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Click Beetles (Coleoptera: Elateridae) of the Southeastern United States

by

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Cover: *Vittathous horni* (Schwarz). Photo taken along the Blue Ridge Parkway near Mt. Mitchell, NC. Photo courtesy of Evan M. Raskin, used with permission.

Contents

About the Author v

Abstract vi

Acknowledgments vii

Introduction 1

Materials and Methods 1
- Morphological Terms 2
- Taxonomic Proposals 2
- Images 3
- Distribution Maps 4
- Collections Studied 4

Elateridae Leach, 1815 7
- Historical Review 7
- Classification and Relationships with Other Taxa 7
- Morphological Characteristics of the Family Elateridae 7
- Ecoregions of the Southeast 8
- Habits and Habitats 9
- Key to the Genera of Elateridae of the Southeast 10

Cebrioninae Latreille, 1802 17
- ***Selonodon*** Latreille, 1834 17

Elaterinae Leach, 1815 31
- Elaterini Leach, 1815 31
  - ***Diplostethus*** Schwarz, 1907 31
  - ***Elater*** Linnaeus, 1758 35
  - ***Orthostethus*** Lacordaire, 1857 37
  - ***Parallelostethus*** Schwarz, 1907 39
  - ***Sericus*** Eschscholtz, 1829 40
- Megapenthini Gurjeva, 1973 43
  - ***Megapenthes*** Kiesenwetter, 1863 43
- Agriotini Laporte de Castelnau, 1840 50
  - ***Agriotes*** Eschscholtz, 1829 50
  - ***Dalopius*** Eschscholtz, 1829 58
- Pomachiliini Candèze, 1859 67
  - ***Idolus*** Desbrochers des Loges, 1875 67
- Synaptini Gistel, 1856 70
  - ***Glyphonyx*** Candèze, 1863 70
- Ampedini Gistel, 1856 83
  - ***Ampedus*** Dejean, 1833 83
- Melanotini Candèze, 1859 112
  - ***Melanotus*** Eschscholtz, 1829 112
- Physorhinini Candèze, 1859 152
  - ***Anchastus*** LeConte, 1853 152
  - ***Physorhinus*** Germar, 1840 159
- Dicrepidiini Candèze, 1859 161
  - ***Blauta*** LeConte, 1853 161
  - ***Dicrepidius*** Eschscholtz, 1829 163
  - ***Dipropus*** Germar, 1839 166

Cardiophorinae Candèze, 1859 174
- ***Cardiophorus*** Eschscholtz, 1829 174
- ***Esthesopus*** Eschscholtz, 1829 183
- ***Floridelater*** Douglas, 2017 187
- ***Horistonotus*** Candèze, 1860 189
- ***Paracardiophorus*** Schwarz, 1895 192

Lissominae Laporte de Castelnau, 1835 194
- ***Drapetes*** Megerle, 1821 194

Oestodinae Hyslop, 1917 199
- ***Bladus*** LeConte, 1861 199
- ***Oestodes*** LeConte, 1853 201

Agrypninae Candèze, 1857 203
- Agrypnini Candèze, 1857 203
  - ***Agrypnus*** Eschscholtz, 1829 203
  - ***Danosoma*** Thomson, 1859 205
  - ***Lacon*** Laporte de Castelnau, 1838 206
  - ***Meristhus*** Candèze, 1857 213
  - ***Rismethus*** Fleutiaux, 1947 214
- Oophorini Gistel, 1856 217
  - ***Aeolus*** Eschscholtz, 1829 217
  - ***Conoderus*** Eschscholtz, 1829 224
  - ***Heteroderes*** Latreille, 1834 244
- Pseudomelanactini Arnett, 1967 246
  - ***Lanelater*** Arnett, 1952 246
- Pyrophorini Candèze, 1863 247
  - ***Deilelater*** Costa, 1975 248
  - ***Ignelater*** Costa, 1975 251
  - ***Pyrophorus*** Billberg, 1820 252
- Hemirhipini Candèze, 1857 253
  - ***Alaus*** Eschscholtz, 1829 253
  - ***Chalcolepidius*** Eschscholtz, 1829 257
  - ***Pherhimius*** Fleutiaux, 1942 259

Pityobiinae Hyslop, 1917 261
- ***Pityobius*** LeConte, 1853 261

Oxynopterinae Candèze, 1857 263
- ***Dixicollis*** Johnson, new genus 263
- ***Melanactes*** LeConte, 1853 265

Dendrometrinae Gistel, 1848 270
- Dendrometrini Gistel, 1848 270

Athous Eschscholtz, 1829 270
Denticollis Piller and Mitterpacher, 1783 . 284
Elathous Reitter, 1890 285
Euplastius Schwarz, 1903 287
Gambrinus LeConte, 1853. 291
Hemicrepidius Germar, 1839 298
Limonius Eschscholtz, 1829 304
Nitidolimonius Johnson, 2008 313
Tetralimonius Etzler, 2019 316
Vittathous Johnson, new genus. 318
Prosternini Gistel, 1856. 320
Acteniceromorphus Kishii, 1955. 321
Actenicerus Kiesenwetter, 1858. 322
Anostirus Thomson, 1859. 324
Brownia Johnson, new genus 325
Corymbitodes Buysson, 1904 327
Hadromorphus Motschulsky, 1859. 329
Laneganus Johnson, new genus. 330
Metanomus Buysson, 1887. 332
Neopristilophus Buysson, 1894. 333
Oxygonus LeConte, 1863 335
Paractenicera Johnson, 2008 337
Proludius Lane, 1971 339
Setasomus Gurjeva, 1985 341
Stropenron Johnson, new genus 342
Sylvanelater Johnson, 2008 344
Tesolasomus Johnson, new genus 346
Hypnoidini Schwarz, 1906 349
Hypnoidus Dillwyn, 1829. 349
Ligmargus Stibick, 1976. 352
Negastriinae Nakane and Kishii, 1956 354
Negastrius Thomson, 1859 354
Neohypdonus Stibick, 1971. 357
Oedostethus LeConte, 1853 358
Paradonus Stibick, 1971. 359
Zorochros Thomson, 1859 363
Literature Cited 365
Appendix 1. Corrections of Historical Records. . 387
Appendix 2. Excluded Species 389
Appendix 3. Checklist of the Elateridae of the Southeast 393
Index 409

About the Author

Blaine Adam Mathison was born and raised in Phoenix and Tempe, Arizona. Ever since his early childhood, he has wanted to pursue a career in something related to natural history: paleontology, zoology, herpetology, entomology, etc. It was in high school where he finally settled on entomology. After graduating high school in 1990, he spent three years at South Mountain Community College. In 1993 he applied to attend the University of Arizona to major in Entomology. He was accepted to Arizona, but the university had just dropped entomology as an undergraduate degree, so he switched to microbiology, having taken a course at the community college and enjoyed it. After graduating from the University of Arizona, he made a brief attempt at graduate school at the Czech Academy of Sciences, České Budějovice, Czech Republic. The studies abroad did not pan out, so Blaine returned to the U.S. and decided to pursue a career in microbiology with an emphasis in parasitology, keeping entomology as an active hobby.

His first major job was as the bacteriologist, parasitologist, and mycologist at the Arizona State Health Laboratory in Phoenix, AZ. He then had a brief stint at the Carl T. Hayden Veterans Affairs Medical Center in Phoenix before being hired by the Centers for Disease Control and Prevention in Atlanta, where he specialized in human parasitology. In 2016, he was recruited by ARUP Laboratories in Salt Lake City, US, where he currently works as an R&D scientist and assists in the diagnostic parasitology laboratory. In the past 20-plus years, he has become a world-renowned expert in medical parasitology. He lectures nationwide and publishes frequently on human parasitology, with specialties in parasite diagnosis, medical entomology, and unusual and zoonotic parasitic diseases. In 2018 he was awarded the Scherago-Rubin Award for Clinical Microbiology by the American Society of Microbiology, which recognizes outstanding bench-level clinical microbiologists involved in routine diagnostic work that have distinguished themselves by excellent performance.

Despite a long career in clinical parasitology, Blaine never lost his love for insects, beetles in particular. His collection habits have varied over the years, everything from Coleoptera of North America, to Coleoptera of Arizona, to scarabaeoids of North America; most of the time his taxonomic focus was in Scarabaeoidea. When he moved to Atlanta to work at the CDC, he found an abundance of scarab workers in the Southeast and wanted to find his own niche. He finally gravitated to click beetles, Elateridae, a family that has received very little attention in recent decades in North America. That interest in elaterids resulted in the work presented herein. He also serves as an editor and curator for BugGuide and iNaturalist for their Elateridae sections. Over the years he has donated most of his specimens to various institutions, and today keeps a semi-synoptic elaterid collection to assist in his work.

Blaine has other interests and hobbies as well. Historically a cyclist and triathlete, he is primarily a runner these days but likes to lift weights as well. He also collects realistic animal models and figures and serves as an administrator for the Animal Toy Forum and editor for the Animal Toy Blog. He also loves baseball and travels around the country visiting stadiums, including those for colleges, Independent Leagues, Minor Leagues, and Major League Baseball; in Atlanta he was a season ticket holder for the Atlanta Braves. In the last year he has also become an avid birder!

Abstract

A ten-year survey of the Elateridae of the southeastern United States (Alabama, Florida, Georgia, Mississippi, North Carolina, South Carolina, Tennessee) is presented, resulting in 286 species. Keys to genera and species are provided. For each species, the following information is given: diagnostic morphologic features, geographic distribution, county and temporal data for specimens examined in the study, and notes on biology and collection methods. Twenty-four species of Elateridae previously recorded in the literature from the Southeast are excluded from the current study, but are briefly discussed as questionable, doubtful, or demonstrably erroneous records or whose taxonomic status is not known. Two-hundred forty-nine new state records are established for 143 species. Twenty-eight species are recorded from the study area for the first time. **New country records** are established for *Anchastus rufiventris* (Florida) and *Pyrophorus mellifluus* (Alabama).

The following taxonomic changes are proposed: *Actenicerомorphus atlas* (Van Dyke, 1932), **new combination**; *Actenicerомorphus crestonensis* (Brown, 1935), **new combination**; *Actenicerомorphus dolorosus* (Van Dyke, 1932), **new combination**; *Actenicerомorphus kaweanus* (Fall, 1937), **new combination**; *Actenicerомorphus sagitticollis* (Eschscholtz, 1829), **new combination**; *Actenicerомorphus sierrae* (Van Dyke, 1943), **new combination**; *Actenicerомorphus tahoensis* (Van Dyke, 1932), **new combination**; *Actenicerомorphus truculentus* (Candèze, 1889), **new combination**; *Actenicerомorphus varius* (Brown), **new combination**; *Actenicerомorphus vulneratus* (LeConte, 1863), **new combination**; *Aeolus lepidus* (LeConte, 1853), **new combination**; *Brownia* Johnson, **new genus**; *Brownia coniungens* (LeConte, 1853), **new combination**; *Brownia copei* (Horn, 1871), **new combination**; *Brownia lecontei* (Candèze, 1881), **new combination**; *Brownia obversa* (Horn, 1871), **new combination**; *Brownia praeses* (Horn, 1871), **new combination**; *Brownia rupestris* (Germar, 1843), **new combination**; *Brownia signaticollis* (Melsheimer, 1846), **new combination**; *Dixicollis* Johnson, **new genus**; *Dixicollis divaricatus* (LeConte, 1853), **new combination**; *Laneganus* Johnson, **new genus**; *Laneganus nunenmacheri* (Van Dyke, 1932), **new combination**; *Laneganus sulcicollis* (Say, 1839), **new combination**; *Proludius angusticollis* (Mannerheim, 1843), **new combination**; *Proludius anthrax* (LeConte, 1861), **new combination**; *Proludius aplastoides* (Van Dyke, 1932), **new combination**; *Proludius capitiosus* (Brown, 1939), **new combination**; *Proludius comes* (Brown, 1939), **new combination**; *Proludius gibsoni* (Lane, 1965), **new combination**; *Proludius humboldti* (Van Dyke, 1932), **new combination**; *Proludius pyrros* (Herbst, 1806), **new combination**; *Proludius protractus* (LeConte, 1859), **new combination**; *Proludius silvaticus* (Van Dyke, 1932), **new combination**; *Proludius tenellus* (Van Dyke, 1932), **new combination**; *Stropenron* Johnson, **new genus**; *Stropenron californica* (Brown, 1936), **new combination**; *Stropenron candida* (Brown, 1936), **new combination**; *Stropenron columbiana* (Brown, 1936), **new combination**; *Stropenron hamata* (Say, 1839), **new combination**; *Stropenron hieroglyphica* (Say, 1839), **new combination**; *Stropenron nigricollis* (Bland, 1864), **new combination**; *Stropenron pallidipes* (Brown, 1936), **new combination**; *Stropenron propola* (LeConte, 1853), **new combination**; *Stropenron pudica* (Brown, 1936), **new combination**; *Tesolasomus* Johnson, **new genus**; *Tesolasomus blanditus* (Brown, 1936), **new combination**; *Tesolasomus deceptor* (Brown, 1936), **new combination**; *Tesolasomus funereus* (Brown, 1936), **new combination**; *Tesolasomus lanei* (Becker, 1949), **new combination**; *Tesolasomus morulus* (LeConte, 1863), **new combination**; *Tesolasomus semivittatus* (Say, 1823), **new combination**; *Tesolasomus sexguttatus* (Brown, 1936), **new combination**; *Tesolasomus sexualis* (Brown, 1935), **new combination**; *Tesolasomus trivittatus* (LeConte, 1853), **new combination**; *Vittathous* Johnson, **new genus**; *Vittathous horni* (Schwarz, 1907), **new combination**; *Vittathous linearis* (Fall, 1910), **new combination**; *Vittathous macer* (Fall, 1910), **new combination**; *Vittathous manisi* (Lane, 1965), **new combination**. Synonymies made here include: *Conoderus perversus* Brown, 1933 is a **new synonym** of *Aeolus scutellatus* (Schaeffer, 1917), *Drasterius curtipennis* Schwarz, 1906 is a **new synonym** of *Aeolus mellillus* (Say, 1834), *Ludius patricius* Van Dyke, 1932 is a **new synonym** of *Vittathous linearis* (Fall, 1910). *Drasterius minor* Schwarz, 1903 is considered *species inquirendum*.

Color photographs are provided to illustrate the habitus or other diagnostic characters for select species. Distribution maps are based entirely on county data from specimens examined in the study. Corrections to previously-published records and a species checklist for the study area are also provided.

Acknowledgments

Glen Griffith (U.S. Geological Survey, Corvallis, OR, USA) supplied the map of southeastern ecoregions. Molly Schnepp (Gainesville, FL, USA) created the template for the distribution maps using Quantum GIS. Michael Krasnobrod and Michele Esposito (California Academy of Sciences, San Francisco, CA) contributed the images of *Dalopius porosus* and *Nitidolimonius appalachius*, respectively. Hume Douglas (Canadian National Collection of Insects, Ottawa, Canada) contributed the image of *Cardiophorus carinatus*. Kyle Schnepp (Florida State Collection of Arthropods, Gainesville, FL, USA) contributed the images of *Aeolus cribratus*, *Alaus myops*, *A. oculatus*, *A. patricus*, *Chalcolepidius viridipilis*, *Deilelater physoderus* (habitus), *Ignelater havaniensis*, *Lanelater sallei*, *Limonius subauratus*, *Liotrichus vulneratus*, *Melanactes morio*, *M. piceus*, *M. puncticollis*, *M. reichei*, *Melanotus difficilis*, *M. prasinus*, *Neohypdonus perplexus*, *Orthostethus infuscatus*, *Oxygonus obesus*, *Parallelostethus attenuatus* (habitus), *Selonodon ferrugineus*, *S. mandibularis* (habitus), *S. medialis*, *S. mississippiensis*, and *S. similis*. Luciana Musetti (C. A. Triplehorn Insect Collection, Ohio State University, Columbus, OH, USA) contributed the image of *Limonius meridianus*.

Brad Barnd (Greenville, IN), Janet Ciegler (West Columbia, SC, USA), John Leavengood (USDA-APHIS-PPQ, Tampa, FL, USA), and Kyle Schnepp kindly tested the keys. Paul Johnson (South Dakota State University, Brookings, SD, USA) and Frank Etzler (Montana Department of Agriculture, Helena, MT) provided literature citations. Frank Etzler and William Warner (Chandler, AZ, USA) reviewed the manuscript prior to submission.

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Click Beetles (Coleoptera: Elateridae) of the Southeastern United States

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Introduction

The cosmopolitan family Elateridae is one of the largest families of Coleoptera, with about 400 genera and over 10,000 species worldwide. Johnson (2002) indicated there were roughly 965 valid species in North America with an estimated 75–100 undescribed species awaiting study. In North America, Elateridae are one of the least-studied of the large families. Members of the family Elateridae are commonly referred to as 'click beetles' for the ability of many members to flip into the air by manipulating their articulated prothorax and corresponding modified mesothorax. The 'jump' is normally initiated when the beetle inserts its prosternal process into the mesosternal fossa. The muscles responsible for the movement build up tension by the friction generated by the contact between the prosternal process and mesosternal fossa. When the prosternal process is released, the stored energy is released, flexing the body ventrally (Evans 1972, 1973; Ribak and Weihs 2011). This clicking mechanism is shared by several other members of the Elateroidea (including Throscidae).

This work is intended to serve as a species identification guide for adult Elateridae in the southeastern United States in hopes of fostering more interest in this exciting families of beetles.

Materials and Methods

The Southeast, as defined here-in comprises the states of Alabama, Florida, Georgia, Mississippi, North Carolina, South Carolina, and Tennessee. A genus-level key is provided initially; species are keyed within a separate key for each genus as it is treated. Subtribes and subgenera may be discussed but are not keyed nor considered with regards to organization. All keys are artificial and pertain only to taxa in the study area. Caution should be used when applying the keys to taxa outside the southeastern United States. Subfamilial and tribal treatment follows Bouchard et al. (2011), with modifications published since then (e.g., Kundrata et al. 2016). Genera within each tribe and species within each genus are listed alphabetically. Suprageneric taxa are given a brief overview, including morphological characteristics and a historical review of the taxon within North America. Unless otherwise noted, range, numbers, and morphological features pertain only to taxa from America north of Mexico. Generic coverage includes a brief synonymy followed by Diagnosis (morphological characters for North American taxa), Range and Numbers (published data, within North America unless otherwise stated), and Discussion (historical review, biology, etc.).

Information provided for individual species is similar to the generic coverage and includes four categories following a brief synonymy: Diagnosis, Distribution, Specimens Examined, and Discussion. The **Diagnosis** section includes the diagnostic morphological features of the adults. Diagnoses apply to males unless otherwise specified. The **Distribution** section describes the known distribution of the species prior to the current study. The type locality is given here if it falls within the study area. **Specimens Examined** lists data from specimens I examined and identified or confirmed. As such, I am solely responsible for any errors in reporting. Unless

otherwise indicated, the locations listed for each state are counties (some areas, such as the Great Smoky Mountains National Park, span multiple counties and determining the precise county is not always possible from label data). Temporal data describes only the month of collection based on label data. The term 'year-round' is used when I have seen specimens collected in all twelve months. Finally, the **Discussion** section includes additional information on the species, including taxonomic information, differentials for identification, collecting methods, biology, and larval habits. Unless otherwise indicated, collection methods and habits are based on label data from specimens collected in the study area.

Morphological Terms

The following terms are briefly explained here to assist the reader. Additional terms specific to a genus may be described later.

Size. The terms small, moderate, and large precede size ranges at the species level. 'Small' refers to those species that are under 10 mm in length. 'Moderate' refers to those species 10–20 mm in length. 'Large' refers to those species greater than 20 mm in length. As such a species 15–25 mm would be indicated as being moderate to large.

Color. Traditional color terms, such as red, red-brown, and yellow-brown, are used in place of terms such as rufous, rufotestaceous, piceus, etc.

Head. The supra-antennal carinae form the frontal ridge that runs between the eyes. The carinae may be 'complete' (uninterrupted, and usually anteriorly directed), incomplete (usually centrally obliterated), and may bend downwards to meet other carinae (e.g. in *Glyphonyx*, Figures 88–90). The relative lengths of antennomeres II–IV are usually provided. The length of the antennae past the apex of the pronotal hind angle is based on the antenna running parallel to the prothorax. When identifying members of the genus *Melanotus*, the nasale and parantennal fovea are helpful characters. The nasale is a rectangular sclerite below the supra-antennal carinae, but above the mouthparts. Parantennal foveae are round to crescent-shaped pits between the nasale and the base of the antennae.

Prothorax. The width of the pronotum, unless otherwise indicated, is measured at the base of the hind angles. The number of carinae on the pronotal hind angles refers to dorsal carinae and does not include the lateral carina separating the pronotum from the hypomeron. The hypomeron is analogous to the propleron, usually resembling a large triangular sclerite on each side of the prosternum when viewed from below (Figure 1). The prosternum and hypomeron are separated by the pronotosternal sutures. The sutures may be 'open' (grooved, usually to receive the antennae) or 'closed'. Sometimes, an additional carina runs alongside the pronotosternal suture, making it appear there are two sutures; this is referred to as 'double'. The prosternal process (Figure 1) may be 'flexed', meaning bent inwards towards the body.

Mesothorax. The mesosternal fossa (Figure 1) receives the prosternal process. If the sides are diverging, they are diverging anteriorly, towards the pronotum. The relationships of the mesepipemeron, mesepisternum, and mesosternum (Figure 1) can be helpful.

Elytron. Counting of elytral striae and intervals starts at the suture.

Legs. Counting of tarsomeres starts at the tibia. Tarsal pads refer to membranous tarsal pads, and not merely setal pads. The presence of basal setae on the tarsal claws can be challenging to interpret; it refers to setae on the actual claw and does not include empodial setae *between* the claws. The claws themselves may be simple, serrate (comb-like, Figure 166), or with a basal flange (Figure 497).

Genitalia. Only male genitalia (aedeagus) are considered. The basal portion is referred to as the basal piece or phallobase. The median lobe (penis) is surrounded on each side by two parameres (lateral lobes). Lateral lobes may have lateral adornments (blade, spine, hook) and may possess or lack apical or pre-apical setae.

Taxonomic Proposals

Herein, Paul Johnson describes new genera of Oxynopterinae, Dendrometrini, and Prosternini and transfers species to new and existing genera of Dendrometrini and Prosternini based on proposed actions in his Ph.D.

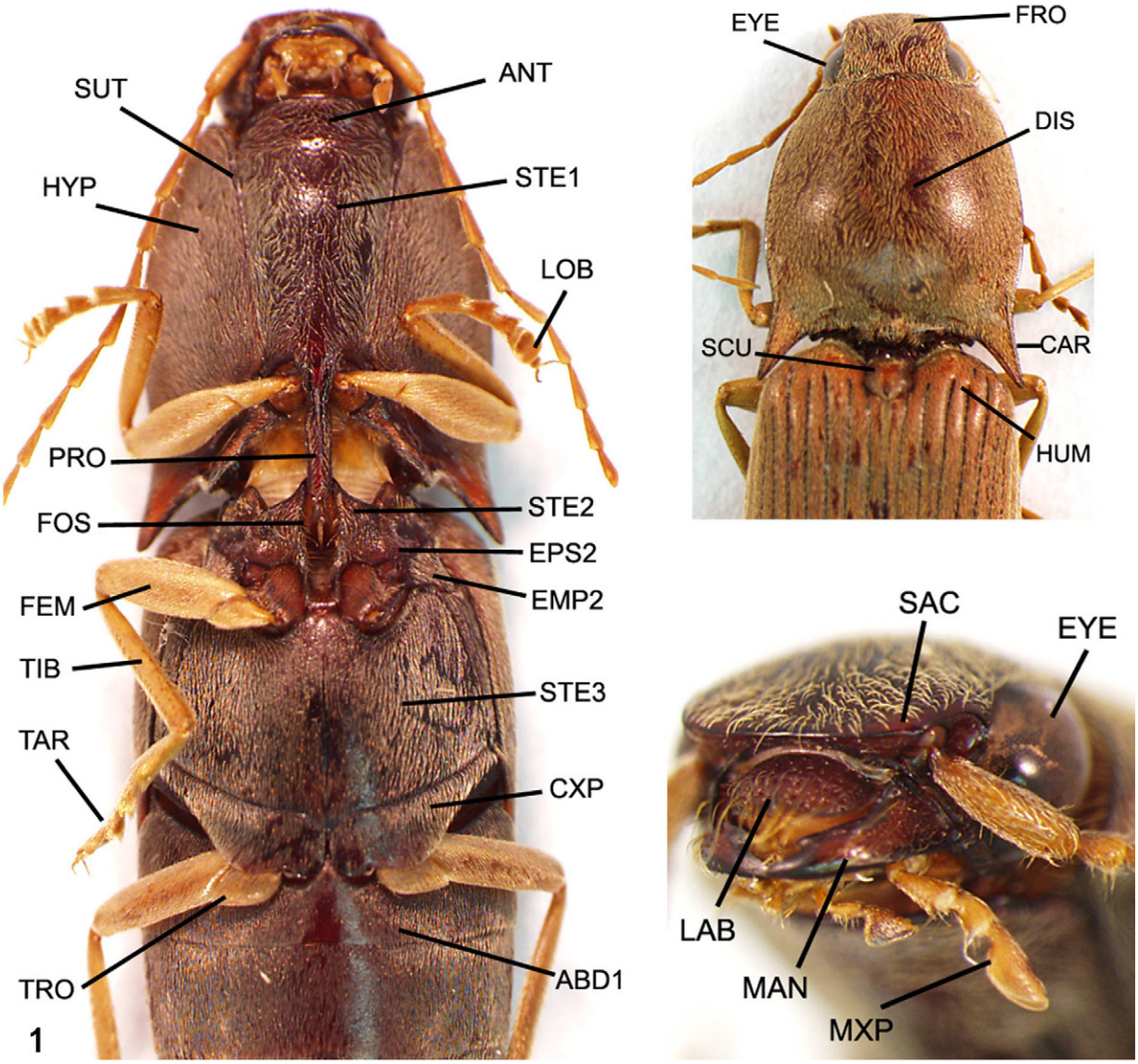


Figure 1. Anatomy of an adult click beetle. **ABD1**, first abdominal sternite; **ANT**, anterior lobe of prosternum; **CAR**, dorsal carina of pronotal hind angles; **CXP**, metacoxal plate; **DIS**, disk of pronotum; **EMP2**, mesepipemeron; **EPS2**, mesepisternum; **EYE**, eye; FEM, femur; **FOS**, mesosternal fossa; **FRO**, frons; **HUM**, humeral/basal area of elytra; **HYP**, hypomeron; **LAB**, labium; **LOB**, membranous lobe on tarsomere; **MAN**, mandible; **MXP**, maxillary palp; **PRO**, prosternal process; **SAC**, supra-antennal carinae (frontal margin); **SCU**, scutellum; **STE1**, prosternum; **STE2**, mesosternum; **STE3**, metasternum; **SUT**, pronotosternal suture; **TAR**, tarsomeres; **TIB**, tibia; **TRO**, trochanter.

thesis (Johnson 1992). Johnson also designates new names and new synonymies in *Aeolus* as presented in the Master of Science thesis of one of his graduate students (Lin 1997). Otherwise, all nomenclatural works through October 2020 have been followed.

Images

Unless otherwise indicated in the Acknowledgements, images were taken by me, using an Olympus DP72 camera attached to an Olympus SZX7 stereomicroscope. Editing of images was done using Adobe Photoshop 7.0. The equipment available to me made making habitus images of larger species difficult, so many of these

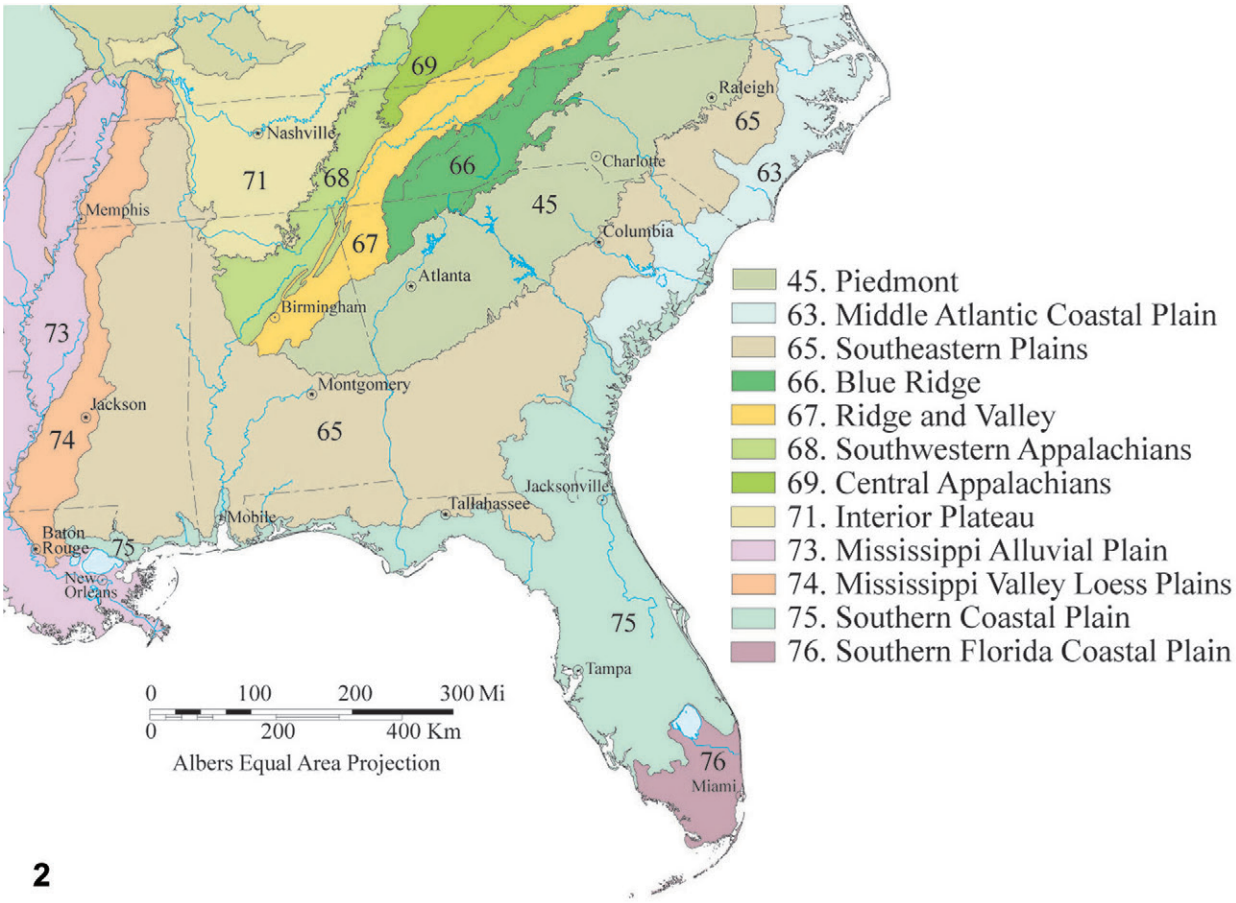


Figure 2. Ecoregions of the Southeastern United States.

images were kindly supplied by colleagues. In addition, images of several rarely or uncommonly collected species were supplied by colleagues.

Distribution Maps

Distribution maps reflect county data based exclusively on specimens I examined in this study. The template for the maps was created using Quantum GIS. Data points and text were added to the maps using Photoshop 7.0.

Collections Studied

Specimens were examined from the following institutional and personal collections collections: **ABS** (Archbold Biological Station Collection, Venus, FL, Mark Deyrup); **AUEM** (Auburn University Museum of Natural History, Auburn, AL, Charles Ray); **BAM** (Blaine A. Mathison personal collection, Salt Lake City, UT), **BYU** (Brigham Young University Insect Collection, Provo, UT, Shawn M. Clark); **CMNH** (Carnegie Museum of Natural History, Pittsburgh, PA, Robert Androw); **CNC** (Canadian National Collection of Insects, Ottawa, Canada, Hume Douglas); **CUAC** (Clemson University Arthropod Collection, Clemson, SC, John Morse); **ECUT** (University of Tennessee, Knoxville, TN, William Klingeman); **FSCA** (Florida State Collection of Arthropods, Gainesville, FL, Paul E. Skelley); **GSAT** (Alabama Museum of Natural History, Tuscaloosa, AL, Milt Ward); **KES** (Kyle E. Schnepp personal collection, Gainesville, FL), **LSAM** (Louisiana State Arthropod Museum, Baton Rouge, LA, Christopher E. Carlton); **MEM** (Mississippi State Museum, Starkville, MS, Terry L. Schiefer); **NCSU** (North Carolina State University Insect Collection, Raleigh, NC, Robert Blinn); **PERC** (Purdue University Insect Collection, West Lafayette, IN, Kyle Schnepp); **TBFWP** (Taylor Brothers Farms Wireworm Project, University of Florida, Gainesville, FL, Lyle J. Buss); **TNTECH** (Tennessee Technological

University Collection, Cookeville, TN, Christopher Brown); **UCFC** (University of Central Florida Collection, Orlando, FL, Shawn Kelly); **UGCA** (University of Georgia Collection of Arthropods, Athens, GA, Joseph McHugh); **UMIC** (University of Mississippi Insect Collection, University, MS, Paul K. Lago); **UTCI** (University of Tennessee Chattanooga Insect Collection, Chattanooga, TN) (Evenhius 2020), as well as the personal collections of Brad Barnd (Greenville, IN); Joshua P. Basham (McMinnville, TN); Mike Brattain (Lafayette, IN); Byron L. Buchli (Deerfield, WI); Janet M. Ciegler (West Columbia, SC); James E. Garrison (Middleburg, FL); Bruce E. Getty (Middleburg, FL); Vincent Golia (Wellington, FL); Kevin R. Hinson (Matthews, NC); Brian D. Holt (Montgomery, AL); John M. Leavengood (Lexington, KY); Will D. Merritt (Clemmons, NC); Roy F. Morris II (Lakeland, FL); Gareth S, Powell (Provo, UT); J. Bo Sullivan (Beaufort, NC); Robert H. Turnbow (Enterprise, AL); Steven M. Valles (Gainesville, FL); James E. Wappes (San Antonio, TX); William B. Warner (Chandler, AZ).

Elateridae Leach, 1815

Historical Review

LeConte (1853) provided the first revision of the family for North America. Horn (1881, 1884) expanded our knowledge of several genera. Van Dyke (1932) keyed many genera and described many new species, especially from western North America. Since the early 1900s, many genera have been reviewed or revised for North America, although several genera are in need of initial or updated revisions. Regional studies for North America include Iowa (Owen and Jacques 1943), the Pacific Northwest (Lanchester 1971; Lane 1971), central Canada (Brooks 1960), Missouri (Smith and Enns 1977, 1978); New York (Dietrich 1945), Wisconsin (Dogger 1959), Pennsylvania (Thomas 1941), northeastern North America (Downie and Arnett 1996), and Atlantic Canada (Majka and Johnson 2008; Webster et al. 2012). For the Southeast, Fattig (1951) published a distributional checklist for the Elateridae of Georgia. Regional state checklists of Coleoptera that include Elateridae are available for North Carolina (Brimley 1938; Wray 1950), Alabama (Löding 1945), South Carolina (Kirk 1969, 1970), and Florida (Peck and Thomas 1998). Becker (1991a, 1991b) discussed and keyed the genera of larvae known at the time.

Classification and Relationships with Other Taxa

Although the family Elateridae is referred to as the 'click beetles,' it belongs to one of two major clades of beetles that exhibit the physical clicking mechanism (Muona 1995; Lawrence et al. 2007). One of these is the eucnemid group, which includes Eucnemidae (including Perothopidae) and Cerophytidae; the other is the elaterid clade which contains Elateridae, sensu Johnson (2002). Two gray areas that remain are the placement of the Throscidae and Anischiidae. Muona (1995) suggested both of these groups belong in the elaterid clade, either as basal families or nested within Elateridae. Muona (1995) suggests that Elateridae without at least some of the throscids are paraphyletic. Lawrence et al. (2007) placed the throscid genus *Aulonothroscus* close to *Cerophytum* (Cerophytidae) in the eucnemid clade and *Anischia* within Eucnemidae proper. The enigmatic Brachypsectridae also appeared to fall within the eucnemid clade. In historical American literature, the cebrionines were treated as an independent family (Cebrionidae) until Lawrence (1988) found evidence of their placement within Elateridae based on adult and larval characters. Buetel's (1995) work using larval characters also supported this. Although it appears that at least some of the throscids may be placed in Elateridae, I am going to remain conservative here and exclude Throscidae from Elateridae. Both the eucnemid and elaterid clades appear to be the sister group to the 'cantharoid' Elateroidea (Cantharidae, Phengodidae, Lampyridae, others).

Lawrence and Newton (1995) divided the family Elateridae into 18 subfamilies on a worldwide basis. The last major treatment for North America was by Johnson (2002), who recognized seven subfamilies. The classification used here follows Bouchard et al. (2011), with the exception of the restoration of Oestodinae by Kundrata et al. (2016), recognizing ten subfamilies in North America: Cebrioninae, Elaterinae, Cardiophorinae, Oestodinae, Lissominae, Agrypninae, Oxynopterinae, Pityobiinae, Dendrometrinae (= Athoinae, including Prosternini and Hypnoidini), and Negastriinae. All ten subfamilies are present in the Southeast.

Morphological Characteristics of the Family Elateridae

Variable in size, ranging from roughly 2.0–60.0 mm in length. Color variable, many yellowish to brown to black, others brightly colored with reds, yellows, and oranges; few metallic coppery or blue-green. Vestiture may be hair-like or scale-like, in the latter often forming distinct patterns of various colors. Head hypognathous or prognathous, usually narrower than prothorax. Eyes moderate to large, hemispherical. Antenna 11- or 12-segmented, filiform to serrate, less commonly pectinate. Frontal margin smooth and flat to strongly transversely carinate. Prothorax freely articulating at junction with mesothorax, subcylindrical to dorsally depressed. Pronotum with lateral edge deplanate and strongly carinate to rounded and ecarinate; punctures sparse to dense, simple to shallow and umbilicate; hind angle usually expanded, with or without carinae; carinae, if present, one or two in number. Hypomeron large, triangular, sometimes with grooves to receive an antenna and/or tarsus. Prosternum with anterior margin truncate or extended and deflexed, forming a distinct lobe. Posterior end of prosternum extended to form a prosternal process that fits into a mesosternal fossa. Prosternum and

proepisternum separated by pronotosternal sutures, which may be single or double, closed or open. Mesosternum reduced, with deep median fossa to receive prosternal process. Scutellum variable, from triangular to pentagonal, ovoid, or cordate, in some emarginate anteriorly and distinctly heart-shaped (cordiform). Metasternum large, subquadrate. Metacoxa nearly approximate, transverse, excavate posteriorly, most with ventral plate or lamina. Abdomen with five visible sternites. Elytron elongate, apex rounded, truncate, dentate, spinose, or bispinose. Metathoracic (flying) wings functional in most. Legs long and slender. Tarsal formula 5-5-5, ventrally setose, sometimes with membranous tarsal pads; claws simple, toothed, or pectinate, with or without basal setae. The external male genitalia (aedeagus) is trilobed, consisting of a phallobase (basal piece), a median lobe that is usually simple and attenuate, and two parameres. The paramere is variable, slender, attenuate or with defined apical blade, variously apically setiferous (Johnson 2002). Females are usually larger and stockier than males and often with shorter antennae; sometimes sexually dimorphic with regards to color. Some species are flightless, in either one (usually female) or both genders.

Ecoregions of the Southeast

Ecoregions often define the distributions of some species. This can be especially true of species that require specific soil types or larval substrates (e.g. pine vs. hardwood) for development. Ecoregions of the United States can be classified into four levels. At Level I, the entire Southeast is in the region known as Eastern Temperate Forests, except for the extreme southern tip of Florida which is classified as Tropical Wet Forests. At Level II, ecological regions have been delineated into areas that give a more detailed description of large ecological regions nested within Level I regions. At this level, the Southeast is only represented by four ecoregions. The next level, Level III, is the level that will be detailed and periodically referred to in this study. Here, the Southeast is represented by 12 Level III ecoregions (Figure 2). Level III ecoregions are smaller and allow for locally defining characteristics to be identified (U.S. EPA 2011).

At the southernmost tip of Florida is the ecoregion known as the Southern Florida Coastal Plain. The ecoregion is frost-free and characterized by flat plains with wet soils, marshes, and swamps with everglades and palmetto prairie vegetation types. Several Caribbean elaterids have been collected in this region (*Conoderus rufidens*, *C. bifoveatus*, *Alaus patricius*, *Dipropus tequesta*, *Physorhinus distigma*, *Ignelater havaniensis*). Most of the remainder of Florida, as well as coastal areas of Mississippi, Alabama, Georgia, and South Carolina, are in the Southern Coastal Plain. It consists of mostly flat plains, but also barrier islands, coastal lagoons, marshes, and swamps. This ecoregion is lower in elevation and has less relief and wetter soils than in the Southeastern Plains. It is warmer, more heterogeneous, has coarser soils, and a longer growing season than the Middle Atlantic Coastal Plain. Once dominated by longleaf pine, slash pine, pond pine, beech, sweetgum, southern magnolia, white oak, and laurel oak, the region is now mostly covered with loblolly and slash pine with oak-gum-cypress forest in lower-lying areas. In northern South Carolina and North Carolina, the coastal areas are part of the Middle Atlantic Coastal Plains. This area consists of low-elevation flat plains, with many swamps, marshes, and estuaries. Forest cover, once dominated by longleaf pine, is now mostly loblolly and shortleaf pine, with patches of oak, sweetgum, and cypress near flowing water. Low terraces, marshes, dunes, barrier islands, and beaches are underlain with unconsolidated sediments. Poorly drained soils are common, and this region has a mix of coarse and finer-textured soils (U.S. EPA 2011). Several elaterids are adapted for the sandy conditions of the coastal plains, including *Floridelater americanus*, *Cardiophorus destinensis*, *C. panamapolis*, *Horistonotus bontai*, *H. pusio*, and *Anchastus fumicollis*.

Moving inland, the coastal plains give rise to the Southeastern Plains. Natural vegetation is predominately longleaf pine, with smaller areas of oak-hickory-pine and Southern mixed forest. The Cretaceous-aged sands, silts, and clays contrast geologically to the older metamorphic and igneous rocks of the Piedmont and the Paleozoic limestone, chert, and shale of the Interior Plateau. Streams are low-gradient and sandy-bottomed. The western border of the Southeastern Plains in Mississippi is bordered by the Mississippi Valley Loess Plain. The ecoregion runs from the Ohio River in western Kentucky to southern Louisiana, running through western regions of Tennessee and Mississippi. It consists primarily of irregular plains, gently rolling hills and bluffs near the Mississippi River. To the east, upland forests are dominated by oak, hickory, and longleaf and loblolly pine.

To the west, mixed and southern mesophytic forests dominate. The Mississippi River itself lies in the Mississippi Alluvial Plain, a broad, flat plain with finely textured and poorly drained soils. Bottomland deciduous forest covered most of the region before much of it was cleared for agriculture (U.S. EPA 2011).

From central Alabama to North Carolina (and beyond), the Southeastern Plains are bordered to the north by an ecoregion known as the Piedmont. This region represents a transitional zone between the mountainous regions to the northwest and the plains. It is a complex mosaic of Precambrian and Paleozoic metamorphic and igneous rocks, with moderately dissected irregular plains and hills. Soils tend to be more finely textured than in Middle Atlantic and Southeastern Plains. Much of the region has reverted to successional pine and hardwood forests. This area is very biodiverse and displays elements of faunas to the north and south (U.S. EPA 2011). *Melanotus*, *Ampedus*, *Lacon*, *Limonius*, *Conoderus*, *Hemicrepidius*, and *Alaus* are common and abundant in this area. The southern portion of the Piedmont is bordered to the north by Ridge and Valley, an ecoregion that cuts north and east between the Appalachian and Blue Ridge Mountains. It is a relatively low-lying, yet diverse, region. As a result of extreme faulting and folding events, the region's roughly parallel ridges and valleys vary greatly in width, depth, and geologic materials, and may include limestone, dolomite, shale, siltstone, sandstone, chert, marble, and mudstone. Modern forests cover roughly 50% of the area (U.S. EPA 2011).

Most of the rest of the Piedmont is bordered to the north by the Blue Ridge Mountains. Elevations vary from low ridges to hilly plateaus to mountains with peaks over 2000 meters in elevation. Slopes are forested, and streams tend to be cool, clear, and high-gradient. The geology is primarily metamorphic rock, with minor areas of igneous rocks and sedimentary soils. The Blue Ridge Mountains are one of the richest centers of biodiversity in the eastern United States (U.S. EPA 2011). Several northern and montane species of elaterids reach their southern distributions here and in the neighboring Appalachians (including several Prosternini, Hypnoidini, Negastriinae, Agriotini, and Dendrometrini). This area contains the Great Smoky Mountains National Park (GSMNP). Clingmans Dome on the North Carolina/Tennessee border of the GSMNP has produced some interesting boreal elements, including *Oxygonus montanus*, *Nitidolimonius resplendens*, and *Megapenthes rogersi*. On the other side of the Ridge and Valley lies the Southwestern and Central Appalachians. The high hills and low mountains are dominated by a mixed mesophytic forest with areas of Appalachian oak and northern hardwood forest; upland forests are dominated by mixed oak and shortleaf pine. To the west of the Appalachians is an ecoregion known as the Interior Plateau. Rock types are distinctly different from coastal plain sediments from the west, and elevations are lower than in the Appalachians to the east. Open hills, irregular plains, and tablelands are made up of Mississippian to Ordovician-aged limestone, chert, sandstone, siltstone, and shale. Natural vegetation is primarily oak-hickory forest, with some areas of bluestem prairie and cedar glades (U.S. EPA 2011).

Habits and Habitats

Elaterids are found in nearly every terrestrial environment in North America. Most adults are phytophagous and consume plant juices. Others are predators on soft-bodied sternorrhynchan hemipterans and their exudates (Johnson 2002). Still others feed on decaying fruit and the fruiting bodies of fungi. Adults are commonly found 'perching' on vegetation, as well as on flowers, in rotting wood, and under bark. Larvae are commonly called 'wireworms' and may be predaceous or phytophagous; some species have been implicated as crop pests. Much of the time, the damage they do to roots and tubers is incidental, as they move through soil searching for prey. Larvae usually live in soil, litter, and rotten wood. All species are terrestrial in the adult and larval stages. Some species are bioluminescent in all stages of development. Adults are most active in the afternoon and evening when temperatures exceed 16°C. Most collection methods for adult terrestrial Coleoptera may be used for collecting elaterids. They can be very abundant at light, especially ultraviolet and mercury vapor lights. Adults perching or resting on vegetation can be collected by beating, sweeping, and hand picking. Many species can also be collected in flight intercept, bait, Lindgren funnel, sticky panels, and pitfall traps. Prying bark of dead or felled trees and examining rotting logs can also be productive.

Key to the Genera of Elateridae of the Southeast

The following key is designed to identify adult elaterids to the genus-level within the study area only. Like any genus-level key for a large family, there are exceptions among some of the genera that may create problems in keying. Several of these are mentioned throughout the key to alert the user of such variations. Caution should be used trying to use the key for specimens from outside the geographic scope of this work. This is particularly important starting at couplet 55, which initiates the part of the key containing the vast majority of Prosternini and the Dendrometrini lacking membranous lobes on the tarsomeres. The key does not account for extremes in sexual dimorphism or uncommon variations (e.g. melanic forms).

1. Tarsal claws pectinate (Figure 166) **2**
— Tarsal claws simple or cleft, never pectinate. **3**

2(1). Inverted V-shaped carina over nasale joining supra-antennal carinae or separated by a short vertical carina; tarsomere IV with membranous lobe; smaller species, most < 5.0 mm in length . . . . . ***Glyphonyx* Candèze**
— Nasale simple, lacking inverted V-shaped carina; tarsomere IV lacking membranous lobe; larger species, all (except *M. insipiens*) > 5.0 mm in length. . . . . ***Melanotus* Eschscholtz**

3(1). Tarsal claws with large basal flange (Figure 497) **4**
— Tarsal claws lacking basal flange **5**

4(3). Larger species, 8.0–11.0 mm in length; elytral margins explanate; often bicolored, black with red-brown elytron . . . . . ***Oxygonus* LeConte**
— Smaller species, 2.5–5.0 mm in length; elytral margins not explanate; body color solid black . . . . . ***Oedostethus* LeConte**

5(3). Antenna 12-segmented, bipectinate in male, serrate in female. . . . . ***Pityobius* LeConte**
— Antenna 11-segmented, form variable. **6**

6(5). Base of pronotum with luminous spots **7**
— Base of pronotum lacking luminous sports **9**

7(6). Apex of elytron spined . . . . . ***Ignelater* Costa**
— Apex of elytron rounded **8**

8(7). Larger species, ≥ 30.0 mm in length; antenna very short, not reaching apex of pronotal hind angle. . . . . ***Pyrophorus* Illiger**
— Smaller species, ≤ 25.0 mm in length; antenna longer, extending to, or beyond, apex of pronotal hind angle. . . . . ***Deilelater* Costa**

9(6). Prosternum truncate anteriorly, exposing mouthparts. **10**
— Prosternum arcuate and lobed anteriorly, covering (mostly) mouthparts **12**

10(9). Basal margin of pronotum entire, lacking basal incisures. . . . . ***Selonodon* Latreille**
— Basal margin of pronotum with prominent incisures **11**

11(10). Pronotum smooth, sparsely punctured; hind angle long, pointed, projecting well beyond base of pronotum . . . . . ***Oestodes* LeConte**
— Pronotum rough, coarsely punctured; hind angle short, broad . . . . . ***Bladus* LeConte**

12(9). At least one tarsomere with a membranous lobe (may be small and inconspicuous) **13**
— All tarsomeres lacking membranous lobes **25**

13(12). Only one membranous tarsal lobe, on tarsomere III *or* IV only. **14**
— Membranous lobes on multiple tarsomeres (II and III, II–IV, I–III, I–IV) **19**

14(13). Membranous lobe on tarsomere III only. **15**
— Membranous lobe on tarsomere IV only. **16**

15(14). Color solid red-brown with yellow-orange macula on frons . . . . . ***Physorhinus*** **Germar**
— Color variable, never as above . . . . . ***Anchastus*** **LeConte**

16(14). No basal setae present on tarsal claws . . . . . ***Esthesopus*** **Eschscholtz**
— Setae present at base of tarsal claws (such setae arise at the base of the claw; do not include empodial setae between the claws) **17**

17(16). Front femur with anteroventral angle carinate; color usually red-yellow with central black pronotal macula and variable dark elytral maculae . . . . . ***Aeolus*** **Eschscholtz**
— Front femur ecarinate; color variable, with or without maculae **18**

18(17). Pronotum subquadrate, with punctures of two types, with large punctures intermixed with smaller ones and interspaces reticulate . . . . . ***Heteroderes*** **Latreille**
— Pronotal punctures of single size (if intermixed small and large, then interspaces shining or pronotum narrowing anteriorly) . . . . . ***Conoderus*** **Eschscholtz**

19(13). Base of hypomeron truncate, not excavate. **20**
— Base of hypomeron excavate, with extension into hind angle (as in Figure 271) **21**

20(19). Mesocoxae widely separated, metasternal process wide . . . . . ***Athous*** **Eschscholtz**
— Mesocoxae approximate, metasternal process narrow . . . . . ***Denticollis*** **Piller and Mitterpacher**

21(19). Size small, < 5.0 mm in length; formal oval to oval-elongate, glabrous . . . . . ***Drapetes*** **Megerle**
— Size variable, usually > 5.0 mm, form elongate, not oval and glabrous. **22**

22(21). Membranous tarsal lobes very small and inconspicuous . . . . . ***Blauta*** **LeConte**
— Membranous tarsal lobes prominent **23**

23(22). Supra-antennal carinae directed down towards plane of labrum . . . . . ***Hemicrepidius*** **Germar**
— Supra-antennal carinae elevated and projecting over labrum **24**

24(23). Inverted, V-shaped carina over nasale; antenna flabellate in male, serrate in female . . . . . ***Dicrepidius*** **Eschscholtz**
— Nasale normal, without carina; antenna serrate in both sexes . . . . . ***Dipropus*** **Germar**

25(12). Vestiture broad, scale-like **26**
— Vestiture slender, hair-like. **32**

26(25). Size small, < 5.0 mm in length **27**
— Size larger, > 5.0 mm in length **28**

27(26). Pronotum narrowed near anterior margin; elytral intervals punctate . . . . . ***Rismethus*** **Fleutiaux**
— Pronotum arcuate and gradually tapering to anterior margin; elytral intervals granulate . . . . . ***Meristhus*** **Candèze**

28(26). Pronotosternal sutures deeply open for reception of antennae **29**
— Pronotosternal sutures closed **31**

29(28). Mesepimeron not forming part of the border for mesocoxal cavity; body broad, robust . . . . . ***Agrypnus*** **Eschscholtz**
— Mesepimeron forming part of border for mesocoxal cavity; body narrow to broad, elongate **30**

30(29). Tarsal claws lacking basal setae; hypomeron lacking tarsal groove . . . . . ***Danosoma*** **Thomson**
— Tarsal claws with basal setae (see couplet 16); hypomeron with or without tarsal groove . . . . . ***Lacon*** **Laporte de Castelnau**

31(28). Meso- and metasternum not fused, joined by a definite suture; pronotum with a pair of eye spots . . . . . ***Alaus*** **Eschscholtz**

— Meso-metasternal suture obsolete or absent; scale-like setae metallic blue-green in color . . . . . ***Chalcolepidius*** **Eschscholtz**

32(25). Scutellum with anterior margin shallowly emarginate to deeply incised, often appearing heart-shaped (Figure 270) **33**

— Scutellum with anterior margin truncate, arcuate, or lobate, shape variable. **35**

33(32). Pronotum with short and obtuse lateral carina at hind angle base, or absent . . ***Horistonotus*** **Candèze**

— Pronotum with fine lateral carina or shallow arcuate groove extending onto hypomeron **34**

34(33). Hypomeron with 90-degree notch at base of hind angle (arrow, Figure 271); elytron immaculate. . . . . ***Cardiophorus*** **Eschscholtz**

— Hypomeron sinuate at base of hind angle (arrow, Figure 272); elytron usually with cream to yellow maculae . . . . . ***Paracardiophorus*** **Schwarz**

35(32). Tarsal claws with basal setae (see couplet 16). **36**

— Tarsal claws lacking basal setae **37**

36(35). Unicolorous; body gray-brown; vestiture yellow-gray, evenly distributed over the body; antenna serrate in both sexes . . . . . ***Lanelater*** **Arnett**

— Multicolored; pronotum red-brown to brown; elytron yellow with irregular dark brown maculae forming a marbled pattern; vestiture yellow, whorled on pronotum, short and decumbent on elytron; antenna pectinate in both sexes. . . . . ***Pherhimius*** **Fleutiaux**

37(35). Mesocoxa closed to mesepisternum and a reduced mesepimeron by connation of mesosternum and metasternum; size small, < 5.0 mm in length **38**

— Mesocoxa open to mesepimeron (and sometimes mesepisternum); size variable, usually > 5.0 mm in length **42**

38(37). Elytron without defined striae. . . . . ***Paradonus*** **Stibick**

— Elytra with defined striae **39**

39(38). Hypomeron with elevated margin along pronotosternal suture (suture appearing 'double') . . . . . ***Zorochros*** **Thompson**

— Hypomeron lacking elevated margin along pronotosternal suture **40**

40(39). Pronotum smooth or microreticulate, shining. . . . . ***Neohypdonus*** **Stibick**

— Pronotum rugose or strigate **41**

41(40). Antenna long in male, reaching mid-body; form pedunculate, with marked constriction at prothorax-mesothorax junction; marked sexual dimorphism, with females broader and having very short antenna that does not reach mid-pronotum; dune specialists restricted to beaches along Gulf Coast . . . . . ***Floridelater*** **Douglas**

— Antenna not reaching apex of pronotal hind angle in either sex; juncture of prothorax and mesothorax broader; no marked sexual dimorphism; more generally distributed (often found in sandy habitats but not restricted to coastal dunes) . . . . . ***Negastrius*** **Thompson**

42(37). Mesepisternum not reaching mesocoxal cavity **43**

— Mesepisternum and mesepimeron reaching mesocoxal cavity **47**

43(42). Hypomeron not emarginate at base, truncate to slightly sinuate **44**

— Hypomeron emarginate at base or with extension into defined hind angle **45**

44(43). Pronotum truncate; pronotosternal sutures never open anteriorly; size small, never more than 10 mm . . . . . ***Tetralimonius*** **Etzler**

— Pronotum usually longer than wide, if as wide as long than pronotosternal sutures open anteriorly; size variable . . . . . ***Limonius*** **Eschscholtz** (in part)

45(43). Large beetles, usually ≥ 20.0 mm in length; color black, often polished . . . . . ***Melanactes*** **LeConte**

— Size smaller, ≤ 10.0 mm in length; color and texture variable. **46**

46(45). Pronotum smooth to micro-reticulate, punctures of one type; supra-antennal carinae complete . . . . . ***Hypnoidus*** **Dillwyn**

— Pronotum rugose and dull, larger punctures intermixed with smaller ones; supra-antennal carinae incomplete . . . . . ***Ligmargus*** **Stibick**

47(42). Head capsule appearing oval and deflexed, frontal margin formed by supra-antennal carinae usually complete but directed downwards and not visible dorsally **48**

— Head capsule appearing flat and prognathous, frontal area formed by supra-antennae carinae complete or not, but directed anteriorly and visible dorsally. **59**

48(47). Pronotosternal sutures open anteriorly **49**

— Pronotosternal sutures closed anteriorly **53**

49(48). Supra-antennal carinae complete across frons **50**

— Supra-antennal carinae incomplete, arcuate anterior, extending along lateral margin of frontoclypeal area **51**

50(49). Size small (≤ 5.5 mm in length); form elongate, subcylindrical; pronotum elongate, often widest anteriorly; elytron black with one each subhumeral and subapical yellow-red macula . . . . . ***Idolus*** **Desbrochers des Logos**

— Size variable, most species > 5.0 mm in length; form usually broader; pronotum wider than long, usually widest at base of hind angle and narrowing anteriorly; color variable . . . ***Ampedus*** **Dejean**

51(49). Lateral margin of pronotum meets anterior margin of pronotosternal suture at opening of suture, forming an acute apex to hypomeron . . . . . ***Agriotes*** **Eschscholtz**

— Lateral margin of pronotum meets anterior margin of pronotosternal suture beyond opening of suture, forming a broadly rounded apex to hypomeron **52**

52(51). Metacoxal plate subequal in width along its length; aedeagus with paramere lacking apical blade or other subapical lateral projection. . . . . ***Sericus*** **Eschscholtz**

— Metacoxal plate narrowing laterally; aedeagus with paramere usually possessing apical blade or other subapical lateral projection or tooth . . . . . ***Dalopius*** **Eschscholtz**

53(48). Supra-antennal carinae complete across frons, although directed downwards . . . . . ***Megapenthes*** **Kiesenwetter**

— Supra-antennal carinae incomplete **54**

54(53). Antennomeres IV–X filiform; metacoxal plate nearly subparallel width along length . . . . . ***Dolerosomus*** **Motschulsky**

— Antennomeres IV–X serrate; metacoxal plate gradually dilated inwards. **55**

55(54). Sides of mesosternal fossa parallel and nearly horizontal along its entire length (Figure 28) . . . . . ***Parallelostethus*** **Schwarz**

— Sides of mesosternal fossa diverging and sloping posteriorly **56**

56(55). Prosternal process declivous immediately behind procoxae (Figure 26) . . . . . ***Diplostethus*** **Schwarz**

— Prosternal process flat behind procoxae (Figure 27). **57**

57(56). Sides of mesosternal fossa protruding and suddenly declivous anteriorly; elongate, red-brown species . . . . . ***Orthostethus*** **Lacordaire**

— Sides of mesosternal fossa divergent and gradually declivous anteriorly; robust, black species . . . . . ***Elater*** **Linnaeus**

59(47). Frontal area with prominent triangular depression; supra-antennal carinae compete, well-elevated above clypeus . . . . . ***Elathous*** **Reitter**

— Frontal area lacking prominent triangular depression; supra-antennal carinae complete or not, if complete often weak **60**

60(59). Hypomeron not emarginate at base, truncate to slightly sinuate . . . . ***Limonius*** **Eschscholtz** (in part)

— Hypomeron emarginate at base or with extension into defined hind angle **61**

61(60). Pronotosternal sutures open anteriorly **62**

— Pronotosternal sutures closed anteriorly **63**

62(59). Form broad, robust; pronotum wider than long, hind angle divergent, strongly unicarinate; antenna short, not reaching apex of pronotal hind angle . . . . . ***Hadromorphus*** **Motschulsky**

— Form subcylindrical; pronotum longer than wide to subquadrate, hind angle subparallel to slightly divergent, unicarinate, carina usually weak; antenna reaching or extending beyond apex of pronotal hind angle (except in *G. plebejus*) . . . . . ***Gambrinus*** **LeConte**

63(61). Head, pronotum, and elytron strongly metallic coppery, green, blue, or purple . . . . . ***Nitidolimonius*** **Johnson**

— Color variable, entire dorsum never colored as above **64**

64(63). Elytron vittate, brown-yellow with longitudinal dark maculae forming defined stripes **65**

— Elytron color variable, never vittate with contrasting yellow-brown and dark stripes **67**

65(64). Form robust; pronotum about as long as wide, color red with hind angles, all margins, and elongate central black macula black . . . . . ***Tesolasomus*** **Johnson, new genus**

— Form elongate; pronotum slender, longer than wide, colored brown-yellow with paired elongate dark maculae to nearly black with yellow hind angle, never colored as above **66**

66(65). Pronotum usually brown-yellow with two longitudinal dark maculae (rarely black with yellow hind angle), hind angle elongate, slender, often carinate (carina weak); flagellar antennomeres normal basally. . . . . ***Euplastius*** **Schwarz**

— Pronotum black with yellow hind angle, hind angle broadly triangular, ecarinate; flagellar antennomeres narrowed and lacking setae basally . . . . . ***Vittathous*** **Johnson, new genus**

67(64). Pronotum red with elongate, oval, central black macula; elytron usually black (if pale, unicolored) **68**

— Pronotum unicolored (may be dark with pale hind angle); elytron various **69**

68(67). Pronotal hind angle short, stout; elytron with striae deep and distinctly punctured; flagellar antennomeres strongly serrate, triangular; smaller species ≤ 11.0 mm . . . ***Brownia*** **Johnson, new genus**

— Pronotal hind angle elongate; elytron with striae feebly impressed; flagellar antennomeres weakly serrate, longer than wide; larger species, ≥ 12 mm . . . . . ***Acteniceromorphus*** **Kishii**

69(67). Color black, elytron orange-red with two large round black maculae, one sub-medial and one subapical, scutellar area also black; flagellar antennomeres strongly serrate . . . . ***Anostirus*** **Thomson**

— Color variable, never as above; flagellar antennomeres variable **70**

70(69). Pronotum medially canaliculate, groove extending at least along half the length of the pronotum. . **71**

— Pronotum not medially canaliculate (faint basal impression may be present). **77**

71(70). Flagellar antennomeres strongly serrate, with extension of posteroventral angle; large, polished black beetles . . . . . ***Neopristilophus*** **Buysson**

— Flagellar antennomeres weakly to moderately serrate, without extension of posteroventral angle; size and color variable. **72**

72(71). Elytron yellow with dark apical lunule, when elytra closed forming heart-shaped apical patch . . . . . ***Stropenron*** **Johnson, new genus**

— Elytron uniformly red-brown to nearly black **73**

73(72). Pronotum subparallel, gradually widening to anterior margin, glabrous, nearly devoid of vestiture, median groove well-pronounced and complete, lateral margins well-visible dorsally; color uniform dark red-brown . . . . . ***Laneganus*** **Johnson, new genus**

— Pronotum arcuate medially or subparallel and narrowing anteriorly, vestiture dense and wiry; color dark red-brown to nearly black (elytron may be paler) **74**

74(72). Pronotum about as long as wide, broadly arcuate medially . . . . . ***Metanomus*** **Buysson**

— Pronotum as long or longer than wide, subparallel or gradually narrowing anteriorly **75**

75(74). Form elongate; pronotum slender, distinctly longer than wide; color black, legs (and occasionally elytron and pronotal hind angles) reddish . . . . . ***Paractenicera*** **Johnson**

— Form broad to subcylindrical; pronotum as long or slightly longer than wide, subparallel or gradually narrowing anteriorly; color nearly black with bronzed or metallic luster **76**

76(75). Form broad; pronotum widest at base of hind angle, gradually narrowing anteriorly; antenna not reaching apex of pronotal hind angle; vestiture on elytron forming distinct patches . . . . . ***Actenicerus*** **Kiesenwetter**

— Form subcylindrical; pronotum subparallel along most of its length; antenna extending beyond apex of pronotal hind angle; vestiture on elytron evenly distributed . . . . . ***Sylvanelater*** **Johnson**

77(70). Pronotal hind angle ecarinate **78**

— Pronotal hind angle carinate (may be short and/or weak) **79**

78(77). Pronotum longer than wide, widest medially, hind angle broadly rounded . . . ***Corymbitodes*** **Buysson**

— Pronotum wider than long, trapezoidal, hind angle strongly divergent and subacute. . . . . ***Dixicollis*** **Johnson, new genus**

79(77). Form elongate, slender; pronotum slender, distinctly longer than wide, antenna extending beyond apex of pronotal hind angle; color red-brown, legs same color as body. . . . . ***Proludius*** **Lane**

— Form broad; pronotum subquadrate; antenna not reaching apex of pronotal hind angle; color black with red legs . . . . . ***Setasomus*** **Gurjev**

Cebrioninae Latreille, 1802

The subfamily Cebrioninae is represented in America north of Mexico by two tribes, Cebrionini and Aplastini. Aplastini contains three genera distributed in the Southwest, from Texas to California (Johnson 2002). Cebrionini contains two genera, *Scaptolenus* LeConte and *Selonodon. Scaptolenus* is distributed from Arizona to Louisiana; *Selonodon*, the only genus present in the study area, is distributed from North Carolina west to Arizona and Utah (Galley 1999). Historically, Cebrioninae were given family rank in North America until Lawrence (1988) provided evidence of its placement in Elateridae based on adult and larval characters. Adults are moderate to large in size, usually varying shades of brown in color. Pubescence is evident, often long (especially around pronotum). Mouthparts prognathous; labrum at least partly visible, concealed beneath clypeus, or apparently absent; free, membranous or separated by suture; mandibles elongate. Antenna 11- or 12-segmented, filiform, serrate, pectinate, bipectinate, plumose, or biplumose. Side of pronotum more or less straight or sinuate; hind angle obtuse to acute, often narrowly so. Hypomeron lacking groove to receive antenna or front tarsus. Anterior edge of prosternum not produced anteriorly. Prosternal process complete, parallel or narrowed apically. Metacoxal plate well-developed. Five, six, or seven visible abdominal sternites. Elytron complete. Metathoracic wings functional for flight in males. Aedeagus symmetrical; paramere without apical blade. Female generally larger than male, with shorter antennae and usually flightless.

Adult males are usually collected at lights, often in large numbers in emergence flights during and following summer rains. Known females are apparently flightless and usually remain on the ground, leaving the soil briefly to attract males. Large congregations of cebrionines on the ground after a summer rain may yield hundreds of males and only a couple females (Werner 1969).

Selonodon Latreille, 1834

Selonodon Latreille, 1834: 163
Boscia Leach, 1824: 37 (nec Leach 1815: 435; nec Schweigger 1819: tab. iv; nec Férussac 1822: 145)
Anachilus LeConte, 1861: 175
Seledodon Chevrolat, 1874: 534 (misspelling)
Selenedon Chevrolat, 1874: 534 (misspelling)
Selenodon Chevrolat, 1874: 535 (misspelling)
Solenodon Chevrolat, 1874: 534 (misspelling)

Diagnosis. Form elongate, nearly parallel-sided. Pubescence short and usually sparse. Head quadrate, about as wide as long. Labrum short, broad, trapezoidal. Mouthparts hypognathus; mandibles broad, angular, not capable of closure beneath labrum. Antenna 11-segmented, serrate. Pronotum wider than long, quadrate, apex weakly arcuate to arcuate; hind angles short. Prosternal process very narrow to broad. Elytron rounded apically; striae well-developed; in male covering tergum VII, last two abdominal segments exposed in females. Metathoracic wings fully developed in both sexes. Tibia with two stout apical spurs, inner spur longer than outer spur. Protibia dilated apically into blunt 'tibial scoop.' Tarsomeres II–IV densely pilose ventrally but lacking membranous lobes; claws simple, without basal setae. Aedeagus with paramere lacking apical blade. Known females similar to male but generally larger and stouter and with much shorter antennae, rarely extending past mid-pronotum.

Range and Numbers. The genus *Selonodon* contains 25 species distributed from the southeastern states west to Arizona and Utah (Galley 1999). There are 16 species recorded from the Southeast.

Discussion. *Selonodon* was revised by Galley (1999). Cladistic analysis showed 23 of the 25 species fall into one of six species groups, with two of uncertain affinities. The shape of the aedeagus defines the species groups, as well as being diagnostic at the species level. Other important diagnostic characters include the shape of the mandible and frons, the shape of the clypeolabral suture (a suture running along the width of the front of the head that separates the clypeus and the labrum), the shape of the prosternum and prosternal process, elytral

color, and density of elytral punctures. There is marked sexual dimorphism. Females tend to be larger than males and their antennae are shorter, failing to attain the tip of the pronotal hind angles. Also, in females the last two abdominal segments are usually exposed, whereas in males the elytra cover the abdomen. Elytral punctures are also smaller and sparser in females. Geographical distribution, habitat, and temporal data can also be useful for identifying species.

Collection records show that most adults are active in the summer from May to August, with different species having different peak periods (Galley 1999). Adults remain underground until heavy rains cause them to emerge for mating flights. These flights may occur during the day or night and are short-lived (Galley 1999). The females emerge, but do not fly, so when large numbers of specimens are collected at light during these emergences, they are males. Females are best collected by looking for large aggregations of males near the ground. Galley's (1999) revision is the best reference for this genus. Little is known about the habits of the larvae and Galley (1999) suggested they are subterranean root feeders. Skelley (2001) observed that larvae use an eversible cervical membrane for burrowing. The following key and subsequent text draws largely from Galley (1999). Despite Galley's excellent revision, members of this genus are not easily identified. Some characters, such as degree of curvature of the clypeolabral suture and width of prosternal process, are open to personal interpretation. Having reference material can be a valuable asset to identifying *Selonodon* spp. The locality of collection is also important, as many species are geographically restricted. Size ranges given are those of the left elytron, also per Galley's work.

Key to the species of *Selonodon* in the Southeast
(adapted from Galley 1999)

1. Prosternal process narrow to extremely narrow (Figure 3) **2**
— Prosternal process moderately narrow to broad (Figure 4) **4**

2(1). Antennomere II longer and cylindrical; pronotum and elytra very dark brown, almost black; central Florida . . . . . ***S. archboldi* Galley**
— Antennomere II shorter; pronotum and elytra light to rust brown **3**

3(2). Mandible very long, slender, even width in basal two thirds; posterior half of pronotum, anterior half of elytra and appendages light brown with anterior half of pronotum and posterior half of elytra darker, rust brown; central Florida . . . . . ***S. mandibularis* (LeConte)**
— Mandible shorter, wider compared to length; pronotum and elytra rust to dark brown; southwestern Alabama to southeastern Louisiana . . . . . ***S. medialis* Galley**

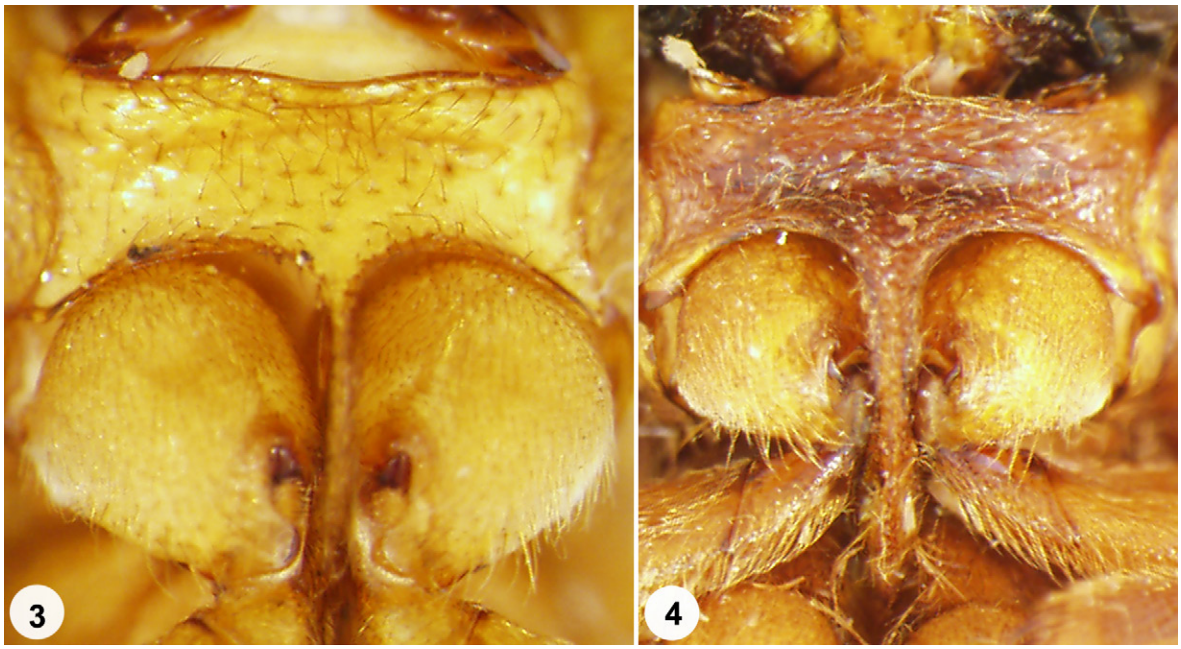
4(1). Clypeolabral suture straight or only slightly curved; pronotal pubescence sparse **5**
— Clypeolabral suture curved; pronotal pubescence long and dense **7**

5(4). Aedeagus with median lobe constricted basally; western Tennessee . . . . . ***S. papillatus* Galley**
— Aedeagus with median lobe subparallel **6**

6(5). Mandible slender at base; southeastern Alabama . . . . . ***S. obscurus* Galley**
— Mandible broad at base; eastern Tennessee . . . . . ***S. orestes* Galley**

7(4). Clypeolabral suture strongly curved **8**
— Clypeolabral suture only slightly curved **10**

8(7). Pronotum and elytron rust brown; antenna exceeding hind angle of pronotum by 1–2 antennomeress; northwestern Florida. . . . . ***S. santarosae* Galley**
— Pronotum and elytron dark brown; antenna exceeding hind angle of pronotum by approximately 1 antennomere. **9**



Figures 3–4. Characteristics of the prosternal process of *Selonodon* spp. **3)** *S. mandibularis*. **4)** *S. appalachiensis*.

9(8). Meso- and metathoracic tarsomeres II–IV moderately short; aedeagus with median lobe moderately stout; central Florida. . . . . ***S. floridensis*** **Galley**

— Meso- and metathoracic tarsomeres II–IV very short; aedeagus with median lobe more or less slender; southern Georgia to northern Florida . . . . . ***S. simplex*** **(LeConte)**

10(7). Prosternal process moderately narrow; pronotum and elytron light to rust brown; southern Georgia to northern Florida . . . . . ***S. ferrugineus*** **Galley**

— Prosternal process broad; pronotum and elytron brown to dark brown **11**

11(10). Aedeagus with apex of median lobe blunt, very broadly rounded; southern Blue Ridge Mountains. . . . . ***S. appalachiensis*** **Galley**

— Aedeagus with apex of median lobe more narrowly rounded. **12**

12(11). Antenna extending beyond apex of pronotal hind angle by at least 3 antennomeres; northeastern Alabama, northwestern Georgia. . . . . ***S. perplexus*** **Galley**

— Antenna extending beyond apex of pronotal hind angle by 1–2 antennomeres **13**

13(12). Aedeagus with fused area of median lobe elongate, median lobe with or without short chitin rod. . . . . ***S. mississippiensis*** **Galley**

— Aedeagus with fused area of median lobe short, median lobe without chitin rod. **14**

14(13). Aedeagus with fused area of median lobe very short; Tennessee. . . . . ***S. gracilis*** **Galley**

— Aedeagus with fused area of median lobe moderately short to slightly elongate **15**

15(14). Aedeagus with median lobe moderately long and moderately stout; antenna extending beyond apex of pronotal hind angle by at least 2 antennomeres; southeastern North Carolina to northeastern Georgia . . . . . ***S. bicolor*** **(Fabricius)**

— Aedeagus with median lobe very elongate and slender; antenna extending beyond pronotal hind angle by 1 antennomere; northern Florida . . . . . ***S. similis*** **Galley**

Selonodon appalachiensis Galley, 1999

Figures 4, 5, 9

Selonodon appalachiensis Galley, 1999: 19

Diagnosis. Size large, elytron length 12.6–15.6 mm. Color dark brown to very dark brown. Labrum without excavation; clypeolabral suture moderately curved, nearly V-shaped. Antenna 11-segmented, serrate, extending beyond apex of pronotal hind angle by 2–3 antennomeres; antennomere II shorter than III. Prosternum moderately narrow; prosternal process moderately broad. Elytron densely punctate, punctures large. Aedeagus with median lobe stout, elongate, slightly widened at base, tapering to broad, very bluntly rounded apex; parameres relatively slender. Female unknown.

Distribution. Known only from the Blue Ridge Mountains in extreme southwestern North Carolina, northwestern South Carolina and northeastern Georgia (Galley 1999). The type locality is Stephens County, GA.

Specimens Examined. North Carolina (Macon); **South Carolina** (Pickens). June–July. (Figure 9)

Discussion. This species is in the *bicolor* group of Galley (1999). Adults are active July to August (Galley 1999).

Selonodon archboldi Galley, 1999

Figures 6, 7, 9

Selonodon archboldi Galley, 1999: 15

Diagnosis. Size moderate, elytron length 9.4–11.4 mm. Pronotum and elytra very dark brown, almost black. Mandible moderately slender and angular. Labrum usually lacking excavation; clypeolabral suture distinct but slightly curved. Antenna 11-segmented, serrate, extending beyond apex of pronotal hind angle by at least three antennomeres; antennomere II long and cylindrical, III long, subconical to cylindrical. Prosternum narrow; prosternal process very narrow; anterior angle broad, tapering to apex. Elytron densely punctate, punctures small. Aedeagus with median lobe stout, elongate, widening to obtusely rounded apex, chitin rod absent; parameres slender, apices slightly widened. Female (Figure 7) with broader pronotum and shorter antennae than male.

Distribution. Recorded only from a couple localities in Highlands County, Florida (Galley 1999). The type locality is the Archbold Biological Station at Lake Placid, FL.

Specimens Examined. Florida (Highlands, Polk). May–June. (Figure 9)

Discussion. This species is in the *estriatus* group of Galley (1999). Adults are active late May to early June. The female has not been formally described. The above observations are based on a specimen (BAM, Figure 7) from Polk County, FL.

Selonodon bicolor (Fabricius, 1801)

Figures 12, 14

Cebrio bicolor Fabricius, 1801: 14

Diagnosis. Size moderate to large, elytron length 11.2–14.4 mm. Pronotum and elytra rusty brown to brown. Labrum with or without shallow, V-shaped excavation; clypeolabral suture moderately curved. Antenna 11-segmented, serrate, extending beyond apex of pronotal hind angle by 2–3 antennomeres; antennomere II shorter than III. Prosternum moderately narrow; prosternal process moderately narrow to moderately broad. Elytron densely punctate, punctures moderately large and often round. Aedeagus with median lobe stout, moderately elongate; shape variable, ranging from narrow to broad at base, gradually narrowing to acute apex. Female unknown.



Figures 5–8. *Selonodon* spp. **5)** *S. appalachiensis* (habitus). **6)** *S. archboldi* (male habitus). **7)** *S. archboldi* (female habitus). **8)** *S. ferrugineus* (habitus). *Selonodon ferrugineus* photo courtesy Kyle Schnepp (Florida State Collection of Arthropods, FDACS-DPI, Gainesville, FL, USA).

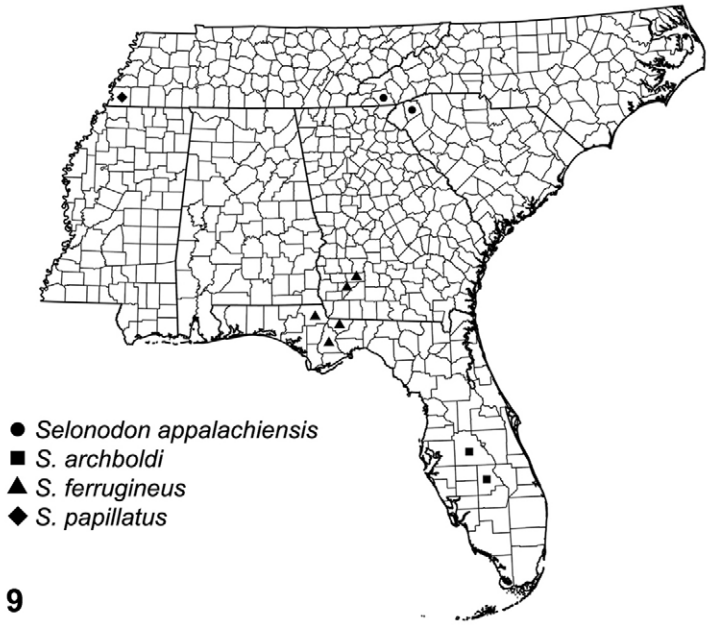


Figure 9. Distributional data for *Selonodon appalachiensis*, *S. archboldi*, *S. ferrugineus*, and *S. papillatus*.

Distribution. Currently known from North Carolina, South Carolina, and eastern Georgia (Galley 1999). Records from Alabama (Löding 1945) and Florida (Leng 1920; Frost 1969) most certainly represent species undescribed at the time.

Specimens Examined. **North Carolina** (Bladen, Columbus, Cumberland, Harnett, Montgomery, Moore, New Hanover, Richmond, Scotland); **South Carolina** (Aiken, Barnwell, Calhoun, Clarendon, Dillon, Florence, Lee, Lexington). May–July, September. (Figure 14)

Discussion. This species is in the *bicolor* group of Galley (1999). Distribution records in Galley (1999) show this species seems to be restricted to the Southeastern Plains and Southern Coastal Plains of Georgia, North Carolina, and South Carolina.

Selonodon ferrugineus Galley, 1999

Figures 8, 9

Selonodon ferrugineus Galley, 1999: 22

Diagnosis. Size large, elytron length 11.9–15.0 mm. Pronotum brown, anterior two-thirds darker; elytra rusty-brown. Labrum variable; clypeolabral suture moderately curved. Antenna 11-segmented, serrate, extending beyond apex of pronotal hind angle by one antennomere or less; antennomere III short to elongate, longer than II. Prosternum moderately broad; prosternal process moderately narrow to narrow, tapering slightly. Elytron densely to very densely punctate, punctures large. Aedeagus with median lobe stout, elongate, narrowed basally, widened medially, tapering to acutely rounded apex. Female similar to male in characters of head and prothorax; antenna not reaching apex of pronotal hind angle.

Distribution. The Florida Panhandle and southwestern Georgia (Galley 1999). The type locality is Spring Creek in Decatur County, GA.

Specimens Examined. **Florida** (Gadsden, Jackson, Liberty); **Georgia** (Baker, Decatur, Dougherty). May–July. (Figure 9)

Discussion. This species is in the *bicolor* group in Galley (1999). It appears to be restricted to Southeastern Plains and Southern Coastal Plains in northern Florida and southern Georgia.

Selonodon floridensis Galley, 1999

Figures 11, 14

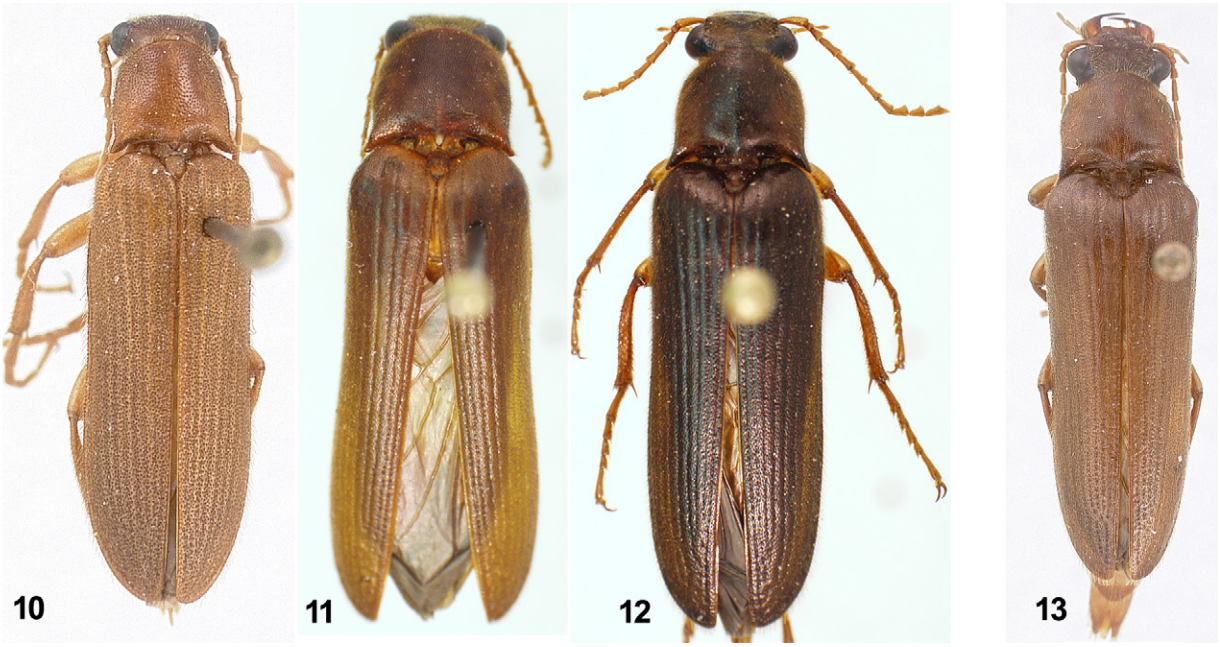
Selonodon floridensis Galley, 1999: 20

Diagnosis. Size moderate to large, elytron length 10.7–14.4 mm. Pronotum and elytra dark brown. Outer margin rounded; clypeolabral suture strongly curved. Antennae 11-segmented, serrate, extending beyond apex of pronotal hind angle by 1–2 antennomeres; antennomere II short, III moderately long. Prosternum moderately narrow; prosternal process moderately broad, slightly tapering. Elytron densely punctate, punctures small. Aedeagus with median lobe slender to stout, moderately elongate, shape variable, ranging from evenly broad to slightly widened medially, tapering to acutely rounded apex. Female similar to male externally except antenna very short, not reaching mid-length of pronotum; elytron sparsely punctate, punctures small.

Distribution. Distributed throughout central Florida (Galley 1999). The type locality is Oneco in Manatee County, FL.

Specimens Examined. **Florida** (Alachua, Hernando, Liberty, Manatee, Marion, Seminole). May–August. (Figure 14)

Discussion. This species is in the *bicolor* group of Galley (1999). Adults are active May through August and have been collected at ultraviolet light.



Figures 10–13. *Selonodon* spp. **10)** *S. medialis* (habitus). **11)** *S. floridensis* (habitus). **12)** *S. bicolor* (habitus). **13)** *S. mississippiensis* (habitus). *Selonodon medialis* and *S. mississippiensis* photos courtesy Kyle Schnepp (Florida State Collection of Arthropods, FDACS-DPI, Gainesville, FL, USA).

Selonodon gracilis Galley, 1999

Figure 14

Selonodon gracilis Galley, 1999: 18

Diagnosis. Size moderate to large, elytron length 12.0–13.7 mm. Pronotum and elytra dark brown. Labrum very broad with small, shallow, V-shaped excavation; clypeolabral suture moderately curved. Antennae 11-segmented, serrate, extending beyond apex of hind angle of pronotum by 2–3 antennomeres; antennomere II short; III moderately long. Apex of pronotum weakly arcuate; sides more or less straight from base to apex; densely punctate, punctures large. Prosternum broad; prosternal process broad to very broad throughout its entire length. Elytron moderately densely punctate, punctures small. Aedeagus with median lobe slender, very elongate, more or less evenly broad along entire length, apex slightly constricted, somewhat rounded, chitin rod absent; fused area very short. Female unknown.

Distribution. Northern Alabama and central Tennessee (Galley 1999). The type locality is Columbia in Maury County, TN.

Specimens Examined. **Tennessee** (Davidson). No date. (Figure 14)

Discussion. This species is in the *bicolor* group of Galley (1999). Adults are active late June to early July.

Selonodon mandibularis (LeConte, 1863)

Figures 3, 15, 17, 19

Anachilus mandibularis LeConte, 1863: 86

Diagnosis. Size moderate, elytron length 7.8–11.3 mm. Posterior half of pronotum, anterior half of elytra light brown; anterior half of pronotum and posterior half of elytra rust brown; appendages light brown. Labrum with or without shallow excavation; clypeolabral suture often faint or absent, when present more or less straight.

Mandible very long and slender. Antenna 11-segmented, serrate, extending beyond apex of pronotal hind angle by about four antennomeres; antennomere II short; III moderately short. Apex of pronotum arcuate, sides slightly rounded from base to apex. Prosternum narrow; prosternal process very narrow. Elytron very densely punctate, punctures small. Aedeagus (Figure 17) with median lobe slender, short, apex acute; fused area short. Female head, prothorax, and color similar to those of male; labrum lacks excavation; clypeolabral suture distinct; mandible long but of normal width; antenna do not reach apex of pronotal hind angle.

Distribution. Northern and central Florida (Horn 1881; Dozier 1918; Leng 1920; Frost 1969; Peck and Thomas 1998; Galley 1999). The type locality is Florida (not further restricted). Records of this species prior to Galley (1999) from outside of Florida probably represent species undescribed at the time. I have examined the specimens (GSAT) that were the bases of Löding's (1945) record from Mobile County, AL and have identified them as *S. mississippiensis*. Additional records of this species by Brimley (1938) from North Carolina and Kirk (1970) from South Carolina were not available for study. Galley (1999) examined specimens from CUAC where many of the Kirk specimens are housed and may have corrected that record during her revision.

Specimens Examined. Florida (Alachua, Citrus, Hernando, Highlands, Hillsborough, Lake, Levy, Manatee, Marion, Orange, Polk, Putnam, Seminole, Sumter). May–August. (Figure 19)

Discussion. This species is in the *speratus* group of Galley (1999). Adults are active May–August. Specimens in the study area have been collected at ultraviolet light and in Malaise traps.

I have examined series of specimens (BAM, KES, MEM) from the Ohoopee Dunes system in Tattnall and Emanuel counties, Georgia (Figures 19) that appear very similar to specimens of *S. mandibularis*. In general, the Georgia specimens are slightly smaller than Florida specimens (Figure 16). The color and external morphological features are nearly identical to *S. mandibularis*, as are the shape of the free portions of the parameres and the median lobe (Figure 18). There are only slight differences where the parameres and median lobe connect basally, and these differences appear variable within each population. I am hesitant to declare the Georgia populations a new species based on this one small physical difference. The Ohoopee Dunes system is a similar habitat to many of those where Florida specimens of *S. mandibularis* were collected, and the Georgia populations could just represent a relict population, with the slight size difference representing clinal variation. More collecting should be done in southern Georgia to see if one or both morphotypes occur in intermediate locations and can connect the Florida and Georgia populations.

Selonodon medialis Galley, 1999

Figures 10, 14

Selonodon medialis Galley, 1999: 10

Diagnosis. Size moderate, elytron length 8.4–11.7 mm. Color rust to dark brown. Labrum with or without swallow emargination; clypeolabral suture usually distinct, more or less straight. Antenna 11-segmented, serrate extending beyond apex of pronotal hind angle by three antenomeres; antennomere II short, III long, subconical. Prosternum narrow; prosternal process moderately to very narrow. Elytron densely punctate, punctures very large. Aedeagus with median lobe elongate, somewhat slender, apex elongate, acutely rounded; fused area moderately elongate. Only one female specimen currently known, and it lacks antennae (Galley 1999); otherwise, color, head, prothorax similar to male, differing only in being slightly larger.

Distribution. Known from southern Louisiana, Mississippi, and Alabama (Galley 1999). The type locality is Mobile in Mobile County, AL.

Specimens Examined. Alabama (Baldwin, Mobile); **Mississippi** (Forrest, Stone). May–August. (Figure 14)

Discussion. This species is in the *speratus* group of Galley (1999). Adults are active May–August.

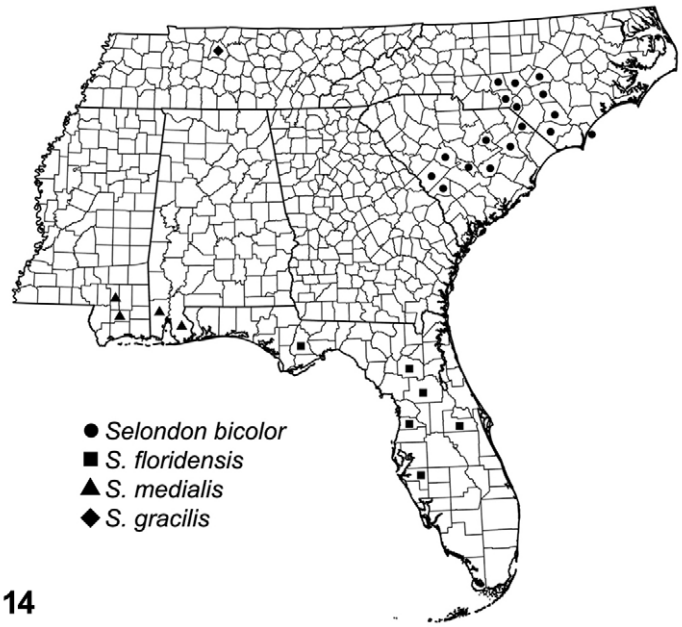


Figure 14. Distributional data for *Selonodon bicolor*, *S. floridensis*, *S. medialis*, and *S. gracilis*.

Selonodon mississippiensis Galley, 1999

Figures 13, 19

Selonodon mississippiensis Galley, 1999: 23

Diagnosis. Size large, elytron length 12.0–13.7 mm. Color brown to dark brown. Labrum with variable excavation; clypeolabral suture moderately curved. Antennae 11-segmented, serrate, extending beyond apex of pronotal hind angle by at least two antennomeres; antennomere II short, III moderately long. Prosternum moderately narrow; prosternal process moderately broad along entire length, occasionally tapering to narrow. Elytron densely to very densely punctate, punctures large. Aedeagus with median lobe stout, elongate, shape variable, from narrowed at base and tapering to apex to evenly broad along entire length, apex broadly to acutely rounded, short chitin rod usually present; fused area elongate. Female larger than male, antenna failing to reach apex of pronotal hind angle.

Distribution. Currently known from Mississippi and Alabama (Galley 1999). The type locality is Lucedale in George County, MS. Löding's (1945) records of *S. mandibularis* from Mobile County, AL pertain to this species.

Specimens Examined. Alabama (Baldwin, Marengo, Mobile); **Mississippi** (Calhoun, Chickasaw, Forrest, George, Granada, Harrison, Jackson, Jones, Lafayette, Lee, Lowndes, Marshall, Monroe, Oktibbeha, Panola, Pontotoc, Stone, Tishomingo, Warren, Wayne, Webster, Winston). June–August. (Figure 19)

Discussion. This species is in the *bicolor* group of Galley (1999). Adults are active June–August. Specimens from Jackson County, MS (MEM) were collected on pecan.



Figures 15–18. *Selonodon* spp. **15)** *S. mandibularis* (habitus). **16)** *S.* cf. *mandibularis* (habitus). **17)** *S. mandibularis* (aedeagus). **18)** *S.* cf. *mandibularis* (aedeagus). *Selonodon mandibularis* (habitus) photo courtesy Kyle Schnepp (Florida State Collection of Arthropods, FDACS-DPI, Gainesville, FL, USA).

Selonodon obscurus Galley, 1999

Figures 19, 20

Selonodon obscurus Galley, 1999: 17

Diagnosis. Size moderate to large, elytron length 11.0 mm. Color dark brown. Labrum broad with broad, very shallow excavation. Mandible moderately slender. Clypeolabral suture distinct, slightly curved. Antenna 11-segmented, serrate, extending beyond apex of pronotal hind angle by at least three antennomeres; antennomere II short, III moderately long. Prosternum moderately broad; prosternal process moderately broad, tapering slightly. Elytron densely punctate, punctures moderately large. Aedeagus with median lobe moderately elongate, evenly broad along entire length, apex acutely rounded, chitin rod absent; fused area moderately elongate. Female unknown.

Distribution. Currently only known from Houston and Dale counties in southeastern Alabama (Galley 1999). The type locality is near Columbia in Houston County, AL.

Specimens Examined. Alabama (Dale). June. (Figure 19)

Discussion. This species is in the *depressifrons* group of Galley (1999). Adults are active June and July.

Selonodon orestes Galley, 1999

(not illustrated)

Selonodon orestes Galley, 1999: 25

Diagnosis. Size moderate, elytron length 12.2–12.8 mm. Color rust to agate brown. Labrum very broad, with or without small, shallow excavation. Mandible very broad, somewhat curved. Clypeolabral suture distinct, somewhat curved. Antenna 11-segmented, serrate, extending beyond apex of pronotal hind angle by

three antennomeres; antennomere II short, III moderately elongate. Prosternum moderately narrow; prosternal process moderately narrow along entire length. Elytra sparsely punctate, punctures small. Aedeagus with median lobe slender, elongate, gradually tapering to apex, apex acutely rounded, chitin rod present; paramere slender; fused area short. Female unknown.

Distribution. Currently only known from the type locality in Cumberland County, TN near the Crab Orchard Mountains (Galley 1999).

Specimens Examined. None.

Discussion. This species is one of those not assigned to a species group by Galley (1999). Adults are active in August.

Selonodon papillatus Galley, 1999

Figure 9

Selonodon papillatus Galley, 1999: 16

Diagnosis. Size moderate, elytron length 12.2–12.3 mm. Color dark brown. Labrum with or without shallow excavation. Antenna 11-segmented, serrate, extending beyond apex of pronotal hind angle by about three antennomeres; antennomere II short, III long. Prosternum moderately narrow; prosternal process broad, tapering slightly. Elytron densely punctate, punctures small. Apex with median lobe elongate, stout, widened medially, tapering to apex, apex constricted, somewhat nipple-like, acutely rounded; fused area elongate. Female unknown.

Distribution. Currently only known from Madison and Shelby counties in western Tennessee (Galley 1999). The type locality is Jackson in Madison County, TN.

Specimens Examined. Tennessee (Shelby). July. (Figure 9)

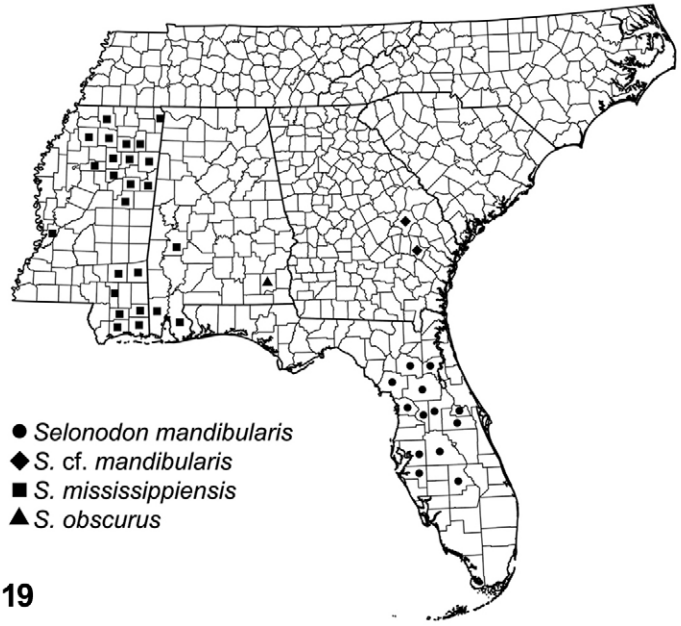


Figure 19. Distributional data for *Selonodon mandibularis*, *S.* cf. *mandibularis*, *S. mississippiensis*, and *S. obscurus*.



Figures 20–22. *Selonodon* spp. **20)** *S. obscurus* (habitus). **21)** *S. perplexus* (habitus). **22)** *S. simplex* (habitus).

Discussion. This species is in the *depressifrons* group of Galley (1999). Adults are active June and July.

Selonodon perplexus Galley, 1999

Figure 21, 25

Selonodon perplexus Galley, 1999: 20

Diagnosis. Size large, elytron 12.5–15.5 mm. Color dark to very dark brown. Labrum with broad, shallow emargination. Clypeolabral suture moderately curved. Shallow depression between eyes. Antenna 11-segmented, serrate, extending beyond apex of pronotal hind angle by 3–4 antennomeres; antennomere II short, III moderately long. Prosternum moderately narrow; prosternal process broad to very broad, tapering slightly. Elytron densely punctate, punctures relatively large. Aedeagus with median lobe elongate, slender, narrowed basally and widened medially, tapering to apex, apex more or less rounded; paramere narrowed basally, somewhat widened apically; fused area short. Female unknown.

Distribution. Central and northern Alabama, northwestern Georgia, and southeastern Tennessee (Galley 1999; Chatzimanolis et al. 2020). The type locality is Helena in Shelby County, AL.

Specimens Examined. **Alabama** (Bibb, Blount, DeKalb, Elmore, Jefferson, Lee, Tallapoosa, Tuscaloosa, Wilcox); **Georgia** (Dade, **Henry**, Meriwether, Upson, Walker). May–September (Figure 25).

Discussion. This species is in the *bicolor* group of Galley (1999). Adults are active in May–September. Specimens in the study area have been collected at light and in Malaise traps.

Selonodon santarosae Galley, 1999

Figures 23, 25

Selonodon santarosae Galley, 1999: 21

Diagnosis. Size moderate, elytron length 10.0–12.8 mm. Color light to rust brown. Labrum lacking excavation, outer margin more or less straight. Clypeolabral suture strongly curved. Shallow depression between eyes. Mandibles relatively slender at base. Antenna 11-segmented, serrate, extending beyond apex of pronotal hind angle by 1–2 antennomeres; antennomere II short, III relatively long, weakly subconical. Prosternum moderately narrow; prosternal process moderately narrow. Elytron densely punctate, punctures moderately large and round. Aedeagus with median lobe short, stout, shape variable, ranging from narrow to stout at base, gradually tapering to apex, apex more or less acutely rounded; paramere relatively stout and evenly straight along entire length; fused area relatively elongate. Female unknown.

Distribution. Currently known only from the western panhandle of Florida (Galley 1999). The type locality is Pensacola in Escambia County, FL.

Specimens Examined. **Florida** (Okaloosa, Santa Rosa). June–July. (Figure 25)

Discussion. This species is in the *bicolor* group of Galley (1999). Adults are active June and July.

Selonodon similis Galley, 1999

Figures 24, 25

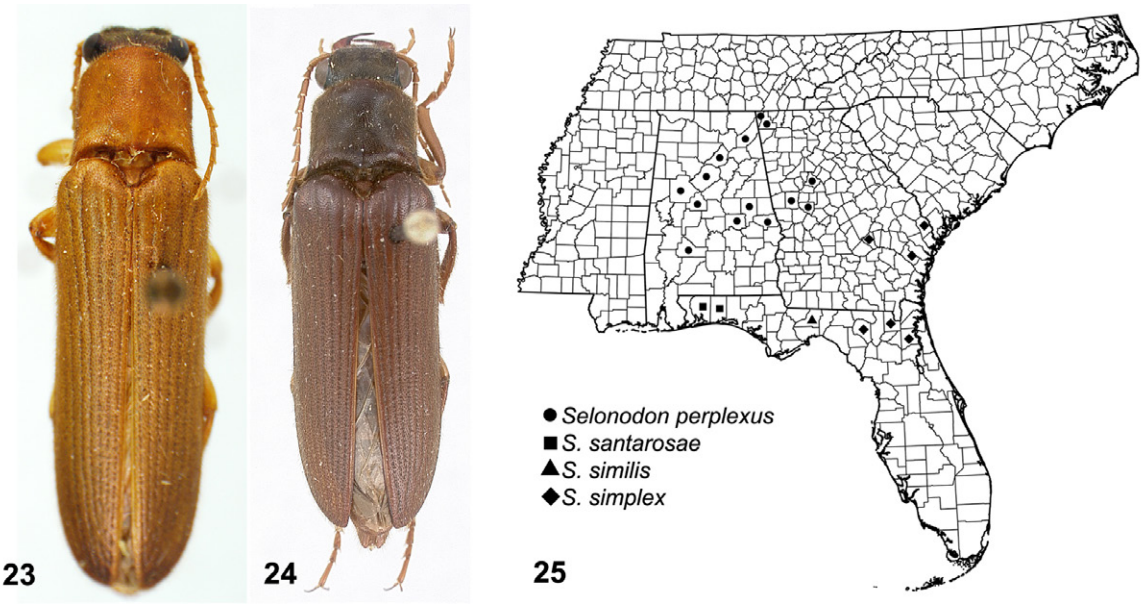
Selonodon similis Galley, 1999: 23

Diagnosis. Size moderate to large, elytron length 11.2–14.7 mm. Color brownish grey to very dark brown. Labrum usually with outer margin more or less straight; excavation usually small and shallow if present. Clypeolabral suture moderately curved. Antenna 11-segmented, serrate, extending beyond apex of pronotal hind angle by 2–3 antennomeres; antennomere II short, III moderately elongate. Prosternum moderately broad; prosternal process broad, tapering slightly. Elytron densely punctate, punctures large. Aedeagus with median lobe slender, elongate, slightly widened medially, tapering to apex, apex acutely rounded; fused area short. Female unknown.

Distribution. Currently known only from Leon County, FL (Galley 1999). The type locality is the Tall Timbers Research Station.

Specimens Examined. Florida (Leon). June–July. (Figure 25)

Discussion. This species is in the *bicolor* group of Galley (1999). Adults are active late June and July.



Figures 23–25. *Selonodon* spp. **23)** *S. santarosae* (habitus). **24)** *S. similis* (habitus). **25)** Distributional data for *S. perplexus*, *S. santarosae*, *S. similis*, and *S. simplex*. *Selonodon similis* photo courtesy Kyle Schnepp (Florida State Collection of Arthropods, FDACS-DPI, Gainesville, FL, USA).

Selonodon simplex (LeConte, 1853)

Figure 22, 25

Cebrio simplex LeConte, 1853: 503
Cebrio confusus LeConte, 1853: 504

Diagnosis. Size moderate to large, elytron length 11.7–13.6 mm. Color agate to dark brown. Outer margin of labrum straight to slightly rounded, lacking excavation. Clypeolabral suture strongly curved. Antenna 11-segmented, serrate, extending beyond apex of pronotal hind angle by one antennomere; antennomere II short, III moderately long. Prosternum moderately broad; prosternal process moderately broad along entire length. Elytron densely punctate, punctures large. Tarsomeres II–IV on mesotarsi and metatarsi very short. Aedeagus with median lobe slender, elongate, widened slightly medially, tapering to apex, apex acutely rounded; paramere slender; fused area elongate. Female unknown.

Distribution. Northern Florida and southern Georgia (LeConte 1853; Leng 1920; Galley 1999). The type localities for both *S. simplex* and *S. confusus* are indicated as being from Georgia (not further restricted).

Specimens Examined. Florida (Baker, Clay, Suwannee); **Georgia** (Effingham, Long, Wheeler). May–July. (Figure 25)

Discussion. This species is in the *bicolor* group of Galley (1999). Adults are active May–July. Specimens in the study area have been collected at ultraviolet light and in Malaise traps.

Elaterinae Leach, 1815

The tribal classification used here is based on Bouchard et al. (2011) and recognizes nine tribes in North America, all of which have been recorded from the Southeast. Johnson (2002) recognized four tribes, placing Pomachiliini and Synaptini as subtribes in Agriotini and Melanotini, Dicrepidiini, and Physorhinini as subtribes in Ampedini. Adults are variable at the subfamily level. Head capsule deflexed, mouthparts inferior. Antenna 11-segmented; antennomere II usually small; III variable; IV–X filiform to flabellate. Pronotum with hind angle usually carinate, one or two carinae may be present. Pronotosternal sutures open or closed. Mesocoxa open to both mesepimeron and mesepisternum. Meso- and metasternum not fused, joined by a definite suture. Tarsomeres with or without membranous lobes; claws usually simple (serrate in Synaptini and Melanotini), without basal setae.

Elaterini Leach, 1815

The tribe Elaterini is represented in the US and Canada by eight genera; all but *Mulsanteus* Gozis and *Campylomorphus* Jacquelin du Val occur in the Southeast. The tribe was last revised for North America by Roache (1961). In that paper, *Mulsanteus* was referred to as *Neotrichophorus* and *Dolerosomus* was regarded as a synonym of *Sericus*. Schimmel and Tarnawski (2010) published a monograph for the subtribe Elaterina on a worldwide basis. Johnson (2018b) transferred *Diacanthus serricornis* Mannerheim to *Campylomorphus*, adding the previously Palearctic genus to the North American fauna.

The characters of the male genitalia help support the unity of these seven genera into a tribal unit (Roache 1961). Adults are usually large, moderately convex and robust species (*Dolerosomus* are smaller and more elongate). Antennomere II small; antennomere III is either subequal to II or intermediate between II and IV; antennomeres beyond III are usually serrate. Supra-antennal carinae incomplete, directed down towards labrum. Pronotum ranges from being subquadrate to longer than wide. Pronotosternal sutures closed or open anteriorly. Differences in the prosternal process and mesosternal fossa are usually used to define and separate the genera. Metacoxal plates usually gradually dilated inwards (nearly equal width along length in *Dolerosomus*). Abdomen with five visible sternites. Tarsomeres without membranous lobes; claw simple, without basal setae. Aedeagus with median lobe usually elongate, parallel or widened midway, gradually or abruptly narrowing to apex, often deflexed at apex; paramere without apical blade but apically setose. Females are usually larger and stouter than males, and with shorter antennae.

Diplostethus Schwarz, 1907

Diplostethus Schwarz, 1907: 252

Diagnosis. Moderate to large body size; form elongate, moderately convex, moderately robust. Color brown to nearly black. Head rounded in front and directed downwards. Antenna 11-segmented, serrate, variable in length; antennomeres II and III short. Pronotum subquadrate, convex, sides parallel to slightly converging towards anterior; densely umbilicately punctate; hind angles carinate. Pronotosternal sutures closed anteriorly. Prosternal process gradually to strongly declivous immediately behind procoxae, in some species forming an acute tooth; subapical tooth present. Mesosternal fossa gradually declivous throughout length, raised on sides. Metacoxal plate broad laterally, bent inward and broadly rounded submedially. Elytron distinctly, but not deeply striated; elytral suture closed throughout entire length. Tarsomeres without membranous lobes; claw simple, without basal seta. Aedeagus with paramere lacking apical blade. Females similar to males, although often larger and more robust and with shorter antennae.

Range and Numbers. There are three species of *Diplostethus* in the United States, ranging from Virginia to California (Roache 1961; Schimmel and Tarnawski 2010; Johnson 2018a). One species is known from the Southeast.

Discussion. Roache (1961) included two species in this genus, *D. peninsularis* (Champion) and *D. opacicollis* Schaeffer, distributed in the southwestern United States and adjacent Mexico. Schimmel and Tarnawski (2010) transferred *Neotrichophorus carolinensis* and *N. texanus* LeConte from *Mulsanteus* to *Diplostethus*. Schaeffer (1916b), when describing *D. opacicollis*, noted similarities between that species and *D. texanus*, but kept them in separate genera based on the level of declivity on the prosternal process. Johnson (2018a) re-evaluated the criteria used to separate *D. peninsularis* and *D. opacicollis*, and determined the former is restricted to the Baja Peninsula, removing it from the U.S. fauna.

Diplostethus carolinensis (Schaeffer, 1916)

Figures 26, 29, 30

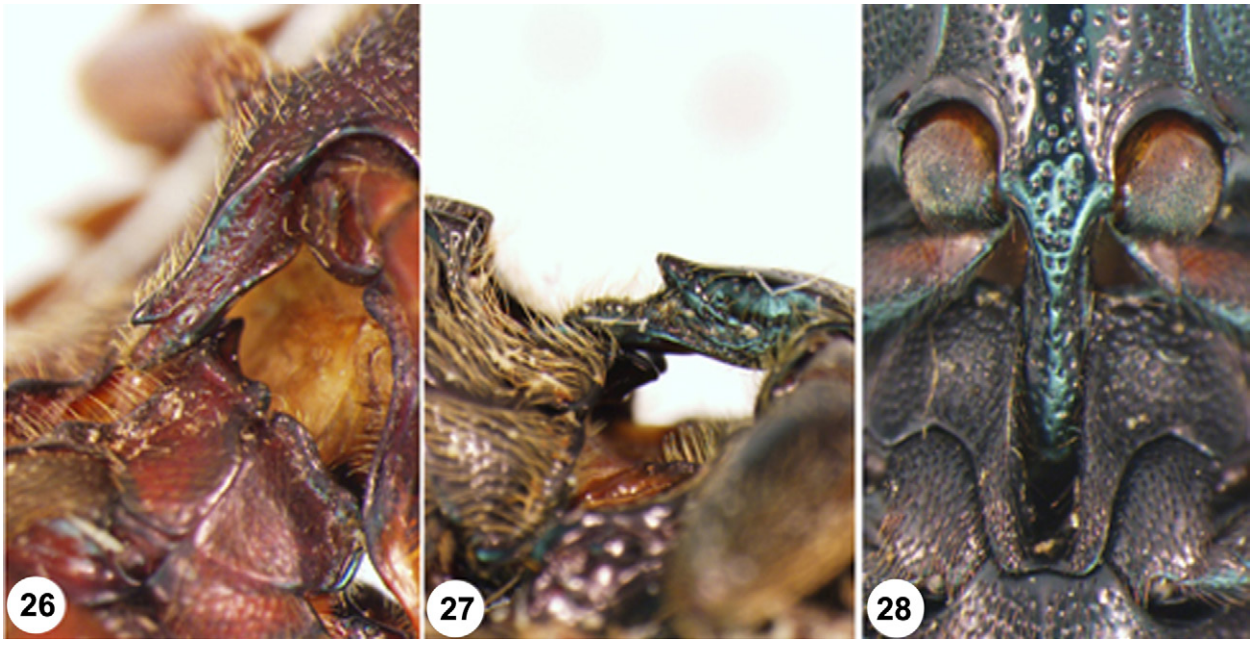
Neotrichophorus carolinensis Schaeffer, 1916b: 261
Crigmus hepaticus of authors, not Germar, 1824

Diagnosis. Moderate to large body size, length 14.0–20.0 mm, form elongate, slightly to moderately robust. Color reddish-brown to brown. Antenna 11-segmented, moderately serrate, extending beyond apex of pronotal hind angle; antennomeres II and III short. Pronotum slightly wider than long, nearly quadrate, subparallel on basal two-thirds; densely umbilicately punctate; hind angle unicarinate. Prosternal process gradually declivous immediately behind procoxa; subapical tooth acute. Mesosternum moderately punctate, moderately clothed with long, medium setae. Metasternum sparsely punctate, sparsely clothed with medium setae. Elytron distinctly striated, rounded at apex. Abdomen moderately punctate, clothed with medium setae. Aedeagus with median lobe long, stout; parameres subparallel, truncate, broadly rounded apically; phallobase with heavy chitinous borders and a median u-shaped unsclerotized area. Female similar to males, but usually larger, more robust, and with shorter antennae.

Distribution. Eastern United States, from Virginia south and west to Texas (Roache 1961). In the current area, it's been recorded from Alabama, Florida, Georgia, Mississippi, North Carolina, and South Carolina (LeConte 1853; Hyslop 1915b; Schaeffer 1916b; Leng 1920; Brimley 1938; Fattig 1951; Roache 1961; Richmond 1968; Kirk 1969, 1970; Peck and Thomas 1998; Lago et al. 2002; Schimmel and Tarnawski 2010; Deyrup and Deyrup 2012). The type locality is Southern Pines in Moore County, NC.

Specimens Examined. Alabama (Autauga, Baldwin, Coffee, Dallas, Elmore, Houston, Jefferson, Mobile, Monroe, Shelby, Tallapoosa, Washington); **Florida** (Alachua, Baker, Bay, Brevard, Broward, Charlotte, Citrus, Clay, Columbia, Desoto, Dixie, Duval, Escambia, Franklin, Hernando, Highlands, Hillsborough, Jackson, Lee, Leon, Levy, Liberty, Marion, Miami-Dade, Monroe, Nassau, Okaloosa, Orange, Palm Beach, Pinellas, Polk, Putnam, Santa Rosa, Sarasota, Seminole, Suwannee, Taylor, Volusia, Wakulla, Walton, Washington); **Georgia** (Brantley, Burke, Camden, Charlton, Chatham, Clarke, Clinch, Cook, Decatur, Emanuel, Glynn, Hart, Lee, Liberty, Long, Lowndes, McIntosh, Mitchell, Montgomery, Tattnall, Taylor, Wayne); **Mississippi** (Bolivar, Claiborne, Harrison, Madison, Oktibbeha, Wilkinson); **North Carolina** (Beaufort, Bladen, Brunswick, Carteret, Columbus, Duplin, Forsyth, Johnson, Moore, New Hanover, Sampson, Scotland, Wayne); **South Carolina** (Aiken, Barnwell, Beaufort, Berkeley, Calhoun, Charleston, Chesterfield, Clarendon, Colleton, Hampton, Horry, Greenville, Kershaw, Lee, Pickens, Richland, Sumter). April–September. (Figure 30)

Discussion. This species is common in the study area and has been collected by a variety of methods, most commonly at ultraviolet and mercury vapor lights. Specimens have also been collected in Malaise, dung, and Lindgren funnel traps. Fattig (1951) reported specimens being collected on persimmon in Richmond County, GA. Deyrup and Deyrup (2012) reported it from the flowers of saw palmetto (*Serenoa repens*) in Highlands County, FL.



Figures 26–28. Comparison of the prosternal process and mesosternal fossa of Elaterini. **26)** *Diplostethus carolinensis*. **27)** *Orthostethus infuscatus*. **28)** *Parallelostethus attenuatus*.

Dolerosomus Motschulsky, 1859

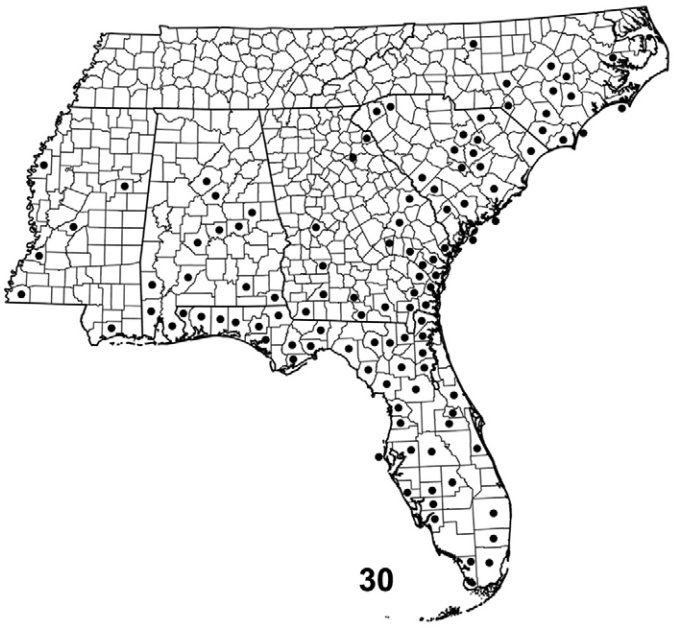
Dolerosomus Motschulsky, 1859: 32

Diagnosis. Relatively small body size, form elongate. Color pale brown to dark brown, nearly black; legs, pronotal hind angles, and base of elytra often lighter than rest of body. Antenna 11-segmented, filiform, extending beyond apex of pronotal hind angle; antennomeres II and III subequal, combined shorter than IV. Pronotum with lateral margins slightly sinuate anterior to posterior angles, converging very slightly anteriorly; densely punctate, punctures umbilicate; hind angle slightly diverging, carinate, carina diverging anteriorly from lateral margin. Pronotosternal sutures closed. Prosternal process broad, flat throughout length; ventrally margined to apex; apex rounded. Mesosternal fossa moderate, subparallel. Metacoxal plate nearly equal width throughout length. Elytron deeply striated; strial punctures large. Tarsomeres without membranous lobes; claw simple, without basal setae. Aedeagus with paramere lacking apical blade. Female externally similar to male, but generally more robust and with a more broadly rounded pronotum and shorter antennae.

Range and Numbers. Johnson (2002) indicated there are three Nearctic species. Lane (1971) recognized two species in the Pacific Northwest, one of which, *D. debilis* (LeConte), is considered a synonym of *D. silaceus* here, following Roache (1961). *Dolerosomus silaceus* is the only species recorded from the Southeast.

Discussion. *Dolerosomus* has a complicated taxonomic history in North America. Roache (1961) considered *Dolerosomus* a synonym of *Sericus*. Lane (1971) considered *Dolerosomus* a valid genus in his coverage of the Elateridae of the Pacific Northwest and recognized two species, *D. debilis* and *D. blaisdelli* (Van Dyke). Brown (1934) and Becker (1956) both considered *D. blaisdelli* a member of *Sericus*. Roache (1961) considered *Sericomus debilis* a synonym of *D. silaceus* but did not mention the status of *D. blaisdelli*. Johnson (2002) indicated there are three Nearctic species but did not list the species he considered valid. Only one species, *D. silaceus*, is known from the Southeast. The taxonomy of this species follows Roache (1961).





Figures 29–30. *Diplostethus carolinensis*. **29)** Habitus. **30)** Distributional data.

Dolerosomus silaceus (Say, 1825)

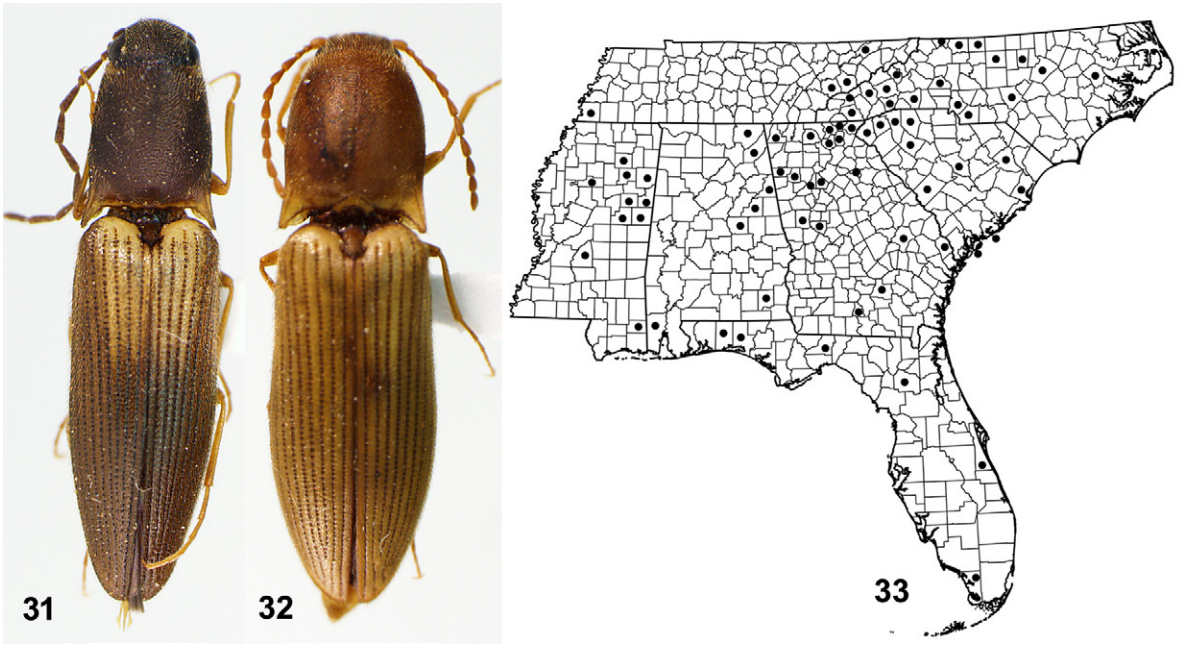
Figures 31, 32, 33

Elater silaceus Say, 1825: 260
Atractopterus umbraticus LeConte, 1853: 505
Dolerosomus flavipennis Motschulsky, 1859: 383
Sericosomus debilis LeConte, 1859: 72
Agriotes inversus Candèze, 1863: 375

Diagnosis. Relatively small body size, length 6.0–8.5 mm, very elongate, slightly convex. Color variable, from pale brown to dark brown, nearly black; pronotal hind angles, base of elytra, and legs usually paler than rest of body. Antenna 11-segmented, filiform, extending beyond apex of pronotal hind angle; antennomeres II and III subequal, combined shorter than IV. Pronotum longer than wide, densely punctate; punctures moderately deep and umbilicate; hind angle slightly divergent, carinate; carina diverging from lateral margin. Pronotosternal sutures closed. Prosternal process broad, flat throughout length; ventrally margined to apex; apex rounded. Mesosternal fossa moderate, slightly divergent. Metacoxal plate nearly equal width throughout length. Elytron deeply striated; strial punctures large. Aedeagus with median lobe very slender, tapering to acute apex; paramere with long, expanded shoulder but lacking apical blade, sharp hook on exterior margin below shoulder approximately mid-way along lobe; phallobase rounded with irregular u-shaped unsclerotized area. Female (Figure 32) similar to male externally but with a broader, more arcuate pronotum that is widest medially.

Distribution. Variably distributed in the United States, throughout much of the East and along the West Coast (Roache 1961). In the current study area, it's been recorded from Alabama, Florida, Georgia, North Carolina, South Carolina, and Tennessee (Leng 1910, 1920; Brimley 1938; Löding 1945; Fattig 1951; Roache 1961; Kirk 1969, 1970; Downie and Arnett 1996; Peck and Thomas 1998). The following records from Mississippi represent a **New State Record**.

Specimens Examined. Alabama (Clay, Cleburne, Coosa, Dale, DeKalb, Jackson, Mobile); **Florida** (Alachua, Brevard, Leon, Monroe, Okaloosa, Walton); **Georgia** (Clarke, Coffee, Cook, DeKalb, Effingham, Emanuel,



Figures 31–33. *Dolerosomus silaceus*. **31)** Male habitus. **32)** Female habitus. **33)** Distributional data.

Fulton, Gilmer, Lumpkin, McIntosh, Meriwether, Paulding, Polk, Rabun, Tattnall, Towns, Union, Upson, Walker, White); **Mississippi** (Chickasaw, George, Grenada, Lowndes, Monroe, Noxubee, Oktibbeha, Pontotoc, Rankin, Winston); **North Carolina** (Alleghany, Buncombe, Catawba, Guilford, Haywood, Henderson, Macon, Mecklenburg, Moore, Orange, Pitt, Rutherford, Stokes, Surry, Swain, Union, Wake, Yancey counties; also along the Blue Ridge Parkway); **South Carolina** (Aiken, Beaufort, Charleston, Florence, Georgetown, Greenville, Laurens, Oconee, Pickens, Richland, Spartanburg); **Tennessee** (Blount, Hawkins, Sevier, Shelby). February–August, October, December. (Figure 33)

Discussion. Roache (1961) maintained a relatively conservative taxonomy and regarded *A. umbraticus*, *D. flavipennis*, and *S. debilis* as synonyms of *D. silaceus*. This species appears to be more common earlier in the year, in spring and early summer. It has been collected by a variety of means, including at ultraviolet light, sweeping and beating vegetation, in canopy, Lindgren funnel, Malaise, and flight intercept traps, and Berlese sampling of leaf litter. Specimens from Florence County, SC (NCSU) were collected by Berlese extraction of litter from a rotting pine stump.

Elater Linnaeus, 1758

Elater Linnaeus, 1758: 404
Ludius Berthold, 1827: 336
Steatoderus Dejean, 1833: 92
Morous Gistel, 1834: 12

Diagnosis. Size moderate, moderately robust to elongate, slightly convex. Color dark brown to black. Head directed downward, rounded in front. Antenna 11-segmented, serrate, variable in length; antennomere II shorter than III, II and III combined slightly longer than IV. Mandible large, entire, acute at apex, simple, strongly curved. Pronotum subquadrate, hind angles divergent; punctures small, shallow to large, deep. Prosternal process moderate to large, narrowly to broadly rounded. Pronotosternal sutures slightly raised. Side of mesosternal cavity divergent and gradually declivous anteriorly. Metacoxal plate slightly to moderately toothed

on inner third of posterior border, slightly declivous to lateral margin. Elytron elongate, apex rounded, striations evident or not, pubescent. Tarsomeres without membranous lobes; claw simple, without basal setae. Aedeagus with parameres lacking apical blade. Females generally larger than males, but with shorter antennae.

Range and Numbers. Johnson (2002) indicated there are six species in North America; Roache (1961) and Schimmel and Tarnawski (2010) listed four for the US and Canada. One species occurs in the Southeast.

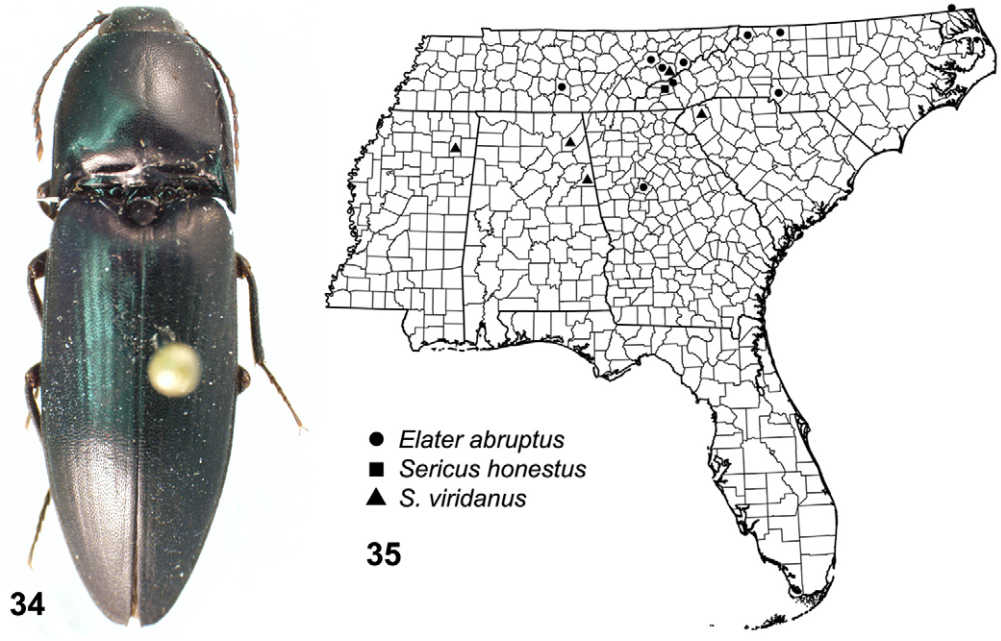
Discussion. The last revision of this genus for America north of Mexico was by Roache (1961) who recognized four species that appeared to fall into three distinct, natural groups. The genus is most similar to *Parallelostethus* from which it can be separated by the gradually declivous mesosternal cavity (parallel in the latter) and the rounded elytral apices (acuminate in *Parallelostethus*).

Elater abruptus Say, 1825

Figures 34, 35

Elater abruptus Say, 1825: 253
Ludius coracinus Germar, 1843: 47

Diagnosis. Moderate body size, length 15.0–22.0 mm, form elongate, moderately robust, convex. Color dark brown to black on dorsal surface; ventral surface, legs, mandibles slightly paler; vestiture fine, dense. Antenna 11-segmented, serrate, not reaching apex of pronotal hind angle; antennomere II shorter than III, II and III combined slightly longer than IV; IV through X similar, XI constricted. Pronotum subquadrate, narrowing anteriorly; punctures umbilicate, small. Hypomeron moderately umbilicately punctate except in basal area. Prosternum convex; prosternal process broadly rounded, slightly deflexed apically. Elytron with striae indistinct, punctures small. Aedeagus with median lobe acutely pointed to deflexed apex, base not emarginated; parameres subapically fringed with setae on exterior margins, apices slightly arcuate; phallobase with large V-shaped unsclerotized area.



Figures 34–35. Elaterini. **34)** *Elater abruptus* (habitus). **35)** Distributional data for *Elater abruptus*, *Sericus honestus*, and *S. viridanus*.

Distribution. Northeastern United States, south to Virginia and west to Kansas (Roache 1961). Previously recorded in the Southeast from Alabama and Georgia (Löding 1945; Fattig 1951). Although it is possible this species occurs in northern Alabama, Löding's (1945) record from southern Alabama (Mobile County) is based on a misidentification (see below). The following records from North Carolina and Tennessee represent **New State Records**.

Specimens Examined. **Georgia** (Henry); **North Carolina** (Ashe, Camden, Mecklenburg, Surry, Swain); **Tennessee** (Cocke, Coffee, Knox, Sevier). June–August. (Figure 35)

Discussion. As the only species of *Elater* recorded from the Southeast, the characters in the key and generic description should help to readily identify this species. I have examined the specimen (GSAT) that was the basis of Löding's (1945) record from Mobile, AL and identified it as *Parallelostethus attenuatus*. All-black specimens of *P. attenuatus* may be mistaken for a member of the genus *Elater* but differ in the shape of the mesosternal fossa and elytral apices. Specimens in the study area have been collected at ultraviolet and mercury vapor light and in Lindgren funnel traps.

Orthostethus Lacordaire, 1857

Orthostethus Lacordaire, 1857: 207

Diagnosis. Large body size, form elongate. Color brown to dark brown, nearly black. Antenna 11-segmented, moderately to strongly serrate; antennomere II short; III intermediate between II and IV, II and III combined shorter than IV. Pronotum subquadrate to slightly longer than wide; pronotal punctures large and dense; hind angles carinate. Prosternum convex; pronotosternal sutures closed anteriorly. Prosternal process nearly straight with anteapical projection. Sides of mesosternal cavity declivous. Elytron elongate, moderately to densely clothed with yellowish pubescence. Tarsomeres without membranous lobes; claw simple, without basal setae. Aedeagus with parameres lacking apical blades.

Range and Numbers. There are two species in the U.S. (Johnson 2018a). Roache (1961) recorded *O. caviceps* Schaeffer from southeastern Arizona and *O. infuscatus* in the East, south to Florida and west to Arizona. Schimmel and Tarnawski (2010) later added the Mexican species *O. pectinicornis* Champion to the U.S. fauna (Arizona). However, Johnson (2018a) placed *O. caviceps* in synonymy with *O. pectinicornis*, bringing the number of U.S. species back down to two. Only *O. infuscatus* is known from the Southeast.

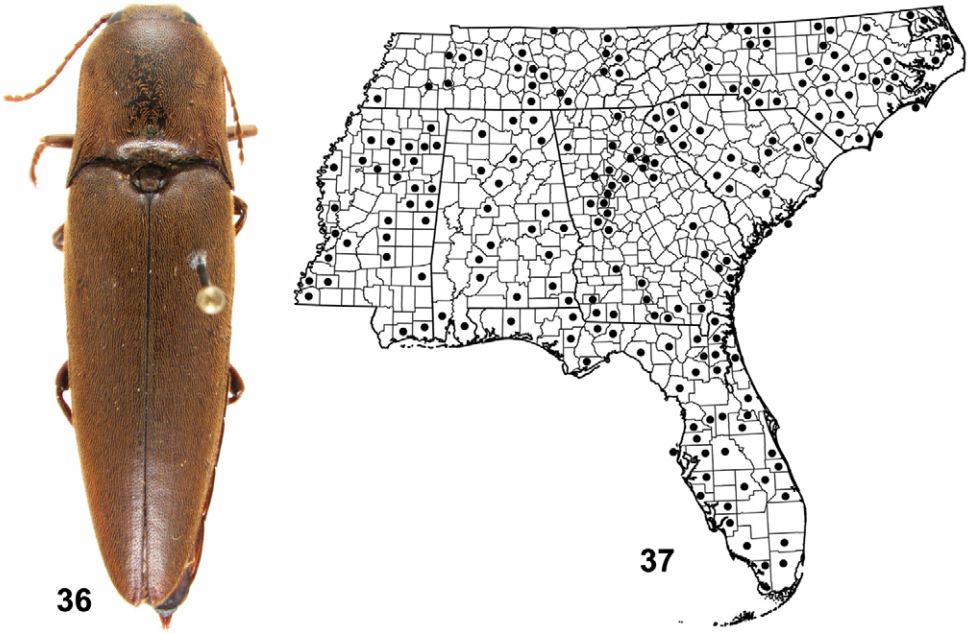
Discussion. *Orthostethus* spp. are the largest of the Elaterini in the United States. Their large size makes them readily identifiable. The marked declivity of the mesosternal fossa and nearly straight prosternal process are also helpful diagnostic features.

Orthostethus infuscatus (Germar, 1844)

Figures 27, 36, 37

Aphanobius infuscatus Germar, 1844: 183
Orthostethus praefectus Candèze, 1863: 315
Pristilophus sordidus Melsheimer, 1845: 216

Diagnosis. Large body size, length 28.0–35.0 mm, very elongate, moderately convex. Color brown to dark brown; vestiture yellow, short, dense, posteriorly directed. Antenna 11-segmented, serrate, not reaching apex of pronotal hind angle; antennomere II short; III intermediate between II and IV, II and III combined subequal to IV; IV–X moderately; XI often elongate, constricted apically. Pronotum subquadrate; punctures large and dense; hind angle carinate. Prosternal process straight. Sides of mesosternal fossa abruptly declivous before middle. Aedeagus with median lobe slender, robust, acuminate at apex, deflexed; parameres not expanded subapically, long dorsolateral setae present.



Figures 36–37. *Orthostethus infuscatus*. **36)** Habitus. **37)** Distributional data. Photo courtesy Kyle Schnepp (Florida State Collection of Arthropods, FDACS-DPI, Gainesville, FL, USA).

Distribution. Eastern United States, from Maryland south to Florida, west to Kansas, Texas, and southwest to Arizona (Roache 1961). Previously recorded from all seven states in the study area (LeConte 1853; Champion 1896; Dozier 1918; Leng 1920; Hepting 1935; Brimley 1938; Löding 1945; Fattig 1951; Roache 1961; Payne and Crossley 1966; Frost 1969; Kirk 1969, 1970; Downie and Arnett 1996; Peck and Thomas 1998; Lago et al. 2002; Schimmel and Tarnawski 2010; Vlach et al. 2010). The type locality of *P. sordidus* is Alabama (not further restricted).

Specimens Examined. Alabama (Baldwin, Bibb, Blount, Bullock, Covington, Dale, Dallas, DeKalb, Elmore, Houston, Jackson, Jefferson, Lawrence, Lee, Madison, Mobile, Monroe, Tallapoosa, Walker, Wilcox); **Florida** (Alachua, Baker, Bradford, Brevard, Broward, Calhoun, Charlotte, Clay, Collier, Duval, Franklin, Gadsden, Hernando, Highlands, Hillsborough, Indian River, Jackson, Lake, Lee, Leon, Levy, Manatee, Martin, Miami-Dade, Monroe, Nassau, Okaloosa, Okeechobee, Orange, Pasco, Pinellas, Polk, Putnam, Sarasota, Seminole, St. John's, Sumter, Suwannee, Taylor, Volusia); **Georgia** (Barrow, Brantley, Charlton, Clarke, Clinch, Cook, Decatur, DeKalb, Echols, Emanuel, Floyd, Forsyth, Fulton, Grady, Greene, Hart, Henry, Jackson, Lee, Liberty, Long, Lowndes, McIntosh, Meriwether, Miller, Newton, Oconee, Oglethorpe, Pike, Spalding, Talbot, Tattnall, Taylor, Tift, Union, Upson); **Mississippi** (Adams, Bolivar, Calhoun, Chickasaw, Claiborne, Franklin, Grenada, Harrison, Hinds, Holmes, Itawamba, Jackson, Kemper, Lafayette, Leake, Lee, Lowndes, Noxubee, Oktibbeha, Panola, Pontotoc, Prentiss, Scott, Sharkey, Smith, Tallahatchie, Warren, Wayne, Webster, Wilkinson, Winston); **North Carolina** (Alleghany, Anson, Beaufort, Bladen, Brunswick, Burke, Cabarrus, Carteret, Chatham, Columbus, Craven, Cumberland, Dare, Durham, Forsyth, Gaston, Gates, Granville, Halifax, Harnett, Hyde, Johnston, Jones, Lenoir, Mecklenburg, Moore, New Hanover, Pasquotank, Person, Pitt, Robeson, Rutherford, Sampson, Stokes, Surry, Union, Wake, Wayne, Yadkin); **South Carolina** (Abbeville, Aiken, Anderson, Barnwell, Calhoun, Charleston, Dorchester, Florence, Greenville, Laurens, Lee, Lexington, Marion, Oconee, Pickens, Sumter); **Tennessee** (Anderson, Benton, Blount, Campbell, Cannon, Chester, Clay, Coffee, Decatur, Dickson, Franklin, Hamilton, Humphreys, Knox, Loudon, Rutherford, Sequatchie, Shelby, Warren, Wilson). April–September. (Figure 37)

Discussion. *Orthostethus infuscatus* is relatively common and has been collected by a variety of methods, including at ultraviolet and mercury vapor light and in Lindgren funnel, panel, and sugar bait traps. Specimens from Alachua County, FL (CMNH) were attracted to traps baited with a mixture of fermenting red wine and grapefruit. Payne and Crossley (1966) reported it from pig carrion in Pickens County, SC.

Parallelostethus Schwarz, 1907

Parallelostethus Schwarz, 1907: 252

Diagnosis. Large body size, moderately robust, convex and oblong-ovate. Color reddish brown to black; vestiture dense. Antenna 11-segmented, serrate, extending to apex of pronotal hind angle; antennomeres II and III subequal. Pronotum subquadrate, convex; punctures irregular; hind angle carinate, carinae extending to base of hind angle. Pronotosternal sutures slightly elevated, closed anteriorly. Prosternal process medium, flat, with single anteapical tooth. Mesosternal fossa with sides parallel and horizontal. Elytron elongate; apex strongly acuminate, diverging at suture toward the apex, often exposing flying wings. Tarsomeres without membranous lobes; claw simple, without basal setae. Aedeagus with paramere lacking apical blade. Females similar to males but generally larger and with shorter antennae.

Range and Numbers. There is currently one species in the genus, *P. attenuatus*, distributed in eastern North America (Roache 1961). When Schwarz described *Parallelostethus* in 1907, he also added five Asian species, but those were transferred to *Elater* and *Leptinostethus* Schimmel and Tarnawski by Schimmel and Tarnawski (2010). Interestingly, Schimmel and Tarnawski (2010) indicated *P. attenuatus* was found only in Arizona, where it lives alongside *Orthostethus caviceps* (now *O. pectinicornis*) in the same habitats. This is an obvious misidentification of specimens, as their figure for *Parallelostethus* (Schimmel and Tarnawski 2010: 337, figure 6) is clearly a male *O. pectinicornis*! *Parallelostethus attenuatus* is well-documented from the East and not known to occur west of Texas (Roache 1961).

Discussion. *Parallelostethus* is readily identified by the parallel sides of the mesosternal fossa (hence the generic name), elytron with an acuminate apex, and size and color.

Parallelostethus attenuatus (Say, 1825)

Figures 28, 38, 39

Elater attenuatus Say, 1825: 257
Ludius fuscus Laporte de Castelnau, 1840: 240

Diagnosis. Large body size, length 15.0–23.0 mm, moderately robust, convex and oblong-ovate. Color reddish brown to black; pronotum and often basal area of elytra with reddish tinge (southern populations appear to be more commonly solid black). Antenna 11-segmented, serrate, extending to apex of pronotal hind angle; antennomeres II and III subequal; IV–X serrate; XI elongate and constricted at end. Pronotum subquadrate, widest basally, narrowing anteriorly, convex; punctures irregular; vestiture medium and dense; hind angles carinate, carinae extending to base of hind angle. Pronotosternal sutures closed anteriorly. Prosternal process medium, flat, with single anteapical tooth. Mesosternal fossa with sides parallel and horizontal. Elytron elongate; apex strongly acuminate; diverging at suture toward the apex, often exposing flying wings. Aedeagus with median lobe pointed, longer than lateral lobes, deflexed at apex; paramere without apical blade; subapical medial-ventral and outer dorsal-lateral borders with setae. Females similar to males but generally larger and with shorter antennae.

Distribution. Eastern United States, west to Oklahoma and Texas (Roache 1961). In the Southeast, it has been recorded from Florida, Georgia, North Carolina, South Carolina, and Tennessee (Brimley 1938; Fattig 1951;

Roache 1961; Kirk 1969, 1970; Downie and Arnett, 1996; Peck and Thomas, 1998). The following records from Alabama and Mississippi represent **New State Records**, although Löding's (1945) record from of *Elater abruptus* from Mobile County, AL pertains to this species.

Specimens Examined. Alabama (Bibb, Mobile, Monroe); **Florida** (Alachua, Baker, Clay, Duval, Jackson, Nassau); **Georgia** (Clarke, McIntosh, Emanuel, Long, Rabun, Taylor, Wheeler); **Mississippi** (Grenada, Pearl River, Washington, Winston); **North Carolina** (Alleghany, Buncombe, Camden, Craven, Durham, Gates, Henderson, McDowell, Mecklenburg, New Hanover, Robeson, Rutherford, Surry, Wake); **South Carolina** (Aiken, Calhoun, Dorchester, Pickens, Sumter); **Tennessee** (Anderson, Blount, Coffee, Fentress, Warren). June–September. (Figure 39)

Discussion. *Parallelostethus attenuatus* exhibits clinal variation from north to south with regards to its color. Specimens in the northern part of its range more commonly have red on the pronotum and basal part of the elytra, while specimens in the south (including nearly all specimens I have examined in the current study area) are solid black. The all-black forms may be confused for *Elater abruptus* but differ in the shape of the mesosternal fossa and elytral apices (see Discussion under *E. abruptus*). To date, I have only seen a few southeastern specimens from Tennessee exhibiting the reddish tinge on the pronotum. Specimens have been collected by a variety of methods, including at ultraviolet and mercury vapor light and in Lindgren funnel and panel traps.

Sericus Eschscholtz, 1829

Sericus Eschscholtz, 1829: 34
Sericosomus Dejean, 1833: 96
Amphilabris Gistel, 1834: 12
Atractopterus LeConte, 1853: 422

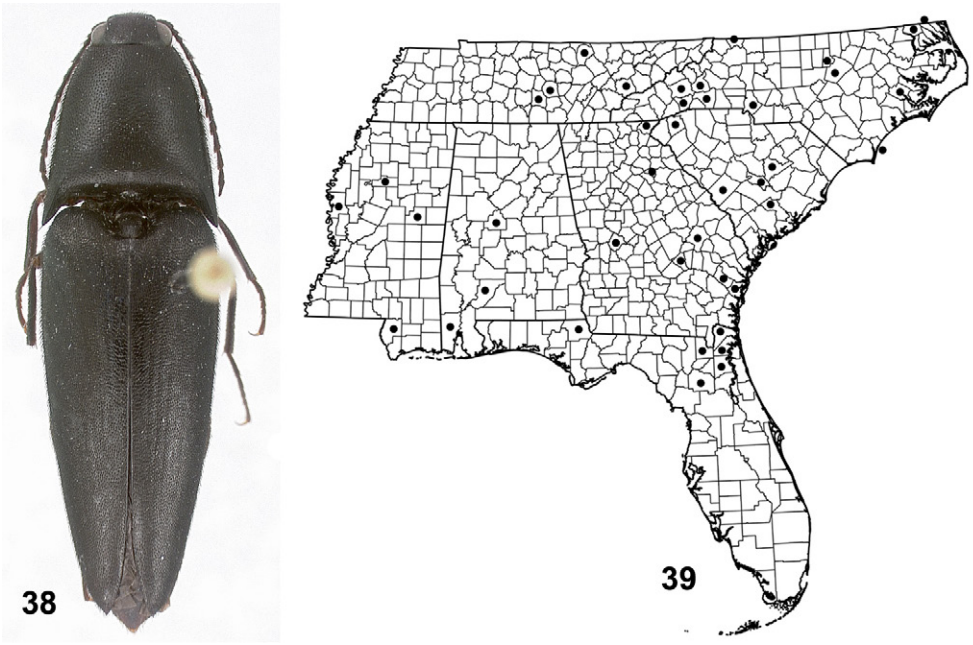
Diagnosis. Size small to moderate, form elongate, moderately convex. Color variable, often bicolored. Antenna 11-segmented, serrate; antennomere II small; III intermediate between II and IV. Pronotum as long as wide or slightly longer than wide, laterally subparallel to slightly sinuate, slightly converging anteriorly; hind angles carinate. Pronotosternal sutures open anteriorly. Prosternal process short, broadly rounded to moderately long. Sides of mesosternal fossa slightly divergent. Metacoxal plate subequal in width along length. Tarsomeres without membranous lobes; claw simple, without basal seta. Aedeagus with paramere lacking apical blade.

Range and Numbers. Johnson (2002) indicated there are five species in North America, boreal and montane in distribution. Roache (1961), with the exclusion of *D. silaceus*, listed only three. Only one species has been recorded from the Southeast, with a second added here.

Discussion. *Sericus* is the only North American genus of Elaterini with the pronotosternal sutures open anteriorly. Adults are often collected on vegetation.

Key to the species of *Sericus* in the Southeast
(adapted from Roache 1961)

1. Pronotum laterally with two circular depressions on each side in apical third; smaller species, 8.0–11.0 mm in length . . . . . ***S. viridanus* (Say)**
— Pronotum lacking lateral circular depressions; larger species, 12.0–16.5 mm in length . . . . . ***S. honestus* (Randall)**



Figures 38–39. *Parallelostethus attenuatus*. **38)** Habitus. **39)** Distributional data. Photo courtesy Kyle Schnepp (Florida State Collection of Arthropods, FDACS-DPI, Gainesville, FL, USA).

Sericus honestus (Randall, 1838)

Figures 35, 40

Elater honestus Randall, 1838: 9
Atractopterus fusiformis LeConte, 1853: 454

Diagnosis. Size moderate, 12.0–16.5 mm in length. Pronotum black; elytra, legs, basal antennomeres, and pronotal hind angles yellow; vestiture yellow, evenly distributed over the body. Antenna 11-segmented, serrate, not reaching apex of pronotal hind angle; antennomere III intermediate between II and IV; II and III combined longer than IV; XI dilated centrally. Pronotum slightly longer than wide, lacking lateral depressions in apical third; lateral margin explanate, lateral carinae visible from above; punctures fine, umbilicate; hind angles slightly divergent, unicarinate. Pronotosternal sutures open anteriorly. Elytron fusiform, gradually tapering to rounded apex. Aedeagus with median lobe narrowly tapering to acute, strongly deflexed apex; paramere gradually tapering to subacute apex, lacking apical blades.

Distribution. Northeastern North America (Roache 1961). Previously not recorded from the Southeast. The following records from North Carolina represent a **New State Record**.

Specimens Examined. North Carolina (Swain). June–July. (Figure 35)

Discussion. This is the largest species of *Sericus* in North America; the key characters should be sufficient for separating it from the other southeastern species, *S. viridanus*. Specimens in the study area have been collected in Malaise traps.

Sericus viridanus (Say, 1825)

Figures 35, 41

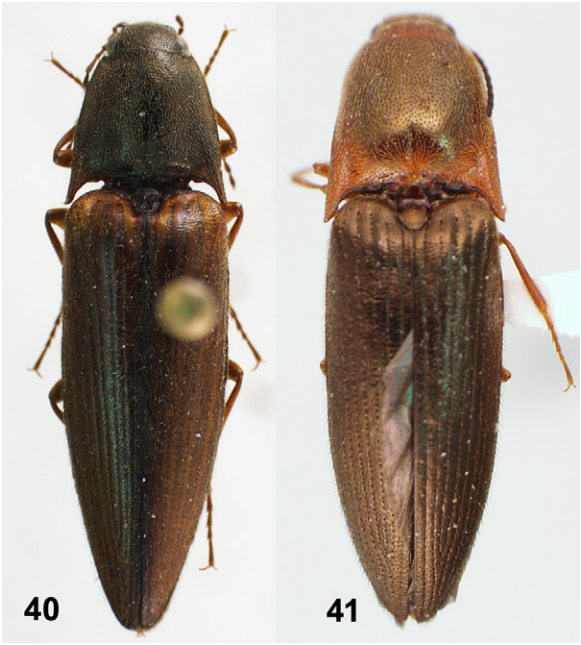
Elater viridanus Say, 1825: 250
Elater sublucens Randall, 1838: 37

Diagnosis. Size small to moderate, 8.0–11.0 mm in length. Color variable, from light yellow-brown to dark red-brown; pronotum sometimes paler, with or without large dark central area; venter, legs, and basal antennomeres red-brown; vestiture yellow, evenly distributed over the body. Antenna 11-segmented, serrate, not reaching apex of pronotal hind angle; antennomere II shorter than III; III intermediate between II and IV; XI rounded apically. Pronotum longer than wide, with two deeply indented lateral depressions in apical third; lateral margin subparallel, slightly sinuate as base of hind angle; punctures large, shallow, umbilicate, separated by a distance approximately equal to their diameters; hind angle unicarinate, slightly divergent. Pronotosternal sutures open anteriorly. Prosternal process short, broadly rounded to moderately long. Sides of mesosternal fossa slightly divergent. Metacoxal plate gradually dilated medially. Aedeagus with median lobe laterally compressed medially, widened subapically, then tapering to subacute apex; paramere laterally compressed in apical third, widening to rounded apices, lacking apical blade.

Distribution. Northeastern United States (Roache 1961). In the Southeast, previously recorded only from South Carolina (Kirk 1970). The following records from Alabama, Mississippi, and Tennessee represent **New State Records**.

Specimens Examined. Alabama (Cleburne, DeKalb); **Mississippi** (Lee); **South Carolina** (Pickens); **Tennessee** (Sevier). April–June. (Figure 35)

Discussion. Like other members of the Elaterini this is a fairly distinctive species in the study area, recognized by the lateral depressions on the pronotum and the open pronotosternal sutures. Specimens from Lee County, MS (MEM) were collected on the flowers of flowering dogwood.



Figures 40–41. *Sericus* spp. **40)** *S. honestus* (habitus). **41)** *S. viridanus* (habitus).

Megapenthini Gurjeva, 1973

The tribe Megapenthini is represented in North America by a single genus, *Megapenthes*, that is distributed throughout the region (Johnson 2002). The adults are variable in size and may be unicolored, bicolored, or patterned. Mouthparts are deflexed; the supra-antennal carina complete, arcuate, bending down between antennae to meet, or at least get close to, the labrum. Antennomeres II and III subequal in length in most species; remaining antennomeres serrate. Pronotal punctures variable in depth and density; hind angles carinate, one or two carinae present. Pronotosternal sutures closed. Prosternal process more or less grooved between procoxae. Mesocoxa open to both mesepimeron and mesepisternum; meso- and metasternum distinct, joined by a definite suture. Tarsomeres without membranous lobes; claws simple and without basal setae.

Megapenthes Kiesenwetter, 1863

Dolopiosomus Motschulsky, 1859: 380 (*nomen oblitum*)
Megapenthes Kiesenwetter, 1863: 353

Diagnosis. Adults are variable in size and color; may be unicolored, bicolored, or patterned. Mouthparts are deflexed; the supra-antennal carina complete, arcuate, bending down between antennae to meet, or at least get close to, the labrum. Antennomeres II and III subequal in length, or nearly so, in most species; remaining antennomeres serrate. Pronotal punctures variable in depth and density; hind angles carinate, one or two carinae present. Pronotosternal sutures unopen. Prosternal process more or less grooved between procoxae. Tarsomeres without membranous lobes; claws simple and without basal setae. Aedeagus with median lobe variable in shape, rounded or pointed at apex; paramere with apical setae; most species in North America also with apical blade.

Range and Numbers. There are 29 species in the US and Canada, generally distributed (Becker 1971). Six species have been previously recorded from the Southeast, with two additional species added here.

Discussion. Becker (1971) provided a key to the Nearctic species of *Megapenthes* and Canada and described five new species from the Southwest. Other than the new species described, he only discussed a few (mostly western) species. The genus is apparently not monophyletic (Becker 1971) and has often served as a dumping ground for morphologically similar species of uncertain affinities.

Key to the species of *Megapenthes* in the Southeast
(adapted from Becker 1971 and Downie and Arnett 1996)

1. Pronotal hind angles unicarinate **2**
— Pronotal hind angles bicarinate **6**

2(1). Opaque, densely punctate; antennae beyond antennomere II strongly serrate; sexually dimorphic (females black; males bicolored black and tan to orange) . . . . . ***M. limbalis* (Herbst)**
— Somewhat shining, dorsum less densely punctured; antennomeres beyond antennomere II moderately serrate; color variable **3**

3(2). Antennomeres II and III small, subequal **4**
— Antennomere II small, III subequal to IV and triangular **5**

4(3). Elytron predominately black with yellow humeral and subapical maculae (humeral lunule may be broken in females giving the appearance of three yellow maculae) . . . . . ***M. stigmosus* (LeConte)**
— Elytron predominately orange with black scutellar area and two transverse bands, connected along suture . . . . . ***M. rogersi* Horn**

5(3). Black, pronotum and hypomeron red . . . . . ***M. illinoisensis* Van Dyke**
— Black, prothorax reddish-yellow with large, dark dorsal and sternal spots; front of head and basal margin of elytron reddish-yellow . . . . . ***M. tarsalis* Schaeffer**

6(1). Antennomere III long, triangular, twice as long as antennomere II and sometimes nearly as long as IV; antennae strongly serrate, especially in male . . . . . ***M. insignis* (LeConte)**
— Antennomeres II and III subequal, combined subequal or shorter than IV 7

7(6). Outer carina of pronotal hind angle well developed; larger (9.0 or more mm in length) . . . . . ***M. angularis* LeConte**
— Outer carina of pronotal hind angle indistinct; smaller (8.0 or less mm in length) . . . . . ***M. rufilabris* (Germar)**

Megapenthes angularis LeConte, 1866

Figures 42, 44

Megapenthes angularis LeConte, 1866: 360

Diagnosis. Size small to moderate, 9.0–11.5 mm in length. Color brown to dark brown, appendages and base of pronotum paler. Antenna 11-segmented, serrate, extending beyond apex of pronotal hind angle; antennomeres II and III small, subequal. Pronotum densely punctate, punctures umbilicate, deep, separated by more than their own diameter, denser along sides; hind angle bicarinate, outer carina well-developed. Aedeagus with median lobe broad, wide, tapering to nipple-like apex, longer than parameres; paramere short, medially compressed, without pronounced apical blade.

Distribution. Central United States, from Arizona to Mississippi, north to Michigan and North Dakota (Becker 1971). In the Southeast, previously recorded from Alabama (Löding 1945) and Mississippi (Becker 1971). The following records from Florida, Georgia, North Carolina, South Carolina, and Tennessee represent **New State Records**.

Specimens Examined. Alabama (Baldwin, Jefferson, Monroe); **Florida** (Alachua, Hillsborough, Taylor); **Georgia** (Union, Union); **Mississippi** (Bolivar, Grenada, Hancock, Jackson, Noxubee, Oktibbeha, Winston); **North Carolina** (Yadkin); **South Carolina** (Pickens, York); **Tennessee** (Blount, Coffee). May–August. (Figure 44)

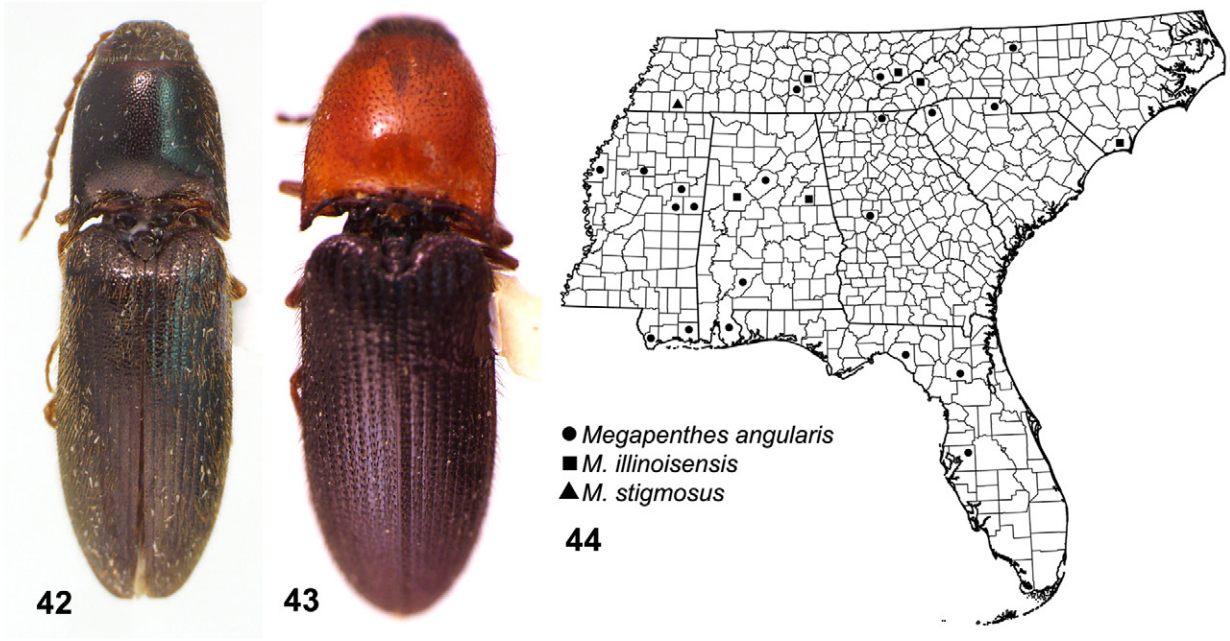
Discussion. In the Southeast, this species should be recognized by having bicarinate pronotal hind angles, with the outer angle well-developed, and subequal antennomeres II and III. It may be confused for *Ampedus melsheimeri*, however, if the generic characters are not observed. I have examined the specimen (GSAT) that was the basis for Löding's (1945) record from Spring Hill, AL (Mobile County), which he described as having '… only single thoracic carina'. The specimen is not superficially attributable to other specimens of *M. angularis*, and my suspicion is that this is an undescribed species, or possibly an adventive from Central America or the Caribbean. The specimen is a male, and its aedeagus is not consistent with what is described by Becker (1971). I have seen a second specimen (AUEM) from Barbour County, AL that is similar to the Löding specimen, but clearly has two carinae on the pronotal hind angles.

Megapenthes illinoisensis Van Dyke, 1932

Figures 43, 44

Megapenthes illinoisensis Van Dyke, 1932: 314

Diagnosis. Size small, 6.5 mm in length on average. Bicolored; body black, pronotum and hypomeron bright red; vestiture black, coarse. Antenna 11-segmented, serrate, extending beyond the apex of the pronotal hind angle; antennomere II small; III intermediate between II and IV. Pronotum longer than wide, sides straight



Figures 42–44. *Megapenthes* spp. **42)** *M. angularis* (habitus). **43)** *M. illinoisensis* (habitus). **44)** Distributional data for *M. angularis*, *M. illinoisensis*, and *M. stigmosus*.

and evenly arcuate; disk finely and sparsely punctate; hind angle acute, unicarinate. Elytral striae not deeply impressed. Aedeagus undescribed.

Distribution. Recorded from Illinois, Kansas, Ohio, North Carolina, and South Carolina (Kirk 1969; Becker 1971). The following records from Alabama and Tennessee represent **New State Records**, although Löding's (1945) record of *Ampedus collaris* from Squaw Shoals, AL refers to this species.

Specimens Examined. Alabama (Clay, Tuscaloosa); **North Carolina** (Brunswick, Haywood); **Tennessee** (Sevier, Warren). April–July, October. (Figure 44)

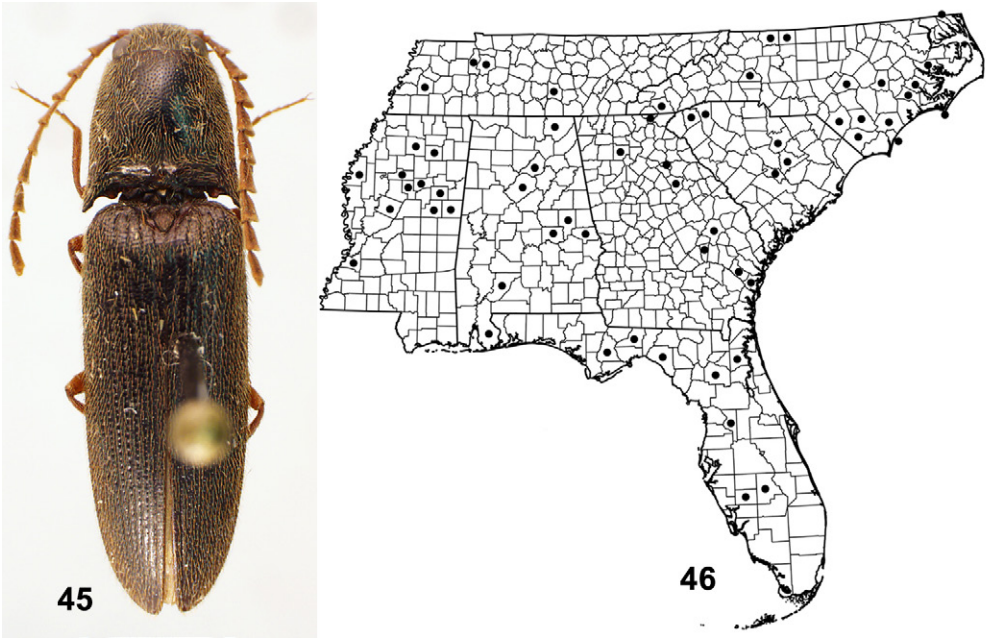
Discussion. This small species may be confused with *Ampedus collaris* or *A. palans* in the East. The most reliable external feature to separate *A. collaris* and *M. illinoisensis* lies in the prosternal sutures, open in the former and not in the latter. Also, this species has entirely black setae on the pronotum, whereas *A. collaris* has yellow-gray setae. Separating *A. palans* and *M. illinoisensis* is more difficult from the descriptions at hand, and the two species may be conspecific (see Discussion under *A. palans*). Specimens from Brunswick County, NC (NCSU) were collected in forest litter.

Megapenthes insignis (LeConte, 1884)

Figures 45, 46

Elater insignis LeConte, 1884: 11

Diagnosis. Size moderate, 10.0–14.0 mm in length. Color brown, appendages slightly paler; vestiture yellow. Antenna 11-segmented strongly serrate, extending beyond apex of pronotal hind angle; antennomere II small; III variable, but longer than II, triangular, often subequal to IV. Pronotum longer than wide; punctures close, umbilicate, separated by approximately their own diameters, closer laterally; hind angles bicarinate. Elytron with strial punctures rather coarse; intervals finally punctate. Aedeagus variable, but typically with median lobe



Figures 45–46. *Megapenthes insignis*. **45)** Habitus. **46)** Distributional data.

longer than parameres, tapering to slightly rounded apex; paramere without apical blade, tapering to acute apex. Female similar to male externally but more robust and less strongly serrate flagellar antennomeres.

Distribution. Eastern United States, from Kentucky, Illinois, and Missouri, south to Florida and west to California (Becker 1971; Downie and Arnett 1996). In the Southeast, previously recorded from Florida, Georgia, Mississippi, and South Carolina (Fattig 1951; Kirk 1969; Becker 1971; Downie and Arnett 1996; Peck and Thomas 1998; Lago et al. 2002). The following records from Alabama, North Carolina, and Tennessee represent **New State Records**.

Specimens Examined. Alabama (Baldwin, Blount, Elmore, Jackson, Jefferson, Lee, Monroe, Tallapoosa); **Florida** (Alachua, Clay, Desoto, Highlands, Leon, Liberty, Marion, Seminole, Sumter, Taylor, Volusia); **Georgia** (Cherokee, Clarke, Emanuel, Greene, Long, McIntosh, Montgomery, Towns); **Mississippi** (Bolivar, Claiborne, Grenada, Holmes, Lafayette, Montgomery, Noxubee, Oktibbeha, Pontotoc, Webster, Winston); **North Carolina** (Beaufort, Bladen, Camden, Carteret, Catawba, Columbus, Craven, Harnett, Jones, Macon, New Hanover, Pender, Robeson, Stokes. Surry, Wayne); **South Carolina** (Calhoun, Greenville, Kershaw, Pickens, Sumter); **Tennessee** (Benton, Coffee, Haywood, Humphreys). April–August. (Figure 46)

Discussion. Becker (1971) indicated that *M. insignis* might represent a species complex. The relative lengths of antennomeres II and III and characteristics of the aedeagus vary considerably, and further work will have to be done to fully understand this complex. In the study area, adults have been collected most commonly at light, including ultraviolet and mercury vapor light. Fattig (1951) reported it as a pasture pest in Georgia.

Megapenthes limbalis (Herbst, 1806)

Figures 47–49

Elater limbalis Herbst, 1806: 53
Elater sturmii Germar, 1844: 164
Ectinus granulosus Melsheimer, 1844: 159

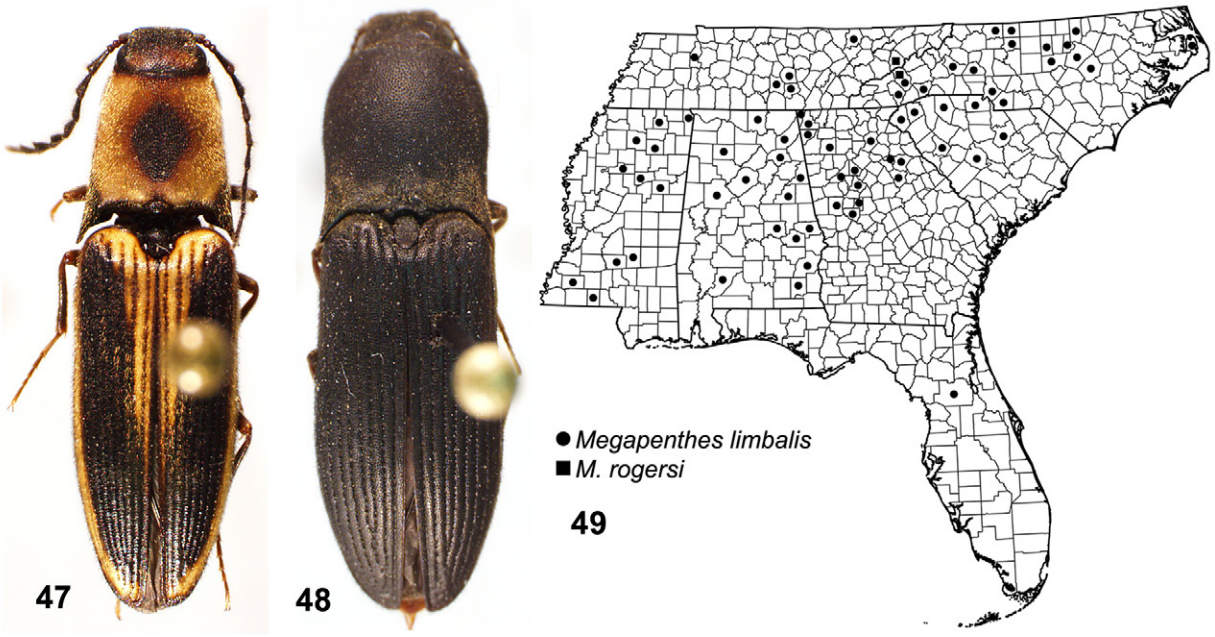
Diagnosis. Size small to moderate, 8.0–16.0 mm in length; form robust. Opaque, sexually dimorphic in terms of color: male black with head between eyes, pronotum (except hind angles and central macula), elytral margins,

base of elytron and basal half of sutural area, and often appendages tan to orange (Figure 47); female solid black (Figure 48). Antenna 11-segmented, strongly serrate; antennomeres II and III subequal. Pronotum densely punctured, punctures umbilicate; hind angle unicarinate. Aedeagus undescribed. In addition to differences in color, females tend to be larger and more robust than males.

Distribution. Eastern United States, west to Illinois (Becker 1971; Downie and Arnett 1996). In the Southeast, recorded from Alabama, Florida, Georgia, North Carolina, and South Carolina (Leng 1910, 1920; Brimley 1938; Löding 1945; Fattig 1951; Kirk 1970; Becker 1971; Downie and Arnett 1996; Peck and Thomas 1998). The following records from Mississippi and Tennessee represent **New State Records**.

Specimens Examined. Alabama (Barbour, Clay, Cleburne, Dale, DeKalb, Elmore, Etowah, Jefferson, Lee, Macon, Madison, Monroe, Tuscaloosa, Winston); **Florida** (Marion); **Georgia** (Bartow, Chattooga, Clarke, Dade, DeKalb, Fulton, Greene, Hall, Henry, Lamar, Meriwether, Oglethorpe, Upson, Walker); **Mississippi** (Franklin, Grenada, Lafayette, Oktibbeha, Pike, Pontotoc, Simpson, Smith, Tippah, Tishomingo, Webster); **North Carolina** (Alamance, Burke, Catawba, Chatham, Dare, Durham, Forsyth, Granville, Haywood, Henderson, Jackson, Johnston, Mecklenburg, Stokes, Surry, Union, Wake counties; also Rocky Mount); **South Carolina** (Greenwood, Kershaw, Lexington, Oconee, Pickens, Spartanburg, York); **Tennessee** (Benton, Blount, Campbell, Coffee, Grundy, Knox, Warren). May–October. (Figure 49)

Discussion. The males of this species are usually easily recognized by color alone. The females may be more difficult, but the large, robust size, subequal antennomeres II and III, unicarinate pronotal hind angles, and densely umbilicately punctate pronotum should help to identify them. Females from Florida must be distinguished from *Blauta falli*, which has small membranous lobes on tarsomeres I–IV. Specimens in the study area have been collected at lights, in sticky, Lindgren funnel, Malaise, and flight intercept traps, and by beating, sweeping, and hand picking from vegetation. A specimen from Spartanburg County, SC was collected on jack-in-the-pulpit. A specimen from Tishomingo County, MS was collected from hydrangea. Specimens from Green County, GA (UGCA) were collected in pitfall traps set in pine woodlands.



Figures 47–49. *Megapenthes* spp. **47)** *M. limbatus* (male habitus). **48)** *M. limbatus* (female habitus). **49)** Distributional data for *M. limbalis* and *M. rogersi*.

Megapenthes rogersi Horn, 1871

Figures 49, 53

Megapenthes rogersi Horn, 1871: 310

Diagnosis. Size small to moderate, 8.0–10.0 mm in length. Color black, elytra predominately orange with black scutellar area and post-medial and subapical transverse black bands, connected along the suture; vestiture yellow, short, evenly distributed over the body. Antenna 11-segmented, serrate; antennomeres II and III subequal. Pronotum about as long as wide, subparallel basally, gradually narrowing anteriorly; punctures small, simple, separated by approximately their own diameters; hind angle unicarinate. Prosternal process tapering between procoxae. Aedeagus undescribed. No sexual dimorphism noted.

Distribution. Northeastern North America (Downie and Arnett 1996). Previously not recorded from the Southeast. The following records from North Carolina and Tennessee represent **New State Records**.

Specimens Examined. North Carolina (Haywood); **Tennessee** (Cocke). July. (Figure 49)

Discussion. This species has a very distinctive color pattern and should not be confused with any other elaterid in the study area. This is a primarily boreal species that apparently reaches the southern portions of the Appalachian Mountains at higher elevations. The specimen from Cocke County, TN (LSAM) was collected at Albright Grove, which contains old growth hemlock forest. Specimens in the study area have been collected in Malaise traps.

Megapenthes rufilabris (Germar, 1843)

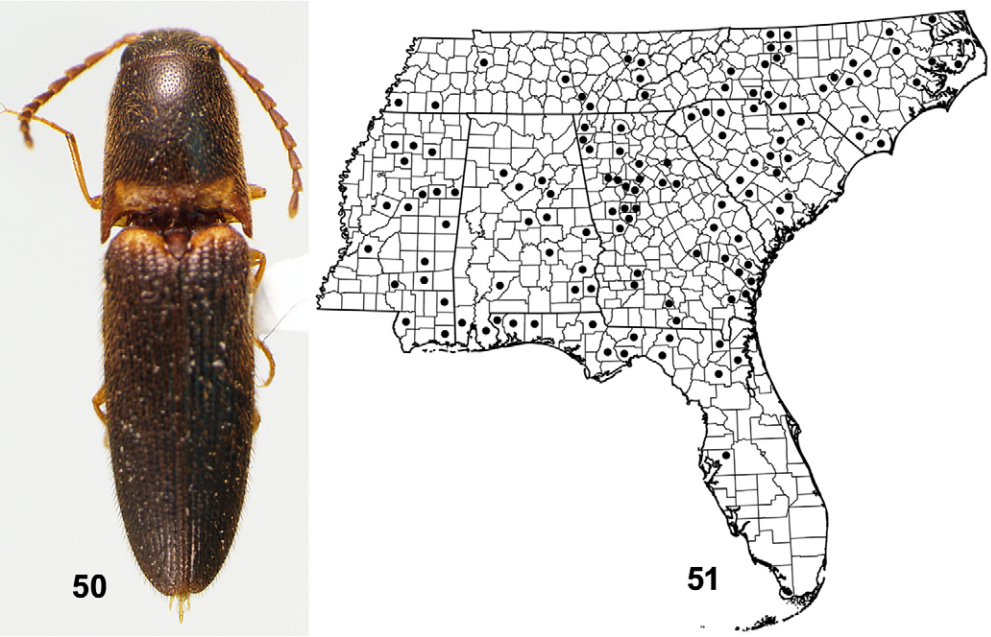
Figures 50–51

Oophorus delicatulus Dejean, 1837: 105 (*nomen nudum*)
Elater rufilabris Germar, 1843: 47

Diagnosis. Size small, 6.0–8.0 mm in length. Color dark brown to nearly black; base of pronotum, base of elytra, basal antennomeres, and legs yellowish brown (rarely pronotum entirely pale); venter reddish. Antenna 11-segmented, serrate; antennomeres II and III subequal. Pronotum longer than wide, sides parallel, narrowing anteriorly; punctures dense and umbilicate; hind angle bicarinate, outer carina often indistinct. Prosternal process suddenly tapering behind procoxae. Aedeagus with median lobe longer than parameres, tapering to apex; paramere slender with a weak, elongate apical blade.

Distribution. Eastern United States, west to Texas and Oklahoma (Becker 1971; Downie and Arnett 1996). In the Southeast, recorded from Alabama, Florida, Georgia, Mississippi, North Carolina, and South Carolina (Brimley 1938; Löding 1945; Fattig 1951; Payne and Crossley 1966; Kirk 1969, 1970; Becker 1971; Downie and Arnett 1996; Lago et al. 2002; Klepzig et al. 2012). The following records from Tennessee represent a **New State Record**.

Specimens Examined. Alabama (Baldwin, Barbour, Chilton, Coosa, Dale, Henry, Jefferson, Lee, Mobile, Monroe, Montgomery, St. Clair, Talladega, Walker); **Florida** (Alachua, Baker, Clay, Escambia, Hillsborough, Jackson, Leon, Liberty, Madison, Okaloosa, Santa Rosa, Taylor, Wakulla); **Georgia** (Brantley, Burke, Bulloch, Chattooga, Cherokee, Clarke, Clayton, Cook, Dougherty, Douglas, Emanuel, Floyd, Fulton, Gilmer, Glynn, Greene, Gwinnett, Henry, Lamar, Lee, Liberty, Long, Lowndes, McIntosh, Meriwether, Morgan, Pike, Rockdale, Talbot, Tattnall, Upson, Walker, Wheeler); **Mississippi** (Attala, Choctaw, Greene, Hinds, Holmes, Jackson, Jasper, Jefferson Davis, Jones, Kemper, Lafayette, Lowndes, Oktibbeha, Panola, Pearl River, Pontotoc, Stone, Winston, Yalobusha); **North Carolina** (Beaufort, Bladen, Brunswick, Burke, Columbus, Craven, Davie, Edgecombe, Forsyth, Gaston, Gates, Graham, Halifax, Harnett, Hyde, Iredell, Johnston, Lee, Mecklenburg, Moore, Union, Rutherford, Stokes, Surry, Wake, Yadkin); **South Carolina** (Aiken, Barnwell, Calhoun,



Figures 50–51. *Megapenthes rufilabris*. **50)** Habitus. **51)** Distributional data.

Chesterfield, Colleton, Dorchester, Horry, Greenville, Kershaw, Laurens, Lexington, Pickens, Richland, Spartanburg, Sumter, York); **Tennessee** (Anderson, Blount, Hamilton, Hardeman, Humphreys, Knox, Sequatchie, Shelby, Warren). April–September. (Figure 51)

Discussion. This commonly collected species is most similar to *M. tarsalis*, but the characters in the key should help to differentiate them. Specimens have been most commonly collected at ultraviolet or mercury vapor light, but specimens have also been collected in Lindgren funnel, panel, pitfall, Malaise, sticky, and flight intercept traps and netted while in flight. Specimens from Laurens County, SC (BAM) were collected on dogwood. Payne and Crossley (1966) reported it from pig carrion in Pickens County, SC.

Megapenthes stigmosus (LeConte, 1853)

Figures 44, 52

Elater stigmosus LeConte, 1853: 472

Diagnosis. Size small, 5.0–7.0 mm in length. Sexually dimorphic with regards to color: male black; often with non-defined yellowish areas at pronotal hind angles, elytron with basal and (usually) subapical yellow spots; female black; elytron with yellow humeral C-shaped lunule (often broken) and subapical yellow macula (Figure 52). Antenna 11-segmented, serrate; antennomeres II and III small, subequal. Pronotum about as long as wide, shallowly punctate; interspaces microreticulate; hind angle unicarinate. Hypomeron punctate. Aedeagus undescribed.

Distribution. Transcontinental in the north (Becker 1971). Previously not recorded from the Southeast. The following record from Tennessee represents a **New State Record**.

Specimens Examined. Tennessee (Hardeman). April. (Figure 44)

Discussion. This species is readily recognized in the East by its color pattern. However, in the West it is very similar to *M. caprella* (LeConte). Males and females are sexually dimorphic with regards to color. The single southeastern record (UGCA, Figure 52) is for a female collected in Hardeman County, TN.

Megapenthes tarsalis Schaeffer, 1916

(not illustrated)

Megapenthes tarsalis Schaeffer, 1916b: 259

Diagnosis. Size small, 6.0 mm in length on average. Body black; prothorax yellow to red with dorsal and ventral black macula and basal margin and front of head yellow-red. Antennae 11-segmented, serrate; antennomere II small; III longer and triangular, similar to IV. Pronotum less densely punctured; hind angles unicarinate. Male genitalia undescribed.

Distribution. Recorded from Georgia, North Carolina, and Tennessee (Schaeffer 1916b; Leng 1920; Brimley 1938; Fattig 1951; Becker 1971). The type locality is Northern Pines in Moore County, NC.

Specimens Examined. None.

Discussion. According to Becker (1971), this enigmatic species is rarely collected. Fattig (1951) reported it from two locations in Georgia: Clarkesville (Habersham County) and Augusta (Richmond County). The Clarkesville record seems legitimate, given the known range of this species, but the Augusta record, which sits just south of the fall line in the Southeastern Plains, seems doubtful. The Augusta record may represent a misidentification of *M. rufilabris*. The size and color is similar to *M. rufilabris* but the presence of only one carina on pronotal hind angle, antennomere III subequal to IV, and density of pronotal punctures should distinguish it from the latter.

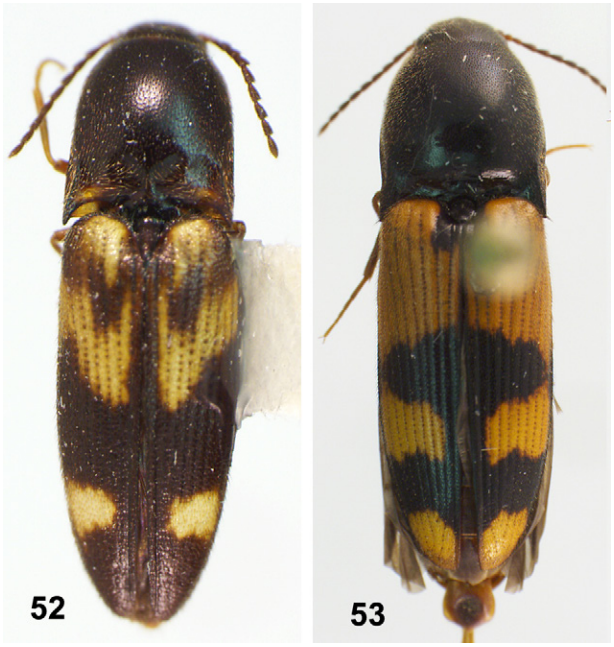
Agriotini Laporte de Castelnau, 1840

The tribe Agriotini, as delineated here, is the Agriotina of Johnson (2002) and represented in the United States by two genera, *Agriotes* and *Dalopius*. Both genera are generally distributed, including in the Southeast, but seem more abundant in the northern and montane regions of North America. Brown (1934) reviewed the North American *Dalopius* species, describing 42 species distributed primarily in the North and West. Becker (1956) revised the North American species of *Agriotes*. Adults have a deflexed head capsule. Supra-antennal carina incomplete, more or less interrupted in the middle, either directed towards meson or downwards. Antenna 11-segmented, filiform to serrate. Pronotosternal sutures open or channeled anteriorly; hypomeron usually with raised carina along suture. Mesocoxa open to both mesepimeron and mesepisternum; meso- and metasternum distinct. Tarsomeres simple, lacking membranous lobes; claw simple or with basal tooth, never serrate. Aedeagus with median lobe variable in shape; paramere with or without apical blade.

Agriotes Eschscholtz, 1829

Agriotes Eschscholtz, 1829: 34
Ectinus Eschscholtz, 1829: 34
Cataphagus Stephens, 1830: 247
Lepidotus Gistel, 1834: 12
Pedetes Kirby, 1837: 145 (in part) (nec *Pedetes* Illiger, 1811: 81)
Agriodrastus Reitter, 1911: 222
Tinecus Fleutiaux, 1939: 124

Diagnosis. Generally small to moderate in size; form subcylindrical Color variable, most reddish-brown to brown, few bicolored or patterned; vestiture variable. Supra-antennal carina incomplete, either directed down towards labrum or towards meson. Antenna 11-segmented, usually serrate, sometimes filiform. Pronotum subparallel to slightly arcuate, usually longer than wide; lateral margin not visible from above, joining anterior edge



Figures 52–53. *Megapenthes* spp. **52)** *M. stigmosus* (female habitus). **53)** *M. rogersi* (habitus).

near anterior end of pronotosternal suture, sometimes interrupted at middle; punctures usually fairly dense, from shallowly umbilicate to deep and simple; hind angle straight or divergent, usually carinate. Pronotosternal sutures vary from slightly concave to deeply open. Tarsomeres without membranous lobes; claw simple, lacking basal setae. Aedeagus variable; shape of median lobe highly variable in length-to-width ratio and apex, may be as long as or much longer than parameres; paramere usually with defined apical blade, or at the very least with a lateral tooth. External sexual dimorphism minimal.

Range and Numbers. There are 37 species in North America (Johnson 2002), including three European introductions. The species are generally distributed, but most are in the north and northwestern parts of the United States and adjacent Canada. Four species (all native) have been recorded from the Southeast, with two additional species added here.

Discussion. Becker (1956) revised the genus for America north of Mexico. He divided the North American species into four groups based on external characteristics and female genitalia. Larval characters also seem to support these groupings. The six southeastern species represent three of these groups. Key morphological features include the shape and punctation of the pronotum, form of pronotosternal sutures, form of supra-antennal carinae, and aedeagus.

Adults have been collected by a variety of methods. *Agriotes* spp. are usually active in late spring and early summer and most commonly collected by sweeping, beating, or hand picking from vegetation (Becker 1956). They may also be collected at ultraviolet or mercury vapor light, in Lindgren funnel traps, and under bark and shore debris.

Key to the species of *Agriotes* in the Southeast
(adapted from Becker 1956)

1. Pronotum distinctly bicolored, red with central oblong black macula . . . . . ***A. collaris* (LeConte)**
— Pronotum unicolored (margins may be paler but not distinctly bicolored) **2**

2(1). Pronotum subquadrate, wider than long . . . . . ***A. mancus*** **(Say)**
— Pronotum longer than wide **3**

3(2). Pronotal punctures shallow, umbilicate (may be weakly so); punctures on hypomeron shallow, umbilicate, close; metasternal and abdominal punctures noticeably finer than on hypomeron **4**
— Pronotal punctures deep, simple; punctures on hypomeron deep, simple; metasternal and abdominal punctures nearly as coarse as those on hypomeron **5**

4(3). Pronotal punctures very close and very shallow, clearly umbilicate; side of pronotum sinuate with slender hind angle; antenna extending two antennomeres beyond apex of pronotal hind angle; aedeagus with apex of paramere more elongate, without prominent setae or occasionally with one seta on ventral side . . . . . ***A. oblongicollis*** **(Melsheimer)**
— Pronotal punctures deeper and slightly umbilicate; side of pronotum straight, convergent from apex of hind angle; antenna extending one antennomere beyond apex of pronotal hind angle; aedeagus with apex of paramere shorter, with two prominent setae on ventral side . . . ***A. arcanus*** **Brown**

5(3). Pronotosternal sutures slightly concave, closed; lateral margin of pronotum not interrupted at middle . . . . . ***A. insanus*** **Candèze**
— Pronotosternal sutures deeply open; lateral margin of pronotum usually interrupted at middle . . . . . ***A. isabellinus*** **(Melsheimer)**

Agriotes arcanus Brown, 1933

Figures 58, 62

Agriotes arcanus Brown, 1933b: 178

Diagnosis. Size small, 7.0–9.0 mm in length; form slender, elongate. Color brown to dark brown; anterior edge and hind angles of pronotum and appendages frequently paler. Antenna 11-segmented, filiform, extending about one antennomere beyond apex of pronotal hind angle; antennomeres II and III combined equal to IV. Pronotum longer than wide, side parallel to slightly sinuate, convergent to apex of hind angle; punctures moderate, slightly umbilicate, separated by their diameters or less on disc, contiguous and very shallow on sides; interspaces somewhat shining; hind angle stout, divergent, with fine carina or ecarinate. Aedeagus with median lobe somewhat parallel, tapering close to apex to rounded apex; paramere slightly longer than wide, with two (sometimes three) prominent setae on ventral side just below apical blade.

Distribution. Northeastern United States and southern Ontario, west to Iowa and Minnesota and south to North Carolina (Becker 1956). In the Southeast, it has only been recorded from North Carolina (Becker 1956; Downie and Arnett 1996).

Specimens Examined. North Carolina (Rutherford). May. (Figure 58)

Discussion. This species is in the *limosus* group of Becker (1956). *Agriotes arcanus* is very similar to *A. oblongicollis* and males may be difficult to distinguish if the aedeagus is not examined. Females can be easier to separate, but again only if genitalia are examined. Typically, *A. arcanus* has slightly deeper, slightly umbilicate pronotal punctures, sides of pronotum straight before hind angles, stouter hind angles, and parameres with shorter apical blades and two (sometimes three) prominent setae on ventral side, just below apical blade. *Agriotes oblongicollis* has shallower, more distinctly umbilicate pronotal punctures, side of pronotum sinuate before hind angle, a more slender hind angle, and paramere with longer apical blades and no (or one) setae on ventral side below apical blade. Specimens in the study area were collected in Lindgren funnel traps.

Agriotes collaris (LeConte, 1853)

Figures 54, 58

Dolopius collaris LeConte, 1853: 456
Agriotes fucosus LeConte, 1853: 456, in part

Diagnosis. Size moderate, 10.0–11.0 mm in length; form slender. Bicolored; head black; pronotum brown-red with central oblong black macula; elytra brown-red; venter dark except hypomeron and mesepisternum red; legs and antennae brown-red; vestiture gray, moderate. Antenna 11-segmented, serrate, extending to, or falling short by one antennomere, apex of pronotal hind angle; antennomeres II and III subequal. Pronotum longer than wide, side slightly sinuate; punctures umbilicate, separated roughly by their own distance on disc, swallower and contiguous laterally; hind angle divergent, strongly unicarinate. Pronotosternal sutures strongly open. Elytron parallel in basal half, then narrowing to rounded apex; intervals slightly rugose. Aedeagus with median lobe broad, gradually tapering to nipple-like apex; paramere as long as median lobe, rounded apically with subapical lateral tooth. Female similar to male externally, except slightly larger and duller in color.

Distribution. Northeastern North America (Becker 1956). Becker (1956) did not record *A. collaris* south of Pennsylvania, however Roble and Hoffman (2012) added it to the fauna of Virginia. The following record from North Carolina represents a **New State Record**.

Specimens Examined. North Carolina (Swain). June. (Figure 58)

Discussion. The species is readily recognized in the study area by its size and color. The color is superficially similar to *Liotrichus vulneratus*, which has dark elytra. Historically, *A. collaris* has been placed in synonymy with *A. fucosus* (LeConte). The two are nearly identically externally (except for black elytra in *fucosus*) and have identical aedeagi (Becker 1956). Neither Becker (1956) nor Downie and Arnett (1996) recorded this species south of Pennsylvania. The single specimen examined was collected in Smokemont, NC and is part of the Löding collection housed at the GSAT.

Agriotes insanus Candèze, 1863

Figures 55, 59

Dolopius sordidus LeConte, 1853: 457 (nec *Elater sordidus* Illiger, 1807:7)
Agriotes insanus Candèze, 1863: 376

Diagnosis. Size small, 6.0–8.0 mm in length; form slightly robust. Color brown to dark brown; appendages usually paler; vestiture whitish, conspicuous, especially on pronotum, denser on odd elytral intervals than on even intervals. Antenna 11-segmented, slightly serrate, extending to, or one antennomerebeyond, apex of pronotal hind angle; antennomeres II and III subequal, combined about 1.4× length of IV. Pronotum slightly longer than wide, lateral side straight, uninterrupted at middle, often abruptly rounded to anterior apex; punctures deep, simple, separated by less than their own diameters on the disc, closer on the sides; interspaces usually shining; hind angle divergent, ecarinate. Pronotosternal sutures slightly concave, closed. Aedeagus with median lobe wide, nearly parallel towards apex, apex nipple-like; paramere slender at base, tapering slightly towards apex; apical blade with lateral acute spine; sclerotized portion on ventral side not covering median lobe. Female similar to male externally, but often slightly larger and with antenna falling failing to reach apex of pronotal hind angle.

Distribution. Primarily along the southern portion of the Great Lakes states, south and west to Texas. There are disjunct populations on the Texas-New Mexico border, western North Carolina to central Georgia, and in the northeast from New Hampshire to northernmost Virginia (Becker 1956). In the Southeast, it has been recorded from Georgia, North Carolina, South Carolina, and Tennessee (Wray 1950; Fattig 1951; Becker 1956; Kirk



Figures 54–57. *Agriotes* spp. **54)** *A. collaris* (habitus). **55)** *A. insanus* (habitus). **56)** *A. isabellinus* (habitus). **57)** *A. mancus* (habitus).

1970; Morrill 1978; Downie and Arnett 1996). The following records from Alabama and Mississippi represent **New State Records**.

Specimens Examined. Alabama (Lawrence); **Georgia** (Clarke, Fulton); **Mississippi** (Marshall); **North Carolina** (Ashe, Forsyth, Rutherford, Wake); **Tennessee** (Blount, Sevier). March–June. (Figure 59)

Discussion. *Agriotes insanus* is in the *sputator* group of Becker (1956). This is the only Nearctic species not having the pronotosternal sutures distinctly open. Otherwise, it is externally very similar to *A. isabellinus*. Adults in the study area have been collected at ultraviolet and mercury vapor light and in Lindgren funnel and flight intercept traps. Specimens from Lawrence County, AL (MEM) were collected on the flowers of roughleaf dogwood. Specimens from Marshall County, MS (MEM) were collected on the flowers of *Photinia*.

Agriotes isabellinus (Melsheimer, 1845)

Figures 56, 58

Dolopius isabellinus Melsheimer, 1845: 218

Diagnosis. Size small, 6.0–9.0 mm in length; form slender. Color light to dark brown; pronotum frequently darker than elytra; appendages often paler. Vestiture moderate, yellowish. Antenna 11-segmented, slightly serrate, extending to or one antennomere beyond apex of pronotal hind angle; antennomere III slightly longer than II, II and III combined nearly 1.4× length of IV. Pronotum slightly longer than wide, parallel to apical one-fourth or sinuate; lateral margin usually interrupted at middle; punctures simple, coarse, close, separated by one-third their diameter; interspaces shining; hind angle divergent, carina, if present, close to lateral margin. Pronotosternal sutures open. Aedeagus, but median lobe nearly always noticeably longer than lateral lobes; parameres with apical blade reduced to a lateral tooth, apex rounded or acutely pointed (if rounded, lateral tooth usually well below apex, while if pointed then lateral tooth generally close to apex). Female similar to male externally, but antenna extending to, or up to two antennomeres short of, pronotal hind angle.

Distribution. Generally distributed in the Northeast, west to Kansas and Nebraska and south to extreme northern Georgia and South Carolina (Becker 1956). In the Southeast, previously recorded from Georgia, North Carolina, South Carolina, and Tennessee (Becker 1956; Kirk 1970; Downie and Arnett 1996). As this species ranges into the Southeast, it seems to be somewhat limited to the Blue Ridge ecoregion and adjacent parts of upper Piedmont and Ridge and Valley.

Specimens Examined. North Carolina (Haywood, Rutherford); **Tennessee** (Sevier). April–May. (Figure 58)

Discussion. This species is in the *sparsus* group of Becker (1956), and the only eastern member of this group. *Agriotes isabellinus* appears highly variable in size, color, and aedeagus but there does not appear to be any correlation in the variation. Specimens in the study area have been collected in Lindgren funnel and Malaise traps.

Agriotes mancus (Say, 1823)

Figures 57–58

Elater mancus Say, 1823: 171
Agriotes striatulus Melsheimer, 1845: 217

Diagnosis. Size small, 6.5–8.5 mm in length; form robust. Color brown, pronotum occasionally darker than elytra; vestiture gray to yellow-gray, moderately dense, often denser on odd elytral intervals than even intervals. Antenna 11-segmented, serrate, extending up to, or one antennomere beyond, apex of pronotal hind angle; antennomeres II and III subequal. Pronotum subquadrate, slightly wider than long; punctures dense, deeply umbilicate; hind angle slightly divergent, unicarinate. Pronotosternal sutures strongly open. Elytron slightly divergent to middle, then rounding to apex; intervals rugose, micro-punctate. Aedeagus with median lobe narrowed basally then widening apically to broadly rounded apex; paramere with elongate lateral lobe, lateral tooth acute. Female similar to male externally, except sometimes slightly larger and with a slightly longer antennomere III.

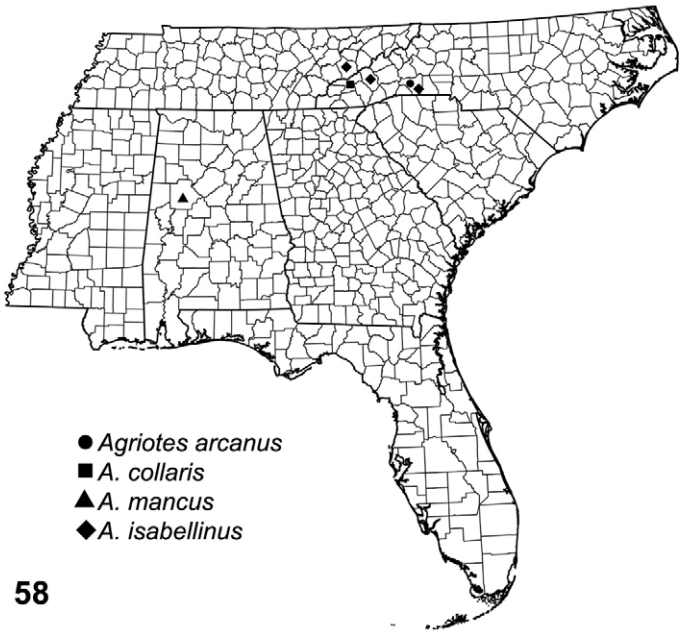


Figure 58. Distributional data for *Agriotes arcanus*, *A. collaris*, *A. mancus*, and *A. isabellinus*.

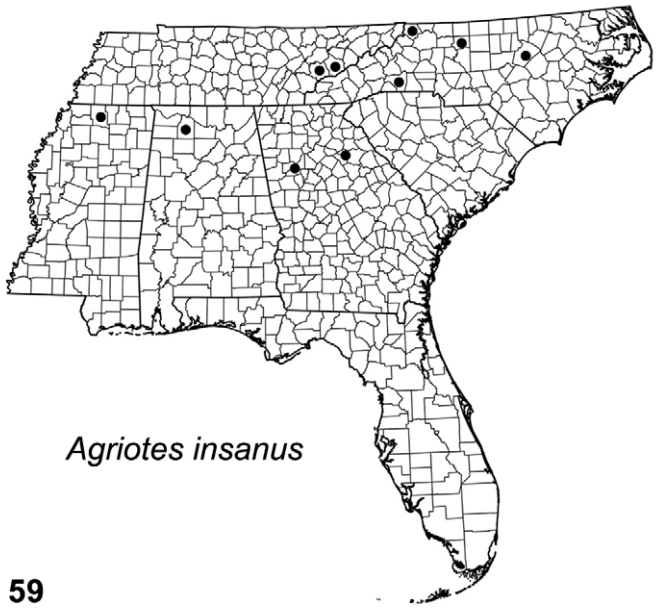


Figure 59. Distributional data for *Agriotes insanus*.

Distribution. Northeastern North America, west to North Dakota (Becker 1956). Previously not recorded from the Southeast. The following record from Alabama represents a **New State Record**.

Specimens Examined. Alabama (Tuscaloosa). March. (Figure 58)

Discussion. Among *Agriotes* spp. in the Southeast, *A. mancus* is readily recognized by its robust form and wide, subquadrate pronotum. This species had not been previously recorded from the Southeast. The single specimen (GSAT) examined was collected in Tuscaloosa, AL in 1976. This record might represent an unestablished introduction. Tuscaloosa is in the transition area between Ridge and Valley and the lower portions of the southwestern Appalachians, so its presence in north-central Alabama is possible.

Agriotes oblongicollis (Melsheimer, 1845)

Figures 60–61, 63

Dolopius oblongicollis Melsheimer, 1845: 216

Diagnosis. Size moderate, 7.0–10.0 mm in length; form slender, elongate. Color brown to dark brown; anterior edge and hind angles of pronotum and appendages frequently paler. Antenna 11-segmented, filiform, extending 1–2 antennomeres beyond apex of pronotal hind angle; antennomere II slightly longer than III; II and III together subequal to IV. Pronotum longer than wide, side slightly sinuate before hind angle; punctures distinctly umbilicate, very shallow, and close, separated by one-half or less their diameters, becoming contiguous on sides; interspaces shining or reticulated and dull; hind angle slender, divergent, unicarinate or ecarinate. Pronotosternal sutures open, but not deeply. Aedeagus with median lobe gradually tapering to rounded apex; paramere with apical blade distinctly longer than wide; side of blade rounded or straight to acutely rounded apex; no (or rarely one small) setae on ventral side of lateral lobe below apical blade. Female similar to male externally, except antenna generally shorter, extending up to one antennomere beyond apex of pronotal hind angle.

Distribution. This species has a similar distribution to *A. isabellinus*, ranging from the Northeast, south and west to Missouri and northernmost Georgia (Becker 1956). As the species reaches the Southeast, it appears to



Figures 60–62. *Agriotes* spp. **60)** *A. oblongicollis* (habitus). **61)** *A. oblongicollis* (close-up of pronotum). **62)** *A. arcanus* (close-up of pronotum).

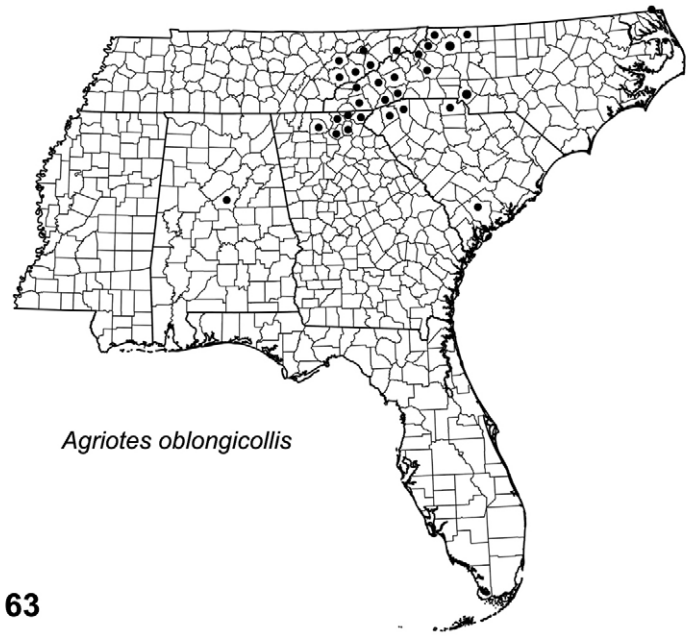


Figure 63. Distributional data for *Agriotes oblongicollis.*

be somewhat limited to the Blue Ridge and adjacent upper Piedmont and Ridge and Valley ecoregions. In the Southeast, it has been recorded from Georgia, North Carolina, South Carolina, and Tennessee (Brimley 1938; Fattig 1951; Becker 1956; Kirk 1970; Downie and Arnett 1996; Buck et al. 2005). The following record from Alabama represents a **New State Record**.

Specimens Examined. Alabama (Shelby); **Georgia** (Gilmer, Lumpkin, Rabun, Towns, Union, White); **North Carolina** (Ashe, Avery, Buncombe, Burke, Camden, Haywood, Henderson, Macon, Mecklenburg, Surry, Swain, Transylvania, Watauga, Wilkes counties, also along the Blue Ridge Parkway); **South Carolina** (Colleton, Greenville, Pickens, York); **Tennessee** (Blount, Cocke, Hamblen, Knox, Sevier, Unicoi). March–July. (Figure 63)

Discussion. This species is closely related to *A. arcanus* in the *limosus* group of Becker (1956). At times, the males may be difficult to separate if the aedeagus is not examined (see Discussion under *arcanus*). Females can be easier to separate, but again only if genitalia are examined. This species has been readily collected where it occurs in the study area. Most specimens have been collected at ultraviolet or mercury vapor light, by sweeping and beating vegetation, or in Lindgren funnel, Malaise, and flight intercept traps. Specimens from the Great Smoky Mountains National Park in North Carolina and Tennessee (ECUT) were collected on flowering dogwood.

Dalopius Eschscholtz, 1829

Dalopius Eschscholtz, 1829: 34

Diagnosis. Relatively small; form depressed or, less commonly, subcylindrical. Color variable, yellowish to dark brown to nearly black; often with anterior edge of pronotum, appendages, and elytral umbone paler, sometimes elytron distinctly striped; vestiture fine, pale. Antenna 11-segmented, filiform, extending beyond apex of pronotal hind angle in most species. Supra-antennal carinae incomplete, directed towards meson. Lateral margin of pronotum straight, entire, not deflexed, joins anterior edge well-removed from pronotosternal suture. Pronotosternal sutures slightly concave anteriorly. Metacoxal plate strongly, but not suddenly, widened interiorly. Elytron elongate, apex rounded or truncate. Aedeagus variable; median lobe usually rounded at apex, often compressed medially or gradually tapering to rounded apex; paramere of various length in relation to median lobe, usually with apical blade or lateral tooth of various size and shape. Females externally similar to males; antenna usually shorter but not always noticeably so.

Range and Numbers. Johnson (2002) indicated there are 54 species in North America. The last review of the group was by Brown (1934), who described 42 of the species. There have been additional species descriptions after Brown's work. Several undescribed species await description, probably even more to be discovered. Only four species have been previously recorded from the Southeast, and one of those is doubtful. Six additional species are added here. As the ranges for many of the species described by Brown (1934) are not well-defined, several more may be eventually found in the study area.

Discussion. Of all the elaterid genera in North America, *Dalopius* is probably the one most in need of an updated, formal revision. Brown (1934) described 42 species but did not cover in detail previously described species. Many of his species were described on the basis of small samplings and the full extent of their morphological variations and geographic distributions are probably not known. Becker (1956) transferred three species from *Agriotes* to *Dalopius* and Knull (1947a) and Mathison (2014) described three additional species. The status of *Dalopius pauper* LeConte, 1853 is unknown (see Discussion below under *gentilis*). The most important criteria for species-level identification are the aedeagus, relative lengths of antennomeres II, III, and IV, shape of elytral apex, size, and color. Females of most species are best identified in association with males, but sometimes can be identified alone with a strong understanding of local fauna (Brown 1934).

Key to the species of *Dalopius* in the Southeast

1. Aedeagus with median lobe serrate laterally. . . . . ***D. porosus* (Van Dyke)**
— Aedeagus with median lobe not serrate laterally **2**

2(1). Aedeagus with apex of paramere emarginate **3**
— Aedeagus with apex of paramere not emarginate **5**

3(2). Aedeagus with median lobe broad and flat, not medially compressed, not carinate . . . . . ***D. cognatus* Brown**
— Aedeagus with median lobe laterally compressed, two carinae separate the lateral and dorsal faces **4**

4(3). Size larger, 8.0–8.5 mm in length; aedeagus longer and more slender, slightly more than 5× longer than wide . . . . . ***D. allegheniensis* Knull**
— Size smaller, 5.0–7.0 mm in length; aedeagus shorter, slightly more than 3× longer than wide . . . . . ***D. vagus* Brown**

5(2). Aedeagus with apex of paramere angulate . . . . . ***D. mississippiensis* Mathison**
— Aedeagus with apex of paramere rounded **6**

6(5). Aedeagus with outer edge of paramere with acute tooth . . . . . ***D. ohioensis* Knull**
— Aedeagus with outer edge of paramere subacute at base, broadly rounded anteriorly **7**

7(6). Aedeagus with median lobe subparallel, gradually tapering to rounded apex; phallobase at least half the length of entire aedeagus . . . . . ***D. virginicus* Brown**
— Aedeagus with median lobe laterally compressed (may be slightly so), broadly rounded apically; phallobase less than half the length of entire aedeagus **8**

8(7). Aedeagus with median lobe slightly compressed medially; color red-brown, elytron immaculate . . . . . ***D. pennsylvanicus* Brown**
— Aedeagus with median lobe noticeably compressed medially; color very dark brown to nearly black, elytron with broad pale vitta running nearly the entire length . . . . . ***D. gentilis* Brown**

Dalopius allegheniensis Knull, 1947

Figure 66

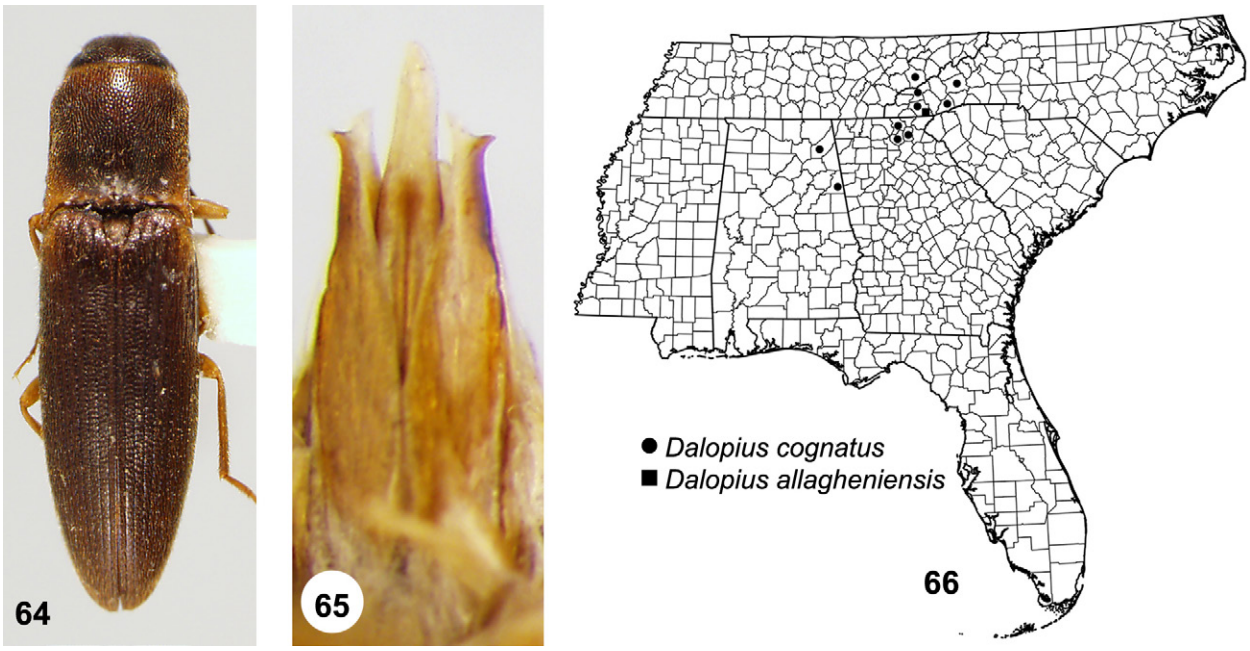
Dalopius allegheniensis Knull, 1947a: 90

Diagnosis. Size small, 8.0–8.5 mm in length; form elongate. Color dark brown, antennae paler; basal antennomeres, apical pronotal margin, and pronotal hind angle pale red-yellow. Antenna 11-segmented, filiform, extending beyond apex of pronotal hind angle by more than two antennomeres; antennomere IV subequal to II and III combined. Pronotum longer than wide; coarsely, shallowly punctured, punctures on disc separated by less than their own diameters; hind angle moderately produced, carinate. Elytron subparallel, truncate at apex. Aedeagus long and slender, slightly more than 5× as long as wide; median lobe medially compressed, widening subapically to rounded apex, sides carinate; paramere emarginate at apex, apical portion membranous. Female undescribed.

Distribution. Previously known from Ohio and Pennsylvania (Knull 1947a). Previously not recorded from the Southeast. The following record from North Carolina (BYU) represents a **New State Record**.

Specimens Examined. North Carolina (Macon). May. (Figure 66)

Discussion. This species is most similar to *D. vagus* but is slightly larger and has an aedeagus with a longer median lobe.



Figures 64–66. *Dalopius* spp. **64)** *D. cognatus* (habitus). **65)** *D. cognatus* (aedeagus). **66)** Distributional data for *D. cognatus* and *D. allegheniensis*.

Dalopius cognatus Brown, 1934

Figures 64–66

Dalopius cognatus Brown, 1934: 38

Diagnosis. Size small, 6.5–7.5 mm in length; form elongate. Color dark brown; basal antennomeres, apical margin and hind angle of pronotum, and macula on humeral umbone pale red-yellow; legs pale red-brown. Antenna 11-segmented, filiform, extending beyond apex of pronotal hind angle by up to three antennomeres; antennomere IV three-fourths as long as II and III combined. Pronotum as long as wide; coarsely, shallowly punctured, punctures on disc separated by less than their own diameters; hind angle moderately produced, carinate. Elytron subparallel, truncate at apex. Aedeagus (Figure 65) with median lobe broad, flat, subparallel, gradually tapering to rounded apex; paramere emarginate at apex, apical portion membranous. Female similar to male externally but slightly larger and antenna shorter, exceeding apex of pronotal hind angle by up to one antennomere.

Distribution. Eastern Canada, south to West Virginia (Downie and Arnett 1996). Previously not recorded from the Southeast. The following records from Alabama, Georgia, North Carolina, and Tennessee represent **New State Records**.

Specimens Examined. Alabama (Cleburne, DeKalb); **Georgia** (Lumpkin, Union, White); **North Carolina** (Buncombe, Macon, Swain, Transylvania); **Tennessee** (Sevier). May–August. (Figure 66)

Discussion. This species is in the *cognatus* group of Brown (1934). This group contains eastern species characterized by having a truncated elytral apex, aedeagus with phallobase longer than the median lobe, and generally being dark in color with a pale macula on the elytral humeral umbone. Separation of the species in this group is best accomplished by examination of the aedeagus. Specimens in the study area have been collected at ultraviolet and mercury vapor light. Three specimens (NCSU) from Black Mountain, NC (Buncombe County) are the basis for Brimley's (1938) record of *D. virginicus* in North Carolina.

Dalopius gentilis Brown, 1934

Figures 67–68, 71

Dalopius gentilis Brown, 1934: 71

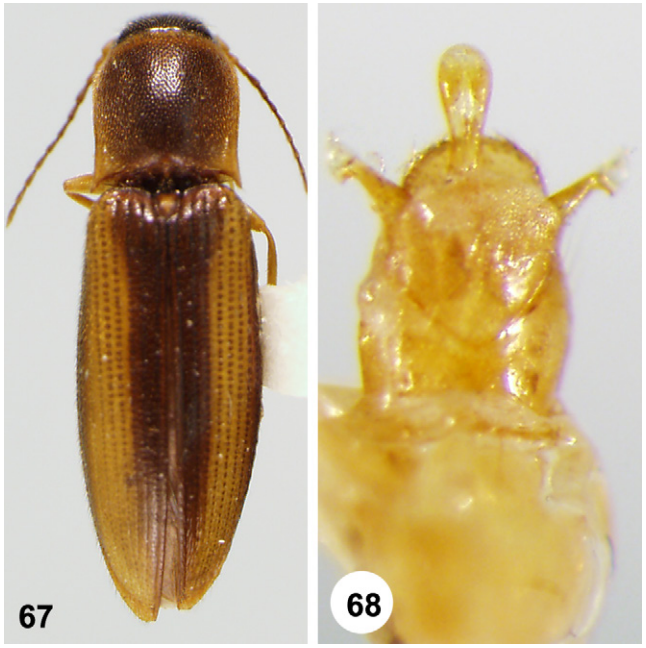
Diagnosis. Size small, 5.5–6.6 mm in length; form elongate, not narrow. Color brown; antennae and legs red-brown; basal antennomeres, pronotal margin, and a vitta on each elytron pale yellow-brown. Antenna 11-segmented, filiform, extending beyond apex of pronotal hind angle by up to two antennomeres; antennomere IV two-thirds length of II and III combined. Pronotum as long as wide; coarsely, shallowly punctured, punctures on disc separated by less than their own diameters; hind angle moderately produced, carinate. Elytron elongate, broadest medially, truncate at apex. Aedeagus (Figure 68) with median lobe medially compressed, widening broadly to rounded apex; paramere with apical blade, base of blade subacute, strongly arcuate to subacute apex. Female similar to male externally, but antenna shorter, exceeding apex of pronotal hind angle by up to one antennomere.

Distribution. Eastern Canada, south to New York (Downie and Arnett 1996). Previously not recorded from the Southeast. The following records from Georgia, North Carolina, and Tennessee represent **New State Records**. (Figure 71)

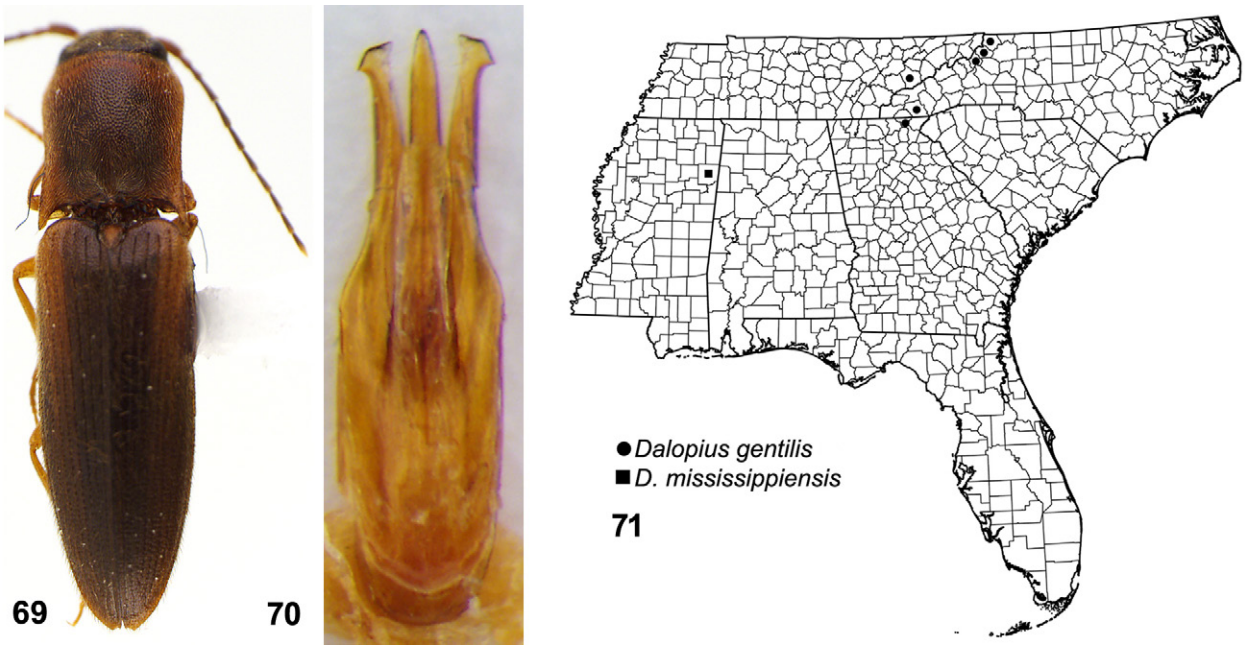
Specimens Examined. Georgia (Towns); **North Carolina** (Ashe, Avery, Macon, Watauga); **Tennessee** (Sevier). May–July.

Discussion. The size, color, and characteristics of the aedeagus make this species readily identifiable in the Southeast. The species is in the *vernus* group of Brown (1934). Species in this group are characterized by having the phallobase of the aedeagus shorter than the median lobe, and the median lobe not carinate nor serrate. To date, this is the only species of the *vernus* group recorded in the Southeast. There are two related species in the Northeast, *D. agnellus* Brown and *D. brevicornis* Brown, that cannot be reliably separated based on aedeagi.

As previously mentioned, the status of *D. pauper* is unknown. The type was indicated as being collected in the 'Atlantic States' which may include the current study area. Brown (1934) did not include it in his treatment of the genus and speculated it is 'probably a concept based on several species'. LeConte's type in the MCZ is a female, so its precise identity is not known. The form and color of the pronotum and elytra is similar to that in



Figures 67–68. *Dalopius gentilis*. **67)** Habitus. **68)** Aedeagus.



Figures 69–71. *Dalopius* spp. **69)** *D. mississippiensis* (habitus). **70)** *D. mississippiensis* (aedeagus – HOLOTYPE). **71)** Distributional data for *D. gentilis* and *D. mississippiensis*.

specimens of *D. gentilis* examined from the Southeast, and if a formal revision is ever completed, the two may turn out to be conspecific, in which case LeConte's name would have priority.

Specimens in the study area have been collected by beating vegetation and in Malaise traps.

Dalopius mississippiensis Mathison, 2014

Figures 69–71

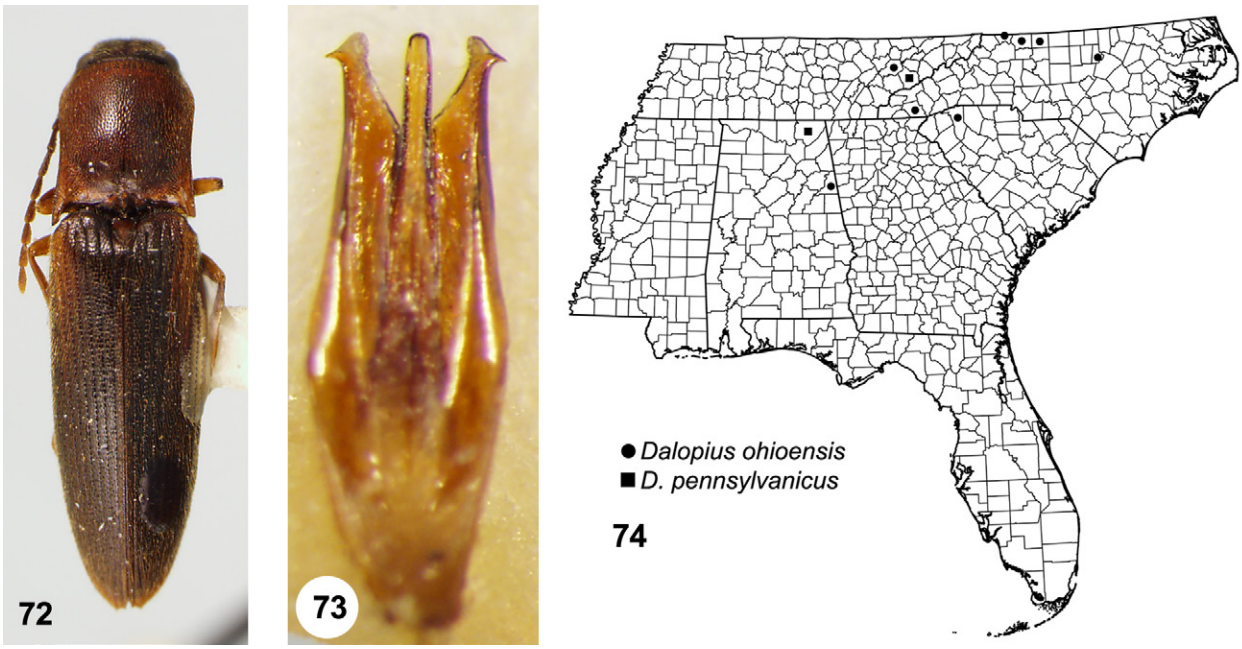
Dalopius mississippiensis Mathison, 2014: 1

Diagnosis. Size small, 6.5–7.0 mm in length; form elongate, slightly convex. Color dark brown; venter, legs, basal two antennomeres, and humeral macula reddish. Antenna 11-segmented, filiform, extending beyond apex of pronotal hind angle by about two antennomeres; antennomere II shorter than III; II and III combined subequal to IV. Pronotum longer than wide, widest anteriorly, slightly concave at base of hind angle; punctures shallow, dense, umbilicate, separated by a less than their own diameters; hind angle slightly divergent, unicarinate. Elytron fusiform, truncate at apex. Aedeagus (Figure 70) with phallobase large, nearly half the length of entire aedeagus; median lobe gradually tapering to subacute apex; paramere with prominent shoulder basally, gradually narrowing to subacute apex, outer lateral margin angulate, with acute lateral expansion. Female unknown.

Distribution. Currently known only from the type locality in Monroe County, Mississippi (Mathison 2014).

Specimens Examined. Mississippi (Monroe). April. (Figure 71)

Discussion. Mathison (2014) placed *D. mississippiensis* in Brown's (1934) *cognatus* group based on the size of the phallobase, humeral maculae on the elytra, and truncate elytral apices. This species differs from other members of the *cognatus* group by having the lateral margins of the apical portions of the parameres angulate. This species also represents the southernmost type locality for a *Dalopius* in eastern North America, having been described from the Fall Line Hills subregion of the Southeastern Plains. Specimens have been collected at ultraviolet light.



Figures 72–74. *Dalopius* spp. **72)** *D. ohioensis* (habitus). **73)** *D. ohioensis* (aedeagus). **74)** Distributional data for *D. ohioensis* and *D. pennsylvanicus*.

Dalopius ohioensis Knull, 1947

Figures 72–74

Dalopius ohioensis Knull, 1947a: 91

Diagnosis. Size small, 8.0–9.0 mm in length; form narrow, elongate. Color dark brown; anterior margin and sides of pronotum, scutellum, legs, and humeral umbone paler. Antenna 11-segmented, filiform, extending beyond apex of pronotal hind angle by up to three antennomeres; antennomere II shorter than III; II and III combined subequal to IV. Pronotum longer than wide, widest at base of hind angle; finely, densely punctate, punctures more numerous laterally and basally; hind angle divergent, strongly carinate. Elytron subparallel, truncate at apex. Aedeagus (Figure 73) slightly variable; median lobe subparallel, slightly constricted at mid-length, broadly rounded to apex; paramere as long, or slightly longer than, median lobe, lateral spine acute, straight or slightly concave to rounded apex; membranous at apex. Female similar to male externally except with slightly shorter antenna, extending beyond apex of pronotal hind angle by one antennomere.

Distribution. Currently recorded only from Ohio (Knull 1947a; Downie and Arnett 1996). The following records from Alabama, North Carolina, South Carolina, and Tennessee represent **New State Records**.

Specimens Examined. Alabama (Cleburne); **North Carolina** (Alleghany, Durham, Macon, Stokes, Surry); **South Carolina** (Greenville); **Tennessee** (Knox). April–July. (Figure 74)

Discussion. This species will key next to *D. vetulus* Brown in Brown's (1934) paper (Knull 1947a). Externally, it is very similar to *D. virginicus* in the study area and examination of male genitalia should be done to confirm its identity. There is some variability in aedeagi between the Ohio and southeastern specimens, and further work may have to be done to determine if they represent one species or are part of a larger species complex. The female has yet to be formally described; the above observations are based on a female associated with a male from Greenville County, SC (CUAC). Specimens in the study area have been collected at ultraviolet light.

Dalopius pennsylvanicus Brown, 1934

Figures 74–76

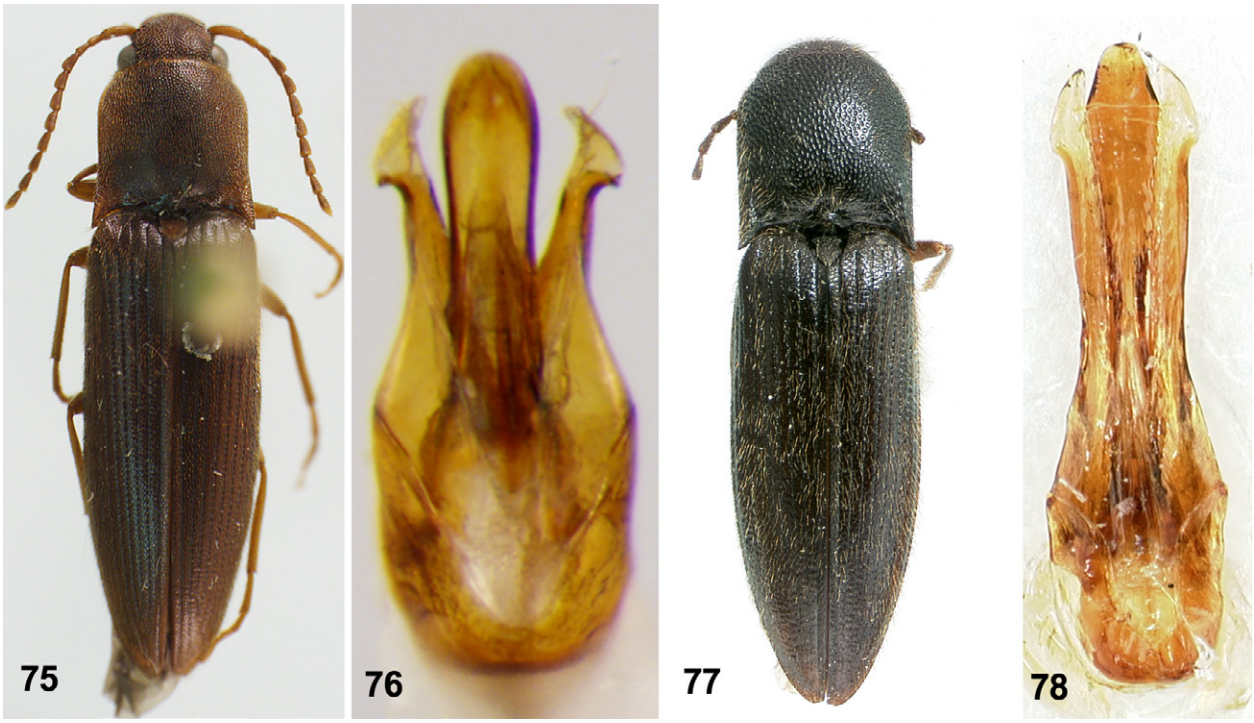
Dalopius pennsylvanicus Brown, 1934: 68

Diagnosis. Size small, 7.5–9.0 mm in length; form elongate, not narrow. Color solid red-brown (pronotal hind angle may be slightly paler). Antenna 11-segmented, filiform, extending beyond apex of pronotal hind angle by up to two antennomeres; antennomeres II and III subequal, combined slightly longer than IV. Pronotum subquadrate; punctures shallow, umbilicate, dense, separated by less than their own diameters; hind angle slightly divergent, carina distinct. Elytron strongly truncate apically, inner margin shorter than outer. Aedeagus (Figure 76) with median lobe slightly compressed medially, broadly rounded apically; paramere not emarginate. No sexual dimorphism described.

Distribution. Northeastern North America (Downie and Arnett 1996). Previously not recorded from the Southeast. The following records from Alabama and Tennessee represent **New State Records**, although Löding's (1945) record of *D. lateralis* from Monte Sano, AL (Madison County) refers to this species.

Specimens Examined. Alabama (Madison); **Tennessee** (Sevier). April–June.(Figure 74)

Discussion. *Dalopius pennsylvanicus* is in Brown's (1934) *vernus* group. The species can be recognized by its larger, broader form, subquadrate pronotum, solid brown color, strongly truncate elytral apex, and aedeagus. Specimens in the study area have been collected in Malaise traps.



Figures 75–78. *Dalopius* spp. **75)** *D. pennsylvanicus* (habitus). **76)** *D. pennsylvanicus* (aedeagus). **77)** *D. porosus* (habitus – HOLOTYPE). **78)** *D. porosus* (aedeagus – HOLOTYPE). *Dalopius porosus* photo courtesy Michael Krasnobrod and Michele Esposito (California Academy of Sciences, San Francisco, CA).

Dalopius porosus (Van Dyke, 1932)

Figures 77–78

Agriotes porosus Van Dyke, 1932: 449

Diagnosis. Size small, 8.0 mm in length; form elongate, subcylindrical. Color black, antennae and legs paler. Antenna 11-segmented, filiform, extending beyond apex of pronotal hind angle by about one antennomere; antennomeres II and III subequal, together about three-fourths the length of IV. Pronotum slightly longer than broad, very convex, side parallel to hind angle; punctures shallow, umbilicate, dense, separated by less than their own diameters; hind angle not divergent, carina distinct and slightly divergent from sides. Elytron elongate, gradually narrowing from middle to apex; apex truncate. Aedeagus (Figure 78) with median lobe serrate laterally, broadest subapically, truncate at apex; paramere with weak apical blade, evenly rounded to subacute apex. Female unknown.

Distribution. This species is currently known only from the type locality in the Black Mountains (Buncombe County) of North Carolina (Van Dyke 1932; Brimley 1938; Becker 1956).

Specimens Examined. None.

Discussion. Van Dyke (1932) described this species in *Agriotes*. Becker (1956) did not examine the specimen for his revision of *Agriotes*, but through colleagues was able to determine it belonged in *Dalopius* and transferred it accordingly. To date, it is still known only from the holotype collected in the Black Mountains of North Carolina. The above description is based on Van Dyke's original description (1932) as well as examination of digital images of the holotype, courtesy of the California Academy of Sciences where it is housed. The serrate median lobe is a characteristic of Brown's (1934) *validus* group. Most members of the group occur along the West Coast, with only *D. mirabilis* Brown recorded from the East (Minnesota to Quebec).

Dalopius vagus Brown, 1934

Figures 79–81

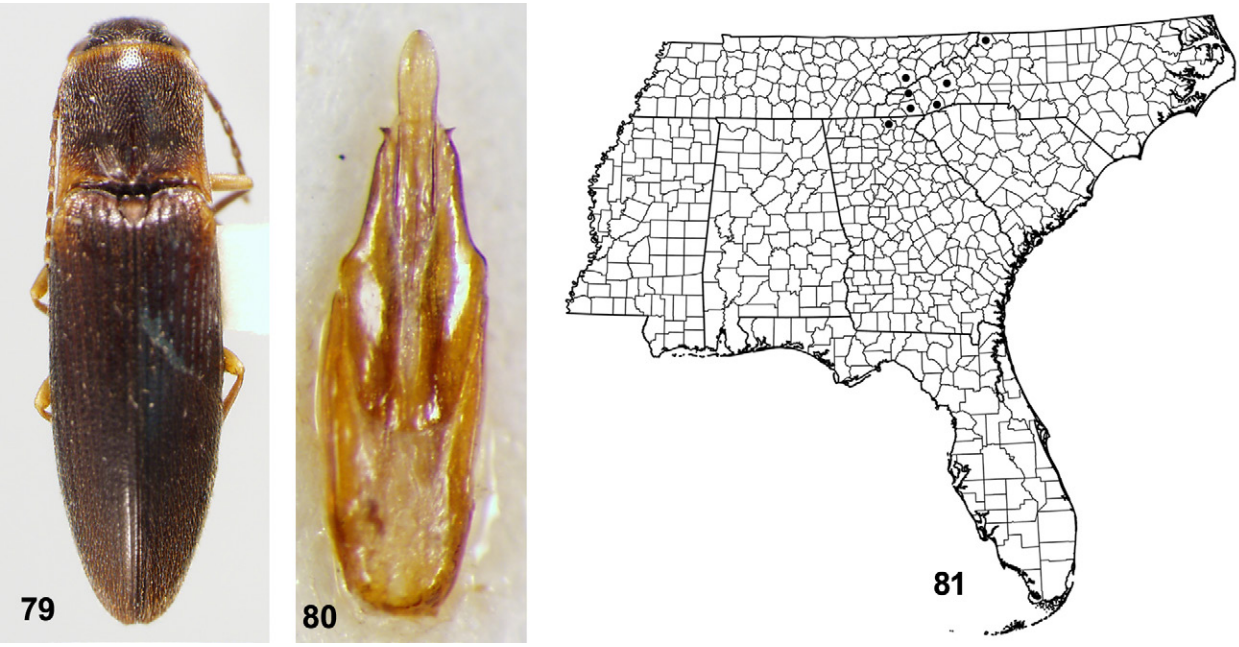
Dalopius vagus Brown, 1934: 66

Diagnosis. Size small, 5.0–7.0 mm in length; form elongate, not narrow. Color dark brown, antennae paler; basal antennomeres, apical pronotal margin and pronotal hind angle, and macula on humeral umbone pale red-yellow. Antenna 11-segmented, filiform, extending beyond apex of pronotal hind angle by up to two antennomeres; antennomere IV subequal to II and III combined. Pronotum as long as wide; coarsely, shallowly punctured, punctures on disc separated by less than their own diameters; hind angle moderately produced, carinate. Elytron subparallel, truncate at apex. Aedeagus (Figure 80) shorter, slightly more than 3× as long as wide; median lobe medially compressed, widening subapically to rounded apex, sides carinate; paramere emarginate at apex, apical portion membranous. Female similar to male externally but slightly larger and with shorter antenna, exceeding apex of pronotal hind angle by up to one antennomere.

Distribution. Eastern Canada, south to West Virginia (Downie and Arnett 1996). Previously not recorded from the Southeast. The following records from Georgia, North Carolina, and Tennessee represent **New State Records**.

Specimens Examined. Georgia (Union); **North Carolina** (Ashe, Buncombe, Macon, Swain, Transylvania); **Tennessee** (Sevier). April–July. (Figure 81)

Discussion. This is another species is in the *cognatus* group of Brown (1934), and like other species in this group a critical examination of the aedeagus is the best method for an accurate identification. The emarginate paramere is most similar to that of *D. cognatus* and *D. allegheniensis*. It is best-separated from *D. cognatus* by having



Figures 79–81. *Dalopius vagus*. **79)** Habitus. **80)** Aedeagus. **81)** Distributional data.

a laterally compressed, carinate median lobe and from *D. allegheniensis* by being slightly smaller and having a shorter, broader aedeagus. Specimens have been collected by sweeping vegetation.

Dalopius virginicus Brown, 1934

Figures 82–84

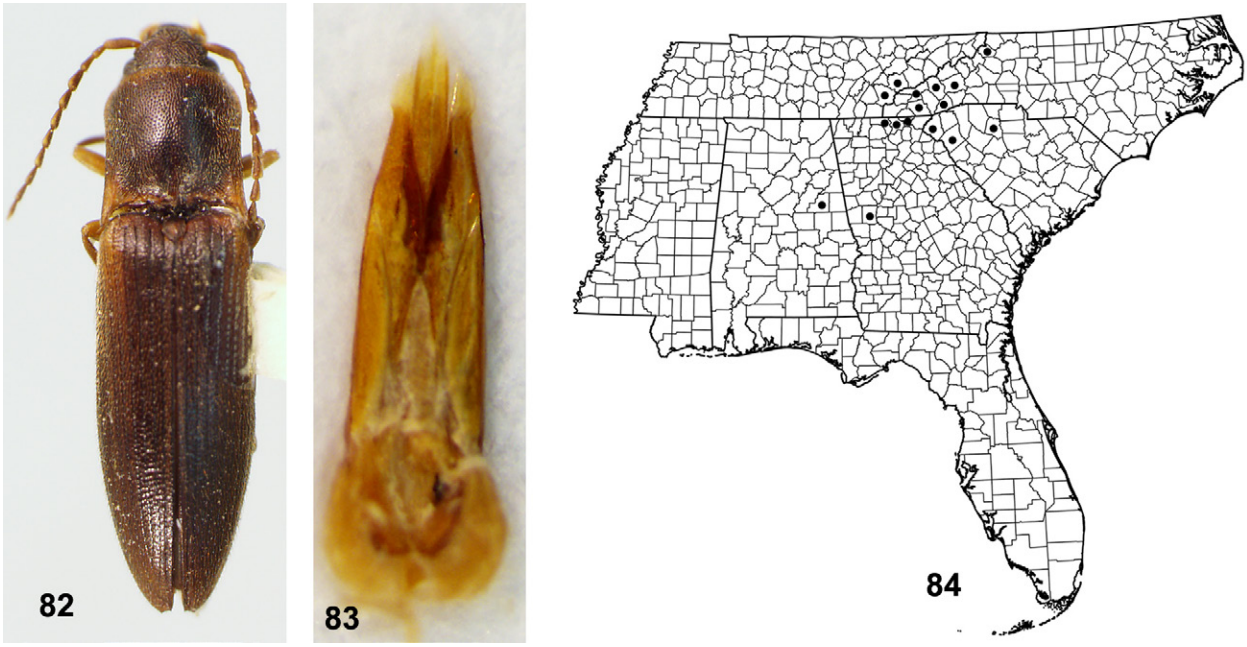
Dalopius virginicus Brown, 1934: 38

Diagnosis. Moderately small, 7.0–8.0 mm in length; form narrow, elongate. Color dark brown; anterior margin and sides of pronotum, pronotal hind angles, legs, and humeral umbone paler. Antenna 11-segmented, filiform; extending beyond apex of pronotal hind angle by up to three antennomeres; antennomeres II and III combined subequal to IV. Pronotum nearly as wide as long, coarsely, shallowly punctured; hind angle moderately divergent, carinate. Elytron subparallel, truncate at apex. Aedeagus with median lobe broad, flat, and not carinate, gradually tapering to rounded apex, slightly longer than parameres; paramere with bluntly pointed lateral projections, tapering to semi-acute apex.

Distribution. Mid-Atlantic United States (Downie and Arnett 1996). In the Southeast, it has been recorded from Georgia (Fattig 1951) and North Carolina (Brimley 1938). While the species' presence in North Carolina was confirmed in this study, the record by Brimley (1938) is based on a misidentification (see below). Fattig's (1951) records of *D. lateralis* from Blue Ridge, GA (Fannin County) pertains to this species. The following records from Alabama, South Carolina, and Tennessee represent **New State Records**.

Specimens Examined. Alabama (Clay); **Georgia** (Fannin, Meriwether, Towns, Union); **North Carolina** (Buncombe, Haywood, Macon, Swain, Transylvania, Watauga); **South Carolina** (Anderson, Oconee, Union); **Tennessee** (Blount, Monroe). March–June. (Figure 84)

Discussion. This is another species in the *cognatus* group of Brown (1934), and like other species in this group a critical examination of the aedeagus is the best method for an accurate identification. I have examined the



Figures 82–84. *Dalopius virginicus*. **82)** Habitus. **83)** Aedeagus. **84)** Distributional data.

specimens (NCSU) that were the basis of Brimley's (1938) record from Black Mountain, NC, and identified them as *D. cognatus*. Specimens in the study area were collected in Malaise traps, by beating and sweeping vegetation, and at ultraviolet and mercury vapor light.

Pomachiliini Candèze, 1859

In North America, the tribe Pomachiliini contains two genera: *Idolus*, transcontinental in the North and in the West Coast, with two species reaching the Southeast, and *Leptoschema* Horn, which is restricted to California (Johnson 2002). Adults are elongate and usually slender. Supra-antennal carinae complete, slightly to moderately arcuate, well-separated from labrum (deflexed in one *Idolus*). Antenna 11-segmented, filiform to serrate. Pronotum elongate, often wider anteriorly. Prosternum usually arcuate anteriorly. Elevated margin on the hypomeron at the pronotosternal sutures, open or not anteriorly. Scutellum truncate anteriorly. Mesocoxae open to both mesepimeron and mesepisternum. Meso- and metasternum not fused, joined by a definite suture. Tarsomeres with or without membranous lobes; tarsomere I usually as long as II and III combined; claws simple, without basal setae.

Idolus Desbrochers des Loges, 1875

Idolus Desbrochers des Loges, 1875: 42
Agriotella Brown, 1933b: 179

Diagnosis. Size small, form subcylindrical. Supra-antennae carinae complete, evenly rounded and well above the labrum (deflexed in *debilis*). Antenna 11-segmented, feebly serrate; antennomere I long, cylindrical; II slightly longer than III; IV slightly longer than II. Pronotum convex, subparallel laterally, strongly arcuate at anterior angle; hind angle weakly divergent. Prosternum with anterior lobe short, strongly deflexed. Elevated margin on the hypomeron at the pronotosternal sutures, strongly open anteriorly. Metacoxal plate strongly but

strongly narrowed laterally, posterior margins not angulate. Tarsomeres lacking membranous lobes; tarsomere I and II combined subequal to remaining tarsomeres; claw simple, without basal setae.

Range and Numbers. There are five species in North America (Johnson 2002), distributed in the northern and western states and provinces. One species has been recorded in the Southeast, with a second added here.

Discussion. The last treatment of this genus for North America was by Brown (1933b) as *Agriotella*. In that paper, he recognized four species. Johnson (2001) transferred *Drasterius debilis* to *Agriotella*. Cate (2007) synonymized *Agriotella* with *Idolus*. Members of this genus are similar to those in Synaptini and Agriotini but usually differ in the form of the supra-antennal carinae.

Key to the species of *Idolus* in the Southeast

1. Supra-antennal carinae directed downwards towards and close to labrum; pronotal hind angle ecarinate; aedeagus with paramere lacking subapical lateral projection . . . . . ***I. debilis* (LeConte)**
— Supra-antennal carinae well-elevated above labrum; pronotal hind angle unicarinate; aedeagus with paramere possessing subapical lateral projection . . . . . ***I. bigeminatus* (Randall)**

Idolus bigeminatus (Randall, 1838)

Figures 85, 87

Elater bigeminatus Randall, 1838: 37

Diagnosis. Size small, 4.0–5.5 mm in length. Bicolored; black, each elytron with yellow-orange humeral and subapical maculae; legs brown-yellow. Supra-antennal carinae arcuate and well-separated above labrum. Antenna 11-segmented, weakly serrate, not reaching apex of pronotal hind angle; antennomere I long. Pronotum convex, subparallel laterally, strongly arcuate at anterior angle; punctures dense, shallow, umbilicate; hind angle weakly divergent, unicarinate with strong carina. Tarsomeres I and II combined subequal to remaining tarsomeres. Aedeagus with median lobe broad basally, slightly narrowed medially, broadly rounded apex; paramere subparallel internally, broadly arcuate from shoulder externally; acute subapical lateral projection; evenly tapering to broadly rounded apex. Female similar to male externally but with slightly shorter antennae.

Distribution. Northeastern North America (Downie and Arnett 1996). In the Southeast, it has been recorded from Georgia, North Carolina, and South Carolina (Leng 1910; Brimley 1938; Fattig 1951; Kirk 1970). The following records from Tennessee represent a **New State Record**.

Specimens Examined. North Carolina (Buncombe, Watauga); **South Carolina** (Pickens); **Tennessee** (Sevier). May–August. (Figure 87)

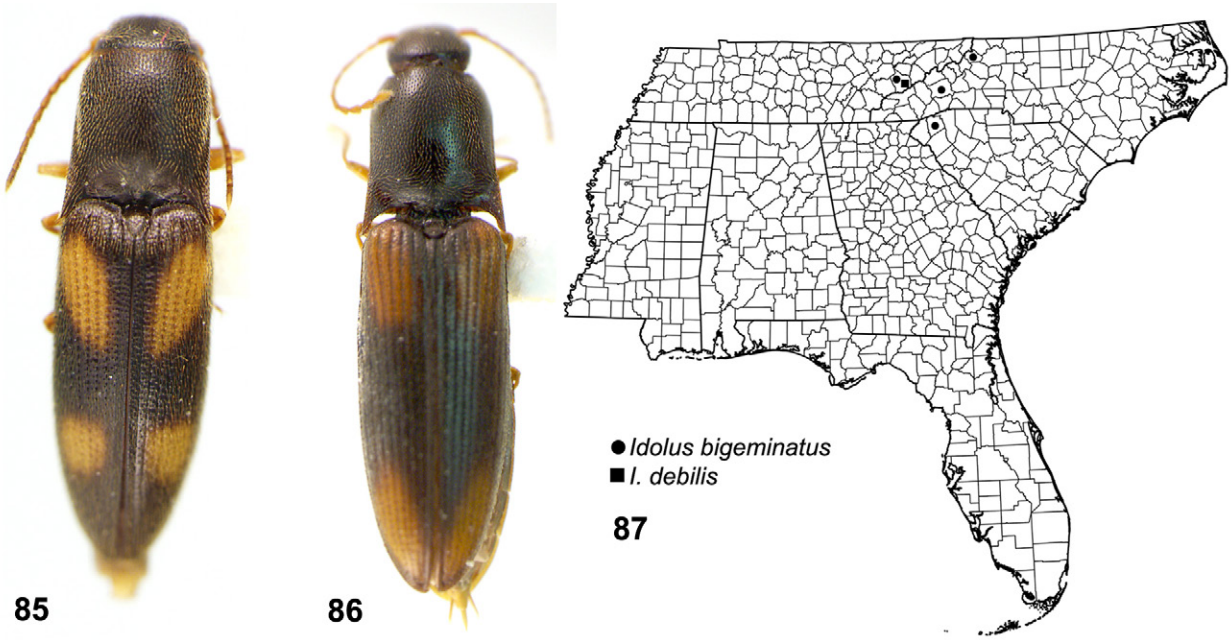
Discussion. This small species is similar to *I. debilis* but can be separated based on the features of the supra-antennal carinae, carinate pronotal hind angle, and the aedeagus. The only other species it might be confused with in the study area is *Anchastus binus*, which has a prominent membranous lobe on tarsomere III. Specimens in the study area have been collected in Malaise traps.

Idolus debilis (LeConte, 1884)

Figures 86–87

Drasterius debilis LeConte, 1884: 5
Drasterius incongruus Fall, 1934: 12

Diagnosis. Size small, 4.0–5.0 mm in length. Bicolored; black, each elytron with yellow-orange humeral and apical maculae (apical macula sometimes lacking); legs brown-yellow. Supra-antennal carinae arcuate, directed



Figures 85–87. *Idolus* spp. **85)** *I. bigeminatus* (habitus). **86)** *I. debilis* (habitus). **87)** Distributional data for *I. bigeminatus* and *I. debilis*.

downwards towards labrum. Antennae 11-segmented, weakly serrate, not reaching apex of pronotal hind angle; antennomere I long. Pronotum slightly longer than wide, sinuate at base of hind angle, narrowing anteriorly; punctures simple, dense; hind angles weakly diverging, ecarinate. Tarsomeres I and II combined subequal to remaining tarsomeres. Aedeagus with median lobe gradually tapering to subacute apex; paramere slender, forceps-like, lacking lateral projection. Female undescribed.

Distribution. Northern and northeastern North America (Downie and Arnett 1996). Previously not recorded from the Southeast. The following records from Tennessee represent a **New State Record**.

Specimens Examined. Tennessee (Sevier). April–May, August–September. (Figure 87)

Discussion. The color of this species is very similar to that of *I. bigeminatus* but these species can be easily separated by the key characters. *Idolus debilis* also tends to be shinier. Specimens in the study area were collected in Lindgren funnel and Malaise traps.

This species has had a complicated taxonomic history. It was described as a member of the genus *Drasterius*, an oophorine genus restricted to the Palearctic. Historically, North American members of *Aeolus* have also been placed in *Drasterius* and as such, *I. debilis* is often keyed and treated with *Aeolus* (e.g. Dietrich 1945, Downie and Arnett 1996). Johnson (2001) transferred *D. debilis* to *Agriotella* (now *Idolus*). While *I. debilis* has several pomachiliine characteristics, there are some features which are quite different from other Nearctic *Idolus* spp., most notably the form of the supra-antennal carinae and the aedeagus. It may be desirable at some point to describe a new genus to accommodate this species or transfer it to an existing genus. It has several characteristics consistent with Becker's (1971) concept of *Megapenthes*, for example.

Synaptini Gistel, 1856

The tribe Synaptini is composed of eight genera (Stibick 1979), of which only *Glyphonyx* is found in the United States and Canada. Johnson (2002) treated this tribe as a subtribe of Agriotini. Stibick (1979) referred to this tribe as Adrastini. Synaptine elaterids are relatively small, slightly robust to elongate and slender. Supra-antennal carinae may be complete or incomplete, in *Glyphonyx* connected to clypeal carinae, often by a short vertical carina. Antenna 11-segmented, serrate. Elevated margin on the hypomeron at the pronotosternal sutures, which are open anteriorly. Scutellum usually shield-shaped, never deeply incised anteriorly. Mesocoxa open to both mesepimeron and mesepisternum. Meso- and metasternum not fused, joined by a definite suture. Tarsomeres simple or with third or fourth tarsomere lobed; claws serrate, without basal setae.

Glyphonyx Candèze, 1863

Glyphonyx Candèze, 1863: 448

Diagnosis. Size small, most species less than 6.0 mm in length; form slightly robust to elongate. Color pale yellowish-brown to dark brown or nearly black; appendages often paler. Supra-antennal carinae joined by an inverted, V-shaped clypeal carina. In some species, the supra-antennae and clypeal carinae are separated by a short vertical carina. In North America, the supra-antennal carinae are complete in all but one species (*G. mimeticus*). Antenna 11-segmented, serrate, may or may not extend beyond the apex of the pronotal hind angle. Lateral margin of pronotum not visible dorsally and frequently sinuate, connecting to anterior pronotal margin anterior to pronotosternal sutures; hind angles carinate, carina length variable, from less than half the length of pronotum to nearly reaching the anterior margin. Prosternal process long, narrow, edges of ventral surface margined to or before the apex, giving it a V- or Y-shaped appearance. Elytral striae distinctly punctured; the ninth interval elevated apically in some species. Tarsomere IV with membranous lobe; claws serrate, without basal setae. Aedeagus with phallobase sclerotized; median lobe subparallel or widened at middle, gradually or suddenly tapering to subacute or acute apex; paramere simple, without apical blade, apex rounded to acute, with or without single apical seta. Females externally similar to males.

Range and Numbers. There are 17 species of *Glyphonyx* recorded from America north of Mexico (Smith and Balsbaugh 1984). Most are distributed in the eastern and southern states. Twelve species have been recorded from the Southeast, although Brimley's (1938) record of *G. quadraticollis* Champion from North Carolina is doubtful.

Discussion. Smith and Balsbaugh (1984) revised the Nearctic species, describing eight new species and removing *G. quadraticollis* from the U.S. fauna. *Glyphonyx* is one of three elaterid genera in North America with serrate tarsal claws, the other two being *Aptopus* and *Melanotus*. Of those two, only *Melanotus* also occurs in the Southeast. *Melanotus* spp. are larger (except *M. insipens*) and lack the membranous pad on tarsomere IV and the inverted, V-shaped carinae above the nasale. The most important features for a species-level identification are the characteristics of the nasale, emargination of ventral surface of the prosternal process, length of carina on the pronotal hind angle, form of elytral interval IX, aedeagus, and color. Specimens from the study area have been collected at light, in Lindgren funnel traps, flight intercept traps, under bark, in leaf litter, and beaten from vegetation.

Key to the species of *Glyphonyx* in the Southeast
(adapted from Smith and Balsbaugh 1984)

1. Supra-antennal carinae not complete, descending separately to near labrum, bisecting nasale (Figure 88) . . . . . ***G. mimeticus* Horn**
— Supra-antennal carinae complete, meeting clypeal margin at center, either directly or separated by a vertical carina **2**

2(1). Supra-antennal and clypeal carinae joined medially or with a shiny raised area in between (Figure 89) **3**

— Supra-antennal and clypeal carinae connected by a vertical carina (Figure 90) **8**

3(2). Margins of prosternal process meet at apex, forming a V-shape (Figure 91) **4**

— Margins of prosternal process meet anterior of apex, forming a Y-shape (Figure 92) **7**

4(3). Elytral interval IX strongly ridged, forming a groove widened at elytral apex (Figure 100) **5**

— Elytral interval IX carinate, but not raised; groove, if present, parallel and not widened **6**

5(4). Color reddish-yellow, elytral suture frequently darker; size larger, body length on average just under 5.0 mm . . . . . ***G. recticollis* (Say)**

— Color dark brown throughout; smaller, body length on average just over 3.5 mm . . . . . ***G. gracilis* Smith and Balsbaugh**

6(4). Carina of ninth elytral interval not reaching apex; elytral suture usually dark and often widened anteriorly; size larger, length on average over 4.5 mm . . . . . ***G. inquinatus* (Say)**

— Carina of ninth elytral interval reaching but not raised at apex; color pale orange-brown, elytral suture if darkened, narrowly so and not widened anteriorly; size smaller, on average length under 4.0 mm . . . . . ***G. testaceus* (Melsheimer)** (in part)

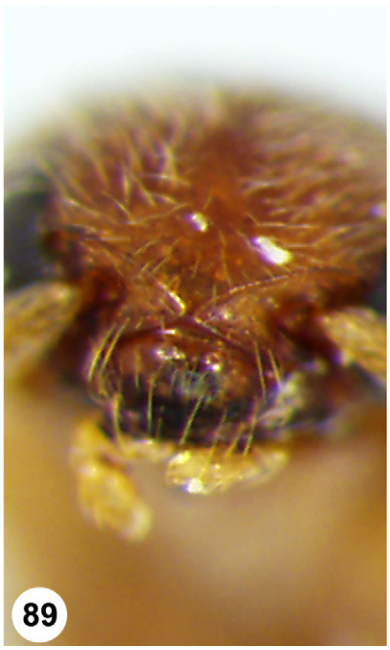
7(3). Color red-brown; size larger, on average over 4.0 mm in length . . . . . ***G. ferruginosus* Schaeffer**

— Color yellow-brown; size smaller, on average under 3.5 mm in length . . . . . ***G. nanus* Smith and Balsbaugh**

8(2). Carina on pronotal hind angle extending more than three-fourths the distance to the anterior pronotal margin (Figure 94) . . . . . ***G. bimarginatus* Schaeffer**

— Carina on pronotal hind angle extending three-fifths or less the distance to the anterior pronotal margin **9**







Figures 88–90. Comparison of the supra-antennal carinae of *Glyphonyx* spp. **88)** *G. mimeticus*. **89)** *G. nanus*. **90)** *G. quietus*.

9(8). Margins of prosternal process meeting anterior of apex, forming a Y-shape (Figure 92) . . . . . ***G. helix* Smith and Balsbaugh**

— Margins of prosternal process meeting at apex, forming a V-shape (Figure 91) **10**

10(9). Color very dark brown to nearly black, legs yellowish . . . . . ***G. quietus* (Say)**

— Color reddish-yellow to rufous, legs usually same or similar color as body **11**

11(10). Color rusty-red (rufous); size larger, on average 5.0 mm in length . . . . . ***G. rhopalacanthus* Smith and Balsbaugh**

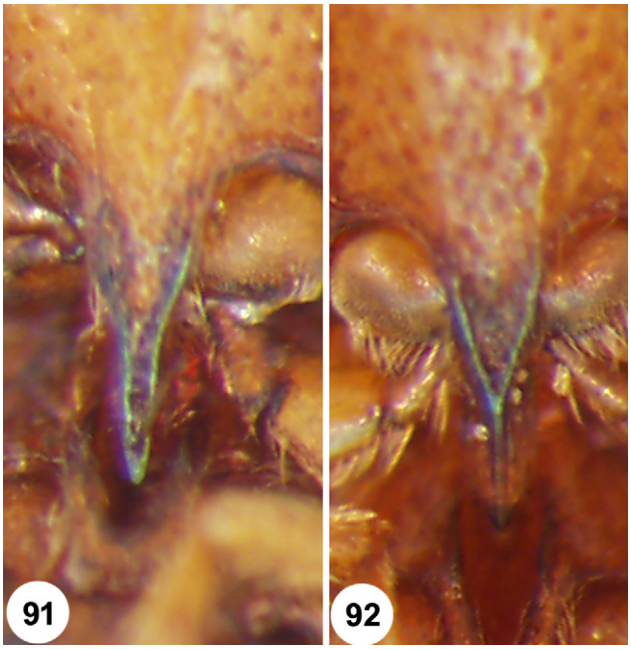
— Color reddish-yellow; size smaller, on average under 4.0 mm in length . . . . . ***G. testaceus* (Melsheimer)** (in part)

Glyphonyx bimarginatus Schaeffer, 1916

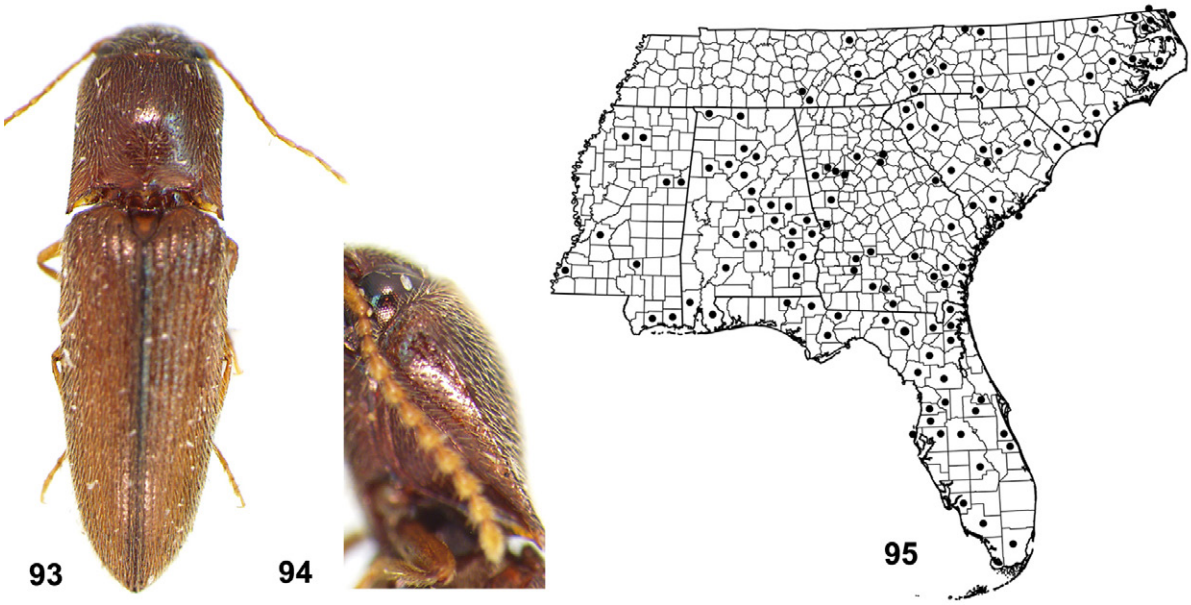
Figures 93–95

Glyphonyx bimarginatus Schaeffer, 1916b: 264

Diagnosis. Size small, 4.5–5.5 mm in length; form elongate. Color red-brown to brown; antennae and legs paler; elytral suture frequently darkened. Antenna 11-segmented, serrate, extending beyond apex of pronotal hind angle by up to 1.5 antennomeres. Supra-antennal and clypeal carinae joined by vertical carina. Pronotum slightly wider than long, punctures moderately sparse at center; hind angle carinate, carina extending more than three-fourths distance to, and nearly reaching, anterior margin. Margins of prosternal process meeting at apex, forming a V-shape. Elytron gradually tapering to apex; striae impressed, punctures shallow, nearly contiguous punctures. Aedeagus with median lobe broadest at middle, gradually tapering to subacute apex; paramere slightly sinuate exteriorly, gradually tapering to subacute apex, one external subapical seta. Female similar to male externally; antenna failing to reach apex of pronotal hind angle.



Figures 91–92. Comparison of the prosternal process of *Glyphonyx* spp. **91)** *G. testaceus*. **92)** *G. ferruginosus*.



Figures 93–95. *Glyphonyx bimarginatus*. **93)** Habitus. **94)** Carina of pronotal hind angle. **95)** Distributional data.

Distribution. Northeastern United States, from Maryland and New Jersey, south to Florida and west to Arizona (Smith and Balsbaugh 1984). Previously recorded from all seven states in the study area (Schaeffer 1916b; Leng 1920; Fattig 1951; Kirk 1969, 1970; Genung 1972; Smith and Balsbaugh 1984; Cherry 1988, 2007; Cheshire and Jones 1988; Downie and Arnett 1996; Peck and Thomas 1998; Cherry and Stansly 2008; Willis et al. 2010a, 2010b). The type locality is Enterprise in Volusia County, FL.

Specimens Examined. Alabama (Baldwin, Barbour, Blount, Bullock, Chilton, Covington, Coosa, Cullman, Dale, Dallas, Elmore, Fayette, Jefferson, Lauderdale, Lee, Limestone, Lowndes, Macon, Mobile, Monroe, Russell, Shelby, Tallapoosa, Walker); **Florida** (Alachua, Baker, Brevard, Clay, Collier, Duval, Gadsden, Hernando, Highlands, Hillsborough, Holmes, Indian River, Jackson, Lee, Levy, Liberty, Madison, Marion, Miami-Dade, Nassau, Orange, Pasco, Pinellas, Polk, Seminole, Sumter, Suwannee); **Georgia** (Brantley, Bulloch, Carroll, Clarke, Clayton, Colquitt, Cook, Crisp, Dougherty, Douglas, Fulton, Gwinnett, Jeff Davis, Lee, Lowndes, McIntosh, Meriwether, Muscogee, Oconee, Pierce, Richmond, Wayne); **Mississippi** (Adams, Covington, Harrison, Hinds, Jackson, Lafayette, Lowndes, Oktibbeha, Panola); **North Carolina** (Alleghany, Beaufort, Brunswick, Buncombe, Burke, Camden, Columbus, Currituck, Gates, Halifax, Henderson, Hyde, McDowell, Mecklenburg, Moore, Pasquotank, Pender, Perquimans, Pitt, Surry, Wake, Wayne); **South Carolina** (Aiken, Anderson, Calhoun, Charleston, Colleton, Florence, Greenville, Hampton, Horry, Laurens, Pickens, Richland, Sumter); **Tennessee** (Blount, Campbell, Hamilton, Sequatchie). January, April–November. (Figure 95)

Discussion. *Glyphonyx bimarginatus* is readily recognized in the study area by its relatively large size (among *Glyphonyx*) and having the pronotal carina extending nearly to the anterior edge of the pronotum (Figure 94), as well as by the characteristics of the supra-antennal carinae, prosternal process, and aedeagus. In the study area, specimens have been collected at ultraviolet and mercury vapor light, in Lindgren funnel, flight intercept, Malaise, and sticky traps, in leaf litter, and by sweeping and beating vegetation. I have collected a large series by beating oak draped with Spanish moss epiphytes in Clay County, FL. Specimens from Lee County, FL (FSCA) were collected from rose-apple. Specimens from Lee County, AL (AUEM) were collected under the bark of sycamore. Specimens from Elmore, Fayette, Limestone, Lowndes, Macon, and Shelby counties, AL (AUEM) were collected in brown marmorated stink bug (*Halyomorpha halys* Stål) traps. Specimens from Baldwin, Moore, and Russell counties, AL (AUEM) were collected in association with pecan. Cherry (2007) and Cherry and Stansly (2008) reported it in sugarcane fields in Florida.

Glyphonyx ferruginosus Schaeffer, 1916

Figures 92, 96, 98

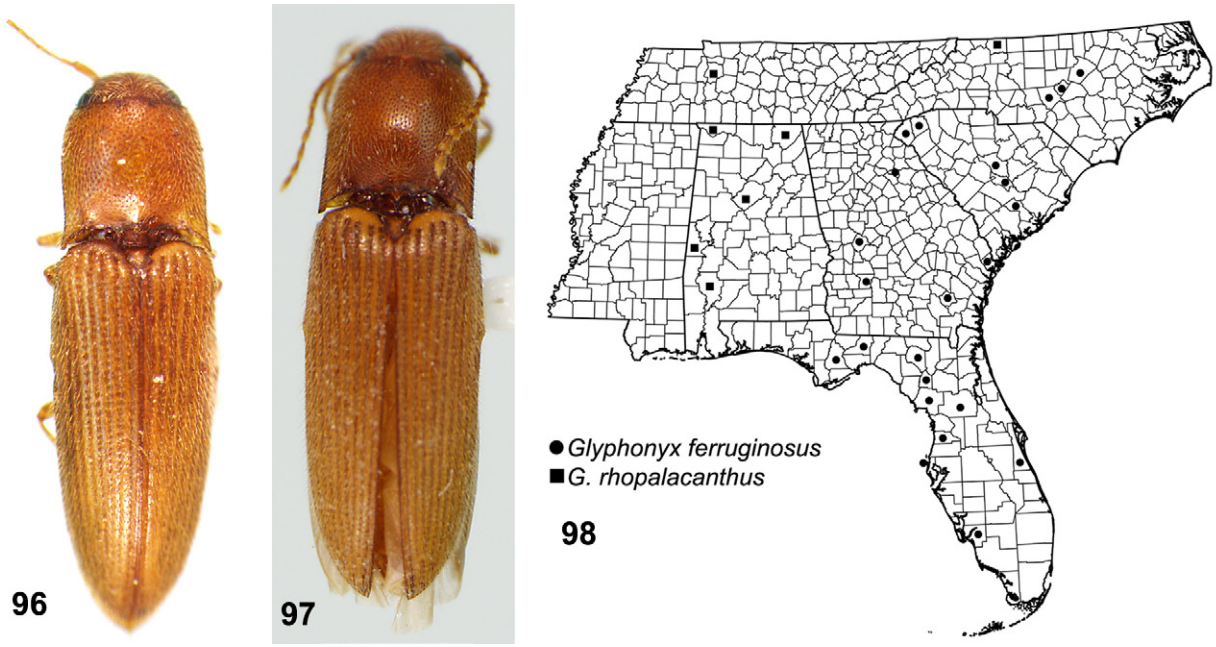
Glyphonyx ferruginosus Schaeffer, 1916b: 266
Glyphonyx ferrugineus Schenkling, 1927: 485

Diagnosis. Size small, 3.9–4.4 mm in length. Color light red-brown; legs same color as body. Antenna 11-segmented, serrate, failing to reach apex of pronotal hind angle by about one-half antennomere. Supra-antennal and clypeal carinae broadly joined on nasale. Pronotum slightly wider than long; punctures on disc coarse, separated by roughly their diameter; hind angle carinae, carina extending approximately half-way to anterior margin. Margins of prosternal process meet in a Y-shape, anterior of apex. Elytron parallel to middle, gradually tapering to apex; striae impressed, punctures circular, contiguous. Aedeagus with median lobe broadest at middle, gradually tapering to subacute apex; paramere slightly sinuate exteriorly, gradually tapering to subacute apex; one external subapical seta. Female similar to male externally.

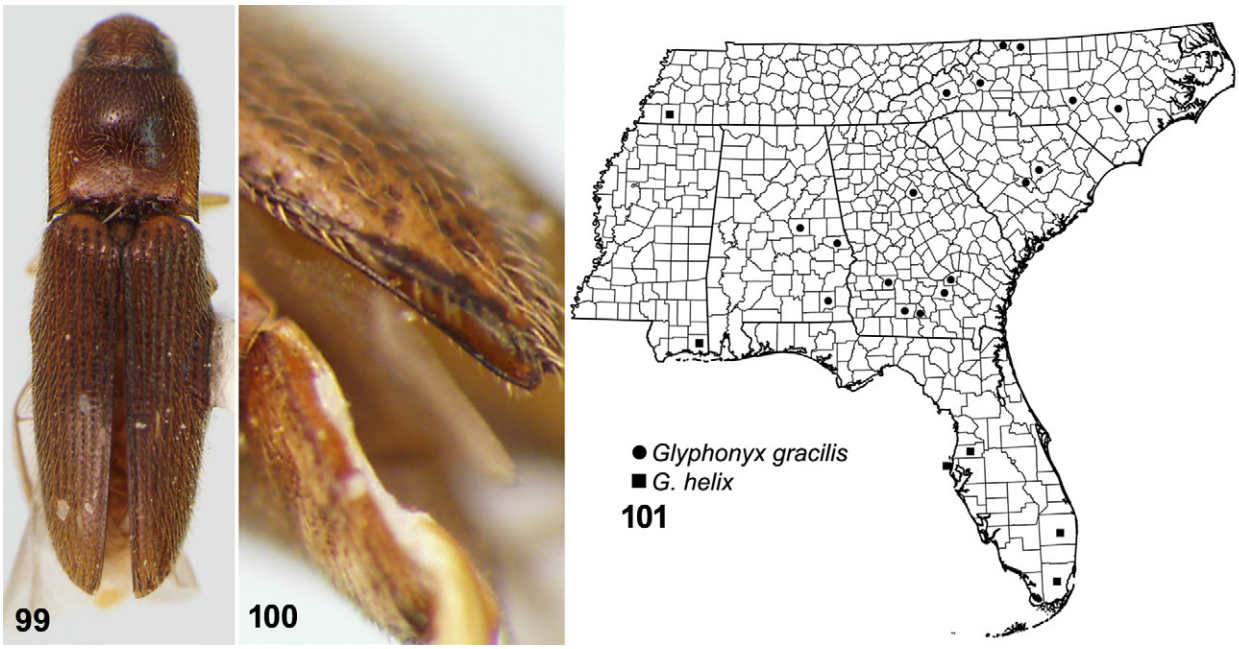
Distribution. Northeast from Maryland, south to Florida and west to Arizona (Smith and Balsbaugh 1984). Previously recorded from all seven states in the study area. (Smith and Balsbaugh 1984; Downie and Arnett 1996; Peck and Thomas 1998).

Specimens Examined. Florida (Brevard, Gilchrist, Hernando, Lee, Leon, Levy, Liberty, Marion, Pinellas, Suwannee); **Georgia** (Chatham, Clarke, Lee, Pierce, Taylor); **North Carolina** (Hyde, Lee, Moore, Wake); **South Carolina** (Calhoun, Dorchester, Oconee, Pickens, Richland). April–August, November. (Figure 98)

Discussion. *Glyphonyx ferruginosus* is one of only four species in the study area with Y-shaped prosternal process, the other three being *G. nanus*, *G. mimeticus*, and *G. helix*. It can be separated from *G. nanus* by being larger and darker than the latter. It is similar in size to *G. helix* but differs in color and characteristics of the supra-antennal carina. *Glyphonyx mimeticus* is larger with interrupted supra-antennal carinae. Specimens in the study area have been taken at ultraviolet and mercury vapor light and in Malaise and Lindgren funnel traps.



Figures 96–98. *Glyphonyx* spp. **96)** *G. ferruginosus* (habitus). **97)** *G. rhopalacanthus* (habitus). **98)** Distributional data for *G. ferruginosus* and *G. rhopalacanthus*.



Figures 99–101. *Glyphonyx* spp. **99)** *G. gracilis* (habitus). **100)** *G. gracilis* (apex of elytron). **101)** Distributional data for *G. gracilis* and *G. helix*.

Glyphonyx gracilis Smith and Balsbaugh, 1984

Figures 99–101

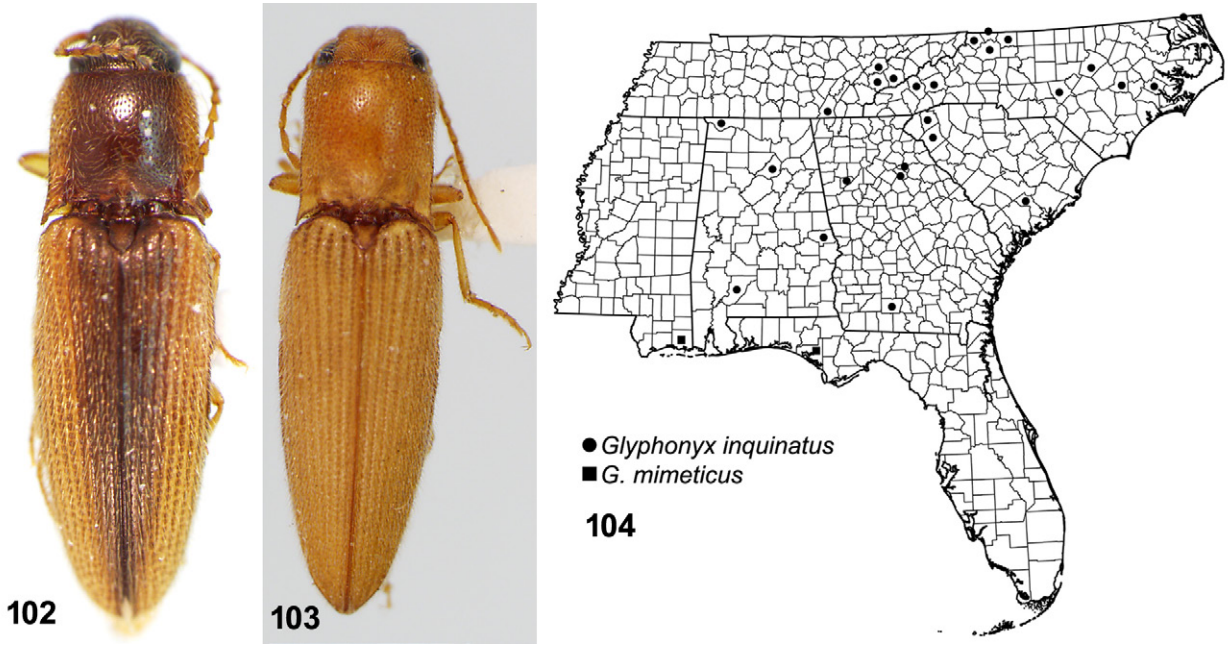
Glyphonyx gracilis Smith and Balsbaugh, 1984: 26

Diagnosis. Small size, 3.5–3.9 mm in length. Color dark brown; legs and antennae yellowish. Antenna 11-segmented, serrate, extending beyond apex of pronotal hind angle up to two antennomeres. Supra-antennal and clypeal carinae joined medially above nasale. Pronotum slightly wider than long; punctures coarse on disc, separated by more than their diameter; hind angles carinate, carina extending about half-way to anterior margin. Margins of prosternal process meet at apex, forming V-shape. Elytron parallel to middle, gradually tapering to apex; striae impressed, punctures contiguous; interval IX grooved and widened at apex. Aedeagus with median lobe wide, tapering suddenly subapically; paramere wide, broadly rounded, tapering to rounded apex; one short subapical seta.

Distribution. Much of eastern United States, west to Missouri (Smith and Balsbaugh 1984). In the Southeast, recorded from Alabama, Georgia, North Carolina, South Carolina, and Tennessee (Smith and Balsbaugh 1984; Downie and Arnett 1996). The type locality is the Great Smoky Mountains National Park in Tennessee.

Specimens Examined. Alabama (Coosa, Dale, Lee); **Georgia** (Coffee, Colquitt, Cook, Jeff Davis, Lee, Morgan); **North Carolina** (Alleghany, Burke, Buncombe, Moore, Sampson, Surry counties; also Blowing Rock State Park); **South Carolina** (Calhoun, Sumter). March–September. (Figure 101)

Discussion. *Glyphonyx gracilis* is one of two species in the study area with the ninth elytral interval widened at apex. The other is *G. recticollis*, which is larger and lighter in color with a darkened elytral suture that widens anteriorly. Specimens in the study area have been collected at ultraviolet and mercury vapor light, in Lindgren funnel and flight intercept traps, and by sweeping vegetation.



Figures 102–104. *Glyphonyx* spp. **102)** *G. inquinatus* (habitus). **103)** *G. mimeticus* (habitus). **104)** Distributional data for *G. inquinatus* and *G. mimeticus*.

Glyphonyx helix Smith and Balsbaugh, 1984

Figures 101, 109

Glyphonyx helix Smith and Balsbaugh, 1984: 27

Diagnosis. Small size, 3.7–4.4 mm in length. Color light red-yellow; elytral suture darker, often expanding to a transverse band midway back on elytra; legs yellow. Antenna 11-segmented, serrate, failing to reach apex of pronotal hind angle by up to two antennomeres. Supra-antennal and clypeal carinae joined by vertical carina. Pronotum slightly wider than long; punctures moderately sparse on disc, separated by more than their own diameter; hind angle carinate, carina extending more than one-half length of pronotum. Margins of prosternal process meet anterior of apex, forming a Y-shape. Elytron parallel in anterior third, gradually tapering to apex; striae impressed, punctures circular, contiguous. Aedeagus with median lobe broad, gradually tapering to subacute apex; paramere broadly rounded to rounded apex; single subapical seta. Female similar to male externally, but antenna slightly shorter.

Distribution. Arizona, east to Florida and north to Tennessee and Ohio (Smith and Balsbaugh 1984). In the Southeast, previously recorded from Florida and Tennessee (Smith and Balsbaugh 1984; Downie and Arnett 1996; Peck and Thomas 1998). The following records from Mississippi represent a **New State Record**.

Specimens Examined. Florida (Miami-Dade, Palm Beach, Pasco, Pinellas); **Mississippi** (Jackson); **Tennessee** (Fayette). April–June, August. (Figure 101)

Discussion. *Glyphonyx helix* can be recognized externally by the color of the elytra, yellowish with a black sutural margin and often with a post-median transverse black macula, in conjunction with the characteristics of the prosternal process, having the supra-antennal and nasale carinae joined by a transverse carina, and the length of carina on pronotal hind angle. Specimens in the study area have been collected at ultraviolet light and by sweeping coastal vegetation (Pinellas County, FL).

Glyphonyx inquinatus (Say, 1839)

Figures 102, 104

Elater inquinatus Say, 1839: 175
Elater pumilus Erichson, 1842: 120

Diagnosis. Size small, 4.2–4.8 mm in length. Color yellow- to red-brown; head, pronotum, sutural stripe (usually) and venter darker; dark area of sutural area often widening anteriorly. Antenna 11-segmented, serrate, exceeding beyond apex of pronotal hind angle by up to one antennomere. Supra-antennal carina and clypeal carinae joined medially. Pronotum slightly wider than long; punctures coarse, separated by more than their own diameter on disc; hind angle carinate, carina extending approximately half the length of pronotum. Margins of prosternal process meet at apex, forming a V-shape. Elytron parallel in basal third, gradually tapering to apex; striae impressed, punctures circular, nearly contiguous; interval IX obsolete at apex. Aedeagus with median lobe longer than parameres, broadest at middle, gradually tapering from middle and then suddenly tapering to subacute apex; paramere wide, gradually narrowing to broadly rounded apex; single subapical seta. Female similar to male externally; antenna slightly shorter, failing to reach apex of pronotal hind angle.

Distribution. Eastern United States, west to Illinois (Smith and Balsbaugh 1984). In the Southeast, recorded from Alabama, Florida, Georgia, North Carolina, and Tennessee (Leng 1920; Brimley 1938; Löding 1945; Fattig 1951; Smith and Balsbaugh 1984; Downie and Arnett 1996, Peck and Thomas 1998; Chatzimanolis et al. 2020). The following records from South Carolina represent a **New State Record**.

Specimens Examined. Alabama (Blount, Lauderdale, Lee, Monroe); **Georgia** (Clarke, Colquitt, Douglas, Oconee); **North Carolina** (Alleghany, Ashe, Buncombe, Camden, Craven, Haywood, Moore, Surry, Wake, Wayne, Wilkes); **South Carolina** (Anderson, Dorchester, Pickens); **Tennessee** (Blount, Hamilton, Knox, Sevier). March–September, November. (Figure 104)

Discussion. *Glyphonyx inquinatus* is most similar to *G. recticollis* in having the dark sutural area of the elytra widened. In *G. inquinatus* this dark area often widens anteriorly, while in *G. recticollis* the dark area is the same width the entire length of the elytron. The two species can also be separated by elytral interval IX carina obsolete in *G. inquinatus* versus strongly ridged and widened in *G. recticollis*. I have seen several specimens from the study area that lack the darkened sutural area but agree with *inquinatus* based on the supra-antennal carinae, elytral apex, prosternal process, and aedeagus. Specimens in the study area have been collected at ultraviolet light and in Lindgren funnel and Malaise traps.

Glyphonyx mimeticus Horn, 1874

Figures 88, 103–104

Glyphonyx mimeticus Horn, 1874: 23

Diagnosis. Size small, 5.3–6.5 mm in length. Color pale yellow-tan to yellow. Antenna 11-segmented, serrate, extending beyond apex of pronotal hind angle by up to two antennomeres. Supra-antennal carinae not complete, descending separately to near labrum, bisecting nasale. Pronotum longer than wide; punctures separated by their own diameters or slightly less; hind angle carinate, carina extending up to one-half the length of pronotum. Margins of prosternal process meet anterior of apex, forming a Y-shape. Elytron gradually tapering from behind epipleura to apex; striae impressed, punctures shallow, circular, contiguous; interval VIII ridged and carinate near apex, carina often darkened. Aedeagus with median lobe broadest medially, gradually narrowing to subacute apex; paramere broad, very slightly narrowing to rounded apex; single subapical seta. Female similar to male externally but with shorter antenna, failing to reach apex of pronotal hind angle by up to three antennomeres.

Distribution. Gulf Coast states, from Texas to Alabama, north to Oklahoma (Smith and Balsbaugh 1984). In the Southeast, previously recorded from Alabama and Mississippi (Champion 1896; Löding 1945; Smith and Balsbaugh 1984). The following record from Florida represents a **New State Record**.

Specimens Examined. Florida (Bay); **Mississippi** (Jackson). June, August. (Figure 104)

Discussion. *Glyphonyx mimeticus* should be readily recognized by its size, color, interrupted supra-antennal carinae and ridged, carinate eighth elytral interval. Specimens in the study area have been collected at ultraviolet light.

Glyphonyx nanus Smith and Balsbaugh, 1984

Figures 89, 105–106

Glyphonyx nanus Smith and Balsbaugh, 1984: 35

Diagnosis. Size small, 3.1–3.8 mm in length. Color pale yellow to red-yellow; sutural line frequently darker, sometimes expanding to post-median macula. Antenna 11-segmented, serrate, failing to reach apex of pronotal hind angle by about one antennomere. Supra-antennal and clypeal carinae joined medially above nasale. Pronotum slightly wider than long; punctures moderately coarse at center, separated by more than their own diameter; hind angle carinate, carina extending up to one-half length of pronotum. Margins of prosternal process meet anterior of apex, forming a Y-shape. Elytron parallel to anterior third, gradually tapering to apex; striate impressed, round punctures shallow, separated by less than half their diameters. Aedeagus with median lobe slightly longer than parameres, broadest at middle, gradually tapering to subacute apex; paramere broadly rounded anteriorly to slightly rounded apex; single subapical seta. Female similar to male externally.

Distribution. Eastern United States, west to Texas (Smith and Balsbaugh 1984). In the Southeast, recorded from Alabama, Florida, Georgia, Mississippi, North Carolina, and South Carolina (Smith and Balsbaugh 1984; Peck and Thomas 1998; Lago et al. 2002). The type locality is the vicinity of Waycross in Ware County, GA.

Specimens Examined. Alabama (Baldwin); **Florida** (Broward, Clay, Highlands, Levy, Pinellas, Santa Rosa, Wakulla); **Georgia** (Emanuel, Lee, Lowndes, McIntosh); **Mississippi** (Harrison); **North Carolina** (Currituck, Moore, New Hanover, Pamlico, Wake); **South Carolina** (Chesterfield, Kershaw). March–July, September-November. (Figure 106)

Discussion. *Glyphonyx nanus* is the smallest Nearctic species of *Glyphonyx*. The small size, in combination with color and Y-shaped margins of the prosternal process, should help to readily identify this species. Specimens in the study area have been collected at ultraviolet light, in leaf litter, and by sweeping vegetation.

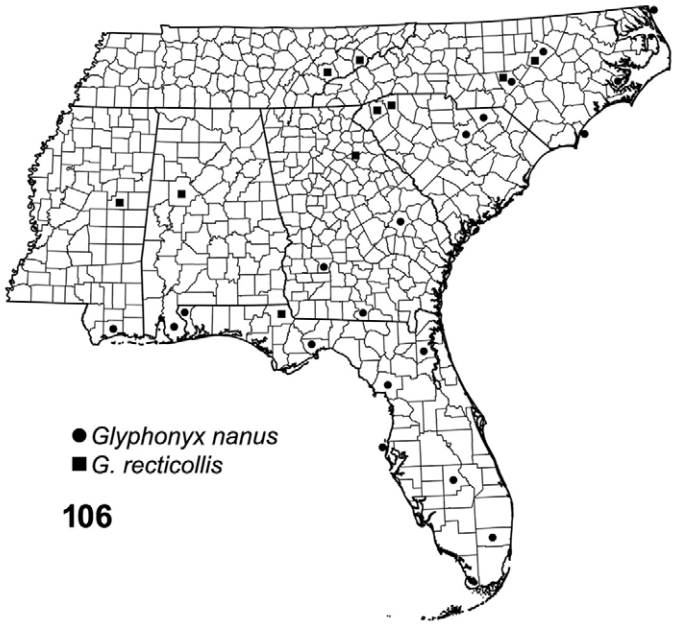
Glyphonyx quietus (Say, 1839)

Figures 90, 107–108

Elater quietus Say, 1839: 184

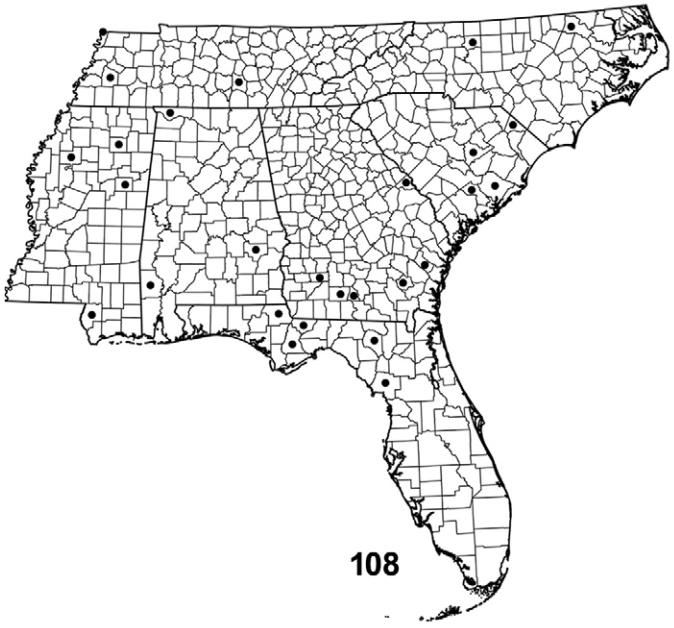
Diagnosis. Size small, 4.2–4.8 mm in length. Color dark brown to nearly black; legs pale yellow. Antenna 11-segmented, serrate, extending beyond apex of pronotal hind angle by about one antennomere. Supra-antennal and clypeal carinae connected by a short, vertical carina. Pronotum slightly wider than long; punctures coarse on disc, separated by approximately their own diameter; hind angles carinate, carina extending anteriorly about one-half length of pronotum. Margins of prosternal process meet at apex, forming a V-shape. Elytron parallel basally, gradually tapering to apex; striae impressed, punctures shallow, nearly contiguous. Aedeagus with median lobe longer than parameres, broadest just anterior to mid-way, gradually tapering to and then suddenly tapering more pre-apically to a subacute apex; paramere wide, broadly rounded tapering to subacute





Figures 105–106. *Glyphonyx* spp. **105)** *G. nanus* (habitus). **106)** Distributional data for *G. nanus* and *G. recticollis*.





Figures 107–108. *Glyphonyx quietus*. **107)** Habitus. **108)** Distributional data.

apex; single subapical seta. Female similar to male externally, but antenna shorter, barely reaching apex of pronotal hind angle.

Distribution. Southeastern United States, north to Indiana and west to Texas and Kansas (Smith and Balsbaugh 1984). Previously recorded from all seven states in the current study area (Brimley 1938; Löding 1945; Fattig 1951; Kirk 1969; Smith and Balsbaugh 1984; Downie and Arnett 1996; Peck and Thomas 1998).

Specimens Examined. Alabama (Bullock, Lauderdale, Washington); **Florida** (Gadsden, Jackson, Levy, Liberty, Suwannee); **Georgia** (Colquitt, Cook, Dougherty, Jeff Davis, Long, Pierce, Richmond); **Mississippi** (Oktibbeha, Pearl River, Pontotoc, Tallahatchie); **North Carolina** (Forsyth, Halifax); **South Carolina** (Berkeley, Dillon, Dorchester, Sumter); **Tennessee** (Coffee, Haywood, Lake). January, April–October. (Figure 108)

Discussion. This species is usually readily recognized by its very dark color in combination with pale legs. The other dark species in the Southeast, *G. gracilis*, differs in having the supra-antennal and clypeal carinae joined medially and having the ninth elytral interval grooved and widened at apex. Specimens in the study area have been collected at ultraviolet light, in Lindgren funnel traps, flight intercept traps, in leaf litter, and by beating and sweeping vegetation.

Glyphonyx recticollis (Say, 1823)

Figures 106, 110

Elater recticollis Say, 1823: 168
Elater inscius Say, 1839: 184 (*nomen nudum*)

Diagnosis. Size small, 4.5–5.4 mm in length. Color light yellow-brown to brown; head and pronotum darker; area around elytral suture often black. Antenna 11-segmented, serrate, extending beyond apex of pronotal hind angle by up to 1.5 antennomeres. Supra-antennal and clypeal carinae margins medially joined above nasale. Pronotum wider than long; punctures moderately coarse on disc, separated by more than their own diameter;



Figures 109–110. *Glyphonyx* spp. **109)** *G. helix* (habitus). **110)** *G. recticollis* (habitus).

hind angle carinate, carina extending anteriorly approximately one-half the length of pronotum. Margins of prosternal process meet at apex, forming a V-shape. Elytron gradually tapering to apex; striae impressed, punctures circular, nearly contiguous; interval IX grooved and widened at apex. Aedeagus with median lobe long and slender, widest post-median, gradually tapering then suddenly tapering pre-apically to subacute apex; paramere long, slender, broadly rounded subapically to subacute apex; single subapical seta. Female similar to male externally but antenna shorter, barely reaching apex of pronotal hind angle.

Distribution. Eastern United States, west to Texas and South Dakota, south to Mississippi and Georgia (Smith and Balsbaugh 1984). In the Southeast, recorded from Alabama, Florida, Georgia, Mississippi, North Carolina, and South Carolina (Leng 1910, 1920; Brimley 1938; Löding 1945; Fattig 1951; Kulash and Monroe 1955; Kirk 1969, 1970; Smith and Balsbaugh 1984; Downie and Arnett 1996; Peck 2005). The following records from Tennessee represent a **New State Record**.

Specimens Examined. Alabama (Tuscaloosa); **Florida** (Jackson); **Georgia** (Clarke); **Mississippi** (Winston); **North Carolina** (Moore, Wake); **South Carolina** (Greenville, Pickens); **Tennessee** (Blount, Cocke). March, May–August. (Figure 106)

Discussion. *Glyphonyx recticollis* is one of two Nearctic species with noticeably darkened and often widened sutural markings, the other being *G. inquinatus*. They are best distinguished externally by the ninth elytral interval, which is grooved and widened at its apex in *G. recticollis* and obsolete in *G. inquinatus*. Specimens in the study area have been collected at ultraviolet light and in leaf litter. This is the only Nearctic *Glyphonyx* whose larval stage is known (Smith and Balsbaugh, 1984). Kulash and Monroe (1955) reported larvae of *G. recticollis* in corn fields in North Carolina.

Glyphonyx rhopalacanthus Smith and Balsbaugh, 1984

Figures 97–98

Glyphonyx rhopalacanthus Smith and Balsbaugh, 1984: 44

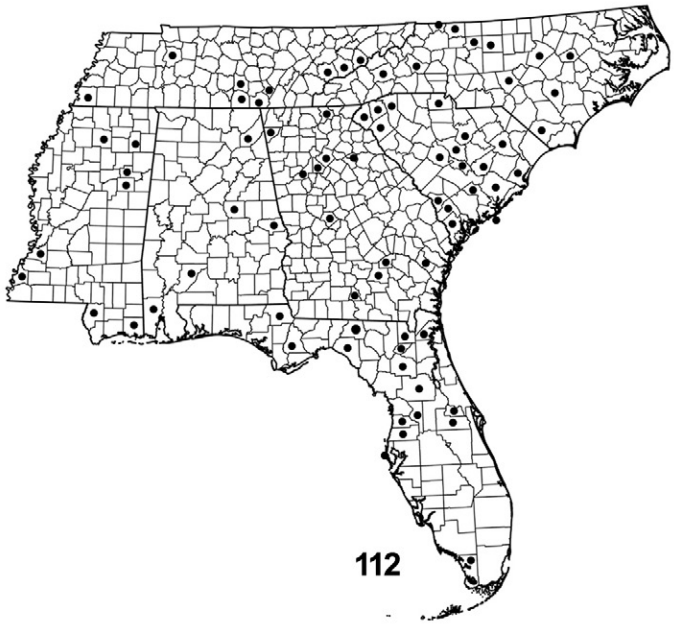
Diagnosis. Size small, 4.5–5.5 mm in length. Color rusty red; legs same color as body or slightly paler. Antenna 11-segmented, serrate, barely reaching apex of pronotal hind angle. Supra-antennal and clypeal carinae connected by vertical carina. Pronotum slightly wider than long; punctures coarse on disc, separated by less than their own diameter; hind angle carinate, carina extending anteriorly half-way the length of pronotum. Margins of prosternal process meet at apex, forming a V-shape. Elytron parallel on anterior third, gradually tapering to apex; striae impressed, punctures round, separated by their own diameter. Aedeagus with median lobe long and slender, subparallel, suddenly tapering subapically to subacute apex; paramere long and slender, subparallel, gradually rounding to subacute apex; very short subapical seta present or absent. Female similar to male externally but antenna shorter, failing to reach apex of pronotal hind angle by up to 1.5 antennomeres.

Distribution. Southern United States, from Arizona to Florida, north to Kansas and Missouri (Smith and Balsbaugh 1984). Previously recorded from the Southeast in Alabama, Florida, and Mississippi (Smith and Balsbaugh 1984; Peck and Thomas 1998). The following records from North Carolina and Tennessee represent **New State Records**.

Specimens Examined. Alabama (Clarke, Jackson, Jefferson, Lauderdale, Sumter); **North Carolina** (Surry); **Tennessee** (Humphreys). April–July, September. (Figure 98)

Discussion. *Glyphonyx rhopalacanthus* is most similar to *G. quietus* from which it differs mainly in terms of color and the aedeagus. Specimens in the study area were collected at ultraviolet light.





Figures 111–112. *Glyphonyx testaceus*. **111)** Habitus. **112)** Distributional data.

Glyphonyx testaceus (Melsheimer, 1845)

Figures 91, 111–112

Ampedus flavescens Dejean, 1837: 42 (*nomen nudum*)
Elater testaceus Melsheimer, 1845: 219

Diagnosis. Size small, 3.1–4.5 mm in length. Color light red-yellow to yellow-brown; elytral suture sometimes darkened but not widened. Supra-antennal and clypeal carinae variable, may be joined medially above nasale or connected by short vertical carina. Antenna 11-segmented, serrate, extending beyond apex of pronotal hind angle by 1–2 antennomeres. Pronotum slightly wider than long; punctures moderately coarse on disc, separated by approximately their own diameter; hind angle carinate, carina extending anteriorly one-half length of pronotum. Margins of prosternal process meet at apex, forming a V-shape. Elytron parallel to middle, gradually tapering to apex; striae impressed, punctures circular, nearly contiguous; interval IX carinate but not widened at apex. Aedeagus with median lobe widest just past middle, gradually tapering apically, then suddenly tapering just before subacute apex; paramere broadly rounded anteriorly to subacute apex; single subapical seta. Female similar to male externally but antenna shorter, exceeding apex of pronotal hind angle by one-half antennomere.

Distribution. Eastern North America, from Ontario south to Florida, west to Texas and Oklahoma (Smith and Balsbaugh 1984). Previously recorded in all seven states in the study area (LeConte 1853; Leng 1920; Brimley 1938; Löding 1945; Fattig 1951; Kirk 1969, 1970; Smith and Balsbaugh 1984; Lago and Mann 1987; Downie and Arnett 1996; Peck and Thomas 1998).

Specimens Examined. Alabama (Coosa, DeKalb, Lee, Mobile, Monroe); **Florida** (Alachua, Baker, Duval, Hernando, Jackson, Liberty, Madison, Marion, Monroe, Orange, Pasco, Pinellas, Seminole, Sumter, Taylor, Union); **Georgia** (Chattooga, Clarke, Coffee, Cook, Crawford, DeKalb, Fulton, Gwinnett, Jeff Davis, Long, Union); **Mississippi** (Adams, Claiborne, Clay, Jackson, Lafayette, Lee, Oktibbeha, Pearl River); **North Carolina** (Alleghany, Beaufort, Buncombe, Burke, Columbus, Forsyth, Guilford, Moore, Sampson, Surry, Swain, Wake, Wilson); **South Carolina** (Allendale, Anderson, Berkeley, Calhoun, Charleston, Clarendon, Dorchester, Florence, Georgetown, Greenville, Hampton, Jasper, Kershaw, Lexington, Oconee, Pickens, Richland, York); **Tennessee** (Blount,

Cocke, Coffee, Franklin, Humphreys, Marion, Sequatchie, Sevier, Shelby). January, March–October, December. (Figure 112)

Discussion. *Glyphonyx testaceus* varies in size, color, and characteristics of the supra-antennal and clypeal carinae. As such, it can often present some difficulty with keying. A critical analysis of several external characters, and aedeagus if possible, should be performed for an accurate identification. Smith and Balsbaugh (1984) gave a size range of 3.59 ± 0.23 mm but also mentioned eight specimens (unknown locality) tentatively identified as *G. testaceus* that were closer to 4.5 mm in length on average and more reddish in color. These specimens agreed with typical forms of *G. testaceus* externally and with regards to the aedeagus. In this study, I have seen several similar specimens in the 4.0–4.5 mm range. Such specimens can often be difficult to separate from *G. inquinatus*. Specimens in the study area have been collected at ultraviolet light, under bark, in leaf litter, in Lindgren funnel, pitfall, sticky, Malaise, and flight intercept traps, and by sweeping vegetation. Löding (1945) reported it from under pecan bark in Mobile County, AL. Lago and Mann (1987) reported it on the flowers of wild carrot in Lafayette County, MS.

Ampedini Gistel, 1856

This tribe, as delineated here, is the same as Ampedina in Johnson (2002) and contains only the genus *Ampedus* in North America. The other subtribes of Ampedini in Johnson (2002) are given tribal status here. Head capsule oval, mouthparts inferior. Supra-antennal carinae complete, arcuate, bending downwards between antennae and coming within close proximity or meeting the labrum. Antenna 11-segmented, serrate. Elevated margin on the hypomeron at the pronotosternal sutures, open anteriorly. Prosternal process flat between procoxae. Scutellum usually shield-shaped, never deeply incised anteriorly. Mesocoxa open to both mesepimeron and mesepisternum. Meso- and metasternum not fused, joined by a definite suture. Tarsomeres lacking membranous lobes; claws simple, without basal setae.

Ampedus Dejean, 1833

Ampedus Dejean, 1833: 92
Ectamenogonus Buysson, 1893: 314

Diagnosis. Size small to moderate. Color variable, often bicolored black with contrasting red, orange, or yellow. Supra-antennal carinae complete, arcuate, bending downwards between antennae and coming within close proximity or meeting the labrum. Antenna 11-segmented, antennomere II small; III variable, IV–X serrate, XI elongate. Pronotum subquadrate, gradually narrowed anteriorly; punctuation variable, shallow and umbilicate to deep and simple, sparse to dense; hind angle with one or (less commonly) two carinae. Elevated margin on the hypomeron at the pronotosternal sutures, open in front. Prosternal process flat between procoxae. Scutellum usually shield-shaped, never deeply incised anteriorly. Mesocoxa open to both mesepimeron and mesepisternum. Meso- and metasternum not fused, joined by a definite suture. Tarsomeres lacking membranous lobes; claws simple, without basal setae. Aedeagus with paramere possessing a defined apical blade. Females typically similar to males externally but are larger and with shorter antennae.

Range and Numbers. There are 71 species in North America (Johnson 2002), generally distributed. Twenty-seven species have been recorded from the Southeast, with two new species added here.

Discussion. The genus was revised for the US and Canada by Ramberg (1979) as a Ph.D. thesis. Previously, Van Dyke (1932) treated the western species in the *cordatus* group. Dietrich (1945) and Downie and Arnett (1996) keyed species from the Northeast. Four species described as new by Ramberg (1979) occur in the study area and are treated here with the numerical designations 1–4, as they have not yet been formally published and thus do not meet the ICZN (1999) requirements for having a valid species name. Ramberg (1979) divided the

North American *Ampedus* into four species groups, based heavily on characteristics of the female genitalia and some external characters (such as number of carinae on the pronotal hind angles). The name *Ectamenogonus* is occasionally used for those species with two carinae on pronotal hind angles (Johnson 2002). Species groups and subspecies are not considered here. Specimens in the study area have been collected by a variety of methods, most commonly at light and in Lindgren funnel and flight intercept traps. *Ampedus* specimens can also be collected with frequency under the bark of felled trees.

Key to the species of *Ampedus* of the Southeast
(adapted from Dietrich 1945 and Ramberg 1979)

1. Pronotal hind angle distinctly bicarinate **2**
— Pronotal hind angle unicarinate (may be weakly bicarinate in some specimens of *A. melanotoides*) . . **4**

2(1). Punctures on pronotum weakly umbilicate and dense laterally, but separated and not contiguous . . . . . ***Ampedus* sp. 3**
— Punctures on pronotum large and very dense laterally, contiguous or nearly so, and shallowly umbilicate **3**

3(9). Smaller species, less than 8.5 mm in length; color red-brown . . . . . ***A. fuscatus* (Melsheimer)**
— Larger species, greater than 8.5 mm in length; color dark brown to black . . . . ***A. melsheimeri* Leng**

4(1). Smaller species, ≤ 5.5 mm in length **5**
— Larger species, ≥ 5.5 mm in length **6**

5(4). Unicolored, light yellow-brown . . . . . ***A. pusio* Germar**
— Bicolored, elytron dark with oblique yellow-orange humeral macula, pronotum orange to dark brown . . . . . ***A. areolatus* (Say)**

6(4). Pronotum and elytra concolorous **7**
— Pronotum and elytra not concolorous, often bicolored or with pattern **16**

7(6). Legs concolorous with body **8**
— Legs yellow or red, contrasting with body **12**

8(7). Antenna extending beyond apex of pronotal hind angle by 1–2 antennomeres . . . . . ***Ampedus* sp. 4**
— Antenna not reaching apex of pronotal hind angle **9**

9(8). Color red-brown to brown; flagellar antennomeres weakly serrate . . . . . ***A. melanotoides* Brown**
— Color dark brown to nearly black; flagellar antennomeres serrate **10**

10(9). Smaller species, 7.0–9.0 mm in length . . . . . ***A. mixtus* (Herbst)** (in part)
— Larger species, ≥ 10.0 mm in length **11**

11(10). Antennomeres II and III subequal . . . . . ***A. luctuosus* (LeConte)**
— Antennomere III twice as long as II, subequal to IV . . . . . ***A. rubricollis* (Herbst)** (in part)

12(7). Pronotum subparallel posteriorly, only moderately rounded and slightly sinuate at hind angle, rounding anteriorly **13**
— Pronotum rounded posteriorly, sinuate at hind angle, gradually narrowing anteriorly **14**

13(12). Body robust, pronotum as wide as base of elytra; antenna not reaching apex of pronotal hind angle; aedeagus with median lobe medially constricted . . . . . ***A. molestus* (LeConte)**
— Body slender, elytra appearing narrower than pronotum; antenna reaching (and occasionally exceeding) apex of pronotal hind angle; aedeagus with median lobe subparallel medially . . . . . ***A. pedalis* (Germar)**

14(12). Larger species ≥ 9.5 mm in length . . . . . ***A. impolitus*** **(Melsheimer)**
— Smaller species, < 9.5 mm in length **15**

15(14). Aedeagus with paramere possessing a small, triangular apical blade . . . . . ***Ampedus*** **sp. 2**
— Aedeagus with paramere possessing an elongate apical blade that is nearly half the length of paramere . . . . . ***Ampedus*** **sp. 1**

16(6). Pronotum red or predominately red (central area or very narrowly anterior or posterior margins black) **17**
— Pronotum black **20**

17(16). Larger species, ≥ 10.0 mm in length . . . . . ***A. rubricollis*** **(Herbst)** (in part)
— Smaller species ≤ 8.0 mm in length **18**

18(17). Pronotum red with anterior central black macula . . . . . ***A. rubricus*** **(Say)**
— Pronotum solid red (hind angles or very narrow anterior or posterior margins may be black) **19**

19(18). Pronotal vestiture black . . . . . ***A. palans*** **(LeConte)**
— Pronotal vestiture yellow . . . . . ***A. collaris*** **(Say)**

20(16). Legs pale yellow . . . . . ***A. nigricollis*** **(Herbst)**
— Legs dark red-brown to black **21**

21(20). Elytron unicolored throughout (may have dark infuscations but not defined, contrasting markings) **22**
— Elytron distinctly bicolored. **24**

22(21). Elytron dark yellow-brown to brown, often with a dark infuscation; pronotum black, hind angle often yellow . . . . . ***A. fusculus*** **(LeConte)**
— Elytron solid red to orange **23**

23(22). Elytron bright red-orange . . . . . ***A. sanguinipennis*** **(Say)**
— Elytron dull red. . . . . ***A. mixtus*** **(Herbst)** (in part)

24(21). Elytron predominately yellow with black sutural areas or dusky apex **25**
— Elytron predominately black with yellow to red basal macula or lateral margin **28**

25(24). Elytron yellow with dusky apical macula, not well-defined . . . . . ***A. vitiosus*** **(LeConte)**
— Elytron yellow with black sutural stripe, apical macula, if present, well-defined **26**

26(25). Elytron yellow with black sutural stripe confined to first interspace, except for defined black apical macula . . . . . ***A. linteus*** **(Say)**
— Elytron yellow with black sutural stripe covering more than one interspace (at least in the apical half), without defined black apical macula **27**

27(26). Black sutural stripe on elytron covering more than first interspace for most of elytron, from apex nearly to basal margin, widest in apical half; antennomere II round, III triangular and subequal to IV. . . . . ***A. sayi*** **(LeConte)**
— Black sutural stripe on elytron widest in apical third, narrowing and becoming obsolete towards basal margin; antennomeres II and III subequal, III not triangular . . . . . ***A. militaris*** **(Harris)**

28(24). Vestiture on pronotum black; pronotal punctures small, sparse . . . . . ***A. xanthomus*** **(Say)**
— Vestiture on pronotum yellow; pronotal punctures larger, denser **29**

29(28). Elytron predominately black, yellow basally and laterally to apex . . . . . ***A. oblessus*** **(Say)**
— Elytron predominately black, yellow to red basally or laterally along basal fourth only **30**

30(29). Elytral macula laterally along basal fourth . . . . . ***A. laesus*** **(LeConte)**
— Elytral macula confined to base or around scutellum **31**

31(30). Elytron subparallel; elytral macula extending on to epipleuron . . . . . ***A. semicinctus* (Randall)**
— Elytron subparallel in basal third, then gradually narrowing apically; elytral macula generally confined to scutellar area (rarely on epipleuron) . . . . . ***A. protervus* (LeConte)**

Ampedus areolatus (Say, 1823)

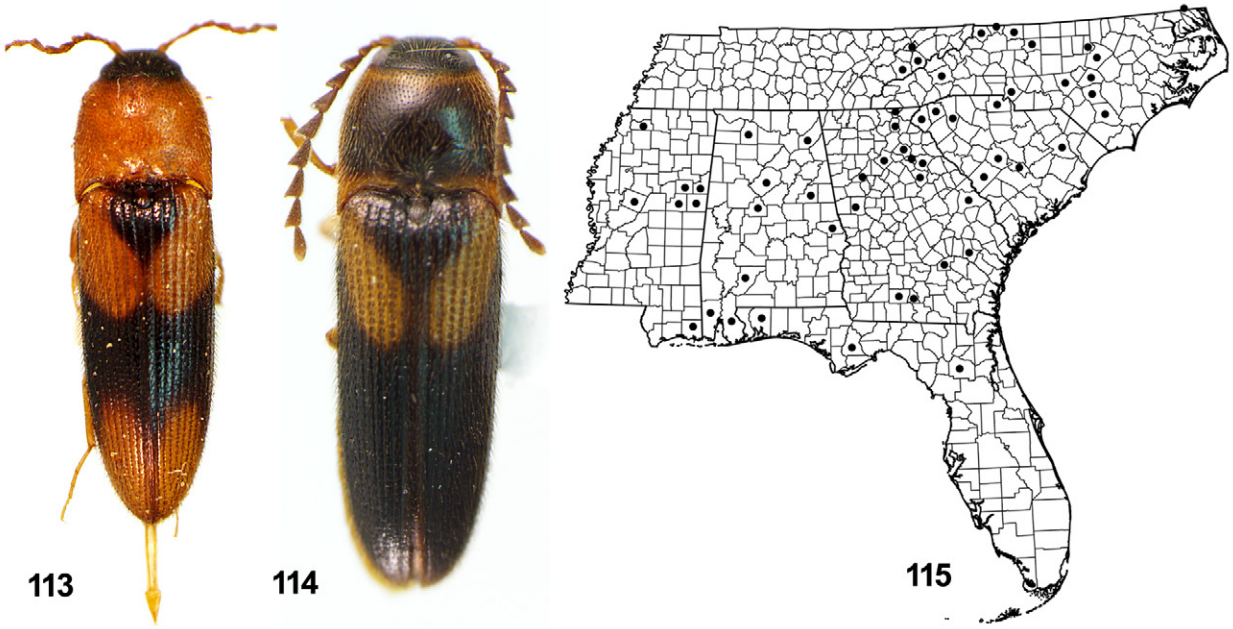
Figures 113–115

Elater areolatus Say, 1823: 167
Elater obliquus Say, 1839: 174
Elater scitulus Germar, 1844: 168

Diagnosis. Size small, length 4.0–5.5 mm. Color variable; head black; pronotum orange to dark brown with yellow-orange margins and hind angle; elytron dark brown to black with oblique yellow-orange macula, starting at humerus and broadly rounding over basal third, apex sometimes orange; vestiture yellow-gray, dense, long. Antenna 11-segmented, serrate; antennomere II small, round; III twice as long as II, subequal to IV in length but not as wide. Pronotum widest at middle, parallel for basal third; punctures coarse, separated by a distance equal to or greater than their diameters, denser laterally; hind angle parallel, not divergent, unicarinate. Elytral striae deeply impressed, punctured; intervals rugose and punctured. Aedeagus with median lobe slender, subparallel, tapering evenly to pointed apex; paramere without strong constriction at base of apical blade, blade small. Female similar to male externally but slightly larger and with shorter antennae.

Distribution. Eastern and Midwestern North America (Ramberg 1979). Previously recorded from all seven states in the study area (Candèze 1859; Leng 1910, 1920; Brimley 1938; Löding 1945; Fattig 1951; Kirk 1969, 1970; Peck and Thomas 1998; Ferro et al. 2012b, 2012c). The type locality of *E. areolatus* is Mississippi (not further restricted).

Specimens Examined. Alabama (Baldwin, Bibb, Clay, DeKalb, Jefferson, Lawrence, Lee, Mobile, Monroe); **Florida** (Alachua, Liberty, Santa Rosa); **Georgia** (Burke, Clarke, Colquitt, Cook, Fulton, Greene, Gwinnett,



Figures 113–115. *Ampedus areolatus*. **113)** Habitus (pale pronotum). **114)** Habitus (dark pronotum). **115)** Distributional data.

Jackson, Jeff Davis, Meriwether, Oglethorpe, Tattnall, Towns, White); **Mississippi** (Holmes, Jackson, Lowndes, Noxubee, Oktibbeha, Tate, Winston); **North Carolina** (Alleghany, Ashe, Bladen, Buncombe, Camden, Cumberland, Durham, Forsyth, Harnett, Mecklenburg, Moore, Surry, Wake); **South Carolina** (Aiken, Calhoun, Florence, Greenville, Lexington, Oconee, Pickens, York); **Tennessee** (Cocke, Hamblen, Sevier). March–July. (Figure 115)

Discussion. This species is usually readily recognized by its small size and color pattern. The only other elaterids in the study area with a similar size and color pattern are the two *Idolus* spp. and *Horistonotus curiatus*. Specimens in the study area have been collected by a variety of means, including at ultraviolet and mercury vapor light, in Lindgren funnel, sticky, Malaise, flight intercept traps, and under bark. Specimens from Burke County, GA were collected in pitfall traps baited with human dung.

Ampedus collaris (Say, 1825)

Figures 116–117

Elater collaris Say, 1825: 268

Diagnosis. Size small, 6.0–8.0 mm in length. Bicolored; head black; prothorax red except prosternum black; remainder of body and appendages black; vestiture yellow-gray, sub-erect, sparse on pronotum. Antenna 11-segmented, serrate; antennomeres II and III subequal; III shorter than IV; flagellar antennomeres as long as wide. Pronotum slightly longer than wide, parallel over basal half, narrowing anteriorly; punctures coarse, sparse, separated by a distance greater than their diameters, denser laterally and apically; hind angles parallel, not divergent, unicarinate. Elytral striae deeply and coarsely punctured; intervals rugose and punctured. Aedeagus with median lobe narrowing apically; paramere broad basally, narrowing to small apical blade. Female similar to male externally, but slightly larger.

Distribution. Eastern United States (Ramberg 1979). In the Southeast, previously recorded from Alabama, Florida, Georgia, North Carolina, and South Carolina (LeConte 1853; Candèze 1869; Leng 1920; Brimley 1938; Löding 1945; Fattig 1951; Kirk 1969; Ramberg 1979; Downie and Arnett 1996). Although this species' presence in Alabama was confirmed in this study, Löding's (1945) record from Squaw Shoals, AL is based on a misidentification (see below). The following records from Mississippi and Tennessee represent **New State Records**.

Specimens Examined. Alabama (Blount, Greene, Madison); **Georgia** (Clarke, Greene, Jones); **Mississippi** (Noxubee, Oktibbeha, Tishomingo, Winston); **North Carolina** (Burke, Gates, Halifax, Rutherford, Surry, Swain, Wake, Wayne); **South Carolina** (Williamsburg); **Tennessee** (Putnam, Warren). April–June. (Figure 117)

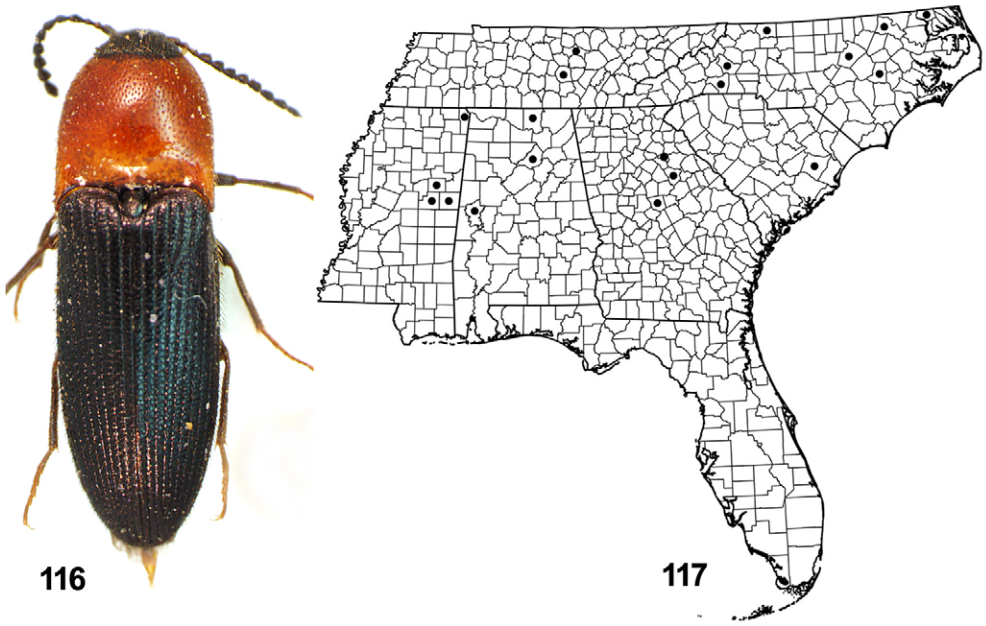
Discussion. In the study area, this species is very similar to *A. palans* and *Megapenthes illinoisensis*, from which both it can be separated by yellow-gray pronotal setae (pronotal vestiture black in *A. palans* and *M. illinoisensis*). In addition, *M. illinoisensis* does not have the pronotosternal sutures open anteriorly. I have examined the specimen (GSAT) that was the basis for Löding's (1945) record from Squaw Shoals, AL (Tuscaloosa County) and identified it as *M. illinoisensis*. Specimens in the study area have been collected at ultraviolet light, in Lindgren funnel traps, in flight intercept traps, and by Berlese extraction of pine bark.

Ampedus fuscatus (Melsheimer, 1845)

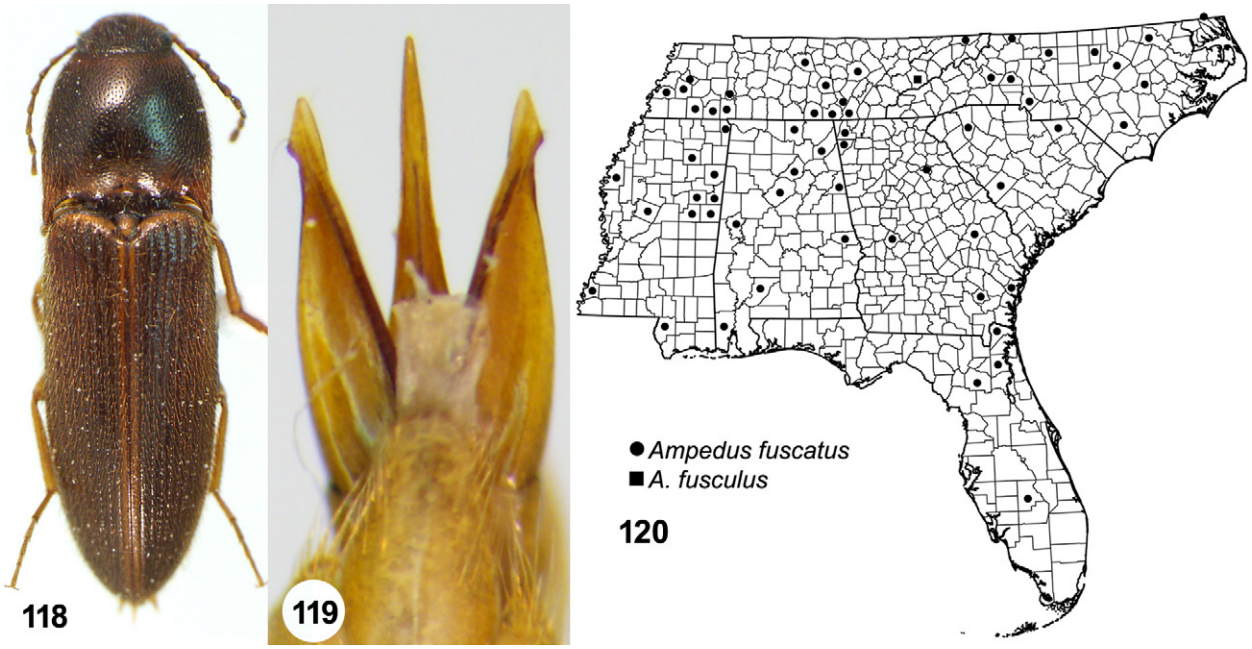
Figures 118–120

Elater fuscatus Melsheimer, 1845: 213

Diagnosis. Size small, 6.0–9.0 mm in length. Color light red-brown to brown, antennae and legs lighter than body; vestiture yellow, long, evenly distributed over the body. Antenna 11-segmented, weakly serrate, not



Figures 116–117. *Ampedus collaris*. **116)** Habitus. **117)** Distributional data.



Figures 118–120. *Ampedus* spp. **118)** *A. fuscatus* (habitus). **119)** *A. fuscatus* (aedeagus). **120)** Distributional data for *A. fuscatus* and *A. fusculus*.

extending beyond apex of pronotal hind angle. Pronotum convex, arcuate, narrowing anteriorly, slightly sinuate at base of hind angle; punctures small, simple, dense, becoming large, umbilicate, and contiguous laterally; hind angle bicarinate. Elytron subparallel; striae punctate; intervals densely punctate, punctures small. Aedeagus (Figure 119) with median lobe tapering evenly to subacute apex; paramere not constricted at base of apical blade; blade broadly rounded laterally and with rounded apex. Female similar to male externally but slightly larger.

Distribution. Eastern and Midwestern North America (Ramberg 1979). In the Southeast, previously recorded from Alabama, Florida, Mississippi, North Carolina, and South Carolina (Ramberg 1979). Löding's (1945) records of *A. luctuosus* (as *A. manipularis*) and *A. melsheimeri* from Alabama refer to this species. The following records from Georgia and Tennessee represent **New State Records**.

Specimens Examined. Alabama (Blount, Cleburne, DeKalb, Greene, Jefferson, Lee, Madison, Mobile, Monroe); **Florida** (Alachua, Clay, Highlands, Nassau); **Georgia** (Chattooga, Clarke, Emanuel, McIntosh, Pierce, Taylor, Walker); **Mississippi** (Pearl River); **Mississippi** (Adams, Bolivar, Holmes, Lowndes, Monroe, Noxubee, Oktibbeha, Pontotoc, Tishomingo, Winston); **North Carolina** (Alleghany, Bladen, Burke, Camden, Catawba, Columbus, Forsyth, Halifax, Harnett, Mecklenburg, Orange, Wake, Wayne); **South Carolina** (Aiken, Chesterfield, Greenville); **Tennessee** (Crockett, Cumberland, Decatur, Franklin, Hamilton, Hardeman, Hardin, Haywood, Marion, McNairy, Sequatchie, Sullivan, Tipton, Warren, Wilson). Year-round. (Figure 120)

Discussion. In the Southeast, this species is similar to *Ampedus* sp. 3 and *Ampedus* sp. 4. *Ampedus fuscatus* differs from Species 3 in having denser pronotal punctures laterally and from Species 4 in not having the antennae extend beyond the apices of the pronotal hind angles. Specimens of *A. melanotoides* with two carinae on the pronotal hind angle may also resemble *A. fuscatus* but are generally darker and larger and have a more pronounced apical blade on the paramere. Seeing both carinae on the hind angle can sometimes be challenging. In some checklists (e.g. Peck and Thomas 1998), this species is incorrectly synonymized with *A. nigricans* Germar. *Ampedus fuscatus* will not key to *A. nigricans* in the published keys by Dietrich (1945) and Downie and Arnett (1996) and are likely to get misidentified as *A. melanotoides* due to the brown color and weakly serrate antennae. Southeastern specimens identified by me as *A. melanotoides* prior to 2014 that could not be re-evaluated in time for publication should be re-examined. Specimens in the study area have been collected at ultraviolet and mercury vapor light, under pine bark, and in Malaise, window, and Lindgren funnel traps. Specimens from Highlands County, FL (BAM) were collected in a tree squirrel nest.

Ampedus fusculus (LeConte, 1853)

Figure 120

Elater fusculus LeConte, 1853: 468

Diagnosis. Size small, 5.0–7.0 mm in length. Bicolored; pronotum black, often with yellow to red hind angle; elytron yellow-brown to brown, with dark infuscation over roughly first three intervals; vestiture yellow, light to moderate, evenly distributed over the body. Antenna 11-segmented, serrate, not extending beyond apex of pronotal hind angle; antennomere II small; III intermediate between II and IV. Pronotum moderately convex, sides arcuate, sinuate at base of hind angle, punctures small, separated by a distance approximately equal to their own diameters, slightly larger and denser laterally; hind angle unicarinate. Elytral striae punctate; intervals densely, coarsely punctate. Aedeagus with median lobe of male tapering to subacute apex; paramere stout, not greatly constricted at base of apical blade. Female similar to male externally but slightly larger.

Distribution. Northeastern North America (Ramberg 1979). Previously not recorded from the Southeast. The following record from Tennessee represents a **New State Record**.

Specimens Examined. Tennessee (Sevier). May. (Figure 120)

Discussion. While the amount of yellow on the pronotum can vary from just the hind angles, to the hind angles and lateral margins, the combination of the color of the pronotum and elytra is usually sufficient for recognizing this species. The one specimen examined (LSAM) was collected at Clingmans Dome on the Tennessee-North Carolina border. This locality has produced several interesting records of normally boreal species of Elateridae. The specimen was collected in a Lindgren funnel trap.

Ampedus impolitus (Melsheimer, 1844)

Figures 121, 123

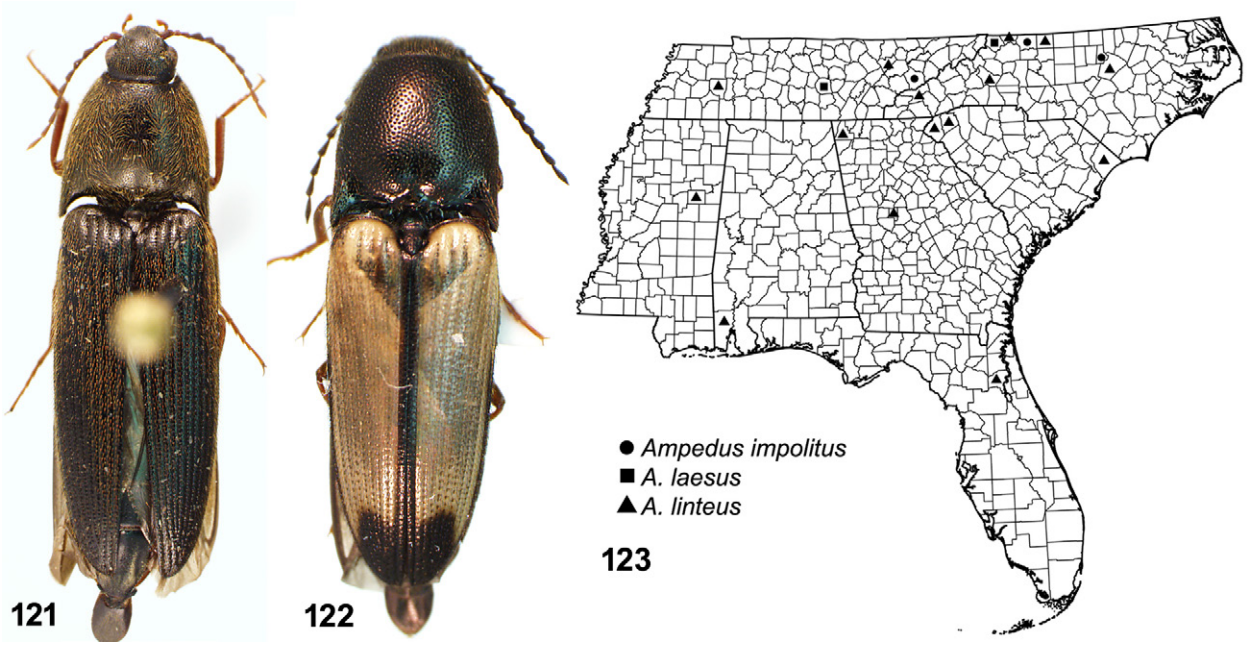
Elater impolitus Melsheimer, 1844: 160

Diagnosis. Size moderate, length 12.0 mm on average. Color black; appendages yellow-red; vestiture yellow, long and dense on pronotum. Antenna 11-segmented, serrate, not extending to apex of pronotal hind angle; antennomere III nearly as long as IV and much longer than II. Pronotum subquadrate, parallel on basal half, converging anteriorly; punctures dense, coarse, becoming contiguous laterally; hind angle slightly divergent, unicarinate. Elytral striae deep and punctured; intervals rugose and coarsely punctured. Aedeagus with median lobe gradually tapering from base; paramere moderately constricted at base of apical blade, lateral edge of blade at a nearly 90-degrees angle to paramere. Female similar to male externally but slightly larger.

Distribution. Northeastern North America, south to Pennsylvania (Downie and Arnett 1996). Previously not recorded from the Southeast. The records below from North Carolina and Tennessee represent **New State Records**.

Specimens Examined. North Carolina (Durham, Surry); **Tennessee** (Sevier). May–July. (Figure 123)

Discussion. *Ampedus impolitus* is one of several species of large, solid black *Ampedus* in the East. It should be easily recognized by its size, reddish legs, and antennomere III nearly twice as long as II and subequal to IV. Specimens in the study area have been collected in Lindgren funnel traps.



Figures 121–123. *Ampedus* spp. **121)** *A. impolitus* (habitus). **122)** *A. linteus* (habitus). **123)** Distributional data for *A. impolitus*, *A. laesus*, and *A. linteus*.

Ampedus laesus (LeConte, 1853)

Figures 123,139, 142

Elater laesus LeConte, 1853: 465

Diagnosis. Size moderate, 11.0–12.0 mm in length. Color black; red macula at base of elytron and along lateral margin of elytron and on epipleuron, extending at least one-fourth length of elytron; vestiture yellow, suberect and sparse on pronotum. Antenna 11-segmented, serrate; antennomere III intermediate between II and IV; IV and beyond distinctly longer than wide. Pronotum slightly longer than wide, parallel basally, widest in middle, converging anteriorly; punctures coarse, separated by approximately their own diameters, nearly contiguous laterally; hind angle parallel, unicarinate. Elytral striae deep and punctured; intervals strongly rugose and coarsely punctured. Aedeagus with median lobe slightly constricted submedially, then widening before narrowing to acute apex; paramere with moderate apical blade. No sexual dimorphism noted.

Distribution. Northeastern North America, south to Georgia (Ramberg 1979). In the Southeast, previously recorded from Georgia and North Carolina (LeConte 1853; Leng 1920; Brimley 1938; Fattig 1951; Ramberg 1979; Downie and Arnett 1996). The type locality is Georgia (not further restricted). While this species' presence in North Carolina was confirmed in this study, one of Brimley's (1938) records is based on a misidentification (see below). The following record from Tennessee represents a **New State Record**.

Specimens Examined. North Carolina (Ashe); **Tennessee** (Warren). May, July. (Figure 123)

Discussion. In the study area, this species is most similar to *A. protervus* and *A. semicinctus* with regards to the color of the elytron. In the latter two, the red along lateral margins of the elytron is much shorter and with *A. semicinctus*, the pronotal punctures are not as dense laterally. I examined the specimen (NCSU) that was the basis of Brimley's (1938) record from Raleigh, NC and identified it as *A. xanthomus*. Specimens in the study area have been collected in Lindgren funnel and sticky traps.

Ampedus linteus (Say, 1839)

Figures 122–123

Elater lugubris Palisot de Beauvois, 1821: 33 (*nomen nudum*)
Elater linteus Say, 1839: 169

Diagnosis. Size small to moderate, 8.0–11.0 mm in length. Bicolored; pronotum black; elytron yellow with first interval and apical patch black; vestiture yellow-gray, sparse and decumbent on pronotum. Antenna 11-segmented, serrate; antennomere II small, globular; III triangular, subequal to IV. Pronotum longer than wide, parallel in basal half, converging anteriorly; punctures dense, umbilicate; hind angle parallel, unicarinate. Elytral striae impressed with coarse punctures; intervals punctured. Aedeagus with median lobe slender, subparallel, tapering to pointed apex; paramere with small, triangular apical blade. Female similar to male externally, but usually larger, antennomere III as long as IV but not as wide, and pronotum subquadrate.

Distribution. Eastern North America, west to Iowa (Downie and Arnett 1996; Peck and Thomas 1998). In the Southeast, previously recorded from Alabama, Florida, Georgia, North Carolina, and South Carolina (Leng 1920; Brimley 1938; Löding 1945; Fattig 1951; Kirk 1970; Ramberg 1976; Downie and Arnett 1996; Peck and Thomas 1998). The following records from Mississippi and Tennessee represent **New State Records**.

Specimens Examined. Alabama (Mobile); **Florida** (Putnam); **Georgia** (Lamar, Walker); **Mississippi** (Oktibbeha); **North Carolina** (Alleghany, Burke, Stokes, Swain, Wake); **South Carolina** (Horry, Oconee, Pickens); **Tennessee** (Anderson, Henderson). January-May, September–December. (Figure 123)

Discussion. This species has a fairly distinctive color pattern and should not be easily confused with any other species in the study area. Specimens in the study area have been collected under pine bark and in Lindgren funnel, panel, and flight intercept traps.

Ampedus luctuosus (LeConte, 1853)

Figure 127

Elater luctuosus LeConte, 1853: 466
Elater manipularis Candèze, 1859: 478

Diagnosis. Size small to moderate, 8.5–11.0 mm in length. Color black; vestiture yellow, prominent. Antenna 11-segmented, weakly serrate; antennomeres II and III subequal. Pronotum broadly rounded, narrowing anteriorly, sinuate at base of hind angle, punctures coarse, dense, separated by approximately their own distances, becoming contiguous laterally; hind angle long, strongly unicarinate. Elytron subparallel; striae deeply punctures; intervals flat, rugose, densely punctate. Aedeagus with median lobe subparallel over most of its length, becoming narrow apically; paramere broad basally, gradually tapering to base of small, triangular apical blade. Female similar to male externally but slightly larger and more robust.

Distribution. Northeastern North America (Ramberg 1979). In the Southeast, previously recorded from Alabama, Georgia, North Carolina, South Carolina (Brimley 1938; Löding 1945; Fattig 1951; Kirk 1969; Ramberg 1979). Many of the previous records from the Southeast may be based on misidentifications (see below).

Specimens Examined. None.

Discussion. While Ramberg (1979) recorded *A. luctuosus* from North Carolina in his Ph.D. thesis, several of the previously published southeastern records for this species may be based on misidentifications. In LeConte (1884), *A. melanotoides* will key to this species, leading to misidentifications in collections (Brown 1933a). I have examined the specimens (GSAT) that were the basis for Löding's (1945) records from Madison and Mobile counties, AL and have identified them as *A. fuscatus*.

Ampedus melanotoides Brown, 1933

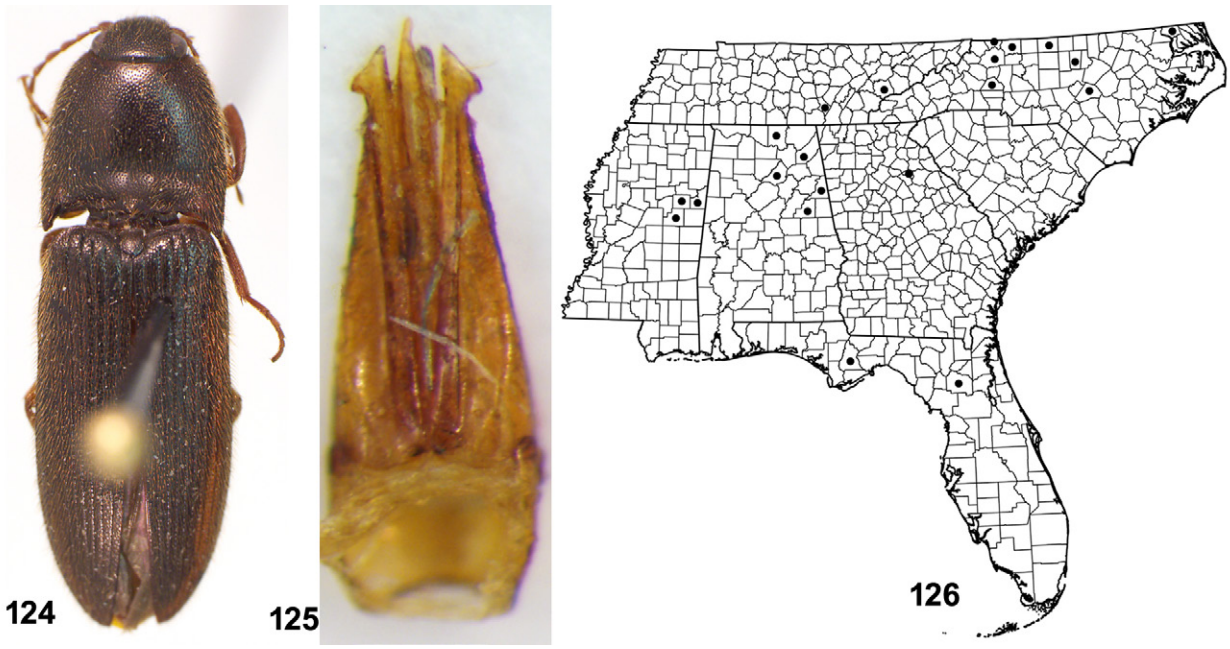
Figures 124–126

Ampedus melanotoides Brown, 1933a: 134

Diagnosis. Size small to moderate, 8.0–12.0 mm in length. Color brown, appendages and venter paler; vestiture brown, short and dense. Antenna 11-segmented, flagellar antennomeres slightly serrate; antennomere III subequal between II and IV; IV twice as long as wide. Pronotum wider than long, widest at middle, parallel basally or with slight concavity as base of hind angle, converging anteriorly; punctures coarse, shallow, umbilicate, denser and contiguous or nearly so laterally; hind angle parallel, usually unicarinate (rarely weakly bicarinate). Elytral striae deep and punctured; interspaces flat but rugose and punctured. Aedeagus (Figure 125) with median lobe tapering to pointed apex; paramere constricted at base of apical blade. Female similar to male externally but generally larger and with shorter antennae.

Distribution. Eastern United States, west to Indiana (Ramberg 1979). In the Southeast, previously recorded from Florida, Georgia, Mississippi, North Carolina, South Carolina, and Tennessee (Kirk 1969, 1970; Ramberg 1976; Downie and Arnett 1996). The following records from Alabama represent a **New State Record**.

Specimens Examined. Alabama (Blount, Clay, Cleburne, DeKalb, Madison); **Florida** (Alachua, Liberty); **Georgia** (Clarke); **Mississippi** (Lowndes, Oktibbeha, Winston); **North Carolina** (Alleghany, Catawba, Gates, Harnett, Orange, Rockingham, Surry, Wilkes); **Tennessee** (Blount, Sequatchie). April–September. (Figure 126)



Figures 124–126. *Ampedus melanotoides*. **124)** Habitus. **125)** Aedeagus. **126)** Distributional data.

Discussion. Brown's name for this species is very appropriate, as it does indeed superficially resemble a member of the genus *Melanotus*. Generic characters, especially of the tarsal claws, will easily separate the two, however. In the study area, this species is most similar to *A. melsheimeri* and *A. fuscatus*, both of which usually have obviously bicarinate pronotal hind angles. In previously published keys by Dietrich (1945) and Downie and Arnett (1996), *A. fuscatus* will key to this species. Specimens identified by me as *A. melanotoides* prior to 2014 should be re-evaluated as possible *A. fuscatus* (location data for specimens that could not be re-examined before publication are not included here). Specimens in the study area have been collected in Lindgren funnel and flight intercept traps.

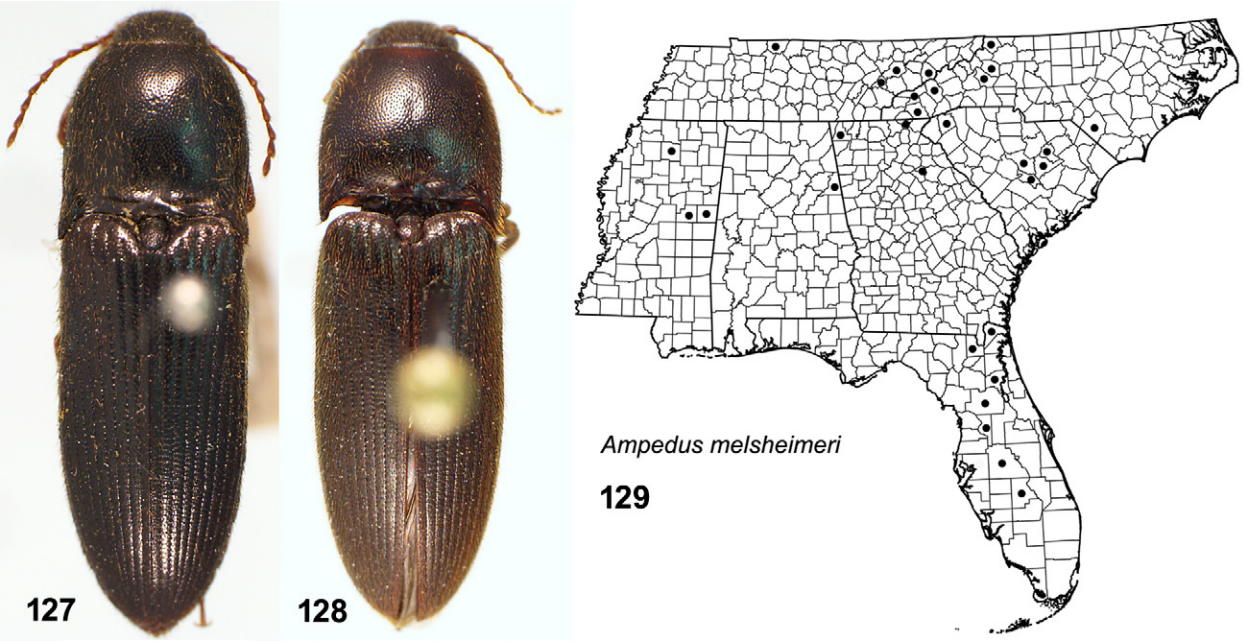
Ampedus melsheimeri (Leng, 1918)

Figures 128–129

Elater hepaticus Melsheimer, 1844: 160 (nec *Elater hepaticus* Germar, 1824: 43)
Ectamenogonus melsheimeri Leng, 1918: 206

Diagnosis. Size small to moderate, 9.0–12.0 mm in length. Color dark red-brown to nearly black; venter and legs paler; vestiture brown and dense. Antenna 11-segmented, antennomeres slender, all antennomeres longer than wide; antennomere III subequal between II and IV. Pronotum slightly longer than wide, nearly parallel basally, converging anteriorly; punctures coarse, close, contiguous laterally; hind angle parallel, bicarinate, outer carina often weak. Elytral striae deep and coarsely punctured; interspaces rugose and sparsely punctured. Aedeagus with median lobe subparallel, then narrowing subapically; paramere not greatly constricted at base of apical blade. Female similar to male externally but larger.

Distribution. Eastern North America (Ramberg 1979). In the Southeast, previously recorded Alabama, Florida, Georgia, North Carolina, and South Carolina (Candèze 1859; Dozier 1918; Leng 1920; Brimley 1938; Löding 1945; Fattig 1951; Kirk 1969, 1970; Ramberg 1979; Peck and Thomas 1998; Chatzimanolis et al. 2020). While this species' presence in Alabama was confirmed in this study, Löding's (1945) record from Mobile



Figures 127–129. *Ampedus* spp. **127)** *A. luctuosus* (habitus). **128)** *A. melsheimeri* (habitus). **129)** *A. melsheimeri* (distributional data).

County, AL is based on a misidentification (see below). The following records from Mississippi and Tennessee represent **New State Records**.

Specimens Examined. Alabama (Cleburne); **Florida** (Baker, Highlands, Marion, Nassau, Polk, Putnam, Sumter); **Georgia** (Clarke, Towns, Walker); **Mississippi** (Lafayette, Noxubee, Winston); **North Carolina** (Ashe, Burke, Caldwell, Haywood, Macon, Robeson, Swain); **South Carolina** (Calhoun, Lee, Pickens, Richland, Sumter); **Tennessee** (Cocke, Knox, Loudon, Robertson). January–February, April–September. (Figure 129)

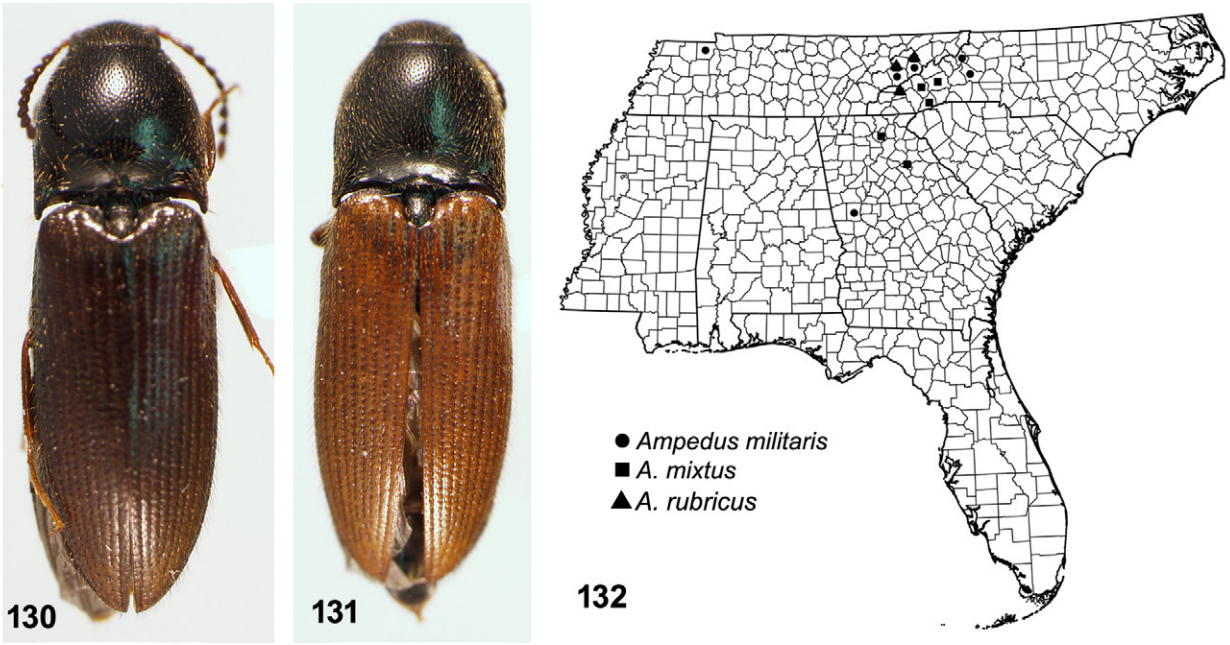
Discussion. This species is the largest in the study area with bicarinate pronotal hind angles. However, in specimens where the outer carina is weak, it may be confused with *A. melanotoides*. In these cases, *A. melsheimeri* usually has smoother interspaces between pronotal punctures and lacks concavity at the base of the hind angles. *Ampedus melsheimeri* is also very similar to *Megapenthes angularis*, and generic characters should be confirmed (namely the excavation of the pronotosternal sutures in the former) to separate the two. I have examined the specimen (GSAT) that was the basis of Löding's (1945) record from Mobile, AL and identified it as *A. fuscatus*. Specimens in the study area have been collected at mercury vapor and ultraviolet light and in Lindgren funnel, wine, and window traps.

Ampedus militaris (Harris, 1836)

Figures 132–133

Elater militaris Harris, 1836: 70

Diagnosis. Size small, 6.4–8.0 mm in Length. Bicolored; head and pronotum black; elytron yellow with black lateral and sutural margins, the latter widening in apical third; appendages dark; vestiture yellow, wiry, spare. Antenna 11-segmented, serrate; antennomeres II and III subequal, together longer than IV; IV triangular, slightly longer than wide. Pronotum slightly longer than wide, parallel over basal half, converging anteriorly; punctures coarse, close, contiguous laterally; hind angle parallel, unicarinate. Elytral striae coarsely punctured;



Figures 130–132. *Ampedus* spp. **130)** *A. mixtus* (habitus, unicolored form). **131)** *A. mixtus* (habitus, bicolored form). **132)** Distributional data for *A. militaris*, *A. mixtus*, and *A. rubricus*.

intervals convex, sparsely punctured. Aedeagus with median lobe tapering apically; paramere moderately constricted at based of apical blade. Female similar to male externally but usually slightly larger.

Distribution. Northeastern North America (Ramberg 1979). In the Southeast, previously recorded from Alabama, Georgia, North Carolina, and Tennessee (Fattig 1951; Ramberg 1979; Vlach et al. 2010).

Specimens Examined. Georgia (Meriwether); **North Carolina** (Avery, Burke); **Tennessee** (Cocke, Henry, Sevier). March–June. (Figure 132)

Discussion. This species is most similar to *A. sayi*. However, *A. sayi* has the black sutural stripe wider over a longer portion of the elytron and antennomere III is triangular. Also, specimens of *A. sayi* tend to be larger. Specimens in the study area have been collected in Malaise and Lindgren funnel traps.

Ampedus mixtus (Herbst, 1806)

Figures 130–132

Elater mixtus Herbst, 1806: 94

Diagnosis. Size small, 5.5–8.5 mm in length. Color variable, either black or black with dusky red-brown elytron (in the latter, elytron solid-colored); legs red-brown to black, tarsi lighter; vestiture yellow, short, dense. Antenna 11-segmented, serrate; antennomeres II and III subequal, combined longer than IV. Pronotum convex, wider than long, widest at middle, slight concavity at base of hind angle, converging anteriorly; punctures coarse, sparser on disc, separated by approximately their own diameters, denser laterally; hind angle parallel, unicarinate. Elytral striae heavily punctured; intervals slightly rugose and sparsely punctured. Aedeagus with median lobe tapering to subacute apex; paramere not greatly constricted at base of apical blade, blade very small. Female similar to male externally but generally slightly larger.

Distribution. Northeastern North America (Ramberg 1979). In the Southeast, previously recorded from Georgia and North Carolina (Candèze 1859; Leng 1920; Fattig 1951; Ramberg 1979).

Specimens Examined. Georgia (Clarke, Lumpkin); **North Carolina** (Buncombe, Haywood, Transylvania). February, May–July.

Discussion. This species should be fairly easily to recognize in the study area. All-black specimens may be confused with *A. pedalis* and bicolored forms may resemble a dull *A. sanguinipennis*. According to Ramberg (1979) this species is generally associated with bogs or marshes.

Ampedus molestus (LeConte, 1853)

Elater molestus LeConte, 1853: 467

Diagnosis. Size small, 7.0–9.0 mm in length. Color black; antennae and legs red-brown; vestiture yellow, light to moderate, evenly distributed over the body. Antenna 11-segmented, serrate, variable in length but not extending beyond apex of pronotal hind angle. Pronotum convex, weakly arcuate, subparallel basally, slightly sinuate at hind angles, punctures small, simple, dense, becoming larger, umbilicate and very dense laterally; hind angle subparallel, unicarinate. Elytron subparallel over basal two-thirds; striae punctate; intervals densely punctate. Aedeagus with median lobe medially compressed, narrowing apically; paramere constricted at base of apical blade. Female similar to male externally but slightly larger.

Distribution. Northeastern North America, south to North Carolina (Ramberg 1979). In the Southeast, previously recorded only from North Carolina (Ramberg 1979).

Specimens Examined. None.

Discussion. In the Southeast, this species is most similar to *A. pedalis*, from which it can be separated by the shorter antennae and medially compressed median lobe of the aedeagus.

Ampedus nigricollis (Herbst, 1801)

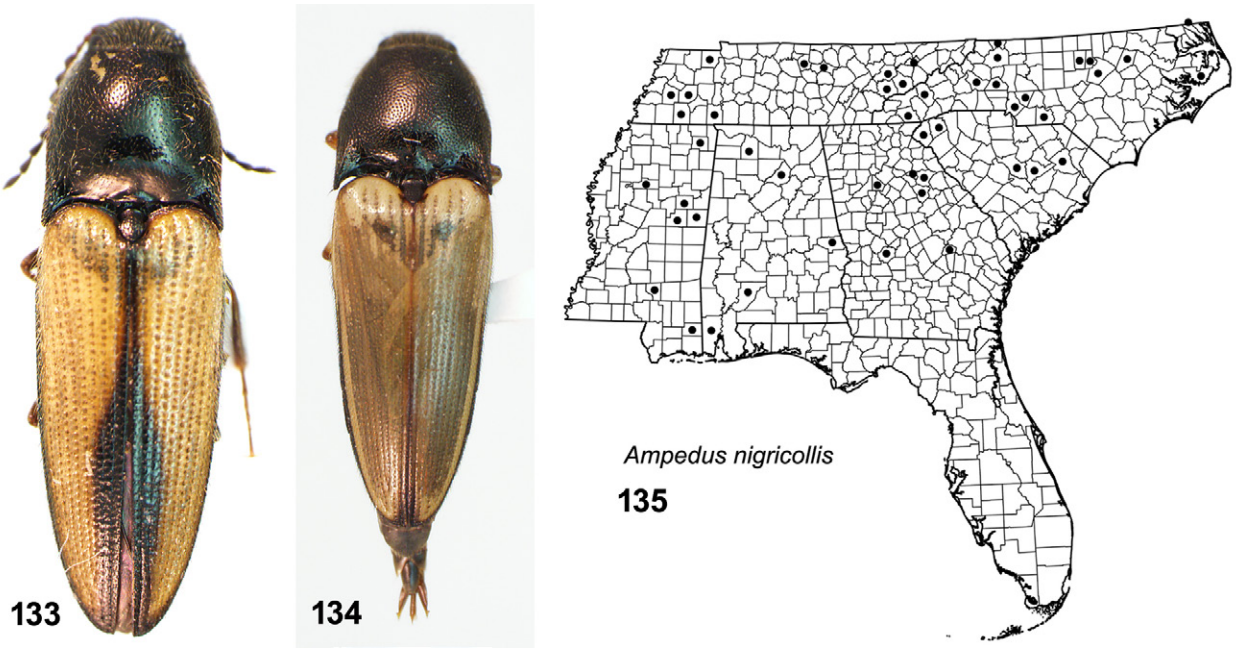
Figures 134–135, 153

Elater nigricollis Herbst, 1801: 73

Diagnosis. Size small to moderate, 9.0–12.0 mm in length. Color variable; bicolored with black pronotum and yellow elytron, elytral disc often dusky, in some specimens nearly black with yellow confined to basal and lateral margins; legs red-brown, paler than body; vestiture yellow on pronotum and lateral margins of elytron, black on elytral disc. Antenna 11-segmented, strongly serrate; antennomere II globular; III triangular, subequal to IV in length but not as wide. Pronotum longer than wide, widest at base of hind angle, gradually converging anteriorly; punctures coarse and close on disc, becoming contiguous and umbilicate laterally; hind angle unicarinate. Elytral striae weakly impressed but coarsely punctured; intervals convex with a double row of setigerous punctures. Aedeagus with median lobe slender, gently tapering to subacute apex; paramere with broad apical blade, defined emargination at base of blades, lateral edge of base of blade rounded, slightly curving inward and tapering to subacute apex. Female similar to male externally but generally slightly larger.

Distribution. Northeastern North America, south to Georgia (Downie and Arnett 1996). In the Southeast, previously recorded from Florida, Georgia, North Carolina, South Carolina, and Tennessee (Leng 1920; Fattig 1951; Kirk 1969, 1970; Ramberg 1979; Downie and Arnett 1996). The following records from Alabama and Mississippi represent **New State Records**, although Löding's (1945) records of *A. oblessus* from Mobile, AL refer to this species.

Specimens Examined. Alabama (Blount, Lawrence, Lee, Monroe); **Georgia** (Clarke, DeKalb, Greene, Macon, Oglethorpe, Treutlen); **Mississippi** (Covington, George, Grenada, Noxubee, Oktibbeha, Prentiss, Winston); **North Carolina** (Alleghany, Anson, Burke, Cabarrus, Camden, Catawba, Durham, Haywood, Hyde, Macon, Mecklenburg, Nash, Orange, Wake, Wilkes); **South Carolina** (Florence, Oconee, Pickens, Richland, Sumter);



Figures 133–135. *Ampedus* spp. **133)** *A. militaris* (habitus). **134)** *A. nigricollis* (habitus). **135)** Distributional data for *A. nigricollis*.

Tennessee (Blount, Hamblen, Hardeman, Hardin, Haywood, Henry, Knox, Madison, Putnam, Sevier, Smith). January–June, August–December. (Figure 135)

Discussion. For the most part, this species is easy to recognize. Specimens that have the dusky part of the elytron becoming nearly black and well-defined can look very similar to *A. oblessus* (Figure 154). In these circumstances, the best external feature to separate them is the color of the legs, red-brown in *A. nigricollis* and black in *A. oblessus*. Specimens from the study area have been collected at ultraviolet light, in Lindgren funnel, pitfall, and Malaise traps, by sweeping vegetation, under oak bark, and in decaying pine logs. Specimens from Blount County, AL (NCSU) were collected by Berlese extraction of litter from an oak tree-hole.

Ampedus oblessus (Say, 1833)

Figures 154–155

Elater discoideus Fabricius 1801: 240 [primary homonym of *Elater discoideus* Weber, 1801: 77].
Elater oblessus Say 1833: 70 [replacement name for *Elater discoideus* Fabricius, 1801, see Bousquet 1993: 12].
Elater sellatus Leng 1918: 206 [unnecessary replacement name for *Elater discoideus* Fabricius, 1801, see Bousquet 1993: 12].

Diagnosis. Size small to moderate, 8.5–11.0 mm in length. Bicolored; body black, elytron with basal and lateral margins yellow to apex; legs dark, tarsi paler; vestiture yellow, long, dense, decumbent. Antenna 11-segmented, serrate; antennomere III subequal between II and IV; II and III combined subequal to IV in length, subcylindrical; IV triangular. Pronotum as wide as long, widest at base of hind angle, converging anteriorly; punctures coarse, shallow, dense and nearly contiguous; hind angles slightly divergent, unicarinate. Elytral striae deep, coarsely punctured at base; intervals rugose and punctured. Aedeagus with median lobe slender, not greatly tapering from base; paramere moderately constricted at base of apical blade, blade elongate and apically blunted. Female similar to male externally but generally slightly larger.

Distribution. Eastern North America, west to Indiana and Ohio (Downie and Arnett 1996). In the Southeast, previously recorded from Alabama, Florida, Georgia, North Carolina, and South Carolina (Leng 1920; Brimley 1938; Löding 1945; Fattig 1951; Kirk 1969, 1970; Downie and Arnett 1996; Peck and Thomas 1998). Although the species' presence in Alabama was confirmed during this study, Löding's (1945) records from Mobile, AL are based on misidentifications (see below). The following records from Mississippi and Tennessee represent **New State Records**.

Specimens Examined. Alabama (Houston); **Florida** (Alachua, Baker, Clay, Gilchrist, Jefferson, Nassau, Pinellas); **Georgia** (Coffee, Montgomery, Walker counties; also the Okefenokee Swamp); **Mississippi** (Oktibbeha); **North Carolina** (Alleghany, Burke, Forsyth, Guilford, Haywood, Orange, Wake); **South Carolina** (Berkeley); **Tennessee** (Davidson). January–May, July, October–November.

Discussion. This species is usually readily recognized by its color pattern. At times, it can look like the dark form of *A. nigricollis* (Figure 153), from which it can be separated by having darker legs. I have examined specimens (GSAT) that are the bases for Löding's (1945) record from Mobile, AL and they are actually the dark form of *A. nigricollis*. Specimens in the study area have been collected in Lindgren funnel traps, in leaf litter, and under oak bark.

Ampedus palans (LeConte, 1853)

Elater palans LeConte, 1853: 469

Diagnosis. Size small, 5.5–6.5 mm in length. Bicolored; body black; pronotum and hypomeron red; vestiture on pronotum black. Antenna 11-segmented, strongly serrate, not extending beyond apex of pronotal hind angle. Pronotum weakly convex, narrowing anteriorly, weakly sinuate at base of hind angle, punctures small, simple, sparse, slightly larger and shallowly umbilicate laterally; hind angle unicarinate. Elytron subparallel; striae punctate; intervals densely punctate, rough. Aedeagus undescribed.

Distribution. Mid-Atlantic United States (Ramberg 1979). In the Southeast, previously recorded from Georgia and North Carolina (Ramberg 1979). The type locality is Georgia (not further restricted).

Specimens Examined. None.

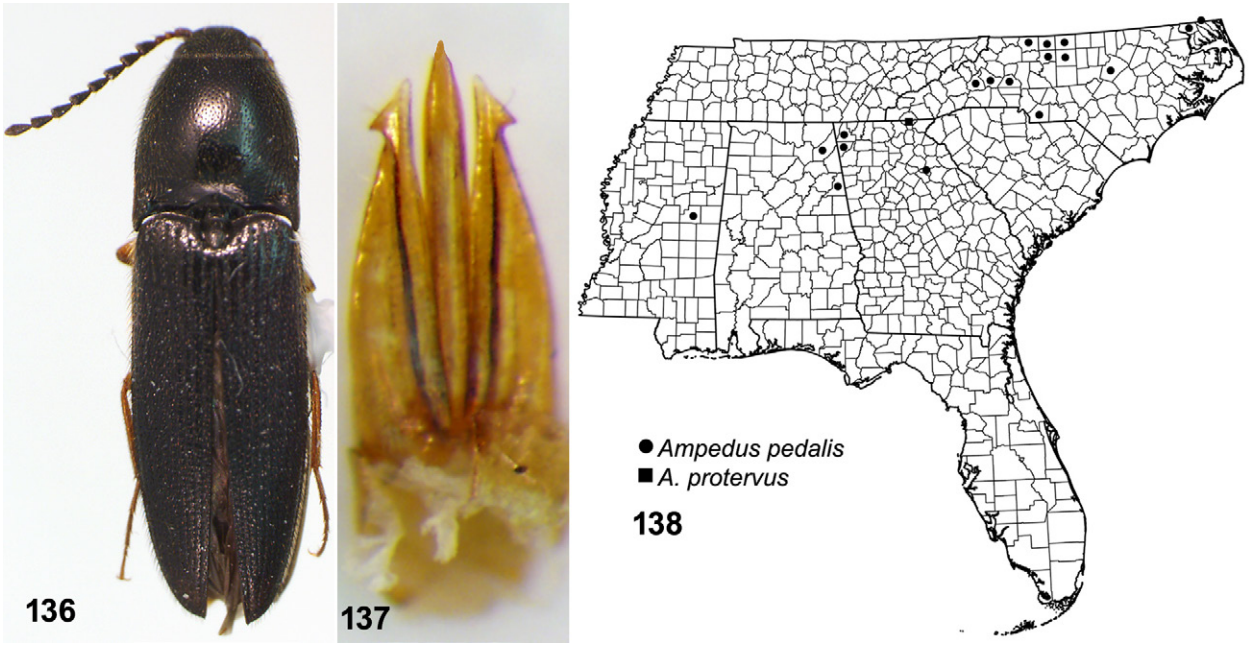
Discussion. *Ampedus palans* is an enigmatic species that has historically been synonymized with *A. collaris.* It differs from *A. collaris* in having darker pronotal setae, less convex pronotum, weakly channeled prosternal sutures, and female genitalia (aedeagus not described). It is actually more similar morphologically to *Megapenthes illinoisensis* and the two may turn out to be conspecific. Ramberg (1979) also seemed to exhibit some doubt to its placement in *Ampedus*.

Ampedus pedalis (Germar, 1843)

Figures 136–138

Elater rufipes Palisot de Beauvois, 1805: 214 (*nomen dubium*)
Elater pedalis Germar, 1843: 176

Diagnosis. Size small, 5.5–8.0 mm in length. Color black; legs and antennae red-brown; vestiture yellow, long and dense. Antenna 11-segmented, serrate, reaching or slightly extending beyond apex of pronotal hind angle; antennomeres II and III subequal, combined slightly longer than IV; IV twice as long as wide. Pronotum slightly wider than long, parallel over basal half, converging anteriorly; punctures fine, simple or weakly umbilicate, sparse basally, denser laterally and anteriorly; hind angle parallel, unicarinate. Elytral striae shallow with deep punctures; intervals rugose and finely punctured. Aedeagus (Figure 137) with median lobe narrow, gently tapering from the base, then narrowing subapically; paramere broad basally, weakly constricted at base of



Figures 136–138. *Ampedus* spp. **136)** *A. pedalis* (habitus). **137)** *A. pedalis* (aedeagus). **138)** Distributional data for *A. pedalis* and *A. protervus*.

apical blade, apical blade small. Female similar to male externally, but generally slightly larger and with a shorter antenna.

Distribution. Northern North America; in the East south to Florida (Ramberg 1979). In the Southeast, previously recorded from Alabama, Florida, Georgia, North Carolina, South Carolina, and Tennessee (Leng 1910; Brimley 1938; Fattig 1951; Kirk 1970; Ramberg 1979; Peck and Thomas 1998). Brimley's (1938) record of *A. nigrinus* from 'Western North Carolina' refers to this species. Fattig's (1951) record from Rabun Bald, GA is based on a misidentification (see below). The following record from Mississippi represents a **New State Record**.

Specimens Examined. Alabama (Cleburne, DeKalb); **Georgia** (Chattooga, Clarke, Walker); **Mississippi** (Winston); **North Carolina** (Burke, Camden, Catawba, Forsyth, Guilford, Gates, McDowell, Rockingham, Stokes, Surry, Union, Wake). April–June. (Figure 138)

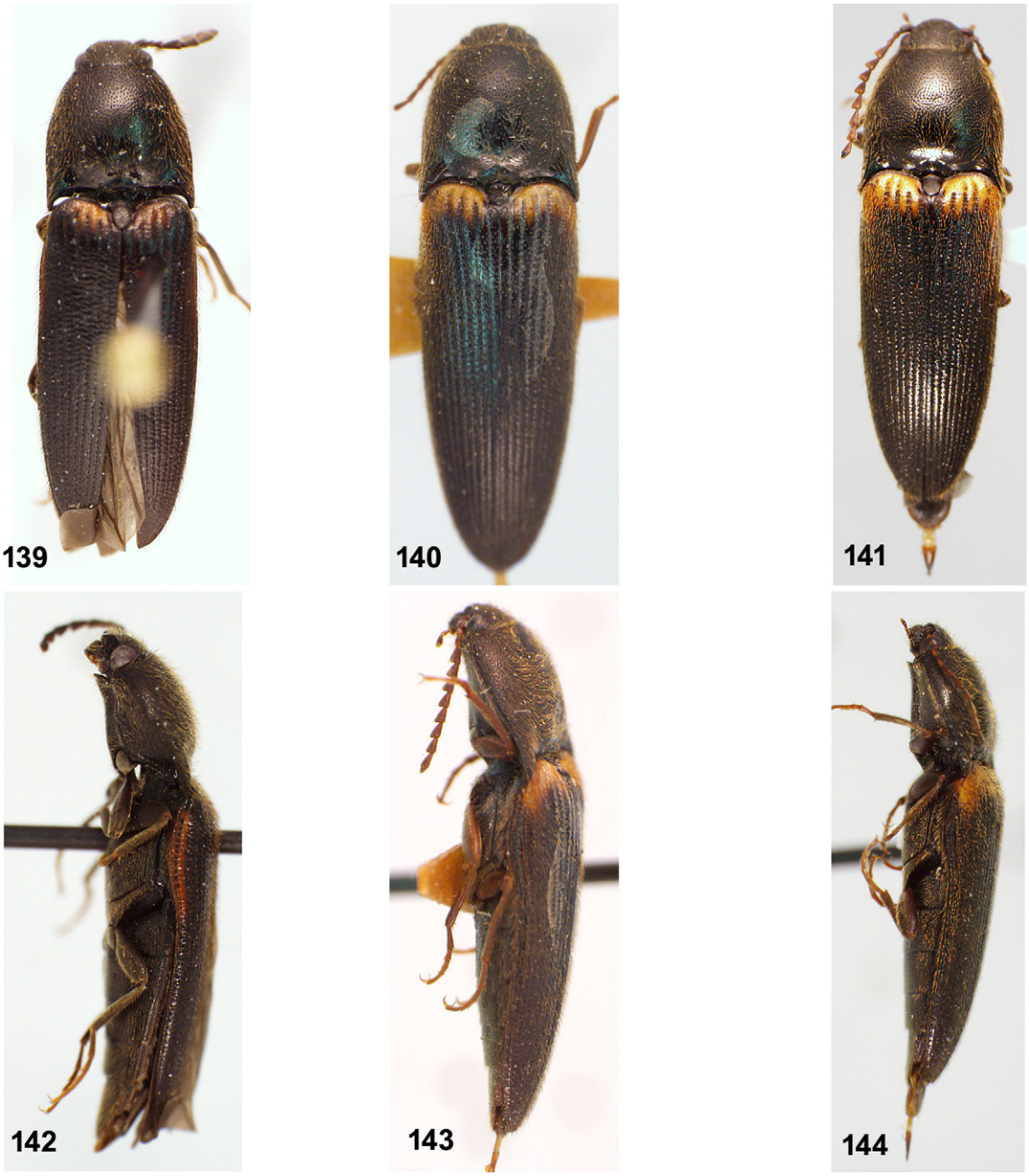
Discussion. This species may be confused with other small, solid black species with red legs. In the Southeast, it is most similar to *Ampedus* sp. 1. The two species can be readily separated by examination of the aedeagus. According to Ramberg (1979) this species has been inadequately described in most keys and texts. I have examined the specimen (UGCA) that was the basis for Fattig's (1951) record from Rabun Bald, GA and identified it as the undescribed *Ampedus* sp. 1. Specimens in the study area have been collected at ultraviolet light and in Lindgren funnel, Malaise, and flight intercept traps.

Ampedus protervus (LeConte, 1853)

Figures 138, 140, 143

Elater protervus LeConte, 1853: 471

Diagnosis. Size small to moderate, 7.5–11.0 mm in length. Color black; elytron with red macula basally around the scutellum and (rarely) along epipleuron; vestiture yellow, moderately long, appressed. Antenna 11-segmented, serrate, extending to or just falling short of apex of pronotal hind angle; antennomere II small; III



Figures 139–144. *Ampedus* spp. **139)** *A. laesus* (habitus). **140)** *A. protervus* (habitus). **141)** *A. semicinctus* (habitus). **142)** *A. laesus* (lateral). **143)** *A. protervus* (lateral). **144)** *A. semicintus* (lateral).

intermediate between II and IV. Pronotum convex, arcuate, slightly narrowing anteriorly, sinuate at base of hind angle, punctures simple, dense to very dense on disk, larger, more umbilicate, and contiguous laterally; hind angle unicarinate. Elytron subparallel in basal third, then gradually tapering to apex; striate punctures; intervals densely punctured, rugose. Aedeagus with median lobe subparallel over much of its length, then narrowing abruptly subapically; paramere not greatly constricted at base of apical blade, blade triangular. Female similar to male but slightly larger and with a less serrate antenna.

Distribtuion. Eastern and Midwestern North America (Ramberg 1979). In the Southeast, previously recorded only from North Carolina (Ramberg 1979). The following record from Georgia represents a **New State Record**, although Fattig's (1951) record of *Ampedus* sp. from Tray Mountain, GA (UGCA) refers to this species.

Specimens Examined. Georgia (Towns). June. (Figure 138)

Discussion. In the study area, this species is most similar to *A. semicinctus* and *A. laesus*, from which it can be separated by the shape of the elytron. Also, with *A. protervus*, the red basal macula on the elytron is generally confined to the scutellar area and not usually extending onto the epipleuron.

Ampedus pusio Germar, 1844

Figures 145, 147

Ampedus pusio Germar, 1844: 169
Elater luteolus LeConte, 1853: 471

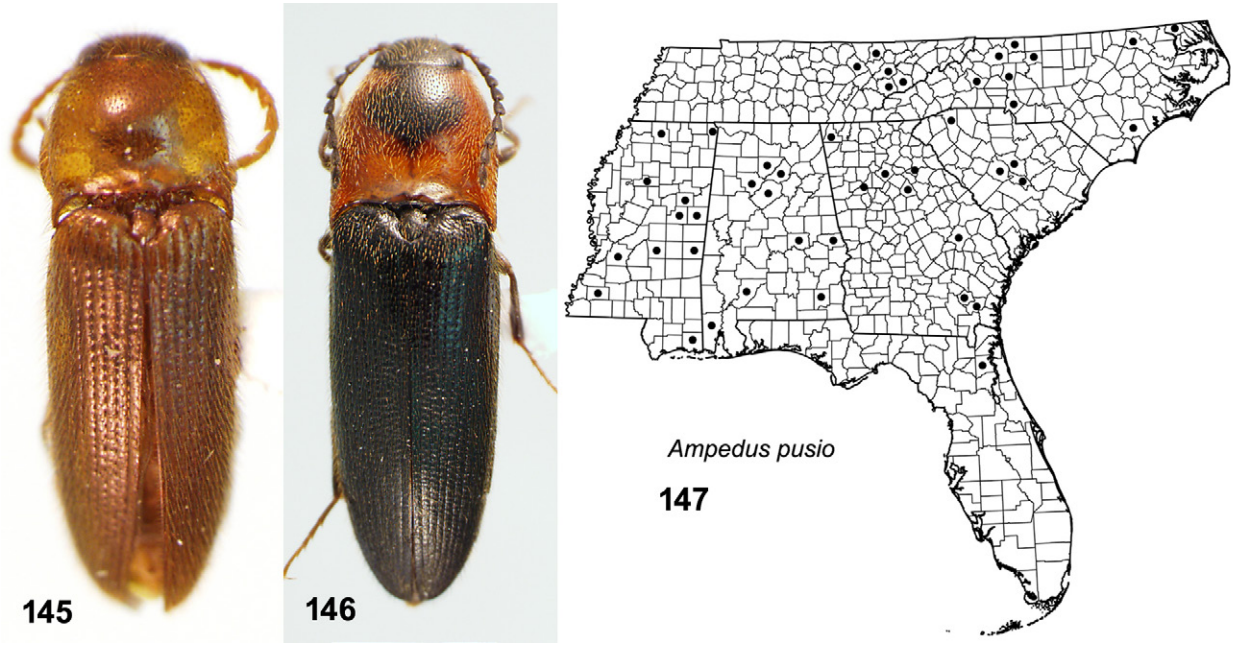
Diagnosis. Size small, 3.0–4.0 mm in length. Color yellow-brown to dusky-brown, pronotum sometimes paler; antennae brown; legs yellow; vestiture yellow, long and dense. Antenna 11-segmented, serrate, antennomere III twice as long as II, subequal to IV in length but not as wide. Pronotum wider than long, widest at middle, concavity at base of hind angle, converging anteriorly; punctures shallow, sparse, separated by a distance more than their diameters. Elytral striae deep, punctured; intervals rugose and finely punctured. Aedeagus with median lobe thin, gradually tapering to pointed apex, narrowing more subapically; parameres with small but defined apical blade, not greatly constricted at base of blade. Female similar to male externally but slightly larger.

Distribution. Northeastern North America (Downie and Arnett 1996). In the Southeast, previously recorded from Alabama, Georgia, North Carolina, South Carolina, and Tennessee (LeConte 1853; Leng 1920; Brimley 1938; Fattig 1951; Kirk 1969, 1970; Ramberg 1979; Ferro et al. 2012b, 2012c; Chatzimanolis et al. 2020). The type locality of both *A. pusio* and *E. luteolus* is North Carolina (neither further restricted). The following records from Florida and Mississippi represent **New State Records**.

Specimens Examined. Alabama (Blount, Cullman, Dale, Elmore, Jefferson, Lee, Mobile, Monroe, Walker); **Florida** (Clay); **Georgia** (Brantley, Clarke, Emanuel, Fulton, Gwinnett, Morgan, Pierce, Walker); **Mississippi** (Franklin, Grenada, Hinds, Jackson, Lauderdale, Marshall, Noxubee, Oktibbeha, Scott, Tishomingo, Winston); **North Carolina** (Burke, Forsyth, Gates, Halifax, Iredell, Mecklenburg, Pender, Surry, Wilkes); **South Carolina** (Calhoun, Greenville, Lexington, Richland); **Tennessee** (Blount, Campbell, Knox, Morgan, Sevier). May–August. (Figure 147)

Discussion. Historically, this species has gone by either the name *A. luteolus* or *A. pusio*. Brown (1933a) considered *A. pusio* a synonym of *A. areolatus*, making *luteolus* the valid name for this species. However, Ramberg (1979) examined Dejean material housed in the British Museum of Natural History and designated a lectotype for *A. pusio*. The specimen was identified as *A. pusio* by Dejean and fits the concept of the species adopted here.

Among *Ampedus* species, *A. pusio* should be easily recognized by its small size and solid yellow-brown color. It is the smallest species of *Ampedus* in North America. Generic characters should be confirmed, however, due to its superficial resemblance to members of the genus *Glyphonyx*. Specimens in the study area have been collected at ultraviolet light, by sweeping vegetation, in Lindgren funnel, Malaise, and flight intercept traps, and Berlese extraction of forest litter. Specimens from Monroe County, AL (ABS) were sifted from a rotten pine stump.



Figures 145–147. *Ampedus* spp. **145)** *A. pusio* (habitus). **146)** *A. rubricus*. **147)** Distributional data for *A. pusio*.

Ampedus rubricollis (Herbst, 1806)

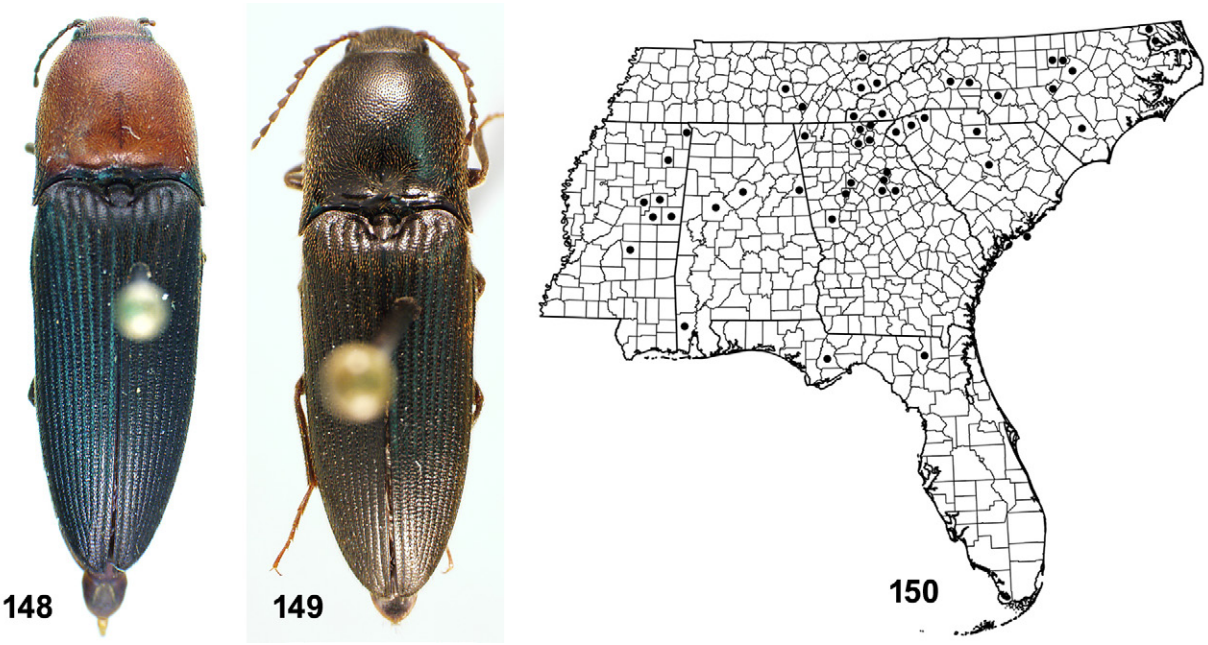
Figures 148–150

Elater rubricollis Herbst, 1806: 49
Elater verticinus Palisot de Beauvois, 1819: 213
Elater socer LeConte, 1853: 467

Diagnosis. Size small to moderate, 8.5–14.0 mm in length. Color variable, either solid black or black with most of the pronotum red, and only the anterior margin, posterior margin, and hind angles black; vestiture yellow, dense. Antenna 11-segmented, serrate; antennomere III nearly twice the length of II and subequal to IV; IV and beyond as long or longer than wide. Pronotum wider than long, slight concavity at base of hind angle or subparallel, converging anteriorly; punctures shallow, umbilicate, dense; hind angle slightly divergent, unicarinate. Elytron subparallel over basal third, then narrowing to apex; striae deep, coarsely punctured; intervals rugose and closely punctured. Aedeagus with median lobe subparallel, tapering subapically to subacute apex; paramere with well-defined apical blade, lateral margin of base of blades sharp, acute, evenly tapering to acute apex. Female similar to male externally but slightly larger.

Distribution. Eastern North America, west to Minnesota, Illinois, and Texas (Ramberg 1979). In the Southeast, previously recorded from all seven states (LeConte 1853; Candèze 1859; Leng 1910, 1920; Dozier 1918; Brimley 1938; Löding 1945; Fattig 1951; Kirk 1969, 1970; Ramberg 1979; Downie and Arnett 1996, Peck and Thomas 1998).

Specimens Examined. Alabama (Cleburne, Jefferson, Mobile, Tuscaloosa); **Florida** (Columbia, Liberty); **Mississippi** (Choctaw, Lee, Noxubee, Oktibbeha, Scott, Tishomingo, Winston); **Georgia** (Clarke, Clayton, DeKalb, Greene, Lumpkin, Meriwether, Morgan, Oconee, Towns, Union, Walker, White); **North Carolina** (Bladen, Burke, Cabarrus, Catawba, Cherokee, Chowan, Durham, Gates, Lee, Macon, Orange, Wake; also Hofmann Forest); **South Carolina** (Charleston, Chester, Greenville, Oconee, Pickens, Richland); **Tennessee** (Blount, Sequatchie, Sevier, Union, Warren). January, March–December. (Figure 150)



Figures 148–150. *Ampedus rubricollis*. **148)** Habitus (bicolored form). **149)** Habitus (dark form). **150)** Distributional data.

Discussion. Despite the two color forms, this species should be relatively easy to identify. The name '*verticinus*' has historically been assigned to the forms with a red pronotum, while the name '*socer*' has been applied to the all-black forms. Other than color, there is very little else separating the two externally. The all-black form ('*socer*', Figure 149) is similar to *A. impolitus* but generally has larger pronotal punctures and less dense pronotal vestiture. The bicolored form ('*verticinus*', Figure 148) is similar to *Melanotus leonardi*; the form of the tarsal claws readily separate the two. Specimens in the study area have been collected at ultraviolet light, in Lindgren funnel, canopy, and pitfall traps, under pine bark, and in oak litter.

Ampedus rubricus (Say, 1825)

Figures 132, 146

Elater rubricus Say, 1825: 268

Diagnosis. Size small, 7.0–9.0 mm in length. Bicolored; elytron black, sometimes dusky red-brown; pronotum red with large black macula covering much of center and usually coming in contact with anterior margin; basal three antennomeres and tarsi paler; vestiture yellow, sparse. Antenna 11-segmented, serrate; antennomere III intermediate between II and IV in size; IV triangular, slightly longer than wide. Pronotum slightly longer than wide, sides parallel over basal half, converging anteriorly; punctures coarse, separated by approximately their own diameters on disc, denser laterally; hind angle parallel, unicarinate. Elytral striae deep, coarsely punctured, intervals slightly rugose and punctured. Aedeagus as in *A. mixtus*. No sexual dimorphism observed.

Distribution. Northeastern North America, south to North Carolina (Downie and Arnett 1996). In the Southeast, previously recorded only from North Carolina and Tennessee (Brimley 1938; Downie and Arnett 1996; Ferro et al. 2012a, 2012c).

Specimens Examined. North Carolina (Swain); **Tennessee** (Cocke, Sevier). May–July.

Discussion. This species should be easily recognized by its size and color. The black macula on the pronotum may be reduced, often to a small diamond shape that does not attain the anterior margin. Specimens in the

study area have been collected in Lindgren funnel and Malaise traps. Ramberg (1979) suggested *A. rubricus* should be placed in synonymy with *A. mixtus*.

Ampedus sanguinipennis (Say, 1823)

Figures 151–152

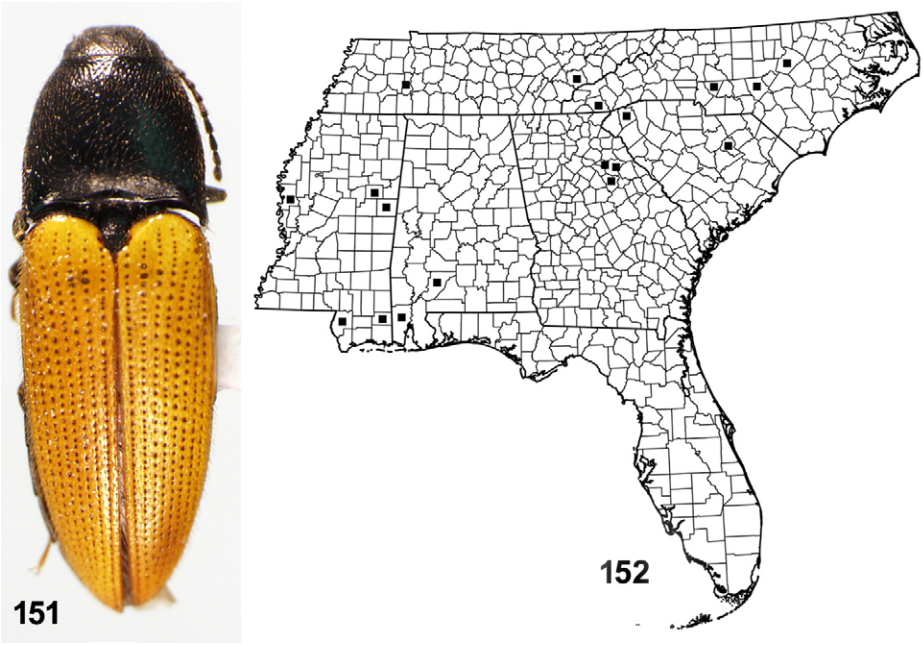
Elater sanguinipennis Say, 1823: 177

Diagnosis. Size small, 6.5–9.0 mm in length. Bicolored; black with solid orange elytron; basal antennomeres and tarsi paler; vestiture brown, sparse. Antenna 11-segmented, serrate; antennomere II globular; III intermediate between II and IV; IV triangular and slightly longer than wide. Pronotum as long as wide; gradually converging from base of hind angle to middle, then more sharply from middle to anterior margin; punctures coarse but very sparse, making the pronotum appear shining; hind angle parallel, unicarinate. Elytral striae well-marked with large, coarse punctures; intervals finely punctured. aedeagus with median lobe short, broad, gently tapering to rounded apex; parameres not greatly constricted at base of apical blade. Female similar to male externally but slightly larger.

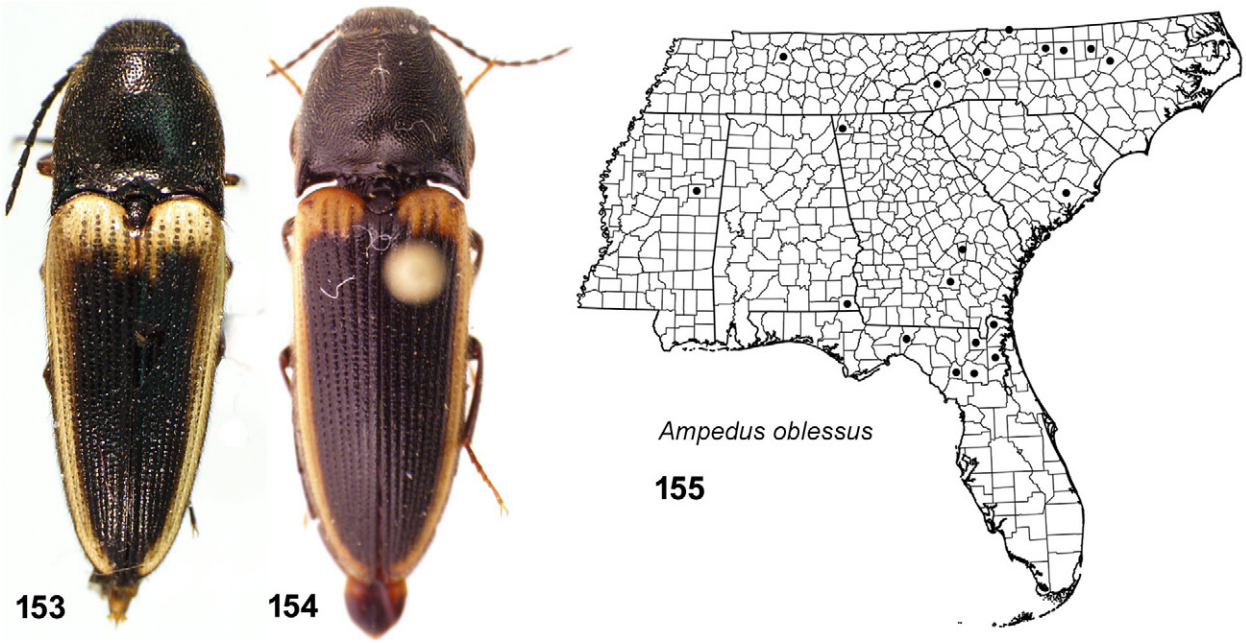
Distribution. Northeastern United States, west to Illinois and south to Georgia and Mississippi (Ramberg 1979). In the Southeast, previously recorded from Alabama, Georgia, Mississippi, North Carolina, South Carolina, and Tennessee (LeConte 1853; Candèze 1859; Leng 1920; Löding 1945; Fattig 1951; Kirk 1969, 1970; Ramberg 1979; Downie and Arnett 1996; Vlach et al. 2010).

Specimens Examined. Alabama (Mobile, Monroe); **Georgia** (Clarke, Greene, Oglethorpe); **Mississippi** (George, Noxubee, Oktibbeha, Pearl River, Washington); **North Carolina** (Cabarrus, Macon, Moore, Wake); **South Carolina** (Lee, Pickens); **Tennessee** (Blount, Decatur). January–July, December. (Figure 152)

Discussion. This species is readily recognized in the study area by its small size, bright solid orange elytra, and shining black pronotum. Specimens in the study area were collected under bark or on flowers. Specimens from Noxubee County, MS (MEM) were collected on the flowers of common pear and red chokeberry.



Figures 151–152. *Ampedus sanguinipennis* **151)** Habitus). **152)** Distributional data.



Figures 153–155. *Ampedus* spp. **153)** *A. nigricollis* (habitus, dark form). **154)** *A. oblessus* (habitus). **155)** Distributional data for *A. oblessus*.

Ampedus sayi (LeConte, 1853)

Figures 157, 160

Elater sayi LeConte, 1853: 465

Diagnosis. Size small to moderate, 7.5–10.0 mm in length. Bicolored; body black; elytron yellow with black sutural stripe varying in width from two elytral striae at base to eight two-thirds from base; vestiture yellow, dense. Antenna 11-segmented, serrate; antennomere II globular; III triangular, as long as IV but half as wide. Pronotum slightly longer than wide, sinuate, converging anteriorly from middle; punctures coarse, umbilicate, dense; hind angle divergent, unicarinate. Elytral striae deeply punctured; interspaces with coarse punctures. aedeagus with median lobe moderately tapering from base to subacute apex; parameres slightly constricted at base of apical blade. Females similar to males externally but slightly larger.

Distribution. Northeastern North America, south to Virginia (Downie and Arnett 1996). In the Southeast, previously recorded from Georgia and South Carolina (Kirk 1970; Ramberg 1979). The following record from Tennessee represents a **New State Record**.

Specimens Examined. Georgia (Clarke); **Tennessee** (Warren). March–May. (Figure 160)

Discussion. This species is morphologically most similar to *A. militaris*, from which it can be separated by having a wider black sutural stripe, triangular antennomere III, and often being larger in size.

Ampedus semicinctus (Randall, 1838)

Figures 141, 144, 156

Elater semicinctus Randall, 1838: 10

Diagnosis. Size moderate, 7.3–10.0 mm in length. Color black; base of each elytron with red macula, macula extending laterally for no more than one-fourth length of elytron; vestiture yellow, sparse. Antenna 11-segmented,

serrate; antennomere III subequal between II and IV; II and IV combined longer than IV. Pronotum as long as wide, widest at base of hind angle, converging anteriorly; punctures on disc coarse, close, becoming contiguous laterally; hind angle parallel, unicarinate. Elytron subparallel; striae deeply punctured; intervals rugose, more so at base, and punctured. Aedeagus with median lobe subparallel over much of its length, then tapering to subacute apex; paramere moderately constricted at base of apical blade, blade slender, elongate. Female similar to male externally but slightly larger, with shorter antennae, and a pronotum that is slightly wider than long.

Distribution. Northeastern North America (Ramberg 1979). In the Southeast, previously only recorded from North Carolina and Tennessee (Brimley 1938; Ferro et al. 2012b, 2012c). The following records from Georgia and South Carolina represent **New State Records**.

Specimens Examined. Georgia (Towns, Union, White); **North Carolina** (Ashe, Avery, Burke, Haywood, Rutherford, Surry, Watauga); **South Carolina** (Pickens); **Tennessee** (Blount, Cocke, Sevier). May–August. (Figure 156)

Discussion. In the study area, this species is most similar to *A. laesus* and *A. protervus*. *Ampedus laesus* generally has a longer red macula along the epipleuron and *A. protervus* has denser pronotal punctures laterally and a different shaped elytron. Specimens in the study area have been collected in Lindgren funnel, Malaise, canopy, and flight intercept traps.

Ampedus vitiosus (LeConte, 1853)

Figures 158, 160

Elater vitiosus LeConte, 1853: 465

Diagnosis. Size moderate, 9.0–13.0 mm in length. Bicolored; pronotum black; elytron yellow with dusky apical macula; legs dark, tarsi paler; vestiture yellow, dense. Antenna 11-segmented, serrate; antennomeres II and III subequal, combined slightly longer than IV; IV triangular. Pronotum slightly longer than wide, widest at base of hind angle, converging anteriorly; punctures coarse and close, becoming umbilicate and contiguous laterally;

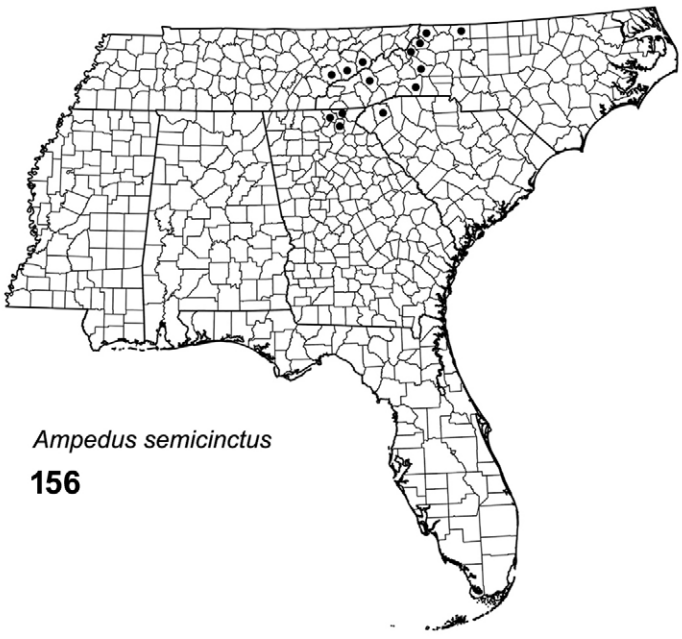


Figure 156. Distributional data for *Ampedus semicinctus*.



Figures 157–158. *Ampedus* spp. **157)** *A. sayi* (habitus). **158)** *A. vitiosus* (habitus).

hind angle subparallel, unicarinate. Elytral striae deeply punctured; interspaces slightly rugose and punctured. aedeagus with median lobe broad, subparallel, tapering subapically; paramere moderately constricted at base of apical blade, blade laterally concave. Female similar to male externally but slightly larger and more robust.

Distribution. Northeastern United States (Downie and Arnett 1996). In the Southeast, previously only recorded from Georgia (Fattig 1951). The following records from North Carolina and Tennessee represent **New State Records**.

Specimens Examined. Georgia (Union); **North Carolina** (Transylvania, Watauga); **Tennessee** (Cocke, Sevier). May–July. (Figure 160)

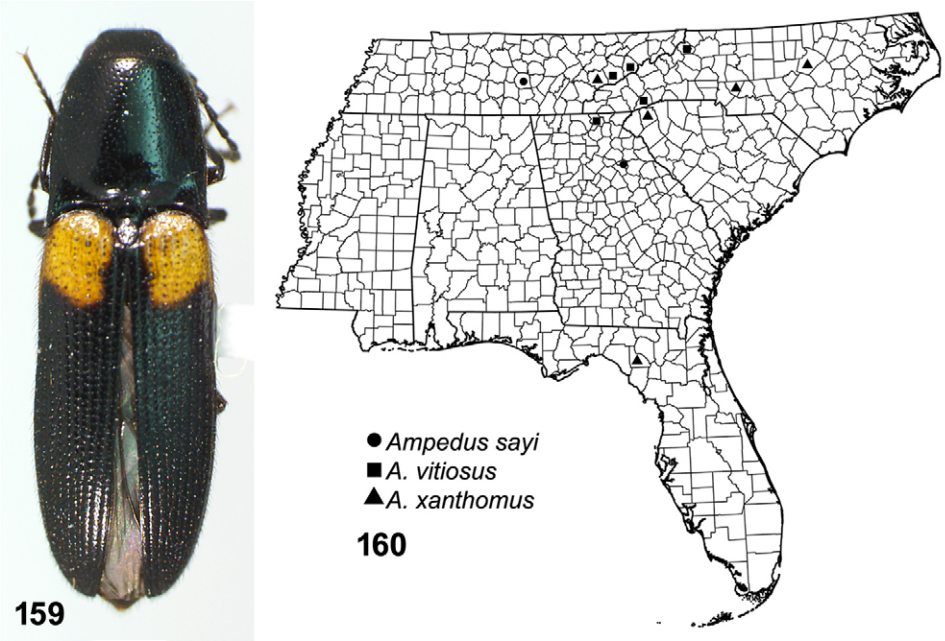
Discussion. This species is most similar in the study area to *A. nigricollis* but is often larger, has darker legs, and usually has a vague, dusky macula at the elytral apex. The apical dusky area on the specimens examined from the Southeast is nearly obsolete, which could represent clinal variation from north to south. Examination of a larger sampling of specimens would have to be done to determine the variability in color of this species. Specimens in the study area have been collected in Malaise and flight intercept traps.

Ampedus xanthomus (Germar, 1843)

Figures 159–160

Elater xanthomus Germar, 1843: 168
Elater humeralis Melsheimer, 1846: 159

Diagnosis. Size small, 8.5–9.5 mm in length. Bicolored; jet black except for each elytron with a basal red to orange macula, epipleuron also orange or red; vestiture black throughout. Antenna 11-segmented, serrate; antennomere II small, III triangular and subequal to II and IV. Pronotum longer than wide, subparallel; punctures coarse, simple; interspaces smooth to microreticulate; hind angle subparallel, unicarinate. Elytron subparallel, striae deep and coarsely punctured; interspaces rugose and punctured, punctures small. Aedeagus with median



Figures 159–160. *Ampedus* spp. **159)** *A. xanthomus* (habitus). **160)** Distributional data for *A. sayi*, *A. vitiosus*, and *A. xanthomus*.

lobe subparallel over most of its length, tapering subapically to subacute apex; paramere with base of apical blade laterally acute. No sexual dimorphism noted.

Distribution. Northeastern United States, south to the Carolinas and west to Ohio (Ramberg 1979). In the Southeast, previously recorded only from North Carolina (Ramberg 1979). The following records from Florida, South Carolina, and Tennessee represent **New State Records**. Brimley's (1938) record of *A. laesus* from Raleigh, NC pertains to this species.

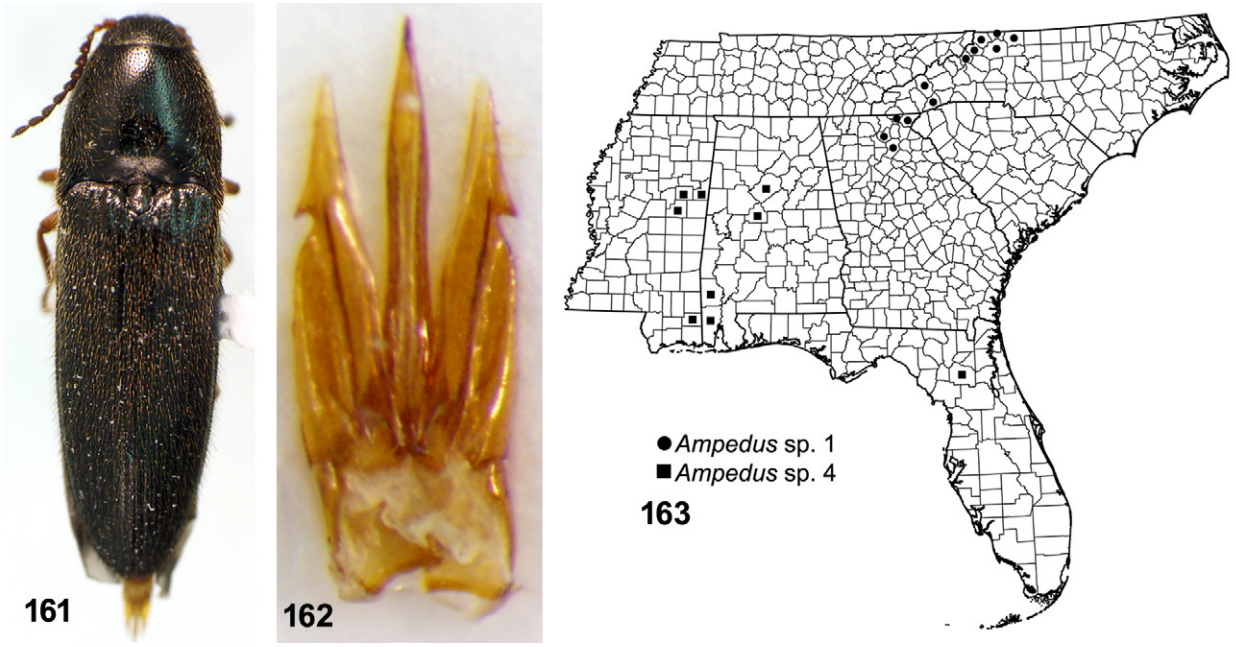
Specimens Examined. Florida (Lafayette); **South Carolina** (Pickens); **North Carolina** (Cabarrus, Wake); **Tennessee** (Blount). April, November. (Figure 160)

Discussion. This species should be easy to recognize by the subparallel body form, color, and black vestiture throughout. In the study area, the color and form is somewhat similar to *Limonius stigma* and *L. meridianus* but the generic characters and the color of the vestiture on the pronotum (yellow in both *Limonius* species) should be sufficient to separate them. Specimens from Blount County, TN (LSAM) were collected under pine bark. The specimen from Lafayette County, FL seems quite disjunct and greatly extends the known range of this species. The specimen, which is part of the Löding collection housed in the GSAT, bears one label stating it was collected at the Steinhatchee River. This river feeds into the Suwannee River basin, which is known to harbor several boreal relicts (Paul E. Skelley, pers. comm. 2014).

Ampedus sp. 1

Figures 161–163

Diagnosis. Size small, 5.4–6.2 mm in length. Color red-brown to nearly black (rarely with yellow to red elytron); legs yellow-red; antennae reddish; vestiture yellow, long, semi-erect. Antenna 11-segmented, serrate, falling short of but nearly reaching apex of pronotal hind angle. Pronotum convex, arcuate, sinuate at base of hind angle, narrowing anteriorly, punctures small, simple, dense, larger and umbilicate laterally; hind angle unicarinate. Elytron subparallel; intervals densely punctate. Aedeagus (Figure 162) with median lobe gradually



Figures 161–163. Undescribed *Ampedus* spp. **161)** *Ampedus* sp. 1 (habitus). **162)** *Ampedus* sp. 1 (aedeagus). **163)** Distributional data for *Ampedus* sp. 1 and *Ampedus* sp. 4.

tapering to rounded apex; paramere broad basally, constricted at base of apical blade, blade very long. Female similar to male externally but slightly larger.

Distribution. Northeastern North America, south to North Carolina and Tennessee (Ramberg 1979). In the Southeast, previously recorded from North Carolina and Tennessee (Ramberg 1979). Fattig's (1951) record of *A. pedalis* from Rabun Bald, GA refers to this species.

Specimens Examined. Georgia (Hall, Lumpkin, Rabun, Towns); **North Carolina** (Alleghany, Ashe, Avery, Haywood, Surry, Transylvania, Watauga, Wilkes). May–July, October. (Figure 163)

Discussion. This species is one of the four species described as new by Ramberg (1979) that occur in the study area. It is similar to other small, black species with red-yellow legs such as *A. pedalis*, *A. molestus*, and *Ampedus* sp. 2. I have seen one specimen (KES) from Transylvania County, NC with dark red elytra. This species can be readily identified by the very large, elongate apical blade on the paramere. Specimens in the study area have been collected by beating vegetation, netted while in flight, in forest litter, and in Lindgren funnel and flight intercept traps.

Ampedus sp. 2

Diagnosis. Size small, 7.5–9.2 mm in length. Color red-brown to dark brown, elytron often slightly paler than pronotum; antennae and legs yellow-red; vestiture yellow, long, dense, appressed. Antenna 11-segmented, serrate, not extending beyond apex of pronotal hind angle. Pronotum convex, arcuate, slightly narrowing anteriorly, sinuate (often strongly) at hind angle, punctures small, simple, dense, becoming slightly larger, denser, and subumbilicate laterally; hind angle unicarinate. Elytron subparallel; striate punctate; intervals densely punctate, punctures small. Aedeagus with median lobe gently tapering apically; paramere moderately constricted at base of apical blade, blade small, triangular. Female similar to male externally but generally slightly larger.

Distribution. Northeastern North America, south to North Carolina (Ramberg 1979). In the Southeast, previously recorded only from North Carolina (Ramberg 1979).

Specimens Examined. None.

Discussion. This species is one of the four species described as new by Ramberg (1979) that occur in the study area. It is similar to other small, brown to black species with red-yellow legs such as *A. pedalis*, *A. molestus*, and *Ampedus* sp. 1. *Ampedus* sp. 2 has genitalia similar to *A. pedalis* but externally has a more rounded pronotum and denser pronotal vestiture. Externally, it is most similar to *Ampedus* sp. 1 but differs significantly in the shape of the male genitalia.

Ampedus sp. 3

Diagnosis. Size small, 7.5–10.0 mm in length. Color red-brown, more red ventrally; legs and antennae lighter than body; vestiture yellow, moderate, evenly distributed over the body. Antenna 11-segmented, serrate, not reaching (or barely reaching) apex of pronotal hind angle. Pronotum convex, arcuate, narrowing anteriorly, sinuate at base of hind angle, punctures small, simple, dense on disk, laterally weakly umbilicate and distinctly separated; hind angle bicarinate. Elytron subparallel; striae punctate; intervals densely punctate, punctures small. Aedeagus with median lobe tapering evenly to subacute apex; paramere narrowing to small apical blade, slight constriction at base of blade. Female similar to male externally but slightly larger.

Distribution. Northeastern North America (Ramberg 1979). In the Southeast, previously recorded only from North Carolina (Ramberg 1979).

Specimens Examined. None.

Discussion. In the Southeast, this species is most similar to *A. fuscatus*, from which it can be separated by having the pronotal punctures clearly separated laterally. The aedeagi, as illustrated by Ramberg (1979) are very similar.

Ampedus sp. 4

Figures 163–165

Diagnosis. Size small, 6.5–7.0 mm in length, form elongate and slender. Color light red-brown, more red ventrally; legs and antennae concolorous with body; vestiture yellow, moderately long, evenly distributed over the body. Antenna 11-segmented, serrate, extending beyond apex of pronotal hind angle by up to two antennomeres; flagellar antennomeres elongate, weakly serrate. Pronotum convex, arcuate, slightly narrowing anteriorly, slightly sinuate at base of hind angle, punctures small and dense on disk, becoming larger, umbilicate, and nearly contiguous laterally; hind angle unicarinate. Elytron subparallel; striae punctate; intervals densely punctate, rough. Aedeagus (Figure 165) with median lobe gradually tapering to subacute apex; paramere with slight constriction at base of blade; blade elongate. Female similar to males externally but generally slightly larger. The antenna of the female is shorter than that of the male, but still extends to or beyond the apex of the pronotal hind angle.

Distribution. Southeastern United States; previously recorded only from Alabama and Florida (Ramberg 1979). The specimen provisionally designated as the type by Ramberg (1979) was collected in Spring Hill in Mobile County, AL.

Specimens Examined. Alabama (Bibb, Jefferson, Mobile, Perry, Washington); **Florida** (Alachua); **Mississippi** (George, Lowndes, Oktibbeha, Winston). April–June. (Figure 163)

Discussion. This endemic southeastern species is most similar to *A. fuscatus* and *Ampedus* sp. 3 but has longer antennae and unicarinate pronotal hind angles. Specimens from the study area have been collected at ultraviolet light, in Lindgren funnel traps, and my beating vegetation. Ramberg (1979) recorded it from under bark (host tree not specified).



Figures 164–165. *Ampedus* sp. 4. **164)** Habitus. **165)** Aedeagus.

Melanotini Candèze, 1859

The tribe Melanotini contains only the genus *Melanotus* in North America (von Hayek 1990). This tribe was considered a subtribe of Ampedini in Johnson (2002). Quate and Thompson (1967) revised *Melanotus* for North America. von Hayek (1990) reclassified the genera of Melanotini on a worldwide basis. Adults variable in size, small to moderate; form elongate. Color usually unicolored brown to dark brown, nearly black (two Nearctic species bicolored with at least a partially red pronotum). Supra-antennal carinae ridged above and between antennae, complete (rarely weakly so). Antenna 11-segmented; antennomeres beyond III subquadrate to triangular. Pronotum distinctly punctate; hind angle carinate. Prosternum normally arcuate anteriorly. Scutellum various, never deeply incised anteriorly. Mesocoxa open to mesepimeron but closed to mesepisternum. Meso- and metasternum distinct, joined by definite suture. Elytron elongate; metathoracic wings functional. Tarsomeres lacking membranous lobes; claws serrate, without basal setae. Aedeagus variable; paramere with or without apical blade. Female externally similar to male, but often larger and with slightly shorter antennae.

Melanotus Eschscholtz, 1829

Melanotus Eschscholtz, 1829: 32
Perimecus Stephens, 1830: 263
Ctenonychus Stephens, 1830: 272
Cratonychus Dejean, 1833: 87

Diagnosis. Size variable, small to moderate. Form elongate. Color yellowish brown to dark brown, nearly black; usually unicolorous (two Nearctic species bicolored with at least a partially red pronotum); vestiture pale, short and decumbent to long and wiry. Head coarsely punctate, punctures hexagonal and separated by less than their own diameter. Supra-antennal carinae complete (rarely obsolescent in middle), often extending shelf-like over nasale (the central, often rectangular area between the margin formed by the supra-antennal carinae and the mouthparts). Mandible with or without pit (depression, Figure 167) on the lateral margin. Parantennal foveae (pits located between the nasale and base of the antennae) variable but usually well-defined. Antenna 11-segmented, antennomere I cylindrical; II subspherical; III variable; IV–X usually triangular; XI elongate. Pronotum distinctly punctate, but size and density of punctures variable; hind angle carinate, with one or two carinae of varying length. Elytron elongate; metathoracic wings functional. Tarsomeres lacking membranous lobes; claws serrate (Figure 166), without basal setae. Aedeagus with median lobe various in shape; paramere with or without apical blade. Female similar to male, but often larger and with less dense pronotal punctures and shorter antennae.

Range and Numbers. Johnson (2002) indicated there are 51 species in North America. Quate and Thompson (1967) recognized 46 species (all native or naturally Holarctic) in their revision of the species of the US and Canada. A couple more species have been described since their revision and at least two European species are now known to be established (Johnson 1998). The genus occurs throughout North America, with the bulk of the species being found east of the Rocky Mountains. Thirty-four species have been previously recorded from the Southeast, with a 35th added here.

Discussion. Quate and Thompson's (1967) revision remains the definitive source for identification of species in this genus in North America. They divided the genus into three groups: *cribricollis*, *americanus*, and *similis*. The *cribricollis* group contains two species in the Southwest. The remainder of the species, and all species in the current study area, fall into the other two groups. The *similis* and *americanus* groups can be separated by the presence (*americanus*) or absence (*similis*) of a pit on the outer lateral edge of the mandible (Figure 167). Quate and Thompson (1967) acknowledged this grouping is probably artificial and was created for the purpose in simplifying identification. von Hayek (1990) also divided *Melanotus* into two admittedly artificial groups to aid in identification, based on the characters of the aedeagus. In her *imitans* group, the paramere possesses an apical

blade and the median lobe is very long, extending beyond the apex of the paramere at a distance greater than the length of the apical blade. In her *annosus* group, the paramere lacks an apical blade.

Melanotus is a large genus of beetles whose species superficially look very similar to one another. A critical evaluation of several external characteristics along with the aedeagus should be done for a confident identification. It also helps to have comparative reference material. Important external features include presence or absence of a mandibular pit; size and shape of parantennal fovea; form of nasale; form of supra-antennal carinae; relative size of antennomeres II and III; shape of pronotum; and size and density of pronotal punctures. Separation of *Melanotus* from other genera usually does not present any problems. It is only one of three North American genera of elaterids with serrate tarsal claws, the other two being *Aptopus* and *Glyphonyx*. *Aptopus* occurs in the Southwest, from Texas to California. *Glyphonyx* species occur throughout the East but differ in being much smaller, by having a membranous lobe on tarsomere IV, and inverted V-shaped carinae above the nasale. The only species of *Melanotus* that gets as small as *Glyphonyx* in North America is *M. insipiens*.

Adults have been collected by a variety of methods. Most species in the study area have been collected at ultraviolet or mercury vapor light or in Lindgren funnel traps. *Melanotus* specimens can also be collected in abundance under the bark of felled trees and in rotting logs. Few species have been implicated as crop pests.

Key to the species of *Melanotus* in the Southeast
(adapted from Quate and Thompson 1967)

1. Pronotum and elytron of different colors, pronotum reddish-orange and elytron black. . . . . ***M. leonardi* (LeConte)**
— Pronotum and elytra concolorous **2**

2(1). Mandible with pit on lateral, exposed margin (Figure 167) **3**
— Mandible without pit on lateral, exposed margin **24**

3(2). Antennomere III small, subequal to II (in doubtful cases, antennomere III less than 1.5× length of II) **4**
— Antennomere III intermediate between II and IV, clearly longer than II **7**

4(3). Small species, elytron less than 6.0 mm . . . . . ***M. americanus* (Say)** (in part)
— Larger species, elytron greater than 6.0 mm **5**

5(4). Larger species, elytron ≥ 8.5 mm; antenna extending beyond apex of pronotal hind angle by about two antennomeres . . . . . ***M. corticinus* (Say)**
— Smaller species, elytron 6.0–8.0 mm; antenna variable **6**

6(5). Antenna very long, extending beyond apex of pronotal hind angle by 2–4 antennomeres; nasale narrow, higher than wide . . . . . ***M. cribriventris* Blatchley**
— Antenna shorter, extending beyond apex of pronotal hind angle by no more than 1 antennomere; nasale wider than high . . . . . ***M. obscuratus* Blatchley**

7(3). Small species, elytron less than 5.0 mm . . . . . ***M. insipiens* (Say)**
— Larger species, elytron greater than 5.0 mm **8**

8(7). Pronotal punctures spare anteriorly, gradually getting smaller and denser posteriorly; vestiture also becomes finer from anterior to posterior ends of pronotum . . . . . ***M. gradatus* LeConte**
— Pronotal punctures and vestiture uniform except small increase in density and size along lateral margins **9**

9(8). Parantennal fovea very large, larger than antennomere III; nasale large and protuberant, especially in male; frontal margin strongly projecting, angular with blunt apex when viewed from above; elytron 8.0 mm or longer **10**

— Parantennal fovea smaller, not larger than antennomere III; not with above combination of characters **11**

10(9). Frontal margin scarcely overhanging protruding nasale, not extending in angular apex; pronotal punctures as large as those on front; aedeagus with paramere possessing apical blade . . . . . ***M. sagittarius* (LeConte)**

— Frontal margin overhanging nasale and curved down on sides above nasale, margin extends out sharply and ends in truncated, angular apex; pronotal punctures smaller than those on front; aedeagus with paramere lacking apical blade . . . . . ***M. hyslopi* Van Zwaluwenburg**

11(9). Side of pronotum straight behind anterior curvature; hind angle large and expanded, beginning about center of pronotum and noticeable divergent **12**

— Side of pronotum concave or parallel from center to base of hind angle, which arise well behind center **14**

12(11). Parantennal fovea small; nasale weak, wider than high; antenna very long, extending beyond apex of pronotal hind angle by 3–4 antennomeres; larger species, elytron often ≥ 8.5 mm . . . . . ***M. difficilis* Blatchley**

— Parantennal fovea large; nasale well-developed, about as high as wide; antenna not greatly elongate; smaller species, elytron ≤ 7.5 mm **13**

13(12). Pronotal punctures smaller than those on front; frontal margin often rounded in center; aedeagus with paramere broad, abruptly rounded at apex . . . . . ***M. testaceus* (Melsheimer)**

— Pronotal punctures subequal in size to those on front; frontal margin often blunt at apex; aedeagus with paramere slender, gradually tapering to apex . . . . . ***M. trapezoideus* (LeConte)** (in part)

14(11). Frontal margin thin, shelf-like, extending in front of nasale by several times width of black rim; parantennal fovea small **15**

— Frontal margin not strongly protruding; parantennal fovea variable **16**



Figures 166–167. Characteristics of *Melanotus* spp. **166)** Serrate tarsal claws of *M. decumanus*. **167)** Mandibular pit (arrow) of *M. morosus*.

15(14). Pronotal punctures separated by no more than their own diameter; antenna extending beyond apex of pronotal hind angle by 3–4 antennomeres; elytron 7.0 mm in length on average; pronotum wider than long . . . . . ***M. macer*** **(LeConte)**

— Pronotal punctures sparse, separated by more than their own diameter; antenna extending beyond apex of pronotal hind angle by no more than 2 antennomeres; elytron on average 6.0–7.0 mm in length; pronotum longer than wide . . . . . ***M. parallelus*** **Blatchley** (in part)

16(14). Antenna short, failing to reach apex of pronotal hind angle . . . . . ***M. piceatus*** **Blatchley**

— Antenna longer, reaching to or beyond apex of pronotal hind angle **17**

17(16). Body dark, nearly black; antennae and legs reddish; pronotal punctures small and sparse . . . . . ***M. pertinax*** **(Say)**

— Body and legs concolorous; pronotal punctures variable **18**

18(17). Larger species, elytra ≥ 7.5 mm **19**

— Smaller species, elytra ≤ 7.5 mm **20**

19(18). Side of pronotum parallel or concave over distal half; pronotal punctures smaller than those on front; color usually reddish-brown; mandibular pit round and deep; aedeagus (Figure 218) with paramere angulate subapically . . . . . ***M. morosus*** **Candèze**

— Side of pronotum divergent posteriorly; pronotal punctures subequal in size to those on front; color usually darker; mandibular pit slit-like; aedeagus (Figure 194) with paramere evenly rounded subapically . . . . . ***M. depressus*** **(Melsheimer)**

20(18). Nasale well-developed, as wide as high **21**

— Nasale flat, not protuberant, wider than high **22**

21(20). Pronotal punctures subequal in size to those on front; pronotum flattened and not rounded . . . . . ***M. trapezoideus*** **(LeConte)** (in part)

— Pronotal punctures smaller than those on front; pronotum rounded . . . ***M. americanus*** **(Say)** (in part)

22(20). Side of pronotum with slight curvature before hind angle . . . . . ***M. prasinus*** **Blatchley**

— Side of pronotum straight, without curvature before pronotal hind angle **23**

23(22). Pronotum subequal in length and width; aedeagus with paramere possessing apical blade . . . . . ***M. infaustus*** **(LeConte)**

— Pronotum wider than long; aedeagus with paramere lacking apical blade . . . . . ***M. tenax*** **(Say)**

24(2). Antennomere III small, subequal to II or at least closer to II than IV **25**

— Antennomere III intermediate between II and IV, clearly longer than II **27**

25(24). Antennomeres beyond III subquadrate, lighter in color than body; side of pronotum with marked curvature before hind angle . . . . . ***M. ignobilis*** **Melsheimer**

— Antennomeres beyond III triangular, same color as body; side of pronotum variable **26**

26(25). Smaller species, elytron ≤ 8.0 mm; frontal margin thin and jutting over nasale; aedeagus with paramere lacking apical blade . . . . . ***M. clandestinus*** **(Erichson)**

— Larger species, elytron ≥ 9.0 mm; frontal margin not strongly jutting over nasale, often appearing obliterated in center when viewed directly in front (Figure 172); aedeagus with paramere possessing apical blade . . . . . ***M. castanipes*** **(Paykull)** (males)

27(24). Pronotum narrow, longer than wide . . . . . ***M. parallelus*** **Blatchley** (in part)

— Pronotum wider than long **28**

28(27). Pronotal punctures very dense and close, appearing granulose; vestiture of pronotum very fine and dense, nearly velvety, denser than on elytron . . . . . ***M. opacicollis* LeConte**

— Pronotal punctures not so dense as to appear granulose; vestiture of pronotum similar to that of elytron **29**

29(28). Pronotal punctures smaller than those on front, dense, nearly contiguous (but not appearing granulose); smaller species, elytron usually ≤ 7.5 mm . . . . . ***M. lanei* Quate**

— Pronotal punctures subequal in size to those on front, sparser; larger species, most with elytron ≥ 7.5 mm **30**

30(29). Frontal margin strongly protuberant, when viewed laterally extends shelf-like over nasale (Figure 191); aedeagus (Figure 183) with paramere having margin straight before apical blade, without marked indentation at base of blade; larger species, elytron 8.0–10.0 mm in length . . . . . ***M. decumanus* (Erichson)**

— Frontal margin not strongly protuberant; aedeagus and size variable **31**

31(30). Frontal margin weakened in center (Figure 172), appearing obliterated when viewed directly in front; large species, elytron ≥ 11.0 mm in length . . . . . ***M. castanipes* (Paykull)** (females)

— Frontal margin defined and complete across front; size generally smaller **32**

32(31). Antennomere IV about 2× longer than wide, and only slightly wider than III; large species, elytron on average 10.0–11.0 mm in length . . . . . ***M. spadix* (Erichson)**

— Antennomere IV about 1.5× longer than wide, considerably wider than III; elytron length usually ≤ 10.0 mm in length **33**

33(32). Pronotal punctures smaller than those on front; smaller species, elytron usually ≤ 8.0 mm in length on average **34**

— Pronotal punctures subequal to those on front; larger species, elytron usually ≥ 8.0 mm in length on average **35**

34(33). Antenna and body concolorous; aedeagus with paramere gradually tapering to apical blade (Figure 187) . . . . . ***M. verberans* (LeConte)**

— Antenna often lighter than body; aedeagus with parameres possessing marked constriction at base of apical blade . . . . . ***M. emissus* LeConte**

35(33). Aedeagus with median lobe subparallel along most of its length, then suddenly tapering to apex . . **36**

— Aedeagus with median lobe slender and evenly tapering from base to apex **37**

36(35). Pronotal punctures large and separated by less than their own diameter; aedeagus (Figures 180, 181) long, slender, with median lobe medially compressed to subparallel before the apex; larger, darker species . . . . . ***M. similis* (Kirby)**

— Pronotal punctures smaller and separated by their own diameter; aedeagus (Figure 182) short, broad, with median lobe subparallel to just before apex; reddish-brown species . . ***M. miscellus* Quate**

37(35). Aedeagus as in Figure 179; paramere extremely slender, apical blade elongate and slender with a small, well-defined emargination at the base of blade . . . . . ***M. dietrichi* Quate**

— Aedeagus with apical blade broader (Figures 177–178) **38**

38(37). Aedeagus as in Figure 177; paramere moderately slender with defined emargination at base of apical blade . . . . . ***M. communis* (Gyllenhal)**

— Aedeagus as in Figure 178; paramere and its apical blade broader . . . . . ***M. indistinctus* Quate**

Melanotus americanus (Herbst, 1806)

Figures 168–170

Elater americanus Herbst, 1806: 74
Cratonychus angustatus Erichson, 1842: 113

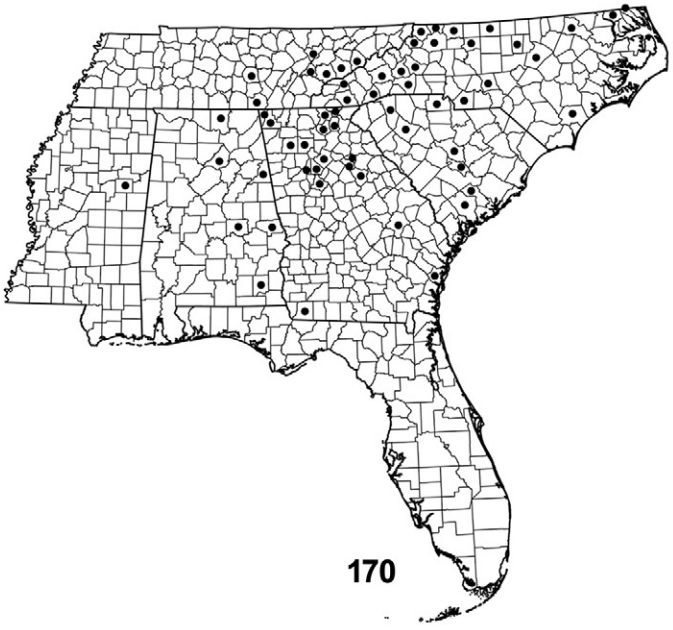
Diagnosis. Size small, 7.0–9.0 mm in length. Color red-brown; vestiture white, evenly distributed over the body. Supra-antennal carinae protrude above nasale, slightly angulate or flat across center when viewed from above. Nasale well-developed, usually as wide as high. Parantennal fovea large, semicircular, moderately deep. Mandible with deep, teardrop-shaped pit. Antenna 11-segmented, serrate, extending beyond apex of pronotal hind angle by 1.5–2.0 antennomeres; antennomere II short; III short, but intermediate between II and IV. Pronotum wider than long, rounded when viewed from the side; subparallel behind rounded anterior; punctures on disk small, separated by distance equal to twice their diameters. Aedeagus (Figure 169) with median lobe wide, narrowing apically to rounded apex; paramere broadly rounded subapically to subacute apex, without apical blade, dense cluster of subapical setae. Female similar to male externally, but antenna slightly shorter with antennomere III often slightly longer.

Distribution. Eastern United States, west to Indiana and Illinois (Quate and Thompson 1967). In the Southeast, recorded from Alabama, Florida, Georgia, North Carolina, South Carolina, and Tennessee (Leng 1910; Brimley 1938; Löding 1945; Fattig 1951; Quate and Thompson 1967; Kirk 1969, 1970; Downie and Arnett 1996; Peck and Thomas 1998; Buck et al. 2005; Vlach et al. 2010). The following record from Mississippi represents a **New State Record**.

Specimens Examined. Alabama (Blount, Cleburne, Dale, Elmore, Lee, Madison); **Georgia** (Bartow, Cherokee, Clarke, Dade, Decatur, DeKalb, Emanuel, Fulton, Greene, Gwinnett, Henry, Lumpkin, McIntosh, Oconee, Towns, Union, Walker, White); **Mississippi** (Oktibbeha); **North Carolina** (Alleghany, Ashe, Buncombe, Burke, Camden, Forsyth, Gates, Halifax, Macon, McDowell, Montgomery, Orange, Pender, Rockingham, Rutherford, Surry, Swain, Transylvania, Union, Wake, Watauga, Wilkes); **South Carolina** (Calhoun, Colleton, Dorchester,







Figures 168–170. *Melanotus americanus*. **168)** Habitus. **169)** Aedeagus. **170)** Distributional data.

Greenville, Laurens, Richland, York); **Tennessee** (Anderson, Blount, Cocke, Loudon, Marion, Sevier, Warren). April–September. (Figure 170)

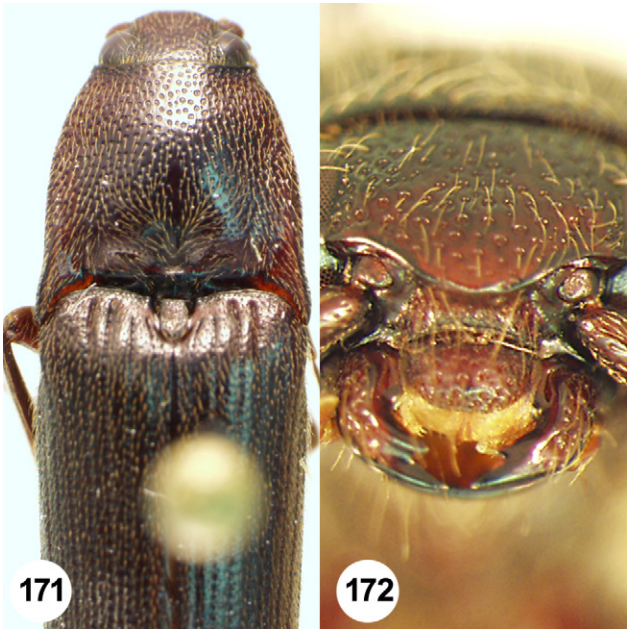
Discussion. This species is usually readily recognized by its small size, small antennomere III, and rounded pronotum with small, sparse punctures. Specimens in the study area have been collected at ultraviolet and mercury vapor light, in Lindgren funnel, panel, and flight intercept traps, in leaf litter, and by sweeping, beating, and hand picking from vegetation. Fattig (1951) recorded specimens being collected in association with soybeans in Whitfield County, GA and black-eyes peas in Richmond County, GA, as well as a pasture pest in Hall County, GA.

Melanotus castanipes (Paykull, 1800)

Figures 171–172, 175

Elater castanipes Paykull, 1800: 23
Melanotus paradoxus Melsheimer, 1846: 152
Cratonychus inaequalis LeConte, 1853: 476
Cratonychus scrobicollis LeConte, 1853: 476
Melanotus texanus Candèze, 1860: 351

Diagnosis. Size moderate to large, 15.0–20.0 mm in length. Color dark red-brown to dark brown, nearly black; vestiture yellowish, evenly distributed over the body. Supra-antennal carinae extending a little above nasale, weakened in center and when viewed from the front appears obliterated (Figure 172). Parantennal fovea very shallow. Mandible without pit. Antenna 11-segmented, serrate; extending beyond apex of pronotal hind angle by about three antennomeres; antennomere II and III small, subequal. Pronotum wider than long, side markedly divergent beyond basally; punctures about the same size as those on front, separated by a distance equal or less to their diameter, denser laterally; hind angle divergent with single, strong carina. Aedeagus with median lobe compressed medially, widening subapically then suddenly narrowing to subacute apex; paramere with large apical blade; side nearly straight to base of blade, apex of blade with dense, long setae. Female similar to male externally but larger and with antennomeres II and III longer.



Figures 171–172. *Melanotus castanipes*. **171)** Close-up of pronotum. **172)** Supra-antennae carinae.

Distribution. Holarctic. In North America, distributed from southeastern Canada and eastern United States west to Utah, Arizona, and southern California (Quate and Thompson 1967). In the Southeast, recorded from Georgia and North Carolina (Fattig 1951; Quate and Thompson 1967). The following record from Tennessee represents a **New State Record**.

Specimens Examined. Georgia (Fulton, Towns); **North Carolina** (Ashe, Buncombe, Burke, Columbus, Haywood, Macon, Surry, Wake, Watauga); **Tennessee** (Sevier). March, May–July. (Figure 175)

Discussion. *Melanotus castanipes* is a variable species throughout its range, but in the East males are usually readily recognized by their large size, subequal antennomeres II and III, and weakened supra-antennal carinae. The aedeagus is also consistently reliable. The female may be more difficult to identify; with their larger second and third antennomeres, they may resemble *M. spadix* or *M. similis*. In these cases, the weakened supra-antennal carinae is the best external diagnostic feature. Adults in the study area have been collected at ultraviolet and mercury vapor light and in Lindgren funnel traps. Fattig (1951) reported *M. castanipes* as a pest of corn in Atlanta, GA and of cotton in Spalding County, GA. He also reported adults being collected on pecan in Crawford County, GA.

Melanotus clandestinus (Erichson, 1842)

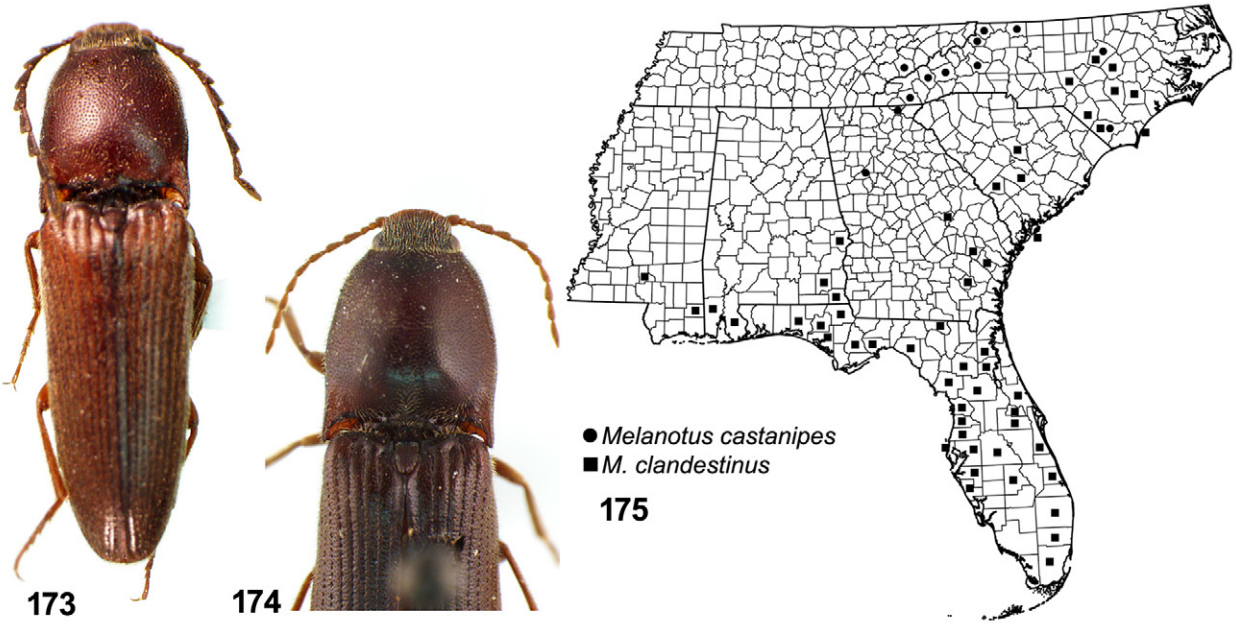
Figures 173–175

Cratonychus clandestinus Erichson, 1842: 112
Melanotus peninsularis Candèze, 1889: 46
Melanotus perplexus Blatchley, 1920: 46

Diagnosis. Size small to moderate, 6.0–10.0 mm in length. Color red-brown to dark red-brown, elytra and appendages often lighter; vestiture yellowish to white, evenly distributed over body. Supra-antennal carinae strongly protruding over nasale, a little angulate and blunt across center when viewed from above. Parantennal fovea lacking; nasale not at all developed. Mandible without pit. Antenna 11-segmented, serrate, extending beyond apex of pronotal hind angle by 1.0–1.5 antennomeres; erect male hairs long and dense; antennomeres II and III subequal. Pronotum variable, but usually about as long as wide, side rounded with slight concavity before hind angle; punctures very dense and subequal in size to those on front; hind angle subparallel, with single carina. Aedeagus with median lobe broadened subapically, tapering to subacute apex; paramere long, slender, slightly rounded to subacute apex, without apical blade; few subapical setae. Female (Figure 174) similar to male externally but with antenna shorter, failing to reach apex of pronotal hind angle; antennomere III small, only slightly longer than II; flagellar antennomeres less serrate than in males.

Distribution. Gulf Coast and coastal eastern United States, from New Jersey south to Florida and west to Texas (Quate and Thompson 1967). In the Southeast, previously recorded from Alabama, Florida, Georgia, Mississippi, North Carolina, and South Carolina (Blatchley 1920; Leng 1920; Brimley 1938; Löding 1945; Fattig 1951; Quate and Thompson 1967; Kirk 1969; Downie and Arnett 1956; Peck and Thomas 1998). The type locality of *M. peninsularis* is Florida (not restricted further); the type locality of *M. perplexus* is Dunedin in Pinellas County, FL.

Specimens Examined. Alabama (Baldwin, Dale, Houston, Mobile, Russell); **Florida** (Alachua, Bay, Brevard, Broward, Citrus, Clay, Hamilton, Hernando, Highlands, Hillsborough, Jackson, Levy, Liberty, Manatee, Marion, Miami-Dade, Orange, Palm Beach, Pasco, Pinellas, Polk, Putnam, Sarasota, Seminole, St. Lucie, Taylor, Volusia, Wakulla, Walton, Washington counties; also Apalachicola National Forest); **Georgia** (Johnson, Long, Pierce, Tattnall); **Mississippi** (George, Jefferson Davis); **North Carolina** (Columbus, Duplin, Johnston, Moore, New Hanover, Robeson, Sampson, Wake); **South Carolina** (Barnwell, Beaufort, Orangeburg, Richland). February–September. (Figure 175)



Figures 173–175. *Melanotus* spp. **173)** *M. clandestinus* (male habitus). **174)** *M. clandestinus* (female, close-up of pronotum and head). **175)** Distributional data for *M. castanipes* and *M. clandestinus*.

Discussion. This species is usually recognized by its size, color, subequal antennomeres II and III, long erect antennal setae, dense pronotal punctures, and lack of a parantennal fovea and mandibular pit. The female (Figure 174) was undescribed at the time of Quate and Thompson's 1967 revision. The above observations are based on females from Barnwell County, SC (CUAC) and Hernando County, FL (UCFC). The color and form are very similar to the male, as is the lack of parantennal foveae and having an underdeveloped nasale. The antennae are less serrate and shorter than in the male, but antennomere III is subequal to II, only slightly longer than II and noticeably shorter than IV. Collection records indicate this species seems to be associated with sandy habitats. Specimens in the study area have been collected at ultraviolet and mercury vapor light, in Malaise traps, and by sweeping or beating vegetation. Specimens from Johnston County, NC (NCSU) were collected in association with soybeans. Specimens from New Hanover County, NC (NCSU) were collected on corn. Kirk (1969) reported it feeding on corn in Florence County, SC.

Melanotus communis (Gyllenhal, 1817)

Figures 176–177, 186

Elater communis Gyllenhal, 1817: 138
Melanotus paganus Candèze, 1860: 359

Diagnosis. Size moderate, 10.0–13.0 mm in length. Color red-brown; vestiture whitish, evenly distributed over the body. Supra-antennal carinae black or dark red-brown, not strongly protruding over nasale. Parantennal fovea shallow, comma-shaped. Mandible without pit. Antenna 11-segmented, serrate, extending beyond apex of pronotal hind angle by 1–2 antennomeres; antennomere II short; III intermediate between II and IV. Pronotum wider than long; punctures on disc separated by a distance equal to or slightly greater than their diameter, denser on margins; hind angle divergent, usually bicarinate (inner carina, when present, shorter and weaker than outer). Aedeagus (Figure 177) with median lobe narrowly and evenly tapering to pointed apex; paramere

with apical blade, small indentation at base of blade, few short setae in basal half of blade. Female similar to male externally.

Distribution. Eastern North America, west to Texas, Oklahoma, and South Dakota, southwest to Arizona (Quate and Thompson 1967). Recorded from all seven states in the study area (Leng 1920; Brimley 1938; Löding 1945; Wilson 1946; Fattig 1951; Quate and Thompson 1967; Kirk 1969, 1970; Genung 1972; Cherry and Hall 1986; Lago and Mann 1987; Cherry 1988; Jansson and Lecrone 1989; Jansson et al. 1989; Jansson and Lecrone 1991; Herbert et al. 1992; Cherry 1993; Cherry and Alvarez 1995; Downie and Arnett 1996; Peck and Thomas 1998; Cherry 2007; Cherry and Stansly 2008; Reed et al. 2009; Willis et al. 2010a, 2010b; Larsen et al. 2013; Gill et al. 2014; Karounos et al. 2018, 2019). Records that predate the revision by Quate and Thompson may represent species described as new therein. Leng (1920) listed *M. spadix* as a synonym of *M. communis* so some of his Florida records may refer to the former.

Specimens Examined. Georgia (Clarke, Emanuel, Jenkins); **Mississippi** (Grenada, Oktibbeha); **Tennessee** (Knox, Warren). February, April–July. (Figure 186)

Discussion. *Melanotus communis* belongs to a complex of species that includes *M. similis*, *M. indistinctus*, *M. dietrichi*, *M. miscellus*, *M. verberans*, *M. decumanus*, *M. spadix*, and *M. emissus*. These six species can be very difficult to distinguish externally and examination of the aedeagus is usually needed for a definitive identification. In some of these species, females cannot be identified without association with males. *Melanotus verberans* and *M. emissus* may sometimes be recognized by their smaller size. Three other related species in the complex, *M. spadix*, *M. decumanus*, and *M. castanipes*, often have sufficient external characteristics to separate them from the aforementioned species. When in doubt, the aedeagus should be examined. Medium-sized brown *Melanotus*, especially those with agricultural associations, often get reported as *M. communis* without thorough identification. Examination and dissection of many specimens in the complex in this study showed very few specimens that could be reliably attributed to true *M. communis*. Specimens in the study area have been collected at ultraviolet light. Lago and Mann (1987) reported it on the flowers of wild carrot in Lafayette County, MS. Cherry (1993) collected *M. communis* in Palm Beach County, FL by baiting with rolled oats, corn, carrots, onions, apples, and radishes. In the Southeast, *M. communis* has been implicated as a crop pest and has been associated with corn (Fattig 1951), soybeans (Fattig 1951), peanuts (Fattig 1951; Herbert et al. 1992), sugarcane (Cherry 1988; Cherry 2007; Cherry and Stansly 2008; Larsen et al. 2013; Karounos et al. 2018, 2019), potatoes (Jansson et al. 1989; Jansson and Lecrone 1989, 1991), and sweet potatoes (Reed et al. 2009; Willis et al. 2010a, 2010b).

Melanotus corticinus (Say, 1823)

Figures 187, 189

Elater corticinus Say, 1823: 183
Cratonychus vetulus Erichson, 1842: 105
Melanotus glandicolor Melsheimer, 1846: 152

Diagnosis. Size moderate to large, 13.0–16.0 mm in length. Color red-brown; vestiture whitish, evenly distributed over the body. Supra-antennal carinae thick, dark reddish brown, scarcely overhanging nasale, angulate and blunt when viewed from above. Parantennal fovea large, deep, and rounded. Nasale well-developed, usually as wide, or a little less, as high. Mandible with large, slit-like pit. Antenna 11-segmented, extending beyond apex of pronotal hind angle by 2–3 antennomeres; antennomere II and III subequal, III noticeable shorter than IV; flagellar antennomeres long and slender, erect male hairs long. Pronotum wider than long, sides straight and divergent posteriorly; punctures on disc separated by a distance equal or less than their diameters; hind angle divergent with long carina. Aedeagus with median lobe tapering to subacute apex; paramere with apical blade; moderate to long setae present the length of blade. Female similar to male externally, but a little larger and with a slightly longer antennomere III.



Figures 176–185. *Melanotus* spp. **176)** *M. communis* (habitus). **177)** *M. communis* (aedeagus). **178)** *M. indistinctus* (aedeagus). **179)** *M. dietrichi* (aedeagus). **180)** *M. similis* (aedeagus). **181)** *M. similis* (aedeagus). **182)** *M. miscellus* (aedeagus). **183)** *M. decumanus* (aedeagus). **184)** *M. verberans* (aedeagus). **185)** *M. spadix* (aedeagus).

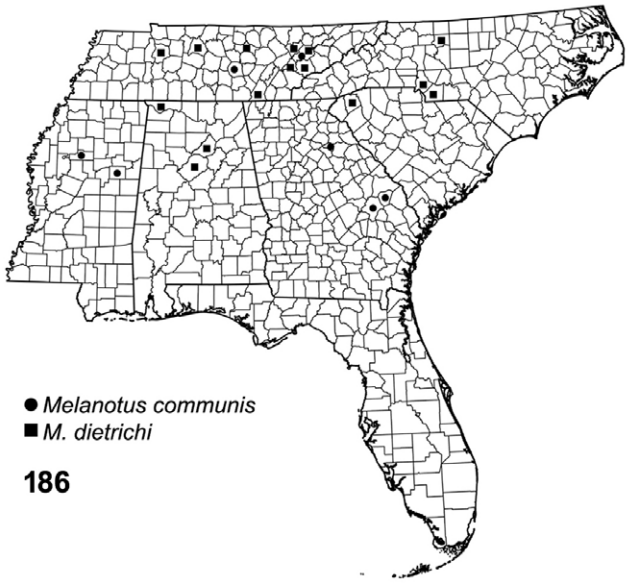


Figure 186. Distributional data for *Melanotus communis* and *M. dietrichi*.

Distribution. Northeastern United States, west to Montana (Quate and Thompson 1967). In the Southeast, previously recorded from Georgia, Mississippi, North Carolina, and Tennessee (LeConte 1853; Candèze 1860; Leng 1920; Brimley 1938; Fattig 1951; Quate and Thompson 1967; Klepzig et al. 2012). The following records from Alabama, Florida, and South Carolina represent **New State Records**.

Specimens Examined. Alabama (Jefferson, Madison); **Florida** (Alachua, Brevard, Clay, Liberty); **Georgia** (Clarke, Grady); **Mississippi** (Jones, Monroe, Webster, Winston); **North Carolina** (Alleghany, Ashe, Burke, Carteret, Haywood, Jones, McDowell, Stokes, Surry, Watauga, Wayne); **South Carolina** (Colleton, Greenville, Lexington, Oconee, Pickens); **Tennessee** (Blount, Sevier). April–July. (Figure 189)

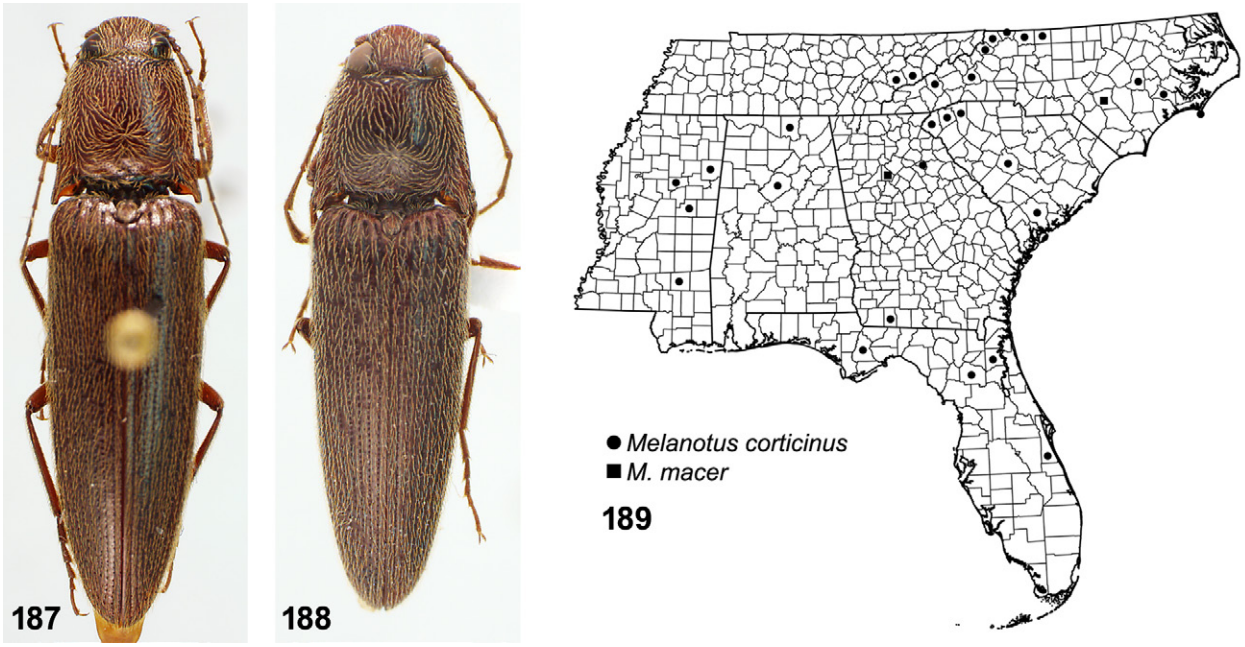
Discussion. This species is usually recognized by its large size, subequal antennomeres II and III, large parantennal fovea, and defined apical blade on the paramere. Females may have a longer antennomere III, but it is still closer to II than IV and should not present problems in keying. Large female specimens may resemble *M. spadix* or *M. castanipes*, but the presence of a mandibular pit should readily rule-out the latter two. Specimens in the study area were collected at ultraviolet and mercury vapor light and in Lindgren funnel, canopy, Malaise, and flight intercept traps. Specimens from Jones County, MS (LSAM) were collected in pitfall traps in a loblolly pine (*Pinus taeda*) forest.

Melanotus cribriventris Blatchley, 1910

Figures 188, 190

Melanotus longicornis Blatchley, 1910: 746 (nec *Melanotus longicornis* Candèze, 1860: 332)
Melanotus cribriventris Blatchley, 1910: 747
Melanotus blatchleyi Leng, 1918: 205

Diagnosis. Size average, 9.0–12.0 mm in length. Color red-brown; vestiture whitish, evenly distributed over the body. Supra-antennal carinae red-brown, not strongly protruding over nasale, angulate and blunt when viewed from above. Parantennal foveae large, deep, and well-defined. Nasale higher than wide, prominently raised. Mandible with deep, round pit. Antenna 11-segmented, serrate, extending beyond apex of pronotal hind angle



Figures 187–189. *Melanotus* spp. **187)** *M. corticinus* (habitus). **188)** *M. cribriventris* (habitus). **189)** Distributional data for *M. corticinus* and *M. macer*.

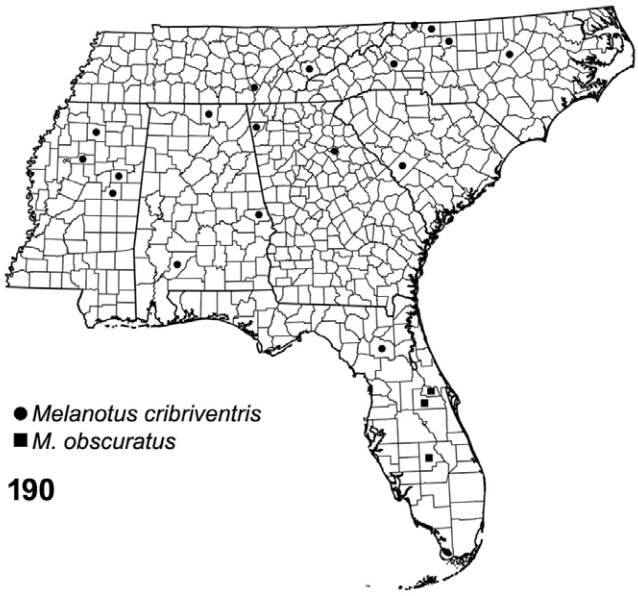


Figure 190. Distributional data for *Melanotus cribriventris* and *M. obscuratus*.

by 3.0–3.5 antennomeres; antennomeres II and III subequal, flagellar antennomeres elongate and slender, erect male hairs long and shaggy. Pronotum wider than long; side straight with slight anterior curvature; punctures on disc separated by a distance equal to less than their own diameters; hind angle divergent with single strong carina. Aedeagus with median lobe gradually tapering to rounded apex; paramere broadly rounded apically to subacute apex, lacking apical blade, moderate pre-apical setae. Female similar to male externally but slightly larger and with shorter antenna, extending beyond apex of pronotal hind angle by about two antennomeres.

Distribution. Northeastern United States, west to Kansas (Quate and Thompson 1967). In the Southeast, previously recorded from North Carolina and Tennessee (Wray 1950; Quate and Thompson 1967). The following records from Alabama, Florida, Georgia, Mississippi, and South Carolina represent **New State Records**.

Specimens Examined. Alabama (Lee, Madison, Monroe); **Florida** (Alachua); **Georgia** (Chattooga, Clarke); **Mississippi** (Grenada, Lafayette, Oktibbeha, Winston); **North Carolina** (Alleghany, Burke, Forsyth, Surry, Wake); **South Carolina** (Aiken); **Tennessee** (Blount, Sequatchie). March–August. (Figure 190)

Discussion. The long antennae and subequal antennomeres II and III are diagnostic, and this species usually does not present with much difficulty in identification. Specimens examined in this study significantly expand the known range of this species southward. Specimens in the study area have been collected at ultraviolet light and in Lindgren funnel traps.

Melanotus decumanus (Erichson, 1842)

Figures 166, 183, 191–192

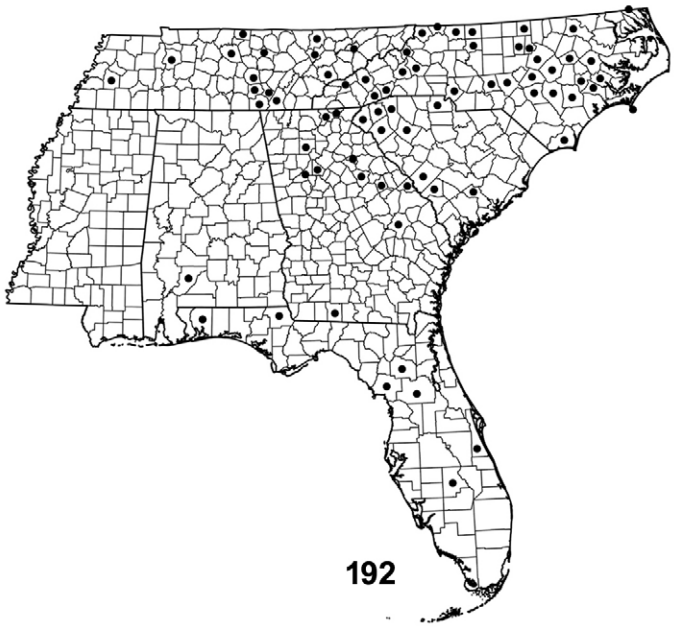
Cratonychus decumanus Erichson, 1842: 104
Cratonychus cuneatus LeConte, 1853: 473
Cratonychus incertus LeConte, 1853: 474
Melanotus canadensis Candèze, 1860: 342

Diagnosis. Size moderate to large, 11.0–18.0 mm in length. Color dark red-brown to nearly black; vestiture yellowish evenly distributed over the body. Supra-antennal carinae strongly protruding and forming noticeable shelf above nasale (Figure 191). Parantennal foveae very shallow, usually teardrop-shaped. Mandible without pit. Antenna 11-segmented, serrate, extending beyond apex of pronotal hind angle by about 1.5 antennomeres, erect male hairs dense; antennomere II small, III intermediate between II and IV; IV and beyond more slender than related species. Pronotum wider than long, side divergent and nearly straight to about 2/3 from base, often sharply angled before concavity at hind angle; punctures on disc separated by distance equal to or less than their diameters, denser laterally; hind angle divergent with single strong carina. Aedeagus (Figure 183) with median lobe variable, subparallel or slightly constricted at middle, widening near apex then suddenly tapering to subacute apex; paramere with broad apical blade possessing eight setae distributed along entire lateral edge of the blade. Female similar to male externally but slightly larger and with slightly shorter antennae.

Distribution. Eastern United States and Canada, west to South Dakota, Colorado, and New Mexico (Quate and Thompson 1967). In the Southeast previously recorded from Alabama, Florida, Georgia, North Carolina, South Carolina, and Tennessee (LeConte 1853; Candèze 1860; Leng 1910, 1920; Brimley 1938; Fattig 1951; Frost 1964; Morrill 1978; Quate and Thompson 1967; Kirk 1969, 1970; Gorsuch et al. 1989; Downie and Arnett 1996; Buck et al. 2005; Vlach et al. 2010; Ferro et al. 2012b, 2012c).

Specimens Examined. Alabama (Monroe); **Florida** (Alachua, Brevard, Highlands, Jackson, Levy, Marion, Santa Rosa); **Georgia** (Cherokee, Clarke, DeKalb, Emanuel, Fulton, Greene, Richmond, Thomas, Towns, Union, Warren); **North Carolina** (Alleghany, Ashe, Avery, Brunswick, Burke, Camden, Carteret, Craven, Cumberland, Duplin, Durham, Forsyth, Halifax, Harnett, Haywood, Henderson, Johnston, Jones, Lenoir, McDowell, Mecklenburg, Montgomery, Moore, Orange, Person, Pitt, Sampson, Stokes, Surry, Swain, Transylvania, Wake, Wilson); **South Carolina** (Aiken, Anderson, Barnwell, Dorchester, Greenville, Laurens, Oconee,





Figures 191–192. *Melanotus decumanus*. **191)** Supra-antennal carinae (lateral view). **192)** Distributional data.

Pickens, York); **Tennessee** (Anderson, Blount, Campbell, Franklin, Grundy, Hamblen, Haywood, Humphreys, Macon, Marion, Putnam, Sequatchie, Sullivan, Warren, Wilson). April–July. (Figure 192)

Discussion. This species is most similar to *M. similis*, *M. spadix*, and *M. castanipes*. The jutting frontal margin formed by the supra-antennal carinae is usually enough to distinguish it from the latter three, but specimens with reduced carinae may present some diagnostic difficulties. Variation in the aedeagus in both this species and *M. similis* can sometimes make that feature unreliable by itself. Specimens of *M. decumanus* are well-represented in collections in the study area, and have been collected at ultraviolet and mercury vapor light and in Malaise and Lindgren funnel traps. A specimen from Laurens County, SC (CUAC) was collected on rose. Fattig (1951) reported it as a pest of black-eyed peas in Atlanta, GA and corn in Jefferson County, GA. Gorsuch et al. (1989) reported it from peach in Anderson County, SC.

Melanotus depressus (Melsheimer, 1846)

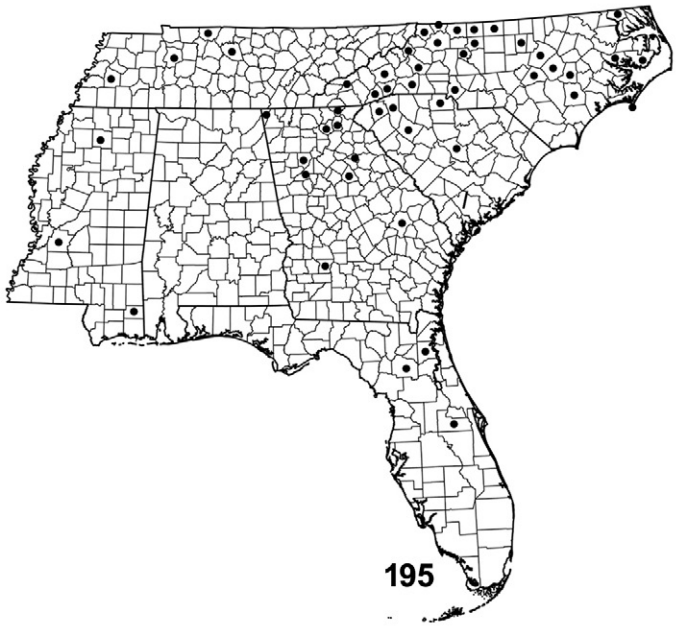
Figures 193–195

Cratonychus depressus Melsheimer, 1846: 151
Ctenonychus parumpunctatus LeConte, 1853: 151
Melanotus divarcarinus Blatchley, 1910: 754
Melanotus lixus Blatchley, 1910: 754

Diagnosis. Size small to moderate, 9.5–13.0 mm in length. Color dark red-brown to nearly black; vestiture yellowish, evenly distributed over the body. Supra-antennal carinae not strongly protruding over nasale, evenly rounded or slightly angulate when viewed from above. Parantennal foveae small, but deep and well-defined, crescent-shaped. Mandible with shallow, slit-like pit. Antenna 11-segmented, serrate, extending beyond apex of pronotal hind angle by 1.0–1.5 antennomeres; antennomere II small, III intermediate between II and IV. Pronotum wider than long; side straight behind small anterior curvature, divergent posteriorly; punctures on disc separated by a distance equal to slightly less or slightly more than own diameters; hind angle subparallel,







Figures 193–195. *Melanotus depressus*. **193)** Habitus. **194)** Aedeagus. **195)** Distributional data.

single strong carina extending beyond base of hind angle. Aedeagus (Figure 194) with median lobe subparallel, gradually tapering to rounded apex; paramere broadly rounded to subacute apex, cluster of long subapical setae present. Female similar to male externally, but slightly larger and with slightly shorter antennae.

Distribution. Eastern United States, west to Nebraska and Texas (Quate and Thompson 1967). Recorded from all seven states in the current study area (Leng 1910, 1920; Brimley 1938; Löding 1945; Fattig 1951; Quate and Thompson 1967; Kirk 1969; Downie and Arnett 1996). Löding's (1945) record from Baldwin County, AL is based on a misidentification (see below).

Specimens Examined. Florida (Alachua, Clay, Orange); **Georgia** (Clarke, Cobb, Dade, Emanuel, Fulton, Lee, Lumpkin, Morgan, Towns, White); **Mississippi** (George, Hinds, Lafayette); **North Carolina** (Alleghany, Ashe, Avery, Beaufort, Buncombe, Burke, Carteret, Davie, Duplin, Forsyth, Gates, Harnett, Hyde, Henderson, Johnston, Mecklenburg, Orange, Rockingham, Rutherford, Stokes, Surry, Swain, Transylvania, Wake, Wayne, Wilkes); **South Carolina** (Colleton, Greenville, Laurens, Pickens, Richland, York); **Tennessee** (Haywood, Humphreys, Robertson, Wilson). April–August. (Figure 195)

Discussion. *Melanotus depressus* is a highly variable species throughout much of its range, most noticeably in terms of body size, but also the size of parantennal fovea and mandibular pit. This species is most similar to *M. morosus* but can be separated by usually being darker, having larger pronotal punctures, a smaller mandibular pit, more prominent pronotal hind angles, and by aedeagal characters. In *M. depressus*, the paramere is broadly rounded to the apex, whereas in *M. morosus* it is more angulate to the apex. The external characters separating the two species are variable but can be helpful when one becomes familiar with them and they are used in combination. When in doubt, the aedeagus is the most reliable feature. I have examined the specimen (GSAT) that is the basis for Löding's (1945) record from Baldwin County, AL, and although the specimen is a female, the external characters support its placement in *M. trapezoideus*. Specimens in the study area have been collected at ultraviolet light, in Lindgren funnel traps, and in flight intercept traps. Specimens from Henderson County, NC (NCSU) were collected in tufted apple bud moth pheromone traps. Fattig (1951) reported this species (as *M. parumpunctatus*) in association with cotton in Cobb County, GA.

Melanotus dietrichi Quate, 1967

Figures 179, 186

Melanotus dietrichi Quate in Quate and Thompson, 1967: 27

Diagnosis. Externally inseparable from *M. communis*, differentiated only by the characters of the aedeagus (Figure 179); median lobe very long and slender, gradually tapering to subacute apex; paramere long and slender, with apical blade, blades long and slender with several long setae basally and medially. Female similar to male externally except for being slightly larger and more robust and having shorter antennae.

Distribution. Northeastern United States, south to Tennessee and west to Iowa (Quate and Thompson 1967). In the Southeast, previously only recorded from Georgia and Tennessee (Quate and Thompson 1967; Morrill 1978; Downie and Arnett 1996; Vlach et al. 2010; Chatzimanolis et al. 2020). The following records from Alabama, North Carolina, and South Carolina represent **New State Records**.

Specimens Examined. Alabama (Blount, Jefferson, Lauderdale); **North Carolina** (Forsyth, Mecklenburg, Union); **South Carolina** (Pickens); **Tennessee** (Anderson, Blount, Davidson, Hamilton, Humphreys, Knox, Loudon, Putnam). April–July, September–October. (Figure 186)

Discussion. This species is closely allied to *M. similis*, *M. indistinctus*, *M. communis*, *M. miscellus*, *M. verberans*, and *M. emissus*, and examination of aedeagus is necessary for an accurate identification. The female was undescribed at the time of Quate's description. The above observations were based on female specimens associated with males from Forsyth County, NC (WDMC) and Loudon County, TN (CMNH). Specimens in the study area have been collected at ultraviolet light and in Lindgren funnel and window traps.

Melanotus difficilis Blatchley, 1910

Figures 196–197

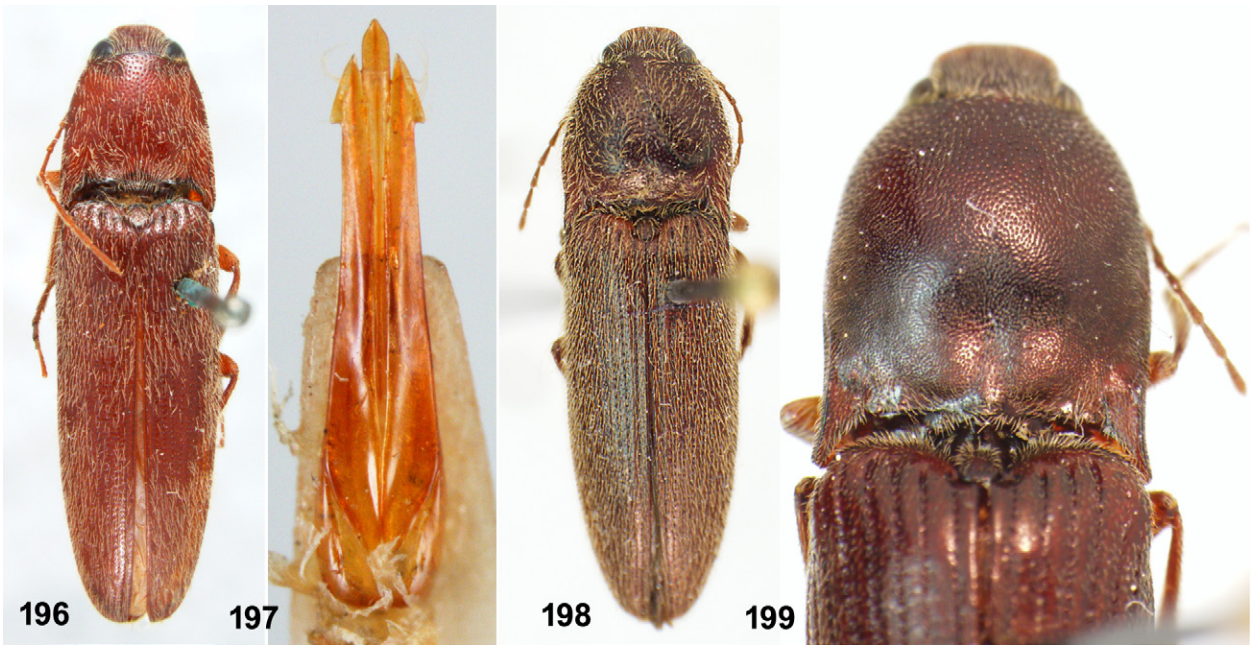
Melanotus difficilis Blatchley, 1910: 751

Diagnosis. Size moderate, 14.0–15.0 mm in length. Color red-brown; vestiture whitish, evenly distributed over the body. Supra-antennal carinae thick, extending over nasale twice the width of the rim, rounded when viewed from above. Parantennal fovea lacking or, if present, small and indistinct. Mandible with small, teardrop-shaped pit. Antenna 11-segmented, serrate, extending beyond apex of pronotal hind angle by 3.0–3.5 antennomeres; antennomere II small; III intermediate between II and IV; flagellar antennomeres long and slender; erect male hairs short but dense. Pronotum wider than long, dorsally flattened; side divergent posteriorly; punctures on disc subequal to those on front, separated by approximately their own diameter; hind angle divergent, single carina extending to base of angle. Aedeagus (Figure 197) with median lobe narrow, broadening subapically then tapering to subacute apex; paramere with long apical blade possessing long setae along entire length of the blade. Female undescribed.

Distribution. Central United States (Quate and Thompson 1967). In the Southeast, previously recorded from Mississippi and Tennessee (Quate and Thompson 1967; Downie and Arnett 1996; Vlach et al. 2010).

Specimens Examined. None.

Discussion. Important diagnostic features for this species include the size, long antenna, obsolete parantennal fovea, and aedeagus. This species is distributed in the Central United States and appears to enter the Southeast in Mississippi and Tennessee at the eastern extent of its range.



Figures 196–199. *Melanotus* spp. **196)** *M. difficilis* (habitus). **197)** *M. difficilis* (aedeagus). **198)** *M. emissus* (habitus). **199)** *M. gradatus* (close-up of pronotum). *Melanotus difficilis* photos courtesy Kyle Schnepp (Florida State Collection of Arthropods, FDACS-DPI, Gainesville, FL, USA).

Melanotus emissus (LeConte, 1853)

Figures 198, 202

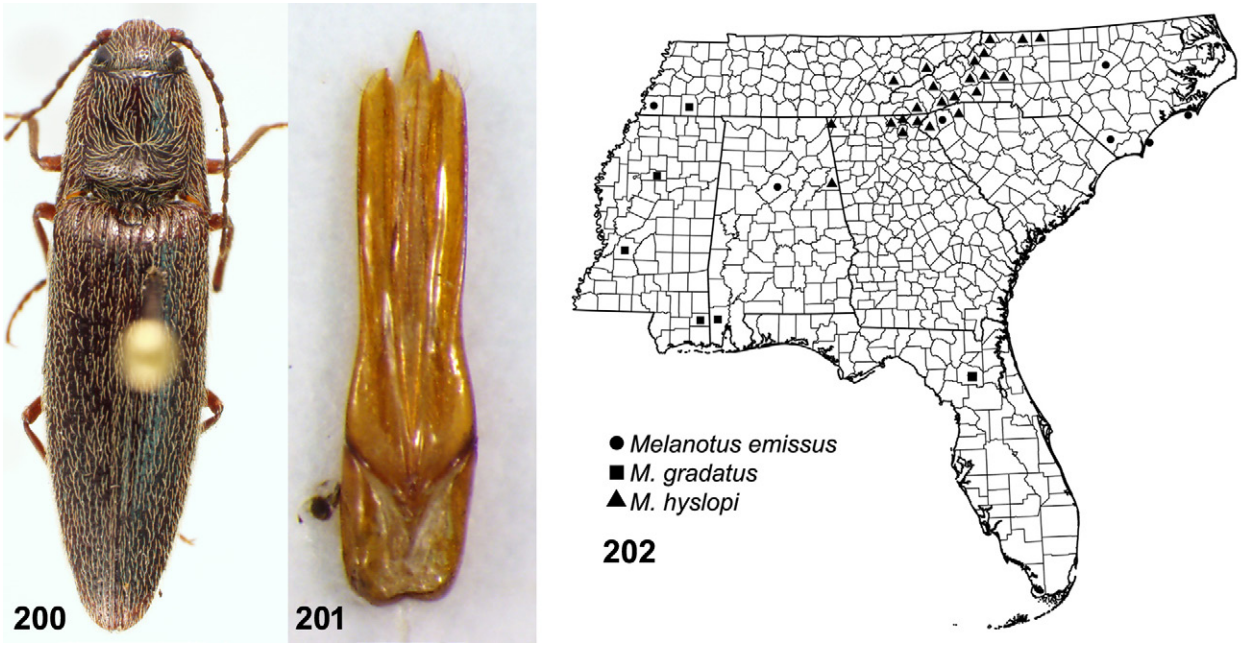
Cratonychus emissus LeConte, 1853: 478

Diagnosis. Externally similar to *M. communis* but generally smaller (9.0–12.0 mm in length), and with pronotal punctures usually denser. Aedeagus shorter, with median lobe wider, subparallel, narrowing subapically; paramere with broad apical blade containing four setae. Female undescribed.

Distribution. Eastern United States, south to Alabama and west to South Dakota and Kansas (Quate and Thompson 1967). In the Southeast, previously recorded from Alabama, Georgia, North Carolina, and Tennessee (LeConte 1853; Candèze 1860; Leng 1920; Fattig 1951; Quate and Thompson 1967; Downie and Arnett 1996; Vlach et al. 2010). The following records from South Carolina represent a **New State Record**.

Specimens Examined. Alabama (Jefferson); **North Carolina** (Carteret, Columbus, New Hanover, Wake); **South Carolina** (Pickens); **Tennessee** (Shelby). March, May–June, August. (Figure 202)

Discussion. Quate and Thompson (1967) were unable to positively identify the female of *M. emissus*. This species is similar to *M. verberans* in resembling a smaller version of *M. communis*. The pronotal punctures are generally denser and the aedeagus is different; *M. verberans* has a wider median lobe. Specimens in the study area were collected at ultraviolet light.



Figures 200–202. *Melanotus* spp. **200)** *M. hyslopi* (habitus). **201)** *M. hyslopi* (aedeagus). **202)** Distributional data for *M. emissus*, *M. gradatus*, and *M. hyslopi*.

Melanotus gradatus LeConte, 1866

Figures 199, 202

Melanotus gradatus LeConte, 1866: 390

Diagnosis. Size moderate, 13.0–14.0 mm in length. Color red-brown; vestiture whitish or yellowish, short, becoming denser, nearly velvety, posteriorly on pronotum (Figure 199). Supra-antennal carinae not strongly protruding over nasale, evenly rounded or flattened when viewed from above. Parantennal foveae large, deep, semicircular. Nasale slightly wider than high, slightly raised. Mandible with large, teardrop-shaped pit. Antenna 11-segmented, serrate, extending beyond apex of pronotal hind angle by one-half antennomere or less; antennomere II small; III nearly as long as IV. Pronotum about as wide as long; shape variable, from laterally straight with hind angles diverging posteriorly to curved with slight concavity before hind angles; punctures on anterior third subequal in size to those on the front, growing smaller and denser and appearing granulose posteriorly. Aedeagus with median lobe broad, subparallel, tapering gradually subapically; paramere with small, rounded apical blade, setae present along length of the blade. Female similar to male externally but antennae shorter, just reaching apex of pronotal hind angle or falling short by one-half antennomere.

Distribution. Northeastern United States, west to Kansas and Arkansas (Quate and Thompson 1967). Previously not recorded from the Southeast. The following records from Alabama, Florida, Mississippi, and Tennessee represent **New State Records**. (Figure 202)

Specimens Examined. Alabama (Mobile); **Florida** (Alachua); **Mississippi** (George, Grenada, Hinds); **Tennessee** (Hardeman). March–July.

Discussion. This species is usually readily recognized by having the pronotal setae and punctures becoming finer and denser posteriorly. The specimens from Hinds County, MS (UMIC) were collected in Lindgren funnel traps set in deciduous woods. Other specimens in the study area have been collected at ultraviolet light.

Melanotus hyslopi Van Zwaluwenburg, 1921

Figures 200–202

Melanotus hyslopi Van Zwaluwenburg, 1921: 210

Diagnosis. Moderate to large in size, 11.0–13.0 mm in length. Color red-brown; vestiture white or yellowish, evenly distributed over the body. Supra-antennal carinae not strongly protruding over nasale, angularly produced into truncated projection when viewed from above. Nasale as wide as high, strongly protuberant. Parantennal foveae large and deep, crescent-shaped. Mandible with deep round or oval pit. Antenna 11-segmented, serrate, extending beyond apices of pronotal hind angle by 2–3 antennomeres; antennomere II small; III intermediate in size between II and IV. Pronotum wider than long; straight behind anterior curvature and divergent posteriorly; punctures on disc sparse, separated by twice their diameters; hind angle divergent; single carina strong, extending beyond base of angle. Aedeagus (Figure 202) with median lobe narrow, subparallel, suddenly tapering subapically to subacute apex; paramere without apical blade, subparallel, rounding to subacute apex, small cluster of apical setae. Female similar to male externally, but antennae shorter, extending beyond apex of pronotal hind angle by 1.5–2.0 antennomeres.

Distribution. Northeastern United States, south to North Carolina and west to Wisconsin and Illinois (Quate and Thompson 1967). In the Southeast, previously recorded from Georgia, Mississippi, North Carolina, and Tennessee (Brimley 1938; Fattig 1951; Quate and Thompson 1967; Downie and Arnett 1996; Buck et al. 2005). The following records from Alabama and South Carolina represent **New State Records**.

Specimens Examined. Alabama (Cleburne); **Georgia** (Dade, Rabun, Towns, Union, White); **North Carolina** (Ashe, Avery, Burke, Catawba, Haywood, Henderson, Macon, McDowell, Rutherford, Stokes, Surry, Transylvania, Watauga counties; also Blowing Rock State Park); **South Carolina** (Greenville, Oconee); **Tennessee** (Blount, Cocke). May–August. (Figure 202)

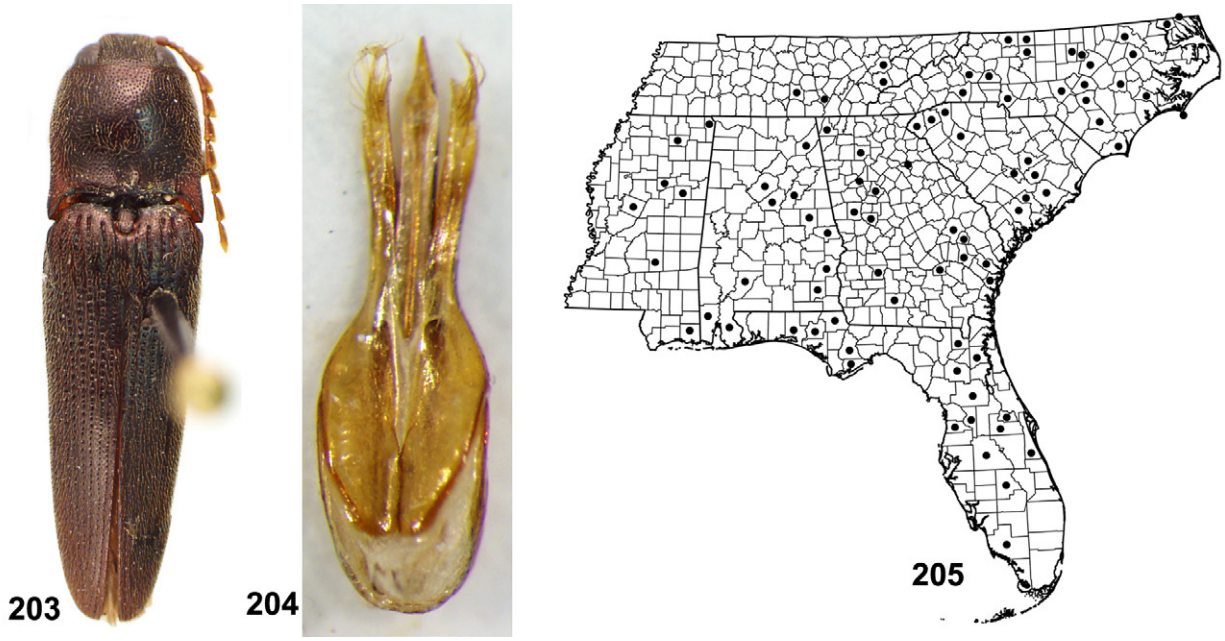
Discussion. *Melanotus hyslopi* and *M. sagittarius* have the largest parantennal foveae among North American *Melanotus* species. That feature, in combination with size, shape of supra-antennal carinae, mandibular pit, pronotal punctures, and antennal length should help to distinguish this species. Specimens in the study area have been collected at ultraviolet light, by beating vegetation, and in Lindgren funnel, canopy, and flight intercept traps.

Melanotus ignobilis Melsheimer, 1846

Figures 203–205

Melanotus ignobilis Melsheimer, 1846: 152
Cratonychus secretus LeConte, 1853: 474
Melanotus despectus Candèze, 1860: 343 (*incertae sedis*)

Diagnosis. Size small to moderate, 7.5–12.0 mm in length. Color dark red-brown to blackish, appendages often paler; vestiture yellowish, evenly distributed over body. Supra-antennal carinae narrow, not strongly protuberant over nasale. Parantennal foveae small and shallow. Nasale flattened, usually twice as wide as high. Mandible without pit. Antenna 11-segmented, extending beyond apex of pronotal hind angle by 1–2 antennomeres; antennomeres II and III subequal; flagellar antennomeres nearly quadrangular; erect male hairs short but dense. Pronotum wider than long to subquadrate, side rounded with slight concavity at base of hind angle; punctures dense, separated by less than their own diameter; hind angles subparallel with single, strong carina extending past base of angle. Aedeagus (Figure 204) with median lobe evenly tapering to rounded apex; paramere subparallel, without apical blade, dense cluster of apical setae. Female similar to male externally but usually larger and with shorter antennae, failing to reach apex of pronotal hind angle; pronotum often with more pronounced concavity at base of hind angle.



Figures 203–205. *Melanotus ignobilis*. **203)** Habitus. **204)** Aedeagus. **205)** Distributional data.

Distribution. Eastern United States, west to South Dakota and Texas (Quate and Thompson 1967). Recorded from all seven states in the study area (LeConte 1853; Candèze 1860; Leng 1920; Brimley 1938; Löding 1945; Wray 1950; Fattig 1951; Quate and Thompson 1967; Frost 1969; Kirk 1969; Downie and Arnett 1996; Vlach et al. 2010). The records in Leng (1920) and Fattig (1951) refer to *M. despectus*, which is probably a synonym of *M. ignobilis* (see below).

Specimens Examined. Alabama (Baldwin, Barbour, Dale, DeKalb, Jefferson, Lee, Mobile, Monroe, Shelby, Talladega, Tallapoosa); **Florida** (Alachua, Baker, Brevard, Clay, Collier, Franklin, Hernando, Highlands, Jackson, Liberty, Marion, Orange, Polk, Seminole, Sumter, Walton, Washington); **Georgia** (Candler, Cherokee, Clarke, Colquitt, Emanuel, Fulton, Henry, Jeff Davis, Lee, Liberty, McIntosh, Meriwether, Tattnall, Upson, Walker); **Mississippi** (Holmes, Jackson, Smith, Oktibbeha, Tishomingo, Union, Webster); **North Carolina** (Bladen, Brunswick, Burke, Camden, Carteret, Catawba, Cumberland, Durham, Edgecombe, Forsyth, Gates, Halifax, Harnett, Jones, Mecklenburg, Moore, Orange, Rutherford, Stokes, Surry, Wake, Wayne); **South Carolina** (Berkeley, Calhoun, Clarendon, Colleton, Dorchester, Greenville, Laurens, Oconee, Pickens, Sumter counties; also Lost Lake); **Tennessee** (Blount, Coffee, Knox, Sequatchie). April–September. (Figure 205)

Discussion. Quate and Thompson (1967) indicated *M. despectus* may be a synonym of *M. ignobilis*, but because they were unable to examine the type for their revision, left the matter unresolved. Leng (1920) and Fattig (1951) recorded *M. despectus* from Georgia, but their specimens were not available for study. For the most part, *M. ignobilis* is a fairly distinctive species, recognized by the small antennomere III, subquadrate flagellar antennomeres, pronotal shape and punctures, and color. There is still quite a bit of variability throughout its range, and some specimens externally are very similar to *M. similis*; examination of the aedeagus may be necessary to separate them. I have examined several specimens from North Carolina and Tennessee that are slightly atypical from other specimens examined. The specimens are larger and more robust than normal (with some males measuring 14.0 mm in length) and have a slightly longer antennomere III. Otherwise, their general form and aedeagus are consistent with other specimens of *M. ignobilis*. This could simply represent clinal variation from north to south. Specimens in the study area have been collected at ultraviolet and mercury vapor light, in Malaise and Lindgren funnel traps, and by beating vegetation. A specimen from Candler County, GA was collected on hickory.

Melanotus indistinctus Quate, 1967

Figures 178, 208

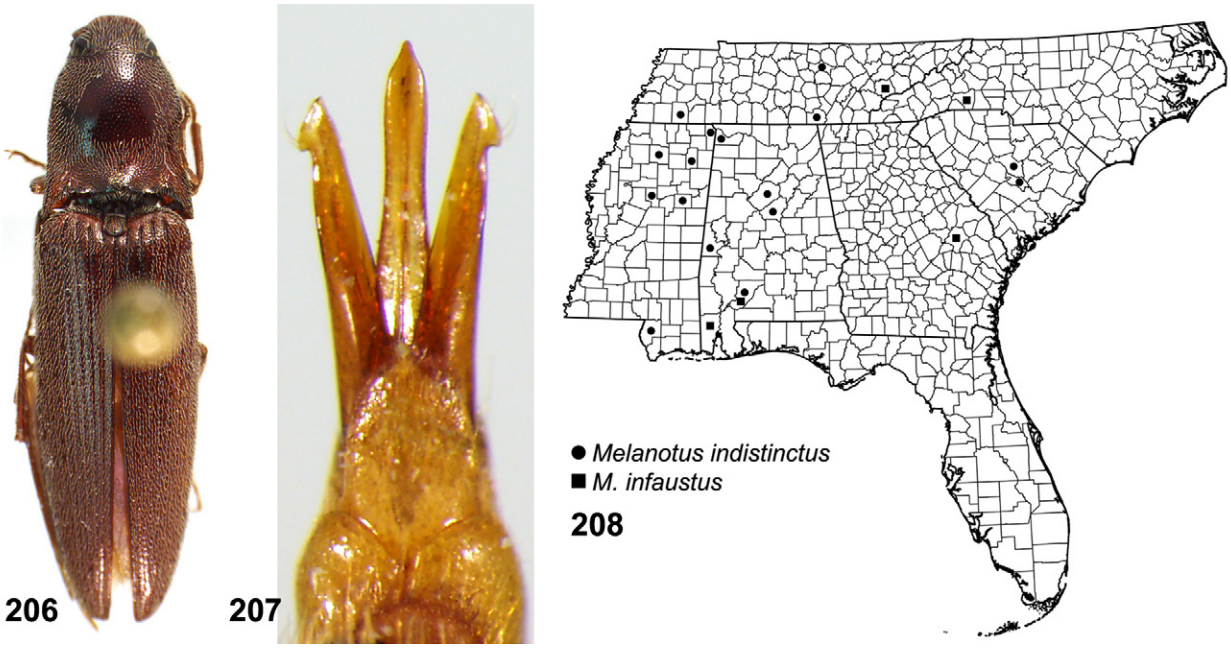
Melanotus indistinctus Quate in Quate and Thompson, 1967: 26

Diagnosis. Externally the same as *M. communis*, although a little darker, parantennal fovea small but distinct, and pronotal punctures a little larger and denser. Also differs in the aedeagus (Figure 178); median lobe slender, evenly tapering to subacute apex; paramere shorter and wider than *M. communis*, with wide apical blade possessing four basal setae, emargination at base of blade deeper and more marked than in *M. communis*. Female not clearly distinguishable from *M. communis* (see below).

Distribution. Eastern United States, west to Oklahoma and Texas (Quate and Thompson 1967). In the Southeast, recorded from Mississippi and Tennessee (Quate and Thompson, 1967; Downie and Arnett 1996; Vlach et al. 2010). The following records from Alabama and South Carolina represent **New State Records**.

Specimens Examined. Alabama (Colbert, Jefferson, Monroe, Shelby, Sumter); **Mississippi** (Lafayette, Lee, Montgomery, Oktibbeha, Pearl River, Tishomingo); **South Carolina** (Calhoun, Richland); **Tennessee** (Hardeman, Marion, Putnam). April–July. (Figure 208)

Discussion. This species is closely allied to *M. similis*, *M. dietrichi*, *M. communis*, *M. miscellus*, *M. verberans*, and *M. emissus*, and examination of the aedeagus is necessary for an accurate identification. Quate and Thompson (1967) found it difficult to define the female. Among the material studied during their revision, they had a series of females from Illinois associated with males. Among this series, there were two forms. One was indistinguishable from *M. communis* and the other was different, having possessed large bursa spines on the female genitalia. Because of the uncertainty of which actually represented the female of *M. indistinctus*, they did not formally describe the female nor include the specimens in the type series. Riley (1983) described the larva and provided a key to related species. Specimens from the study area have been collected at ultraviolet light. Specimens from Shelby County, AL (AUEM) were collected in traps set for the brown marmorated stink bug.



Figures 206–208. *Melanotus* spp. **206)** *M. infaustus* (habitus). **207)** *M. infaustus* (aedeagus). **208)** Distributional data for *M. indistinctus* and *M. infaustus*.

Melanotus infaustus (LeConte, 1853)

Figures 206–208

Cratonychus infaustus LeConte, 1853: 30

Diagnosis. Size small to moderate, 9.0–10.0 mm in length. Color red-brown; vestiture whitish, evenly distributed over the body. Supra-antennal carinae thin, strongly protruding over nasale, flattened and straight when viewed from above. Parantennal foveae small, well-defined, arched. Nasale as wide as high, slightly protuberant. Mandible with deep, slit-like pit. Antenna 11-segmented, serrate, extending beyond apex of pronotal hind angle by 1.5 antennomeres; antennomere II small; III intermediate between II and IV. Pronotum as long as wide, side straight behind anterior curvature, nearly parallel; punctures on disc separated by their diameter or less; hind angle divergent, single carina extending just past base of hind angle. Aedeagus (Figure 207) with median lobe tapering subapically to subacute apex; paramere with short apical blade, cluster of long and short setae along length of the blade. Female similar to male externally but antenna shorter, exceeding apex of pronotal hind angle by one antennomere or less.

Distribution. Southeastern United States, west to Texas and north to South Dakota, Indiana, and Illinois (Quate and Thompson 1967). In the Southeast, previously recorded from Florida and Georgia (LeConte 1853; Candèze 1860; Leng 1920; Fattig 1951; Quate and Thompson 1967). The type locality is Georgia (not further restricted). The following records from Alabama, North Carolina, and Tennessee represent **New State Records**.

Specimens Examined. Alabama (Mobile, Monroe); **Georgia** (Emanuel); **North Carolina** (Rutherford); **Tennessee** (Blount). May–June, August. (Figure 208)

Discussion. *Melanotus infaustus* is not easily recognized, and in the study area may be confused with *M. parallelus*, *M. tenax*, or *M. trapezoideus*. Examination of the aedeagus is generally needed for a positive identification. Specimens in the study area were collected at ultraviolet light and in Lindgren funnel traps.

Melanotus insipiens (Say, 1825)

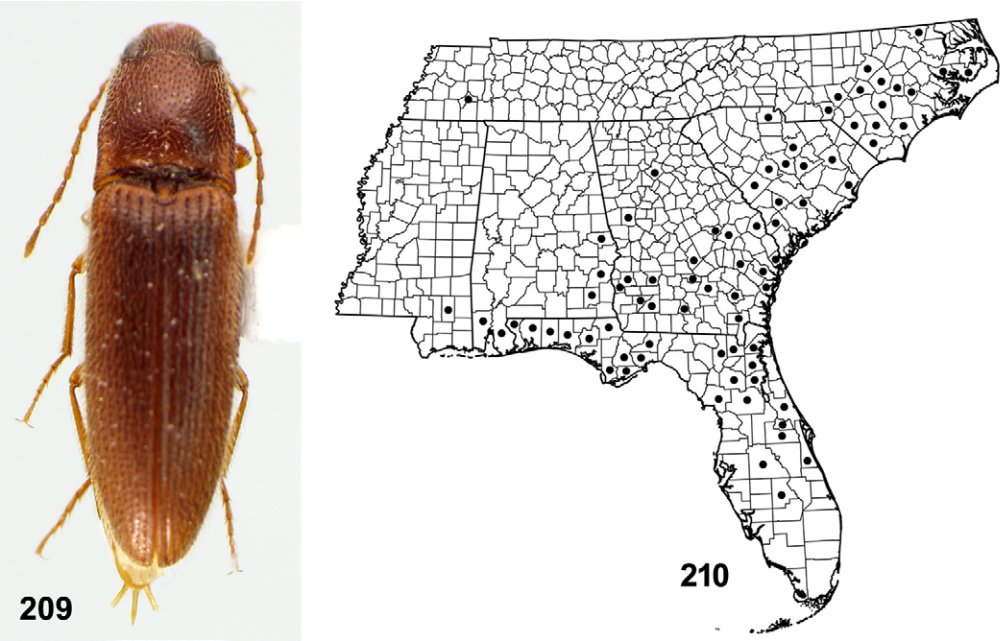
Figures 209–210

Elater insipiens Say, 1825: 267
Cratonychus tenellus Erichson, 1842: 114

Diagnosis. Size small, 5.0–6.5 mm in length. Color light to dark red-brown; white or yellowish vestiture evenly distributed over the body. Supra-antennal carinae not strongly protruding over nasale. Parantennal foveae deep, well-defined, semi-circular. Nasale wider than high. Mandible with deep rounded to elongate pit. Antenna 11-segmented, serrate, extending beyond apex of pronotal hind angle by 2.0–2.5 antennomeres; antennomere II small; III intermediate between II and IV. Pronotum wider than long, side straight behind slight anterior curvature; punctures on disc separated by a distance subequal to their diameters; hind angle divergent; single carina running past base of hind angle, parallel to side. Aedeagus with median lobe gradually tapering to rounded to subacute apex; paramere with apical blade, emargination at base of blade limited to slight curvature, dense cluster of long setae along the blade. Female similar to male externally but antenna shorter, exceeding apex of pronotal hind angle by one-half antennomere.

Distribution. Eastern United States, west to Texas (Quate and Thompson 1967). In the Southeast, previously recorded from Alabama, Florida, Georgia, North Carolina, South Carolina, and Tennessee (LeConte 1853; Candèze 1860; Leng 1920; Brimley 1938; Löding 1945; Fattig 1951; Quate and Thompson 1967; Kirk 1969, 1970; Downie and Arnett 1996; Peck and Thomas 1998; Vlach et al. 2010). The following record from Mississippi represents a **New State Record**.

Specimens Examined. Alabama (Baldwin, Barbour, Dale, Lee, Mobile); **Florida** (Alachua, Baker, Brevard, Clay, Columbia, Duval, Escambia, Franklin, Gulf, Highlands, Jackson, Leon, Levy, Liberty, Marion, Okaloosa,



Figures 209–210. *Melanotus insipiens*. **209)** Habitus. **210)** Distributional data.

Orange, Polk, Putnam, Santa Rosa, Seminole, Volusia, Wakulla, Walton, Washington); **Georgia** (Baker, Ben Hill, Charlton, Chatham, Clay, Coffee, Cook, Dodge, Emanuel, Gwinnett, Johnson, Lee, Liberty, McIntosh, Meriwether, Mitchell, Pierce, Randolph, Screven, Tattnall counties; also Okefenokee Swamp); **Mississippi** (Perry); **North Carolina** (Beaufort, Bladen, Columbus, Harnett, Hyde, Johnston, Lenoir, Moore, Northampton, Pender, Richmond, Robeson, Sampson, Wake, Wayne); **South Carolina** (Aiken, Bamberg, Berkeley, Dorchester, Florence, Georgetown, Hampton, Kershaw, Lexington, Richland, Sumter, York); **Tennessee** (Chester). February–August. (Figure 210)

Discussion. *Melanotus insipiens* is the smallest North American member of the genus, and its size alone should be sufficient for identification. The only other species in the study area that comes close in size is *M. americanus*, which has a more rounded pronotum with sparser punctures and is usually darker in color. *Melanotus insipiens* rivals in size some of the larger specimens of *Glyphonyx*, and one must be careful to check for the generic characters separating the two. Specimens in the study area have been collected by a variety of methods, including at ultraviolet and mercury vapor light, in Lindgren funnel, Malaise, and flight intercept traps, and in Berlese sampling of *Quercus* litter. Specimens from Dodge County, GA (UGCA) were collected in dung-baited pitfall traps. Specimens from Duval County, FL (FSCA) were collected in Theysohn-Pheroprax® pheromone traps. Fattig (1951) reported it as a pest of alsike clover in Bartow County, GA and wheat in Habersham County, GA.

Melanotus lanei Quate, 1967

Figures 211, 213

Melanotus lanei Quate in Quate and Thompson, 1967: 30

Diagnosis. Externally very similar to *M. communis* but differs in the following characters. Size generally smaller, 9.0–12.0 mm in length. Color darker reddish-brown; vestiture whitish, evenly distributed over body but noticeably denser than in *M. communis*. Pronotal punctures smaller and denser. Aedeagus with median lobe similar, shorter and broader but evenly tapering to subacute apex; paramere with apical blade; emargination at base of blade deeper, setae on blades longer. Female similar to male externally but larger.

Distribution. Eastern United States, west to South Dakota and Kansas (Quate and Thompson 1967). In the Southeast, recorded only from Florida (Quate and Thompson 1967; Downie and Arnett 1996; Peck and Thomas 1998). The following records from Mississippi and Tennessee represent **New State Records**.

Specimens Examined. Mississippi (Lafayette); **Tennessee** (Obion). June, September. (Figure 213)

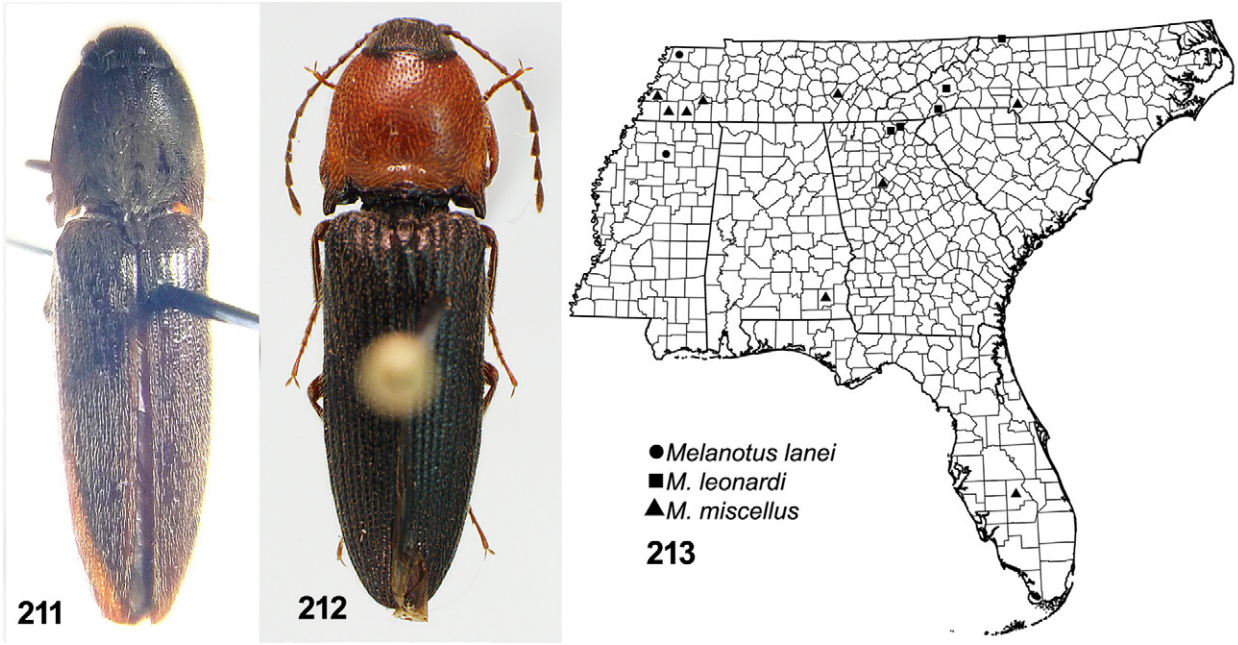
Discussion. This species is similar to *M. communis* and other similar-looking species and examination of the aedeagus is necessary for a definitive identification. The denser pronotal punctures and vestiture can also be helpful for recognizing this species in the study area, but it may be confused with *M. pilosus* Blatchley where their distributions overlap in the Midwest.

Melanotus leonardi (LeConte, 1853)

Figures 212–213

Cratonychus leonardi LeConte, 1853: 475

Diagnosis. Size moderate, 9.0–11.0 mm in length. Bicolored; pronotum reddish-orange; head, elytra, and venter black; appendages dark red-brown; vestiture whitish. Supra-antennal carinae scarcely protuberant over nasale. Parantennal foveae absent or, if present, very shallow. Nasale flat. Mandible without pit. Antenna 11-segmented, serrate, extending beyond apex of pronotal hind angle by one antennomere; antennomere II small; III slightly longer than II but noticeably shorter than IV. Pronotum wider than long, evenly rounded with marked concavity before hind angle; punctures on disc separated by approximately their own diameter; hind angle divergent, single carina weak, barely reaching base of angle. Aedeagus with median lobe gradually tapering, then sudden tapering subapically to subacute apex; paramere slender with small apical blade, long setae along entire length of blade. Female similar to male externally, but antenna shorter, extending to about the apex of pronotal hind angle, and antennomere III slightly longer.



Figures 211–213. *Melanotus* spp. **211)** *M. lanei* (habitus). **212)** *M. leonardi* (habitus). **212)** Distributional data for *M. lanei*, *M. leonardi*, and *M. miscellus*.

Distribution. Northeastern United States and adjacent Canada, south and west to Texas (Quate and Thompson 1967). In the Southeast, previously recorded from Georgia and North Carolina (LeConte 1853; Leng 1920; Fattig 1951; Quate and Thompson 1967; Downie and Arnett 1996).

Specimens Examined. Georgia (Towns, Union); **North Carolina** (Alleghany, Buncombe, Transylvania). May–June. (Figure 213)

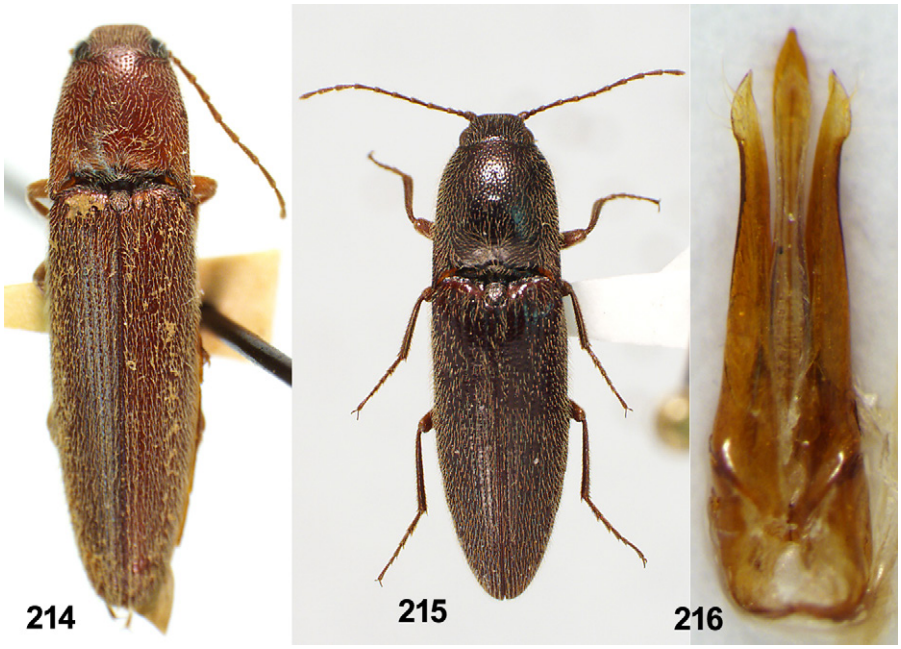
Discussion. The color alone makes this species immediately recognized in the study area. The only other North American species with similar coloring is *M. taenicollis* (LeConte), a northeastern species that to date has not yet been recorded from the current study area. This species may also resemble a member of the genus *Ampedus*, but the serrate tarsal claws readily separate it.

Melanotus macer (LeConte, 1853)

Figures 189, 214

Cratonychus macer LeConte, 1853: 473

Diagnosis. Size moderate, 9.0–12.0 mm in length. Color red-brown; vestiture whitish, evenly distributed over the body. Supra-antennal carinae thin, shelf-like, protruding over nasale, angulate and flattened when viewed from above. Parantennal foveae small, but well-defined, crescent-shaped. Nasale not developed. Mandible with shallow, slit-like pit. Antenna 11-segmented, extending beyond apex of pronotal hind angle by 3–4 antennomeres; antennomere II small; III intermediate between II and IV; flagellar antennomeres slender, nearly parallel-sided, not serrate; erect male hairs short, sparse. Pronotum wider than long, side straight with almost no anterior curvature and slightly divergent posteriorly; punctures on disc separated thier distance or slightly less; hind angles nearly parallel; single carina parallel, extending past base of angle. Aedeagus with median lobe



Figures 214–216. *Melanotus* spp. **214)** *M. macer* (habitus). **214)** *M. obscuratus* (habitus). **215)** *M. obscuratus* (aedeagus).

subparallel, gradually tapering to rounded apex; paramere with triangular apical blade, apex subacute, long setae running entire length of blade. Female undescribed.

Distribution. Northeastern United States, west to Kansas (Quate and Thompson 1967). In the Southeast, previously recorded from Georgia, Mississippi, and North Carolina (LeConte 1853; Candèze 1860; Leng 1920; Quate and Thompson 1967; Downie and Arnett 1996).

Specimens Examined. Georgia (DeKalb); **North Carolina** (Cumberland). June. (Figure 189)

Discussion. The female was unknown to Quate and Thompson at the time of their 1967 revision. This species is most similar to *M. difficilis* in having long, non-serrate antennae, a poorly developed nasale, and small or vestigial parantennal foveae. Specimens in the study area have been collected at ultraviolet light.

Melanotus miscellus Quate, 1967

Figures 182, 213

Melanotus communis var. B Dietrich, 1945: 57
Melanotus miscellus Quate in Quate and Thompson, 1967: 28

Diagnosis. Externally, same as *M. communis*; differing in the aedeagus (Figure 182). Median lobe broad, tapering subapically to subacute apex; paramere short, broad, with broad apical blade; sharp emargination at base of blade, dense cluster of setae running length of blade. Female similar to male externally.

Distribution. Eastern United States and adjacent Canada, west to Illinois (Quate and Thompson 1967). Previously recorded from all seven states in the study area (Quate and Thompson 1967; Kirk 1969; Downie and Arnett 1996; Peck and Thomas 1998; Vlach et al. 2010). The type locality is Chapel Hill in Orange County, NC.

Specimens Examined. Alabama (Dale); **Florida** (Highlands); **Georgia** (DeKalb); **North Carolina** (Mecklenburg); **Tennessee** (Bledsoe, Chester, Fayette, Hardeman, Tipton). January-April, June, September, November-December. (Figure 213)

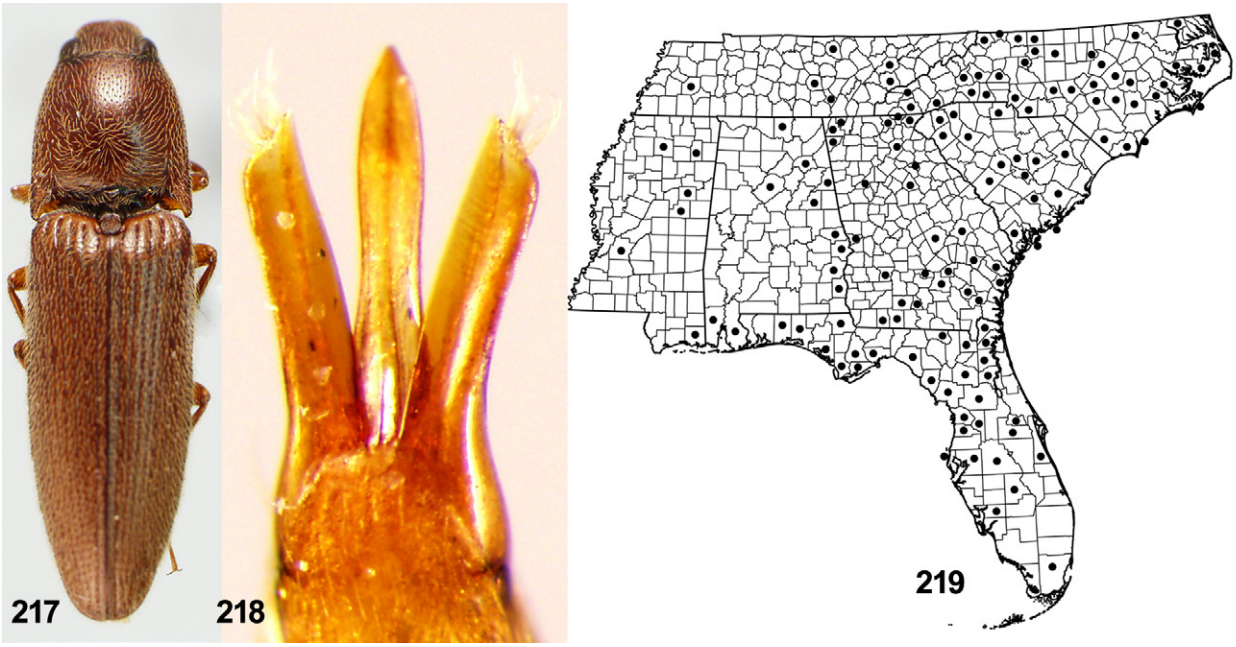
Discussion. This species is closely allied to *M. similis*, *M. indistinctus*, *M. communis*, *M. dietrichi*, *M. verberans*, and *M. emissus*, and examination of the aedeagus is necessary for an accurate identification. It appears to be an intermediate between *M. similis* and *M. communis*, externally resembling the latter but having an aedeagus more similar to the former. Specimens in the study area have been collected at mercury vapor light and under the bark of fallen pine trees and in decaying pine logs.

Melanotus morosus Candèze, 1860

Figures 167, 217–219

Cratonychus longulus LeConte, 1853: 480 (not LeConte, 1853: 473)
Melanotus morosus Candèze, 1860: 346
Melanotus debilis Blatchley, 1910: 754
Melanotus simulans Blatchley, 1927: 140

Diagnosis. Size moderate, 9.0–12.0 mm in length (specimens in the southern part of its range often smaller). Color red-brown; vestiture whitish, evenly distributed over the body. Supra-antennal carinae not strongly protruding over nasale, evenly rounded or flattened anteriorly. Parantennal foveae moderately large and deep, circular. Nasale wider than high. Mandible with deep rounded to teardrop-shaped pit. Antenna 11-segmented, serrate, extending beyond apex of pronotal hind angle by 1–2 antennomeres; antennomere II small; III intermediate between II and IV. Pronotum wider than long, side straight behind slight anterior curvature and subparallel, sometimes with concavity at base of hind angle; punctures smaller than those on front, separated



Figures 217–219. *Melanotus morosus*. **217)** Habitus. **218)** Aedeagus. **219)** Distributional data.

on disc their diameter or slightly more; hind angles slightly divergent, single carina extending past base of angle. Aedeagus (Figure 218) with median lobe broad, evenly tapering to rounded apex; paramere broad, subparallel, angulate subapically to subacute apices; dense cluster of subapical/apical setae. Female similar to male externally, often larger; antenna shorter, exceeding apex of pronotal hind angle by up to one antennomere.

Distribution. Eastern United States and adjacent Canada, west to Texas and Nebraska (Quate and Thompson 1967). Previously recorded from all seven states in the study area (LeConte 1853; Candèze 1860; Leng 1920; Fattig 1951; Quate and Thompson 1967; Kirk 1969, 1970; Morrill 1978; Downie and Arnett 1996; Peck and Thomas 1998; Vlach et al. 2010). The type locality of *C. longulus* is Georgia (not further restricted). The type locality of *M. simulans* is Dunedin in Pinellas County, FL.

Specimens Examined. Alabama (Baldwin, Barbour, Clay, Cleburne, Etowah, Henry, Jefferson, Lee, Madison, Mobile, Russell); **Florida** (Alachua, Baker, Bay, Brevard, Citrus, Charlotte, Clay, Dixie, Duval, Franklin, Gulf, Hamilton, Hernando, Highlands, Hillsborough, Jackson, Levy, Liberty, Marion, Miami-Dade, Nassau, Okaloosa, Orange, Pinellas, Polk, Putnam, Seminole, Sumter, Taylor, Wakulla, Walton); **Georgia** (Ben Hill, Brantley, Catoosa, Chattooga, Clarke, Coffee, Colquitt, Cook, Emanuel, Fulton, Grady, Hall, Jeff Davis, Lee, Laurens, Liberty, McIntosh, Morgan, Muscogee, Pierce, Rabun, Tattnall, Thomas, Towns, Union, Walker); **Mississippi** (Hinds, Jackson, Lafayette, Lee, Oktibbeha, Winston); **North Carolina** (Alleghany, Ashe, Beaufort, Brunswick, Burke, Carteret, Catawba, Cleveland, Columbus, Craven, Cumberland, Dare, Davie, Duplin, Durham, Forsyth, Gates, Guilford, Halifax, Harnett, Hyde, Johnston, Jones, Macon, McDowell, Mecklenburg, Montgomery, Moore, New Hanover, Rutherford, Sampson, Stokes, Surry, Swain, Transylvania, Union, Wake, Wayne); **South Carolina** (Aiken, Anderson, Beaufort, Berkeley, Calhoun, Charleston, Dorchester, Florence, Greenville, Jasper, Laurens, Lexington, Pickens, Richland, Sumter, York); **Tennessee** (Blount, Knox, Madison, Overton, Sequatchie, Warren). February–October. (Figure 219)

Discussion. In the Southeastern and Coastal Plains, specimens of *M. morosus* tend to be smaller and paler in color. However, farther north specimens tend to become larger and darker and increasingly difficult to separate externally from *M. depressus*. *Melanotus morosus* has smaller pronotal punctures and a larger, rounded mandibular pit. The two species also differ in the aedeagus. The paramere of *M. depressus* is broadly rounded to the apex,

where in *M. morosus* it is angulate to the apex. Specimens of *M. morosus* have been readily collected in the study area and by a variety of methods, most commonly at ultraviolet or mercury vapor light, in Lindgren funnel, canopy, Malaise, and flight intercept traps, and by sweeping and beating vegetation.

Melanotus obscuratus Blatchley, 1927

Figures 190, 215, 216

Melanotus obscuratus Blatchley, 1927: 141

Diagnosis. Size small to moderate, 9.0–10.5 mm in length. Color dark red-brown; vestiture whitish. Supra-antennal carinae not strongly protruding over nasale, rounded in front. Parantennal foveae small but distinct. Nasale wider than high, not strongly developed. Mandible with slit-like pit. Antenna 11-segmented, serrate, extending beyond apex of pronotal hind angle by no more than one antennomere; antennomeres II and III subequal. Pronotum slightly longer than wide, side nearly parallel; punctures on disc separated by approximately their diameter; hind angles slightly divergent. Aedeagus (Figure 216) with median lobe narrow subapically to subacute apex; paramere with well-defined apical blade, base of blade with broadly rounded emargination, setae along entire length of the blade. Female similar to male externally, but antenna shorter, just reaching apex of pronotal hind angle.

Distribution. Southeastern United States (Quate and Thompson 1967). Currently only recorded from Florida and North Carolina (Quate and Thompson 1967; Peck and Thomas 1998). The type locality is Ormond in Volusia County, FL.

Specimens Examined. Florida (Highlands, Orange, Seminole). April–June. (Figure 190)

Discussion. At the time of Quate and Thompson's revision (1967), this species appeared rare in collections; they had only examined three specimens. I have had the chance to examine a good series of specimens from Orange County, FL housed in the UCFC. The specimens were collected in Malaise traps set in cypress and mix pond pine/Dahoon holly forests. Other specimens in the study area have been collected at ultraviolet light.

Melanotus opacicollis LeConte, 1866

Figure 220

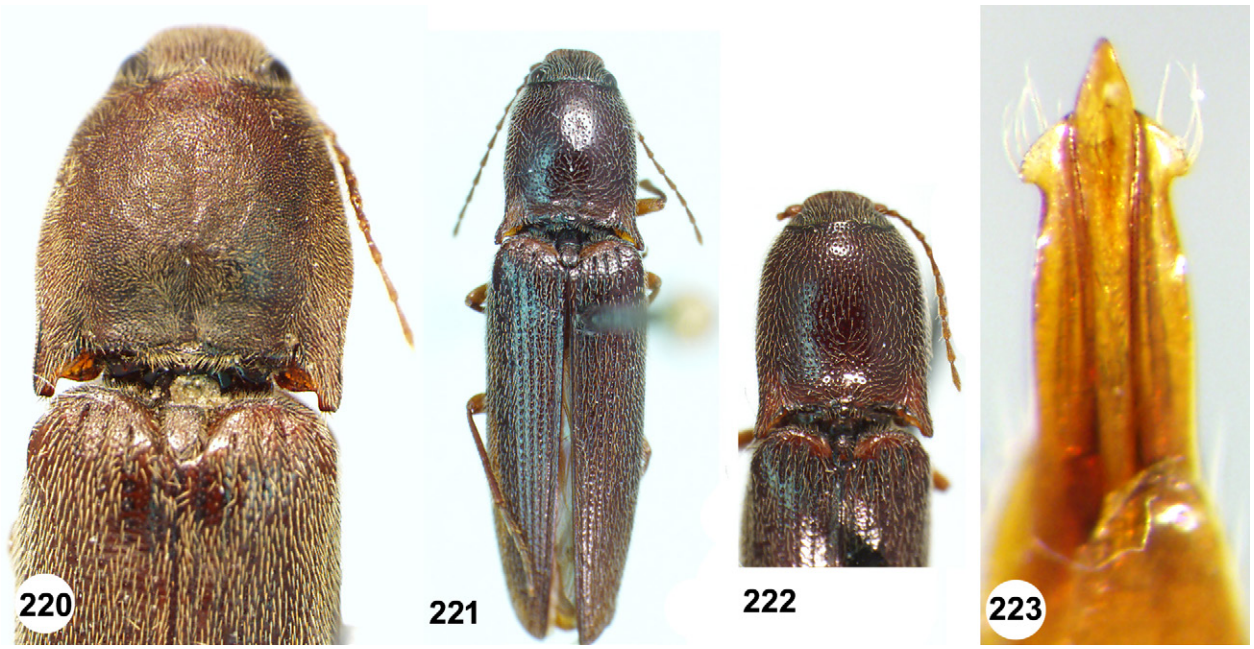
Melanotus opacicollis LeConte, 1866: 390

Diagnosis. Size moderate, 10.0–11.0 mm in length. Color red-brown; vestiture whitish, very dense and nearly velvety on pronotum (Figure 220). Supra-antennal carinae thin and protruding over nasale. Parantennal fovea shallow. Mandible without pit. Antenna 11-segmented, serrate, extending beyond apex of pronotal hind angle by 1–2 antennomeres; antennomere II short; III intermediate between II and IV. Pronotum wider than long; punctures on disc very dense, appearing granulose; hind angles slightly divergent; usually bicarinate, inner carina short. Aedeagus with median lobe narrowly and evenly tapering to subacute apex; paramere broad with apical blade, small indentation at base of blade, slightly sinuous before center, few short setae in basal half of blade. Female similar to male externally.

Distribution. East-central United States, from Indiana west to Montana and south to Kansas and Mississippi (Quate and Thompson 1967). In the Southeast only recorded from Mississippi (Quate and Thompson 1967).

Specimens Examined. None.

Discussion. This species is readily identified by having very dense, small pronotal punctures and dense, nearly velvety, pronotal setae.



Figures 220–223. *Melanotus* spp. **220)** *M. opacicollis* (close-up of pronotum). **221)** *M. parallelus* (male habitus). **222)** *M. parallelus* (female, close-up of pronotum). **223)** *M. parallelus* (aedeagus).

Melanotus parallelus Blatchley, 1920

Figures 221–223, 225

Melanotus parallelus Blatchley, 1920: 45

Diagnosis. Size small to moderate, elytron 9.0–11.0 mm in length. Color red-brown; vestiture white or yellow, evenly distributed over body. Supra-antennal carinae dark red-brown, strongly protruding over nasale, evenly rounded and angulate when viewed from above. Parantennal fovea small, shallow, arched or somewhat reduced. Nasale flat, width equal to or slightly more than length. Mandible with shallow, slit-like pit. Antenna 11-segmented, serrate, extending beyond apex of pronotal hind angle by 1.0–1.5 antennomeres; antennomere II small; III intermediate between II and IV; erect male hairs short and thick. Pronotum slender, longer than wide; side nearly straight behind slight anterior curvature and parallel or slightly convergent posteriorly; punctures at center usually separated by their diameter or more. Aedeagus with median lobe broad, subparallel, suddenly tapering near apex to rounded apex; paramere with apical blade, slight curvature at base of blade, moderate to long setae along entire length of blade. Female (Figure 222) similar to male externally but with a slightly broader pronotum and shorter antennae, failing to reach apex of pronotal hind angle by about one antennomere.

Distribution. Southern United States, north to Arkansas (Quate and Thompson 1967). In the Southeast, recorded from Florida, Georgia, North Carolina, and Tennessee (Blatchley 1920; Fattig 1951; Quate and Thompson 1967; Peck and Thomas 1998; Ferro et al. 2012c). The type locality is Dunedin in Pinellas County, FL. The following records from Alabama and South Carolina represent **New State Records**.

Specimens Examined. Alabama (Baldwin, Mobile); **Florida** (Citrus, Clay, Highlands, Liberty, Manatee, Marion, Okaloosa, Orange, Pinellas, Polk, Santa Rosa); **Georgia** (Long); **North Carolina** (Carteret, Jones, Montgomery, Moore); **South Carolina** (Beaufort, Chesterfield, Georgetown, Kershaw, Lexington). March–July. (Figure 225)

Discussion. This species is usually recognized by its slender, long pronotum and jutting supra-antennal carinae. The mandibular pit can be easily obscured when dirty, hence its placement in the key among other members of

the *similis* group (Quate and Thompson 1967). This species appears uncommon in collections. Specimens in the study area have been collected at ultraviolet and mercury vapor light, in Malaise traps, and by beating dead wood. Specimens from Chesterfield County, SC (NCSU) were collected in association with peach.

Melanotus pertinax (Say, 1839)

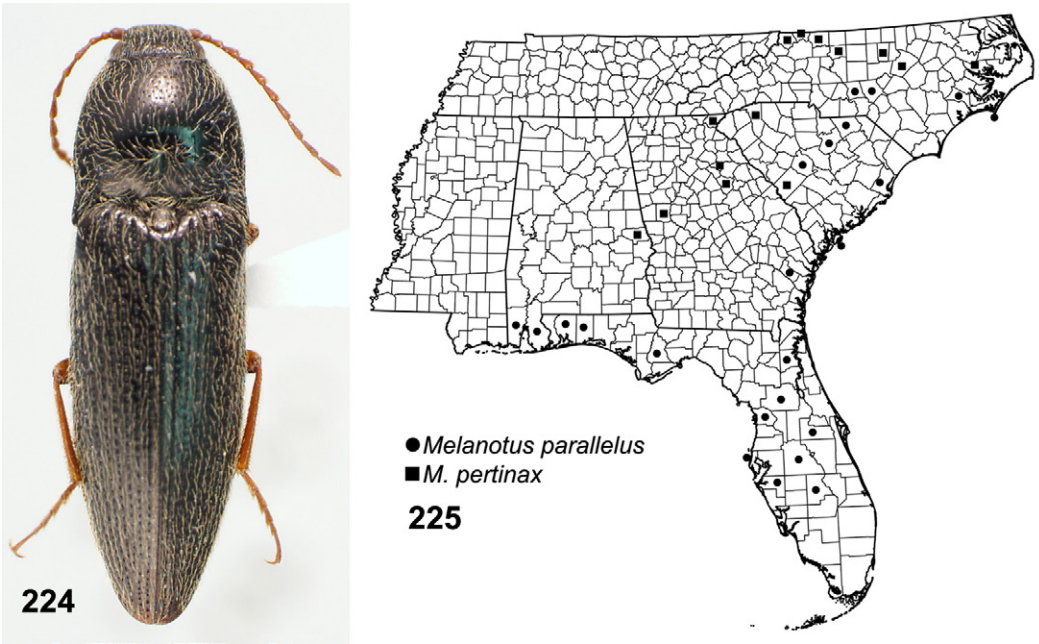
Figures 224–225

Elater pertinax Say, 1839: 185

Diagnosis. Size small to moderate, 9.0–11.0 mm in length. Color dark red-brown to black; appendages lighter red-brown; vestiture white, evenly distributed over body. Supra-antennal carinae narrow, not strongly protuberant over nasale; rounded when viewed from above. Parantennal fovea small and circular, but deep. Nasale flat, approximately twice as wide as long. Mandible with deep, teardrop-shaped pit. Antenna 11-segmented, serrate, extending beyond apex of pronotal hind angle by about one antennomere; antennomere II small, III intermediate between II and IV. Pronotum wider than long; side rounded, concave before hind angle; punctures on disc separated by greater than twice their diameter; hind angles divergent, single carina weak, not extending past base of hind angle. Aedeagus with median lobe broad, subparallel, tapering before apex to rounded apex; paramere without apical blade, broadly rounded to subacute apex, dense cluster of preapical setae. Female similar to male externally but usually larger and with antenna shorter, failing to reach apex of pronotal hind angle.

Distribution. Eastern United States, west to Wisconsin and Illinois (Quate and Thompson 1967). In the Southeast, previously recorded from Georgia, North Carolina, South Carolina, and Tennessee (LeConte 1853; Candèze 1860; Leng 1920; Brimley 1938; Fattig 1951; Quate and Thompson 1967; Downie and Arnett 1996; Buck et al. 2005). The following records from Alabama represent a **New State Record**.

Specimens Examined. Alabama (Lee); **Georgia** (Clarke, Green, Meriwether, Rabun); **North Carolina** (Alleghany, Ashe, Beaufort, Forsyth, Orange, Surry, Wake); **South Carolina** (Aiken, Greenville). April–August. (Figure 225)



Figures 224–225. *Melanotus* sp. **224)** *M. pertinax* (habitus). **225)** Distributional data for *M. parallelus* and *M. pertinax*.

Discussion. The very dark color with paler appendages and pronotum with sparse punctures should readily identify this species. The only other species that can sometimes have a similar color is *M. ignobilis*. The latter species had a smaller antennomere III, denser pronotal punctures, and lacks a mandibular pit. Specimens in the study area have been collected at ultraviolet light, in Lindgren funnel traps, and by beating vegetation.

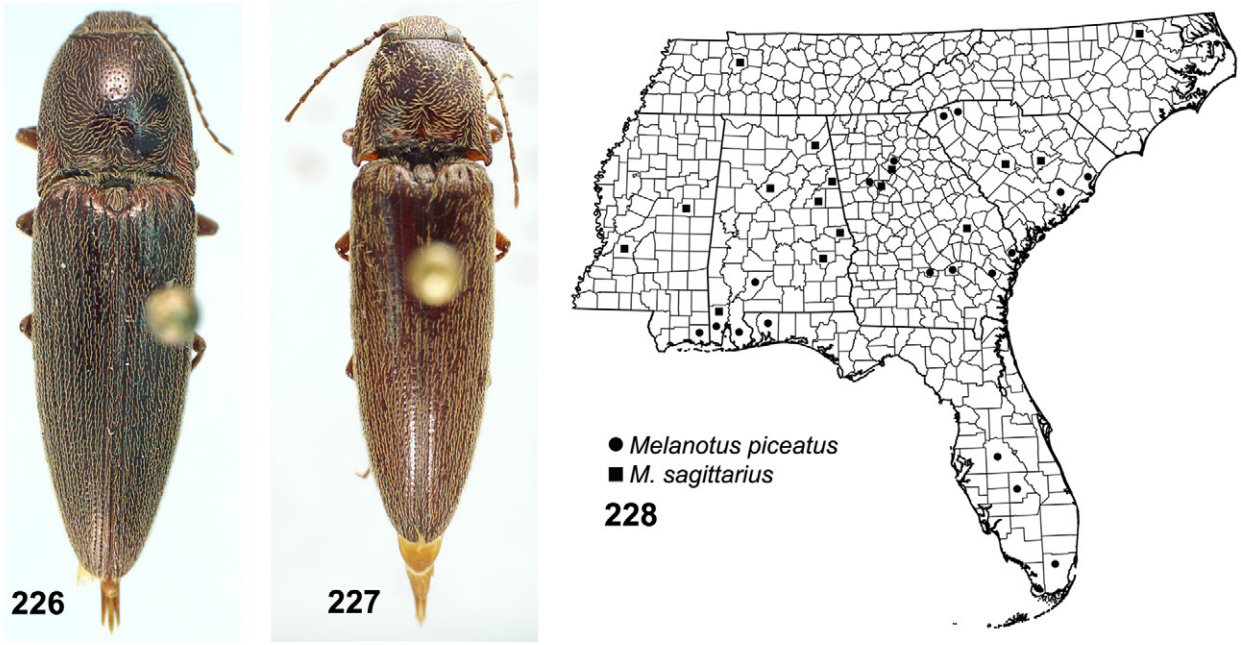
Melanotus piceatus Blatchley, 1927

Figures 226, 228

Melanotus piceatus Blatchley, 1927: 141

Diagnosis. Size moderate, 11.0–12.0 mm in length. Color dark red-brown to black; vestiture yellowish, spare, evenly distributed over body. Supra-antennal carinae variable, from thick and barely protruding over nasale to thin and jutting out a little longer than own width, rounded or flattened and angulate when viewed from above. Parantennal fovea small, shallow, arched. Nasale flat, width 1.5× height. Mandible with slit-like or teardrop-shaped pit. Antenna 11-segmented, serrate, falling short of apex of pronotal hind angle by a length approximate to antennomere XI; antennomere II short; III longer, nearly as long as IV. Pronotum wider than long; side gently curved over anterior third to half, subparallel or convergent posteriorly with small concavity before hind angle; punctures on disc separated by their diameter to twice their diameter; hind angles slightly divergent, single carina usually extending just past base of angle. Aedeagus with median lobe broad, evenly tapering in apical third to subacute apex; paramere narrow, without apical blade, subparallel to acute apex, small cluster or long preapical setae. Female similar to male externally but with shorter antennae.

Distribution. Southeastern United States (Quate and Thompson 1967). Previously recorded from all seven states in the study area (Fattig 1951; Quate and Thompson 1967; Peck and Thomas 1998; Lago et al. 2002; Klepzig et al. 2012). The type locality is Dunedin in Pinellas County, FL.



Figures 226–228. *Melanotus* spp. **226)** *M. piceatus* (habitus). **227)** *M. sagittarius* (habitus). **228)** Distributional data for *M. piceatus* and *M. sagittarius*.

Specimens Examined. Alabama (Baldwin, Mobile, Monroe); **Florida** (Highlands, Miami-Dade, Polk, Santa Rosa); **Georgia** (Ben Hill, Chatham, Fulton, Gwinnett, Jeff Davis, Long); **Mississippi** (Jackson); **South Carolina** (Berkeley, Georgetown, Greenville, Pickens). April–June. (Figure 228)

Discussion. This species resembles *M. depressus* in both the form of the pronotum and aedeagus but is usually recognized by its relatively short antennae in both sexes. The paramere is similar to that of *depressus* but generally more slender and parallel-sided. Quate and Thompson (1967) suggested it is of Neotropical ancestry and does not appear to have any close relatives in the United States. Specimens in the study area were collected at light.

Melanotus prasinus Blatchley, 1910

Figures 229–230

Melanotus prasinus Blatchley, 1910: 752

Diagnosis. Size small to moderate, 8.0–10.0 mm in length. Color red-brown; vestiture white, evenly distributed over body. Supra-antennal carinae thin, often strongly protruding over nasale and turned up in front. Parantennal fovea small, but well-defined, arched. Nasale poorly developed, 1.5–2.0× wide as high. Mandible with deep slit-like or teardrop-shaped pit. Antenna 11-segmented, serrate, extending beyond apex of pronotal hind angle by 1–2 antennomeres; antennomere II small; III subequal between II and IV. Pronotum wider than long, gently rounded on anterior half, divergent posteriorly with concavity at base of hind angle; punctures on disc usually separated usually by twice their diameter; hind angles divergent; single carina weak, extending slightly beyond base of angle. Aedeagus (Figure 230) with median lobe long, subparallel, tapering subapically to subacute apex; paramere shorter, subparallel, without apical blade, evenly rounded to subacute apex, dense cluster of moderately long preapical setae. Female similar to male externally to male but slightly larger.

Distribution. Northeastern United States, south to North Carolina and west to Illinois and Missouri (Quate and Thompson 1967). In the Southeast, only recorded from North Carolina and Tennessee (Quate and Thompson 1967; Downie and Arnett 1996).

Specimens Examined. None.

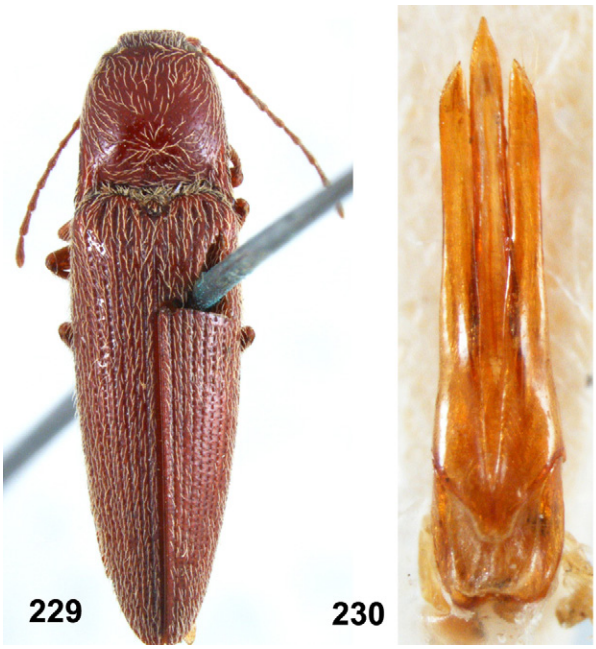
Discussion. Quate and Thompson (1967) had a rather small sample set to work with during their revision of North American *Melanotus* and were not familiar with the extent of variation and geographic distribution of this species. They described it as being most similar to *M. depressus*.

Melanotus sagittarius (LeConte, 1853)

Figures 227–228

Cratonychus sagittarius LeConte, 1853: 480
Melanotus carinus Blatchley, 1910: 752

Diagnosis. Size moderate, 13.0–15.0 mm in length. Color red-brown to dark red-brown, nearly black; vestiture yellowish, evenly distributed over body. Supra-antennal carinae not strongly protruding over nasale; angulate with blunt apex when viewed from above. Parantennal fovea large and deep, nearly as long as antennomere II.



Figures 229–230. *Melanotus prasinus*. **229)** Habitus – HOLOTYPE. **230)** Aedeagus – HOLOTYPE. Photos courtesy Kyle Schnepp (Florida State Collection of Arthropods, FDACS-DPI, Gainesville, FL, USA).

Nasale protuberant, slightly wider than high. Mandible with deep, teardrop-shaped pit. Antenna 11-segmented, serrate, extending beyond apex of pronotal hind angle by 2.0–2.5 antennomeres; antennomere II small; III intermediate between II and IV; erect male hairs long and dense. Pronotum wider than long, nearly straight past small anterior curvature, sometimes with slight concavity at base of hind angle; punctures on disc separated by approximately their own diameter; hind angles divergent. Aedeagus with median lobe subparallel, tapering subapically to subacute apex; paramere slender with narrow apical blade, blade evenly tapering to acute apex, long setae along entire length of blade. Female similar to male externally but slightly larger and with shorter antenna, extending beyond apex of pronotal hind angle by 1.0–1.5 antennomeres.

Distribution. Eastern United States, west to Illinois (Quate and Thompson 1967). In the Southeast, previously recorded from Florida, Mississippi, North Carolina, and Tennessee (Brimley 1938; Quate and Thompson 1967; Downie and Arnett 1996; Peck and Thomas 1998; Ferro et al. 2012c). The following records from Alabama and Georgia represent **New State Records**.

Specimens Examined. Alabama (Bullock, Clay, Cleburne, DeKalb, Jefferson, Lee, Mobile); **Georgia** (Clayton, Emanuel, Gwinnett); **Mississippi** (Hinds, Winston); **North Carolina** (Halifax); **South Carolina** (Lexington, Sumter); **Tennessee** (Humphreys). April–July. (Figure 228)

Discussion. This is one of the larger species bearing a mandibular pit. In addition to its size, the large parantennal fovea, shape of pronotum, relative sizes of antennomeres II–IV, and aedeagus should aid in its identification. Externally, this species is most similar to *H. hyslopi*, and examination of the aedeagus is the best way to separate the two. Specimens in the study area have been collected at ultraviolet and mercury vapor light and in Lindgren funnel traps.

Melanotus similis (Kirby, 1837)

Figures 180–181, 231

Perimecus similis Kirby, 1837: 149
Elater fissilis Say, 1839: 183
Cratonychus laticollis Erichson, 1842: 102
Ctenonychus ochraceipennis Melsheimer, 1846: 259
Ctenonychus sphenoidalis Melsheimer, 1846: 150
Cratonychus exuberans LeConte, 1853: 477

Diagnosis. Size moderate, 10.0–15.0 mm in length. Color red-brown to dark red-brown, nearly black; vestiture yellowish, evenly distributed over body. Supra-antennal carinae slightly protruding over nasale. Parantennal fovea shallow. Nasale wider than high. Mandible without pit. Antenna 11-segmented, serrate, extending beyond apex of pronotal hind angle by two antennomeres; antennomere II short; III subequal between II and IV; IV triangular. Pronotum expanded, wider than long, side rounded with concavity at base of hind angle; punctures on disc coarse, separated by less than their diameter; hind angles divergent, usually with two carinae. Aedeagus variable; median lobe may be constricted mid-way (Figure 181) to subparallel (Figure 180), tapering subapically to rounded or subacute apex; paramere with well-defined apical blade; blade usually with eight setae running along its entire length. Female externally similar to male but larger and antenna shorter, usually just reaching apex of pronotal hind angle.

Distribution. Eastern United States and adjacent Canada, west to Montana, Utah, Arizona and southwest into southern California (Quate and Thompson 1967). Recorded from all seven states in the study area (Leng 1920; Hepting 1935; Brimley 1938; Löding 1945; Fattig 1951; Frost 1964; Quate and Thompson 1967; Richmond 1968; Kirk 1969, 1970; Downie and Arnett 1996; Peck and Thomas 1998).

Specimens Examined. Alabama (Baldwin, Blount, Bullock, DeKalb, Jackson, Jefferson, Lauderdale, Lawrence, Lee, Macon, Madison, Marion, Mobile, Talladega, Walker, Washington); **Florida** (Alachua, Baker, Brevard, Broward, Charlotte, Clay, Franklin, Hernando, Highlands, Hillsborough, Leon, Levy, Liberty, Marion, Miami-Dade, Monroe, Orange, Palm Beach, Pinellas, Polk, Sarasota, Seminole, Suwannee, Wakulla, Washington); **Georgia** (Ben Hill, Brantley, Camden, Cherokee, Clarke, Clayton, Coffee, Colquitt, Cook, DeKalb, Fayette, Floyd, Fulton, Grady, Gwinnett, Jeff Davis, Liberty, Long, Madison, McIntosh, Morgan,

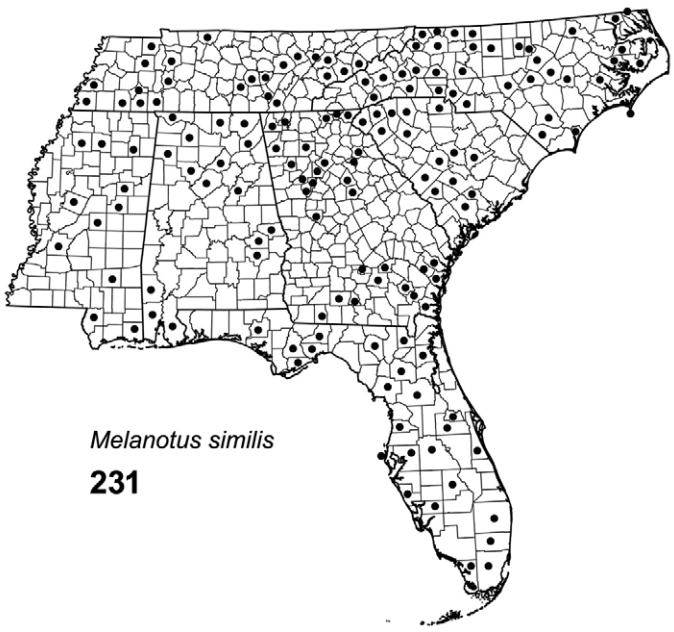


Figure 231. Distributional data for *Melanotus similis*.

Paulding, Pierce, Putnam, Rabun, Towns, Union, Upson, Walker, Whitfield); **Mississippi** (Hinds, Holmes, Jackson, Jones, Lafayette, Leake, Lee, Oktibbeha, Panola, Pearl River, Winston); **North Carolina** (Alleghany, Ashe, Beaufort, Bladen, Buncombe, Burke, Camden, Carteret, Catawba, Columbus, Craven, Durham, Forsyth, Gaston, Gates, Guilford, Halifax, Harnett, Haywood, Hyde, Johnston, New Hanover, McDowell, Mecklenburg, Moore, Orange, Rowan, Rutherford, Stokes, Surry, Transylvania, Union, Wake, Washington, Watauga, Wayne, Wilkes counties; also along the Blue Ridge Parkway, Blowing Rock State Park); **South Carolina** (Aiken, Anderson, Barnwell, Colleton, Dillon, Dorchester, Greenville, Laurens, Lexington, Oconee, Orangeburg, Pickens, Richland, Spartanburg, Sumter, York counties; also Ft. Iron); **Tennessee** (Anderson, Blount, Carroll, Chester, Cocke, Coffee, Cumberland, Hamilton, Hardeman, Hardin, Henry, Humphreys, Knox, McNairy, Morgan, Perry, Robertson, Sequatchie, Sevier, Shelby, Tipton, Van Buren, Warren). February–December. (Figure 231)

Discussion. *Melanotus similis* is variable throughout its range. Specimens in the East tend to have a wider pronotum and have an aedeagus with a longer apical blade on the paramere. There are also differences in the density of pronotal punctures, color (darkness), and width of median lobe. In some specimens, the median lobe is slender and subparallel, tapering suddenly subapically. This has caused misidentifications in collections as *M. communis*. In others, however, the median lobe is medially compressed, then widening before evenly tapering subapically towards a subacute apex. This species is most similar to *M. decumanus*, *M. spadix*, and *M. castanipes*. Important external characters that may be used to separate these genera include the form of the supra-antennal carinae, relative lengths of antennomeres II–IV, and shape of antennomere IV, however examination of the aedeagus is most reliable.

Specimens have been commonly collected throughout the study area. Specimens have been collected at ultraviolet and mercury vapor light, in Lindgren funnel, panel, Malaise, and flight intercept traps, under pecan and oak bark, and by sweeping vegetation. Fattig (1951) reported *M. similis* as a pest of black-eyed peas, bunch beans, and okra in Georgia.

Melanotus spadix (Erichson, 1842)

Figures 185, 232

Cratonychus spadix Erichson, 1842: 103
Melanotus abdominalis of authors, not Erichson, 1842
Melanotus decumanus of authors, not Erichson, 1842

Diagnosis. Size moderate to large, 14.0–17.0 mm in length. Color red-brown to dark red-brown; vestiture yellowish, evenly distributed over the body. Supra-antennal carinae not strongly protruding over nasale, evenly rounded when viewed from above. Parantennal fovea very shallow. Mandible without pit. Antenna 11-segmented, serrate, extending beyond apex of pronotal hind angle by about two antennomeres; antennomere II small; III intermediate between II and IV; IV slender, about twice as long as maximum width. Pronotum wider than long; side divergent and nearly straight approximately two-thirds distance from anterior margin, rather sharply angled before concavity at base of hind angle; punctures on disc separated by their own diameter; hind angles divergent with single strong carina. Aedeagus (Figure 185) with median lobe evenly tapering until just before apex, then tapering more to subacute apex; paramere with large, well-defined apical blade, dense cluster of 30–40 long setae running entire length of blade. Female similar to male externally but larger and with shorter antenna.

Distribution. Eastern United States, west to Nebraska and Arkansas (Quate and Thompson 1967). In the Southeast, previously recorded from Florida, Georgia, North Carolina, South Carolina, and Tennessee (Wray 1950; Quate and Thompson 1967; Downie and Arnett 1996; Peck and Thomas 1998; Vlach et al. 2010). The following records from Alabama and Mississippi represent **New State Records**.

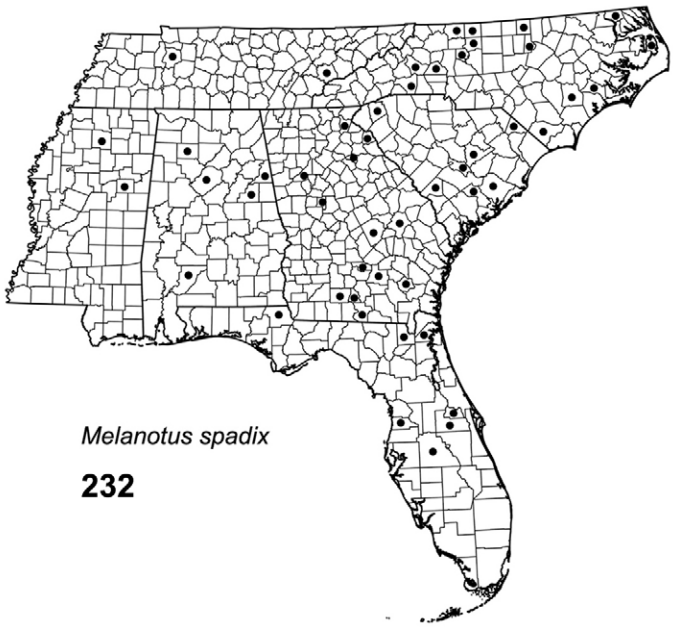


Figure 232. Distributional data for *Melanotus spadix*.

Specimens Examined. Alabama (Clay, Cleburne, Jefferson, Monroe, Winston); **Florida** (Baker, Duval, Hernando, Jackson, Orange, Polk, Seminole); **Georgia** (Ben Hill, Clarke, Coffee, Colquitt, Cook, Emanuel, Fulton, Habersham, Hart, Lamar, Laurens, Lowndes, Pierce); **Mississippi** (Lafayette, Oktibbeha); **North Carolina** (Burke, Catawba, Columbus, Dare, Davie, Duplin, Durham, Forsyth, Gates, Jones, Moore, Nash, Pender, Rutherford, Stokes, Surry); **South Carolina** (Barnwell, Berkeley, Calhoun, Dillon, Dorchester, Pickens, Sumter); **Tennessee** (Blount, Humphreys counties; also Great Smoky Mountains National Park). March–August. (Figure 232)

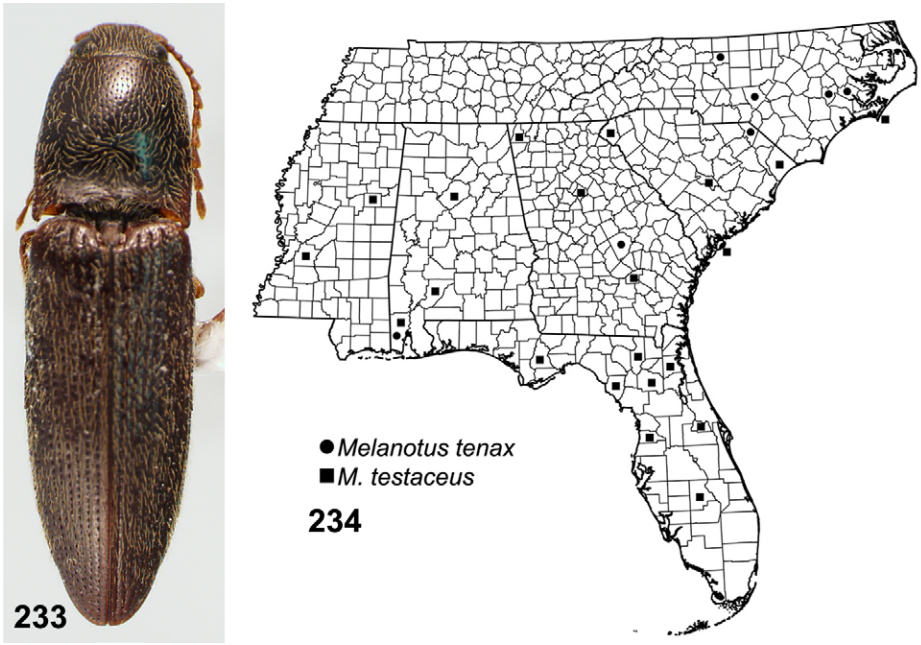
Discussion. This species is most similar to *M. similis* and *M. decumanus*. It's usually larger and paler than *M. similis*, and has a longer, more slender fourth antennomere. When in doubt, the aedeagus is most helpful. Externally, it can be separated from *M. decumanus* by usually being paler and having less strongly protruding supra-antennal carinae. In cases where *M. decumanus* has shorter supra-antennal carinae, the two species are best separated by characteristics of the aedeagus. The aedeagus of *M. spadix* is usually not confused with that of other species. Specimens in the study area have been collected at ultraviolet and mercury vapor light and in Lindgren funnel traps. Specimens from Duval County, FL (FSCA) were collected in Theysohn-Pheroprax® pheromone traps.

Melanotus tenax (Say, 1839)

Figures 233–234

Elater tenax Say, 1839: 185

Diagnosis. Size small, 8.0–9.0 mm in length. Body color red-brown to dark red-brown; vestiture white or yellow, evenly distributed over the body. Supra-antennal carinae not strongly protruding over nasale, thinner in center, evenly rounded or slightly flattened anteriorly when viewed from above. Parantennal fovea large, circular, well-defined. Nasale slightly raised, wider than high. Mandible with deep, teardrop-shaped pit. Antenna 11-segmented, serrate, extending beyond apex of pronotal hind angle by one-half antennomere; antennomere II small; III intermediate between II and IV; IV slender, about twice as long as maximum width. Pronotum as wide



Figures 233–234. *Melanotus* spp. **233)** *M. tenax* (habitus). **234)** Distributional data for *M. tenax* and *M. testaceus*.

as, or slightly wider than, long; side straight behind anterior curvature, subparallel; punctures on disc separated by their own diameter; hind angles slightly divergent, single carina usually extending past base of hind angle. Aedeagus with median lobe slender, irregularly tapering to rounded apex; paramere slender, evenly rounded to subacute apex, lacking apical blade, cluster of short subapical setae. Female similar to male but antenna shorter, not reaching apex of pronotal hind angle.

Distribution. Northeastern United States, south to Georgia and west to Illinois (Quate and Thompson 1967). In the Southeast, previously recorded from Alabama, Georgia, North Carolina, and South Carolina (Löding 1945; Fattig 1951; Quate and Thompson 1967; Kirk 1969; Downie and Arnett 1996).

Specimens Examined. Alabama (Mobile); **Georgia** (Laurens); **North Carolina** (Craven, Forsyth, Lenoir, Moore); **South Carolina** (Marlboro). April–June. (Figure 234)

Discussion. This species is most similar to *M. trapezoideus* and *M. americanus*. From *M. americanus* it is best separated by the larger parantennal fovea, flatter pronotum with larger punctures, and aedeagus. Externally it is best separated from *M. trapezoideus* by the characters of the nasale. The aedeagus is not often useful for separating *M. trapezoideus* and *M. tenax*. Specimens in the study area have been collected in flight intercept traps.

Melanotus testaceus (Melsheimer, 1846)

Figures 234–236

Cratonychus testaceus Melsheimer, 1846: 151
Cratonychus dubius LeConte, 1853: 479
Melanotus angustatus of authors, not Erichson, 1842

Diagnosis. Size small to moderate, 9.5–10.0 mm in length. Color red-brown; vestiture white, evenly distributed over the body. Supra-antennal carinae not strongly protuberant over nasale, evenly rounded or angulate and flattened when viewed from above. Parantennal fovea small, deep, and well-defined. Nasale protruding,



Figures 235–236. *Melanotus testaceus*. **235)** Habitus. **236)** Aedeagus.

slightly wider than high. Mandible with deep, oval pit. Antenna 11-segmented, serrate, extending beyond apex of pronotal hind angle by 1.0–1.5 antennomeres; antennomere II small; III intermediate between II and IV. Pronotum as wide as long; side nearly straight behind anterior curvature, slight concavity at base of hind angle; punctures on disc usually separated by their diameter to twice their diameter; hind angles divergent, single carina extending beyond base of angle. Aedeagus (Figure 236) with median lobe broad, subparallel, tapering subapically to rounded apex; paramere wide basally, suddenly tapering before becoming subparallel, narrowing subapically to subacute apex, apical blades absent, small cluster of preapical setae. Female externally similar to male.

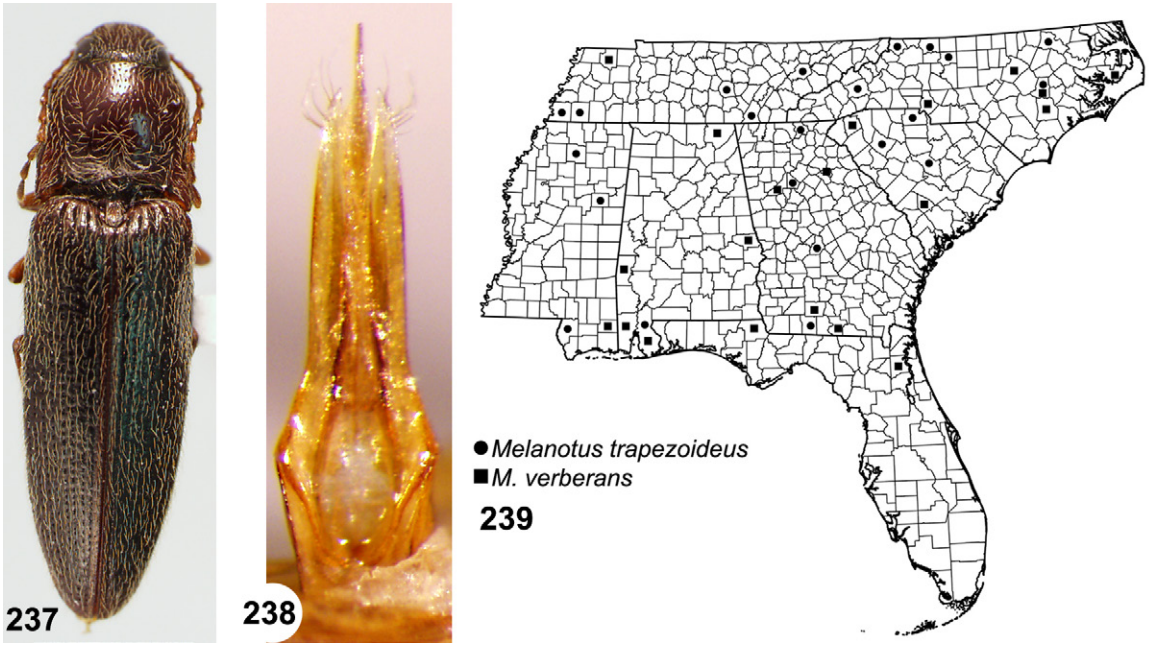
Distribution. Eastern United States, west to Missouri and Texas (Quate and Thompson 1967). In the Southeast, previously recorded from Florida, Georgia, and North Carolina (Leng 1920; Fattig 1951; Quate and Thompson 1967; Downie and Arnett 1996). The following records from Alabama, Mississippi, and South Carolina represent **New State Records**.

Specimens Examined. Alabama (Jefferson, Mobile, Monroe); **Florida** (Alachua, Clay, Columbia, Dixie, Hernando, Highlands); **Georgia** (Jeff Davis, Newton, Walker); **Mississippi** (Hinds, Oktibbeha); **North Carolina** (Carteret); **South Carolina** (Beaufort, Calhoun, Horry, Oconee). March–July. (Figure 234)

Discussion. Externally, this species may be confused with *M. trapezoideus* or *M. americanus* and examination of the aedeagus is recommended to confirm its identification. The paramere is similar to that of *M. morosus* but are shorter and broader basally, suddenly tapering before becoming subparallel apically. Specimens in the study have been collected at ultraviolet and mercury vapor light, in Lindgren funnel, flight intercept, and Malaise traps, and in association with scrub pine.

Melanotus trapezoideus (LeConte, 1853)

Figures 237–239



Figures 237–239. *Melanotus* spp. **237)** *M. trapezoideus* (habitus). **238)** *M. trapezoideus* (aedeagus). **239)** Distributional data for *M. trapezoideus* and *M. verberans*.

Cratonychus trapezoideus LeConte, 1853: 475

Diagnosis. Size small, 8.0–9.0 mm in length. Color red-brown to dark red-brown; vestiture white or yellowish, evenly distributed over the body. Supra-antennal carinae thinner in center, weakly protruding over nasale, flattened and angulate when viewed from above. Nasale raised, as high as wide. Parantennal fovea well-defined, circular or semicircular. Antenna 11-segmented, serrate, extending beyond apex of pronotal hind angle by 1.0–1.5 antennomeres; antennomere II small; III intermediate between II and IV. Pronotum wider than long, straight behind anterior curvature; punctures on disc separated by their own diameter or slightly more; hind angles divergent, single carina extending beyond base of hind angle. Aedeagus (Figure 238) as in *M. tenax*. Female similar to male externally but with shorter antenna, exceeding apex of pronotal hind angle by about one-half antennomere.

Distribution. Northeastern United States and adjacent Canada, south to North Carolina and west to Minnesota, Illinois, and Arkansas (Quate and Thompson 1967). In the Southeast, previously recorded from Georgia, Mississippi, North Carolina, and Tennessee (Brimley 1938; Fattig 1951; Quate and Thompson 1967; Downie and Arnett 1996; Chatzimanolis et al. 2020). The following records from Alabama and South Carolina represent **New State Records**, although Löding's (1945) record of *M. depressus* from Baldwin County, AL refers to this species.

Specimens Examined. Alabama (Baldwin); **Georgia** (DeKalb, Houston, Thomas, Union); **Mississippi** (Lafayette, Oktibbeha, Pearl River); **North Carolina** (Ashe, Buncombe, Cleveland, Forsyth, Halifax, Surry, Wayne counties; also, Council); **South Carolina** (Laurens, Richland, York); **Tennessee** (Fayette, Hamilton, Knox, Shelby, Warren). March–August. (Figure 239)

Discussion. This species is most similar to *M. americanus* and *M. tenax*. From *M. americanus* it can be separated by the shape of pronotum and size and density of pronotal punctures, and the aedeagus. The aedeagus of *M. trapezoideus* is very similar to that of *M. tenax* and the two species are best separated externally by the

characteristics of the nasale and shape of pronotum. Specimens in the study area have been collected at ultraviolet light, in Lindgren funnel and vane traps, and by sweeping and beating vegetation.

Melanotus verberans (LeConte, 1853)

Figures 184, 239

Cratonychus verberans LeConte, 1853: 478

Diagnosis. Externally the same as *M. communis* although generally lighter in color and smaller, 9.0–12.0 mm in length. Differences occur in the aedeagus (Figure 184); median lobe subparallel, tapering subapically to subacute apex; paramere with large apical blade; small cluster of setae (usually only two) at base of blade. Female externally similar to male.

Distribution. Eastern United States, west to South Dakota and Texas (Quate and Thompson 1967). In the Southeast, previously recorded from Alabama, Florida, Georgia, Mississippi, North Carolina, and South Carolina (Löding 1945; Quate and Thompson 1967; Kirk 1969; Morrill 1978; Downie and Arnett 1996; Peck and Thomas, 1998). The following record from Tennessee represents a **New State Record**.

Specimens Examined. Alabama (Baldwin, Choctaw, Jackson, Lee, Mobile); **Florida** (Clay, Jackson); **Georgia** (Clarke, Colquitt, Fulton, Lowndes); **Mississippi** (George); **North Carolina** (Duplin, Hyde, Mecklenburg, Wake, Wayne); **South Carolina** (Bamberg, Pickens); **Tennessee** (Sevier, Weakley). March–July, October–December. (Figure 239)

Discussion. This species externally looks like a smaller version of *M. communis*. The aedeagus should be examined to confirm the identity. Specimens in the study area have been collected at ultraviolet light and in Lindgren funnel and pitfall traps. Specimens from Bamberg County, SC (NCSU) were collected in moss.

Physorhinini Candèze, 1859

The tribe Physorhinini contains two genera in the United States, both of which are present in the Southeast (Johnson 2002). Johnson (2002) considered this tribe a subtribe of Ampedini. Morphologic differences separating the genera are not completely understood and one or both may not be monophyletic (Schaaf 1970). The supra-antennal carinae are complete, usually protruding anteriorly. Antenna 11-segmented, antennomeres III and beyond serrate. Prosternum usually arcuate anteriorly. Elevated margin on the hypomeron at the pronotosternal sutures, open anteriorly. Scutellum usually shield-shaped, never deeply incised anteriorly. Mesocoxa open to both mesepimeron and mesepisternum. Meso- and metasternum not fused, joined by a definite suture. Tarsomere III lobed; claws simple or with basal tooth, but never serrate, without basal setae.

Anchastus LeConte, 1853

Anchastus LeConte, 1853: 459
Brachycepis LeConte, 1853: 460
Crepidotritus LeConte, 1861: 167
Elatrinus Horn, 1871: 307

Diagnosis. *Anchastus* as presently delineated is difficult to define. Size variable, small to moderate. Color variable; some unicolorous, from pale yellow brown to dark brown, nearly black; others bicolored or with maculae. Antenna 11-segmented, serrate; antennomere II small, connected to antennomere I on its distal end; III and IV variable in length and in relation to each other. Pronotum subquadrate to longer than wide; distinctly punctate, punctures variable, usually shallow, umbilicate and dense; hind angle with one or two carinae. Pronotosternal

sutures narrow, margins evenly separated throughout length. Metacoxal plate subquadrate and angulate over trochanter. Elytron elongate. Metathoracic wings functional for flight. Tarsomere III distinctly lobed; claw simple or with basal tooth, never serrate, without basal setae.

Range and Numbers. There are 17 species recorded from North America (Johnson 2002), distributed in the eastern and southern states and along the West Coast. Six species have been previously recorded from the Southeast, with two additional species added here.

Discussion. On a worldwide basis *Anchastus* is difficult to define and separate from *Physorhinus*, and the genus is probably not currently monophyletic (Schaaf 1970). In North America at least, the two genera are easily separated due to the distinct color of species of *Physorhinus*, which are all solid brown with a yellow to orange macula on the frons. There have been no formal revisions of *Anchastus* in North America and the last key to the genus as a whole was by Van Dyke (1932). In most species, the aedeagus has not been critically evaluated nor illustrated. Adults can be collected by a variety of methods, most commonly at ultraviolet light at night.

Key to the species of *Anchastus* in the Southeast
(adapted from Van Dyke 1932)

1. Bicolored dorsally, at least on elytron or pronotum **2**
— Unicolored dorsally (faint dusky areas on pronotum may be present but no defined, contrasting colors) **3**

2(1). Pronotum black; elytron black with two orange-red maculae, one humeral and one subapical . . . . . ***A. binus* (Say)**
— Pronotum yellow along lateral and basal margins and on hind angle, dusky black on disc covering much of center and touching anterior margin medially; elytron black with small yellow humeral macula . . . . . ***A. signaticollis* (Germar)**

3(1). Antennomere III longer than II, subequal to IV **4**
— Antennomere III smaller, subequal to II or at least much closer to II than IV **7**

4(3). Pronotal hind angle unicarinate . . . . . ***A. rufiventris* Candèze**
— Pronotal hind angles bicarinate **5**

5(4). Pronotum longer than wide; metacoxal plate suddenly dilated inwardly . . ***A. bicarinatus* (LeConte)**
— Pronotum wider than long; metacoxal plate gradually dilated inwardly **6**

6(5). Size larger, 9.0–11.0 mm in length . . . . . ***A. rufus* Candèze**
— Size smaller, 5.5–6.0 mm in length . . . . . ***A. splendidus* Knull**

7(3). Antenna longer, in male exceeding apex of pronotal hind angle by more than 3 antennomeres; outer carina of hind angle longer than inner . . . . . ***A. fumicollis* Fall**
— Antenna shorter, in male just reaching apex of pronotal hind angle or exceeding by 1–2 antennomeres; outer carina of hind angle subequal to (and sometimes weaker than) inner . . . . . ***A. longulus* LeConte**

Anchastus bicarinatus (LeConte, 1853)

Figures 244, 249

Brachycepis bicarinatus LeConte, 1853: 461

Diagnosis. Size small, length 8.0–9.0 mm. Color red-brown to dark red-brown. Vestiture yellow, suberect on pronotum, evenly distributed over the body. Antenna 11-segmented, serrate, extending beyond apex of pronotal hind angle by up to two antennomeres; antennomere II small; III subequal to IV. Pronotum longer than wide;

punctures on disc slightly umbilicate, becoming shallower and more umbilicate laterally; hind angle distinctly bicarinate. Metacoxal plate suddenly dilated inwardly. Aedeagus undescribed.

Distribution. Previously recorded from Alabama, Florida, Georgia, and North Carolina (LeConte 1853; Candèze 1859; Leng 1910, 1920; Van Dyke 1932; Löding 1945; Wray 1950; Fattig 1951; Peck and Thomas 1998). The type locality is Georgia (not further restricted). Löding's (1945) records from Alabama are based on misidentifications (see below). The following records from South Carolina represent a **New State Record**.

Specimens Examined. Florida (Miami-Dade, Monroe); **Georgia** (Long); **North Carolina** (Carteret, Cumberland, Wake); **South Carolina** (Dorchester, Florence, Kershaw). May–September. (Figure 249)

Discussion. In the study area, *A. bicarinatus* most closely resembles *A. rufus*. The two can be separated by the shape of the metacoxal plate and the shape of the pronotum. I have examined the specimens (GSAT) that were the bases of Löding's (1945) records from Mobile County, AL and have identified them as females of *A. fumicollis*. Specimens in the study area have been collected at ultraviolet light.

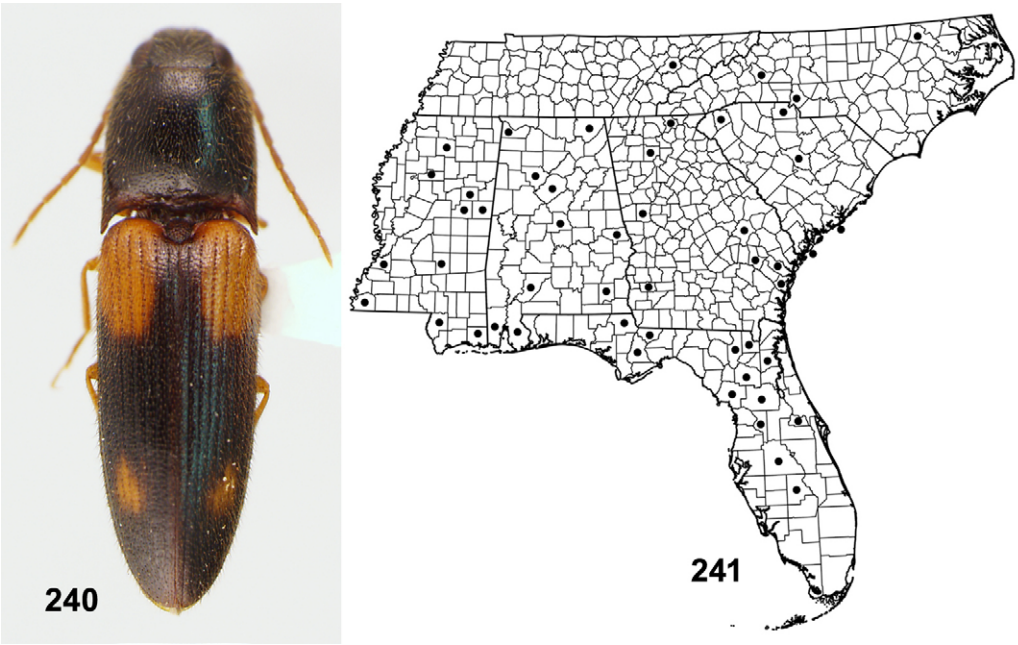
Anchastus binus (Say, 1839)

Figures 240–241

Elater binus Say, 1839: 178

Diagnosis. Size small, length 8.0 mm. Body color black; elytron with two orange to red maculae, one humeral and one subapical; antennae and legs rufous; vestiture yellowish, short, decumbent, evenly distributed over body. Antenna 11-segmented, serrate, extending beyond apex of pronotal hind angle by 1–2 antennomeres; antennomere II small; III subequal to IV. Pronotum about as wide as long; punctures on disc separated by a distance approximately equal to their diameter, umbilicate, becoming denser near hind angles; hind angle unicarinate. Metacoxal plate gradually dilated inwardly. Aedeagus undescribed.

Distribution. Southeastern United States, north to Indiana (Peck and Thomas 1998). In the Southeast, previously recorded from Alabama, Florida, Georgia, and South Carolina (LeConte 1853; Leng 1920; Van Dyke



Figures 240–241. *Anchastus binus.* **240)** Habitus. **241)** Distributional data.

1932; Löding 1945; Fattig 1951; Kirk 1969, 1970; Frost 1975; Downie and Arnett 1996; Peck and Thomas 1998). The following records from Mississippi, North Carolina, and Tennessee represent **New State Records**.

Specimens Examined. Alabama (Baldwin, Chilton, Colbert, Dale, Jackson, Jefferson, Lee, Mobile, Monroe, Walker); **Florida** (Alachua, Baker, Clay, Columbia, Gadsden, Highlands, Jackson, Levy, Liberty, Marion, Polk, Seminole, Sumter); **Georgia** (Calhoun, Cherokee, Emanuel, Liberty, McIntosh, Meriwether, Tattnall, Union); **Mississippi** (Claiborne, Grenada, Jackson, Lafayette, Noxubee, Oktibbeha, Pearl River, Smith, Wilkinson, Winston); **North Carolina** (Burke, Halifax, Mecklenburg); **South Carolina** (Beaufort, Charleston, Pickens, Richland, York); **Tennessee** (Knox). March–September. (Figure 241)

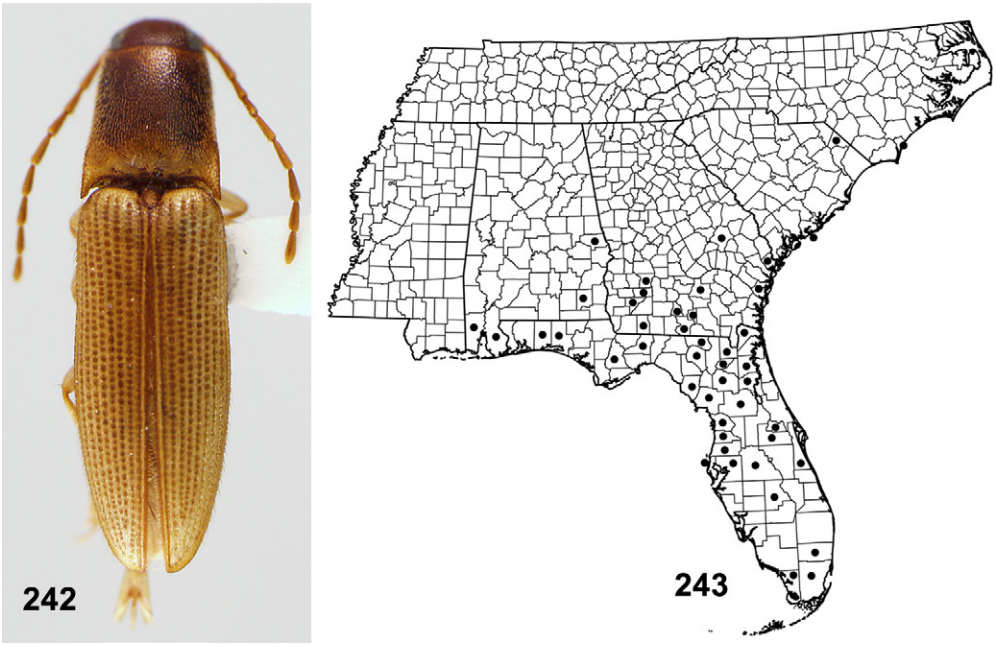
Discussion. The color alone should make this species easily recognizable. The other species in the study area with a similar color pattern are the two species of *Idolus*, which tend to be smaller and lack a membranous pad on tarsomere III. The subapical macula on the elytron varies in size, sometimes quite small, but the humeral macula is always large and distinct. Specimens in the study area were collected at ultraviolet and mercury vapor light and by sweeping vegetation.

Anchastus fumicollis Fall, 1934

Figures 242–243

Anchastus fumicollis Fall, 1934: 17

Diagnosis. Size small, 5.9–7.3 mm in length. Color pale yellow-brown; pronotum usually with two large, dusky, poorly defined maculae; vestiture yellowish, short, decumbent, evenly distributed over the body. Antenna 11-segmented, serrate, extending beyond apex of pronotal hind angle by more than three antennomeres; antennomeres II and III subequal. Pronotum longer than wide; punctures close, moderately shallow, umbilicate, nearly contiguous laterally and on hind angle; hind angle distinctly bicarinate, outer carina longer than inner. Metacoxal plate suddenly dilated inwardly. Aedeagus undescribed. Female similar to male externally, but more robust and often a slightly darker red-brown; antenna shorter, usually just reaching or extending beyond apex of pronotal hind angle by 1–2 antennomeres.



Figures 242–243. *Anchastus fumicollis*. **242)** Habitus. **243)** Distributional data.

Distribution. Previously recorded only from Florida (Fall 1934; Frost 1964; Peck and Thomas 1998). The type locality is Royal Palm Park, Florida (for which there appears to be more than one in different counties). The following records from Alabama, Georgia, North Carolina, and South Carolina represent **New State Records**, although Löding's (1945) records of *Physorhinus* sp. and *A. bicarinatus* from Alabama refer to this species.

Specimens Examined. Alabama (Baldwin, Dale, Lee, Mobile); **Florida** (Alachua, Baker, Brevard, Broward, Citrus, Clay, Dixie, Hamilton, Hernando, Highlands, Hillsborough, Leon, Levy, Liberty, Marion, Miami-Dade, Monroe, Nassau, Okaloosa, Orange, Pascoe, Pinellas, Polk, Putnam, Seminole, Suwannee, Union, Walton); **Georgia** (Baker, Chatham, Coffee, Cook, Emanuel, Grady, Lanier, Lee, Lowndes, McIntosh); **North Carolina** (New Hanover); **South Carolina** (Charleston, Dillon). January–July. (Figure 243)

Discussion. This species is relatively easily recognized in the study area by its size, color, long antennae, and subequal second and third antennomeres. The female has not been formally described; the above observations are based on the examination of several specimens from Florida and southern Georgia. Females of *A. fumicollis* resemble specimens of *A. longulus* but differ in the length of the outer carina on the pronotal hind angle (outer carina longer than the inner in *fumicollis* and subequal to the inner in *longulus*). Peck and Thomas (1998) considered this species a Florida endemic, but it clearly appears to be more widely distributed in the Southern Coastal Plains and Southeastern Plains than previously thought. In addition to the above-mentioned records, I have also seen specimens from Louisiana (MEM) and Texas (BAM). *Anchastus fumicollis* has been collected by a variety of methods. Most specimens were collected at ultraviolet or mercury vapor light, but they have also been collected in flight intercept, wine, sugar bait, and Malaise traps, by sweeping and beating vegetation, and Berlese extraction of oak leaf litter. I have seen specimens from Clay (BAM) and Putnam (KES) counties, FL from the nest of the eastern fox squirrel. Specimens from Highlands County, FL (ABS) were collected in the flowers of the scrub pawpaw.

Anchastus longulus LeConte, 1878

Figures 245, 252

Anchastus longulus LeConte, 1878: 404

Diagnosis. Size moderate, length 9.0–11.0 mm. Color red-brown to brown; vestiture yellowish, decumbent, evenly distributed over the body. Antenna 11-segmented, serrate, extending beyond apex of pronotal hind angle by no more than one antennomere; antennomere II small; III small, only slightly longer than II and clearly shorter than IV. Pronotum longer than wide; punctures on disc very close, shallow, umbilicate, nearly contiguous laterally and at hind angles; hind angle bicarinate with outer carina as long as (and sometimes weaker than) inner carina. Metacoxal plate gradually but sharply dilated inwardly. Aedeagus undescribed. Females similar to males externally.

Distribution. Southeastern United States (Fall 1934). In the Southeast, previously recorded Florida, Georgia, and South Carolina (Leng 1920; Fall 1934; Fattig 1951; Kirk 1969). The type locality is Enterprise along the Upper St. John's River in Volusia County, FL. Southeastern records for *A. digitatus* most certainly pertain to this species (see Discussion, below). The following records from Alabama, Mississippi, North Carolina, and Tennessee represent **New State Records**.

Specimens Examined. Alabama (Baldwin, Chambers, Dale, DeKalb, Jefferson, Mobile); **Florida** (Alachua, Baker, Clay, Franklin, Hernando, Highlands, Indian River, Levy, Liberty, Monroe, Orange, Seminole, Sumter); **Georgia** (Cook, Jeff Davis, McIntosh); **Mississippi** (Clay, Jackson, Oktibbeha); **North Carolina** (Bladen, Carteret, Forsyth); **South Carolina** (Dorchester, Sumter) **Tennessee** (Coffee, Rutherford). February–August. (Figure 252)

Discussion. In the study area, this species is most similar to *A. fumicollis*, from which it can usually be separated by having shorter antennae and a shorter outer carina on the pronotal hind angle. Previous records of *A.*



Figures 244–246. *Anchastus* spp. **244)** *A. bicarinatus* (habitus). **245)** *A. longulus* (habitus). **246)** *A. rufiventris* (habitus).

digitatus from Alabama (Löding 1945), Florida (Downie and Arnett 1996; Peck and Thomas 1998), Georgia (Peck and Thomas 1998), and South Carolina (Kirk 1970) most certainly pertain to this species. For years, *A. longulus* has been catalogued as a synonym of *A. digitatus*, despite Fall's (1934) declaration that it should not be. Examination of Löding's (1945) records of *A. digitatus* from Mobile, AL demonstrated this to be the case. Until a formal revision (including critical evaluation of aedeagi) is done, the true relationship between these two species will remain unknown. Specimens in the study area were collected at ultraviolet or mercury vapor light, under rocks, and in Malaise and Lindgren funnel traps. Specimens from Dale County, AL were collected in a Malaise trap set in a cypress bog.

Anchastus rufiventris Candèze, 1859

Figures 246, 249

Anchastus rufiventris Candèze, 1859: 401

Diagnosis. Size small, 7.0–8.0 mm in length. Color dark red-brown to black dorsally, venter and appendages paler red-brown; vestiture yellow, short, evenly distributed over the body. Antenna 11-segmented, serrate, extending beyond apex of pronotal hind angle by approximately one antennomere; antennomere II small; III subequal to IV. Pronotum about as wide as long; punctures dense, moderately shallow, umbilicate; hind angle subparallel, distinctly unicarinate, carina strong. Metacoxal plate narrow, broadly widening inwardly. Aedeagus with median lobe narrowed medially, widening subapically, then tapering to subacute apex; paramere with sharp, triangular apical blade. Female not observed.

Distribution. Cuban endemic (Peck 2005). Previously not recorded from the United States. The following records from Florida represent a **New Country Record**.

Specimens Examined. Florida (Miami-Dade, Monroe, Palm Beach). April–June. (Figure 249)

Discussion. Although this species' occurrence in Florida was previously known (Hume Douglas pers. comm. 2013), it has never been formerly recorded from the U.S. In Van Dyke (1932), this species will key to *A. ventralis* Van Dyke, a species known from southern Arizona. In the study area, this species should be recognized by its small size, solid dark color dorsally, shorter antenna, and distinctly unicarinate pronotal hind angle. Specimens have been collected at ultraviolet light.

Anchastus rufus Candèze, 1859

Figures 250, 252

Anchastus rufus Candèze, 1859: 404

Diagnosis. Size moderate, 9.0–11.0 mm in length. Unicolorous, red-brown; vestiture yellow, short, evenly distributed over the body. Antenna 11-segmented, serrate, extending beyond apex of pronotal hind angle by 1–2 antennomeres; antennomere II small; III long, subequal to IV. Pronotum wider than long; punctures dense, moderately shallow and umbilicate; hind angle subparallel, distinctly bicarinate. Metacoxal plate gradually dilated inwardly. Aedeagus not observed.

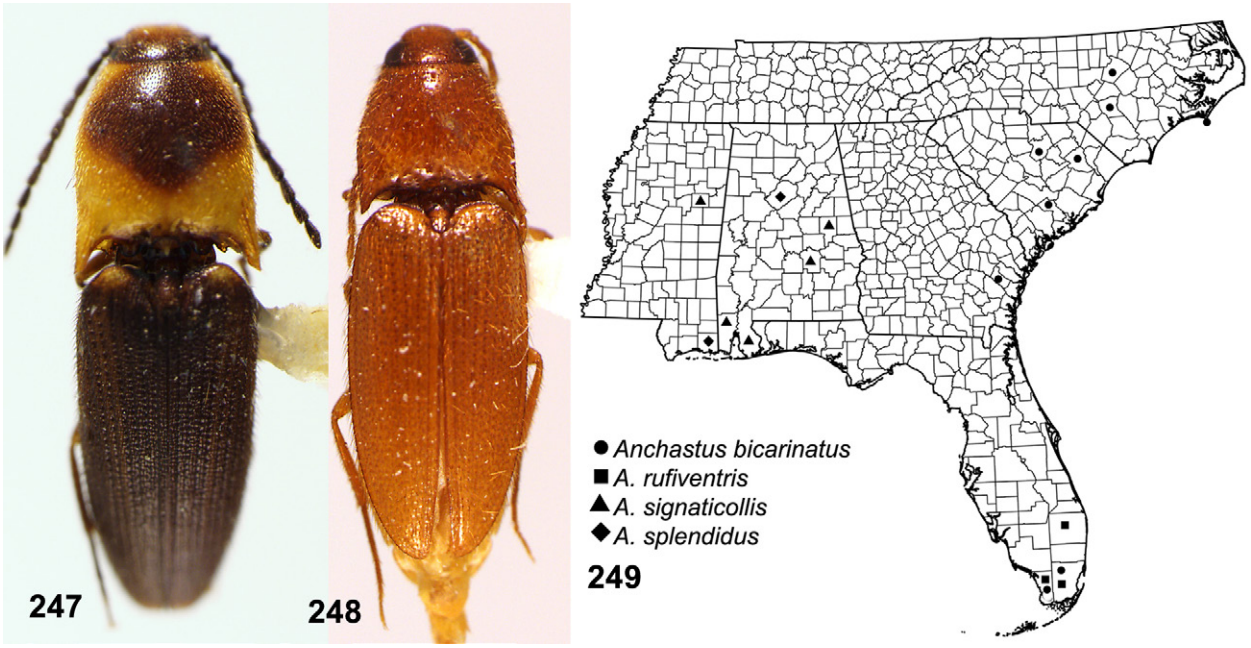
Distribution. Gulf Coast states (Leng 1920). In the current study area, only recorded from Alabama (Löding 1945).

Specimens Examined. Alabama (Baldwin, Monroe). May–July. (Figure 252)

Discussion. This species is usually recognized by its broad pronotum, long antennomere III, and subparallel pronotal hind angle that is distinctly bicarinate. It is similar to *A. bicarinatus* but tends to be slightly larger and has the metacoxal plate gradually dilating inwardly.

Anchastus signaticollis (Germar, 1843)

Figures 248–249



Figures 247–249. *Anchastus* spp. **247)** *A. signaticollis* (habitus). **248)** *A. splendidus* (habitus). **249)** Distributional data for *A. bicarinatus*, *A. rufiventris*, *A. signaticollis*, and *A. splendidus*.

Ampedus signaticollis Germar, 1843: 190

Diagnosis. Size small, 6.0 mm in length. Body bicolored: head black with a yellow-orange frons; pronotum yellow-orange on anterior angles, lateral and basal margins, and hind angle, most of disc covered with large black macula reaching anterior margin at middle; hypomeron yellow-orange with irregular central dusky macula; elytron black with small humeral yellowish macula; legs and antennae dark. Antenna 11-segmented, serrate, not extending beyond apex of pronotal hind angle; antennomere II small; III triangular, subequal to IV. Pronotum longer than wide; punctures on disc separated by less than own diameters, umbilicate; hind angle unicarinate. Metacoxal plate gradually dilated inwardly. Aedeagus undescribed.

Distribution. Southeastern United States (Van Dyke 1932); previously recorded from Alabama (Löding 1945) and South Carolina (Kirk 1969). The following record from Mississippi represents a **New State Record**.

Specimens Examined. Alabama (Baldwin, Mobile, Montgomery, Tallapoosa); **Mississippi** (Oktibbeha). June–July. (Figure 249)

Discussion. This enigmatic species appears rare in collections but should be readily recognized by its color pattern among those species with membranous tarsal pads. Its full geographic range is not well known. In addition to the records above I have seen a specimen from Texas (MEM). Specimens in the study area have been collected at ultraviolet light.

Anchastus splendidus Knull, 1965

Figures 248–249

Anchastus splendidus Knull, 1965: 218

Diagnosis. Size small, 5.5–6.0 mm in length, form slightly robust. Color light red-brown, shining; vestiture yellow, depressed, evenly distributed over the body. Antennae 11-segmented, serrate, extending beyond apex of pronotal hind angle; antennomeres III and IV subequal. Pronotum wider than long, widest at base of hind angle; punctures shallow, sparse; hind angle subparallel, bicarinate, outer carina long and parallel with lateral margin. Metacoxal plate strongly dilated inwards. Hind tarsomere I long and slender, as long as tarsomeres II–IV combined; membranous pad on tarsomere III small, often inconspicuous. Aedeagus with median lobe subparallel, gradually tapering subapically to rounded apex; paramere with subapical lateral tooth, apex subacute. Female similar to male externally but more robust.

Distribution. Previously recorded only from Indiana and Ohio (Downie and Arnett 1996). The following records from Alabama and Mississippi represent **New State Records**.

Specimens Examined. Alabama (Jefferson); **Mississippi** (Jackson). June. (Figure 249)

Discussion. This species is very similar to *A. rufus* but is much smaller. The female has not been previously described; the above observations are based on specimens (collection Brian D. Holt) from Jefferson County, AL. Specimens in the study have been collected at ultraviolet light.

Physorhinus Germar, 1840

Physorhinus Dejean, 1833: 86 (*nomen nudum*)
Physorhinus Germar, 1840: 245

Diagnosis. Size moderate. Specimens recorded from the United States solid red-brown to dark-brown; frons with yellow to orange macula. Antennae 11-segmented, serrate; antennomere II connected to antennomere I on its inner side, leaving the distal end of I to form a cap over the end of II; III small. Pronotum about as wide as long; punctures usually dense, umbilicate; hind angle bicarinate, outer carina may be faint. Pronotosternal

sutures separated widely mid-way along suture, more narrowly at the ends. Metacoxal plate forming a broad, elongate lobe posteriorly. Elytron elongate. Metathoracic wings functional for flight. Tarsomere III distinctly lobed; claws simple, without basal setae. No external sexual dimorphism noted.

Range and Numbers. The genus is restricted to the New World. There are 24 species distributed primarily in the Neotropics, with three species recorded from the United States, from southern Texas to Arizona (Schaaf 1970). Peck and Thomas (1998) and Johnson (2002) recorded the genus from Florida but did not indicate which species is present. Löding (1945) also recorded the genus (only) from Alabama, but after examination of that specimen (GSAT) I have identified it as a female of *Anchastus fumicollis*.

Discussion. Schaaf (1970, 1971) revised the genus for mainland America and the Caribbean. His study did not include seven species described from the Galapagos that could not be reliably separated from *Anchastus*. All specimens recorded from the United States have the characteristic brown color with a yellow-orange macula on the frons. Central and South American specimens of some species are variously colored and have maculae and bands on the elytra as well (Central and South American populations of *P. distigma* have a subapical elytral macula but these are not always present in specimens in the northern part of its range, including the southern U.S.). Very little is known about the biology of the species in this genus, and most specimens have been collected at light, in bait traps, or by beating vegetation.

Physorhinus distigma Candèze, 1859

Figures 251–252

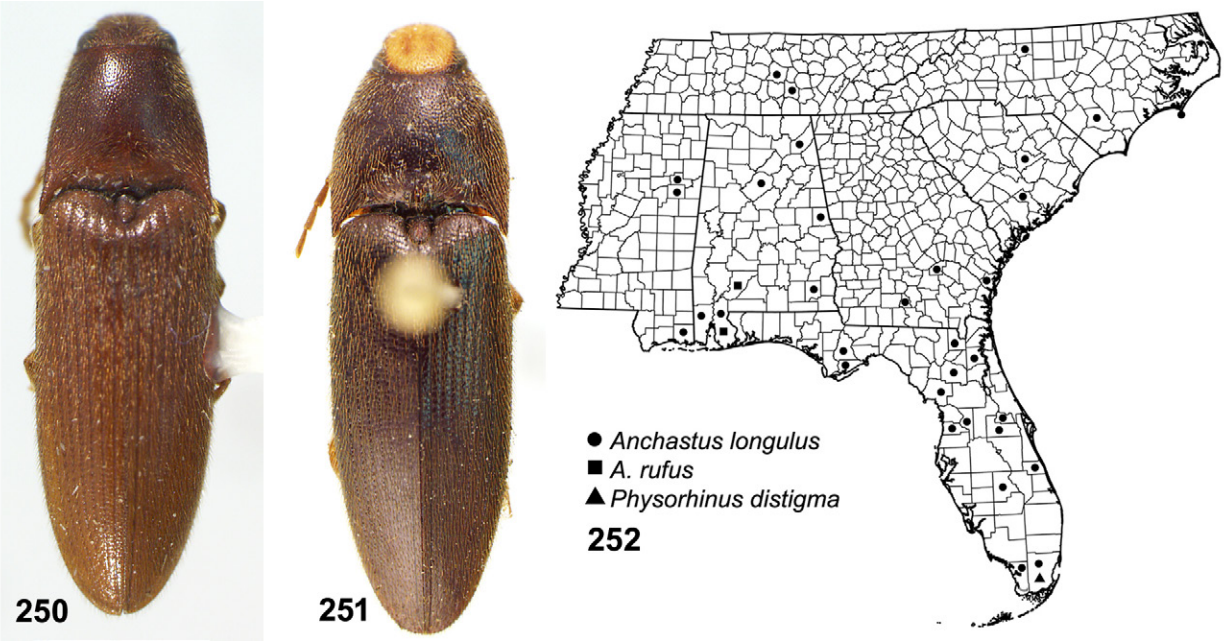
Physorhinus distigma Candèze, 1859: 390
Physorhinus sericeus Candèze, 1859: 392
Physorhinus cephalicus Candèze, 1889: 31
Physorhinus moseri Schwarz, 1902: 146
Physorhinus yuccae Wickham, 1903: 67

Diagnosis. Size moderate, 8.5–17.0 mm in length. Color red-brown to dark brown; frons with yellow-orange macula; typical specimens in the southern part of its range possess a subapical yellow macula or band on the elytron, specimens in the northern part of its range, including the Caribbean and the United States, may lack this feature. Antenna 11-segmented, serrate, extending beyond apex of pronotal hind angle by about one antennomere. Pronotum subtriangular, slightly convex, parallel at hind angle; punctures on disc shallow, umbilicate, separated by a distance equal to or slightly more than own diameter; punctures denser laterally, becoming obsolete near hind angles; hind angle distinctly bicarinate. Apex of elytron distinctly serrate. Aedeagus with paramere variable, either long and slender, with outer margins slightly curved, or short with outer margins more strongly curved.

Distribution. Argentina, Paraguay, and Peru, north to Mexico and southern Texas, also the Caribbean (Schaaf 1971). This is undoubtedly the species referred to in Peck and Thomas (1998) and Johnson (2002) as being from Florida but was never formally cited at the species-level. As such, the following records from Florida represent a **New State Record**.

Specimens Examined. Florida (Miami-Dade). April–May, October. (Figure 252)

Discussion. *Physorhinus distigma* is a highly variable species through much of its range, but specimens in northern Mexico, the Caribbean, and southern U.S. may lack a subapical macula on the elytron, including all those examined from Florida examined in this study. Specimens from Florida have been collected by beating vegetation, one of which (BAM) was on fig.



Figures 250–252. Physorhinini. **250)** *Anchastus rufus* (habitus). **251)** *Physorhinus distigma* (habitus). **252)** Distributional data for *A. longulus*, *A. rufus*, and *P. distigma*.

Dicrepidiini Candèze, 1859

The tribe Dicrepidiini, as treated here, was considered a subtribe of Ampedini by Johnson (2002). Clark (1963) revised the tribe for the United States as a Ph.D. thesis. Casari (2008) provided a detailed phylogenetic analysis of the tribe, but again as a subtribe of Ampedini. Her results showed that removal of the Neotropical genus *Ovipalpus* Solier made the group monophyletic and considered Physorhinini (as Physorhinina) as its sister group. The tribe is composed of 36 genera (Casari 2008), three of which are found in the United States. All three are present in the Southeast. Supra-antennal carinae are complete, usually protruding anteriorly. Antenna 11-segmented, serrate to flabellate in males. Prosternum usually arcuate anteriorly. Elevated margin on the hypomeron at the pronotosternal sutures, which are open anteriorly. Scutellum usually shield-shaped, never deeply incised anteriorly. Mesocoxa open to both mesepimeron and mesepisternum. Meso- and metasternum not fused, joined by a definite suture. Tarsomeres I–III, II and III, or I–IV lobed; claws simple or dentate, lacking basal setae. Casari and Biffi (2012) keyed the larvae for three genera whose larvae were known at the time.

Blauta LeConte, 1853

Blauta LeConte, 1853: 472

Diagnosis. Size moderate. Body form subcylindrical. Color red-brown to black; vestiture golden. Supra-antennal carinae complete, rounded in front. Antennomere II small; III intermediate between II and IV; IV and beyond serrate. Antenna 11-segmented, serrate, extending beyond apex of pronotal hind angle by one-half antennomere. Pronotum subparallel to slightly arcuate; punctures dense, on disc separated by distance less than their own diameter; hind angles slightly divergent; single strong carina present. Pronotosternal sutures widest at middle, open anteriorly. Metacoxal plate strongly narrowed outwardly. Tarsomeres I–IV with membranous lobes; lobes sometimes small, may be difficult to see; claws simple, lacking basal setae. Aedeagus with paramere

with apical blade. Females similar to males externally but generally larger and more robust and with shorter antenna, not extending beyond apex of pronotal hind angle.

Range and Numbers. The genus *Blauta* contains two species, both of which are endemic to the southeastern United States (Casari 2005). *Blauta cribraria* (Germar) is generally distributed in the Southeast, while *B. falli* Brown is endemic to Florida.

Discussion. The genus *Blauta* was revised by Clark (1963) as a Ph.D. thesis, and then again formally by Casari (2005).

Key to the species of *Blauta* in the Southeast
(adapted from Casari 2005)

1. Color black; pronotum densely and strongly punctured; tarsomeres distinctly lobed; aedeagus with median lobe compressed in middle, broad subapically; recorded only from Florida . . . . . ***B. falli* Brown**

— Color red-brown; pronotum densely but shallowly punctured; membranous lobes on tarsomeres smaller, less distinct; aedeagus with median lobe subparallel, slightly widened subapically; generally distributed in the Southeast . . . . . ***B. cribraria* (Germar)**

Blauta cribraria (Germar, 1844)

Figures 253, 255

Ampedus cribrarius Germar, 1844: 178
Blauta cauta LeConte, 1853: 490

Diagnosis. Size moderate, length 9.0–16.0 mm. Color red-brown; appendages often paler; vestiture long, dense, bristly, golden in color. Antennae 11-segmented, serrate; antennomere IV longer than wide. Pronotum almost as long as wide, strongly convex; punctures on disc coarse and dense, but shallow. Metacoxal plate with tooth near middle. Membranous lobes on tarsi smaller, less distinct (at times can be difficult to discern). Aedeagus with median lobe narrow, subparallel, slight widening subapically before narrowing to rounded apex; paramere with apical blade, row of moderate to long setae along entire length of blade. Female similar to male externally but slightly larger and with shorter antenna, not reaching apex of pronotal hind angle.

Distribution. Southeastern United States, west to Texas, and in all states in the current study area except Tennessee (LeConte 1853; Candèze 1859; Leng 1920; Brimley 1938; Löding 1945; Fattig 1951; Clark 1963; Richmond 1968; Kirk 1969, 1970; Peck and Thomas 1998; Casari 2005; Peck 2005; Casari 2008; Klepzig et al. 2012). The type localities for both *A. cribrarius* and *B. cauta* are Georgia (not further restricted). Clark's (1963) records of this species from California and Oregon may be based on mislabeled specimens.

Specimens Examined. Alabama (Baldwin, Elmore, Lee, Mobile, Monroe); **Florida** (Alachua, Baker, Citrus, Clay, Columbia, Hernando, Highlands, Indian River, Leon, Levy, Liberty, Marion, Osceola, Okaloosa, Orange, Pinellas, Polk, Putnam, Seminole, Taylor, Wakulla, Washington); **Georgia** (Brantley, Emanuel, Liberty, Long, Lowndes, McIntosh, Tattnall); **Mississippi** (Forrest, Harrison, Jackson, Leake, Pearl River, Winston); **North Carolina** (Bladen, Brunswick, Columbus, Johnston, Moore, New Hanover, Wake); **South Carolina** (Barnwell, Beaufort, Clarendon, Richland, Sumter). May–September. (Figure 255)

Discussion. The characters listed in the key and description should be sufficient for separating this species from *B. falli*. Specimens in the study area have been collected at light (including ultraviolet, mercury vapor, and sodium vapor light) and in Malaise and Lindgren funnel traps.

Blauta falli Brown, 1936

Figures 254–255

Blauta falli Brown, 1936e: 251

Diagnosis. Size small to moderate, length 9.0–11.5 mm. Color black; appendages sometimes dark red-brown; vestiture short, bristly, golden in color. Antennae 11-segmented, serrate; antennomere IV nearly as wide as long. Pronotum longer than wide, strongly convex; punctures on disc very dense and coarse. Metacoxal plate with margin slightly sinuous at inner half. Membranous lobes on tarsi larger, more distinct. Aedeagus with median lobe compressed medially then wider subapically before tapering to rounded apex; parameres with apical blade; two setae present mid-way along blade. Female undescribed.

Distribution. Currently known only from Florida (Brown 1936e; Clark 1963; Peck and Thomas 1998; Casari 2005). The type locality is Miami in Miami-Dade County, FL.

Specimens Examined. Florida (Brevard, Broward, Charlotte, Hernando, Highlands, Hillsborough, Indian River, Marion, Miami-Dade, Orange, Pinellas, Polk, Sumter). May–July. (Figure 255)

Discussion. The characters listed in the key and description should be sufficient for separating this species from *B. cribraria*. *Blauta falli* has a superficial resemblance to females of *Megapenthes limbalis*, the latter of which lacks membranous lobes on the tarsomeres. To date, this species has only been recorded from Florida. The female was not described at the time of Casari's (2005) revision. Specimens in the study have been collected at ultraviolet and mercury vapor light.

Dicrepidius Eschscholtz, 1829

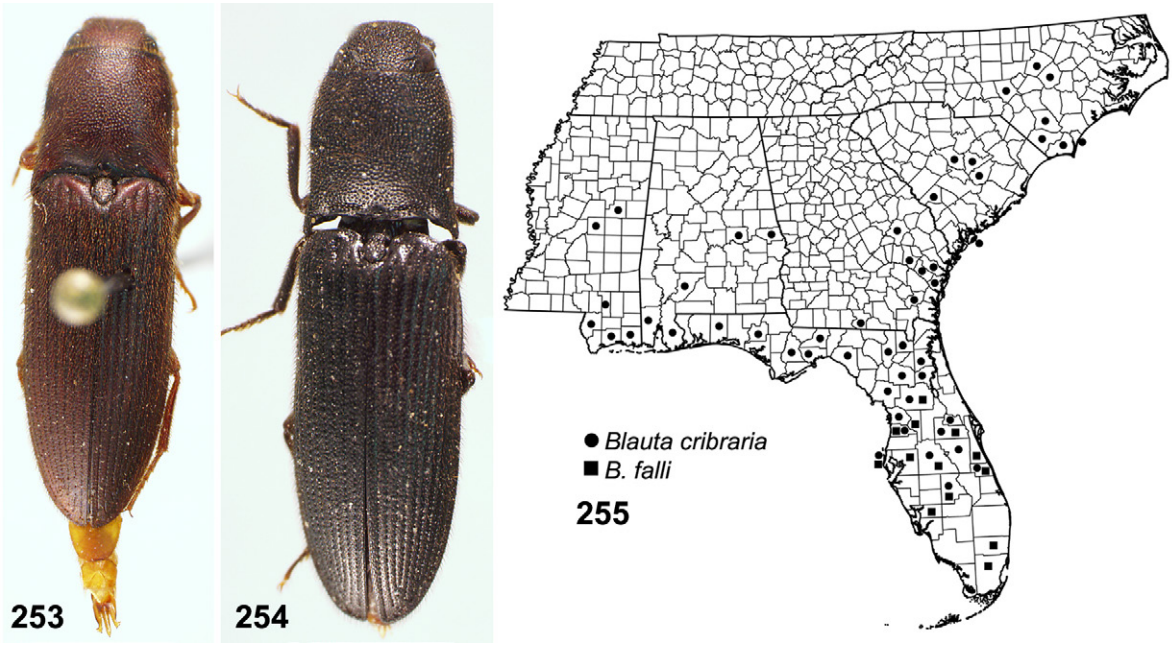
Dicrepidius Eschscholtz, 1829: 31

Diagnosis. Size moderate to large. Form elongate, slightly robust. Color red-brown to black. Supra-antennal carinae complete, projecting anteriorly, rounded when viewed from above. Nasale with two dorsally converging carinae that meet at the anterior end of the frons. Antennae 11-segmented; extending beyond apex of pronotal hind angle in both genders; antennomere II very small; III–X strongly serrate to flabellate in males, serrate in females (Figure 258); XI elongate. Pronotum as long or longer than wide; punctures sparse to dense, umbilicate; hind angles divergent or weakly so, unicarinate. Pronotosternal sutures concave, broad, open in apical one-third. Elytron elongate, weakly to strongly striate; apex rounded or truncate. Tarsomeres II and III with membranous lobes; claws simple. Aedeagus with parameres short, with slight expansion of apical blade. Marked sexual dimorphism; in addition to the less strongly serrate antennae, females are typically larger than males.

Range and Numbers. There are four species in the United States, eastern and southern in distribution (Mathison and Schnepp 2013). Three species are recorded from the Southeast, but Frost's (1975) record of *D. corvinus* Candèze, 1859 from Florida is doubtful.

Discussion. Members of this genus are readily recognized by the converging carinae above the nasale, membranous lobes on second on tarsomeres II and III, and flabellate antennae in males (serrate in one southwestern species). Clark (1963) revised the genus for North America as part of an unpublished Ph.D. thesis. Casari (2009) described a new species from Brazil and discussed the distribution of *D. ramicornis*. Mathison and Schnepp (2013) added the Mexican *D. serraticornis* Champion to the U.S. fauna and keyed the species north of Mexico. Adults are most commonly collected at light.

Species in this genus from North America have a complicated taxonomic history (see Discussion under *D. ramicornis*, below).



Figures 253–255. *Blauta* spp. **253)** *B. cribraria* (habitus). **254)** *B. falli* (habitus). **255)** Distributional data for *B. cribraria* and *B. falli*.

Key to the species of *Dicrepidius* in the Southeast
(adapted from Mathison and Schnepp 2013)

1. Pronotum (including hind angles) longer than wide; male with flabellum of antennomere III more than 2.5× the length of antennomere III (Figure 256); aedeagus with median lobe compressed medially, widened subapically; widely distributed in eastern USA . . . . . ***D. palmatus* Candèze**

— Pronotum (including hind angles) as wide or wider than long; male with flabellum of antennomere III twice the length of antennomere III (Figure 257); aedeagus with median lobe subparallel, slightly widened subapically; in the Southeast, known only from southernmost FL. . . . . ***D. ramicornis* (Palisot de Beauvois)**

Dicrepidius palmatus Candèze, 1859

Figures 256, 258–259

Dicrepidius ramicornis LeConte, 1853: 462 (nec *Dicrepidius ramicornis* Palisot de Beauvois, 1805: 10)
Dicrepidius palmatus Candèze, 1859: 146

Diagnosis. Size moderate, length 15.0–18.0 mm. Color red-brown; appendages often paler; vestiture pale, longer at extremities of body. Antennae 11-segmented, antennomeres III–X with a long, slender flabellum; flabellum on antennomere III always at least 2.5× longer than length of antennomere III. Pronotum (including hind angle) longer than wide; nearly parallel until abrupt tapering near apical margin; apical margin arcuate; punctures on disc sparse, umbilicate, denser laterally; hind angles weakly divergent, subacute at apex, single carina acute, dark in color, running parallel to lateral margin up to basal fifth of pronotum. Metacoxal plate inwardly dilated, sharply toothed on inner third of free posterior border. Aedeagus with median lobe slightly compressed medially, broader subapically, tapering to rounded apex. Female externally similar to male but larger and with deeply serrate antennomeres.

Distribution. Mid-Atlantic United States, south to Florida and west to Texas (Clark 1963). In the Southeast, previously recorded from Alabama, Florida, Georgia, North Carolina, and South Carolina (Brimley 1938; Fattig 1951; Clark 1963; Kirk 1969; Downie and Arnett 1996; Peck and Thomas 1998). The type locality of *D. ramicornis* LeConte is Florida (not further restricted). The following records from Mississippi and Tennessee represent **New State Records**.

Specimens Examined. Alabama (Baldwin, Barbour, Blount, Clarke, Coffee, Elmore, Etowah, Hale, Houston, Jefferson, Lee, Madison, Mobile, Monroe, Sumter, Tallapoosa); **Florida** (Alachua, Baker, Broward, Charlotte, Clay, Franklin, Gulf, Hernando, Highlands, Indian River, Jackson, Leon, Levy, Liberty, Miami-Dade, Okaloosa, Polk, Putnam, Santa Rosa, Seminole, Sumter, Taylor, Wakulla, Walton); **Georgia** (Bleckley, Chatham, Cherokee, Clarke, Clinch, Emanuel, Floyd, Fulton, Greene, Henry, Jackson, Lamar, Lee, Liberty, McIntosh, Montgomery, Spalding, Taylor, Thomas, Tift, Upson, Whitfield); **Mississippi** (Adams, Claiborne, Forrest, Grenada, Holmes, Jackson, Kemper, Lafayette, Leake, Lee, Lowndes, Oktibbeha, Pearl River, Pike, Pontotoc, Scott, Smith, Webster, Winston); **North Carolina** (Beaufort, Bertie, Bladen, Burke, Camden, Carteret, Catawba, Columbus, Duplin, Granville, Halifax, Jones, Mecklenburg, New Hanover, Robeson, Surry, Wake, Wayne counties; also Rocky Mount); **South Carolina** (Aiken, Anderson, Calhoun, Chesterfield, Colleton, Dorchester, Florence, Greenville, Marion, Oconee, Pickens, Sumter); **Tennessee** (Cocke, Coffee, Haywood, Knox, Warren). April–October. (Figure 259)

Discussion. The species has the widest range of any U.S. *Dicrepidius*. In addition to the published records above, most of the records from Alabama (Löding 1945), Florida (Peck and Thomas 1998), Georgia (Fattig 1951), and South Carolina (Champion 1896; Kirk 1969, 1970) for *D. ramicornis* probably pertain to this species (see Discussion under *D. ramicornis*, below). This species, especially the male, is readily recognized and in the current study area should only be confused with *D. ramicornis* where their ranges overlap in southern Florida. The key characters listed above should be sufficient for separating the two. At first glance, the female may be mistaken for a species of *Dipropus*, but the carinate nasale should readily identify them. Specimens in the study area have been collected at ultraviolet and mercury vapor light and in panel traps.

Dicrepidius ramicornis (Palisot de Beauvois, 1805)

Figures 257, 259

Elater ramicornis Palisot de Beauvois, 1805: 10
Elater ceramboides Sturm, 1826: 135
Dicrepidius pectinicornis Eschscholtz, 1829: 31

Diagnosis. Size moderate to large, length 16.0–30.0 mm. Color red-brown to dark red-brown; antennae dark. Antennae 11-segmented; antennomeres III–X with a flabellum, not as long and slender as in *D. palmatus*, flabellum on antennomere III approximately twice the length of antennomere III. Pronotum (including hind angle) as wide or wider than long; side parallel for basal four-fifths, roundly tapering in apical one-fifth; punctures on disc sparse, umbilicate, denser laterally; hind angles weakly divergent, apically acute; strongly carinate, single carina not parallel to lateral margin of angle. Metacoxal plate dilated inwardly, one large blunt tooth and one small tooth lateral to where leg inserts, one small laterally reflexed tooth at median side of insertion. Aedeagus with median lobe subparallel, slightly widened subapically before tapering to rounded apex. Female externally similar to male but larger and with deeply serrate antennae.

Distribution. Widely distributed from Argentina and Brazil, north to southernmost United States in Florida and Texas, as well as the Caribbean (Casari 2009). In the Southeast, previously recorded from Alabama, Florida, Georgia, and South Carolina (Leng 1920; Löding 1945; Clark 1963; Frost 1964; Kirk 1969, 1970; Peck and Thomas 1998; Peck 2005; Casari 2009). Many of the published records for this species outside of southern Florida probably pertain to *D. palmatus*, although the type was reportedly collected in South Carolina (see below).



Figures 256–258. *Dicrepidius* spp. **256)** *D. palmatus* (male habitus). **257)** *D. ramicornis* (male habitus). **258)** *D. palmatus* (female habitus).

Specimens Examined. Florida (Broward, Miami-Dade, Monroe). May–June. (Figure 259)

Discussion. This species is similar to *D. palmatus* but has a much more southerly distribution in the United States. The records from Alabama (Löding 1945), Georgia (Fattig 1951), and South Carolina (Champion 1896; Kirk 1969, 1970) most certainly pertain to *D. palmatus*. Many of the county records in Peck and Thomas (1998) were also identified as *D. palmatus* by Casari after examination of the material for her works published in 2008 and 2009. As currently known, this species seems to be restricted to southern Florida in the Southeast.

The type of *E. ramicornis* was reportedly collected in South Carolina and is apparently lost (Paul Johnson pers. comm. 2013). If this species was truly described from South Carolina, then that name could apply to what is currently known as *D. palmatus* in the United States. As such, what is currently known as *D. ramicornis* would require a new name and possibly one or more new species descriptions. It appears that *D. ramicornis* as presently delineated (*sensu* Casari 2009) represents a species complex. Further taxonomic work is currently underway (Paul Johnson, pers. comm. 2013). Specimens in the study area have been collected at ultraviolet light. Casari and Biffi (2012) described the larva.

Dipropus Germar, 1839

Dipropus Germar, 1839: 25
Atractodes Germar, 1839, in part
Heterocrepidius Lacordaire, 1857: 170
Ischiodontus Candèze, 1859: 90
Tricrepidius Motschulsky, 1859: 366

Diagnosis. Size small to moderate; form elongate, convex to weakly convex. Color usually uniform, light yellow-brown to dark red-brown, nearly black; pronotum sometimes lighter than elytron; vestiture sparse to conspicuous, usually golden to brown. Supra-antennal carinae complete, projecting anteriorly, rounded when viewed from above. Antenna 11-segmented, length variable, usually extending well beyond apex of pronotal

hind angle; antennomere II small; III–X weakly to strongly serrate, III subequal to IV and always longer than II; XI elongate. Pronotal shape variable, usually as long as wide; coarsely punctate, punctures on disc small or large, sparse to dense; hind angle divergent or not, unicarinate. Elytron elongate, usually parallel in basal half; striae strongly to weakly punctate; interspaces micro-punctate to granulose. Tarsomeres II and III with distinct membranous lobes (absent in the female of *D. asper*); claws simple, lacking basal setae. Aedeagus with median lobe variable; parameres with or without defined apical blade. Females variable; some species externally similar to males but stouter and with shorter antennae, others (especially psammophilous species) exhibit more pronounced sexual dimorphism.

Range and Numbers. 10 species have been recorded from the United States (Mathison and Johnson 2017), generally distributed but more abundant in the southern states. Five species have been previously recorded from the Southeast. Records of *D. ferreus* (LeConte) from Florida (Leng 1920) and Georgia (Fattig 1951) seem doubtful.

Discussion. *Dipropus* is one of the most speciose, yet understudied, genera in the New World. Clark (1963) revised the genus for North America as a Ph.D. thesis. Clark's revision had several errors, as he apparently relied heavily on pre-identified material and did not examine at least some of the type specimens, most notably those housed in the British Museum of Natural History (BMNH). Johnson (2016) and Mathison and Johnson (2017) helped stabilize the Nearctic fauna by creating new synonymies, describing new species, and creating updated keys for the southwestern and eastern North America, respectively. Casari (2008) performed a phylogenetic analysis of Dicrepidiini (as a subtribe of Ampedini) and her results showed that as presently delineated, *Dipropus* is not monophyletic. The uniformity of the members of the species currently assigned to the genus can make a species-level identification difficult. Important characters include size, the length and form of antenna, shape of pronotum and form of hind angles, density of pronotal punctures, texture of pronotum and/or elytron, and aedeagus. Collection records show that most adults are collected at light. Larvae are found in decaying wood (Costa 1977) or under loose bark and among epiphyte roots and rhizoids on tree branches where they are predators on other invertebrates (Johnson 2016).

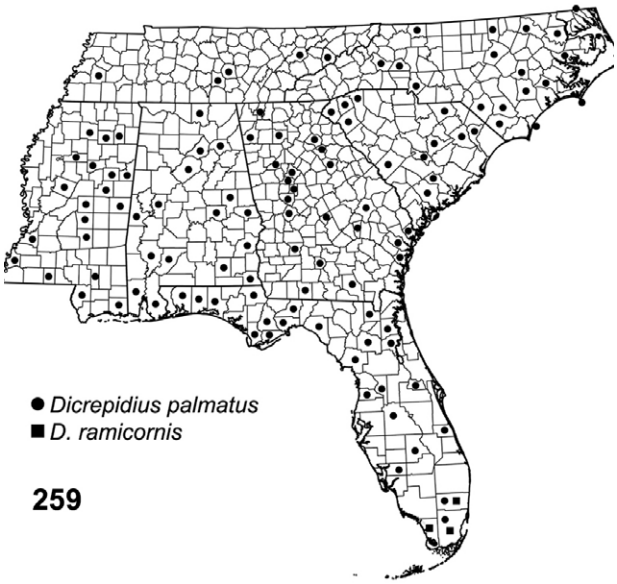


Figure 259. Distributional data for *Dicrepidius palmatus* and *D. ramicornis*.

Key to the species of *Dipropus* in the Southeast
(adapted from Mathison and Johnson 2017)

1. Side of pronotum nearly parallel for entire length; elytron elongate, about 3.0× as long as wide; antenna long, extending beyond apex of pronotal hind angle by 5 antennomeres in males, antennomeres III–X elongate and strongly serrate . . . . . ***D. schwarzi* (Becker)**
— Side of pronotum never parallel beyond basal two-thirds, gradually converging apically; elytron shorter, never more than 2.5× as long as wide; antenna variable in length **2**

2(1). Pronotal hind angle divergent; hind tibia and tarsomere I usually with row of strong, stout spines; small species, most specimens less than 6.5 mm in length . . . . . ***D. asper* (LeConte)**
— Pronotal hind angle scarcely to slightly divergent if at all; hind tibia and tarsi normal; size variable, most specimens longer than 6.5 mm **3**

3(2). Species red-brown in color; pronotum longer than wide, widest at base of hind angle and clearly narrowing anteriorly; known only from extreme southern Florida . . . . . ***D. tequesta* Johnson**
— Species dark red-brown to black; pronotum subquadrate; species more widely distributed in the East and Southeast **4**

4(3). Pronotum trapezoidal, gradually tapering from base to apex; aedeagus with median lobe subparallel over most of its length, tapering subapically to subacute apex . . . . . ***D. simplex* (LeConte)**
— Pronotum subparallel in basal two-thirds, then gradually tapering to apex; aedeagus with median lobe gradually tapering from base to subacute apex . . . . . ***D. soleatus* (Say)**

Dipropus asper (LeConte, 1878)

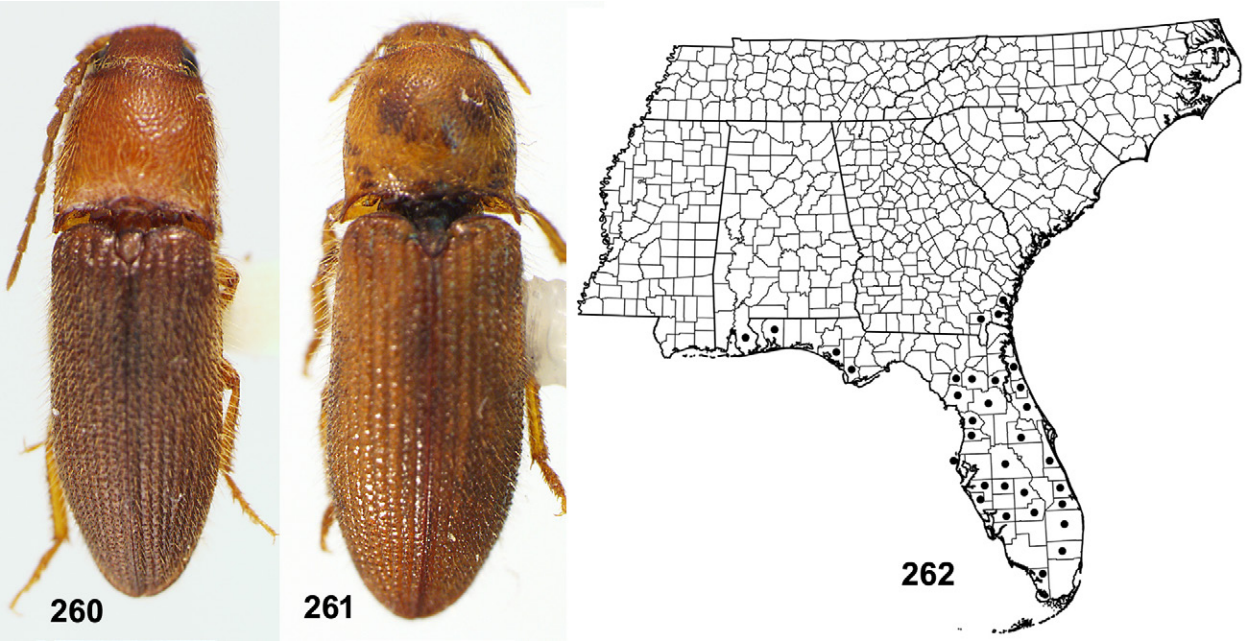
Figures 260–262

Anchastus asper LeConte, 1878: 104
Ischiodontus granosus Fall, 1925: 180

Diagnosis. Size small, on average 5.0 mm in length. Variably colored, from pale yellow to yellow-brown to dark red-brown, nearly black, pronotum occasionally paler than elytron; vestiture conspicuous, long, brown. Antennae 11-segmented, serrate, extending beyond apex of pronotal hind angle by up to four antennomeres. Pronotum wider than long, weakly convex, parallel in basal half, gradually tapering to rounded apex; punctures on disc coarse, umbilicate, dense, separated by a distance less than their own diameters; hind angles clearly divergent, apex subacute, carinate, single carina running parallel to lateral margins of pronotum. Elytron parallel in basal half, gradually tapering towards rounded apex; striae deeply impressed at base, strongly punctured; interspaces punctate, granulose. Tibia with linear row of short, stout spines nearly along entire length; tarsomere I with row of spines; membranous lobes on tarsomeres variable, on tarsomere II usually very small and often inconspicuous. Aedeagus with median lobe expanded subapically, tapering to subacute apex; paramere with apical blade longer than wide, with small basal lateral tooth. Marked sexual dimorphism; female (Figure 261) larger and more robust than male; antennae shorter, not reaching mid-length of pronotum; metathoracic wings reduced in length; tarsomeres lacking membranous lobes.

Distribution. Previously recorded only from Florida and Georgia (Leng 1920; Fall 1925; Van Dyke 1932; Fattig 1951; Clark 1963; Peck and Thomas 1998; Deyrup and Deyrup 2012; Kim and Holt 2012; Mathison and Johnson 2017). The type locality of *A. asper* is Cedar Keys in Levy County, FL. The type locality of *I. granosus* is Palm Beach in Palm Beach County, FL. The following record from Alabama represents a **New State Record**.

Specimens Examined. Alabama (Baldwin); **Florida** (Alachua, Bay, Brevard, Broward, Charlotte, Citrus, Flagler, Gilchrist, Glades, Gulf, Hardee, Hernando, Highlands, Levy, Manatee, Marion, Martin, Monroe, Orange,



Figures 260–262. *Dipropus asper*. **260)** Male habitus. **261)** Female habitus. **262)** Distributional data.

Palm Beach, Pinellas, Polk, Putnam, Santa Rosa, Sarasota, St. Johns, St. Lucie, Volusia); **Georgia** (Camden, Charlton, Glynn). April–October. (Figure 262)

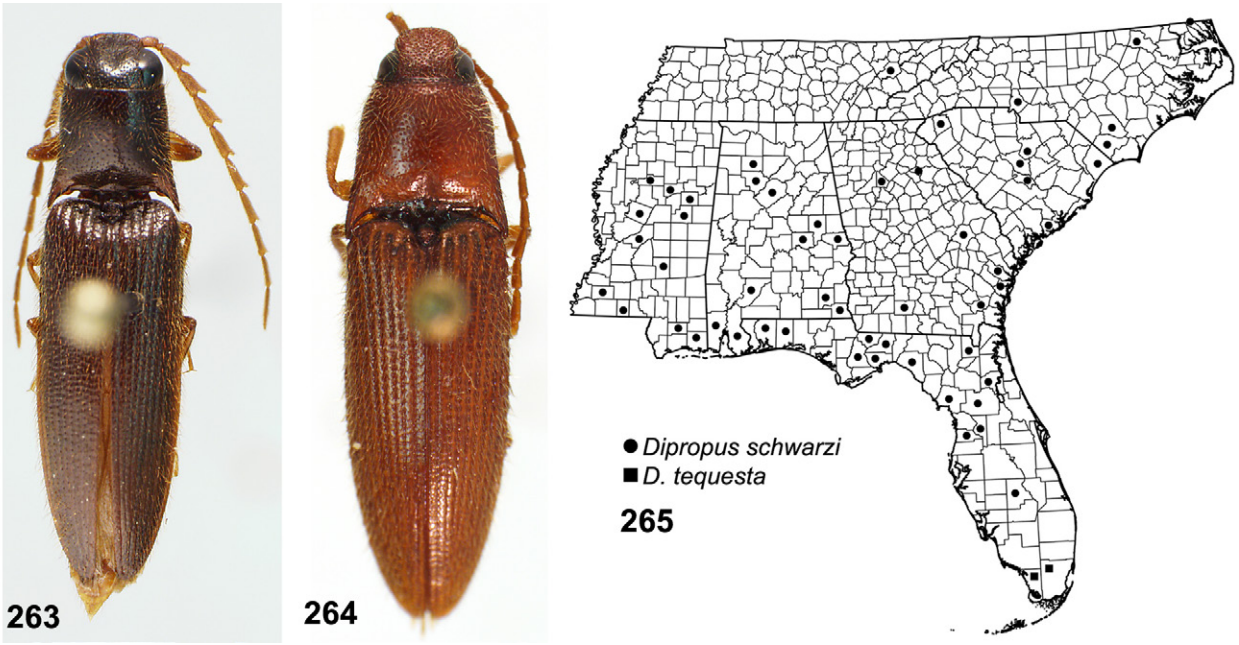
Discussion. This species is variable in appearance but should be readily recognized by its small size, divergent pronotal hind angles, row of short, stout tibial spines, and granulose elytral intervals. This species is associated with sandy habitats. A series of specimens from Brevard County, FL (UCFC) were collected in Malaise traps set in a xeric oak scrub. Other specimens were collected in wire traps, red wine traps, sweeping beach grasses, and in association with dunes. Deyrup and Deyrup (2012) reported it from the flowers of saw palmetto (*Serenoa repens*) in Highlands County, FL. Kim and Holt (2012) reported it feeding on oak leaves (*Quercus inopina* and *Q. geminata*) in Highlands County, FL. Mathison and Johnson (2017) described the female.

Dipropus schwarzi (Becker, 1961)

Figures 263, 265

Ischiodontus parallelus Schwarz, 1906: 104 (nec *Ischiodontus parallelus* Candèze, 1859: 121)
Ischiodontus schwarzi Becker, 1961: 169

Identification. Size moderate, on average 8.0–10.0 mm in length. Color brown, pronotum often slightly darker than elytron; legs and antennae lighter than elytra; vestiture yellowish, moderate, suberect. Antennae 11-segmented, strongly serrate, extending five antennomeresbeyond apices of pronotal hind angle; antennomere II small; III–X large, strongly serrate with ventral posterior angle produced, each antennomere becoming less serrate and slightly more elongate than preceding; X elongate. Pronotum longer than wide, side nearly parallel along entire length; punctures on disc umbilicate, sparse, separated by a distance greater than their own diameters; hind angles divergent, weakly carinate, carina parallel to lateral margins. Elytron nearly parallel in basal half, gradually tapering to rounded apex. Aedeagus with median lobe subparallel, slightly constricted medially and tapering to rounded apex; paramere with apical blade longer than broad, base with laterally directed spine. Female undescribed.



Figures 263–265. *Dipropus* spp. **263)** *D. schwarzi* (habitus). **264)** *D. tequesta* (habitus). **265)** Distributional data for *D. schwarzi* and *D. tequesta*.

Distribution. Southeastern United States; previously recorded from Alabama, Florida, Georgia, Mississippi, and South Carolina (Leng 1920; Löding 1945; Becker 1961; Clark 1963; Richmond 1968; Kirk 1969; Peck and Thomas 1998; Casari 2008; Mathison and Johnson, 2017). The lectotype designated by Becker (1961) was collected in Alabama (not restricted further). The following records from North Carolina and Tennessee represent **New State Records**.

Specimens Examined. Alabama (Baldwin, Dale, Elmore, Houston, Jefferson, Lee, Mobile, Monroe, Tallapoosa, Walker, Winston); **Florida** (Baker, Gadsden, Hernando, Highlands, Leon, Levy, Liberty, Marion, Okaloosa, Putnam, Santa Rosa, Sumter, Taylor, Wakulla); **Georgia** (Brantley, Clarke, Colquitt, DeKalb, Emanuel, McIntosh); **Mississippi** (Grenada, Holmes, Franklin, Jackson, Liberty, Madison, Oktibbeha, Pike, Smith, Stone, Webster, Winston); **North Carolina** (Bladen, Camden, Columbus, Halifax, Mecklenburg); **South Carolina** (Calhoun, Charleston, Horry, Kershaw, Pickens, Richland counties; also Lost Lake); **Tennessee** (Knox). May–September. (Figure 265)

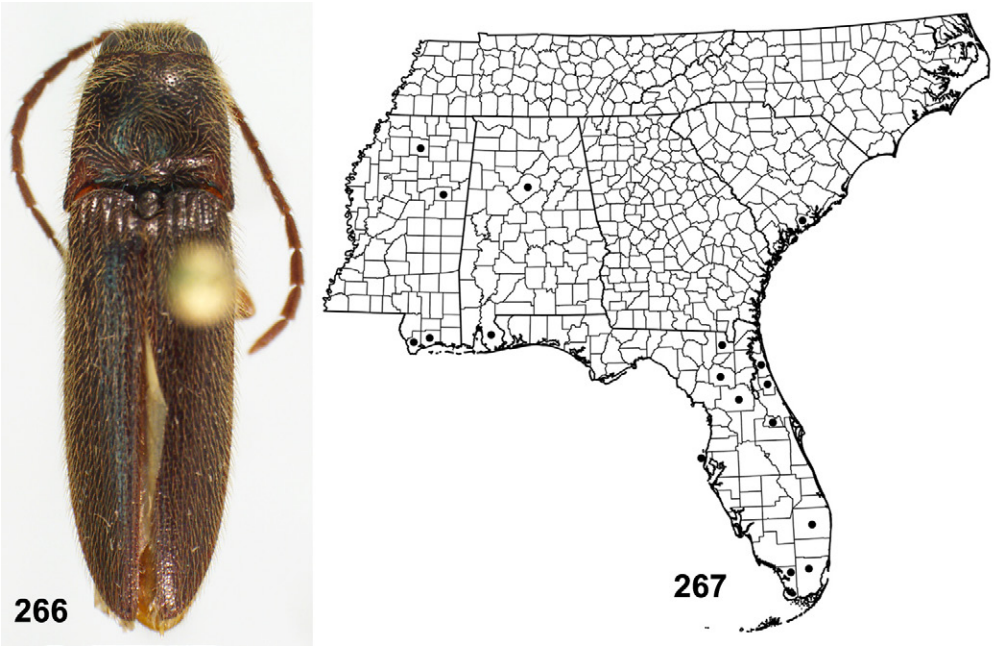
Discussion. This species is usually readily recognized by its long, strongly serrate antennae and subparallel pronotum. Specimens in the study area have been collected at ultraviolet and mercury vapor light and in Lindgren funnel traps. Specimens from Madison County, MS (MEM) were collected at ultraviolet light set in a cypress swamp.

Dipropus simplex (LeConte, 1853)

Figures 266–267

Dicrepidius simplex LeConte, 1853: 462

Diagnosis. Size small to moderate, 8.0–10.0 mm in length. Color dark red-brown; venter and antennae reddish; vestiture yellow-brown, semi-erect. Antennae 11-segmented, serrate, extending beyond apex of pronotal hind angle by up to four to five antennomeres. Pronotum slightly wider than long, trapezoidal, gradually tapering from base to apex; weak median sulcus basally; punctures large, shallow, umbilicate, separated by a distance equal to or less than their own diameters, denser laterally; hind angles weakly divergent, carinate, carina parallel



Figures 266–267. *Dipropus simplex*. **266)** Habitus. **267)** Distributional data.

to lateral margin. Elytron parallel for basal three-fourths, gradually tapering to rounded apex; striae shallow with deep punctures; interspaces convex, micro-punctate. Membranous lobe on tarsomere III extending beyond tarsomere IV. Aedeagus with median lobe subparallel over most of its length, tapering subapically to subacute apex; parameres with apical blade longer than wide with a small basal lateral tooth. Female similar to male externally.

Distribution. Southern United States (Clark 1963). In the Southeast, recorded from Alabama, Florida, Georgia, and Mississippi (Löding 1945; Richmond 1968; Mathison and Johnson 2017). Also recorded from Cuba (Peck 2005). The following records from South Carolina represent a **New State Record**.

Specimens Examined. Alabama (Baldwin, Jefferson); **Florida** (Alachua, Baker, Flagler, Marion, Miami-Dade, Monroe, Palm Beach, Pinellas, Seminole, St. Johns); **Mississippi** (Hancock, Harrison, Lafayette, Oktibbeha); **South Carolina** (Charleston). April–August, October. (Figure 267)

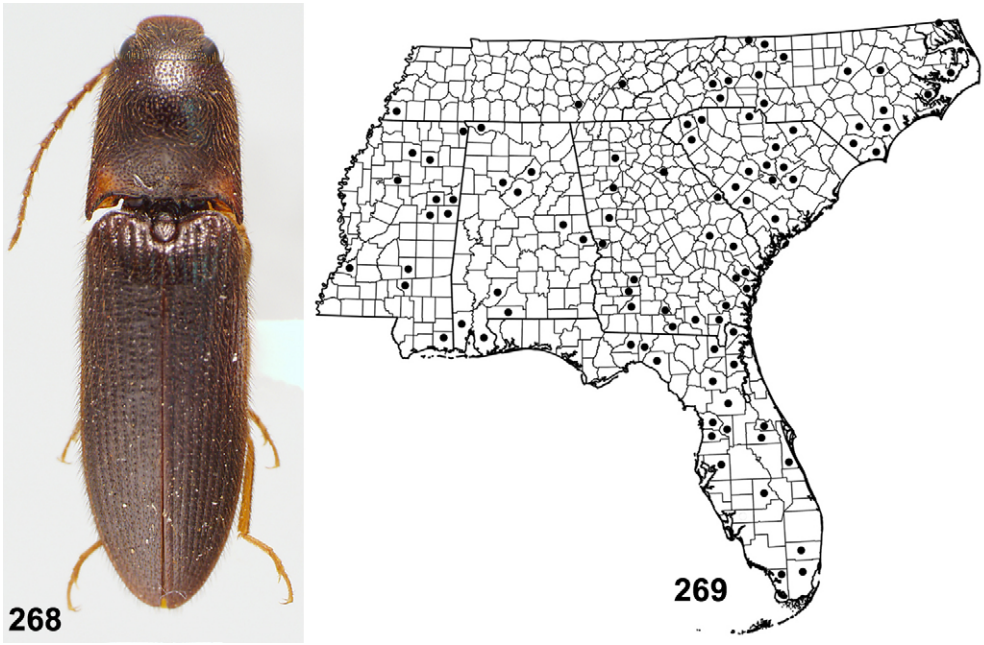
Discussion. This species is similar to *D. soleatus* but differs in having a more subquadrate pronotum and in the characteristics of the aedeagus. Clark (1963) recorded the species from Arizona to Texas, but Peck (2005) also recorded it from Cuba so its presence in southern Florida should not be surprising. Specimens in the study area have been collected at ultraviolet light, in Lindgren funnel and Malaise traps, and by sweeping and beating vegetation.

Dipropus soleatus (Say, 1839)

Figures 268–269

Elater soleatus Say, 1839: 176
Ischiodontus oblitus Candèze, 1859: 101
Anchastus fuscus LeConte, 1878: 404

Diagnosis. Size moderate, 9.0–12.0 mm in length. Color dark brown; ventral surface and antennae reddish; vestiture brownish, semi-erect. Antennae 11-segmented, serrate, extending beyond apex of pronotal hind angles



Figures 268–269. *Dipropus soleatus*. **268)** Habitus. **269)** Distributional data.

by up to antennomeres; antennomere II small; III–X serrate, each antennomere more slender and less serrate than previous; XI elongate. Pronotum slightly wider than long, subparallel at basal two-thirds, gradually narrowing anteriorly, anterior margin weakly sinuate; punctures on disc dense, shallow, umbilicate, separated by a distance less than their own diameters; hind angles weakly divergent, carinate, carina parallel to lateral margin. Elytron parallel for basal three-fifths, gradually tapering to rounded apex. Membranous lobe on tarsomere III long, usually extending beyond tarsomere IV. Aedeagus with median lobe gradually tapering from base to subacute apex; paramere with apical blades longer than wide. Female similar to male externally but slightly larger and with shorter antenna, extending beyond apex of pronotal hind angle by up to two antennomeres.

Distribution. Generally distributed throughout much of the eastern United States (Clark 1963). Previously recorded from all seven states in the current study area (Leng 1920; Brimley 1938; Löding 1945; Wray 1950; Fattig 1951; Clark 1963; Payne and Crossley 1966; Richmond 1968; Kirk 1970; Downie and Arnett 1996; Peck and Thomas 1998; Lago et al. 2002; Johnson 2016; Mathison and Johnson 2017). The type locality of *A. fuscus* is Enterprise in Volusia County, FL.

Specimens Examined. Alabama (Baldwin, Blount, Escambia, Jefferson, Lauderdale, Lee, Mobile, Monroe, Tallapoosa, Walker); **Florida** (Alachua, Baker, Brevard, Broward, Citrus, Clay, Hernando, Highlands, Hillsborough, Jefferson, Leon, Marion, Miami-Dade, Monroe, Nassau, Orange, Seminole, Sumter, Taylor); **Georgia** (Brantley, Bulloch, Charlton, Cherokee, Clarke, Clinch, Cook, Dougherty, Emanuel, Fulton, Lee, Liberty, Long, Lowndes, McIntosh, Meriwether, Mitchell, Muscogee, Richmond); **Mississippi** (Claiborne, Covington, Grenada, Jackson, Lafayette, Lowndes, Noxubee, Oktibbeha, Pontotoc, Smith, Tishomingo, Winston); **North Carolina** (Alleghany, Bladen, Brunswick, Burke, Camden, Columbus, Duplin, Forsyth, Hyde, Iredell, McDowell, Mecklenburg, Pamlico, Pender, Rutherford, Surry, Union, Wake, Wilson); **South Carolina** (Aiken, Anderson, Barnwell, Calhoun, Chesterfield, Clarendon, Colleton, Greenville, Kershaw, Lexington, Pickens, Richland, Sumter, York counties; also Lost Lake); **Tennessee** (Loudon, Sequatchie, Shelby). May–October. (Figure 269)

Discussion. In addition to the external characters, this species is recognized by having the median lobe of the aedeagus gradually tapering from base to apex. Specimens in the study area have been collected at ultraviolet and

mercury vapor light, and in Lindgren funnel, Malaise, and flight intercept traps. Payne and Crossley (1966) and Kirk (1970) reported it from pig carrion in Pickens County, SC. Jewett (1946) described the larva.

Dipropus tequesta Johnson, 2017

Figures 264–265

Dipropus tequesta Johnson in Mathison and Johnson, 2017

Diagnosis. Size moderate, 11.0–14.0 mm in length. Color reddish; vestiture yellow. Antenna 11-segmented, extending beyond apex of pronotal hind angle by about four antennomeres; antennomere II small; III–X longer than wide, serrate; XI elongate. Pronotum longer than wide, widest at hind angle and clearly narrowing anteriorly; punctures large, umbilicate, separated by approximately their own diameters or less; hind angles slightly divergent, unicarinate, carina strong. Elytron subparallel, apex subacute; striae composed of large, close, deep punctures; interspaces convex, micropunctate. Membranous lobes on tarsomeres large and conspicuous. Aedeagus with median lobe subparallel, tapering subapically to subacute apex; paramere with apical blade longer than wide, subacute apically. Female undescribed.

Distribution. Known only from extreme southern Florida (Mathison and Johnson 2017). The type locality is Fleming Key in Monroe County, FL.

Specimens Examined. **Florida** (Miami-Dade, Monroe). May–June. (Figure 265)

Discussion. This species is currently known only from the southernmost counties of Miami-Dade and Monroe in Florida. It shares some morphological similarities with the Cuban species *D. antennatus* (Candèze) and *D. striatus* (Candèze). Specimens in the study area have been collected at ultraviolet light.

Cardiophorinae Candèze, 1859

The subfamily Cardiophorinae contains seven genera in North America (Douglas 2017). Five of these occur in the Southeast; the genera *Aptopus* and *Aphricus* occur in the Southwest and are not known to occur east of Texas. Head capsule deflexed, mouthparts inferior. Antenna 11-segmented, filiform to slightly serrate. Pronotum variable, usually arcuate laterally and often with plicae along basal margin. Prosternal process short, truncate. Scutellum variable, but often deeply emarginate anteriorly to appear heart-shaped (Figure 270). Mesepimeron and mesepisternum separated from mesocoxal cavity by meso- and metasternum. Meso- and metasternum not fused, joined by a definite suture. Metathoracic wings functional for flight or reduced or absent. Tarsomeres variable, tarsomere IV with membranous pad in most species of *Esthesopus*; claws variable, simple, toothed, or apically cleft (serrate in *Aptopus*), without basal setae.

Cardiophorinae remains one of the most poorly understood groups of elaterids in North America (Stibick 1979; Wells 2000; Douglas 2017). Douglas' (2011a) first phylogenetic analysis of the subfamily showed that inclusion of the New Zealand genus *Exoeolus* Broun rendered Cardiophorinae polyphyletic and recommended its transfer to Hemiopinae. His study also gave support for inclusion of *Coptostethus americanus* in Cardiophorinae, and not the genus *Negastrius* where it was placed by Johnson (2001). Douglas later (2017) performed another phylogenetic analysis and proposed a revised classification of the subfamily, including resurrecting *Paracardiophorus* and describing *Floridelater* to accommodate *C. americanus*. Horn (1884) presented the first organized review of *Esthesopus* and *Horistonotus*. Rhyand (1976) later revised *Esthesopus* as a Masters thesis. Wells (2000) described two new species of *Horistonotus* and keyed the species of the United States and Canada. Blanchard (1889) first revised the genus *Cardiophorus* for all of North America. Lanchester (1971) treated the Cardiophorinae of the Pacific Northwest, describing many new species of *Cardiophorus* which may turn out to be invalid once a regional revision is done. Douglas (2003) revised the *Cardiophorus* of the Eastern United States and Canada. In the Southeast, specimens are collected by a variety of methods, often in association with sandy habitats.

Cardiophorus Eschscholtz, 1829

Cardiophorus Eschscholtz, 1829: 34
Dicronychus Brullè, 1832: 138
Caloderus Stephens, 1830: 249

Diagnosis. Size small to moderate. Color variable, usually unicolored red-brown to black, sometimes bicolored; vestiture variable. Supra-antennal carinae complete across frons. Labrum large, partially covering mandibles when closed. Lateral margin of pronotum absent or represented by submarginal line on hypomeron; hypomeron with 90-degree notch at base of hind angle (arrow, Figure 271). Scutellum distinctly emarginate anteriorly, appearing heart-shaped (Figure 270). Metathoracic wings functional for flight. Tarsomeres lacking membranous lobes; claws simple or with basal or median tooth. Aedeagus with median lobe variable; parameres with or without apical blades or other apical or preapical expansions. Female similar to male externally, but antennae usually shorter and with sparser vestiture.

Range and Numbers. With the transfer of 22 species to *Paracardiophorus* by Douglas (2017), and the description of a new species from Florida by Douglas and Mathison (2017), there are currently 61 described species known from the US and Canada, generally distributed. Seven species have been recorded from the Southeast, one of which (*C. convexulus*) is doubtful.

Discussion. Blanchard (1889) first revised the genus for North America. Douglas (2003) revised the genus for North America east of the Rocky Mountains and later (2017) transferred 22 species to *Paracardiophorus*. The fauna of the West is less well-known. Lanchester (1971) treated the species of the Pacific Northwest, describing 45 species (many now in Paracardiophorus), but several of these may turn out to be invalid after a detailed

revision for the West is completed. Adults of *Cardiophorus* species have been collected by a variety of methods, usually associated with sandy habitats (Douglas 2003). Most specimens in the study area have been collected at light, in flight intercept traps, under rocks, among dunes, and swept from or hand picked from vegetation.

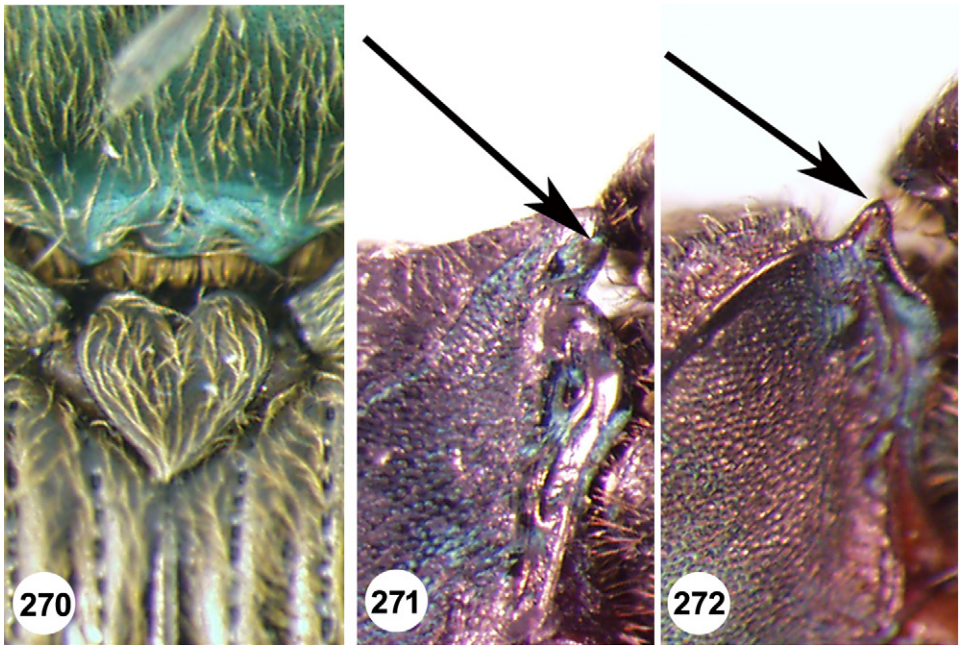
Key to the species of *Cardiophorus* in the Southeast
(adapted from Douglas 2003)

1. Elytral interval 8 forming carinate ridge; frontal margin medially incised; antennae very long, extending to metacoxa . . . . . ***C. carinatus*** **Mathison and Douglas**
— Elytral interval 8 normal, lacking elevated ridge; frontal margin normal; antennae shorter, not extending to metacoxa **2**

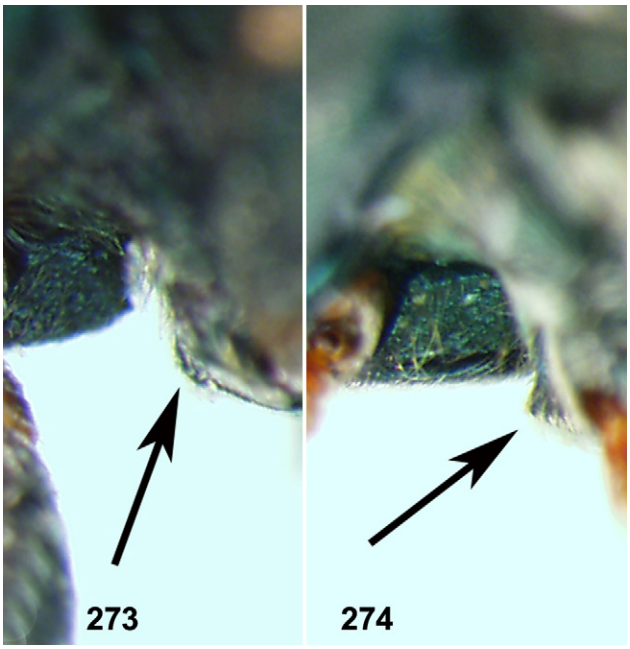
2(1). Mesosternal fossa with anteroventral margin convex to slightly and evenly concave with viewed laterally, anteroventral angle not projecting anteriorly, outer angle obtuse to completely rounded (arrow, Figure 273) . . . . . ***C. gagates*** **Erichson**
— Mesosternal fossa with anteroventral margin with ventral portion slightly to abruptly concave when viewed laterally, outer angle nearly vertical or projecting anteriorly (arrow, Figure 274) **3**

3(2). All visible abdominal ventrites nearly glabrous, ventrites III–V with bulges laterally . . . . . ***C. destinensis*** **Douglas**
— All visible abdominal ventrites with appressed vestiture similar to that on elytron **4**

4(3). Pronotum with medial impression extending to anterior margin, impression strongest on anterior half; currently known only from the Florida panhandle . . . . . ***C. panamapolis*** **Douglas**
— Pronotum with medial impression not extending to anterior margin, impression strongest basally; more generally distributed throughout much of the East **5**



Figures 270–272. Characteristics of Cardiophorinae. **270)** *Cardiophorus convexus* (scutellum). **271)** *C. gagates* (hypomeron). **272)** *Paracardiophorus cardisce* (hypomeron).



Figures 273–274. Mesosternum of *Cardiophorus* spp. (lateral view). **273)** *C. gagates*. **274)** *C. convexus*.

5(4). Pronotum with vestiture at base of hind angle short, suberect; punctuation much finer and denser than on elytral intervals . . . . . ***C. erythropus* Erichson**

— Pronotum with vestiture long throughout; punctuation on basal third of pronotum similar in size and density to that on elytral intervals . . . . . ***C. convexus* (Say)**

Cardiophorus carinatus Mathison and Douglas, 2018

Figures 280, 282

Cardiophorus carinatus Mathison and Douglas in Douglas and Mathison, 2018: 311

Diagnosis. Size small, length 4.9 mm on average. Color dark red-brown; legs and elytron paler; vestiture yellow-white. Antenna 11-segmented, serrate, extending to metacoxa; antennomere III roughly 2.5× length of II. Supra-antennal carinae depressed at center, appearing medially incised. Pronotum elongate, side arcuate; medial impression absent; sublateral longitudinal carinae present; larger punctures on disc intermixed with smaller punctures separated by a distance equal to 0.5–2.0× their diameter, punctures denser laterally; hind angle not truncate dorsally. Hypomeron with approximately right-angled notch on hind margin below the hind angle; submarginal lines restricted to posterior half. Ventral surface of prosternal process not margined to apex. Elytron with interval VIII forming a carinate ridge; intervals III–VII slightly carinate. Ventrites III–VI without lateral bulges; vestiture similar in density to that on elytra. Aedeagus with median lobe gradually tapering apically; paramere narrowed evenly from articulation to point, with one pair of long, lateral setae. Female unknown.

Distribution. Currently known only from the type locality in the Lake Wales Ridge, Polk County, FL (Douglas and Mathison 2018).

Specimens Examined. Florida (Polk). January. (Figure 282)

Discussion. This enigmatic species can be readily recognized from all other North American members of *Cardiophorus* by the very long antennae, carinate elytral intervals, and incised frontal margin formed by the

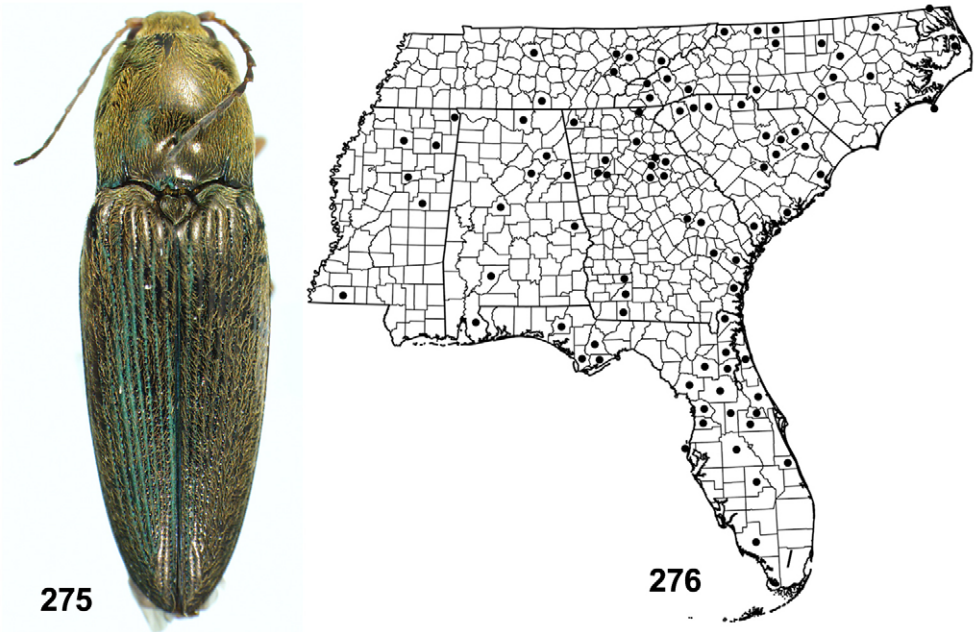
supra-antennal carinae. It is currently known only from the Lake Wales Ridge system in central Florida and is believed to be psammophilous (Douglas and Mathison 2018)

Cardiophorus convexus (Say, 1823)

Figures 270, 274–276

Elater convexa Say, 1823: 169
Cardiophorus amictus Melsheimer, 1844: 158
Cardiophorus erythropus LeConte, 1853: 497 (nec *Cardiophorus erythropus* Erichson, 1840: 293)
Cardiophorus insulus Candèze, 1860: 169
Cardiophorus floridae Candèze, 1865: 41
Cardiophorus angustatus Blanchard, 1889: 14

Diagnosis. Size small to moderate, length 6.5–10.5 mm. Color reddish-brown to black, with or without bronze tinge, pronotum sometimes darker than elytra; legs and basal two antennomeres red-brown; vestiture yellowish, appressed, uniform in length and density on frons, anterior portion of pronotum, and base of elytron, longer on posterior third of pronotum and hind angle. Antenna 11-segmented, serrate, extending beyond apex of pronotal hind angle by 1.5 antennomeres; antennomere II slightly shorter than III. Pronotum elongate, side arcuate; medial impression near base only, or with slight extension onto disc; sublateral longitudinal carina on each side of medial impression; larger punctures on disc intermixed with smaller punctures separated by a distance equal to 1–3× their diameter, punctures denser laterally; hind angle not truncate dorsally, vestiture at hind angle long, dense, appressed. Hypomeron with approximately right-angled notch on hind margin below the hind angle; submarginal lines reaching middle of pronotum anteriorly, joining lateral margin of hind angle. Ventral surface of prosternal process margined to apex. Mesosternal fossa with anterior edge convex ventrally when viewed laterally; anterior edge nearly vertical and projecting anteriorly before mesocoxae; anteroventral angle approximately right and projecting anteriorly. Elytral intervals with punctures similar in size and density to those on pronotum. Ventrites III–VI without lateral bulges; vestiture similar in density to that on elytra. Aedeagus with median lobe slightly constricted medially, apex rounded; paramere not abruptly narrowed at shoulder, inner edge weakly



Figures 275–276. *Cardiophorus convexus*. **275)** Habitus. **276)** Distributional data.

curved outwards basally, apex fully sclerotized with small subapical expansions, varying from long and pointed to low and rounded; one pair of long subapical setae. Female similar to male externally, but antenna sometimes shorter, at least reaching apex of pronotal hind angle.

Distribution. Eastern North America, west to Colorado and South Dakota (Douglas 2003). In the Southeast, previously recorded from Alabama, Florida, Georgia, North Carolina, South Carolina, and Tennessee (Blanchard 1889; Leng 1920; Brimley 1938; Löding 1945; Fattig 1951; Kirk 1969, 1970; Downie and Arnett 1996; Peck and Thomas 1998; Douglas 2003). The type locality of *C. floridae* is Saint John's in Duval County, FL; the type locality of *C. angustatus* is Haulover Beach in Miami-Dade County, FL. The following records from Mississippi represent a **New State Record**.

Specimens Examined. Alabama (Baldwin, Bibb, Cleburne, Etowah, Lee, Madison, Monroe, St. Clair); **Florida** (Alachua, Citrus, Collier, Clay, Franklin, Gulf, Hernando, Highlands, Indian River, Lake, Levy, Liberty, Marion, Miami-Dade, Nassau, Orange, Pinellas, Polk, Putnam, Seminole, St. Johns, Volusia, Walton); **Georgia** (Clarke, Cobb, Emanuel, Dougherty, Douglas, Fulton, Glynn, Grady, Greene, Hall, Johnson, Liberty, Mitchell, Morgan, Oconee, Oglethorpe, Tattnall, Towns, Walker); **Mississippi** (Amite, Lafayette, Lee, Tishomingo, Webster, Winston); **North Carolina** (Ashe, Burke, Camden, Catawba, Carteret, Dare, Forsyth, Halifax, Harnett, Haywood, Henderson, Hoke, Macon, Mecklenburg, Orange, Stokes, Surry, Swain, Wake, Wayne); **South Carolina** (Calhoun, Charleston, Darlington, Florence, Georgetown, Greenville, Jasper, Kershaw, Lee, Pickens, Spartanburg, Sumter, York); **Tennessee** (Anderson, Cocke, Franklin, Knox, Loudon, Wilson). March–September. (Figure 276)

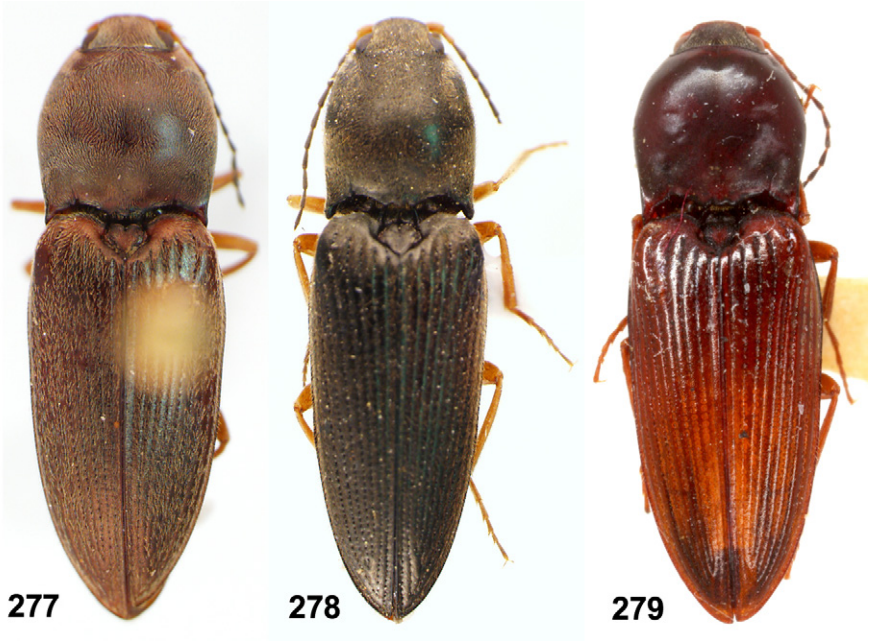
Discussion. *Cardiophorus convexus* is variable throughout its range and preliminary molecular data suggest it may represent a species complex (Hume Douglas, pers. comm. 2017). In the study area, this species is most similar to *C. erythropus*, from which it can be separated externally by the length and density of vestiture on the pronotum, especially at the hind angles. Based on the specimens I have examined, this is the most commonly collected *Cardiophorus* in the Southeast. Specimens have been collected by a variety of methods, including at ultraviolet and mercury vapor light and in flight intercept, panel, Malaise, pitfall, and Lindgren funnel traps. Specimens in Florida have been collected in association with dogwood, asparagus, scrub hickory, honeycombhead, and on southern live oak. Specimens from Highlands County, FL (ABS) were collected on the flowers of elliptical rushfoil. Specimens from Hoke County, NC (NCSU) were collected on eastern red cedar. Specimens from Nassau County, FL (FSCA) were collected in Theysohn/Pheroprax© pheromone traps. Douglas (2003) recorded it from several habitats including lake beach dune scrub, turkey oak scrub, pine barrens, oak savannah, mesic forests, and on mountain peaks and islands.

Cardiophorus destinensis Douglas, 2003

Figures 277, 284

Cardiophorus destinensis Douglas, 2003: 520

Diagnosis. Size small, length 7.5–9.2 mm. Color red-brown to dark red-brown; pronotum sometimes darker than elytron; basal two antennomeres and legs reddish; vestiture silvery, appressed, evenly distributed over pronotum and elytra. Antenna 11-segmented, serrate, reaching apex of pronotal hind angle or extending beyond them by length of one antennomere; antennomere III longer than II. Pronotum broadly rounded; medial impression at basal area only or barely extending to anterior third; sublateral longitudinal carina on either side of medial impression; larger punctures on disc intermixed with smaller punctures separated by a distance equal to 1.0–1.5× their diameter, punctures denser near hind angle; hind angle not truncate dorsally. Hypomeron with approximately right-angled notch on hind margin below the hind angle; submarginal lines reaching middle of pronotum anteriorly, joining lateral margin of hind angle. Ventral surface of prosternal process margined to apex. Mesosternal fossa with anterior edge concave ventrally when viewed laterally; anteroventral angle



Figures 277–279. *Cardiophorus* spp. **277)** *C. destinensis* (habitus). **278)** *C. erythropus* (habitus). **279)** *C. panamapolis* (habitus).

approximately right and projecting anteriorly. Elytral striae with punctures smaller, but sparser, than those on pronotum. Abdominal ventrites III–VI with bulges laterally (more pronounced in larger specimens); ventrites nearly glabrous. Aedeagus with median lobe subparallel, widening slightly apically, forming broadly rounded apex; paramere not abruptly narrowed at shoulder, gradually narrowing to apex, apex with small lateral expansion, two subapical setae. Female similar to male externally, sometimes with a shorter antenna.

Distribution. Known only from Okaloosa County, FL where it occurs on black dunes of beaches along the Gulf of Mexico (Douglas 2003). The type locality is the Henderson Beach Recreation Area.

Specimens Examined. Florida (Okaloosa). March-April. (Figure 284)

Discussion. This species is morphologically most similar to *C. erythropus*, from which it can be best distinguished by its glabrous ventrites. To date, it is only known from two locations in Okaloosa County, FL, from back of dunes along the beach. A large series of specimens were taken by beating scrub pine (Douglas 2003; RHTC).

Cardiophorus erythropus Erichson, 1840

Figures 278, 284

Cardiophorus erythropus Erichson, 1840: 293
Cardiophorus saturninus LeConte, 1853: 497

Diagnosis. Size moderately small, length 7.6–10.0 mm. Color red-brown to black; pronotum occasionally darker than elytron; legs and basal two antennomeres red-brown; vestiture silvery, shorter on posterior portion of pronotum. Antenna 11-segmented, serrate, falling just short of, or extending beyond, apex of pronotal hind angle by less than one antennomere; antennomere II slightly shorter than III. Pronotum rounded; medial impression strongest in basal half; short sublateral longitudinal carina on either side of medial impression; larger punctures on disc intermixed with smaller punctures, smaller punctures extremely fine, punctures denser near hind angles; vestiture near hind angle nearly absent to much finer than that on frons and anterior portion

of pronotum; hind angle slightly divergent to slightly convergent, not truncate dorsally. Hypomeron with approximately right-angled notch on hind margin below the hind angle; submarginal line reaching middle of pronotum anteriorly, joining lateral margin of hind angle. Ventral surface of prosternal process margined to apex. Mesosternal fossa with inner anterior edge with ventral portion slightly to abruptly concave when viewed laterally; ventral angle clearly vertical and projecting anteriorly at approximately right angle before mesocoxae. Elytral striae with punctures separated about twice the distance as those on pronotal disc. Ventrites III–VI without bulges; vestiture similar in length and density to that on apical half of elytron. Aedeagus with median lobe medially compressed, broadly rounding subapically then tapering to subacute to slightly rounded apex; paramere not abruptly narrowed at shoulder, inner edge weakly curved outwards basally, more so at apex, apex fully sclerotized with preapical expansions, two long preapical setae, relatively close to each other. Female similar to male externally.

Distribution. East Coast and Gulf Coast states, from Massachusetts to Alabama (Douglas 2003). In the Southeast, previously recorded from Alabama, Florida, Georgia, North Carolina, and South Carolina (LeConte 1853; Blanchard 1889; Leng 1920; Löding 1945; Fattig 1951; Kirk 1970; Douglas 2003). The type locality of *C. saturninus* is South Carolina (not further restricted).

Specimens Examined. Alabama (Baldwin, Dale); **Florida** (Bay, Highlands, Hillsborough, Lake, Levy, Liberty, Polk, Santa Rosa, Walton); **Georgia** (Emanuel, Montgomery, Tattnall); **North Carolina** (Beaufort, Dare); **South Carolina** (Barnwell, Clarendon, Pickens). April–July. (Figure 284)

Discussion. In the study area, this species is most similar to *C. convexus*, but the two can be separated by the relative length of pronotal setae, especially at the hind angle. It is also similar to *C. gagates*, from which it can be separated by characteristics of the mesosternal fossa. In the study area, this species has been apparently collected with less frequency than *C. convexus* or *C. gagates*. Specimens in the study area have been collected by sweeping vegetation, in Malaise traps, and at ultraviolet light. A specimen from Clarendon County, SC was collected on apple. A series of specimens (KES) from Santa Rosa County, FL were collected by beating *Pinus glabra*. Douglas (2003) recorded it from a variety of sandy habitats, including beach dune scrub, turkey oak scrub, and pine barrens.

Cardiophorus gagates Erichson, 1840

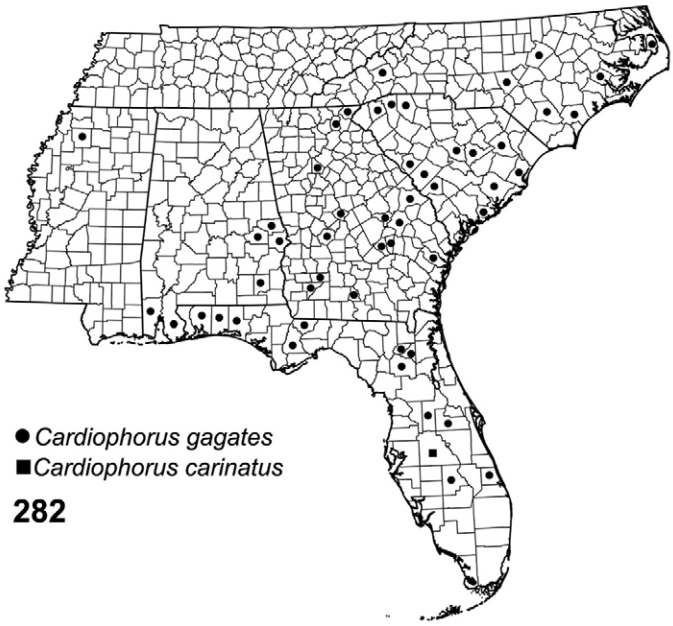
Figures 271, 273, 281–282

Cardiophorus laevicollis Dejean, 1833: 92 (*nomen nudum*)
Cardiophorus gagates Erichson, 1840: 297

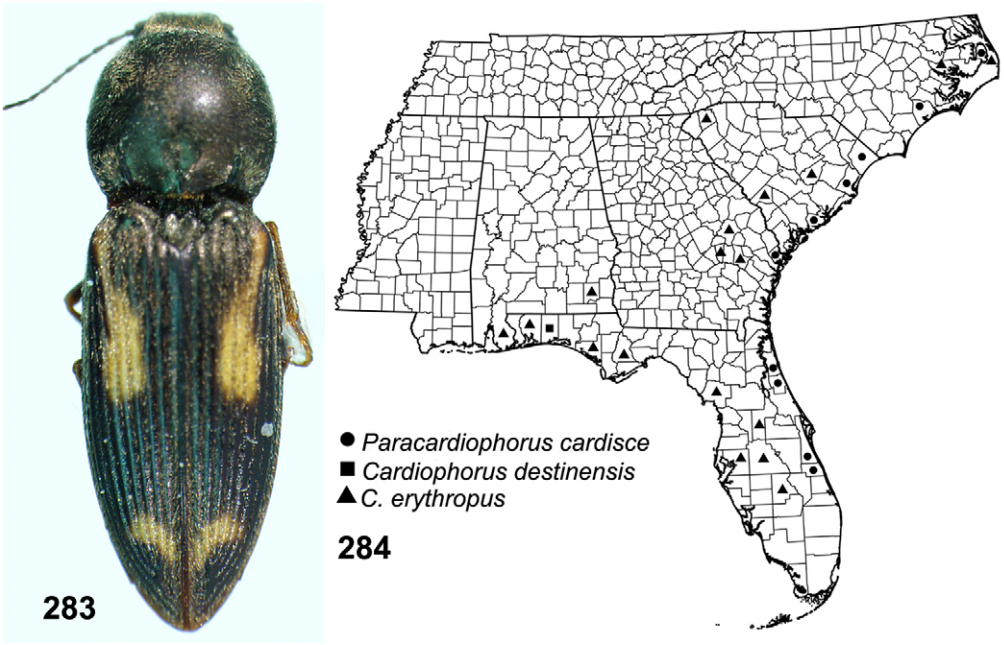
Diagnosis. Size small, length 5.0–8.0 mm. Color black; joints of appendages often red-brown; vestiture silvery, similar in length and density over pronotum and base of elytra. Antenna 11-segmented, serrate, extending beyond apex of pronotal hind angle by up to 2.5 antennomeres; antennomere II shorter than III, from half the length of III to nearly subequal. Pronotum broadly rounded; medial impression restricted to basal third; sublateral longitudinal carina longer, slender; large punctures on disc intermixed with smaller punctures, punctures denser laterally; hind angles not truncate dorsally. Hypomeron with approximately right-angled notch on hind margin below the hind angle; submarginal line reaching middle of pronotum anteriorly, joining lateral margin of hind angle, often appearing as a fold of cuticle overlapping upper portion of hypomeron from below. Prosternal process weakly curved dorsally, margined ventrally to apex. Mesosternal fossa with anterior edge convex ventrally when viewed laterally, flat to weakly concave; ventral angle obtuse and rounded. Elytral striae moderately densely punctate. Ventrites III–VI without lateral bulges; vestiture similar in density to elytral disc. Aedeagus with median lobe subparallel, sometimes slightly compressed medially; broadly rounded apex; paramere not abruptly narrowed at shoulder, inner arms curved weakly outwards basally, slightly incurved at apex,



Figures 280–281. *Cardiophorus* spp. **280)** *C. carinatus* (habitus – HOLOTYPE). **281)** *C. gagates* (habitus). *Cardiophorus carinatus* photo courtesy Hume Douglas (Canadian National Insect Collection, Agriculture and Agri-Food Canada, Ottawa Canada).



282) Distributional data for *C. gagates* and *C. carinatus*.



Figures 283–284. Cardiophorinae. **283)** *Paracardiophorus cardisce* (habitus). **284)** Distributional data for *P. cardisce*, *Cardiophorus destinensis*, and *C. erythropus*.

apex translucent, without blade or expansion, two preapical setae. Female similar to male externally but antenna failing to reach apex of pronotal hind angle.

Distribution. Eastern North America, west to Texas and Oklahoma (Douglas 2003). Previously recorded from all seven states in the study area (Blanchard 1889; Leng 1910, 1920; Brimley 1938; Fattig 1951; Kirk 1969, 1970; Downie and Arnett 1996; Peck and Thomas 1998; Douglas 2003).

Specimens Examined. Alabama (Baldwin, Dale, Lee, Macon, Mobile, Russell); **Florida** (Alachua, Bradford, Gadsden, Highlands, Lake, Liberty, Okaloosa, Orange, Santa Rosa, St. Lucie, Union, Walton); **Georgia** (Baker, Bibb, Burke, Cook, DeKalb, Dougherty, Emanuel, Johnson, Liberty, Macon, Montgomery, Rabun, Wheeler, White); **Mississippi** (Lafayette); **North Carolina** (Bladen, Buncombe, Craven, Dare, Moore, Pender, Wake); **South Carolina** (Aiken, Barnwell, Berkeley, Charleston, Edgefield, Florence, Georgetown, Greenville, Jasper, Kershaw, Pickens, Richland, Spartanburg, Sumter). February–July. (Figure 282)

Discussion. In the study area, this species is readily recognized by its solid black color and having the ventral angle of the mesosternal fossa obtuse and rounded. Despite its wide range, it is not as commonly collected as *C. convexus* in the study area. Specimens in the study area have been collected by sweeping and beating vegetation, in flight, in Lindgren funnel traps, among lichens, on sand, and in association with oak (including eastern live oak in Orange County, FL). Specimens from Alachua County, FL (FSCA) were collected in Nantucket pine tip moth pheromone traps. Specimens from Baker County, GA were collected in the burrows of pocket gophers. Fattig (1951) reported it feeding on oak in White County, GA. Douglas (2003) recorded it from a variety of sandy habitats and indicated it has been collected in flight intercept and light traps, suggesting it may be a strong flyer.

Cardiophorus panamapolis Douglas, 2003

Figure 279

Cardiophorus panamapolis Douglas, 2003: 519

Diagnosis. Female (male undescribed). Size small, length 7.9–8.7 mm. Color red-brown, often with exposed sternites, frons, and pronotal hind angles darker; vestiture silvery, shorter on pronotal disc than on frons, venter, and elytra. Antenna 11-segmented, serrate, falling short of apex of pronotal hind angle a length approximately that of half of antennomere XI; antennomere II shorter than III. Pronotum broadly rounded; medial impression extending from base to near anterior margin, strongest in anterior half; shorter sublateral longitudinal carina on both sides of medial impression; punctures on disc extremely fine and dense; hind angle not truncate dorsally. Hypomeron with approximately right-angled notch on hind margin below the hind angle; submarginal lines reaching middle of pronotum anteriorly, joining lateral margin of hind angle. Prosternal process scarcely curved dorsally, ventrally margined to apex. Mesosternal fossa with inner anterior edge with ventral portion gently concave when viewed laterally; ventral angle produced anteriorly nearly vertically. Elytral striae with punctures twice the diameter of those on pronotal disc and more sparse. Ventrites III–VII without bulges; vestiture similar in length to that on elytron but denser.

Distribution. Known only from the type locality in West Panama City, Bay County, FL (Douglas 2003).

Specimens Examined. None.

Discussion. The male was unknown at the time of Douglas' (2003) description. This species is best-recognized in the study area by having the medial impression of the pronotum extending nearly to the anterior margin and stronger in the anterior third.

Esthesopus Eschscholtz, 1829

Esthesopus Eschscholtz, 1829: 32

Diagnosis. Size small, form robust. Color usually uniform, yellow-brown to black (bicolored in one species). Supra-antennal carinae complete, single, without secondary carina extending from supra-antennal carina over base of eye. Antenna 11-segmented, serrate. Basal margin of pronotum slightly sinuate and smooth, without basal indentations (except in *E. pusio*). Posterior margin of hypomeron sinuate and without a distinct rectangular notch (except in *E. pusio*). Anterior margin of scutellum convex, rounded dorsally, not apically emarginated (except in *E. pusio*); apex more pointed. Suture between meso- and metasternum lacking. Tarsomere IV short, less than half the length of III, with membranous lobe or slanting (lobe lacking in the western *E. mitis*); tarsomere I long, as long as II and III combined; claws simple or apically cleft, without basal setae. Aedeagus with paramere lacking apical blade. No marked sexual dimorphism externally.

Range and Numbers. Rhyand (1976) recognized seven species in the US and Canada, placing three western species in synonymy with *E. parcus* Horn and describing a new species from Texas. Johnson (2002) indicated there are nine species, generally distributed in North America. Four species have been recorded from the Southeast.

Discussion. The first treatment of this genus was by Horn (1884), who recognized six species north of Mexico. Becker (1973) re-evaluated the characters separating this genus from the related *Horistonotus* and transferred the western *H. mitis* Horn to *Esthesopus*. Rhyand (1976) revised the genus as a Masters thesis that was never published. In the study area, members of this genus are recognized by having a typical cardiophorine habitus with a membranous lobe on tarsomere IV. Most specimens were collected at light.

Key to the species of *Esthesopus* in the Southeast
(adapted from Rhyand 1976)

1. Bicolored, pronotum red and elytron black . . . . . ***E. atripennis* Candèze**
— Pronotum and elytra concolorous **2**

2(1). Size small, under 4.0 mm in length; known only from Florida and southern Georgia . . ***E. pusio* Horn**
— Size larger, greater than 5.0 mm in length; more generally distributed **3**

3(2). Aedeagus with median lobe medially depressed at apex . . . . . ***E. claricollis* (Say)**
— Aedeagus with median lobe broadly rounded apically . . . . . ***E. praeditus* Horn**

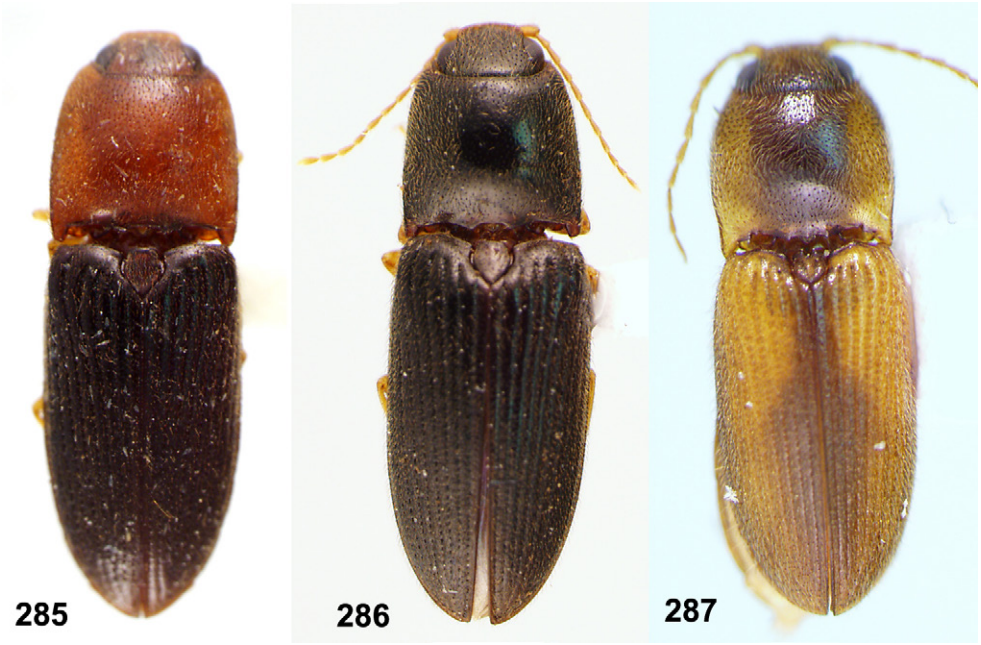
Esthesopus atripennis Candèze, 1860

Figures 285, 288

Esthesopus atripennis Candèze, 1860: 280
Esthesopus bicolor Horn, 1874: 22

Diagnosis. Size small, length 5.5–5.9 mm, form robust. Bicolored; head and pronotum red, elytron black; dark red-brown ventrally; vestiture yellowish, fine and sparse. Antenna 11-segmented, serrate, not reaching apex of pronotal hind angle; antennomeres II and III combined longer than IV. Pronotum slightly longer than wide, side moderately arcuate; punctures on disc shallow to moderately deep, variably spaced; larger punctures intermixed with smaller punctures of varying depth; hind angles parallel to slightly convergent. Elytron widest medially, converging apically; striae well-impressed, deeply and coarsely punctured; intervals convex and sparsely punctate. Aedeagus with median lobe broadly rounded at apex; paramere subparallel, gradually tapering to subacute apex, two long, subapical setae. Female externally similar to male.

Distribution. Recorded from Florida and Georgia in the United States (Horn 1884; Champion 1896; Leng 1920; Fattig 1951; Frost 1975; Rhyand 1976; Peck and Thomas 1998). The holotype of *E. bicolor* is labeled as



Figures 285–287. *Esthesopus* spp. **285)** *E. atripennis* (habitus). **286)** *E. praeditus* (habitus). **287)** *E. pusio* (habitus).

being collected in Delaware, but this certainly represents a labeling error. Peck and Thomas' (1998) record for *Anchastus bicolor* in Highlands County, FL refers to this species.

Specimens Examined. Florida (Brevard, Highlands, Marion, Palm Beach). April–July, September. (Figure 288)

Discussion. This species is easily recognized by its color and presence of a membranous lobe on tarsomere IV. Most specimens in the study area have been collected at ultraviolet and mercury vapor light. Specimens from Brevard County, FL (UCFC) were collected in Malaise traps set in a xeric oak hammock.

Esthesopus claricollis (Say, 1839)

(not illustrated)

Elater claricollis Say, 1839: 179

Diagnosis. Size small, 5.5–6.4 mm in length, form moderately robust. Color dark red-brown to black; vestiture yellowish, fine and moderately dense. Antenna 11-segmented, serrate, extending beyond apex of pronotal hind angle by 1–2 antennomeres; antennomere II longer than III, II and III combined distinctly longer than IV. Pronotum subquadrate to slightly wider than long, broadly rounded or parallel medially and slightly convergent posteriorly; punctures on disc variable, large punctures usually shallow, widely separated, intermixed with smaller, weakly impressed punctures; hind angles slightly divergent. Elytron widest medially, converging apically; striae well-impressed, punctures coarse, deep, and close; intervals convex and distinctly punctate. Aedeagus with median lobe broadened apically with medial depression; paramere subparallel to broadly rounded apex, two long subapical setae. Female similar to male externally.

Distribution. Eastern United States, from Indiana south to Florida and west to Texas (Downie and Arnett 1996). In the Southeast, previously recorded from Alabama, Florida, Georgia, Mississippi, and South Carolina (Leng 1920; Löding 1945; Fattig 1951; Kirk 1969; Rhyand 1976; Downie and Arnett 1996; Peck and Thomas 1998). Löding's (1945) record from Daphne, AL is based on a misidentification (see below). No specimens from the study area were positively confirmed in this study and it is possible it does not occur in the Southeast (Paul Johnson, pers. comm. 2014)

Specimens Examined. None.

Discussion. This species is most similar to *E. praeditus* in the study area and examination of aedeagus is the only way to reliably separate the two. Horn (1884) used the presence (*E. claricollis*) or absence (*E. praeditus*) of basal indentations on the pronotum to separate the two, but this does not appear to be a reliable character. I have examined the specimen (GSAT) that was the basis of Löding's (1945) record from Daphne, AL (Baldwin County) and have identified it as *E. praeditus* based on the characters of the aedeagus.

Esthesopus praeditus Horn, 1884

Figures 286, 288

Esthesopus praeditus Horn, 1884: 42

Diagnosis. Externally nearly indistinguishable from *E. claricollis*. Aedeagus with median lobe subparallel, broadly rounded apically; paramere diverging apically to subacute apex, two long subapical setae. Female externally similar to male.

Distribution. Southern United States, from Texas to Georgia (Rhyand 1976). In the Southeast, previously recorded from Alabama, Georgia, and Tennessee (Horn 1884; Leng 1920; Löding 1945; Rhyand 1976). The following records from Florida, Mississippi, North Carolina, and South Carolina represent **New State Records**. Löding's (1945) record of *E. claricollis* from Daphne, AL pertains to this species.

Specimens Examined. Alabama (Baldwin, Jefferson, Monroe, Monroe); **Florida** (Alachua, Baker, Clay, Hernando, Highlands, Hillsborough, Levy, Liberty, Orange, Seminole, Sumter); **Georgia** (Chattooga, Decatur, Dougherty, Lee, Long, McIntosh, Tattnall); **Mississippi** (Grenada, Hancock, Harrison, Jackson, Lowndes, Noxubee, Oktibbeha); **North Carolina** (Mecklenburg, New Hanover, Stokes); **South Carolina** (Dorchester); **Tennessee** (Hamilton, Haywood). May–September. (Figure 288)

Discussion. This species is most similar to *E. claricollis* in the study area and examination of aedeagus is the only way to reliably separate the two. Horn (1884) used the presence (*E. claricollis*) or absence (*E. praeditus*) of basal indentations on the pronotum to separate the two, but this does not appear to be a reliable character. Rhyand (1976) noted the pronotal punctures tend to be larger in *E. praeditus*, but again this character is variable in *E. claricollis*. Specimens in the study area have been collected at ultraviolet and mercury vapor light, and in Lindgren funnel traps. Specimens from Seminole County, FL (UCFC) were collected in Malaise traps set in a mixed longleaf pine-turkey oak forest.

Esthesopus pusio Horn, 1884

Figures 287–288

Esthesopus pusio Horn, 1884: 43

Diagnosis. Size very small, length 3.2–3.9 mm, form slightly robust. Color light yellow-brown to dark brown, darker individuals often with lighter appendages, elytral shoulders, scutellum, and pronotal hind angles; vestiture yellow to yellow-gray, fine and moderate. Antenna 11-segmented, serrate, extending beyond apex of pronotal hind angle by 2–3 antennomeres; antennomeres II and III combined longer than IV. Pronotum subquadrate to slightly wider than long; punctures shallow and irregularly spaced, intermixed smaller punctures scarce or absent; hind angle parallel to slightly divergent. Elytron widest medially, converging to apex; striae moderately impressed and moderately coarsely punctures; intervals flat, slightly rugose, shiny. Aedeagus with

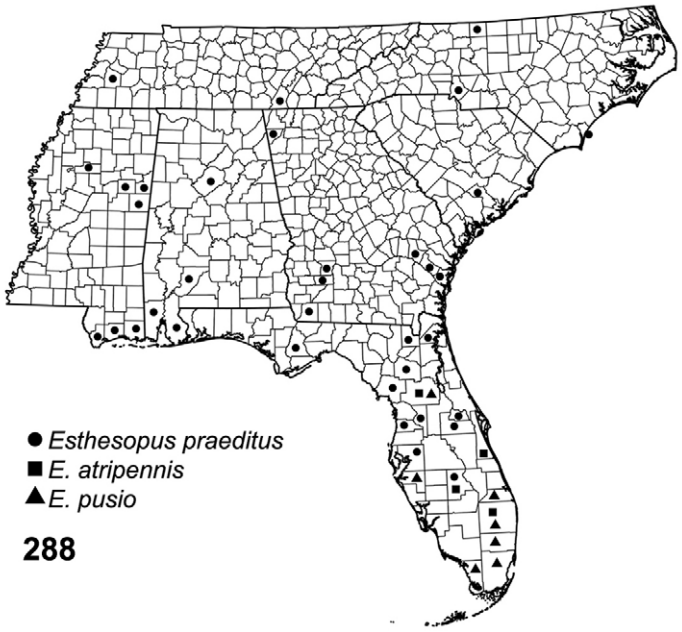


Figure 288. Distributional data for *Esthesopus praeditus*, *E. atripennis*, and *E. pusio*.

median lobe slender, subparallel to subacute apex; parameres slender, apex subacute, two long subapical setae and a small cluster of short, erect apical setae. Female externally similar to male.

Distribution. Currently known only from Florida and Georgia (Horn 1884; Leng 1920; Fattig 1951; Rhyand 1976; Peck and Thomas 1998). The type locality of *pusio* is Florida (not further restricted).

Specimens Examined. Florida (Broward, Manatee, Marion, Martin, Miami-Dade, Monroe, Palm Beach). February, April–August. (Figure 288)

Discussion. This species should be readily recognized externally by its small size and paler color (in comparison with other southeastern *Esthesopus* spp.). It also shows several external features (base of pronotum, anterior margin of scutellum, and base of hypomeron) in common with *Horistonotus*, but the characteristics of the tarsomeres support its placement in *Esthesopus*. This species seems restricted to the Southeastern Plains and Southern Coastal Plains. Specimens in the study area have been collected in Lindgren funnel traps and by sweeping and beating vegetation.

Floridelater Douglas, 2017

Floridelater Douglas, 2017: 39

Diagnosis. Size small. Color brown; vestiture silvery. Eyes normal in males. Antenna 11-segmented, weakly serrate, extending beyond apex of pronotal hind angle by 3–4 antennomeres. Pronotum longer than wide, very convex; side arcuate, wider in middle, narrowing anteriorly and basally; finely granulate; hind angle short, subacute, dorsal carina lacking. Scutellum broadly triangular, slightly incised anteriorly, posteriorly bilobed. Elytron connate, elongate-oval, very convex; striae finely punctured; intervals granulose. Metathoracic wings lacking. Tarsomeres without membranous lobes; claws slender, simple, without basal setae. Aedeagus with median lobe widened apically; parameres articulated in posterior half, with lateral expansions, apex not forked, one pair of setae. Marked sexual dimorphism; females similar to males in general form but more convex, with smaller eyes, shorter tarsi, and with very short moniliform antennae that do not reach half the length of the pronotum.

Range and Numbers. One species, distributed in coastal areas from Louisiana to Florida (Peck and Thomas 1998).

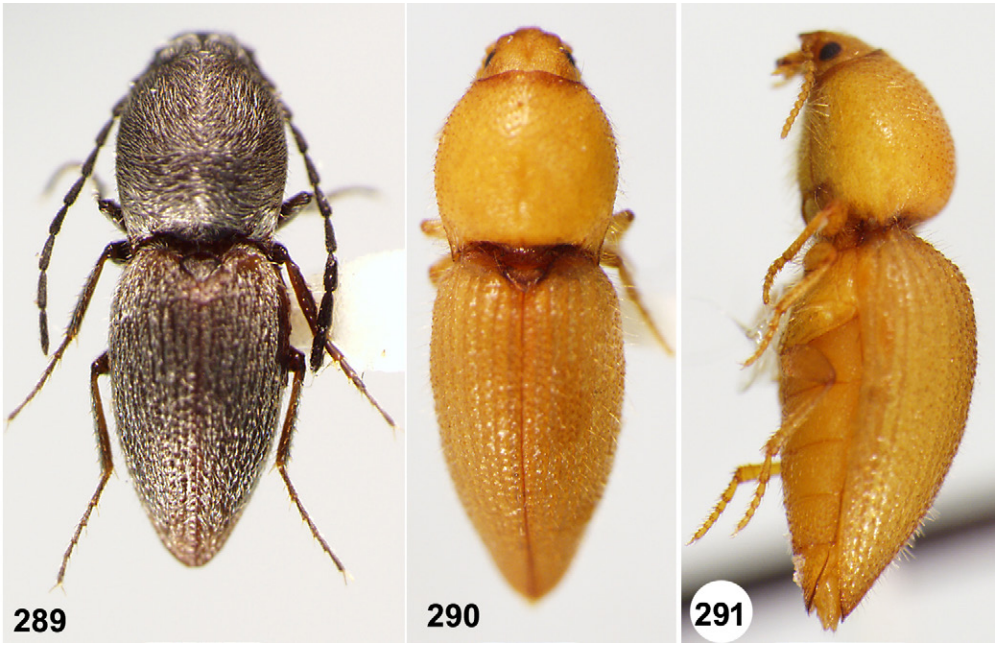
Discussion. Douglas (2017) described the genus *Floridelater* to accommodate *Coptostethus americanus*, a species with a complicated taxonomic history. Horn (1871) described *C. americanus* from a single specimen from Louisiana. He expressed some doubt of its placement in *Coptostethus*, an Old-World taxon generally treated as a subgenus of *Cardiophorus* (Schimmel 2008) but did not think that a description of a new genus was warranted at the time. Johnson (2001) transferred the species to *Negastrius*. Douglas' (2011a) phylogenetic analysis based on adult morphological characters showed that the species does appear to belong in Cardiophorinae, probably basal to other members of the subfamily, and not in *Negastrius* as assigned by Johnson. Douglas (2017) later described *Floridelater* as part of a new phylogenetic analysis and updated generic classification of the Cardiophorinae.

Floridelater americanus (Horn, 1871)

Figures 289–291, 296

Coptostethus americanus Horn, 1871: 303

Diagnosis. Size small, 3.5–4.5 mm in length. Color brown; vestiture silvery. Eyes normal in males. Antenna 11-segmented, weakly serrate, extending beyond apex of pronotal hind angle by 3–4 antennomeres. Pronotum longer than wide, very convex; side arcuate, wider in middle, narrowing anteriorly and basally; finely granulate;



Figures 289–291. *Floridelater americanus*. **289)** Male habitus. **290)** Female habitus. **291)** Female habitus (lateral).

hind angle short, subacute, dorsal carina lacking. Scutellum broadly triangular, slightly incised anteriorly, posteriorly bilobed. Elytron connate, elongate-oval, very convex; striae finely punctured; intervals granulose. Metathoracic wings lacking. Tarsomeres without membranous lobes; claws slender, simple, without basal setae. Aedeagus with median lobe widened apically; parameres articulated in posterior half, with lateral expansions, apex not forked, one pair of setae. Marked sexual dimorphism; females (Figures 290–291) similar to males in general form but more convex, with smaller eyes, shorter tarsi, and with very short moniliform antennae that do not reach half the length of the pronotum. Female specimens I examined were pale yellow, much paler than the males.

Distribution. Coastal areas, from Louisiana to Florida (Peck and Thomas 1998). In the current study area, previously recorded only from Alabama and Florida (Löding 1945; Peck and Thomas 1998). The following records from Mississippi represent a **New State Record**.

Specimens Examined. Alabama (Baldwin); **Florida** (Bay, Escambia, Franklin, Okaloosa, Santa Rosa, Walton); **Mississippi** (Harrison, Jackson). February, April–September. (Figure 296)

Discussion. Collection records indicate this species appears to be a beach and dune specialist along the Gulf Coast. The morphological features of this species make it unlikely it would be confused with other elaterids in the study area, but it shares several derived features in common with brachypterous, psammophilous species of *Horistonotus* in the Southwest. Most specimens were collected by sifting sand. Others were collected in pitfall traps. Specimens from Santa Rosa County, FL (UGCA) were collected on dune grasses. Specimens from Harrison County, MS (MEM) were also collected on beach grasses (genus not indicated). Although not widespread, specimens can be collected in abundance under the right conditions.

Horistonotus Candèze, 1860

Horistonotus Candèze, 1860: 243

Diagnosis. Size small, form elongate to robust. Color usually uniform, yellow-brown to black (bicolored in one species), Supra-antennal carinae complete; secondary carina extending from supra-antennal carina over base of antenna to middle of eye. Antenna 11-segmented, serrate. Pronotum with posterior margin strongly sinuate; basal indentation present between midline and base of hind angle. Posterior margin of hypomeron with defined rectangular notch adjacent to hind angle. Scutellum with anterior margin depressed or incised, sometimes deeply, giving the scutellum a heart-shaped appearance, apex more rounded. Suture present between meso- and metathorax. Metathoracic wings functional or not. Tarsomere IV elongate, two-thirds as long as III, not slanted, lacking membranous lobe; tarsomere I shorter than II and III combined; claws simple, medially cleft, or apically cleft, without basal setae. aedeagus with paramere lacking without apical blade. No marked sexual dimorphism externally.

Range and Numbers. There are 13 species, generally distributed in the US and Canada (Wells 2000). Four species have been recorded from the Southeast, one of which, *H. exoletus* (Erichson), does not occur here (see Discussion below under *H. uhleri*).

Discussion. The first treatment of this genus for North America was by Horn (1884), who recognized 14 species. Becker (1973) re-evaluated the characters separating this genus from the related *Esthesopus* and transferred the western *H. mitis* Horn to *Esthesopus*. Wells (2000) described two new species for North America and transferred the southwestern *H. vulneratus* Horn to *Cardiophorus*. In the Southeast, *Horistonotus* species can be recognized by their small, general cardiophorine form, lack of a membranous lobe on tarsomere IV, and lack of a secondary carina or groove extending from the pronotum onto the hypomeron. Most specimens in the study area have been collected at light or on vegetation.

Key to the species of *Horistonotus* in the Southeast
(adapted from Wells 2000)

1. Bicolored black, each elytron with basal and apical orange maculae . . . . . ***H. curiatus* (Say)**
— Unicolored yellow-brown to dark brown **2**

2(1). Lateral margin of pronotum sinuate on basal third, hind angles slightly divergent; aedeagus with paramere with rounded apex; generally distributed in the East . . . . . ***H. uhleri* Horn**
— Lateral margin of pronotum nearly straight on basal third, hind angles not divergent; aedeagus with paramere with subacute apex; known only from a few islands off the coast of Georgia . . . . . ***H. bontai* Wells**

Horistonotus bontai Wells, 2000

Figures 294, 296

Horistonotus bontai Wells, 2000: 413

Diagnosis. Size small, 6.5–7.5 mm in length. Color yellow-brown; vestiture yellow-brown, double. Antenna 11-segmented, serrate, extending beyond apices of pronotal hind angles by 1–2 antennomeres. Pronotum evenly arcuate to base; two basal plicae present along basal margin; medial impression on basal third; punctures fine, double, with smaller punctures intermixed among larger punctures; hind angles not divergent. Scutellum not deeply incised anteriorly. Elytron subparallel on basal two-thirds, gradually tapering to apex; interval costate on apical fourth. Tarsal claws apically cleft. Aedeagus with median lobe evenly tapering to bluntly rounded apex; paramere subparallel, suddenly tapering subapically to pointed apex, single long subapical seta. Female similar

to male externally but with shorter antenna, just reaching apex of pronotal hind angle or extending beyond by one antennomere.

Distribution. Currently known from a few coastal islands in Glynn, Liberty, and McIntosh counties in Georgia (Wells 2000). The type locality is Saint Simons Island in Glynn County.

Specimens Examined. Georgia (Glynn, McIntosh). June. (Figure 296)

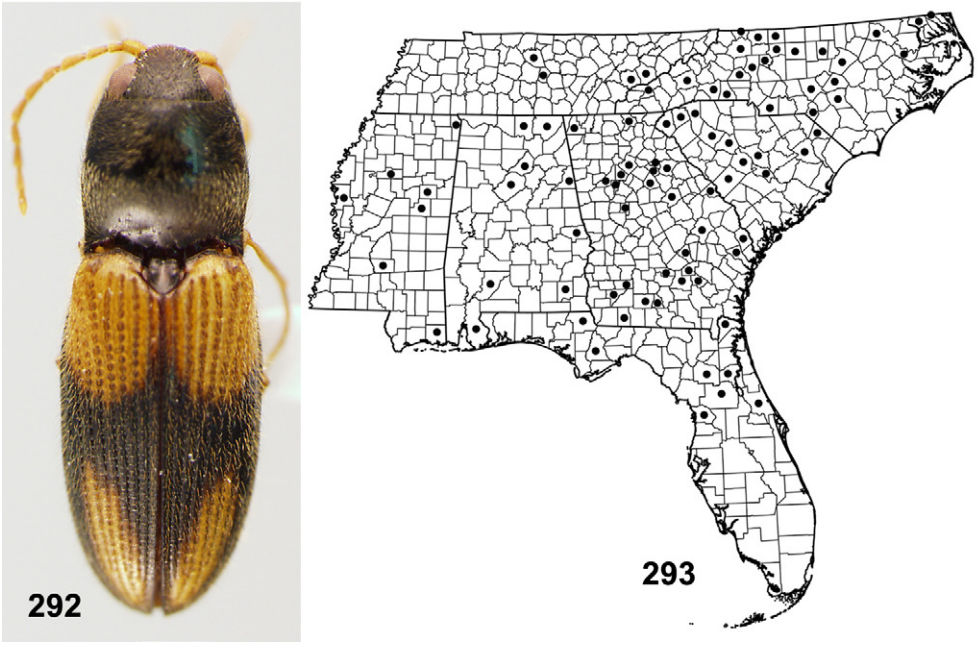
Discussion. In the study area, this species is most similar to *H. uhleri*, from which it can be distinguished externally by the shape of the pronotum and non-divergent hind angle. It is also currently known to be rather geographically restricted, while *H. uhleri* is known from several localities along the East Coast, from Maryland to Florida and west to Indiana. I have examined specimens of both species from the same collection even from Sapelo Island, McIntosh County, Georgia (CMNH). Specimens have been collected by beating vegetation.

Horistonotus curiatus (Say, 1839)

Figures 292–293

Elater curiatus Say, 1839: 173
Cardiophorus areolatus Erichson, 1840: 320

Diagnosis. Size small, 4.0–5.0 mm in length. Bicolored, pronotum and elytron black, the latter with large basal and apical orange maculae; antennae and legs yellow-brown; vestiture yellow-brown, dense. Antenna 11-segmented, serrate, extending beyond apex of pronotal hind angle by about two antennomeres. Pronotum widest at middle, subparallel basally with slight concavity at base of hind angle; no pronounced medial depression; two basal plicae present basally on each side of the middle; punctures dense, single; hind angles scarcely divergent. Scutellum deeply incised anteriorly, appearing heart-shaped. Elytron subparallel in basal two-thirds, gradually tapering to apex; intervals not costate apically. Tarsal claws medially toothed. Aedeagus with median lobe subparallel, slightly tapering to rounded apex; paramere subparallel, slightly tapering to subacute apex, single, long subapical seta present. Female similar to male externally but often slightly larger and with shorter antenna, just reaching apex of pronotal hind angle.



Figures 292–293. *Horistonotus curiatus*. **292)** Habitus. **293)** Distributional data.

Distribution. Eastern North America, west to Texas (Peck and Thomas 1998). In the Southeast, previously recorded from Alabama, Florida, Georgia, North Carolina, and South Carolina (Leng 1910; Brimley 1938; Löding 1945; Fattig 1851; Kirk 1969, 1970; Downie and Arnett 1996; Peck and Thomas 1998). The following records from Mississippi and Tennessee represent **New State Records**.

Specimens Examined. Alabama (Baldwin, Blount, Cleburne, Dale, Lee, Escambia, Jackson, Jefferson, Madison, Monroe); **Florida** (Alachua, Citrus, Jackson, Liberty, Marion, Nassau, Putnam, Volusia); **Georgia** (Bacon, Baker, Ben Hill, Bryan, Clarke, Clayton, Coffee, Colquitt, Cook, DeKalb, Dougherty, Effingham, Emanuel, Fulton, Grady, Gwinnett, Hancock, Jeff Davis, Lamar, Morgan, Oconee, Oglethorpe, Richmond, Union, Walker, Wheeler); **Mississippi** (Grenada, Jackson, Oktibbeha, Simpson, Tishomingo, Washington, Winston); **North Carolina** (Alleghany, Buncombe, Camden, Catawba, Cleveland, Cumberland, Davie, Forsyth, Gates, Guilford, Halifax, Harnett, Iredell, Martin, Moore, Orange, Rutherford, Scotland, Stokes, Surry, Swain, Union, Wake, Wilkes); **South Carolina** (Aiken, Calhoun, Dillon, Florence, Greenville, Laurens, Lexington, Newberry, Oconee, Pickens, Richland); **Tennessee** (Blount, Cannon, Sevier, Winston). February, April–August, October–December. (Figure 293)

Discussion. In the study area, this species is readily recognized by its size and color. The only other elaterid with a similar size and color pattern in the study area is *Ampedus areolatus*; subfamilial and generic characters should readily separate the two. This species has been readily collected in the Southeast and by a variety of means, including at ultraviolet light, in Lindgren funnel, Malaise, and flight intercept traps, sifting and Berlese extraction of leaf litter, and from sweeping, beating, and hand picking from vegetation. In the spring and early summer in Georgia, I have often observed this species resting on the large leaves of various hardwoods along forest paths, sometimes in numbers. A similar perching behavior can be seen with *Limonius basilaris* and *L. quercinus*, and the two species can be found together with *H. curiatus*. Fattig (1951) recorded specimens from White County, GA feeding on white oak.

Horistonotus uhleri Horn, 1871

Figures 295–296

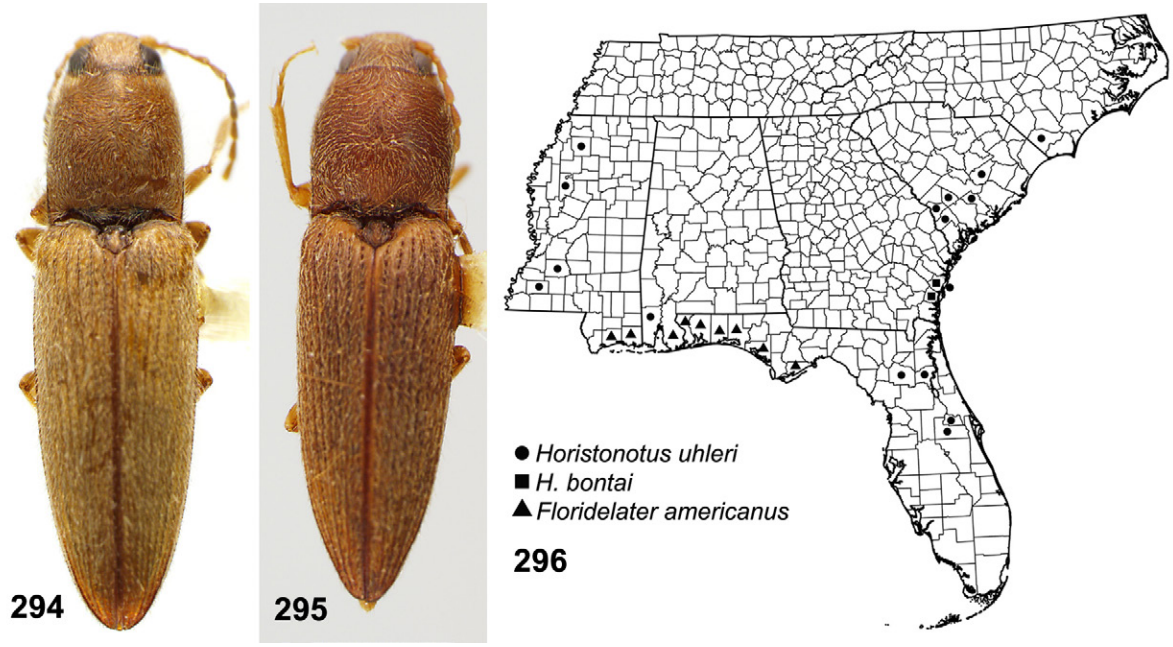
Horistonotus uhleri Horn, 1871: 302

Diagnosis. Size small, 6.0–7.0 mm in length. Color red-brown; vestiture yellow-brown, dense, long on pronotum. Antenna 11-segmented, weakly serrate, extending beyond apex of pronotal hind angle by 2–3 antennomeres. Pronotum widest at middle; slight concavity at base of hind angle; medial depression restricted to basal third; basal plicae small but distinct; punctures fine, single; hind angles slightly divergent. Scutellum not deeply incised anteriorly. Elytron widest below humerus, gradually narrowing apically; costate in apical third. Tarsal claws apically cleft. Aedeagus with median lobe subparallel, scarcely narrowing to broadly rounded apex; paramere broadest at shoulder, subparallel and scarcely narrowing to slightly rounded apex, single long subapical seta. No external sexual dimorphism noted.

Distribution. Eastern United States, from Maryland south to Florida (Peck and Thomas 1998). In the Southeast, previously recorded from Alabama, Florida, Georgia, Mississippi, North Carolina, and South Carolina (Horn 1871; Horn 1884; Hyslop 1915b; Leng 1920; Brimley 1938; Tenhet 1939; Löding 1945; Fattig 1951; Kirk 1969, 1970; Peck and Thomas 1998). Previous North American records of *H. exoletus* refer to this species.

Specimens Examined. Alabama (Mobile); **Florida** (Alachua, Orange, Putnam, Seminole); **Georgia** (McIntosh); **Mississippi** (Copiah, Franklin, Leflore, Panola); **North Carolina** (Columbus); **South Carolina** (Allendale, Bamberg, Clarendon, Dorchester, Hampton). June-September. (Figure 296)

Discussion. In the study area, this species is most similar to *H. bontai*, from which it can be distinguished externally by the shape of the pronotum. It also has a much more extensive geographic distribution than the latter. I have examined specimens of both species from the same collection event from Sapelo Island, McIntosh County, Georgia (CMNH). Horn (1871, 1884) discussed similarities between this species and *H. exoletus* from South



Figures 294–295. Cardiophorinae. **294)** *Horistonotus bontai* (habitus). **295)** *H. uhleri* (habitus). **296)** Distributional data for *H. uhleri*, *H. bontai*, and *Floridelater americanus*.

America. Previous North American records for *H. exoletus* actually pertain to *H. uhleri* (Wells 2000). Specimens in the study area have been collected at ultraviolet light, in Malaise traps, in yellow pan traps, and on sandbars. Tenhet (1939) implicated it as a pest of corn, cotton, and black-eyes peas in South Carolina. Hyslop (1915a) described the larva.

Paracardiophorus Schwarz, 1895

Paracardiophorus Schwarz, 1895: 40

Diagnosis. Size small, form elongate to robust. Color usually black, usually with white or yellow maculae on the elytra. Supra-antennal carinae complete across frons. Lateral margin of pronotum absent or represented by submarginal line on hypomeron; base of hypomeron sinuate at hind angle (Figure 272). Scutellum distinctly emarginate anteriorly, appearing heart-shaped. Metathoracic wings functional for flight. Tarsomeres lacking membranous lobes; claws simple or with basal or median tooth. Aedeagus with median lobe simple. Female similar to male externally, but antennae usually shorter.

Range and Numbers. There are 22 species, generally distributed in the US and Canada (Douglas 2017). One species has been recorded from the Southeast.

Discussion. Douglas (2017) resurrected *Paracardiophorus* for North American members of *Cardiophorus* with the hypomeron sinuate at the base of the hind angle and usually with maculate elytra. *Paracardiophorus* species are usually associated with sandy habitats (Lanchester 1971; Douglas 2003).

Paracardiophorus cardisce (Say, 1839)

Figures 272, 283–284

Elater cardisce Say, 1839: 169
Cardiophorus dejeanii LeConte, 1853: 497

Diagnosis. Size small, length 5.1–8.7 mm. Color dark red-brown to black; each elytron with two pale yellowish maculae; vestiture silvery, appressed, uniform in length and density on frons, pronotum, and basal third of elytra. Antenna 11-segmented, serrate, extending beyond apex of pronotal hind angle by up to 1.5 antennomeres; antennomere II half to three-fourths length of III. Pronotum broadly rounded; medial impression confined to posterior slope or faintly impressed onto anterior quarter; sublateral longitudinal carina on each side of medial impression; larger punctures on disc intermixed with smaller punctures separated by less than to more than twice their diameters, punctures denser posteriorly; hind angle truncate dorsally, diverging from hypomeron when viewed from below. Hypomeron with concavity on hind angle shallow and evenly curved; submarginal lines reaching middle anteriorly. Ventral surface of prosternal process margined laterally to apex. Mesosternal fossa with anterior edge convex ventrally when viewed laterally; anteroventral angle obtuse and rounded. Elytral intervals with punctures equal or slightly greater in size and density of those on disc of pronotum. Ventrites III–VI without lateral bulges; vestiture similar in density to that on elytra. Aedeagus with median lobe subparallel, gradually tapering to slightly rounded apex; paramere with shoulder abruptly narrowed, inner edges curved weakly outwards basally then curved weakly inwards apically, apex weakly sclerotized, without blade or expansion, two long subapical setae. Female similar to male externally but with antenna shorter, failing to reach apex of pronotal hind angle.

Distribution. Northeastern United States and adjacent Canada, west to Wyoming and south from Virginia along the Atlantic Coast to southern Florida (Douglas 2003). In the Southeast, previously recorded from Alabama, Florida, Georgia, North Carolina, and South Carolina (LeConte 1853; Leng 1920; Fattig 1951; Kirk 1969; Downie and Arnett 1996; Peck and Thomas 1998; Douglas 2003). The type locality of *C. dejeanii* is Georgia (not restricted further). In the Southeast, *P. cardisce* seems for the most part restricted to coastal areas along the Atlantic. Löding's (1945) records from Alabama may be based on misidentifications (see below).

Specimens Examined. Florida (Brevard, Flagler, Indian River, St. Johns); **Georgia** (Chatham); **North Carolina** (Dare, Onslow); **South Carolina** (Charleston, Georgetown, Horry). February-April, June, December. (Figure 284)

Discussion. In the study area, this species is easily recognized by its color and broad concavity on the hypomeron just below the pronotal hind angle. Löding (1945) recorded it from 'over state' in Alabama. While examining specimens from the Löding collection (GSAT), I came across three specimens labeled as *cardisce* from Mobile County, AL that I identified to be *C. gagates*. Alabama seems a bit disjunct given the distribution presented by Douglas (2003). Specimens in the study area have been collected under beach drift. Douglas (2003) also noted it is most commonly collected under shore debris.

Lissominae Laporte de Castelnau, 1835

The subfamily Lissominae here follows Kundrata et al. (2016) and recognizes the elevation of Oestodini to subfamily level, leaving *Drapetes* as the only genus in America north of Mexico. Historically, the lissomines were considered a tribe of Throscidae (e.g., Blanchard 1917). Yensen (1975) suggested Lissomini should be in Buprestidae. Böving and Craighead (1931) described the larva of *Drapetes* and proposed its transfer to the elaterid subfamily Oestodinae. Crowson (1961) supported their decision based on larval and adult characters, and a detailed cladistic analysis by Calder et al. (1993) helped support the move. Calder et al. (1993) also pointed out that the name Lissominae has priority over Oestodinae, the latter having been proposed by Hyslop (1917). However, a molecular analysis by Kundrata et al. (2016) showed the traditional Lissominae to be paraphyletic and reinstated Oestodinae to accommodate *Oestodes* and *Bladus* in North America.

North American members of this subfamily are small, elongate to oval, robust and convex. Color variable, most bicolored; most species in North America can be identified by color alone. Supra-antennal carinae complete, arcuate, not anteriorly directed. Mandible bifid. Antenna 11-segmented; antennomere I elongate; II and III simple, IV and beyond serrate. Pronotum convex, lacking sublateral incisions; variably punctured; hind angle carinate. Prosternum strongly lobed anteriorly. Pronotosternal sutures open anteriorly. Trochanter on front and middle legs long and slender; tarsomeres I–IV strongly lobed; claws simple or toothed, without basal setae.

Drapetes Megerle, 1821

Drapetes Megerle in Dejean, 1821: 34

Diagnosis. Size small, 5.0 mm or less in length; body form elongate to ovate, robust, convex. Color black or bicolored black with white, red, or orange. Antenna 11-segmented, not reaching apex of pronotal hind angle; antennomere I elongate; II and III small, subequal; IV and beyond serrate. Pronotum broad, convex, variably punctured; hind angle unicarinate. Prosternum strongly lobed anteriorly; each side with two approximate carinae running from the base of the anterior lobe to the procoxa. Pronotosternal sutures broadly open anteriorly. Trochanters on front and middle legs long and slender; tarsomeres I–IV strongly lobed; claws with basal tooth, without basal setae.

Range and Numbers. There are eight species in North America, distributed mostly in the East, south and west to Arizona (Johnson 2015). Four species have been recorded from the Southeast.

Discussion. Schaeffer (1916a) was the first to key *Drapetes* for North America. Blanchard later (1917) revised the genus within Throscidae. Johnson (2015) described a new species from Arizona and New Mexico and provided an updated key to the North American fauna. The body form of *Drapetes* spp. is dissimilar to other North American elaterids and they are usually easily recognized by their size, shape, and colors. The southeastern species can be successfully keyed and identified based on color alone. Specimens in the study area have been collected by a variety of methods, usually on vegetation but also in Lindgren funnel and flight intercept traps.

Key to the species of *Drapetes* in the Southeast

1. Pronotum red; elytron blue-black (Figure 300) . . . . . ***D. rubricollis* LeConte**
— Pronotum black; elytron variable **2**

2(1). Elytron black with white saddle-shaped area covering much of surface (Figure 298) . . . . . ***D. plagiatus* (Boheman)**
— Elytron black with orange to red maculae **3**

3(2). Elytron black with two orange maculae, one just below the humerus and one subapical (Figure 299) . . . . . ***D. quadripustulatus* Bonvouloir**

— Elytron black with single red transverse macula located just anterior to the middle (Figure 297) . . . . . ***D. exstriatus* (Say)**

Drapetes exstriatus (Say, 1834)

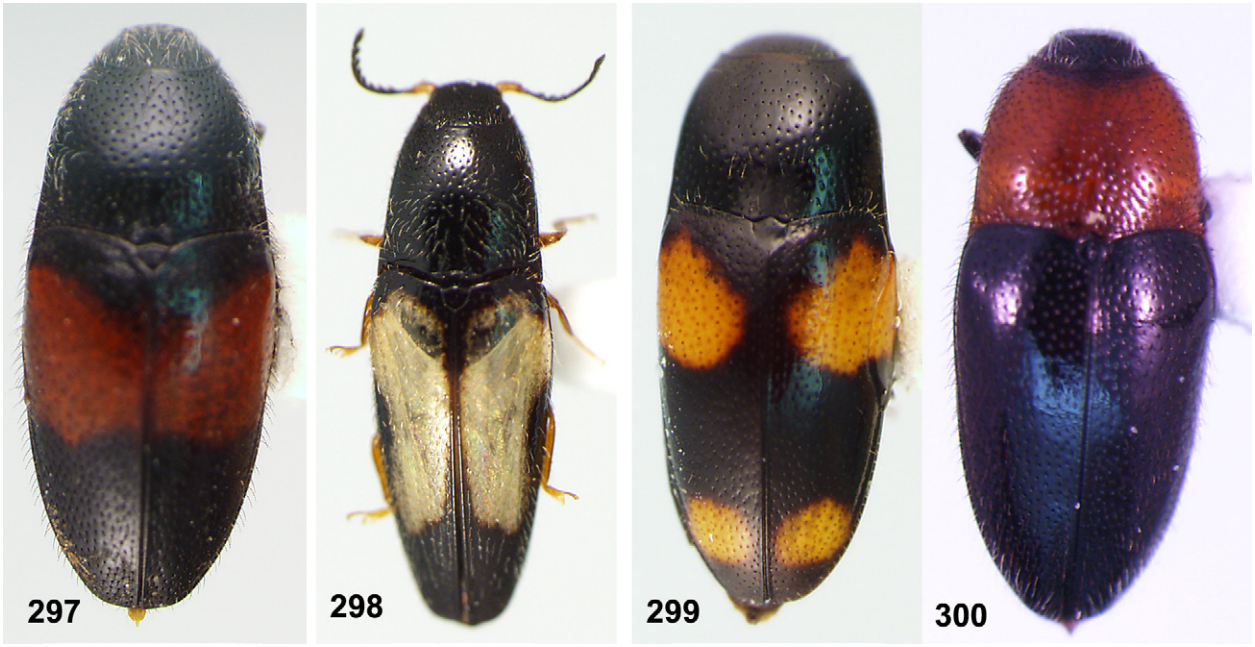
Figures 297, 301

Elater geminatus Say, 1825: 264 (nec *Elater geminatus* Germar, 1824: 43)
Elater exstriatus Say, 1834: 80
Elater basalis Randall, 1838: 9
Lissomus nitidus Melsheimer, 1844: 149

Diagnosis. Size small, 3.0–4.0 mm in length, form ovate. Color black, each elytron with a red-orange macula between the humerus and the middle, sometimes attaining the elytral suture and appearing as a transverse band across the body; vestiture yellow-gray, sparse, suberect. Antenna 11-segmented, not reaching apex of pronotal hind angle. Pronotum narrower than elytra, slightly sinuate at base of hind angle; punctures large, deep, sparse; hind angle unicarinate, carina long, extending well beyond base of hind angle. Elytron with sutural stria. Aedeagus undescribed.

Distribution. Eastern North America, west to Texas (Peck and Thomas 1998). In the Southeast, previously recorded from Alabama, Florida, Georgia, North Carolina, South Carolina, and Tennessee (Horn 1885; Blanchard 1917; Leng 1920; Brimley 1938; Löding 1945; Kirk 1969, 1970; Downie and Arnett 1996; Peck and Thomas 1998; Johnson 2015). The following records from Mississippi represent a **New State Record**.

Specimens Examined. Alabama (Coosa, Cullman, Dale, Elmore); **Florida** (Alachua, Dixie, Highlands, Jackson, Lake, Leon, Levy, Liberty, Marion, Orange, Pinellas, Santa Rosa, Seminole); **Georgia** (Clarke, Emanuel, Jackson, Rabun, Wheeler); **Mississippi** (Lauderdale, Marion, Oktibbeha, Winston); **North Carolina** (Buncombe,



Figures 297–300. *Drapetes* spp. **297)** *D. exstriatus* (habitus). **298)** *D. plagiatus* (habitus). **299)** *D. quadripustulatus* (habitus). **300)** *D. rubricollis* (habitus).

Harnett, Henderson, Hyde, Johnston, Mecklenburg, Moore, Pasquotank, Wake); **Tennessee** (Warren). April–September. (Figure 301)

Discussion. In the study area, this species is easily recognized by its size, shape, and color. Blanchard (1917) mentioned the form '*nitidus*', collected in Pennsylvania and described by Melsheimer (1844). This form is entirely black and lacks the red-orange maculae. Melanic forms are not uncommon among elaterids. Specimens in the study area have been collected by beating dead wood, under *Quercus* bark, and in window, boll weevil, Malaise, and sticky traps. Specimens from Oktibbeha County, MS (MEM) have been collected in association with *Quercus velutina* and pecan. Specimens from Marion County, MS (MEM) have been collected in association with cotton.

Drapetes plagiatus (Boheman, 1858)

Figures 298, 302

Lissomus plagiatus Boheman, 1858: 66
Drapetes praesutus Bonvouloir, 1859: 79

Diagnosis. Size small, 3.5–4.5 mm in length, form elongate, widest at base of elytra. Color black; each elytron with white saddle-shaped macula, this paler area often translucent and showing metathoracic wings below; vestiture white, long, suberect. Antenna 11-segmented, not reaching apex of pronotal hind angle. Pronotum longer than wide, widest at base; punctures large, deep, sparse; hind angle unicarinate, carina long, extending more than half the distance to the anterior of the pronotum. Elytron with sutural stria, seriately punctate, each puncture with a white seta. Aedeagus undescribed.

Distribution. Native to Central and South America, introduced to Florida (Smith and Dixon 2007; Thomas 2007; Johnson 2015). Boheman (1858) described it from California, but Champion (1896) considered these records as erroneous and Johnson (2015) suggested mislabeling.

Specimens Examined. Florida (Palm Beach). May. (Figure 301)

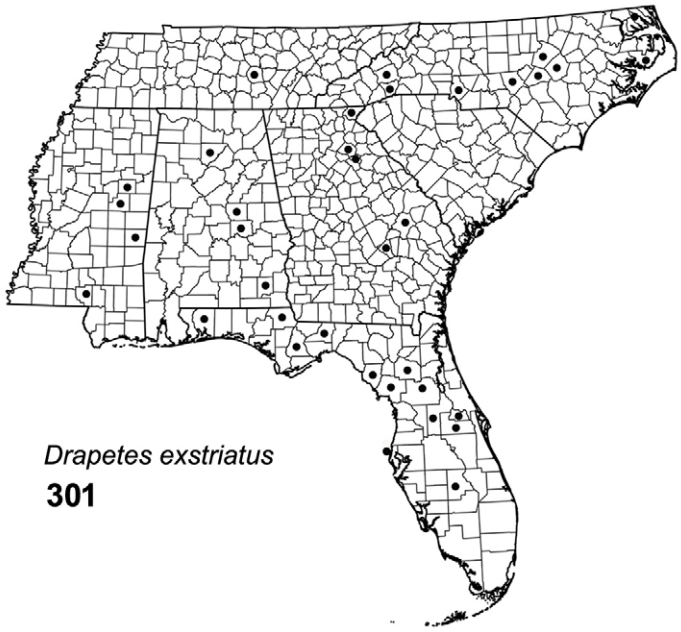


Figure 301. Distributional data for *Drapetes exstriatus*.

Discussion. This is a Neotropical species, introduced to Florida. Based on the collection records, it appears to be established. When Boheman described the species, he recorded it from San Francisco, CA but Champion (1896) considered the record erroneous. Woodworth (1913) and Hyslop (1916) also recorded it from California based on Boheman's report. See Johnson (2015) for a detailed discussion on the description and possible origins of the type specimen of this species. Like its congeners, this species can be readily recognized in the Southeast by its color pattern. The elongate habitus and rows of setigerous punctures on the elytron is also distinctive. Specimens in the study area have been collected on vegetation, including poinsettia.

Drapetes quadripustulatus Bonvouloir, 1859

Figures 299, 302

Drapetes quadripustulatus Bonvouloir, 1859: 74

Diagnosis. Size small, 2.5–4.0 mm in length, form ovate. Color black, each elytron with two orange maculae, one subhumeral and one subapical; vestiture yellow-gray, sparse, suberect. Antenna 11-segmented, not reaching apex of pronotal hind angle. Pronotum widest at base; punctures large, deep, sparse; hind angle unicarinate, carina short, extending just past base of angle. Elytron without sutural stria. Aedeagus undescribed.

Distribution. Eastern United States, from Maryland south to Florida, west to Wisconsin and Texas (Peck and Thomas 1998). In the Southeast, previously recorded from Alabama, Florida, Georgia, Mississippi, South Carolina, and North Carolina (Blanchard 1917; Leng 1920; Brimley 1938; Löding 1945; Kirk 1969, 1970; Downie and Arnett 1996; Peck and Thomas 1998; Johnson 2015).

Specimens Examined. Florida (Alachua, Charlotte, Columbia, Escambia, Highlands, Pinellas); **Georgia** (Clarke, Decatur); **North Carolina** (Mecklenburg). January, April–June, August. (Figure 302)

Discussion. Like other species of *Drapetes* in the study area, this species is easily recognized by its size, shape, and color. Specimens in the study area have been collected in Lindgren funnel traps and by beating dead wood. Specimens from Florida have been collected on the flowers of chinkapin and saw palmetto.

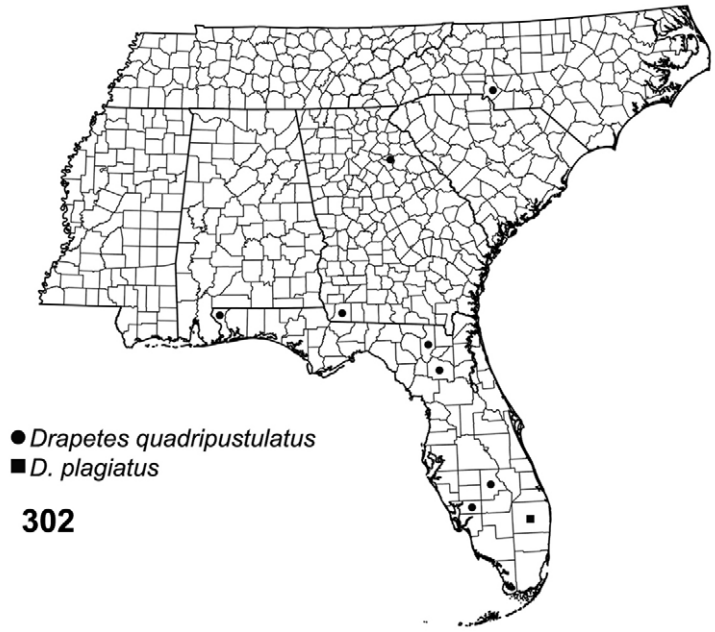


Figure 302. Distributional data for *Drapetes quadripustulatus* and *D. plagiatus*.

Drapetes rubricollis LeConte, 1866

Figures 300, 303

Drapetes rubricollis LeConte, 1866: 82

Diagnosis. Size small, 2.5–3.5 mm in length, form ovate. Head black; prothorax red; elytron deep blue-black; venter other than prothorax black; vestiture black (paler on head and at elytral apices), sparse, suberect. Antenna 11-segmented, not reaching apex of pronotal hind angle. Pronotum widest just before, and slightly sinuate at, base of hind angles; punctures large, deep, sparse; hind angle unicarinate, carina short, extending just past base of angle. Elytron without sutural stria. Aedeagus undescribed.

Distribution. Southeastern United States, north to North Carolina and west to Arkansas (Peck and Thomas 1998). In the Southeast, previously recorded from Alabama, Florida, Georgia, North Carolina, and South Carolina (Horn 1885; Blanchard 1917; Leng 1920; Brimley 1938; Löding 1945; Kirk 1969; Peck and Thomas 1998; Costello et al. 2003; Johnson 2015). The following records from Mississippi represent a **New State Record**.

Specimens Examined. Alabama (Baldwin, Coffee, Dale, Jefferson); **Florida** (Alachua, Baker, Citrus, Clay, Hernando, Highlands, Hillsborough, Indian River, Jackson, Lake, Levy, Liberty, Marion, Miami-Dade, Monroe, Orange, Pinellas, Polk, Seminole, Wakulla); **Georgia** (Charlton, Clarke, Johnson); **Mississippi** (Jackson, Lamar, Noxubee); **North Carolina** (Carteret). March–August. (Figure 303)

Discussion. This southeastern species has been readily collected in the study area. Like its congeners, it is readily identified by its size, shape, and color. Specimens in the study area have been collected by beating and sweeping vegetation and in Malaise and flight intercept traps. Specimens from Lamar County, MS (MEM) were collected in association with cotton. Specimens from Jackson County, MS (MEM) were collected on woody goldenrod. Costello et al. (2003) recorded it in association with the introduced tree, broad-leaved paperback, in Florida.

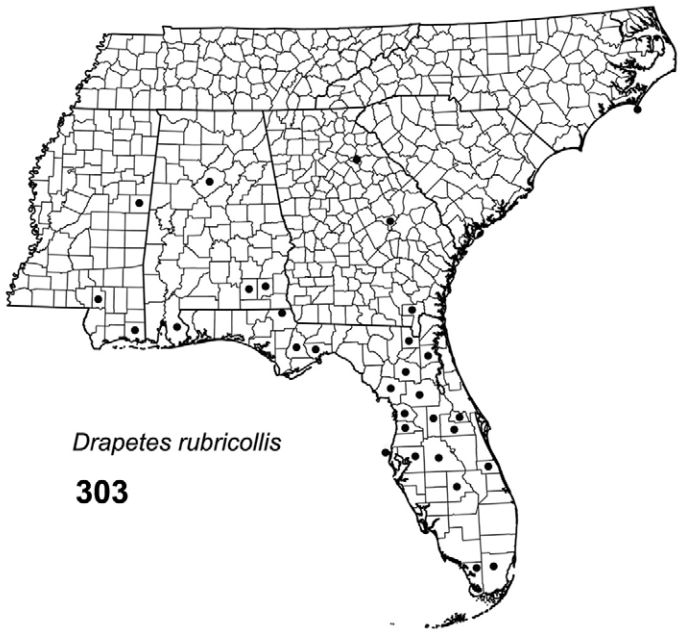


Figure 303. Distributional data for *Drapetes rubricollis*.

Oestodinae Hyslop, 1917

In North America, the subfamily Oestodinae is represented by two genera, *Bladus* and *Oestodes* (Kundrata et al. 2016), both of which occur in the Southeast. Historically, Oestodinae was considered a tribe of Lissominae, until molecular analysis by Kundrata et al. (2016) demonstrated Lissominae to be paraphyletic and elevated Oestodini to the subfamily level. Adults are elongate, subparallel. Supra-antennal carinae incomplete, directed downwards towards labrum. Antenna 11-segmented, antennomeres elongate, serrate. Pronotum normally arcuate laterally and convex to globular dorsally to elongate, variably punctured, with sublateral incisions. Prosternum truncate anteriorly, exposing labium. Elevated margin on the hypomeron at the pronotosternal sutures, open anteriorly, or secondarily closed with suture present. Mesocoxae open to both mesepimeron and mesepisternum; meso- and metasternum not fused, separated by a definite suture. Tarsomeres without membranous lobes; claws simple, without basal setae. Sexual dimorphism variable.

Bladus LeConte, 1861

Bladus LeConte, 1861: 171

Diagnosis. Size small, body sub-fusiform. Vestiture dense, long, sub-erect. Supra-antennal carinae incomplete, directed downwards towards labrum. Antenna 11-segmented, serrate. Pronotum sub-quadrate, basal incisures weak, densely punctate; hind angle slightly divergent, ecarinate. Pronotosternal sutures straight, closed to receive antenna or tarsus. Anterior margin of prosternum truncate, mandibles exposed. Scutellum shield-shaped, not emarginated anteriorly. Elytron fusiform, subparallel in anterior three-fourths, tapering to rounded apex; striae deeply punctate; interval slightly convex, coarsely punctate. Tarsomeres without membranous lobes; claws simple, without basal setae. Aedeagus undescribed. Female undescribed.

Range and Numbers. One species, *B. quadricollis* (Say, 1839), distributed in the Midwestern United States (Johnson 2002).

Discussion. *Bladus* is currently aligned with *Oestodes* based on the truncated anterior margin of the prosternum and the presence of basal incisures on the pronotum. The principle characters for uniting members of the subfamily (including the Lissominae) lie in the larvae (Lawrence and Arias 2009), and the larva of *Bladus* is currently unknown.

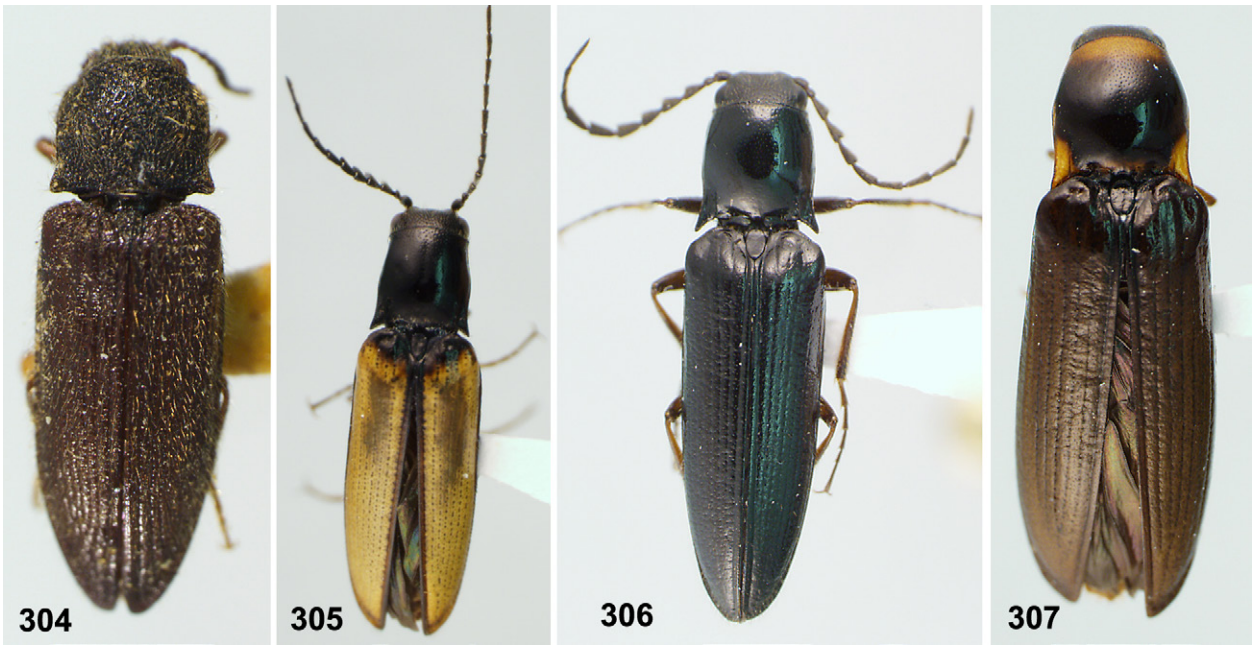
Bladus quadricollis (Say, 1839)

Figures 304, 308

Elater quadricollis Say, 1839: 186

Diagnosis. Size small, length 3.0–7.0 mm; body sub-fusiform. Color dark red-brown, pronotum sometimes darker. Vestiture yellow, dense, long, sub-erect. Supra-antennal carinae incomplete, directed downwards towards labrum. Antenna 11-segmented, serrate, not extending beyond apex of pronotal hind angle, antennomeres II and III small, subequal. Pronotum sub-quadrate, densely punctate, punctures large, shallow, umbilicate; hind angles short, broad, slightly divergent, ecarinate. Pronotosternal sutures straight, closed to receive antenna or tarsus. Anterior margin of prosternum truncate, labium exposed. Scutellum shield-shaped, not emarginated anteriorly. Elytron fusiform, subparallel in anterior three-fourths, tapering to rounded apex; striae deeply punctate; interval slightly convex, coarsely punctate. Tarsomeres without membranous lobes; claws simple, without basal setae. Aedeagus undescribed. Female undescribed.

Distribution. Midwestern United States (Johnson 2002). Downie and Arnett (1996) recorded it from Indiana, Kansas, and Ohio. Previously not recorded from the current study area, although Summers (1874) recorded it



Figures 304–307. Oestodini. **304)** *Bladus quadricollis* (habitus). **305)** *Oestodes tenuicollis* (male habitus). **306)** *O. tenuicollis* (male habitus-melanic form). **307)** *O. tenuicollis* (female habitus).

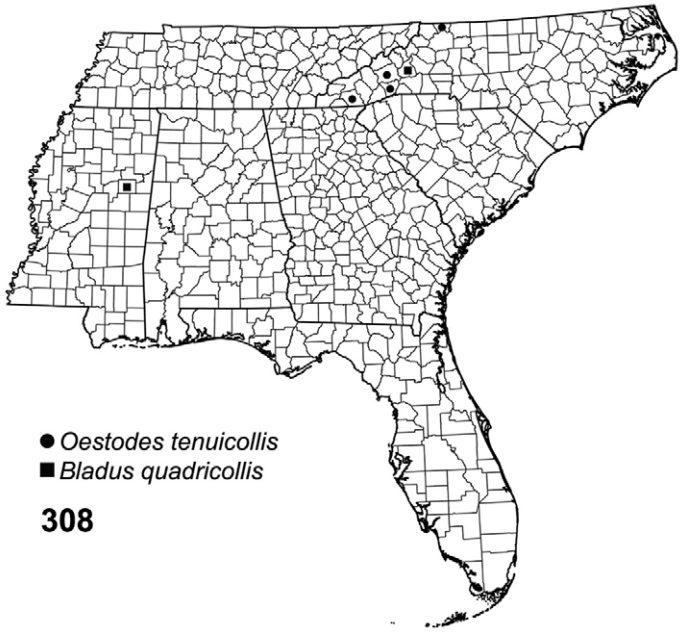


Figure 308. Distributional data for *Oestodes tenuicollis* and *Bladus quadricollis*.

from the vicinity of Lake Pontchartrain, Louisiana. The following records from Mississippi and North Carolina represent **New State Records**.

Specimens Examined. Mississippi (Oktibbeha); **North Carolina** (McDowell). April–May. (Figure 308)

Discussion. Very little is known about this enigmatic species and nothing has been published on its biology. Based on label data, the specimen from Oktibbeha County, MS (MEM) was collected in 1914 on what is now the Mississippi State University campus. This area has been heavily collected in the last 100 years, and the absence of other specimens suggests it may be extinct in the region. The area contains several 'prairie islands' of blackbelt prairie, and the specimen may have come from an isolated, disjunct population that is no longer present due to development of parts of the area. The specimen from McDowell County, NC (BAM) was collected more recently (2014) in a Lindgren funnel trap. According to the collector of the specimen, the trap was set on a ridge-like projection roughly 50 meters from a lake in open woods consisting of mostly pine intermixed with deciduous shrubs and trees (Will D. Merritt, pers. com. 2015).

Oestodes LeConte, 1853

Oestodes LeConte, 1853: 424

Diagnosis. Size small, form elongate. Color variable, from solid black to red-brown, to bicolored. Antenna 11-segmented, extending beyond the apex of the pronotal hind angle; antennomere II small, III subequal to IV; III and beyond serrate. Pronotum longer than wide, medially arcuate, distinctly sinuate at base of hind angle; sublateral longitudinal carina on each side of median; variably punctured; hind angles divergent, unicarinate. Prosternum truncate anteriorly, exposing labium. Elevated margin on the hypomeron at the pronotosternal sutures, open in front or secondarily closed with open line present. Scutellum elongate. Elytron elongate, striae impressed with distinct punctures; intervals flat and punctured. Tarsomeres without membranous lobes; claws simple, without basal setae. Female larger and more robust than male, with stouter pronotal hind angle and shorter antenna, not extending beyond apex pronotal hind angle.

Range and Numbers. There are two species in North America, *O. puncticollis* Horn distributed in the northern Midwest, and *O. tenuicollis* in the Northeast (Johnson 2002). The latter extends southerly into the northern part of the Southeast.

Discussion. *Oestodes* only genus in the Southeast other than *Bladus* and *Selonodon* to have a truncated anterior margin on the prosternum. The genus contains only two species in North America but has not yet been formally revised.

Oestodes tenuicollis (Randall, 1838)

Figures 305–308

Elater tenuicollis Randall, 1838: 14

Diagnosis. Size small, 7.0–10.0 mm in length. Color variable, from solid black to red-brown with pale legs to black with pale elytra (Figures 305–306); in dark specimens the pronotal hind angles are sometimes paler; vestiture very short and extremely sparse. Antenna 11-segmented, extending beyond apex of pronotal hind angle; antennomere II small, III subequal to IV; III and beyond serrate. Pronotum longer than wide, medially arcuate, distinctly sinuate at base of hind angle; sublateral longitudinal carina on each side of median; punctures shallow and sparse; hind angles divergent, unicarinate. Prosternum truncate anteriorly, exposing labium. Elevated margin on the hypomeron at the pronotosternal sutures, closed anteriorly, but with open line present. Scutellum elongate. Elytron elongate, striae impressed with distinct punctures; intervals flat and punctured. Tarsomeres

without membranous lobes; claws simple, without basal setae. Female (Figure 307) larger and more robust than male, with stouter pronotal hind angle and shorter antenna, not extending beyond apex of pronotal hind angle.

Distribution. Northeastern United States. Downie and Arnett (1996) and Johnson (2002) recorded it south to New York. In the Southeast, previously recorded from Georgia (Fattig 1951) and North Carolina (Brimley 1938).

Specimens Examined. North Carolina (Alleghany, Buncombe, Henderson, Macon). June–July. (Figure 308)

Discussion. This species is readily recognized by its shape, smooth polished pronotum and elytron, and the form of the prosternum. There is not much published data available on collection methods for this species; most specimens seem to have been hand picked or swept from vegetation.

Agrypninae Candèze, 1857

The classification of the subfamily Agrypninae here follows Johnson (2002) and recognizes five tribes in North America, all of which are found in the Southeast. The subfamily as a whole is generally distributed, but most species are found in the southern part of the country. Morphologically, the family is difficult to define due to variations in most external characters. Size, shape, and color are all highly variable; vestiture may be hair-like or scale-like. The antennae are variable in length. The form of the pronotum is variable; the hypomeron may or may not contain a groove to receive the front tarsus; prosternal lobe usually arcuate, often prominent; prosternal process normally elongate. Mesocoxa may be open or closed to mesepimeron and mesepisternum. Scutellum variable, but never incised anteriorly. Tarsomeres variable, with or without membranous lobes; claws simple, most species with one or more basal setae (absent in *Danosoma*). Several species are bioluminescent.

Several groups within this subfamily have been treated in recent decades. Van Dyke (1932) keyed *Conoderus* and *Heteroderes* (at the time, the latter a subgenus of the former). Arnett (1952) reviewed the Agrypnini (as the subtribe Adelocerina of Pyrophorini). Costa (1975, 1983) treated the Pyrophorini. Spilman (1985) revised *Lanelater*. Casari revised *Alaus* (1996a), *Pherhimius* (1996b), and *Chalcolepidius* (2002b).

Species in this group are readily collected by a variety of methods, most commonly at light or under bark. Larvae of many species are predaceous. Several members of the genera *Conoderus* and *Heteroderes* have been implicated as crop pests.

Agrypnini Candèze, 1857

The tribe Agrypnini was reviewed for the United States and Canada by Arnett (1952) as the subtribe Adelocerina of Pyrophorini. In that work, the tribe included *Lanelater* (now in Pseudomelanactini), *Rismethus* was regarded as a synonym of *Meristhus*, *Agrypnus* was referred to as *Colaulon*, and *Lacon* was referred to as *Lepidotus* with *Danosoma* a subgenus contained therein. Arnett (1953) reconsidered the type of *Lacon* and moved the Nearctic species of *Lepidotus* back to *Lacon*. There are five genera of Agrypnini in North America (Johnson 2002), all of which occur in the Southeast. Adults are small to moderate in size; elongate to robust; punctures usually large, deep. Color variable, usually brown to black; color patterns often formed by arrangements of scale-like setae. Supra-antennal carinae incomplete, often vague, or absent; frons concave. Antenna 11-segmented, short, rarely extending past apex of pronotal hind angle; flagellar antennomeres moniliform to serrate. Prosternum with anterior lobe arcuate, often prominent. Prosternal sutures with deep grooves for reception of antennae; hypomeron sometimes with groove for reception of front tarsus. Mesosternum and mesepisternum simple, not divided by cross sutures; meso- and metasternum juncture various, with or without suture. Legs with tibial spurs absent; tarsomeres various; claws simple, usually with basal setae (absent in *Danosoma*). Adults are collected by a variety of methods, often at light or under the bark of felled trees, where the larvae live as predators.

Agrypnus Eschscholtz, 1829

Agrypnus Eschscholtz, 1829: 32
Colaulon Arnett, 1952: 116

Diagnosis. Size small, form robust. Color dark brown to black, vestiture brown, scale-like, not forming defined colored patterns. Supra-antennal carinae incomplete. Antenna 11-segmented, short, not reaching apex of pronotal hind angle. Pronotum subquadrate; punctures large, round, deep; base of pronotum truncate; hind angles scarcely to slightly divergent. Hypomeron with or without groove for reception of front tarsus. Hypomeral and prosternal punctures similar to those on pronotum. Scutellum not carinate. Elytral striae made up of rows of

large, deep circular punctures; interspaces reticulate. Tarsomeres without membranous lobes; claws with basal setae. External sexual dimorphism not evident.

Range and Numbers. There are three species of *Agrypnus* in United States, distributed in the East and South (Johnson 2002). One species is known from the Southeast.

Discussion. The last treatment of this genus for North America was by Arnett (1952) as the genus *Colaulon*. In that work he recognized two species. Knull (1973) described a third species from Texas. Members of this genus are usually readily recognized by their robust shape and punctation.

Agrypnus rectangularis (Say, 1825)

Figures 309–310

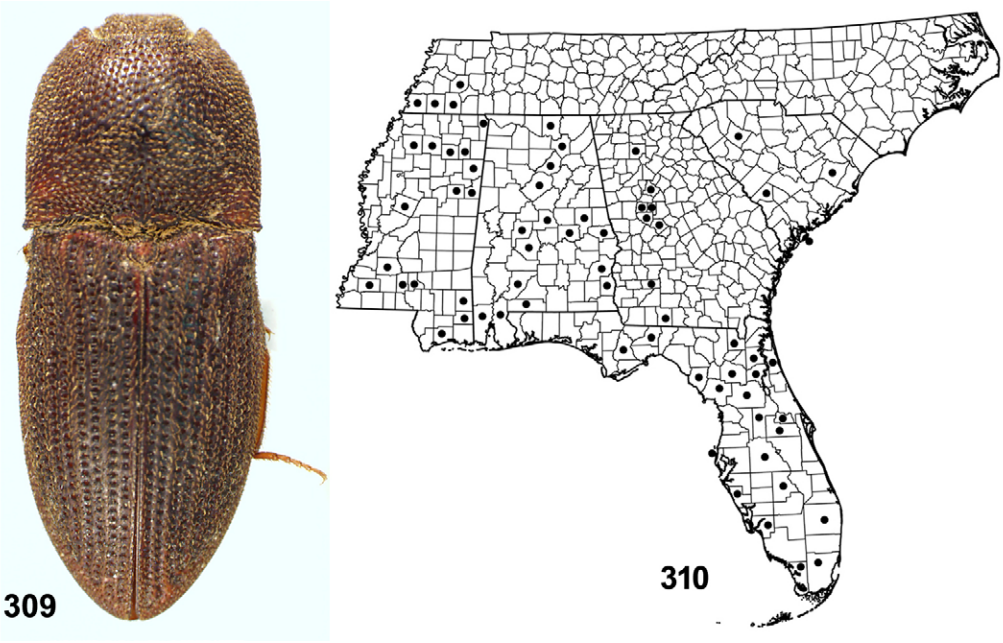
Elater rectangularis Say, 1825: 263
Adelocera curtus LeConte, 1853: 491

Diagnosis. Size small, 8.0–10.0 mm in length; form robust. Color dark brown to black, vestiture brown, scale-like, not forming distinct patterns. Supra-antennal carinae incomplete. Antenna 11-segmented, short, not reaching apex of pronotal hind angle; flagellar antennomeres serrate. Pronotum subquadrate, sometimes with faint median impression in basal third; punctures large, round, deep; base of pronotum truncate; hind angle scarcely to slightly divergent. Hypomeron with faint groove for reception of front tarsus. Hypomeral and prosternal punctures similar to those on pronotum. Scutellum not carinate. Elytral striae made up of rows of large, deep circular punctures; interspaces reticulate. Tarsomeres without membranous lobed; claws with basal setae. Aedeagus with paramere lacking apical blade. External sexual dimorphism not evident.

Distribution. Eastern United States, west to Indiana and Nebraska, south and west to Arizona (Arnett 1963). In the Southeast, previously recorded from Alabama, Florida, Georgia, Mississippi, South Carolina, and Tennessee (LeConte 1853; Candèze 1857; Dozier 1918; Leng 1920; Löding 1945; Fattig 1951; Arnett 1952; Kirk 1970; Greenberg and Thomas 1995; Downie and Arnett 1996; Peck and Thomas 1998; Lago et al. 2002). The type locality of *A. curtus* is Georgia (not further restricted).

Specimens Examined. Alabama (Baldwin, Barbour, Blount, Chilton, Dallas, Elmore, Escambia, Henry, Jefferson, Lee, Madison, Marshall, Mobile, Monroe, Perry, Tallapoosa); **Florida** (Alachua, Baker, Clay, Collier, Dixie, Highlands, Lake, Lee, Leon, Levy, Liberty, Marion, Miami-Dade, Monroe, Orange, Palm Beach, Pinellas, Polk, Putnam, Sarasota, Seminole, St. Johns); **Georgia** (Cherokee, Crawford, Dougherty, Henry, Lamar, Pike, Upson, Thomas counties; also Okefenokee Swamp); **Mississippi** (Copiah, Franklin, George, Greene, Harrison, Holmes, Jefferson Davis, Lafayette, Lawrence, Lee, Lowndes, Monroe, Oktibbeha, Panola, Pontotoc, Tishomingo); **South Carolina** (Barnwell, Beaufort, Laurens, Williamsburg); **Tennessee** (Fayette, Hardeman, Madison, Shelby). January-November. (Figure 310)

Discussion. In the study area, this species is usually easily recognized by its size, shape, and punctation. Specimens in the study area have been collected by a variety of methods, including at ultraviolet and mercury vapor light, in dung, pitfall, malt, and Malaise traps, on vegetation, in forest litter, and in the mounds of pocket gophers (*Geomys* sp.). A specimen from Palm Beach County, FL (VGIC) was collected by baiting with chicken livers. Specimens from Oktibbeha and Monroe counties, MS (MEM) were collected in pitfall traps set in cotton fields. Other specimens from Oktibbeha County, MS (MEM) were collected in association with pecan. Dozier (1918) reported it associated with corn in Florida.



Figures 309–310. *Agrypnus rectangularis*. **309)** Habitus. **310)** Distributional data.

Danosoma Thomson, 1859

Danosoma Thomson, 1859: 103

Diagnosis. Size moderate, form broad, elongate. Color brown; vestiture scale-like, usually a mix of white, black, and golden setae, forming a mottled pattern. Supra-antennal carinae incomplete. Antenna 11-segmented, short, not reaching apex of pronotal hind angle; flagellar antennomeres moniliform. Pronotum broadly rounded; broad median furrow present, stronger in basal half; with or without anterior foveae; punctures round, deep, dense; hind angles short, divergent. Prosternal sutures deeply grooved for reception of antennae. Hypomeron lacking groove for reception of front tarsus. Legs with tibial spurs absent; tarsomeres lacking membranous lobes; claws simple, lacking basal setae.

Range and Numbers. There are two species in the US and Canada: *D. obtecta* in the Northeast and *D. brevicorne* (LeConte), transcontinental in the North (Arnett 1963). Only the former reaches the Southeast.

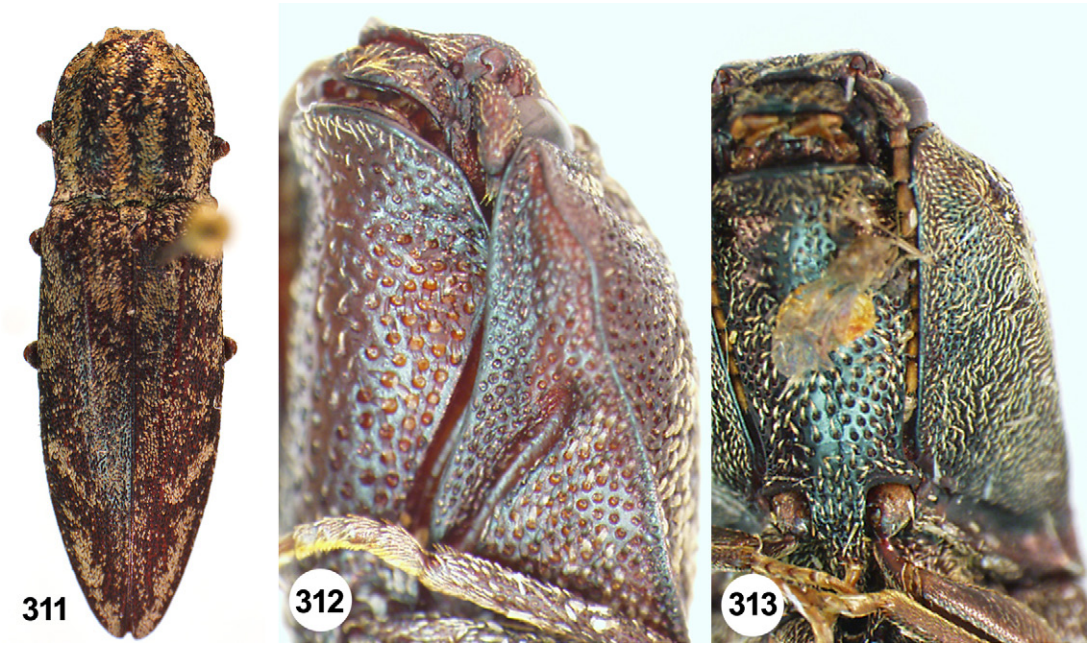
Discussion. The last treatment of *Danosoma* for North America was by Arnett (1952), as a subgenus of *Lepidotus* (=*Lacon*). *Danosoma* spp. are superficially very similar to *Lacon* but lack basal setae on the tarsal claws. Adults are usually collected under bark.

Danosoma obtecta (Say, 1839)

Figure 311

Elater obtectus Say, 1839: 181

Diagnosis. Size moderate, 15.0–17.0 mm in length. Color brown; vestiture scale-like, a mix of white, black, and golden setae, forming a mottled pattern. Supra-antennal carinae incomplete. Antenna 11-segmented, short, not reaching apex of pronotal hind angle; antennomeres moniliform. Pronotum broadly rounded; broad median furrow present, stronger in basal half; without anterior foveae; punctures round, deep, dense; hind angles short,



Figures 311–313. Agrypnini. **311)** *Danosoma obtecta* (habitus). **312)** *Lacon marmoratus* (hypomeron). **313)** *L. avitus* (hypomeron).

divergent. Prosternal sutures deeply grooved for reception of antennae. Hypomeron lacking groove for reception of front tarsus. Tarsomeres without membranous lobes; claws simple, lacking basal setae. Aedeagus undescribed.

Distribution. Northeastern North America, south to Georgia and west to Wyoming (Arnett 1963). In the Southeast, previously recorded from Georgia, North Carolina, and Tennessee (Brimley 1938; Fattig 1951; Downie and Arnett 1996; Buck et al. 2005).

Specimens Examined. None.

Discussion. This species is likely to only be collected in the northern, montane part of the study area, where it is most likely to be confused with *Lacon marmoratus*. It differs from the latter in lacking basal setae on the tarsal claws and lacking a groove on the hypomeron for reception of the front tarsus.

Lacon Laporte de Castelnau, 1838

Lacon Laporte de Castelnau, 1838: 11
Lepidotus Stephens, 1830: 374
Aulacon Arnett, 1952: 112
Diphyaulon Arnett, 1952: 111
Zalepia Arnett, 1953: 7
Lepidelater Smith in Arnett, et al., 1969: 11

Diagnosis. Size small to moderate. Form elongate to slightly robust; densely punctate, punctures simple and deep. Ground color reddish-brown to brown or black; vestiture consisting of appressed scales, white, yellow, golden, orange, or black in color. Antennae 11-segmented, serrate, not reaching apex of pronotal hind angle. Pronotum with or without median furrow, with or without tubercles or lateral foveae; hind angle short, parallel or slightly divergent, carinate or not. Prosternal sutures concave their entire length, deep enough to receive antennae. Hypomeron with or without groove to receive front tarsus. Elytron densely punctate with deep

punctures, in defined rows or confused. Legs slender, approximately same size throughout; tibial spurs absent; tarsomeres lacking membranous lobes; claws simple, with basal setae. Aedeagus has yet to be critically examined as a diagnostic feature.

Distribution. There are 13 species in America north of Mexico, generally distributed (Johnson 2002). Six species have previously recorded from the Southeast, one of which is a Caribbean species known only from extreme southern Florida. A seventh species is added here.

Discussion. The last review for the genus in North America was by Arnett (1952) as the genus *Lepidotus.* He divided *Lepidotus* into four subgenera (including *Danosoma*). Arnett (1953) reconsidered the type of *Lacon* and moved the Nearctic species back to *Lacon* from *Lepidotus*. Specimens have been collected by a variety of methods, most often at light or under the bark of felled trees.

Key to the species of *Lacon* in the Southeast
(adapted from Arnett 1952)

1. Hypomeron with groove for reception of front tarsus (Figure 312) **2**
— Hypomeron lacking groove for reception of front tarsus (Figure 313) **5**

2(1). Broad species; tarsal groove on hypomeron usually deep and distinctly delineated and impunctate . . . . . ***L. marmoratus* (Fabricius)**
— Narrower species; tarsal groove of hypomeron short, shallow, punctate and usually not well-defined (this groove can be a variable character in *L. impressicollis*) **3**

3(2). Elytron with punctures in rows . . . . . ***L. impressicollis* (Say)**
— Elytron with confused punctures **4**

4(3). Color black with golden to orange scales on head and lateral margins of pronotum . . . . . ***L. discoideus* (Weber)**
— Color black with white, golden, and dark scales evenly distributed over the body with no discernible pattern . . . . . ***L. auroratus* (Say)**

5(1). Elytron with confused punctures . . . . . ***L. avitus* (Say)**
— Elytral punctures in rows forming defined striae **6**

6(5). Scales on dorsum mixed black and golden; generally distributed in the southern United States into Central America . . . . . ***L. mexicanus* (Candèze)**
— Scales on dorsum mixed gray and golden; Caribbean species, known only from extreme southern Florida in the U.S . . . . . ***L. subcostatus* (Candèze)**

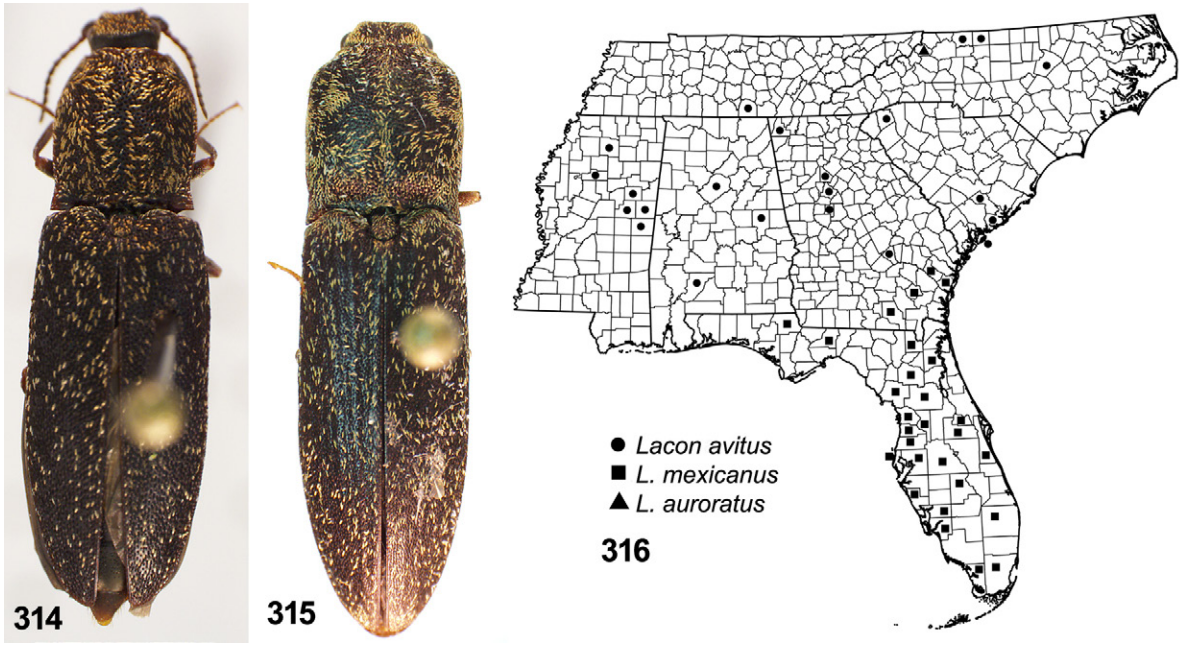
Lacon auroratus (Say, 1839)

Figures 314, 316

Elater auroratus Say, 1839: 181

Diagnosis. Size moderate, 11.0–13.0 mm in length, form elongate. Color dark brown to black with white, golden, and dark scales evenly distributed over the body in no discernible pattern. Antenna 11-segmented, serrate, not reaching apex of pronotal hind angle. Pronotum longer than wide, with shallow median impression, densely punctate; hind angles divergent, ecarinate. Hypomeron with tarsal groove shallow, not strongly delineated, punctate. Elytron densely punctate, punctures not in defined rows. Aedeagus undescribed.

Distribution. Northeastern North America (Downie and Arnett 1996). Previously not recorded from the Southeast. The following record from North Carolina represents a **New State Record**.



Figures 314–316. *Lacon* spp. **314)** *L. auroratus* (habitus). **315)** *L. avitus* (habitus). **316)** Distributional data for *L. avitus*, *L. mexicanus*, *L. auroratus*.

Specimens Examined. North Carolina (Watauga). June. (Figure 316)

Discussion. In the study area, this species resembles a smaller, slender *L. marmoratus*. It can be separated from the latter by having a shallow, punctate tarsal groove on the hypomeron. It may also be confused for a dark *L. impressicollis* but has more vestiture of varying colors and the elytral punctures are not in defined rows. The single specimen examined during this study (NCSU) was collected in a flight intercept trap in mixed deciduous woods.

Lacon avitus (Say, 1839)

Figures 313, 315–316

Elater avitus Say, 1839: 182

Diagnosis. Size moderate, length 12.0–14.0 mm in length. Color dark brown, covered with slender golden scales, distributed relatively evenly over the body and not forming distinct patterns (sometimes scales are thicker along the anterior sides of the pronotum forming small patches). Antenna 11-segmented, serrate, not reaching apex of pronotal hind angle. Pronotum densely punctate, median furrow limited to basal half; hind angles slightly divergent, ecarinate. Hypomeron lacking groove for reception of front tarsus. Elytron densely punctate, punctures simple and not in organized rows. Aedeagus undescribed.

Distribution. Northeastern United States, west to Wisconsin (Downie and Arnett 1996). In the Southeast, it has been recorded officially only from Georgia (Fattig 1951). Leng (1920) recorded it from Florida, but those records are likely misidentifications of *L. mexicanus* (see Discussion, below). The following records from Alabama, Mississippi, North Carolina, South Carolina, and Tennessee represent **New State Records**.

Specimens Examined. **Alabama** (Jefferson, Monroe, Tallapoosa); **Georgia** (DeKalb, Henry, Lamar, Walker, Wheeler); **Mississippi** (Grenada, Kemper, Lafayette, Noxubee, Oktibbeha, Winston); **North Carolina**

(Beaufort, Stokes, Surry); **South Carolina** (Charleston, Dorchester, Pickens); **Tennessee** (Franklin). May–September. (Figure 316)

Discussion. This species is most similar to *L. mexicanus*, from which it can be separated by having confused elytral punctures. Arnett (1952) examined specimens identified as *L. avitus* from Florida and concluded they were *L. mexicanus*. Given the known distribution of *L. avitus*, it is possible some of Fattig's (1951) records from Georgia also represent *L. mexicanus*. Fattig's specimens were not available for study, but his records from Brooks and Houston counties, which are in the Southeastern Plains, may actually represent *L. mexicanus*. Specimens in the study area have been collected at mercury vapor and ultraviolet light and in Lindgren funnel traps.

Lacon discoideus (Weber, 1801)

Figures 317–318

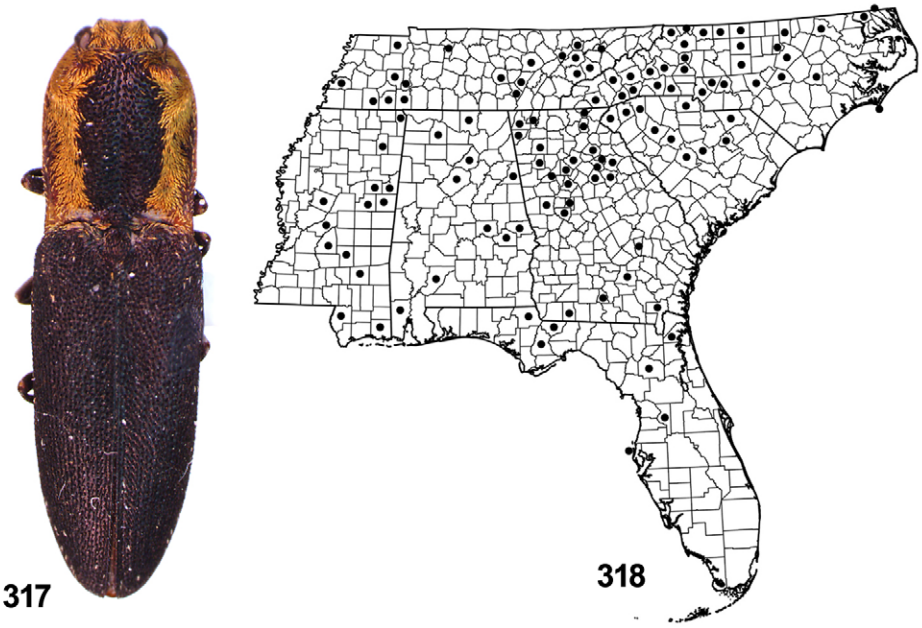
Elater discoidea Weber, 1801: 77
Elater pennata Fabricius, 1801: 269

Diagnosis. Size small to moderate, length 8.0–12.0 mm. Color uniformly black; head, lateral edges of pronotum and anterior basal edge of elytron with golden to orange scales. Antenna 11-segmented, serrate, not reaching apex of pronotal hind angle. Pronotum densely punctate, without median furrow, tubercles or foveae; hind angles short, wide, ecarinate. Tarsal groove on hypomeron shallow, punctate and not distinctly limited. Elytron devoid of scales (except at very basal edge). Elytral punctures confused, not in defined rows. Aedeagus undescribed.

Distribution. Eastern United States, west to at least Mississippi, Arkansas, and Missouri (Downie and Arnett 1996). Previously recorded from all seven states in the study area (Löding 1945; Fattig 1951; Arnett 1952; Kirk 1969, 1970; Downie and Arnett 1996; Peck and Thomas 1998; Buck et al. 2005; Vlach et al. 2010; Ferro et al. 2012b; Klepzig et al. 2012).

Specimens Examined. **Alabama** (Blount, Cleburne, Elmore, Jefferson, Lawrence, Lee, Macon, Madison, Mobile, Monroe); **Florida** (Alachua, Duval, Gadsden, Jackson, Liberty, Pinellas, Sumter); **Georgia** (Bartow, Charlton, Chattooga, Clarke, Coffee, Cook, DeKalb, Fulton, Grady, Greene, Gwinnett, Henry, Jackson, Lamar, Meriwether, Montgomery, Morgan, Oconee, Oglethorpe, Paulding, Towns, Upson, Walker, White, Whitfield); **Mississippi** (Holmes, Jackson, Jones, Madison, Lee, Lowndes, Noxubee, Pearl River, Oktibbeha, Rankin, Smith, Tishomingo, Winston); **North Carolina** (Alexander, Alleghany, Ashe, Buncombe, Burke, Cabarrus, Camden, Carteret, Catawba, Cleveland, Durham, Gates, Granville, Guilford, Halifax, Harnett, Haywood, Henderson, Macon, McDowell, Mecklenburg, Moore, Randolph, Rockingham, Rutherford, Stanly, Stokes, Surry, Transylvania, Wake, Wayne, Wilkes); **South Carolina** (Chesterfield, Greenville, Lee, Laurens, Lexington, Newberry, Oconee, Pickens, Richland, York); **Tennessee** (Anderson, Bledsoe, Blount, Cheatham, Cumberland, Decatur, Hamblen, Hardeman, Hardin, Henderson, Henry, Knox, Loudon, McNairy, Sequatchie, Sevier, Tipton, Union, Warren). Year-round. (Figure 318)

Discussion. This species is immediately recognizable based on its color alone. Specimens in the study area have been collected by a variety of methods, including in rotting logs, at ultraviolet light, sweeping and beating vegetation, and in Lindgren funnel, panel, Malaise, and flight intercept traps. It has also been collected under the bark of a variety of trees, including pine, magnolia, and oak. Specimens from Blount County, AL (NCSU) were collected by Berlese extraction of litter from an oak tree-hole. Specimens from Meriwether County, GA (UGCA) were collected on red buckeye. Löding (1945) recorded it on the flowers of chinquapin in Mobile County, AL.



Figures 317–318. *Lacon discoideus*. **317)** Habitus. **318)** Distributional data.

Lacon impressicollis (Say, 1825)

Figures 319, 321

Elater fuscus Melsheimer, 1806: 44 (*nomen nudum*)
Elater impressicollis Say, 1825: 260
Elater lepturus Say, 1839: 182
Adelocera senilis Germar, 1840: 259

Diagnosis. Size small to moderate, 7.0–10.0 mm in length; form fairly slender. Color uniformly light to dark brown, sparsely pubescent with slender, pale scales. Antenna 11-segmented, serrate, not reaching apex of pronotal hind angle. Pronotum with faint median impression, densely punctate; hind angles divergent, ecarinate, and often slightly paler than rest of pronotum. Tarsal groove on hypomeron punctate, not distinctly limited. Elytron densely punctate, punctures in defined rows. Aedeagus undescribed.

Distribution. Eastern United States, west to Texas (Downie and Arnett 1996). In the Southeast, it's been recorded from Alabama, Florida, Georgia, North Carolina, South Carolina, and Tennessee (Löding 1945; Fattig 1951; Frost 1964; Kirk 1969, 1970; Downie and Arnett 1996; Peck and Thomas 1998; Vlach et al. 2010). The following records from Mississippi represent a **New State Record**.

Specimens Examined. **Alabama** (Baldwin, Clay, Cleburne, Jefferson, Lee, Mobile, Walker); **Florida** (Alachua, Baker, Bay, Citrus, Hernando, Highlands, Levy, Liberty, Marion, Miami-Dade, Monroe, Santa Rosa, Seminole, Taylor); **Georgia** (Chatham, Cherokee, Clarke, Coffee, DeKalb, Emanuel, Jeff Davis, Lee, Liberty, McIntosh, Meriwether, Newton, Oglethorpe, Pierce, Thomas, Towns, Wheeler); **Mississippi** (Choctaw, Grenada, Jackson, Leake, Marshall, Noxubee, Oktibbeha, Pearl River, Winston); **North Carolina** (Bladen, Burke, Columbus, Craven, Cumberland, Halifax, Harnett, Johnston, Mecklenburg, Moore, Person, Rockingham, Rutherford, Wake); **South Carolina** (Beaufort, Calhoun, Charleston, Chesterfield, Clarendon, Dorchester, Georgetown, Kershaw, Oconee, Pickens, Richland, Sumter); **Tennessee** (Anderson, Cumberland, Hardeman, Knox, Warren). Year-round. (Figure 321)

Discussion. This species may be recognized in the study area by its smaller size (among *Lacon*), uniformly pale to dark brown color with sparse pubescence, and elytral punctures in defined rows. Specimens from the study area have been collected at ultraviolet and mercury vapor light, in Lindgren funnel, panel, and Malaise traps, and under pine bark. A specimen from Georgia (FSCA) was collected on a gilled mushroom growing on dead oak.

Lacon marmoratus (Fabricius, 1801)

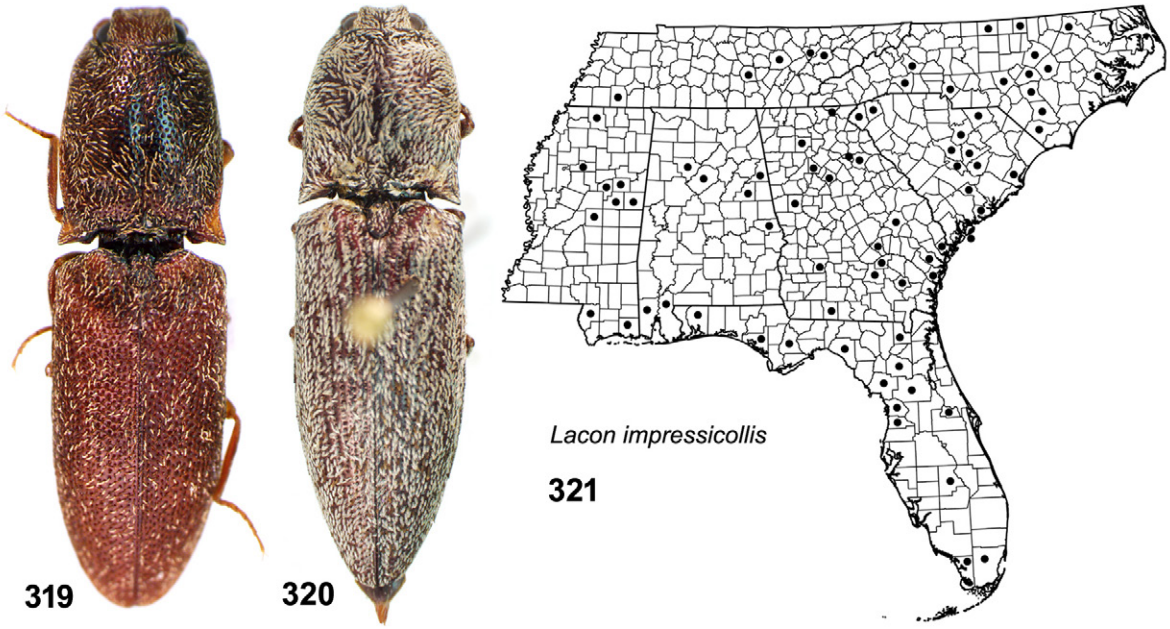
Figures 312, 322, 324

Elater marmoratus Fabricius, 1801: 227

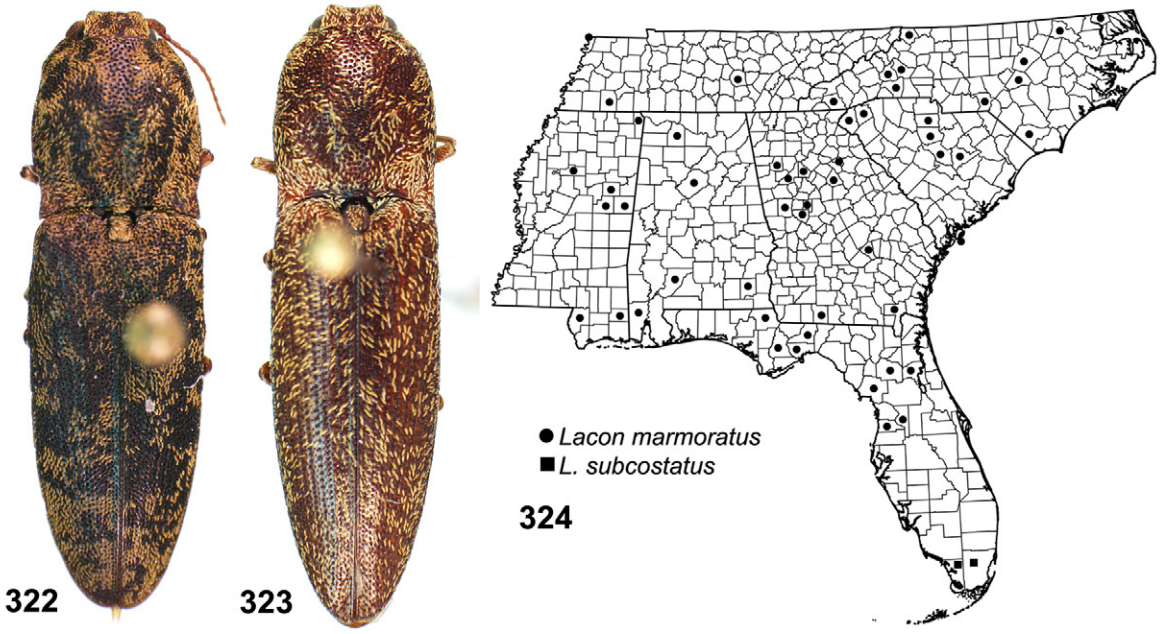
Diagnosis. Size moderate, 14.0–19.0 mm in length, form more robust. Color dark brown, mottled with patches of black and white or yellow scales forming defined patterns. Antenna 11-segmented, serrate, not reaching apex of pronotal hind angle. Pronotum densely punctate and with pronounced median furrow; hind angles wide, slightly divergent, ecarinate. Hypomeron with deep, defined tarsal groove lacking punctures (Figure 312). Elytron densely punctate, punctures not in defined rows. Aedeagus undescribed.

Distribution. Eastern United States, west to Texas (Downie and Arnett 1996). In the Southeast, previously recorded from Alabama, Florida, Georgia, North Carolina, and Tennessee (Dozier 1918; Leng 1910, 1920; Brimley 1938; Löding 1945; Fattig 1951; Kirk 1969, 1970; Peck and Thomas 1998; Vlach et al. 2010). The following records from Mississippi represent a **New State Record**.

Specimens Examined. **Alabama** (Dale, Jefferson, Lawrence, Mobile, Monroe); **Florida** (Alachua, Hernando, Jackson, Leon, Levy, Liberty, Putnam, Sumter, Wakulla); **Georgia** (Clarke, Charlton, DeKalb, Fulton, Lamar, Meriwether, Morgan, Paulding, Thomas, Upson, Wheeler counties; also Okefenokee Swamp); **Mississippi** (George, Grenada, Oktibbeha, Noxubee, Pearl River, Tishomingo, Winston); **North Carolina** (Ashe, Burke, Columbus, Gates, Halifax, Harnett, Macon, McDowell, Richmond, Rutherford, Wake); **South Carolina** (Beaufort, Chester, Fairfield, Oconee, Pickens, Richland, Sumter); **Tennessee** (Hardeman, Lake, Warren). January–August, October, December. (Figure 324)



Figures 319–321. *Lacon* spp. **319)** *L. impressicollis* (habitus). **320)** *L. subcostatus* (habitus). **321)** Distributional data for *L. impressicollis*.



Figures 322–324. *Lacon* spp. **322)** *L. marmoratus* (habitus). **323)** *L. mexicanus* (habitus). **324)** Distributional data for *L. marmoratus* and *L. subcostatus*.

Discussion. This species is one of the largest *Lacon* in the East and is easily recognized by its marbled pattern in conjunction with the characters of the pronotum and the tarsal groove on the hypomeron. Specimens from the study area have been collected at ultraviolet and mercury vapor light, in Lindgren funnel traps, and under pine bark. Dozier (1918) reported it from under the bark of pine and oak in Florida.

Lacon mexicanus (Candèze, 1857)

Figures 316, 323

Adelocera mexicana Candèze, 1857: 70

Diagnosis. Size moderate, 14.0–19.0 mm in length. Color dark brown, center of pronotum and elytral intervals closest to suture darker, often black; body covered with thin, yellow and black scales not arranged in any particular pattern. Antenna 11-segmented, serrate, not reaching apex of pronotal hind angle. Pronotum densely punctate, punctures large; hind angles parallel to slightly divergent, pointed and with small, indistinct carina, often paler than rest of pronotum. Hypomeron lacking groove for reception of front tarsus. Elytron densely punctate, punctures in defined rows. Aedeagus undescribed.

Distribution. Southern United States to Central America (Peck and Thomas 1998). In the Southeast, previously recorded only from Florida (Arnett 1952; Peck and Thomas 1998). The following records for Georgia represent a **New State Record**, although it is possible some of Fattig's (1951) records for *L. avitus* from Georgia refer to this species (see Discussion under *avitus*).

Specimens Examined. **Florida** (Alachua, Baker, Charlotte, Clay, Collier, Hernando, Highlands, Hillsborough, Jackson, Lee, Leon, Marion, Miami-Dade, Monroe, Orange, Palm Beach, Pasco, Pinellas, Polk, Sarasota, Seminole, Sumter); **Georgia** (Clinch, Long, McIntosh, Pierce). February, May–August. (Figure 316)

Discussion. This species is most similar to *L. avitus* in that it lacks a tarsal groove on the hypomeron. However, it can be readily separated from that species by having the elytral punctures in defined rows. *Lacon subcostatus*

also lacks a tarsal groove on the hypomeron but is a Caribbean species that occurs only in extreme southern Florida in the U.S. Specimens from the study area have been collected in Lindgren funnel traps and at ultraviolet and mercury vapor light. A specimen from Monroe County, FL (FSCA) was collected under mangrove bark.

Lacon subcostatus (Candèze, 1857)

Figures 320, 324

Adelocera subcostata Candèze, 1857: 69
Lacon floridanus Knull, 1948: 102

Diagnosis. Size moderate to large, 17.0–20.0 mm in length. Color dark brown; body covered with gray and golden scales, not arranged in a particular pattern. Antenna 11-segmented, serrate, not reaching apex of pronotal hind angle. Pronotum densely punctate, punctures large; hind angles parallel to slightly divergent, pointed and with small, indistinct carina, often paler than rest of pronotum. Hypomeron lacking groove for reception of front tarsus. Elytron densely punctate, punctures in defined rows. Aedeagus not observed.

Distribution. Dominican Republic, Cuba, Antigua, Guadeloupe, and southern Florida (Knull 1948; Peck and Thomas 1998). The type locality of *L. floridanus* is Coral Gables in Miami-Dade County, FL.

Specimens Examined. **Florida** (Miami-Dade, Monroe). April–June. (Figure 324)

Discussion. Morphologically, this species is most similar to *L. mexicanus* but is paler and has intermixed gray and golden scales (*L. mexicanus* has intermixed black and golden scales). This is a Caribbean species that also occurs in southern Florida. Specimens examined have been collected at ultraviolet light and on white mangrove.

Meristhus Candèze, 1857

Meristhus Candèze, 1857: 19

Diagnosis. Size small, less than or equal to 5.0 mm in length; form elongate-robust; body covered with broad, erect setae. Supra-antennal carinae incomplete. Antenna 11-segmented, not reaching apex of pronotal hind angle; flagellar antennomeres IV–VIII serrate, subtriangular. Pronotum arcuate, widest at middle, evenly tapering to apical margins, strongly sinuate at base of hind angle; hind angles slightly divergent, ecarinate. Prosternal sutures open to receive antennae. Hypomeron with deep, diagonal furrows for receiving front tarsus. Scutellum carinate. Elytral intervals granulate. Legs with tibial spurs absent; tarsomeres lacking membranous lobes; claws simple, with basal setae. Aedeagus undescribed.

Range and Numbers. One species in North America, distributed in the South and Southwest (Johnson 2002).

Discussion. This genus is most similar to *Rismethus* but can easily be separated by the shape of the pronotum and the presence of granules on the elytral intervals (elytral intervals punctate in *Rismethus*). The last treatment of this genus was by Arnett (1952). At that time, the genus also contained the species currently placed in *Rismethus.* Not much is known about their biology, and adults are typically collected in sandy habitats.

Meristhus cristatus Horn, 1871

Figures 325, 328

Meristhus cristatus Horn, 1871: 299

Diagnosis. Size small, 3.0–5.0 mm in length; form elongate-robust. Color brown, occasionally with pale subapical macula on elytron; vestiture scale-like, erect, evenly distributed over entire body, forming even rows on the elytron. Antenna 11-segmented; antennomere I elongate; II and III small; IV–VIII triangular; remaining moniliform. Pronotum longer than wide, arcuate, widest and middle, gradually tapering to apical margin,



Figures 325–327. Agrypnini. **325)** *Meristhus cristatus* (habitus). **326)** *Rismethus scobinula* (habitus). **327)** *R. squamiger* (habitus).

sinuate at base of hind angle; hind angles slightly divergent, ecarinate. Hypomeron with deep, diagonal groove for reception of front tarsus. Elytron elongate, intervals granulate. Aedeagus not observed.

Distribution. Southern and southwestern United States. Neither Arnett (1952) nor Johnson (2002) indicated that it occurred east of Texas, although Löding (1945) recorded it from Alabama. The following records from Mississippi represent a **New State Record**.

Specimens Examined. Alabama (Baldwin); **Mississippi** (Bolivar, Grenada). May–July.(Figure 328)

Discussion. This species resembles members of the genus *Rismethus* but can be separated by the shape of the pronotum and elytral sculpture. Not much is known about the biology of this species. Specimens from Grenada County, MS (MEM) were collected in pitfall traps set on a sandbar. Specimens from Bolivar County, MS (MEM) were collected under a log on a sandbar.

Rismethus Fleutiaux, 1947

Rismethus Fleutiaux, 1947: 242

Diagnosis. Size small, less than 5.0 mm in length; form robust. Body covered with broad, erect setae. Supra-antennal carinae incomplete. Antenna 11-segmented, not reaching apex of pronotal hind angle; flagellar antennomeres IV–VIII serrate, subtriangular. Pronotum subquadrate, constricted near anterior margin, strongly sinuate at base of hind angle; hind angles slightly divergent, ecarinate. Prosternal sutures open to receive antennae. Hypomeron with deep, diagonal groove for receiving front tarsus. Scutellum carinate. Elytral intervals finely punctate. Legs with tibial spurs absent; tarsomeres lacking membranous lobed; claws simple, with basal setae. Aedeagus with parameres variable.

Range and Numbers. There are two species in the United States, distributed in the East, south and west to New Mexico (Johnson 2002). Both species are found in the Southeast.

Discussion. Arnett (1952) treated this genus as a synonym of *Meristhus*. Nomenclatural and taxonomic changes to the North American species are in progress (Paul Johnson, pers. comm, 2020). The key characters should be sufficient for separating the two genera. Species in this genus are readily recognized by their small size, robust shape, punctate elytral intervals, and erect scale-like setae displayed in even rows on the elytron.

Key to the species of *Rismethus* in the Southeast
(adapted from Champion 1896)

1. Form short, stout; elytron broadest at middle, gradually tapering anteriorly and broadly rounded apically; elytral scales larger, approximately 18 in the sutural striae; aedeagus with paramere not laterally hooked . . . . . ***R. squamiger* (Champion)**
— Form more elongate; elytron subparallel over basal half, gently tapering apically; elytral scales smaller, approximately 25 in the sutural striae; aedeagus with paramere laterally hooked . . . . . ***R. scobinula* (Candèze)**

Rismethus scobinula (Candèze, 1857)

Figures 326, 328

Meristhus scobinula Candèze, 1857: 164
Meristhus setarius Chevrolat, 1867: 596
Meristhus texanus Horn, 1871: 300

Diagnosis. Size small, 3.0–4.0 mm in length. Color brown; pronotum sometimes paler; elytron often with pale brown humeral and subapical macula; vestiture scale-like, erect, evenly distributed over entire body, forming even rows on the elytron. Antenna 11-segmented; antennomere I elongate; II and III small; IV–VIII triangular; remaining moniliform. Pronotum quadrate, subparallel, narrowing apically and distinctly sinuate at base of hind angle; hind angles slightly divergent, ecarinate. Hypomeron with deep, diagonal groove for reception of front tarsus. Elytron elongate, subparallel over basal half, gently tapering apically; approximately 25 scales in the sutural striae. Aedeagus with paramere apically hooked.

Distribution. Known from China, Japan, the Caribbean, and South America north to the southeastern United States (Arnett 1952). In the Southeast, previously recorded from Florida and Georgia (Fattig 1951; Arnett 1952; Van Zwaluwenburg 1957; Peck and Thomas 1998). The following records from Alabama represent a **New State Record**.

Specimens Examined. Alabama (Clarke, Lee, Mobile); **Florida** (Gadsden, Liberty); **Georgia** (Meriwether). April–July. (Figure 328)

Discussion. This species closely resembles the other species in the genus, *R. squamiger*, but differs primarily in being more elongate in relation to its width and has more (approximately 25) setae in the sutural striae. The aedeagi are also different, with *R. squamiger* having the paramere slightly subapically widened, but not hooked apically, and *R. scobinula* with a broad apical hook on the paramere. Also, *R. scobinula* is more generally distributed in the Southeast, whereas *R. squamiger* in the United States is currently known only from Florida. Specimens in the study area have been collected at ultraviolet and mercury vapor light.

Rismethus squamiger (Champion, 1896)

Figures 327–328

Meristhus squamiger Champion, 1896: 269

Diagnosis. Size small, 2.0–3.5 mm in length. Color dark brown; pronotal hind angle sometimes paler; elytron often with pale yellow-brown humeral and subapical macula; vestiture scale-like, erect, evenly distributed over entire body, forming even rows on the elytron. Antenna 11-segmented; antennomere I elongate; II and III small; IV–VIII triangular; remaining moniliform. Pronotum subquadrate, broadest medially, rounding anteriorly and distinctly sinuate at base of hind angle; hind angles slightly divergent, ecarinate. Hypomeron with deep, diagonal groove for reception of front tarsus. Elytron broad, widest medially, gradually tapering anteriorly and broadly rounded apically; approximately 18 scales in the sutural striae. Aedeagus with paramere slightly widening subapically, not apically hooked.

Distribution. South America north to Mexico; in the United States previously recorded only from Florida (Peck and Thomas 1998). The following record from Alabama represents a **New State Record**.

Specimens Examined. Alabama (Mobile); **Florida** (Alachua, Baker, Citrus, Clay, Hernando, Highlands, Hillsborough, Leon, Levy, Liberty, Marion, Miami-Dade, Orange, Palm Beach, Polk, Putnam, Seminole, St. Lucie). March-April; June-November. (Figure 328)

Discussion. What is currently known as *R. squamiger* from Alabama and Florida appears to be an undescribed species. Examination of the aedeagus from specimens from Florida seem to show that the Florida populations are not conspecific with nominal *R. squamiger* from Central America (P. Johnson, pers. comm. 2014; the description above pertains specifically to Florida specimens). I am retaining the use of *R. squamiger* here, pending formal revision with a critical evaluation of the aedeagus.

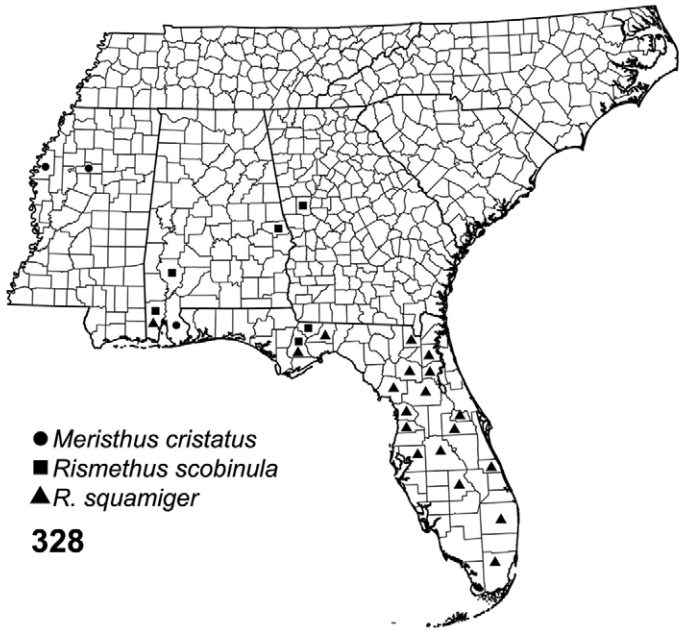


Figure 328. Distributional data for *Meristhus cristatus*, *Rismethus scobinula*, and *R. squamiger*.

This species is similar to *R. scobinula* but broader and often darker and has fewer (approximately 18) setae in the sutural striae. The characteristics of the aedeagus will also separate the two, with *R. squamiger* having a slight subapical widening of the paramere but not hooked apically, and *R. scobinula* with a broad apical hook. The subapical elytral macula may also be more prominent in this species. Specimens in the study area have been collected at ultraviolet, mercury vapor, and sodium vapor light, in Lindgren funnel traps, and in wood litter.

Oophorini Gistel, 1856

The tribe Oophorini contains four genera in North America (Johnson 2002); all but *Deronocus* Johnson (southern California) occur in the Southeast. Delineation of some genera is difficult, and several genera may eventually be split into smaller, more manageable taxa (Stibick 1979). This tribe is also frequently referred to as Conoderini or Monocrepidiini in older literature. Adults are variable in size, shape, and color. Supra-antennal carinae are complete and well-separated from the labrum. Antenna 11-segmented, usually serrate. Pronotosternal sutures closed. Neither prosternum nor hypomeron possess a groove for receiving the antenna or tarsus. Meso- and metasternum not fused, separated by a definite suture. Tarsomere IV broadened or with membranous lobe; claws simple, with basal setae. Several species have been implicated as crop pests. Rabb (1963) keyed the late instar larvae of several economically important members of *Conoderus* in North Carolina.

Aeolus Eschscholtz, 1829

Aeolus Eschscholtz, 1829: 33
Trypheus Gistel, 1834: 12

Diagnosis. Size small. Color variable, most species yellow to orange with variable dark maculae on pronotum and/or elytra; tegument shining. Supra-antennal carinae complete and well-separated from the labrum. Antenna 11-segmented, usually serrate, often weakly so, not extending beyond apex of pronotal hind angle. Pronotal shape variable; punctures of one size, interspaces shining; hind angle carinate, one or two carinae present (second carina may be faint and difficult to see). Pronotosternal sutures closed. Neither prosternum nor hypomeron possess grooves for receiving antennae or tarsi. Metathoracic wings usually functional, but brachyptery is common. Front femur with anteroventral carina (a carina on the anterior side of the femur that essentially separates the dorsal and ventral portions of the femur). Tarsomere IV with setiferous pad or membranous lobe; claws simple, with basal setae. No external sexual dimorphism noted.

Range and Numbers. There are currently 14 described species in the US and Canada, generally distributed (Johnson 2002), although the genus is currently being revised. Eight species have been recorded from the Southeast; Kirk's (1969) record of *A. livens* (LeConte) from South Carolina is considered doubtful and the status of *A. minor* (Schwarz) is unresolved.

Discussion. The genus was revised by Lin (1997) as a Masters thesis. Synonymies proposed in that work that have not been published are codified here. Some new species described in Lin's work have distributions that include the present study area, but those species will not be considered here as I never encountered specimens during the course of this study. Historically, there has been much confusion about the placement of species in the genus, with many species assigned to *Drasterius*. As presently delineated, *Drasterius* is a Palearctic genus of Oophorini and North American species previously assigned to this genus are now in the genera *Aeolus* or *Idolus* (Johnson 2001). Most members of the genus *Aeolus* can be readily recognized by their color; most species are yellow to orange with a central dark macula on the pronotum and sub-basal and post-medial dark maculae on the elytra. *Aeolus* spp. can also be distinguished from other oophorines by the presence of a carina on the anteroventral margin of the front femur and having a more shining tegument (*Heteroderes* spp. and most *Conoderus*

spp. have a dull or microreticulate tegument). Specimens can be collected by a variety of methods, most commonly at light. Some species have been implicated as crop pests, but larvae are primarily predators.

Key to the species of *Aeolus* in the Southeast
(adapted from Lin 1997)

1. Scutellum raised to anteriorly subconical (Figure 336) **2**
— Scutellum flat to evenly convex **3**

2(1). Pronotal hind angle bicarinate (inner carina may be weak); scutellum depressed basally, strongly conical anteriorly; generally distributed in the East . . . . . ***A. scutellatus* (Schaeffer)**
— Pronotal hind angle unicarinate; scutellum gradually raised anteriorly; restricted to Southern Coastal Plains of Florida and neighboring Alabama and Georgia . . . . . ***A. lepidus* (LeConte)**

3(2). Pronotal hind angle unicarinate **4**
— Pronotal hind angle bicarinate (inner carina may be weak) **5**

4(3). Pronotal hind angles subparallel; metathoracic wings always brachypterous . . . . . ***A. pseudothoracicus* Lin and Johnson**
— Pronotal hind angles divergent; metathoracic wings functional for flight . . . . ***A. amabilis* (LeConte)**

5(3). Pronotum subparallel at base of hind angle; scutellum evenly, moderately convex . . . . . ***A. cribratus* (LeConte)**
— Pronotum sinuate at base of hind angle; scutellum flat to slightly convex . . . . . ***A. mellillus* (Say)**

Aeolus amabilis (LeConte, 1853)

Figures 329, 333

Drasterius amabilis LeConte, 1853: 485
Drasterius fretus Casey, 1884: 170

Diagnosis. Size small, 3.8–4.8 mm in length. Color red-yellow; head dark; legs and antennae concolorous with body; pronotum with an elongate-oval central dark macula; elytron with darkening round the scutellum, a sub-basal dark macula, and a post-medial transverse black macula that reaches suture; vestiture golden, evenly distributed over the body. Antenna 11-segmented, weakly serrate. Pronotum longer than wide, sinuate at base of hind angles; punctures coarse, dense, separated by less than to slightly greater than their own diameters, interspaces shining; hind angles slightly divergent, unicarinate. Scutellum shallowly, evenly convex. Aedeagus with median lobe robust basally, tapering to acute apex; paramere with long apical setae.

Distribution. Eastern North America (Lin 1997). In the Southeast previously recorded from Alabama, Georgia, North Carolina, and South Carolina (Löding 1945; Fattig 1951; Kirk 1969, 1970; Lin 1997).

Specimens Examined. Alabama (Lee, Talladega); **Georgia** (Fulton); **North Carolina** (Hyde). April, June–July, September. (Figure 329)

Discussion. *Aeolus amabilis* is externally very similar to the common *A. mellillus*, but is generally smaller, being consistently less than 5.0 mm in length, and has the pronotal hind angle unicarinate. *Aeolus amabilis* is also generally less common in the East than *A. mellillus* and *A. scutellatus*, and many previously published records may refer to small specimens of the *A. mellillus*. Löding (1945) recorded it from under the bark of white oak. Specimens in the study area have been collected in Lindgren funnel traps.

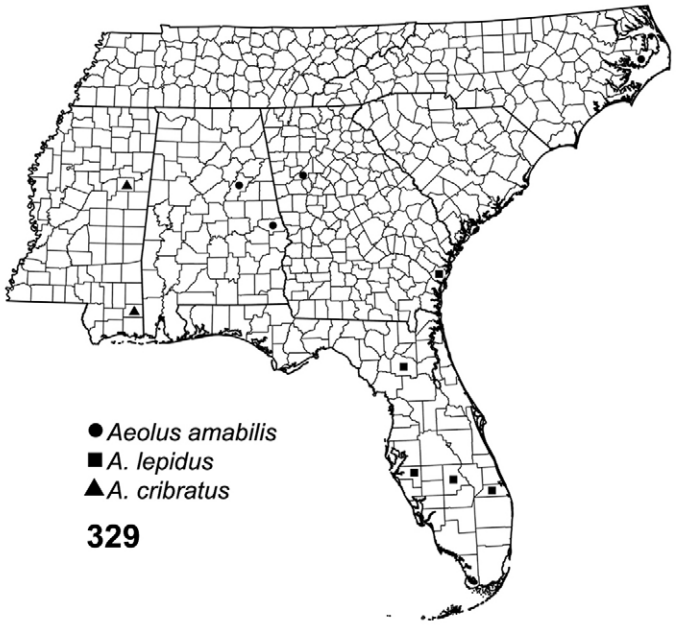


Figure 329. Distributional data for *Aeolus amabilis*, *A. lepidus*, and *A. cribratus*.

Aeolus cribratus (LeConte, 1884)

Figures 329–330

Drasterius cribratus LeConte, 1884: 487

Diagnosis. Size small, 5.4–7.6 mm in length. Color as in *amabilis*. Antenna 11-segmented, weakly serrate. Pronotum longer than wide, subparallel at base of hind angle; punctures coarse, dense, separated by less than or equal to their own diameters, interspaces shining; hind angle bicarinate (inner carina may be weak). Scutellum moderately, evenly convex. Aedeagus robust with median lobe attenuate; paramere with long apical setae.

Distribution. Midwestern United States, south and east to Florida (Lin 1997). In the Southeast, previously recorded from Alabama, Florida, Georgia, and Mississippi (Lin 1997).

Specimens Examined. Mississippi (George, Oktibbeha). April–May, July. (Figure 329)

Discussion. This species is superficially similar to *A. mellillus* externally but has the pronotum subparallel to the base of the hind angle.

Aeolus lepidus (LeConte, 1853), new combination

Figures 329, 331

Monocrepidius lepidus LeConte, 1853: 485

Diagnosis. Size small, 5.3–5.4 mm in length. Color pale orange-yellow; head dark; antennae and legs concolorous with body; pronotum with brown elongate central macula; elytron with faint elongate-oval sub-basal macula and elongate sub-terminal sutural brown macula; pronotal and elytral maculae of *M. lepidus* typically paler than other *Aeolus* spp.; vestiture golden, evenly distributed over body. Antenna 11-segmented, weakly serrate. Pronotum longer than wide, widest at base of hind angles, slightly sinuate at base of hind angles; punctures coarse, dense, separated by less than their own diameters, interspaces shining; hind angle unicarinate. Scutellum

gradually raised anteriorly. Aedeagus with median lobe attenuate; paramere with simple apical blade possessing long apical setae.

Distribution. Limited to Florida and neighboring Coastal Plains of Alabama, Florida, Georgia, and South Carolina (LeConte 1853; Leng 1920; Van Dyke 1932; Löding 1945; Fattig 1951; Lin 1997; Peck and Thomas 1998). The type locality is Georgia (not further restricted).

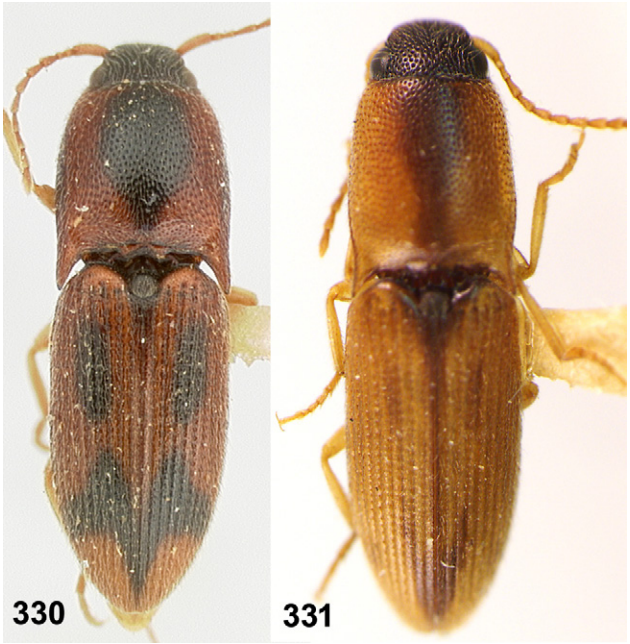
Specimens Examined. Florida (Alachua, Highlands, Manatee, Martin); **Georgia** (McIntosh). February, April, June–July. (Figure 329)

Discussion. This species should be recognized by the less prominent maculae, anteriorly raised scutellum, and unicarinate pronotal hind angles. It has been historically placed in the genus *Conoderus*, but the presence of a carina on the anteroventral angle of the front femur supports its placement in *Aeolus*. Specimens in the study area have been collected at ultraviolet light. The new combination of *Aeolus lepidus* (LeConte, 1853) as proposed by Lin (1997) is here validated and should be credited to Lin and Johnson in this work.

Aeolus mellillus (Say, 1834)

Figures 332, 334

Elater dorsalis Say, 1823: 167 (nec *Elater dorsalis* Paykull, 1800: 4)
Elater mellillus Say, 1834: 173
Oophorus nigrosignatus Candèze, 1859: 286 (nec *Oophorus nigrostriatus* Dejean, 1833: 105)
Drasterius brevipennis Schwarz, 1903: 57 (nec *Drasterius brevipennis* Candèze, 1881: 62)
Drasterius curtipennis Schwarz, 1906: 112 (replacement name for *D. brevipennis* Schwarz, 1903), **new synonym** (ex. Lin and Johnson, here designated)



Figures 330–331. *Aeolus* spp. **330)** *A. cribratus* (habitus). **331)** *A. lepidus* (habitus). *Aeolus cribratus* photo courtesy Kyle Schnepp (Florida State Collection of Arthropods, FDACS-DPI, Gainesville, FL, USA).

Diagnosis. Size small, 5.0–8.6 mm in length. Color as in *A. amabilis*. Antenna 11-segmented, weakly serrate. Pronotum about as long as wide, sinuate at base of hind angles; punctures coarse, dense, separated by less than to equal to their own diameters, interspaces shining; hind angle bicarinate, inner carina may be faint. Scutellum slightly, evenly convex. Aedeagus short, robust, with median lobe attenuate, acute apically; paramere with long apical setae.

Distribution. much of North America (Downie and Arnett 1996; Lin 1997). Previously recorded from all seven states in the study area (Leng 1920; Brimley 1938; Löding 1945; Fattig 1951; Becker 1961; Kirk 1969, 1970; Lin 1997). The type locality for *D. brevipennis* is Alabama (not further restricted).

Specimens Examined. Alabama (Barbour, Colbert, Dallas, Elmore, Lauderdale, Lawrence, Lee, Limestone, Madison, Marengo, Mobile, Montgomery); **Georgia** (Calhoun, Clarke, Emanuel, Greene, Henry, Jackson, Lamar, Meriwether, Murray, Oglethorpe, Rabun, Wheeler); **Mississippi** (Grenada, Hinds, Lafayette, Oktibbeha, Pearl River, Pontotoc); **North Carolina** (Avery, Bladen, Buncombe, Camden, Cumberland, Forsyth, Guilford, Haywood, Hyde, Mecklenburg, Moore, Rowan, Stokes, Surry, Wake, Wayne); **South Carolina** (Aiken, Anderson, Calhoun, Dillon, Marion, Oconee, Pickens, Richland, York); **Tennessee** (Chester, Cumberland, Dyer, Hamblen, Hamilton, Hardeman, Hardin, Knox, Lake, Meigs, Montgomery, Rhea, Sevier, Shelby). February-November. (Figure 332)

Discussion. This is the most commonly collected species of *Aeolus* in the East. In the Southeast, it is most similar to *A. scutellatus* from which it can be separated by the form of the scutellum. Some historical records for the less common *A. amabilis* might actually pertain to this species. Specimens in the study area have been collected by a variety of methods, including at ultraviolet and mercury vapor light, in Lindgren funnel traps, sweeping vegetation, and in pitfall traps. Specimens from Mobile County, AL (GSAT) were collected under oak bark. Kirk (1969) recorded it feeding on cotton seed as well as being a predator of the weevil *Sphenophorus*

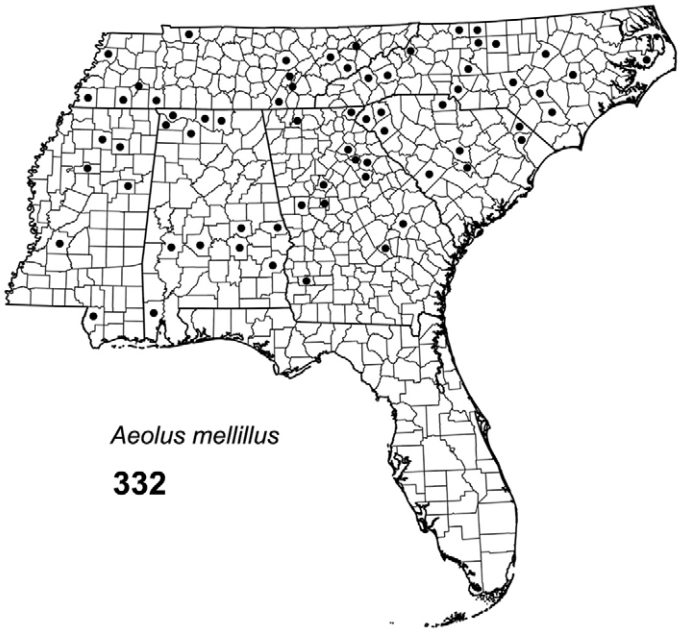
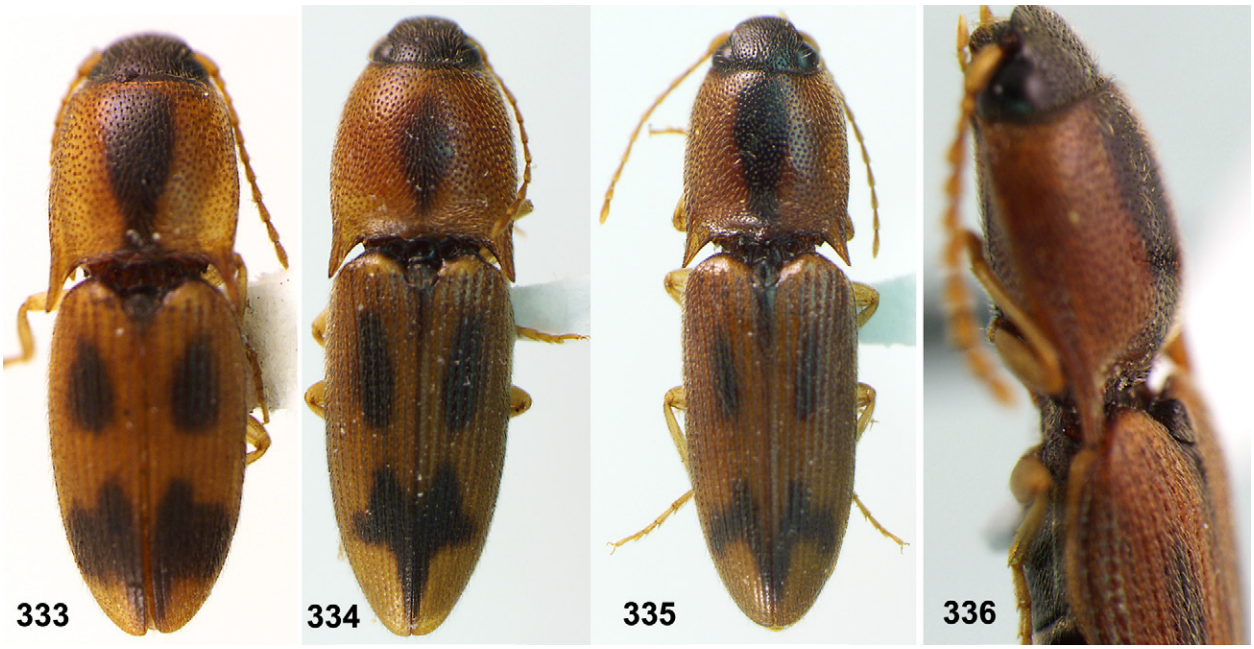


Figure 332. Distributional data for *Aeolus mellillus*.



Figures 333–336. *Aeolus* spp. **333)** *A. amabilis* (habitus). **334)** *A. mellillus* (habitus). **335)** *A. scutellatus* (habitus). **336)** *A. scutellatus* (lateral view of scutellum).

maidis Chittenden in South Carolina. The synonymy of *D. curtipennis* Swartz as proposed in Lin (1997) is here validated and should be credited to Lin and Johnson in this work.

Aeolus pseudothoracicus Lin and Johnson

(not illustrated)

Drasterius thoracicus Schaeffer, 1917: 41 (nec *Drasterius thoracicus* Candèze, 1859: 344)
Aeolus pseudothoracicus Lin and Johnson in Johnson and Steury 2021: 37

Diagnosis. Female: size small, 3.9–5.2 mm in length. Color as in *A. amabilis* and *A. mellillus*. Antenna 11-segmented, serrate. Pronotum about as long as wide, large, occupying approximately ⅓ the body length; punctures coarse, dense, separated by a less than or equal to their own diameter, interspaces shining; hind angle subparallel, unicarinate. Scutellum flat. Male undescribed.

Distribution. Eastern North America (Lin 1997). In the Southeast, previously recorded from Georgia, Mississippi, North Carolina, South Carolina, and Tennessee (Lin 1997).

Specimens Examined. None.

Discussion. The name *D. thoracicus* is preoccupied by Candèze, 1859, which was described from Colombia. This species is recognized by its relatively small size and the large pronotum with subparallel, unicarinate hind angles.

Aeolus scutellatus (Schaeffer, 1917)

Figures 335–337

Drasterius scutellatus Schaeffer, 1917: 41
Conoderus perversus Brown, 1933b: 173, **new synonym** (ex. Lin and Johnson, here designated)

Diagnosis. Size small, 5.5–7.7 mm in length. Color as in *A. amabilis* and *A. mellillus*, with the elytral maculae often joining to form a defined stripe. Antenna 11-segmented, serrate. Pronotum about as long as wide, sinuate at base of hind angle; punctures coarse, dense, separated by less than or equal to their own diameters, interspaces shining; hind angle bicarinate, inner carinae may be faint. Scutellum anteriorly strongly raised and subconical (Figure 336). Aedeagus undescribed.

Distribution. Southeastern United States to Texas (Peck and Thomas 1998). Previously recorded from all seven states in the study area (Brown 1933b; Fattig 1951; Kirk 1969, 1970; Frost 1975; Lin 1997; Peck and Thomas 1998; Lago et al. 2002). The type locality of *C. perversus* is Enterprise in Volusia County, FL.

Specimens Examined. Alabama (Coosa, Dallas, Elmore, Jefferson, Lee, Limestone, Montgomery, Sumter, Tallapoosa, Tuscaloosa); **Florida** (Brevard, Highlands, Manatee, Marion, Monroe, Palm Beach); **Georgia** (Clarke, Clayton, Laurens, Meriwether, Pike); **Mississippi** (Bolivar, Calhoun, Kemper, Lafayette, Lowndes, Noxubee, Oktibbeha, Pontotoc, Tishomingo, Washington); **North Carolina** (Burke, Camden, Cumberland, Forsyth, Mecklenburg, Wake); **South Carolina** (Aiken, Barnwell, Charleston, Dorchester, Pickens, Richland, Spartanburg, York); **Tennessee** (Knox, Sevier). April–September. (Figure 337)

Discussion. This species is common in the Southeast and is most likely to be confused with *A. mellillus*, from which it can be separated by having a strongly anteriorly raised, subconical scutellum. Specimens in the study area have been collected by a variety of methods, including at ultraviolet and mercury vapor light, by sweeping vegetation, and in Lindgren funnel, Malaise, and sticky traps. Fattig (1951) recorded it in association with rice in Bryan County, GA. Kirk (1970) recorded it from sweeping alfalfa in Pickens County, SC. The synonymy of *C. perversus* Brown as proposed in Lin (1997) is here validated and should be credited to Lin and Johnson in this work.

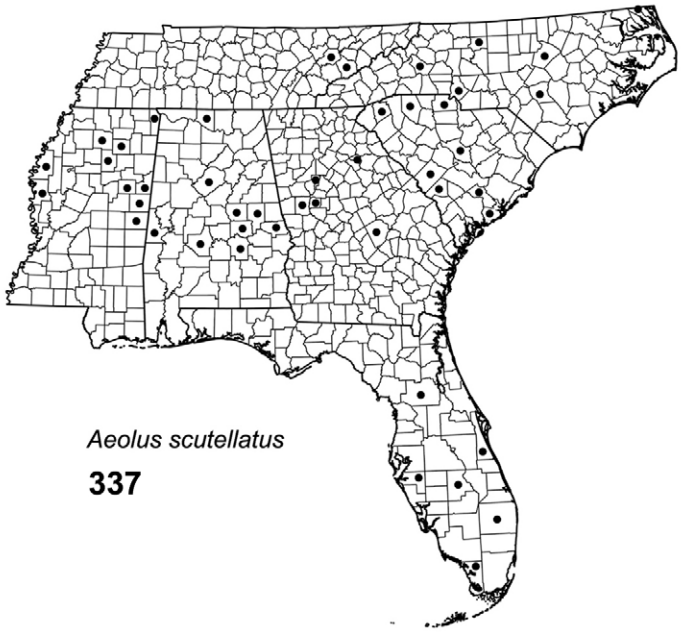


Figure 337. Distributional data for *Aeolus scutellatus*.

Conoderus Eschscholtz, 1829

Conoderus Eschscholtz, 1829: 31
Monocrepidius Eschscholtz, 1829: 82
Conoderes Van Dyke, 1932, misspelling

Diagnosis. Size variable, small to moderate; form variable, from short and robust to elongate, nearly parallel-sided. Color variable, unicolorous or bicolored, often with maculae forming distinct patterns. Supra-antennal carinae complete and well-separated from the labrum. Antenna 11-segmented, usually serrate, often weakly so. Pronotal shape variable; punctures typically of one size (intermixed small and large punctures in *C. blandulus* and *C. falli*); hind angle carinate, one or two carinae present. Pronotosternal sutures closed. Neither prosternum nor hypomeron possess a groove for receiving the antenna or front tarsus. Tarsomere IV with membranous lobe (may be narrow and not readily visible from above); claws simple, with basal setae.

Range and Numbers. There are 27 species recorded from North America, generally distributed but more abundant in the South (Johnson 2002). Fifteen species have been previously recorded from the Southeast, two of which are of Caribbean origin and currently known only from southern Florida. Fattig's (1951) records of *C. delicatus* (Fall 1929) from Georgia are doubtful. One additional new species is added to the study area here.

Diagnosis. Kundrata et al. (2019) gave *Monocrepidius* priority over the long-standing *Conoderus*; however, *Conoderus* is retained here as the species currently assigned to the genus in North America will probably be split into multiple genera pending a formal revision (P. Johnson, pers. comm. 2019).

Members of this genus are highly variable, and at times can be difficult to distinguish from *Heteroderes*. The last treatment as a whole for North America was by Van Dyke (1932), who considered *Heteroderes* a subgenus of *Conoderus*. Typically, *Conoderus* species have punctures of one size on the pronotum, although *C. blandulus* and *C. falli* have a mix of large and small pronotal punctures. Specimens can be collected by a variety of methods, and can be particularly abundant at light. Several species have been implicated as crop pests.

Key to the species of *Conoderus* in the Southeast
(adapted from Van Dyke 1932)

1. Pronotum with punctures of two sizes, larger punctures intermixed with smaller ones (Figure 353) . **2**
— Pronotum with punctures of one size **3**

2(1). Pronotum shining, punctures less dense with interspaces glabrous, color orange with two broad longitudinal maculae . . . . . ***C. blandulus* (LeConte)**
— Pronotum dulled, punctures very dense with interspaces microreticulate, color unicolorous dark brown (hind angles may be paler) . . . . . ***C. falli* (Lane)**

3(1). Body unicolored (sutural area of elytron may be darkened) **4**
— Body bicolored or with dark maculae forming defined patterns **9**

4(3). Base of hypomeron truncate, without distinct projection of a hind angle . . . . . ***C. scissus* (Schaeffer)**
— Base of hypomeron with distinct projection of a hind angle **5**

5(4). Smaller species, < 7.0 mm in length . . . . . ***C. debilitatus* (Candèze)**
— Larger species, > 9.0 mm in length **6**

6(5). Pronotal hind angle bicarinate, with both carinae strong, prominent; color dark dusky brown . . . . . ***C. exsul* (Sharp)**
— Pronotal hind angle bicarinate, with inner carina short and inconspicuous; color light red-brown . . **7**

7(6). Sides of mesosternal fossa gradually sloping between mesocoxae, posterior end of mesosternal fossa on same plane as adjacent metasternum; aedeagus asymmetrical (Figure 350); widely distributed in the East . . . . . ***C. lividus*** **(De Geer)**

— Sides of mesosternal fossa abruptly sloping between mesocoxae, posterior end of mesosternal fossa above plane of adjacent metasternum; aedeagus symmetrical; in the United States known only from southern Florida **8**

8(7). Antennomere III small, intermediate between II and IV but much closer to II in length; membranous lobe on tarsomere IV broadly rounded apically . . . . . ***C. bifoveatus*** **(Palisot de Beauvois)**

— Antennomere III longer, subequal to IV; membranous lobe of tarsomere IV concave apically . . . . . ***C. rufidens*** **(Fabricius)**

9(3). Membranous lobe of tarsomere IV short and broad, clearly visible from above **10**

— Membranous lobe of tarsomere IV long and narrow, scarcely visible from above **13**

10(9). Carina of pronotal hind angle straight, diverging anteriorly from lateral margin of pronotum . . . . . ***C. aversus*** **(LeConte)**

— Carina of pronotal hind angle close to, and almost parallel with, lateral margin of pronotum, diverging slightly anteriorly and distinctly sinuate along hind angle **11**

11(12). Larger species, 8.0–10.0 mm in length; color highly variable, often with pronotum yellow-brown with two elongate, dark maculae . . . . . ***C. vespertinus*** **(Fabricius)**

— Smaller species, 7.0 mm or less in length; color variable but never with two elongate dark maculae on pronotum **12**

12(11). Pronotum dark, nearly black, hind angle and anterior margin usually red-yellow (sometimes entire lateral margin red-yellow) . . . . . ***C. rudis*** **Brown**

— Pronotum reddish with elongate central black macula, sometimes attaining both anterior and posterior margins . . . . . ***C. suturalis*** **(LeConte)**

13(9). Size 5.0–7.0 mm in length . . . . . ***C. auritus*** **(Herbst)**

— Size 2.5–4.0 mm in length **14**

14(13). Base of pronotum with small, erect tubercle (arrow, Figure 347) . . . . . ***C. pictus*** **(Candèze)**

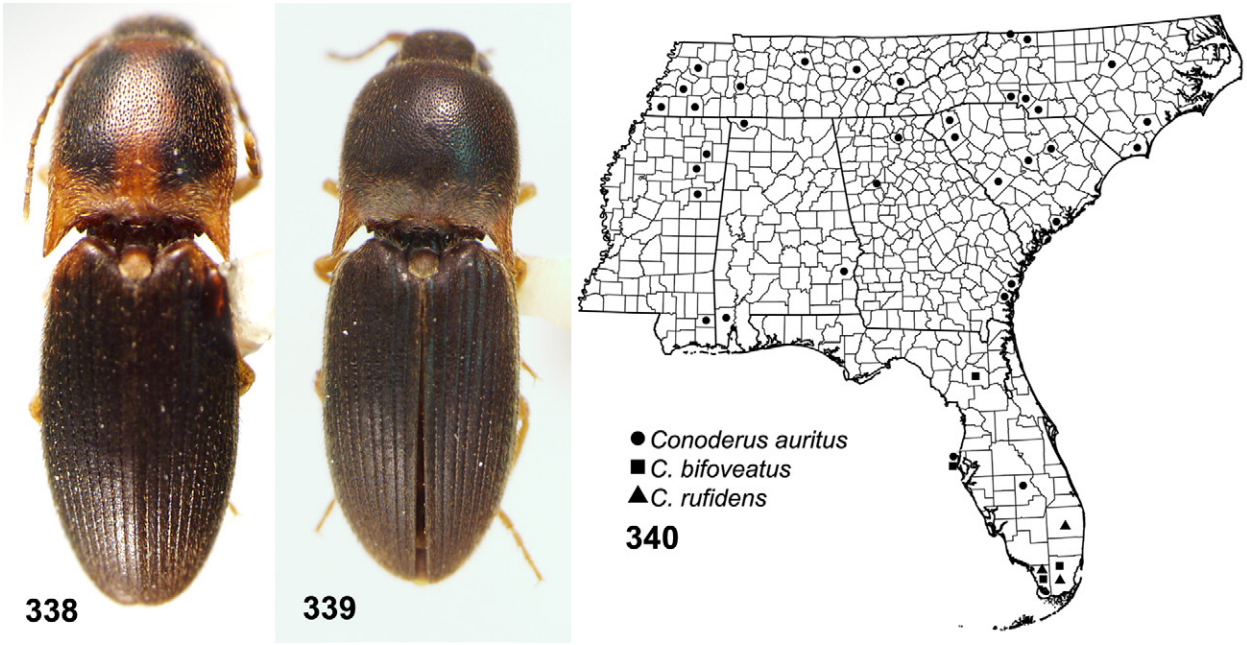
— Base of pronotum lacking tubercle . . . . . ***C. bellus*** **(Say)**

Conoderus auritus (Herbst, 1806)

Figures 338–340

Elater auritus Herbst, 1806: 145
Oophorus crassicollis Melsheimer, 1844: 214
Monocrepidius finitimus Casey, 1884: 170
Monocrepidius caseyi Leng, 1918: 206

Diagnosis. Size small, 5.0–7.0 mm in length; form robust. Bicolored, highly variable; head usually black; pronotum varies from nearly black with thin, central median macula to red with two elongate black maculae; elytron highly variable, from solid black to black with red maculae (primarily humeral), to red with a few black markings; antennae and legs red-brown; vestiture yellow, dense. Antennae 11-segmented; antennomere II small; III intermediate between II and IV but closer to II in length; flagellar antennomeres serrate. Pronotum slightly longer than wide, sinuate at base of hind angle; punctures of one size, coarse, dense; interspaces alutaceous; hind angle bicarinate, inner carina small, often difficult to see, outer carina long, prominent, sinuate and running parallel to lateral margin of hind angle. Elytral striae deeply punctured; intervals slightly convex. Membranous



Figures 338–340. *Conoderus* spp. **338)** *C. auritus* (habitus). **339)** *C. auritus* (habitus, melanic form). **340**. Distributional data for *C. auritus*, *C. bifoveatus*, and *C. rufidens*.

lobe of tarsomere IV slender, not readily visible from above. Aedeagus not observed. Female similar to male externally but with pronotum wider than long.

Distribution. Eastern North America (Downie and Arnett 1996). In the Southeast, previously recorded from Alabama, Georgia, Mississippi, North Carolina, and South Carolina (LeConte 1853; Leng 1920; Brimley 1938; Löding 1945; Fattig 1951; Kirk 1969, 1970; Downie and Arnett 1996; Lago et al. 2002). The following records from Florida and Tennessee represent **New State Records**.

Specimens Examined. Alabama (Barbour, Lauderdale, Mobile); **Florida** (Highlands, Pinellas); **Georgia** (Clarke, Fulton, Glynn, Lumpkin, McIntosh); **Mississippi** (George, Lee, Oktibbeha, Pontotoc); **North Carolina** (Alleghany, Brunswick, Gaston, Mecklenburg, Pender, Surry, Union, Wake); **South Carolina** (Aiken, Anderson, Charleston, Lee, Pickens, Richland); **Tennessee** (Blount, Cumberland, Gibson, Haywood, Hardeman, Perry, Shelby, Wilson). February–August, October–November. (Figure 340)

Discussion. This species is highly variable in terms of color and is most likely to be confused with *C. blandulus* or *C. suturalis* in the study area. Both of the latter species have a larger, broader membranous lobe on tarsomere IV; *C. blandulus* also has mixed large and small punctures on the pronotum. Dark (melanic) forms (Figure 339) have been collected in the Southeastern Plains. Specimens in the study area have been collected at ultraviolet and mercury vapor light, under pine bark, and by sweeping vegetation. Fattig (1951) reported it in association with Bermuda grass in Spalding County, GA. Kirk (1969) reported it as a pest of corn and tobacco in South Carolina.

Conoderus aversus (LeConte, 1853)

Figures 341, 343

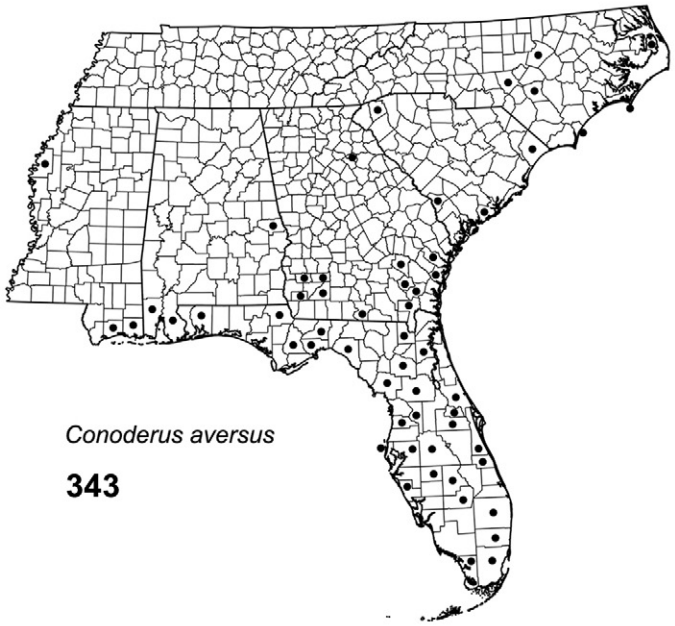
Monocrepidius scutellaris Dejean, 1837: 98 (*nomen nudum*)
Monocrepidius puellus Dejean, 1837: 98 (*nomen nudum*)
Monocrepidius aversus LeConte, 1853: 482

Diagnosis. Size small, 7.0–10.0 mm in length. Bicolored, color highly variable: head yellow-brown to pitchy-black or yellow-brown with central black macula; pronotum yellow-brown or yellow-brown with black maculae (single central macula or two subparallel elongate black maculae) to black with hind angles yellow-brown; elytron yellow-brown with dark sutural area to nearly solid pitchy-black with slender yellow-brown humeral maculae; legs and antennae yellow-brown; vestiture yellow, fine, dense. Antennae 11-segmented; antennomere II small, slightly longer than wide; antennomere III intermediate between II and IV; flagellar antennomeres elongate, weakly serrate. Pronotum longer than wide, widest at middle, subparallel at base of hind angle; punctures of one size, but very fine and dense, often not readily observed; hind angles slightly divergent, unicarinate, carina straight and clearly diverging from lateral margin of hind angle. Elytral striae densely punctured; intervals convex, alutaceous. Membranous lobe on tarsomere IV broad, easily observed from above. Aedeagus not observed. Female similar to male externally but with wider pronotum.

Distribution. Southeastern United States south to Central America (Van Dyke 1932). In the Southeast, previously recorded from Alabama, Florida, Georgia, Mississippi, North Carolina, and South Carolina (LeConte 1853; Candèze 1859; Champion 1896; Leng 1920; Van Dyke 1932; Brimley 1938; Löding 1945; Fattig 1951; Kirk 1969, 1970; Peck and Thomas 1998; Lago et al. 2002). The type locality is Georgia (not further restricted).

Specimens Examined. Alabama (Baldwin, Lee, Mobile); **Florida** (Alachua, Baker, Brevard, Broward, Clay, Glades, Hardee, Hernando, Highlands, Hillsborough, Indian River, Jackson, Leon, Levy, Liberty, Marion,





Figures 341–343. *Conoderus* spp. **341)** *C. aversus* (habitus). **342)** *C. vespertinus* (habitus). **343)** Distributional data for *C. aversus*.

Miami-Dade, Monroe, Orange, Palm Beach, Pinellas, Polk, Santa Rosa, Sarasota, Seminole, Sumter, Taylor, Volusia, Wakulla); **Georgia** (Appling, Brantley, Calhoun, Charlton, Clarke, Dougherty, Liberty, Lowndes, McIntosh, Miller, Mitchell, Pierce); **Mississippi** (Bolivar, Harrison, Jackson); **North Carolina** (Carteret, Cumberland, Dare, Moore, New Hanover, Wake); **South Carolina** (Allendale, Charleston, Horry, Pickens). March–August, October. (Figure 343)

Discussion. This is another species in the study area that is highly variable with regards to color. In terms of size, shape, and color, it most closely resembles *C. vespertinus*, from which it can be separated by the straight, diverging carina on the pronotal hind angle (Figure 341) and the finer pronotal punctures. Also, *C. aversus* tends to have a more southerly distribution, while *C. vespertinus* is more common in the north. Specimens in the study area have been collected by a variety of methods, including ultraviolet and mercury vapor light, in Malaise traps, sweeping and beating vegetation, and in barrier pitfall traps. Specimens from Miami-Dade County, FL were collected by beating avocado. Fattig (1951) reported it from Chatham County, GA in association with plum.

Conoderus bellus (Say, 1823)

Figures 344–345

Elater bellus Say, 1823: 168
Monocrepidius variegatus Steinheil, 1875: 123

Diagnosis. Size small, 2.5–4.0 mm in length. Bicolored: head black; pronotum red-brown with two subparallel elongate black maculae; maculae may be broken medially; elytron black with varying amounts of elongate to ovate yellow-red maculae; antennae and legs red-brown; vestiture yellow, sparse. Antennae 11-segmented; antennomeres II and III subequal; flagellar antennomeres elongate and weakly serrate. Pronotum as long as wide, subparallel at hind angle; lacking erect basal tubercle; punctures of one size, coarse and dense but not contiguous; hind angles parallel, wide, truncate, unicarinate, carina relatively straight and parallel with hind angle. Elytral striae deeply punctured; interspaces micro-punctate. Aedeagus with median lobe broad, gradually tapering to broadly rounded apex; paramere subparallel, lacking apical blade, broadly rounded at apex. No marked sexual dimorphism externally.

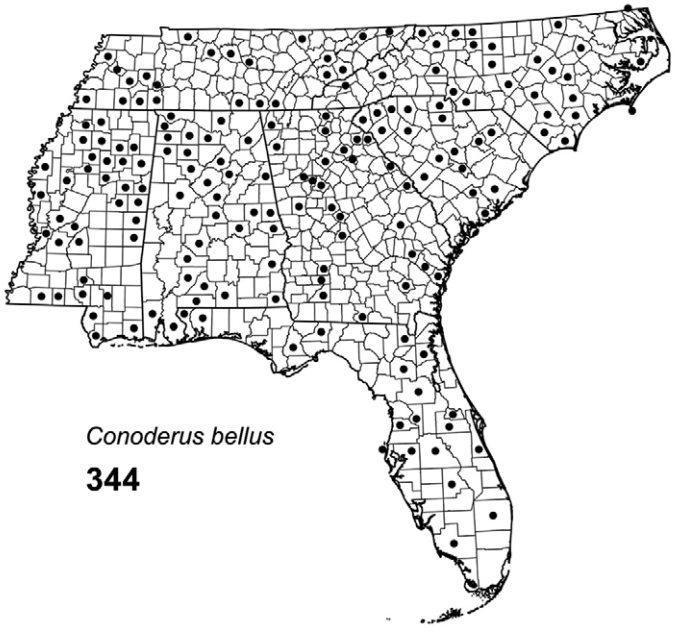


Figure 344. Distributional data for *Conoderus bellus*.

Distribution. Eastern North America, south and west to California (Peck and Thomas 1998). In the Southeast, previously recorded from Alabama, Florida, Georgia, Mississippi, North Carolina, and South Carolina (Leng 1910; Brimley 1938; Löding 1945; Fattig 1951; Richmond 1962; Frost 1964; Kirk 1969, 1970; Peck and Thomas 1998; Lago et al. 2002; Reed et al. 2009; Willis et al. 2010a, 2010b). The following records from Tennessee represent a **New State Record**.

Specimens Examined. Alabama (Baldwin, Barbour, Blount, Chambers, Chilton, Cleburne, Colbert, Conecuh, Covington, Dallas, DeKalb, Elmore, Escambia, Franklin, Houston, Jefferson, Lauderdale, Lawrence, Lee, Madison, Marion, Mobile, Monroe, Morgan, Shelby, St. Clair, Tallapoosa, Tuscaloosa, Walker, Wilcox, Winston); **Florida** (Alachua, Baker, Brevard, Clay, Collier, Escambia, Hernando, Highlands, Hillsborough, Leon, Liberty, Marion, Orange, Palm Beach, Pinellas, Polk, Santa Rosa, Seminole, Sumter); **Georgia** (Bibb, Clarke, Clayton, Dougherty, Emanuel, Floyd, Franklin, Fulton, Gwinnett, Hart, Henry, Houston, Jackson, Lee, Lincoln, Long, Lowndes, Lumpkin, McIntosh, Meriwether, Mitchell, Monroe, Pierce, Richmond, Tattnall, Union, Walker); **Mississippi** (Amite, Bolivar, Calhoun, Chickasaw, Forrest, Grenada, Hancock, Hinds, Jackson, Jefferson Davis, Kemper, Lafayette, Lauderdale, Lee, Leflore, Lowndes, Madison, Marion, Marshall, Monroe, Noxubee, Oktibbeha, Panola, Pearl River, Pike, Pontotoc, Rankin, Tate, Warren, Washington, Webster, Winston, Yalobusha, Yazoo); **North Carolina** (Ashe, Bladen, Brunswick, Buncombe, Camden, Carteret, Catawba, Columbus, Cumberland, Duplin, Edgecombe, Forsyth, Guilford, Hyde, Johnston, Mecklenburg, Moore, Pender, Randolph, Stokes, Surry, Swain, Union, Wake, Warren, Wayne, Wilkes); **South Carolina** (Aiken, Anderson, Berkeley, Calhoun, Charleston, Chester, Darlington, Dorchester, Greenville, Laurens, Lee, Lexington, Oconee, Pickens, Richland, Spartanburg, York); **Tennessee** (Blount, Crockett, Davidson, Decatur, DeKalb, Dyer, Franklin, Hamilton, Hardeman, Hardin, Hawkins, Henderson, Franklin, Knox, Madison, Marion, McNairy, Montgomery, Scott, Sevier, Shelby, Sullivan, Wilson counties; also Oak Ridge). Year-round. (Figure 344)

Discussion. This species has been commonly collected in the study area and is easily recognized by its small size and color pattern. I have seen a few specimens from Hinds County, MS (CMNH) that were melanic and lacked any recognizable pattern on the pronotum or the elytra. The only species in the Southeast it may be confused with is *C. pictus*, which possesses a small, erect tubercle at the base of the pronotum. Also, *C. pictus* is a Neotropical introduction currently known only from Florida in the United States, while *C. bellus* has a much broader distribution in the East. Specimens in the study area have been collected at ultraviolet and mercury vapor light, in Lindgren funnel traps, window traps, under rocks, in leaf litter, in soil, and by sweeping vegetation. Specimens from Lincoln County, GA were collected by Berlese extraction of leaf and grass litter. Specimens from Edgecombe County, NC (MEM) were collected in pitfall traps set it cotton fields. Specimens from Johnston County, NC (NCSU) were collected in pitfall traps set in soybean fields. Specimens from Pender County, NC (NCSU) were collected in association with lettuce. In the Southeast, *C. bellus* has also been associated with sweet potato (Reed et al. 2009; Willis et al. 2010a).

Conoderus bifoveatus (Palisot de Beauvois, 1805)

Figures 340, 356, 359

Elater bifoveatus Palisot de Beauvois, 1805: 78

Diagnosis. Size small to moderate, 9.5–13.5 mm in length. Unicolored, light red-brown; vestiture silvery-yellow, dense. Antennae 11-segmented, extending beyond apices of pronotal hind angle by one antennomere; antennomere III intermediate between II and IV, but much closer in length to II; flagellar antennomeres elongate, serrate. Pronotum longer than wide, slightly sinuate near base of hind angle; punctures coarse, dense; hind angle slightly diverging, bicarinate, inner carina small and indistinct, outer carina long and prominent, sinuate and parallel with lateral margin of hind angle. Sides of mesosternal fossa abruptly sloping between mesocoxae, above the plane of adjacent metasternum. Elytral striae coarsely punctured; interspaces slightly convex, punctate. Membranous lobe on tarsomere IV broad, readily visible from above, broadly rounded apically. Aedeagus

(Figure 359) with median lobe broad, gradually tapering to rounded apex; paramere with inner margin straight, outer margin sinuate; lacking apical blade; apex blunt with apical and subapical spines. Female similar to male externally but with a shorter antenna, just reaching apex of pronotal hind angle.

Distribution. Virgin Islands, Cuba, Hispaniola, Puerto Rico, the Bahamas, and southern Florida (Becker 1975; Frank and McCoy 1992; Peck and Thomas 1998).

Specimens Examined. Florida (Alachua, Miami-Dade, Monroe, Pinellas). March–September. (Figure 340)

Discussion. This is a Caribbean species established in southern Florida. Prior to this study, it was known only from the southernmost counties of Florida. However, I have examined two specimens (FSCA) from Alachua County, FL which significantly expand the known range of this species within the state. It is morphologically most similar to *C. lividus* and *C. rufidens*. From *C. lividus* it can be separated by the characteristics of the mesosternal fossa and aedeagus, as well as by having a more restricted geographic distribution. From *C. rufidens* it can best be separated by being slightly smaller, as well as by the characteristics of the aedeagus, the lobe on tarsomere IV, and the relative lengths of antennomeres II–IV. Specimens in the study area have been collected at ultraviolet light.

Conoderus blandulus (LeConte, 1853)

Figures 348, 350

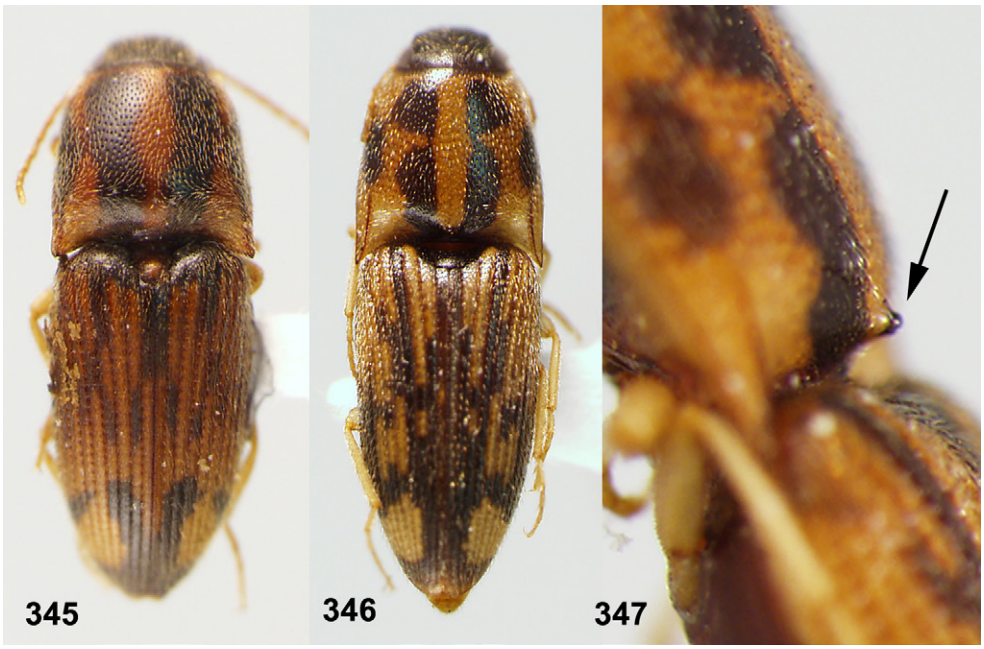
Monocrepidius blandulus LeConte, 1853: 483

Diagnosis. Size small, 5.0–6.0 mm in length. Bicolored: head black; pronotum red-brown with two wide, subparallel, dusky black maculae; elytron yellow brown with scutellar and sutural areas darkened, dark area extending post-medially to at least elytral interval IV; antennae and legs yellow-brown; vestiture yellow, relatively sparse. Antennae 11-segmented; antennomere III subequal between II and IV, but closer in length to II; flagellar antennomeres elongate, weakly serrate. Pronotum slightly longer than wide, subparallel at base of hind angle; punctures large, coarse, deep, intermixed with smaller yet coarse punctures, interspaces shining; hind angles subparallel, broad, unicarinate, carina slightly sinuate and parallel with lateral margin of hind angle. Elytral striae coarsely punctured; interspaces convex, reticulate. Membranous lobe of tarsomere IV elongate, but visible from above. Aedeagus not observed.

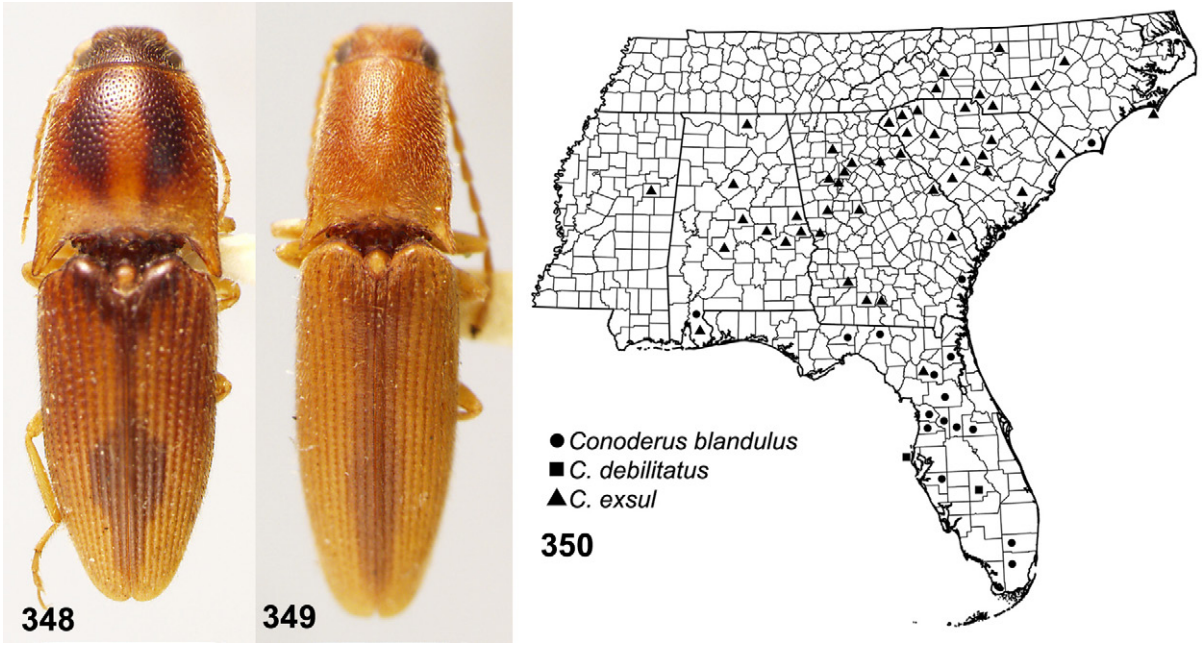
Distribution. Southern United States, from Florida to California (Peck and Thomas 1998). In the Southeast, previously recorded from Alabama, Florida, Georgia, and South Carolina (LeConte 1853; Candèze 1859; Leng 1920; Van Dyke 1932; Löding 1945; Fattig 1951; Kirk 1969, 1970; Peck and Thomas 1998). The type locality is Georgia (not further restricted). The following record from North Carolina represents a **New State Record**.

Specimens Examined. Alabama (Baldwin); **Florida** (Alachua, Broward, Citrus, Clay, Hernando, Lake, Leon, Madison, Manatee, Marion, Miami-Dade, Orange, Sumter); **Georgia** (McIntosh); **North Carolina** (Brunswick). March, May–August, October. (Figure 350)

Discussion. This species is similar to *C. falli* in having intermixed large and small punctures on the pronotum, however the interspaces between the punctures are smoother than as seen with *C. falli*. Specimens in the study area have been collected at ultraviolet light, in bait traps, and by sweeping vegetation.



Figures 345–347. *Conoderus* spp. **345)** *C. bellus* (habitus). **346)** *C. pictus* (habitus). **347)** *C. pictus* (base of pronotum).



Figures 348–350. *Conoderus* spp. **348)** *C. blandulus* (habitus). **340)** *C. debilitatus* (habitus). **350)** Distributional data for *C. blandulus*, *C. debilitatus*, and *C. exsul*.

Conoderus debilitatus (Candèze, 1891)

Figures 349–350

Athous debilis LeConte, 1878: 405 (nec *Athous debilis* Reiche, 1869: 382)
Monocrepidius debilitatus Candèze, 1891: 156

Diagnosis. Size small, 5.0–6.0 mm in length; form elongate and narrow. Unicolored, pale yellow-brown, sutural area of elytron often darker with slight widening of dark area in apical third; vestiture yellow, dense. Antennae 11-segmented, long, extending beyond apex of pronotal hind angle by two antennomeres; antennomere III short, subequal to II; flagellar antennomeres elongate, weakly serrate. Pronotum longer than wide, subparallel, slightly sinuate at base of hind angle; punctures fine and dense; hind angles slightly divergent; unicarinate, carina parallel with lateral margin of hind angle. Elytral striae coarsely punctured; intervals convex, reticulate. Membranous lobe of tarsomere IV broad, clearly visible from above. Aedeagus with median lobe subparallel, gently tapering subapically to rounded apex; paramere with rounded, serrated apical extension.

Distribution. Currently known only from Florida and Georgia (Leng 1920; Van Dyke 1932; Fattig 1951; Peck and Thomas 1998). The type locality is Florida (not further restricted).

Specimens Examined. Florida (Highlands, Pinellas). February-April, June. (Figure 350)

Discussion. This is the smallest of the unicolored *Conoderus* in the Southeast. It can be readily recognized by its long slender body, pale color with dark sutural area of the elytron, and long antennae. Based on the known distribution, this species seems restricted to the Southeastern Plains and Southern Coastal Plains. Specimens in the study area have been collected at mercury-vapor light.

Conoderus exsul (Sharp, 1877)

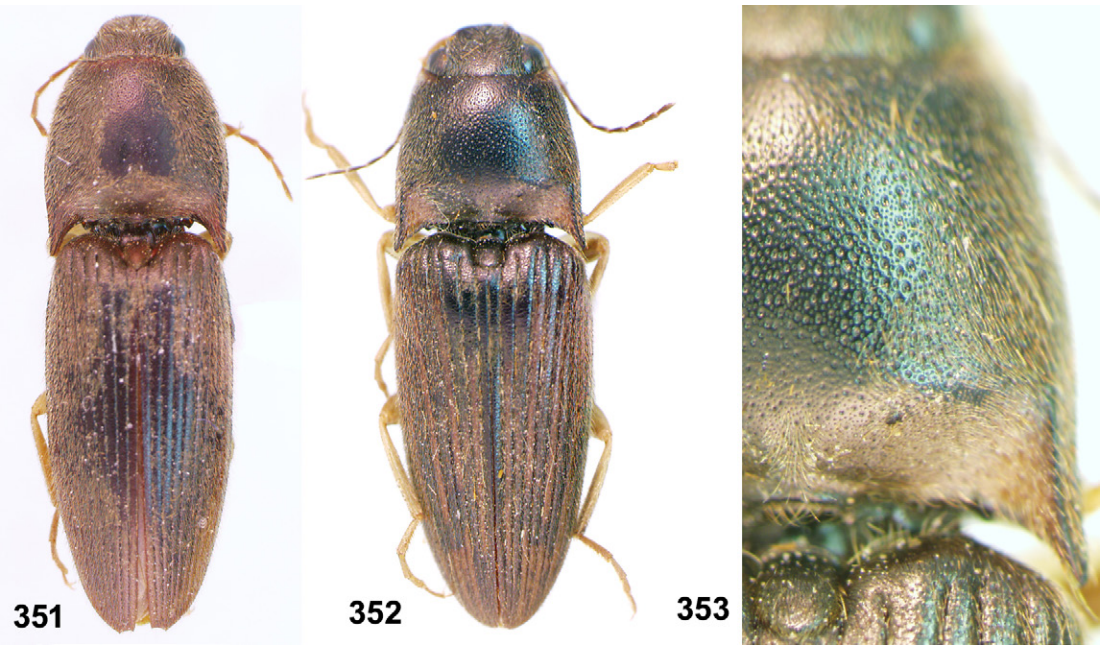
Figures 350–351

Monocrepidius exsul Sharp, 1877: 20
Conoderes bicarinatus Van Dyke, 1932: 297 (nec *Aeolus bicarinatus* Reitter, 1891: 148)
Conoderus arizonicus Van Dyke, 1939: 11
Conoderus duplicatus Van Dyke, 1943: 44

Diagnosis. Size small to moderate, 9.0–15.0 mm in length; form elongate, robust. Color dusky brown-black; legs and antennae yellowish; vestiture yellow, dense. Antennae 11-segmented; antennomere I long; III subequal between II and IV; flagellar antennomeres elongate, weakly serrate. Pronotum as long as wide, subparallel in basal half, gradually tapering anteriorly; punctures small, very dense, and of one size; hind angles subparallel, distinctly bicarinate. Elytral striae deeply punctured; interspaces nearly flat, micro-punctate; apices bidentate. Membranous lobe on tarsomere IV broad and clearly visible from above. Aedeagus with median lobe subparallel, narrowing suddenly subapically to a rounded apex; paramere broadened apically to form a rounded apical blade, lateral spines present along outer margin of blade.

Distribution. Native to New Zealand and Oceania; introduced to Hawaii and the Americas (Lane 1954; Stone 1975). In the continental United States, known from across the southern portion of the country, from Florida to California (Peck and Thomas 1998). In the Southeast, previously recorded only from Florida (Peck and Thomas 1998). The following records from Alabama, Georgia, Mississippi, North Carolina, and South Carolina represent **New State Records**.

Specimens Examined. Alabama (Baldwin, Chambers, Chilton, Dallas, Elmore, Jefferson, Lee, Macon, Madison); **Florida** (Alachua); **Georgia** (Bulloch, Cherokee, Clarke, Clayton, Colquitt, Cook, DeKalb, Dougherty, Elbert, Fulton, Gwinnett, Meriwether, Monroe, Muscogee, Richmond); **Mississippi** (Oktibbeha); **North Carolina** (Burke, Carteret, Forsyth, Mecklenburg, Moore, Rutherford, Union, Wake); **South Carolina** (Aiken,



Figures 351–353. *Conoderus* spp. **351)** *C. exsul* (habitus). **352)** *C. falli* (habitus). **353)** *C. falli* (close-up of pronotum).

Anderson, Berkeley, Calhoun, Greenville, Horry, Kershaw, Laurens, Lexington, Oconee, Pickens, Richland, York). April–November. (Figure 351)

Discussion. *Conoderus exsul* should be easily recognized by its uniform color, strongly bicarinate pronotal hind angle, and strongly bidentate elytral apex. This species has historically been placed in either *Conoderus* or *Heteroderes*. Specimens identified by me prior to 2014 may reflect the latter. *Conoderus exsul* is commonly known as the 'sugarcane wireworm' or 'pasture wireworm' and has been implicated as a crop pest (Lane 1954; Stone 1975). Specimens examined from the study area have been collected at ultraviolet and mercury vapor light and in Lindgren funnel traps.

Conoderus falli (Lane, 1956)

Figures 352–354

Monocrepidius vagus Candèze, 1893: 32 (nec *Monocrepidius vagus* Candèze, 1888: 674)
Monocrepidius difformis Fall, 1929: 56 (nec *Monocrepidius difformis* Fleutiaux, 1920: 302)
Monocrepidius falli Lane, 1956: 35

Diagnosis. Size small, 6.0–8.0 mm in length. Color red-brown to brown; elytron with faint red-yellow to yellow elongate maculae, these maculae often not visible without magnification; legs and antennae red-yellow; vestiture yellow-brown, short, dense. Antennae 11-segmented, serrate; antennomere I long; III subequal between II and IV, closer in length to II. Pronotum as long as wide; subparallel in basal third, narrowing anteriorly; punctures dense and of two sizes, small punctures intermixed with larger ones (Figure 353); hind angles subparallel; unicarinate or bicarinate with inner carina very small and inconspicuous and outer carina long and prominent, subparallel to lateral margin of hind angle. Elytral striae deep, defined punctures not evident, punctures elongate; interspaces nearly flat, micro-punctate; apices rounded. Aedeagus with median lobe broad, subparallel, slightly narrowing subapically to rounded apex; paramere subparallel with round spinose apical blade, apex rounded

Distribution. South America, north to southern United States (Peck and Thomas 1998). While typically considered introduced into the United States, its presence in the southern portions of the country is possibly natural, with additional expansion into disturbed areas and where land has been cleared for agricultural use. In the Southeast, *C. falli* has been previously recorded from Alabama, Florida, Georgia, Mississippi, North Carolina, and South Carolina (Löding 1945; Fattig 1951; Lane 1953, 1954; Deen and Cuthbert 1955; Dobrovsky 1955; Norris 1957; Richmond 1962; Creighton et al. 1963; Frost 1964, 1975; Kirk 1969, 1970; Day et al. 1971; Genung 1972; Onsager and Day 1975; Onsager 1976; McCoy and Rey 1981; Jansson and Lecrone 1989, 1991; Peck and Thomas 1998; Lago et al. 2002; Reed et al. 2009; Willis et al. 2010a, 2010b). The type locality of *M. difformis* is Savannah in Chatham County, GA. Löding (1945) indicated the type of *M. difformis* as being from Mobile in Mobile County, AL but this must represent an editorial error. The type locality of *H. nicholsi* is Jacksonville in Duval County, FL. The following record from Tennessee represents a **New State Record**.

Specimens Examined. Alabama (Baldwin, Barbour, Bibb, Chilton, Choctaw, Cleburne, Colbert, Elmore, Escambia, Jefferson, Lawrence, Lee, Houston, Mobile, Monroe, Perry, Tallapoosa, Tuscaloosa, Walker, Washington); **Florida** (Alachua, Baker, Bay, Brevard, Charlotte, Clay, Collier, Escambia, Gadsden, Hernando, Highlands, Hillsborough, Holmes, Indian River, Lake, Lee, Leon, Levy, Liberty, Marion, Miami-Dade, Monroe, Okaloosa, Orange, Palm Beach, Pasco, Pinellas, Polk, Santa Rosa, Sarasota, Seminole, St. Johns, St. Lucie, Sumter, Suwannee, Taylor, Volusia, Wakulla, Walton counties; also Quinley); **Georgia** (Bulloch, Charlton, Clarke, Clinch, Colquitt, Cook, Crawford, Decatur, DeKalb, Dougherty, Echols, Emanuel, Floyd, Fulton, Henry, Houston, Jeff Davis, Lamar, Lanier, Lee, Long, Lowndes, McIntosh, Meriwether, Pierce, Pike, Polk, Rockdale, Spalding, Thomas, Toombs); **Mississippi** (Bolivar, Calhoun, Forrest, Franklin, George, Grenada, Hancock, Harrison, Jackson, Jasper, Jefferson Davis, Kemper, Lafayette, Lincoln, Lowndes, Noxubee, Oktibbeha, Pike, Pontotoc, Rankin, Warren, Webster); **North Carolina** (Bladen, Brunswick, Camden, Carteret, Columbus, Duplin, Gates, Granville, Hyde, Johnston, Mecklenburg, Moore, New Hanover, Pender, Robeson, Union, Wake); **South Carolina** (Aiken, Allendale, Barnwell, Berkeley, Calhoun, Charleston, Chester, Clarendon, Colleton, Dillon, Dorchester, Florence, Georgetown, Greenville, Lexington, Marion, Richland, Pickens, Sumter, York); **Tennessee** (Shelby). January, March-October, December. (Figure 354)

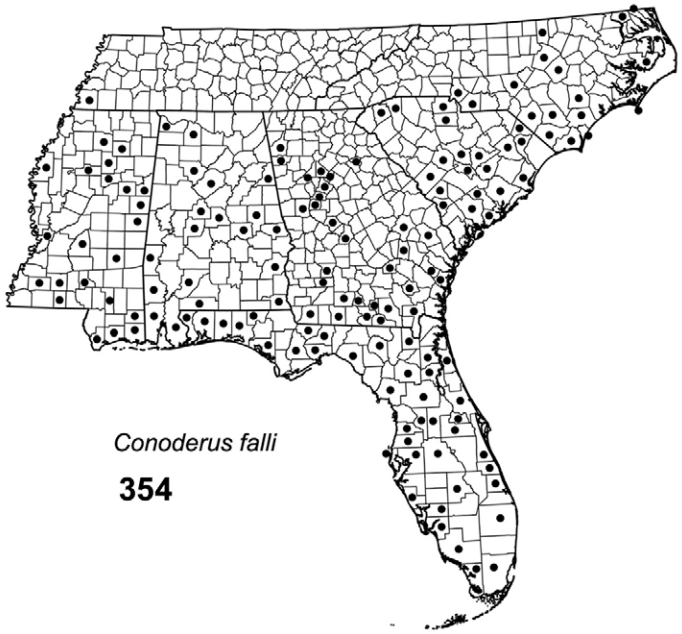


Figure 354. Distributional data for *Conoderus falli*.

Discussion. *Conoderus falli* is most similar to *C. blandulus* in having two sizes of pronotal punctures but can be separated from that species by microreticulate interspaces on the pronotum and by color. This species has historically been placed in either *Conoderus* or *Heteroderes*. Specimens identified by me prior to 2014 may reflect the latter. Known as the 'southern potato wireworm', this species has been frequently implicated as a crop pest (Lane 1954; Stone 1975). In the Southeast, it's been associated with okra (Fattig 1951), peanuts (Fattig 1951), rutabagas (Kirk 1969, 1970), potatoes (Deen and Cuthbert 1955; Dobrovsky 1955; Norris 1957; Kirk 1969, 1970; Day et al. 1971; Jansson and Lecrone 1989, 1991), sweet potatoes (Kirk 1969, 1970; Reed et al. 2009; Willis et al. 2010a, 2010b), and tobacco (Creighton et al. 1963). Specimens in Hillsborough County, FL (FSCA) were collected in a gladiolus field. Other specimens in the study area were collected at ultraviolet and mercury vapor light, under rocks, in Lindgren funnel traps, in pitfall traps, and by sweeping vegetation.

Conoderus lividus (De Geer, 1774)

Figures 1, 355, 357, 360

Elater lividus De Geer, 1774: 162
Elater castaneus Olivier, 1790: 30
Elater castanipes Herbst, 1806: 23
Elater lobatus Say, 1823: 175

Diagnosis. Size moderate, 12.0–17.0 mm in length. Unicolored, brown to dark brown; antennae and legs paler; vestiture yellow, short, dense. Antennae 11-segmented, antennomere II small; III subequal between II and IV, clearly longer than II; flagellar antennomeres elongate and weakly serrate. Pronotum longer than wide, widest at middle and distinctly sinuate at hind angle; punctures variable in size, coarse, very dense; hind angles divergent, bicarinate, inner carina short and inconspicuous, outer carinae long and prominent, sinuate and running parallel to lateral margin of hind angle. Mesosternal fossa gradually sloping between mesocoxae, its posterior edge on same plane as adjacent metasternum. Elytral striae coarsely punctured; interspaces convex, reticulate. Membranous lobe of tarsomere IV broad, clearly visible from above, broadly rounded apically. Aedeagus (Figure 360) with median lobe subparallel, constricted subapically to rounded apex; paramere asymmetrical basally, lacking an apical blade but with long spines externally and long, dense setae internally. No marked sexual dimorphism externally.

Distribution. Eastern North America, west to Texas (Peck and Thomas 1998). Previously recorded from all seven states in the study area (Leng 1910, 1920; Hyslop 1915b; Dozier 1918; Brimley 1938; Löding 1945; Fattig 1951; Payne and Crossley 1966; Kirk 1969, 1970; Morrill 1978; Lago and Miller 1986; Gorsuch et al. 1989; Herbert et al. 1992; Fontes et al. 1994; Downie and Arnett 1996; Peck and Thomas 1998; Lago et al. 2002; Buck et al. 2005; Peck 2005; Willis et al. 2010a, 2010b).

Specimens Examined. Alabama (Baldwin, Blount, Cherokee, Chilton, Clay, Coffee, Coosa, Cullman, Dale, Dallas, DeKalb, Elmore, Etowah, Fayette, Franklin, Jefferson, Lawrence, Lee, Limestone, Macon, Marengo, Mobile, Monroe, Montgomery, Morgan, Shelby, Talladega, Tallapoosa, Washington, Wilcox counties; also Wilson Dam); **Florida** (Alachua, Brevard, Clay, Columbia, Hamilton, Hendry, Highlands, Hillsborough, Jackson, Lafayette, Lake, Lee, Leon, Levy, Liberty, Marion, Martin, Miami-Dade, Osceola, Orange, Palm Beach, Sarasota, Seminole, Taylor, Union, Volusia, Wakulla); **Georgia** (Ben Hill, Bibb, Carroll, Chatham, Cherokee, Clarke, Clayton, Dade, Dawson, DeKalb, Dougherty, Emanuel, Floyd, Forsyth, Fulton, Gilmer, Glynn, Habersham, Henry, Jackson, Jeff Davis, Jefferson, Lowndes, McIntosh, Meriwether, Montgomery, Morgan, Murray, Pike, Pierce, Polk, Rabun, Rockdale, Talbot, Thomas, Towns, Troup, Union, Walton, Wayne, Wheeler, White, Whitfield); **Mississippi** (Adams, Attala, Calhoun, Carroll, Desoto, Granada, Hancock, Hinds, Jefferson Davis, Lee, Monroe, Noxubee, Oktibbeha, Panola, Pontotoc, Rankin, Scott, Tishomingo, Warren, Webster, Winston); **North Carolina** (Alleghany, Ashe, Avery, Beaufort, Bladen, Brunswick, Buncombe, Burke, Camden, Carteret, Catawba, Chatham, Chowan, Cleveland, Columbus, Cumberland, Dare, Duplin, Edgecombe, Forsyth, Gates,

Granville, Guilford, Halifax, Harnett, Henderson, Hyde, Iredell, Johnston, Lenoir, Macon, McDowell, Mecklenburg, Montgomery, Moore, Nash, New Hanover, Pender, Pitt, Robeson, Rockingham, Rutherford, Sampson, Stokes, Surry, Swain, Union, Wake, Warren, Washington, Watauga, Wayne, Yadkin counties; also along the Blue Ridge Parkway, Hofmann Forest); **South Carolina** (Allendale, Anderson, Barnwell, Beaufort, Berkeley, Calhoun, Charleston, Chester, Chesterfield, Colleton, Florence, Greenville, Horry, Laurens, Lee, Oconee, Pickens, Spartanburg, York); **Tennessee** (Anderson, Benton, Blount, Campbell, Carter, Coffee, Cumberland, Davidson, Decatur, Franklin, Gibson, Hamilton, Hardeman, Haywood, Humphreys, Grundy, Jefferson, Knox, Lauderdale, Loudon, Madison, Maury, McMinn, Monroe, Montgomery, Putnam, Sequatchie, Sevier, Warren counties; also Oak Ridge). April–October. (Figure 355)

Discussion. The species is common and readily collected throughout its range. In Florida, it is most likely to be confused with *C. bifoveatus* and *C. rufidens*, two Caribbean species found only in the southern part of the state. It can be separated from both of these by characteristics of the mesosternal fossa and by having an asymmetrical aedeagus. Specimens have been collected by a variety of methods, including at ultraviolet and mercury vapor light, beating and sweeping vegetation, and in Lindgren funnel, panel, boll weevil, and flight intercept traps. Specimens from Hillsborough and Volusia counties, FL (FSCA) have been collected on citrus. Specimens from Hancock County, MS (MEM) and Pender County, NC (NCSU) were collected on pecan. Specimens from Seminole County, FL (UCFC) were collected in Malaise traps set in a bald cypress swamp. Specimens from Pontotoc County, MS (MEM) and Edgecombe County, NC (MEM) were collected in cotton fields. Specimens from Beaufort, Johnston, Pender, and Washington counties, NC (NCSU) were collected in soybean fields. Specimens from Winston County, MS (MEM) were collected on the flowers of American chinquapin. In the Southeast, *C. lividus* has been previously associated with many crop plants including corn (Dozier 1918; Fattig 1951; Kirk 1969, 1970), peanuts (Fattig 1951; Herbert et al. 1992), cotton (Fattig 1951; Kirk 1969, 1970), sugar cane (Fattig 1951), sweet potatoes (Willis et al. 2010a, 2010b), cabbage (Kirk 1969, 1970), and peach (Gorsuch et al. 1989). Lago and Miller (1986) recorded it from the flowers of southern magnolia in Lafayette County, MS. Fontes et al. (1994) reported it from the flowers of goldenrod in Alachua County, FL. Payne and Crossley (1966) reported it from pig carrion in Pickens County, SC.

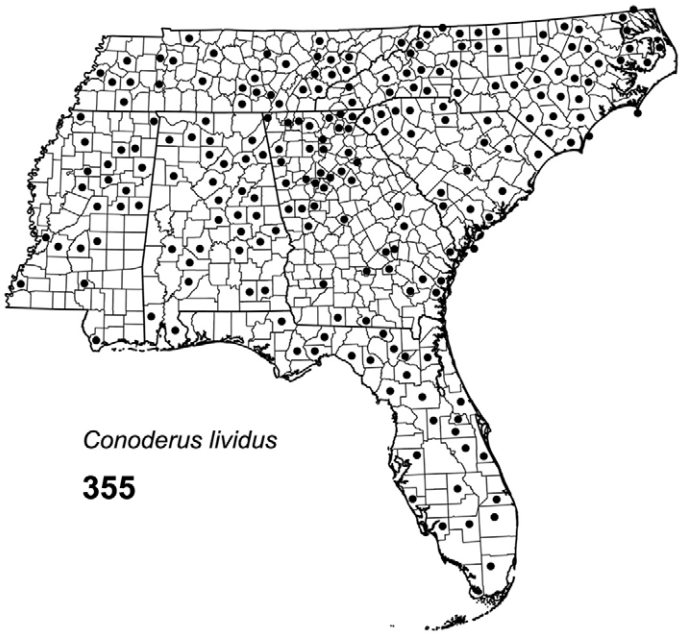


Figure 355. Distributional data for *Conoderus lividus*.

Conoderus pictus (Candèze, 1859)

Figures 346–347, 367

Monocrepidius pictus Candèze, 1859: 267

Diagnosis. Size, shape, and color as in *C. bellus*; the longitudinal pronotal maculae of *pictus* are often broken medially and joined basally, giving the appearance of a 'happy-face' design on the pronotum. Antennae 11-segmented; antennomere III subequal between II and IV; flagellar antennomeres serrate. Pronotum as long as wide, subparallel at hind angle; base with small, erect tubercle (arrow, Figure 347); punctures coarse, dense; hind angles parallel, wide, truncate, unicarinate, carina relatively straight and parallel with hind angle. Elytral striae deeply punctured; interspaces convex, micro-punctate. Membranous lobe of tarsomere IV elongate, not readily visible from above. Aedeagus not observed. No external sexual dimorphism noted.

Distribution. Neotropical, from Mexico to South America (Candèze 1859; Champion 1896). Introduced to Florida, where it has been found throughout the state (Johnson 2018a).

Specimens Examined. Florida (Alachua, Baker, Brevard, Broward, Citrus, Clay, Gadsden, Gilchrist, Hernando, Highlands, Lake, Lee, Levy, Marion, Miami-Dade, Orange, Palm Beach, Pasco, Pinellas, Polk, Putnam, Seminole, Sumter, Suwannee). March–September, November-December. (Figure 367)

Discussion. This small species is most similar to *C. bellus*, from which it can be separated by having a small, erect tubercle at the base of the pronotum. To date, this Neotropical introduction has only been recorded from Florida, but its presence in northern Florida (Baker County) along the Georgia border suggests it may soon be found in surrounding states. Specimens have been collected at ultraviolet and mercury violet light, in flight intercept traps, under beach drift, and by sweeping vegetation and sifting sand. Specimens from Highlands County, FL (ABS) were collected in the root mat of Natal grass.

Conoderus rudis Brown, 1933

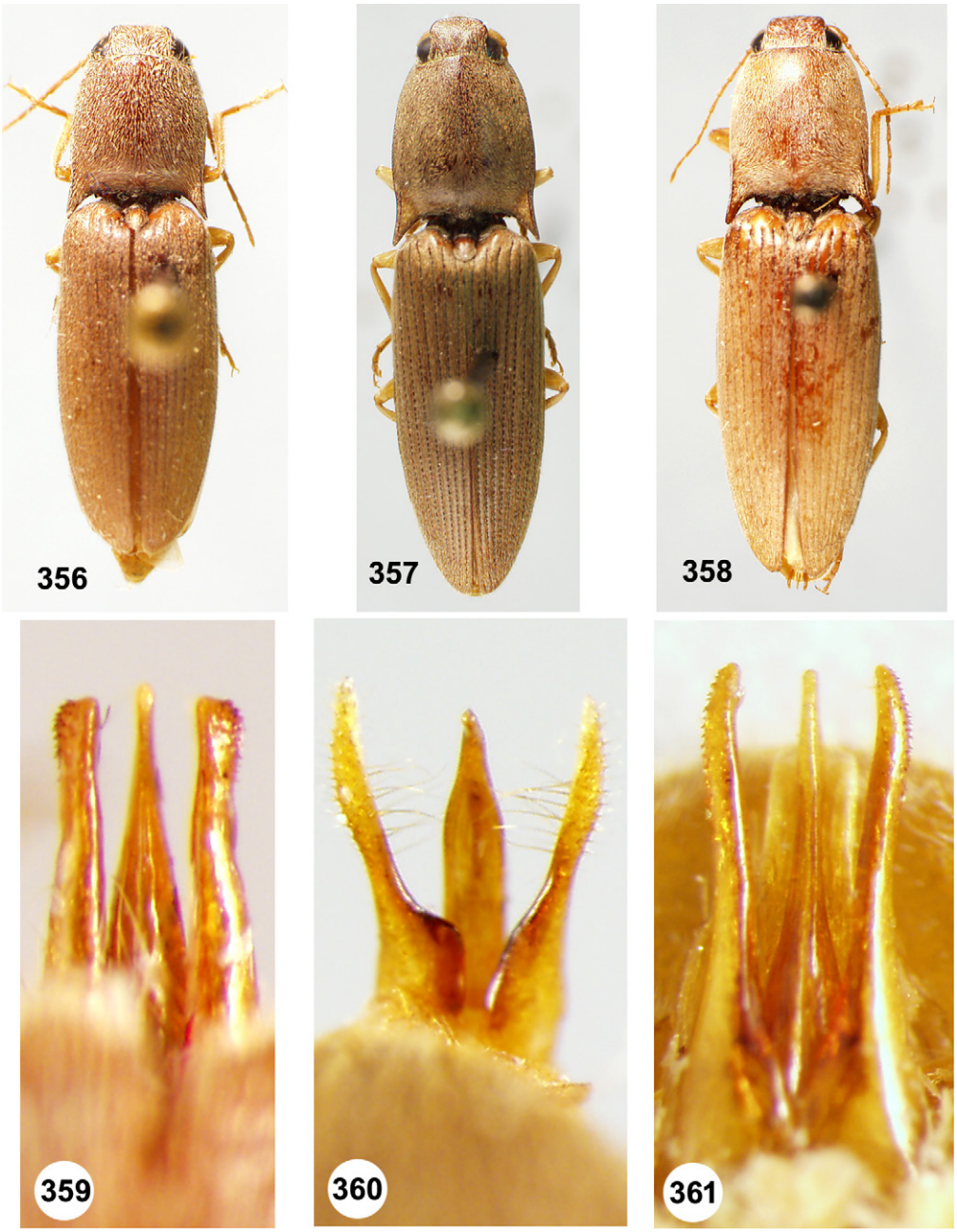
Figures 362–363

Conoderus rudis Brown, 1933b: 174

Diagnosis. Size small, size 6.0–8.0 mm in length. Bicolored: head pitchy-black; pronotum pitchy-black, hind angle and anterior angles, and sometimes entire basal and lateral margins, red-yellow; elytron pitchy black with medial and apical yellow-red maculae, medial maculae large, often extending from the suture to interval IV; antennae and legs yellow; vestiture silvery-yellow, dense but short. Antennae 11-segmented; antennomere III intermediate between II and IV; flagellar antennomeres elongate and weakly serrate. Pronotum about as long as wide, widest just before and slightly sinuate at base of hind angle; punctures small, coarse, dense, interspaces reticulate; hind angles unicarinate, carina sinuate and parallel with lateral margin of hind angle. Elytral striae deeply, coarsely punctate; intervals convex, micro-reticulate. Membranous lobe on tarsomere IV broad, clearly visible from above. Aedeagus not observed. No external sexual dimorphism observed.

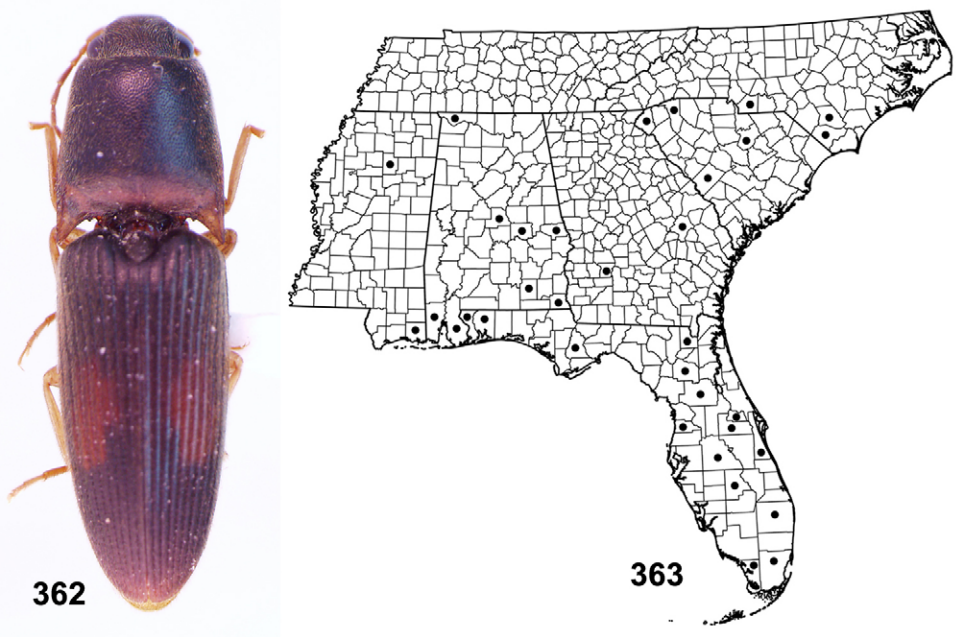
Distribution. Eastern North America, west to Indiana and Louisiana (Peck and Thomas 1998). In the Southeast, recorded from Alabama, Florida, Georgia, Mississippi, North Carolina, and South Carolina (Brown 1933b; Fall 1934; Löding 1945; Lane 1954; Jansson and Lecrone 1989, 1991; Seal et al. 1991, 1992; Seal and Chalfant 1994; Peck and Thomas 1998; Diaz et al. 2012). The type locality is Grand Bay in Mobile County, AL. Lane (1954) suggested that this species may be a Neotropical introduction.

Specimens Examined. Alabama (Baldwin, Chilton, Coffee, Elmore, Houston, Lauderdale, Lee, Mobile); **Florida** (Alachua, Baker, Brevard, Escambia, Hernando, Highlands, Liberty, Marion, Miami-Dade, Monroe, Orange, Palm Beach, Polk, Santa Rosa, Seminole); **Georgia** (Emanuel, Lee); **Mississippi** (Calhoun, Jackson); **North Carolina** (Bladen, Columbus, Union); **South Carolina** (Aiken, Greenville, Kershaw, Oconee). April–September. (Figure 363)



Figures 356–361. *Conoderus* spp. **356)** *C. bifoveatus* (habitus). **357)** *C. lividus* (habitus). **358)** *C. rufidens* (habitus). **359)** *C. bifoveatus* (aedeagus). **360)** *C. lividus* (aedeagus). **361)** *C. rufidens* (aedeagus).

Discussion. *Conoderus rudis* belongs to a taxonomically complex group that also include the Neotropical and southwestern *C. browni* Knull, *C. posticus* (Eschscholz), and *C. melliculus* (Candeze). A critical evaluation of male genitalia is necessary for determining the species (Paul Johnson, pers. comm. 2018). Unfortunately, most species have not had their aedeagus adequately described nor illustrated. A formal revision of the genus, which is lacking for North America, might show *C. rudis* to be synonymous with one of the other species in the complex.



Figures 362–363. *Conoderus rudis*. **362)** Habitus. **363)** Distributional data.

Conoderus rudis is somewhat variable in color. I have seen a couple specimens where the medial macula on the elytron is absent. In such cases where the elytral maculae are reduced, or there is more red-yellow on the pronotum, specimens may be mistaken for a small *C. vespertinus* or *C. aversus*. Typically, *C. rudis* is noticeably smaller than *C. vespertinus* and the maculae are more red than yellow (in *C. vespertinus* the pale areas are more yellow in color). From *C. aversus* it can be separated by being smaller and by the form of the carina on the pronotal hind angles (straight and divergent in *C. aversus*; sinuate and parallel with the lateral margin in *C. rudis*). Specimens in the study area have been collected at ultraviolet and mercury vapor light, by sweeping vegetation, and in Malaise traps. A specimen from Palm Beach County, FL (Collection Vince Golia) was collected on grass roots. Seal et al. (1991) reported it as a pest of sweet potato in Florida, and Seal et al. (1992) reported it as a pest of sweet potato in Georgia. Jansson and Lecrone (1989, 1991) reported it as a pest of potato in Florida. Diaz et al. (2012) reported it in association with the introduced pest plant, tropical soda apple in Florida.

Conoderus rufidens (Fabricius, 1801)

Figures 340, 358, 361

Elater rufidens Fabricius, 1801: 234

Diagnosis. Size moderate, 13.0–17.5 mm in length. Unicolored, pale red-brown; vestiture yellow, dense. Antennae 11-segmented, just reaching apex of pronotal hind angle; antennomere III longer than II, subequal to IV; flagellar antennomeres elongate, weakly serrate. Pronotum longer than wide, slightly sinuate near base of hind angle; punctures coarse, dense; hind angles slightly divergent, bicarinate, inner carina small and indistinct, outer carina long and prominent, sinuate and parallel with lateral margin of hind angle. Sides of mesosternal fossa abruptly sloping between mesocoxae, above the plane of adjacent metasternum. Elytral striae deeply punctured; intervals convex, reticulate. Membranous lobe of tarsomere IV broad, clearly visible from above, concave apically. Aedeagus (Figure 361) with median lobe slender, gently tapering to rounded apex; paramere lacking apical blade, slender, curving inwards apically, apex rounded, lateral spines extending nearly half the length of

the paramere. Female similar to male externally but larger and with a shorter antenna, failing to reach the apex of the pronotal hind angle by up to two antennomeres.

Distribution. Mexico south to Brazil, the Caribbean, and extreme southern Florida (Becker 1975; Frank and McCoy 1992; Peck and Thomas 1998; Peck 2005).

Specimens Examined. Florida (Miami-Dade, Monroe, Palm Beach). April–July. (Figure 340)

Discussion. This is a Neotropical species established in extreme southern Florida. It is morphologically most similar to *C. lividus* and *C. bifoveatus*. From *C. lividus* it can be separated by the characteristics of the mesosternal fossa and aedeagus, as well as by having a more restricted geographic distribution. From *C. bifoveatus* it can best be separated by being slightly larger, as well as the characteristics of the aedeagus, the membranous lobe on tarsomere IV, and the relative lengths of antennomeres II–IV. Specimens in the study area have been collected at light and by beating vegetation.

Conoderus scissus (Schaeffer, 1909)

Figures 364–365

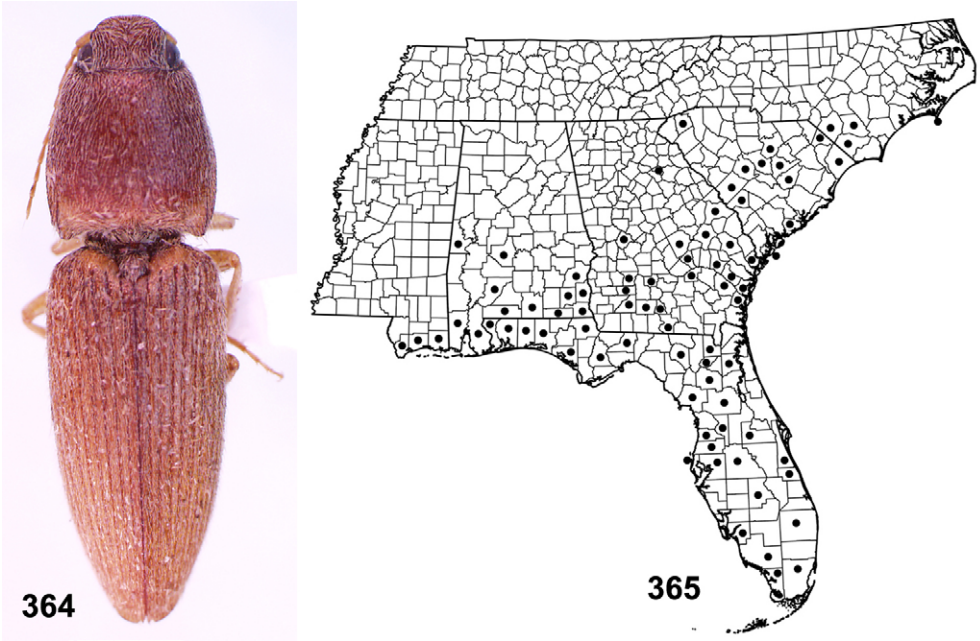
Monocrepidius scissus Schaeffer, 1909: 378

Diagnosis. Size small to moderate, 8.0–11.0 mm in length. Unicolored, light yellow-brown to red-brown; vestiture yellow, dense; legs and antennae same color as body. Antennae 11-segmented; antennomere III subequal between II and IV; flagellar antennomeres elongate, weakly serrate. Pronotum about as long as wide, widest at base, gradually tapering apically; sub-truncate basally, hind angles obsolete; single, strong carina running subparallel to lateral margin; punctures coarse but shallow, dense. Elytral striae deeply punctured; interval convex, granulose; elytral apex truncate, spinose, or notched. Membranous lobe of tarsomere IV elongate, narrow, not readily visible from above. Aedeagus with median lobe gradually tapering to narrowly rounded apex; paramere apically swollen, setose and spinose. No external sexual dimorphism noted.

Distribution. Southeastern United States, from Virginia south and west to Louisiana (Hoffman 2007). In the current study area, previously recorded from Alabama, Florida, Georgia, Mississippi, North Carolina, and South Carolina (Leng 1920; Van Dyke 1932; Löding 1945; Fattig 1951; Kirk 1970; Seal et al. 1991, 1992; Peck and Thomas 1998; Lago et al. 2002; Hoffman 2007; Willis et al. 2010a, 2010b). The type locality is Tybee Island in Chatham County, GA.

Specimens Examined. Alabama (Baldwin, Barbour, Covington, Dallas, Dale, Escambia, Geneva, Henry, Houston, Mobile, Monroe, Sumter); **Florida** (Alachua, Baker, Bay, Brevard, Clay, Collier, Escambia, Hernando, Highlands, Hillsborough, Indian River, Jackson, Lee, Leon, Levy, Liberty, Marion, Miami-Dade, Monroe, Okaloosa, Orange, Palm Beach, Pasco, Pinellas, Polk, Santa Rosa, Sumter, Suwannee, Union, Walton); **Georgia** (Bulloch, Burke, Chatham, Clarke, Colquitt, Cook, Dougherty, Emanuel, Glynn, Jeff Davis, Laurens, Lee, Long, Lowndes, McIntosh, Mitchell, Tattnall, Taylor, Turner, Wayne, Wheeler); **Mississippi** (Hancock, Harrison, Jackson); **North Carolina** (Bladen, Carteret, Columbus, Robeson); **South Carolina** (Aiken, Barnwell, Beaufort, Charleston, Clarendon, Dillon, Horry, Kershaw, Lexington, Pickens, Richland, Sumter). April–September, December. (Figure 365)

Discussion. This species should be easily recognized by the shape of pronotum with obsolete hind angles. Specimens in the study area have been collected at ultraviolet and mercury vapor light, in pitfall traps, and by sweeping vegetation. Kirk (1970) reported it from under beach drift in South Carolina. It has also been associated with sweet potato (Seal et al. 1991; Willis et al. 2010a, 2010b). Label data for specimens from Highlands County, FL (ABS) indicate they were harvested from the stomach of the southern toad (*Anaxyrus terrestris* (Bonnaterre)) as part of a herpetological study. Hoffman (2007) illustrated the aedeagus and discussed its distribution.



Figures 364–365. *Conoderus scissus*. **364)** Habitus. **365)** Distributional data.

Conoderus suturalis (LeConte, 1853)

Figures 366–367

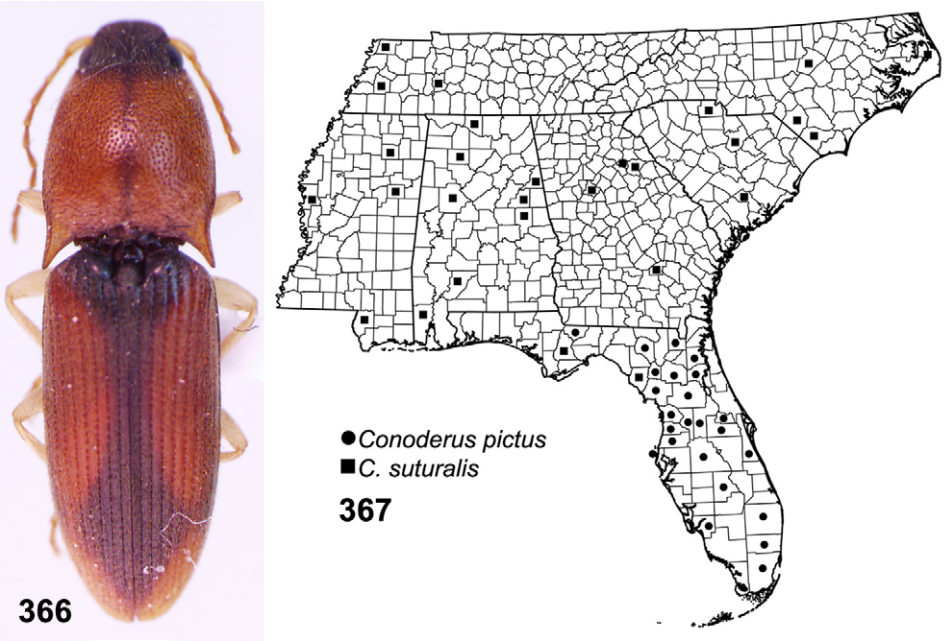
Monocrepidius suturalis LeConte, 1853: 482

Diagnosis. Size small, 6.0–7.0 mm in length. Bicolored: head black; pronotum reddish with elongate central black macula, often reaching both anterior and posterior margins; elytron reddish, scutellar area and interval I along entire length of suture black, black area extending up to interval V in apical third; legs and antennae yellow; vestiture yellow, dense, whorled on pronotum. Antenna 11-segmented, serrate; antennomere III intermediate between II and IV. Pronotum about as long as wide, widest at base of hind angle; punctures coarse yet shallow, dense; hind angles divergent, bicarinate, internal carina small, often difficult to see, outer carina long, prominent, sinuate and running parallel along lateral margin of hind angle. Elytral striae deeply punctured; intervals convex, reticulate. Membranous lobe of tarsomere IV broad, easily visible from above. Aedeagus not observed. No external sexual dimorphism noted.

Distribution. Eastern North America, west to Texas and Oklahoma (Downie and Arnett 1996). In the Southeast, previously recorded from Alabama, Florida, Georgia, North Carolina, and South Carolina (LeConte 1853; Candèze 1859; Leng 1920; Van Dyke 1932; Brimley 1938; Löding 1945; Fattig 1951; Frost 1966, 1975; Kirk 1969; Downie and Arnett 1996). The type locality is Alabama (not further restricted). The following records from Mississippi and Tennessee represent **New State Records**.

Specimens Examined. Alabama (Clay, Cleburne, Limestone, Mobile, Monroe, Tallapoosa, Tuscaloosa, Winston); **Florida** (Dixie, Liberty); **Georgia** (Clarke, Jeff Davis, Newton, Oglethorpe); **Mississippi** (Oktibbeha, Pearl River, Pontotoc, Washington); **North Carolina** (Columbus, Dare, Robeson, Wake); **South Carolina** (Dorchester, Kershaw, York); **Tennessee** (Haywood, Obion, Perry). January–June, September–November. (Figure 367)

Discussion. Based on size and color, this species should be fairly easily to recognize in the study area, although it superficially resembles a member of the genus *Aeolus*; the background color of the pronotum and elytra are more red than yellow, however. The elytral marking can be similar to *C. vespertinus* or *C. avitus*, but neither of



Figures 366–367. *Conoderus* spp. **366)** *C. suturalis* (habitus). **367)** Distributional data for *C. pictus* and *C. suturalis*.

the latter two species have pronotal markings like *C. suturalis*. Specimens in the study area have been collected at ultraviolet light, in Lindgren funnel traps, and under bark. Specimens from Mobile County, AL were collected under bald cypress bark. A specimen from Pearl River County, MS (BAM) was collected on swamp titi. Specimens from Kershaw County, SC (NCSU) were collected by sifting litter at the base of a tupelo stump.

Conoderus vespertinus (Fabricius, 1801)

Figures 342, 368

Elater vespertinus Fabricius, 1801: 240
Elater finitimus Say, 1839: 179
Monocrepidius serotinus Germar, 1839: 227
Monocrepidius peninsularis Candèze, 1889: 26

Diagnosis. Size, shape, and color as in *C. aversus*. Antenna 11-segmented; antennomere II longer than wide; antennomere III intermediate between II and IV, but closer in size to IV and clearly larger than II; flagellar antennomeres elongate and weakly serrate. Pronotum longer than wide, widest just before base of hind angles, distinctly sinuate at base of hind angle; punctures small but coarse, dense, readily visible; hind angles divergent, usually bicarinate, inner carina short and often difficult to see and sometimes lacking, outer carina prominent, sinuate and running subparallel to lateral margin of hind angle, slightly diverging anteriorly. Elytral intervals coarsely punctate; intervals slightly convex, micro-punctate. Membranous lobe of tarsomere IV broad, clearly visible from above. Aedeagus not observed. No external sexual dimorphism noted.

Distribution. Eastern United States (Johnson 2018a). In the Southeast, previously recorded from Alabama, Florida, Georgia, Mississippi, North Carolina, and South Carolina (Conradi and Eagerton 1914; Dozier 1918; Leng 1920; Brimley 1938; Löding 1945; Fattig 1951; Rabb 1963; Kirk 1969, 1970; Frost 1975; Onsager and Day 1975; Gorsuch et al. 1989; Herbert et al. 1992; Peck and Thomas 1998; Lago et al. 2002; Reed et al. 2009; Willis et al. 2010a, 2010b). The following records from Tennessee represent a **New State Record**.

Specimens Examined. Alabama (Autauga, Covington, Cullman, DeKalb, Elmore, Etowah, Henry, Lauderdale, Lee, Limestone, Macon, Madison, Mobile, Morgan, Shelby, Talladega, Tallapoosa, Walker counties; also Wilson Dam); **Florida** (Alachua, Escambia, Highlands, Leon, Liberty, Madison, Miami-Dade, Orange, Palm Beach, Santa Rosa, Volusia); **Georgia** (Appling, Baker, Bibb, Chatham, Clarke, Dade, Decatur, DeKalb, Dougherty, Fulton, Henry, Houston, Jefferson, Lee, Lowndes, McIntosh, Meriwether, Oconee, Paulding, Peach, Polk, Rockdale, Thomas, Toombs, Troup, Union, Wheeler); **Mississippi** (Attala, Bolivar, Calhoun, Chickasaw, Choctaw, Clay, Desoto, Forrest, Greene, Hinds, Jackson, Jefferson Davis, Jones, Leake, Leflore, Lowndes, Monroe, Noxubee, Oktibbeha, Panola, Pearl River, Pontotoc, Warren, Washington, Wayne, Webster, Winston); **North Carolina** (Anson, Beaufort, Bertie, Bladen, Brunswick, Buncombe, Camden, Carteret, Catawba, Chowan, Cleveland, Columbus, Cumberland, Currituck, Dare, Duplin, Durham, Edgecombe, Gates, Halifax, Hoke, Hyde, Johnston, Lenoir, Mecklenburg, Montgomery, Moore, New Hanover, Onslow, Pasquotank, Robeson, Rockingham, Surry, Swain, Wake, Warren, Washington counties; also Rocky Mount); **South Carolina** (Aiken, Allendale, Anderson, Bamberg, Barnwell, Calhoun, Charleston, Clarendon, Darlington, Florence, Greenville, Hampton, Lee, Marlboro, Pickens, Richland); **Tennessee** (Chester, Cumberland, Fentress, Grundy, Hardeman, Warren). February, April–September. (Figure 368)

Discussion. In the Southeast, this species is most similar to *C. aversus* from which it can be separated by the form of the carina on the pronotal hind angle (straight and clearly divergent in *C. aversus*; sinuate and nearly parallel to the lateral margin in *C. vespertinus*). This species is commonly referred to as the 'tobacco wireworm' or 'southern corn wireworm' and has been implicated as pest of several crops. Fattig (1951) reported it from blackeyes peas and cotton in Georgia. Kirk (1969, 1970) reported it from cotton, alfalfa, sorghum, Johnson grass, and corn in South Carolina; Gorsuch et al. (1989) reported it from peach in South Carolina. In North Carolina, it has been associated with peanuts (Herbert et al. 1992) and sweet potatoes (Willis et al. 2010a, 2010b). Dozier (1918) reported it in association with corn in Florida. Specimens from Choctaw, Forrest, Jefferson Davis, Oktibbeha, Panola, Pontotoc counties, MS (MEM) and Chowan, Cleveland, and Edgecombe counties, NC (MEM) were collected in association with cotton. Specimens from Etowah Co., AL (AUEM) were collected in association with corn. Additional specimens from Oktibbeha County, MS (MEM) were collected on pecan. Specimens from several locations in North Carolina (NCSU) have been collected in association with a variety of

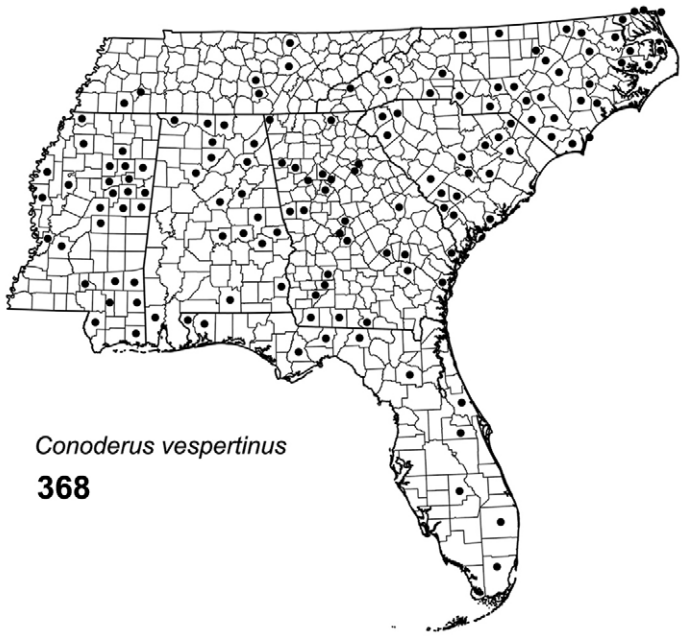


Figure 368. Distributional data for *Conoderus vespertinus*.

crops, including strawberries, sweet potatoes, tobacco, peanuts, and soybeans. Adults in the study area have also been collected at ultraviolet and mercury vapor light and in sticky traps. Specimens from Cleveland County, NC (NCSU) have been collected in rotting fruit. Conradi and Eagerton (1914) described its biology in South Carolina; Rabb (1963) described its biology in the Piedmont of North Carolina.

Heteroderes Latreille, 1834

Heteroderes Latreille, 1834: 155

Diagnosis. Size small, form generally robust. Color variable, usually unicolored and dark, rarely with maculae; legs and antennae often paler than body. Supra-antennal carinae are complete and well-separated from the labrum. Antenna 11-segmented, usually serrate, often weakly so. Pronotum variable in shape; punctures usually of two types, with small and large intermixed; hind angles carinate, one or two carinae present. Pronotosternal sutures closed. Meso- and metasternum not fused, joined by a definite suture. Tarsomere IV with membranous lobe; claws simple, with basal setae.

Range and Numbers. There are three species in the United States, distributed across the southern portion of the country (Johnson 2002). *Conoderus exsul* and *C. falli* have also often placed in *Heteroderes* but are retained in *Conoderus* here. Two species have been previously recorded from the Southeast, although Champion's (1896) record of *H. sordidus* from Florida is doubtful.

Discussion. The last treatment of this genus for North America was by Van Dyke (1932) who considered it a subgenus of *Conoderus*. The two genera can often be difficult to distinguish from each other, and among North American taxa there does not seem to be a single morphological feature that is unique for one genus or the other. Typically, *Heteroderes* species have intermixed small and large punctures on the pronotum, but this feature is also present in *C. falli* and *C. blandulus*. Adults have been collected by a variety of methods and can be particularly abundant at light. *Heteroderes amplicollis* has been implicated as a crop pest.

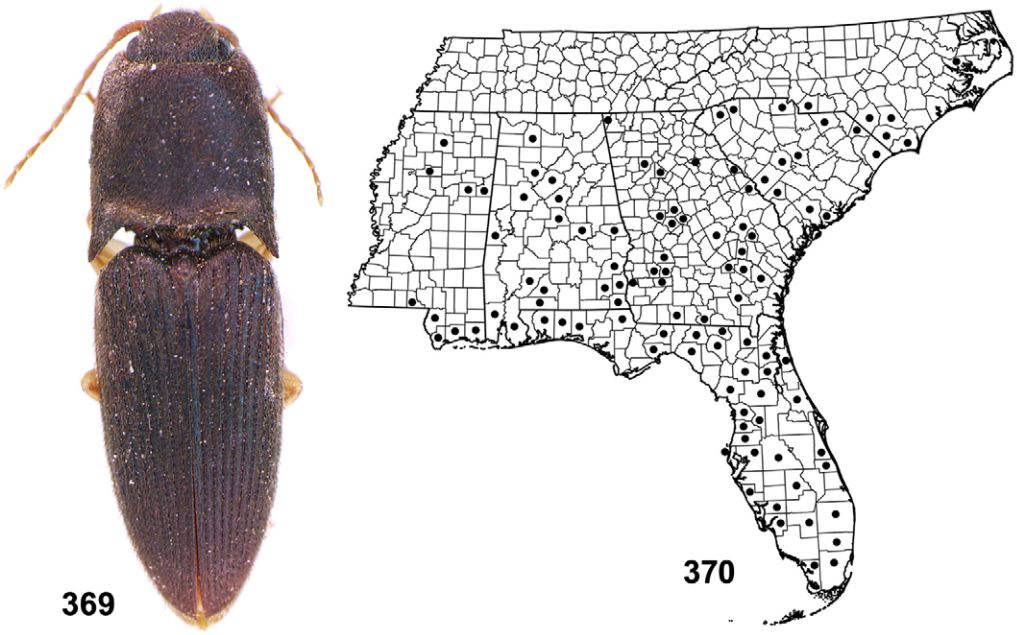
Heteroderes amplicollis (Gyllenhal, 1817)

Figures 369–370

Elater amplicollis Gyllenhal, 1817: 141
Heteroderes nicholsi Notman, 1922: 107
Monocrepidius fucosus Blatchley, 1925: 163
Monocrepidius planidiscus Fall, 1929: 56
Heteroderes laurentii of authors, not Guerin-Meneville, 1838

Diagnosis. Size small to moderate, 7.0–10.0 mm in length, form robust. Color dark pitchy black; legs and antennae yellow; vestiture yellow-brown, short, dense. Antennae 11-segmented; antennomere I elongate; II small; III subequal to IV; flagellar antennomeres elongate, weakly serrate. Pronotum subquadrate, flat, widest at base of hind angle, very slightly narrowing anteriorly; punctures dense and of two sizes, small punctures intermixed with larger ones; hind angles slightly divergent, bicarinate, inner carina small and inconspicuous, outer carina prominent and sinuate, running parallel to lateral margin of hind angle. Elytral striae punctate; interspaces nearly flat, reticulate and punctate; apex weakly truncate. Membranous lobe of tarsomere IV broad, visible from above. Aedeagus with median lobe slender, subparallel; paramere widened apically, paddle-like, lacking defined blade.

Distribution. Central and South America north to southern United States and the Caribbean islands; introduced to Hawaii (Peck and Thomas 1998). While historically considered introduced, its presence in the southern United States may be natural, with additional expansion into disturbed areas. In the Southeast, it has been previously recorded from Alabama, Florida, Georgia, Mississippi, North Carolina, and South Carolina (Blatchley



Figures 369–370. *Heteroderes amplicollis*. **369)** Habitus. **370)** Distributional data.

1925; Van Dyke 1932; Löding 1945; Wilson 1946; Wray 1950; Fattig 1951; Lane 1954; Richmond 1962; Frost 1969; Kirk 1969, 1970; Jansson and Lecrone 1989; Seal et al. 1992; Peck and Thomas 1998; Lago et al. 2002; Peck 2005; Willis et al. 2010a, 2010b; Peck et al. 2014; Peck 2016). The type locality of *M. planidiscus* is St. Petersburg in Pinellas County, FL. The type locality of *M. fucosus* is Savannah in Chatham County, GA.

Specimens Examined. Alabama (Baldwin, Barbour, Chilton, Conecuh, Dale, Elmore, Escambia, Henry, Houston, Jefferson, Lawrence, Lee, Mobile, Monroe, Shelby, Sumter, Tuscaloosa, Walker); **Florida** (Alachua, Baker, Brevard, Broward, Charlotte, Citrus, Clay, Hamilton, Hendry, Hernando, Highlands, Hillsborough, Indian River, Jackson, Lee, Leon, Levy, Madison, Marion, Miami-Dade, Monroe, Okaloosa, Orange, Palm Beach, Pasco, Pinellas, Polk, Putnam, Santa Rosa, Sarasota, St. Johns, Sumter, Suwannee, Taylor, Volusia, Wakulla, Walton); **Georgia** (Appling, Bibb, Candler, Clay, Cobb, Clarke, Crawford, Dade, DeKalb, Dougherty, Emanuel, Jeff Davis, Laurens, Lee, Lincoln, Lowndes, Monroe, Richmond, Sumter, Terrell, Thomas, Toombs, Upson, Ware, Wayne); **Mississippi** (Grenada, Hancock, Harrison, Jackson, Lafayette, Lowndes, Oktibbeha, Pearl River, Walthall, Warren); **North Carolina** (Beaufort, Bladen, Brunswick, Columbus, Robeson, Union); **South Carolina** (Aiken, Barnwell, Charleston, Chesterfield, Colleton, Dillon, Greenville, Horry, Lexington, Pickens, Richland, York). January, March-November. (Figure 370)

Discussion. This species is similar to *C. falli*, from which it can be separated by the shape of the pronotum and color. This species is commonly called the 'Gulf wireworm' and has been implicated as a crop pest (Stone 1975). Fattig (1951) reported it as a pest of corn, sugar cane, sorghum, and velvet beans in Georgia. In the Southeast, it has also been associated with potato (Jansson and Lecrone 1989, 1991) and sweet potato (Seal et al. 1992; Willis et al. 2010a, 2010b). In the study area, it has also been collected at ultraviolet and mercury vapor light and in mosquito, Malaise, pitfall, and Lindgren funnel traps. Specimens from Highlands County, FL (ABS) were collected in a pile of grass clippings.

Pseudomelanactini Arnett, 1967

The tribe Pseudomelanactini contains two genera in North America: *Anthracalaus* Fairmaire, with one species in Arizona, and *Lanelater*, with three species distributed in the East and South (Johnson 2002). Adults are large and robust; brown to black in color; vestiture hair-like. Supra-antennal carinae incomplete. Antenna 11-segmented; antennomere II smaller than III; IV–X strongly serrate; XI elongate. Pronotosternal sutures deeply grooved for reception of antennae (*Lanelater*) or open anteriorly only (*Anthracalaus*). Prosternal lobe arcuate. Hypomeron lacking a groove for reception of the front tarsus. Meso- and metasternum not fused, separated by a definite suture. Tarsomeres lacking membranous lobes; claws simple, with basal setae.

Lanelater Arnett, 1952

Amaurus Laporte de Castelnau, 1840: 237 (nec *Amaurus* Burmeister, 1835: 294)
Lanelater Arnett, 1952: 105

Diagnosis. Large beetles, form robust. Dark gray-brown in color; vestiture yellow, short, appressed. Antenna 11-segmented; antennomere II smaller than III; IV–X strongly serrate; XI elongate. Pronotum with broad, median tubercle basally; lateral margin complete; hind angle unicarinate. Pronotosternal sutures deeply grooved for reception of antennae. Prosternal lobe arcuate. Hypomeron lacking a groove for reception of front tarsus. Tibial spurs present. Tarsomeres without membranous lobes; claws simple, with basal setae. Aedeagus with paramere possessing a short apical blade. Female similar to male externally but usually larger and with shorter antennae.

Range and Numbers. There are three species of *Lanelater* in the United States, ranging from Maryland south to Florida and west to Arizona (Spilman 1985). One species occurs in the Southeast.

Discussion. *Lanelater* was revised for the United States by Spilman (1985). Little is known about the biology of these beetles. At the time of Spilman's revision, the larvae were undescribed. He suspected they were subterranean predators on scarabaeoid larvae or other soft-bodied arthropods. Donlan et al. (2004) reported the larvae of *L. sallei* feeding on eggs of the loggerhead sea turtle in Florida. Adults are typically collected at light.

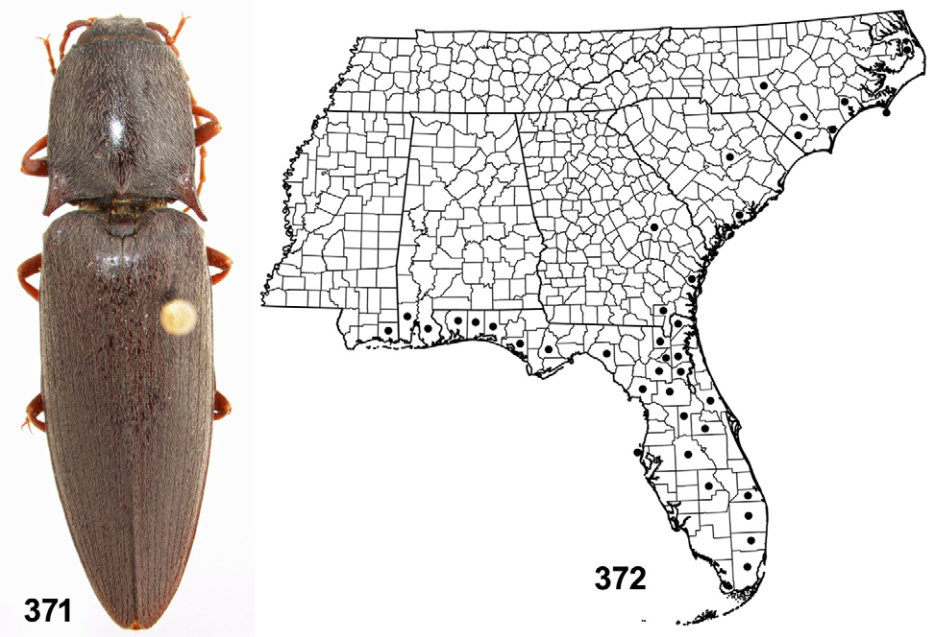
Lanelater sallei (LeConte, 1853)

Figures 371–372

Agrypnus sallei LeConte, 1853: 491

Diagnosis. Size large, 22.0–30.0 mm in length. Color dark gray-brown; vestiture yellow, dense, appressed. Antenna 11-segmented, extending beyond apex of pronotal hind angle by 2–4 antennomeres; antennomere II small; III triangular, longer than II; IV–X strongly serrate, each antennomere thinner than the previous; XI elongate. Pronotum slightly longer than broad, arcuate, widest before hind angle; broad median tubercle at base; punctures simple, round, separated by a distance approximately equal to, or just less than, their own diameters, becoming denser and umbilicate laterally; hind angles divergent; single carina sinuate and parallel with lateral margin, extending along basal third of pronotum. Elytron elongate; strial punctures small; interspaces punctate. Foretibiae without dorsal carina. Aedeagus with median lobe slender, subparallel then narrowing subapically; paramere with short apical blades, base of blade subacute, evenly tapering to rounded apex, long setae along length of paramere with a dense cluster of apical setae. Female similar to male externally but larger and with shorter antennae, extending no more than one antennomere beyond the apex of pronotal hind angle, with flagellar antennomeres broader, subquadrate.

Distribution. Eastern United States, from Maryland south to Florida and west to Louisiana; restricted to coastal areas north of Virginia (Spilman 1985). In the Southeast, previously recorded from Alabama, Florida,



Figures 371–372. *Lanelater sallei*. **371)** Habitus. **372)** Distributional data. Photo courtesy Kyle Schnepp (Florida State Collection of Arthropods, FDACS-DPI, Gainesville, FL, USA).

Georgia, Mississippi, North Carolina, and South Carolina (Dozier 1918; Leng 1920; Brimley 1938; Löding 1945; Fattig 1951; Frost 1964; Richmond 1968; Kirk 1969; Spilman 1985; Downie and Arnett 1996; Peck and Thomas 1998; Lago et al. 2002; Donlan et al. 2004).

Specimens Examined. Alabama (Baldwin, Mobile); **Florida** (Alachua, Baker, Bay, Bradford, Broward, Clay, Highlands, Lake, Levy, Liberty, Marion, Martin, Miami-Dade, Nassau, Okaloosa, Orange, Palm Beach, Pinellas, Polk, Putnam, Santa Rosa, Taylor, Volusia, Walton); **Georgia** (Charlton, Emanuel, McIntosh); **Mississippi** (Jackson); **North Carolina** (Bladen, Carteret, Columbus, Dare, Moore, New Hanover, Onslow); **South Carolina** (Charleston, Sumter). March–July, September. (Figure 372)

Discussion. This species should be easy to recognize based on its size, shape, hair-like setae, and basal setae on the tarsal claws. Since Spilman's (1985) revision, very little has been added about the biology of these beetles. Most adults have been collected at ultraviolet and mercury vapor light, in malt traps, and in drift net traps. Donlan et al. (2004) reported the larvae feeding on eggs of the loggerhead sea turtle in Miami-Dade County, FL.

Pyrophorini Candèze, 1863

The tribe Pyrophorini contains three native genera in the United States, with a Neotropical genus added here. Two of the native genera occur in the Southeast. The third, *Vesperelater* Costa, occurs in Arizona (Johnson 2002). Hyslop (1917) first revised the group for North America, with all species placed in the genus *Pyrophorus*. Costa (1975) reviewed the tribe on a world basis and later (Costa 1983) revised *Deilelater*. In North America, pyrophorines are readily recognized by having a pair of luminous spots at the base of the pronotum. Larvae are also luminous through intersegmental membranes. In adults, the supra-antennal carinae may be complete or not. Antenna 11-segmented, serrate beyond antennomere III (rarely III also serrate). Pronotosternal sutures closed or open anteriorly. Prosternal lobe normally arcuate. Hypomeron lacking a groove for reception of the antenna or front tarsus. Meso- and metasternum not fused, joined by a definite suture. Abdomen with or

without luminous areas. Tarsomeres lacking membranous lobes; claws simple, with basal setae. Not much is known of the biology of many of the species. Adults are nocturnal and flash patterns are involved with mate attraction. Known larvae are predaceous.

Deilelater Costa, 1975

Deilelater Costa, 1975: 108

Diagnosis. Size moderate. Color dark red-brown to brown with a pair of luminous spots on the base of the pronotum. Supra-antennal carinae complete, weak, not protruding over labrum. Antenna 11-segmented, reaching apex of pronotal hind angle or beyond; antennomeres II and III subequal (III may be longer than II but clearly closer to II than IV); IV and beyond serrate. Eyes large. Pronotum longer than wide, convex; luminous spots lateral, visible also on hypomeron; base of pronotum with or without median tubercle; hind angle unicarinate. Elytra subparallel, rounded apically. Tarsomeres lacking membranous lobes; claws simple, with basal setae. Aedeagus with paramere with a weak apical blade or at least a lateral tooth.

Range and Numbers. Three species in the United States, from Florida to Texas (Costa 1983; Johnson 2002). All three species have been recorded from the Southeast.

Discussion. Among the three pyrophorine genera in the Southeast, *Deilelater* species are easily recognized by their smaller size and rounded elytral apices. Costa (1983) revised the genus on a world basis, recognizing eight species.

Key to the species of *Deilelater* in the Southeast
(adapted from Costa 1983)

1. Pronotum with tubercle medially at base (Figure 375) . . . . . ***D. physoderus* (Germar)**
— Pronotum without tubercle medially at base **2**

2(1). Antenna extending beyond apex of pronotal hind angle; carina of hind angle strong . . . . . ***D. ustulatus* Costa**
— Antenna reaching, but not extending beyond, apex of pronotal hind angle; carina of hind angle weak . . . . . ***D. atlanticus* (Hyslop)**

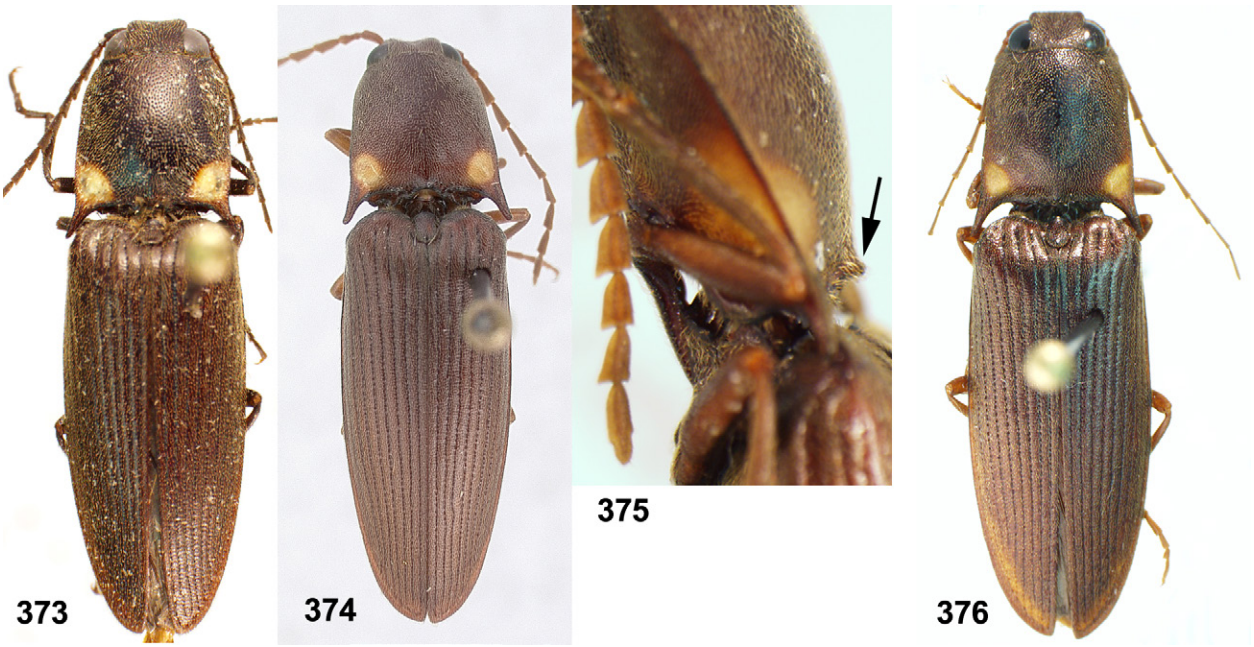
Deilelater atlanticus (Hyslop, 1917)

Figures 373, 377

Pyrophorus atlanticus Hyslop, 1917: 8

Diagnosis. Size moderate, 15.0–17.0 mm in length. Color dark brown; luminous spots yellow in dead specimens; vestiture yellow, decumbent, evenly distributed over body. Antenna 11-segmented, reaching, but not extending beyond, apex of pronotal hind angle; antennomeres II and III subequal, IV and beyond serrate. Pronotum longer than wide, lacking median tubercle at base; luminous spots lateral, visible through pronotum to hypomeron; punctures dense, umbilicate, slightly denser laterally; hind angles slightly divergent, unicarinate, carina weak. Aedeagus with median lobe gradually tapering to broad-rounded apex; paramere with a sharp subapical lateral tooth, rounded at apex, dense, long setae medially and along external margin. Female similar to male but with a broader pronotum and shorter antennae.

Distribution. Known from Florida and Georgia (Hyslop 1917; Leng 1920; Moznette 1920; Fattig 1951; Frost 1969; Costa 1983; Peck and Thomas 1998). The type locality is Enterprise in Volusia County, FL.



Figures 373–376. *Deilelater* spp. **373)** *D. atlanticus* (habitus). **374)** *D. physoderus* (habitus). **375)** *D. physoderus* (base of pronotum). **376)** *D. ustulatus* (habitus). *Deilelater physoderus* (habitus) photo courtesy Kyle Schnepp (Florida State Collection of Arthropods, FDACS-DPI, Gainesville, FL, USA).

Specimens Examined. Florida (Alachua, Brevard, Citrus, Clay, Hernando, Highlands, Levy, Marion, Miami-Dade, Orange, Palm Beach, Polk, Seminole). April–September. (Figure 377)

Discussion. This species is similar to *D. ustulatus* in lacking a tubercle at the base of the pronotum but has shorter antennae and is generally smaller. Specimens in the study are have been collected at ultraviolet light and in Malaise traps. Lloyd (1965) commented on the mating behavior of this species from observations in Highlands Hammock State Park in Highlands County, FL.

Deilelater physoderus (Germar, 1841)

Figures 374–375, 377

Pyrophorus physoderus Germar, 1841: 36
Pyrophorus texanus Hyslop, 1917: 9

Diagnosis. Size large, 20.0–24.0 mm in length. Color dark red-brown to brown; luminous spots yellow in dead specimens; vestiture yellow, decumbent, evenly distributed over body. Antenna 11-segmented, reaching apex of pronotal hind angle or extending beyond them by two antennomeres; antennomere II small; III subequal between II and IV, closer in length to II; IV and beyond serrate. Pronotum longer than wide; median tubercle at base (Figure 375); luminous spots lateral, visible through pronotum to hypomeron; punctures dense, shallow, umbilicate, denser laterally; hind angles divergent; unicarinate, carina moderate. Aedeagus with median lobe abruptly tapering subapically, apex subacute; paramere with rounded emargination at base of apical blade, lateral margin of blade pointed, curving inwards to rounded apex, long, dense setae along inner margin of blade. Female similar to male externally but with a broader, more convex pronotum and shorter antennae.

Distribution. Southeastern United States, west to Texas (Costa 1983; Peck and Thomas 1998). In the Southeast, recorded from Alabama, Florida, and Georgia (Champion 1896; Hyslop 1917; Leng 1920; Moznette

1920; Löding 1945; Fattig 1951; Costa 1983; Peck and Thomas 1998). The type locality is Alabama (not further restricted).

Specimens Examined. Florida (Broward, Manatee, Monroe, Pinellas). May–June, August–September. (Figure 377)

Discussion. This is the only species of *Deilelater* in the United States with a tubercle at the base of the pronotum. This feature, along with the rounded elytral apices, should make it easily identifiable.

Deilelater ustulatus Costa, 1983

Figures 376–377

Deilelater ustulatus Costa, 1983: 123

Diagnosis. Size large, 20.0–21.0 mm in length. Color dark red-brown to brown; luminous spots yellow in dead specimens; vestiture yellow, decumbent, evenly distributed over the body. Antenna 11-segmented, extending beyond apex of pronotal hind angle by up to three antennomeres; antennomeres II and III subequal; IV and beyond serrate. Pronotum longer than wide; lacking tubercle at base; luminous spots lateral, visible through pronotum to hypomeron; punctures dense, umbilicate, slightly denser laterally; hind angles divergent, unicarinate, carina strong. Aedeagus with median lobe gradually tapering to rounded apex; paramere with subacute extension, curving inwards to rounded apex, dense, long setae medially and along external margin. Female undescribed.

Distribution. Currently known only from Florida (Peck and Thomas 1998). The type locality is Dunedin in Pinellas County, FL.

Specimens Examined. Florida (Charlotte, Levy, Orange). March, May–July, September-October. (Figure 377)

Discussion. This species is most similar to *D. atlanticus* but is larger and has longer antennae and a stronger carina on the pronotal hind angle. Specimens in the study area have been collected in Malaise traps.

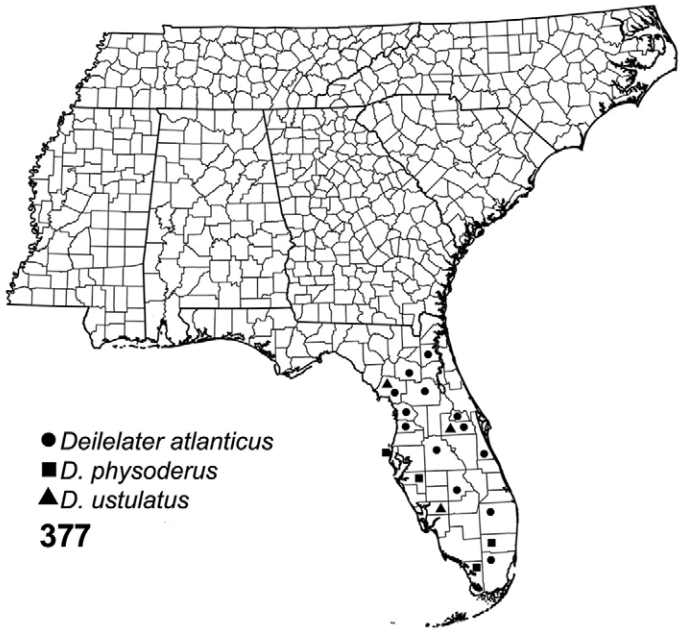


Figure 377. Distributional data for *Deilelater atlanticus*, *D. physoderus*, and *D. ustulatus*.

Ignelater Costa, 1975

Ignelater Costa, 1975: 105

Diagnosis. Size large, form elongate. Color dark red-brown to brown; luminous spots at base of pronotum. Supra-antennal carinae incomplete, frons depressed. Antenna 11-segmented, extending beyond apex of pronotal hind angle; antennomere II small; III intermediate between II and IV, combined with II shorter than IV; IV and beyond serrate. Eyes large. Pronotum longer than wide, slightly convex; base of pronotum with tubercle; luminous spots visible through pronotum to hypomeron. Elytron elongate, spinose apically. Tarsal claws simple, with basal setae. Aedeagus with median lobe with or without median tubercles; paramere lacking defined apical blade but with a subapical tooth. Female similar to male externally but usually more robust and with shorter antennae, just reaching the apex of the pronotal hind angle.

Range and Numbers. Three species, Neotropical and Caribbean in distribution, one of which is found in central and southern Florida (Costa 1975). *Ignelater luminosus* (Illiger) was introduced from the Caribbean into Florida in 1943 to aid in control of the scarab, *Euetheola rugiceps* (LeConte), but never became established (Frank and McCoy 1993).

Discussion. This genus is readily recognized by its size, long antennae, luminous spots on the pronotum, and spinose elytral apices. Adults are nocturnal and usually attracted to light.

Ignelater havaniensis (Laporte de Castelnau, 1840)

Figures 378, 380

Pyrophorus havaniensis Laporte de Castelnau, 1840: 236
Pyrophorus causticus Germar, 1841: 36
Pyrophorus impressifrons Sturm, 1843: 67

Diagnosis. Size large, 20.0–25.0 mm in length, form elongate. Color dark red-brown to brown; luminous spots yellow in dead specimens; vestiture yellow, evenly distributed over body. Antenna 11-segmented, extending beyond apex of pronotal hind angle; antennomere II small; III intermediate between II and IV, combined with II shorter than IV; IV and beyond serrate. Pronotum longer than wide, slightly convex; base of pronotum with tubercle; luminous spots visible through pronotum to hypomeron; punctures dense, umbilicate, becoming denser and more shallow laterally; hind angles short, divergent, unicarinate. Elytron elongate, spinose apically. Aedeagus with median lobe gradually tapering to rounded apex; paramere with a sharp, subapical lateral tooth, apex rounded, long dense setae medially, three short setae laterally below lateral tooth. Female similar to male externally but usually more robust and with shorter antennae, just reaching the apex of pronotal hind angle.

Distribution. Cuba, Hispaniola, Bahamas, Mexico, and southern and central Florida (Costa 1975; Peck and Thomas 1998; Peck 2005).

Specimens Examined. Florida (Hillsborough, Miami-Dade, Monroe). April–June. (Figure 380)

Discussion. This species is readily recognized by its large size, long antennae, luminous spots on the pronotum, and spinose elytral apices. Specimens in the study area have been collected at mercury-vapor light and in Lindgren funnel traps.

Pyrophorus Billberg, 1820

Pyrophorus Billberg, 1820: 20

Diagnosis. Size large, form robust. Color brown to dark brown; luminous spots on pronotum laterally located. Supra-antennal carinae incomplete, frons depressed. Antenna 11-segmented, serrate, very short, not reaching apex of pronotal hind angle and often barely reaching mid-pronotum; antennomere II very small; III small and triangular; IV and beyond serrate. Eyes normal. Pronotum convex; punctures variable; hind angles stout, slightly divergent, carinate; luminous spots visible or not ventrally. Elytron broad, not spinose apically. Aedeagus with median lobe tapering to apex; paramere short, apically densely setose. Female similar to male externally but more robust.

Range and Numbers. There are 24 described species, Neotropical and Caribbean (Costa 1975). No species are native to the United States; the one species added here probably represents an incidental finding (see Discussion under *P. mellifluus*, below).

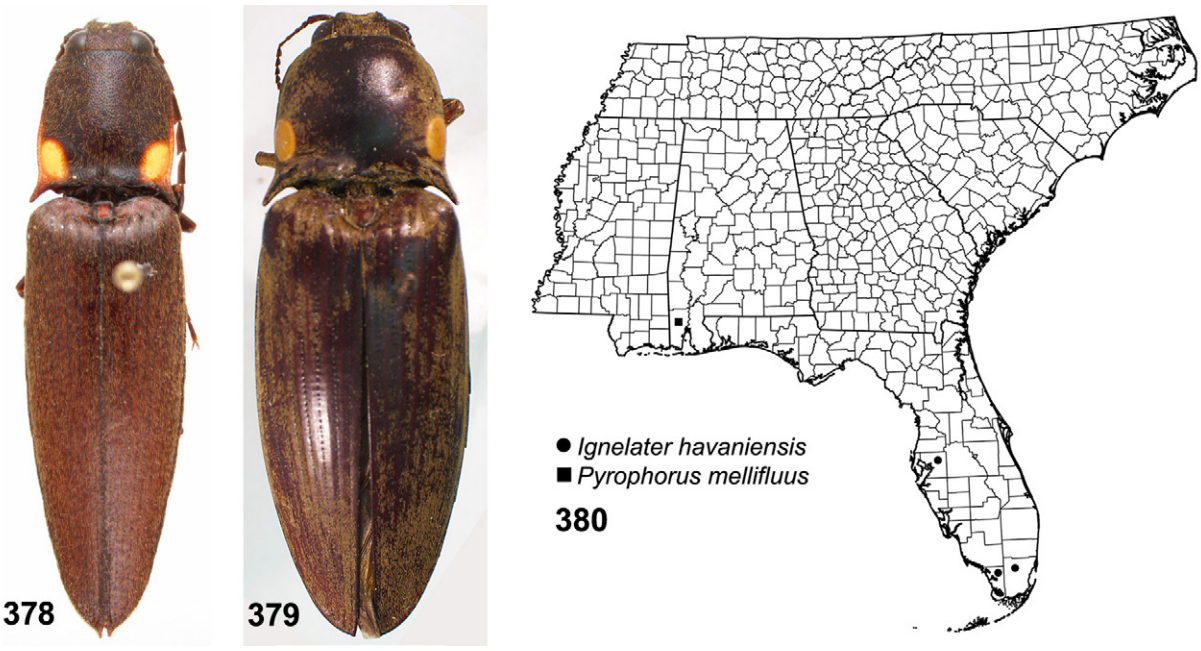
Discussion. Members of the genus *Pyrophorus* can be recognized by their large size, very short antennae, and by having the luminous spots on the pronotum laterally located.

Pyrophorus mellifluus Costa, 1972

Figures 379–380

Pyrophorus mellifluus Costa, 1972: 211

Discussion. Size large, 30.0–40.0 mm in length, form robust. Color brown; luminous spots yellow-orange in dead specimens; vestiture yellow, dense, evenly distributed over the body. Antenna 11-segmented, serrate, barely reaching anterior of luminous spots; antennomere II very small; III triangular, intermediate between II and IV; IV and beyond serrate. Pronotum wider than long, convex, lacking basal tubercle; punctures shallow, very



Figures 378–380. Pyrophorini. **378)** *Ignelater havaniensis* (habitus). **379)** *Pyrophorus mellifluus* (habitus). **380)** Distributional data for *I. havaniensis* and *P. mellifluus*. *Ignelater havaniensis* photo courtesy Kyle Schnepp (Florida State Collection of Arthropods, FDACS-DPI, Gainesville, FL, USA).

dense; hind angles stout, divergent, strongly unicarinate. Elytron broad, not spinose apically. Aedeagus with median lobe broad basally, tapering to rounded apex, median rod compressed medially then broadly rounding apically; paramere divergent, apically densely setose, interior setae very long. Female not examined.

Distribution. Cuba, Hispaniola, Martinique, St. Lucia, Trinidad, Mexico south to Colombia (Peck 2005). Previously not recorded from the United States. The following record from Alabama represents a **New Country Record** (see Discussion below).

Specimens Examined. Alabama (Mobile). June. (Figure 380)

Discussion. *Pyrophorus mellifluus* can be separated from all native pyrophorines by the large, robust form and very short antennae. The single specimen examined (Figure 379) was collected in Mobile, AL in June 1909 and is part of the H. P. Löding collection housed in the GSAT. The specimen probably represents a vagrant and the species is not currently believed to have established breeding populations in the U.S. The specimen was included in the current study to aid in the identification of other specimens that may turn up in Gulf Coast states.

Hemirhipini Candèze, 1857

The tribe Hemirhipini here follows Johnson (2002) and recognizes three genera in the United States, all of which can be found in the Southeast. All three genera have been recently revised on a world basis (Casari 1996a, 1996b, 2002b). Casari (2002a) also reviewed the larval characters of the tribe. Adults are large beetles, variably colored, often brightly so with contrasting patterns; vestiture scale-like. Supra-antennal carinae incomplete to complete and prominent. Antenna 11-segmented; antennomere II small; III variable; flagellar antennomeres serrate, lamellate, or flabellate. Pronotum lacking luminous spots. Pronotosternal sutures variable. Prosternal lobe nearly straight to arcuate anteriorly. Hypomeron lacking a groove for reception of antenna or front tarsus. Meso- and metasternum not fused, joined by a definite suture (absent or indistinct in *Chalcolepidius*). Tarsomeres lacking membranous lobes; claws simple, with basal setae. Known larvae are predators under bark and in rotting wood.

Alaus Eschscholtz, 1829

Alaus Eschscholtz, 1829: 32

Diagnosis. Size large. Body covered with pale scale-like setae, forming distinct patterns, including a pair of eyespots on the pronotum. Supra-antennal carinae incomplete, frons depressed. Antenna 11-segmented; antennomere II small; III variable; flagellar antennomeres serrate to flabellate. Pronotum longer than wide; with or without faint median impression running nearly entire length of pronotum; lacking luminous spots. Pronotosternal sutures closed. Hypomeron lacking a groove for reception of antenna or front tarsus. Meso- and metasternum not fused, joined by a definite suture. Tibial spurs lacking. Aedeagus with paramere with or without a defined apical blade.

Range and Numbers. There are six species in the United States (Casari 1996a). Three species have been recorded from the Southeast, one of which is a Caribbean species known only from extreme southern Florida.

Discussion. The genus was revised on a world basis by Casari (1996a). Casari (2003) described a few more species and transferred some species from *Chalcolepidius* to *Alaus*. Members of the genus *Alaus* are commonly called 'eyed click beetles' and are among the best-known members of the family. Adults are large and conspicuous and easily recognized by the eye spots on the pronotum. Known larvae are predaceous, usually under the bark of dead, felled trees. Casari (2002a) redescribed the larvae of *A. myops* and *A. oculatus*. Adults are commonly collected under bark or in decaying logs, and are also attracted to light at night.

Key to the species of *Alaus* in the Southeast
(adapted from Casari 1996a)

1. Eyespots on pronotum not surrounded by a band of white scales; pronotum lacking faint median groove; antenna flabellate in male; known only from extreme southern Florida in the United States . . . . . ***A. patricus* (Candèze)**
— Eyespots on pronotum surrounded by a band of white scales; pronotum with a faint median groove running nearly entire length of pronotum; antenna serrate in both sexes; generally distributed throughout the eastern United States **2**

2(1). Vestiture grayish or slightly brownish; eye spots smaller, less than one-third length of pronotum . . . . . ***A. myops* (Fabricius)**
— Vestiture black and white; eye spots larger, approximately one-third length of pronotum . . . . . ***A. oculatus* (Linnaeus)**

Alaus myops (Fabricius, 1801)

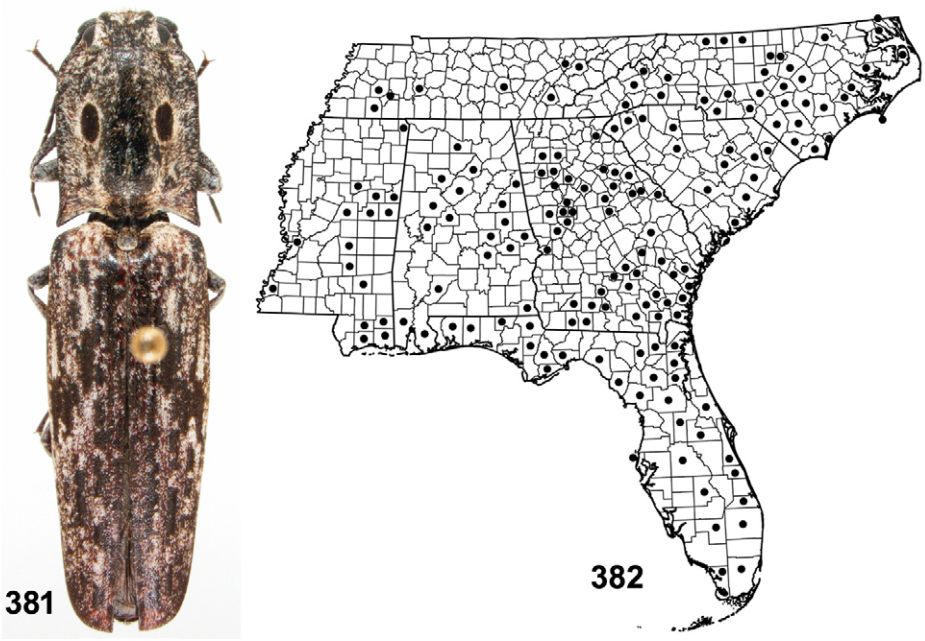
Figures 381–382

Elater luscus Olivier, 1790: 21 (in part, nec *Elater luscus* Fabricius, 1775: 824)
Elater myops Fabricius, 1801: 222
Alaus canadensis Candèze, 1889: 11

Diagnosis. Size large, 20.0–42.0 mm in length. Dark red-brown to brown; vestiture scale-like, graying to brownish of several tonalities intermingled or forming irregular spots of various sizes; eyespots small, less than one-third length of pronotum, formed of velvety black pubescence surrounded by thin ring of white scales. Antenna 11-segmented, not extending beyond apex of pronotal hind angle; antennomere II small; III triangular; IV and beyond serrate. Pronotum longer than wide; faint median groove not reaching margins; densely micropunctate; hind angles short, wide, slightly divergent, ecarinate. Elytral striae punctate; intervals slightly convex, coarsely and densely punctate. Tarsal claws with five basal setae. aedeagus with median lobe abruptly narrowed subapically to a broadly rounded apex; paramere with a large, defined apical blade, dense row of long setae running length of blade and lateral portion of paramere below the blade. Female similar to male externally.

Distribution. Eastern North America, west to Texas and Kansas (Casari 1996a). Recorded from all seven states in the study area (Dozier 1918; Leng 1920; Brimley 1938; Löding 1945; Fattig 1951; Richmond 1962; Frost 1964; Kirk 1969, 1970; Woodruff 1971, 1976; Casari 1996a; Downie and Arnett 1996; Peck and Thomas 1998; Lago et al. 2002; Miller 2006; Campbell et al. 2008a, 2008b; Miller and Duerr 2008; Miller et al. 2011; Klepzig et al. 2012).

Specimens Examined. Alabama (Baldwin, Bibb, Blount, Clay, Cleburne, DeKalb, Elmore, Escambia, Hale, Houston, Jefferson, Lee, Macon, Mobile, Monroe, Montgomery, Morgan, Tallapoosa, Tuscaloosa, Walker); **Florida** (Alachua, Baker, Brevard, Calhoun, Clay, Columbia, Dixie, Duval, Franklin, Hendry, Highlands, Holmes, Indian River, Jackson, Lake, Levy, Liberty, Marion, Martin, Miami-Dade, Monroe, Okaloosa, Orange, Palm Beach, Pinellas, Polk, Putnam, Santa Rosa, Taylor, Volusia, Wakulla; Apalachicola, Ocala, Osceola Natl. Forests); **Georgia** (Baldwin, Bartow, Ben Hill, Brantley, Camden, Charlton, Chattahoochee, Cherokee, Clarke, Clinch, Cobb, Coffee, Colquitt, Cook, DeKalb, Emanuel, Fulton, Glynn, Grady, Greene, Habersham, Jeff Davis, Lamar, Liberty, Long, McDuffie, McIntosh, Meriwether, Mitchell, Montgomery, Newton, Oglethorpe, Paulding, Pierce, Pike, Putnam, Richmond, Spalding, Talbot, Tattnall, Telfair, Thomas, Tift, Upson, Walton, Ware, Warren, Wilkes); **Mississippi** (Adams, Attala, George, Harrison, Jackson, Jones, Lowndes, Noxubee, Oktibbeha, Scott, Smith, Stone, Tishomingo, Warren, Webster, Winston); **North Carolina** (Beaufort, Bladen, Brunswick, Buncombe, Burke, Camden, Carteret, Chatham, Columbus, Craven, Cumberland, Dare, Duplin, Durham, Granville, Halifax, Harnett, Johnston, Jones, Mecklenburg, Moore, New Hanover,



Figures 381–382. *Alaus myops*. **381)** Habitus. **382)** Distributional data. Photo courtesy Kyle Schnepp (Florida State Collection of Arthropods, FDACS-DPI, Gainesville, FL, USA).

Orange, Pasquotank, Richmond, Robeson, Rockingham, Rutherford, Sampson, Stanley, Stokes, Surry, Transylvania, Union, Wake, Yancey counties; also Hofmann Forest); **South Carolina** (Berkeley, Charleston, Florence, Greenville, Lee, Marion, Newberry, Oconee, Orangeburg, Pickens, Sumter, Union, Williamsburg); **Tennessee** (Anderson, Chester, Hardeman, Knox, Madison, McMinn, Perry, Warren). January–November. (Figure 382)

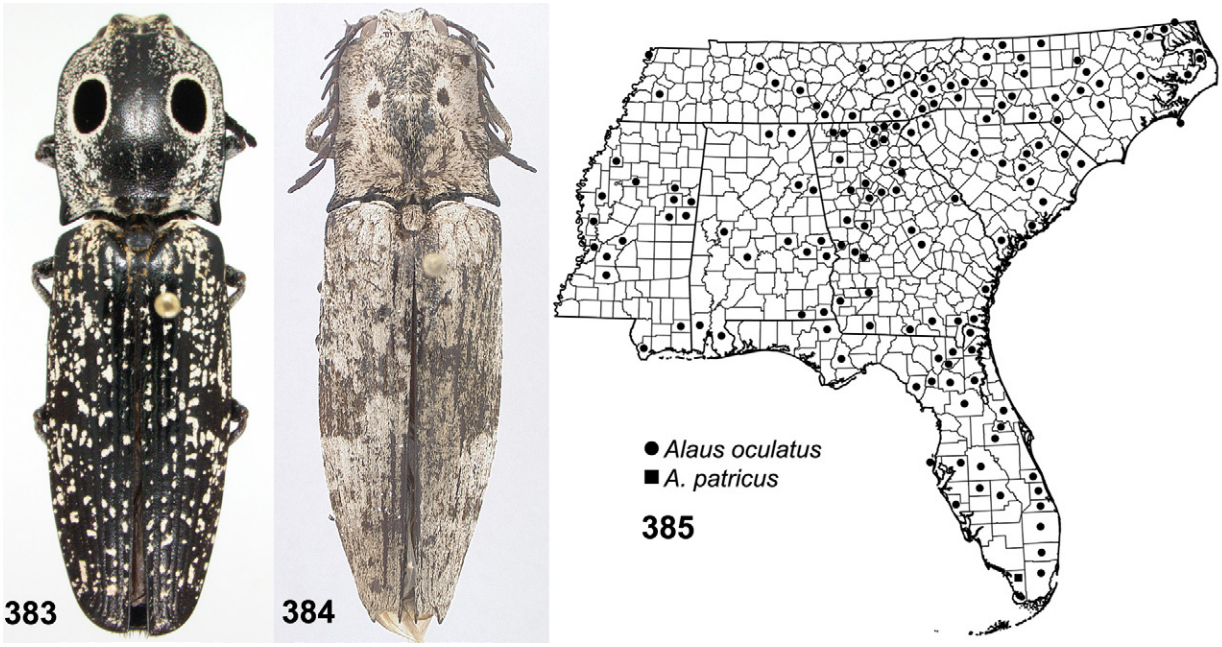
Discussion. This large beetle should be easily recognized in the study area by its color pattern. It is commonly called the 'blind click beetle' because of its small eyespots. Most label data examined by Casari (1996a) showed this species collected in association with pine. The larva was described (Casari 2002a) and is predaceous on other beetle larvae in pine. Miller (2006) and Miller et al. (2011) collected *A. myops* in Florida, Georgia, and South Carolina using volatile attractants used as cerambycid lures. Specimens examined in this study were collected at ultraviolet and mercury vapor light and in Lindgren funnel and panel traps.

Alaus oculatus (Linnaeus, 1758)

Figures 383, 385

Elater oculatus Linnaeus, 1758: 404
Elater luscus Fabricius, 1775: 824
Alaus oklahomensis Hatch, 1928: 23

Diagnosis. Size large, 24.0–44.0 mm in length. Color black; vestiture scale-like, white and black arranged in patches; eyespots large, about one-third length of pronotum, formed of velvety black pubescence surrounded by white scale-like vestiture. Antenna 11-segmented, not extending beyond apex of pronotal hind angle; antennomere II small; III triangular; IV and beyond serrate. Pronotum longer than wide; median longitudinal groove usually reaching margins; punctures small and coarse, denser laterally; hind angles stout, subparallel; ecarinate. Elytral striae punctate; intervals convex, coarsely and densely punctate. Tarsal claws with four basal setae. Aedeagus with median lobe abruptly narrowed subapically, broadly rounded apex; paramere with large, defined apical



Figures 383–395. *Alaus* spp. **383)** *A. oculatus* (habitus). **384)** *A. patricus* (habitus). **385)** Distributional data for *A. oculatus* and *A. patricus*. Photos courtesy Kyle Schnepp (Florida State Collection of Arthropods, FDACS-DPI, Gainesville, FL, USA).

blade, dense row of long setae running length of blade and lateral portion of paramere below the blade. Female similar to male externally.

Distribution. Eastern North America, west to Texas and Colorado (Casari 1986a). Recorded from all seven states in the study area (Leng 1910, 1920; Dozier 1918; Brimley 1938; Löding 1945; Fattig 1951; Kirk 1969, 1970; Woodruff 1971, 1976; Casari 1996a; Downie and Arnett 1996; Peck and Thomas 1998; Casari 2002a; Campbell et al. 2008a, 2008b).

Specimens Examined. Alabama (Baldwin, Calhoun, Cleburne, Dallas, Elmore, Geneva, Hale, Houston, Jackson, Lee, Macon, Madison, Mobile, Russell); **Florida** (Alachua, Baker, Broward, Columbia, Dixie, Duval, Gilchrist, Hardee, Highlands, Hillsborough, Indian River, Jackson, Liberty, Marion, Martin, Miami-Dade, Nassau, Orange, Palm Beach, Pinellas, Polk, Putnam, Sarasota, Seminole, St. Lucie, Union, Volusia); **Georgia** (Bartow, Camden, Charlton, Clarke, Clinch, DeKalb, Dougherty, Early, Fulton, Grady, Henry, Jackson, Laurens, Lowndes, Lumpkin, Marion, McIntosh, Meriwether, Morgan, Murray, Muscogee, Newton, Rabun, Richmond, Schley, Towns, Union, Upson, White, Whitfield, Wilkinson); **Mississippi** (Clay, Copiah, George, Grenada, Hancock, Hinds, Lowndes, Madison, Noxubee, Oktibbeha, Quitman, Sharkey, Sunflower, Warren, Winston); **North Carolina** (Anson, Buncombe, Burke, Cabarrus, Camden, Carteret, Catawba, Chowan, Dare, Davidson, Durham, Forsyth, Gates, Harnett, Haywood, Henderson, Hertford, Hyde, Johnston, Macon, Madison, Mecklenburg, McDowell, Moore, Northampton, Pitt, Rockingham, Rutherford, Sampson, Scotland, Surry, Transylvania, Wake, Wilkes); **South Carolina** (Berkeley, Charleston, Clarendon, Darlington, Horry, Jasper, Lee, Marion, Newberry, Oconee, Pickens, Richland, Sumter, Union, York); **Tennessee** (Anderson, Cocke, Davison, Hamilton, Haywood, Lake, Polk, Rutherford, Sequatchie, Sevier, Warren). Year-round. (Figure 385)

Discussion. Commonly called the 'eyed elater', this is probably the most well-known species in the family in North America. In the Southeast it is easily recognizable, but in the western part of its range it can be easily confused with *A. lusciosus* (Hope) where their distributions overlap in Texas, New Mexico, and Oklahoma. The larva has been described (Casari 2002a) and its biology is fairly well known. Adults and larvae are found in

decaying logs and under bark of felled trees (usually hardwoods), where they are known predators of cerambycid and buprestid larvae. Label data examined by Casari (1986a) showed this species in association with a variety of trees, including cycads, oak, sycamore, tulip tree, hickory, beech, willow, and pine. Löding (1945) recorded it from southern magnolia in Alabama. Specimens have also been collected in Lindgren funnel and panel traps. A specimen from Palm Beach County, FL (collection Vince Golia) was collected by baiting with fruit. Specimens from Dallas County, AL (AUEM) were collected in decaying mulberry. Unlike *A. myops*, this species does not seem to be readily attracted to light at night. Specimens are often collected with phoretic pseudoscorpions attached to their legs or under their elytra. Beier (1948) and Muchmore (1971) recorded the pseudoscorpion *Americhernes oblongus* (Say) in association with *A. oculatus* in the eastern U.S.

Alaus patricius (Candèze, 1857)

Figures 384–385

Calais patricia Candèze, 1857: 242
Elater luscus Olivier, 1790: 21 (in part, nec *Elater luscus* Fabricius, 1775: 824)
Alaus primarius Candèze, 1874: 151

Diagnosis. Size large, 25.0–37.0 mm in length. Color red-brown to dark brown; vestiture mix of yellow-white to gray-white scale-like setae and brown hair-like setae; eyespots formed by dark brown pubescence surrounded by yellow-gray pubescence. Antenna 11-segmented, extending beyond apex of pronotal hind angle by one antennomere; antennomeres II and III small, subequal; flagellar antennomeres flabellate. Pronotum almost as long as wide; lacking median longitudinal groove; punctures mix of sparse, larger coarse punctures and dense smaller, finer punctures; hind angles strongly divergent, ecarinate. Elytral striae weakly punctate; interspaces flat and micropunctate; apices deeply emarginate. Tarsal claws with seven basal setae. Aedeagus with median lobe very broad, gradually tapering to rounded apex; paramere without apical blade. Female similar to male externally but with shorter, pectinate antennae.

Distribution. Bahamas, Cuba, Jamaica, the Dominican Republic, and extreme southern Florida (Leng 1920; Hatch 1930; Woodruff 1976; Smith 1980; Casari 1996a; Peck and Thomas 1998; Casari 2003; Peck 2005).

Specimens Examined. Florida (Monroe). May–June. (Figure 384)

Discussion. This is a Caribbean species known in the United States only from extreme southern Florida, where it is believed to be established (Smith 1980). The larva is undescribed and label data examined by Casari (1996a) show this species is attracted to light at night.

Chalcolepidius Eschscholtz, 1829

Chalcolepidius Eschscholtz, 1829: 52

Diagnosis. Large beetles. Body covered with colorful, often metallic scale-like vestiture. Supra-antennal carinae incomplete, frons depressed. Antenna 11-segmented; antennomere II small; III usually triangular, shorter than IV; flagellar antennomeres serrate to flabellate. Pronotum longer than wide; lacking luminous spots; posterior margin notched medially. Pronotosternal sutures closed. Hypomeron lacking a groove for reception of antenna and front tarsus. Meso-metasternal suture behind mesosternal fossa obsolete or absent. Tarsomeres lacking membranous lobes; claws simple, with basal setae. Aedeagus with the apex of the median lobe usually serrate laterally; paramere with or without defined apical blade.

Range and Numbers. There are nine species recorded from the United States, eastern and southwestern in distribution (Casari 2002b). One species occurs in the Southeast.

Discussion. *Chalcolepidius* species are large, attractive beetles. The genus was revised by Casari (2002b). Not much is known about the biology of the species. Adults can be frequently collected on flowers and sap flows. Known larvae are predaceous in rotting logs, usually hardwoods.

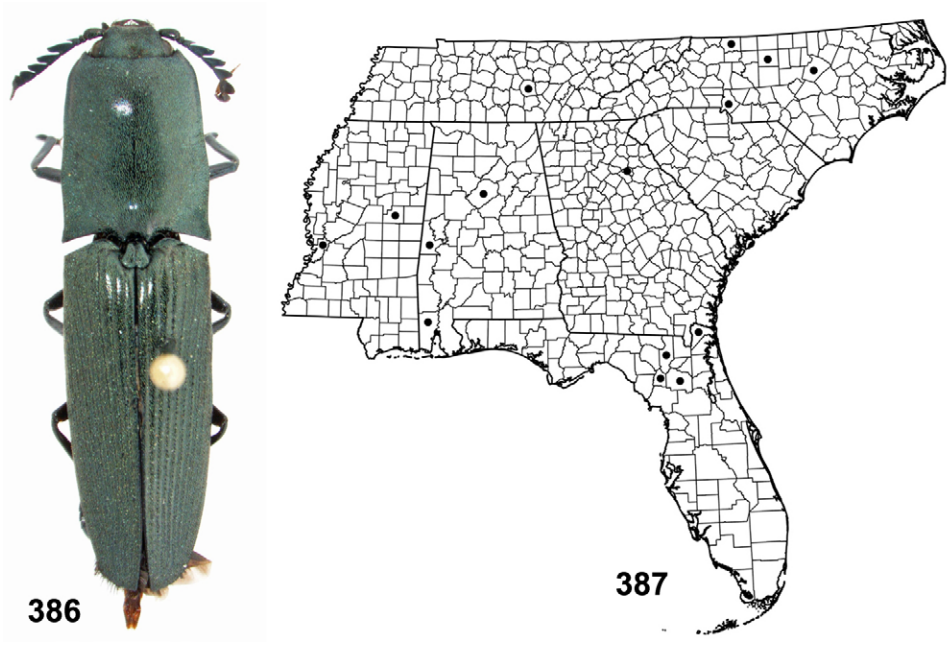
Chalcolepidius viridipilis (Say, 1825)

Figures 386–387

Elater viridipilis Say, 1825: 257
Chalcolepidius prasianus Erichson, 1841: 85
Chalcolepidius debilis Casey, 1907: 34

Diagnosis. Size large, 18.0–26.0 mm in length, narrow and subparallel. Color dark red-brown to dark brown, clothed with metallic olive to blue-green scale-like vestiture. Antenna 11-segmented, extending beyond apex of pronotal hind angle; antennomere II small; III triangular with spiniform apex; IV and beyond flabellate. Pronotum longer than wide, subparallel; posterior margin prominent and notched medially; punctures very dense, nearly contiguous even on disc; hind angles slightly divergent, ecarinate. Meso-metasternal suture behind mesosternal fossa obsolete or absent. Elytral striae coarsely punctate; interspaces convex and micropunctate. Tarsomeres lacking membranous lobes; claws simple, with basal setae. Aedeagus with median lobe widened subapically, gradually narrowing to rounded apex, lateral margins serrate; paramere medially deeply cleft, subapically broadly rounded to slender, rounded apex. Female similar to male externally but antennae pectinate, with antennomere III triangular and without a spiniform apex.

Distribution. Northeastern United States, south and west to Texas (Casari 2002b). In the Southeast, previously recorded from Alabama, Florida, Georgia, North Carolina, and South Carolina (Leng 1920; Brimley 1938;



Figures 386–387. *Chalcolepidius viridipilis*. **386)** Habitus. **387)** Distributional data. Photo courtesy Kyle Schnepp (Florida State Collection of Arthropods, FDACS-DPI, Gainesville, FL, USA).

Löding 1945; Fattig 1951; Kirk 1969; Downie and Arnett 1996; Peck and Thomas 1998; Casari 2002b). The type locality of *C. debilis* is North Carolina (not further restricted). The following records from Mississippi represent a **New State Record**.

Specimens Examined. Alabama (Jefferson, Mobile, Sumter); **Florida** (Alachua, Columbia, Gilchrist, Nassau); **Georgia** (Clarke); **Mississippi** (Warren, Winston); **North Carolina** (Guilford, Mecklenburg, Surry, Wake); **Tennessee** (Warren). June-September. (Figure 387)

Discussion. In the Southeast, this beetle is unlikely to be confused with any other species. Casari (2002b) did not comment on the biology of this species. Specimens examined from the study area have been collected in Lindgren funnel traps and on flowers of viburnum.

Pherhimius Fleutiaux, 1942

Pherhimius Fleutiaux, 1942: 112

Diagnosis. Size moderate to large. Pronotum red-brown to brown; elytron yellow with irregular dark brown maculae forming a marbled pattern. Supra-antennae carinae complete, medially weak and depressed. Antenna 11-segmented, short, barely reaching middle of pronotum; antennomere II small; III subequal to II with spinose extension; flagellar antennomeres strongly pectinate in both sexes. Pronotum wider than long with four rounded impressions; lacking luminous spots. Pronotosternal sutures closed. Hypomeron lacking a groove for reception of antenna or front tarsus. Meso- and metasternum not fused, joined by a definite suture. Tibial spurs absent. Tarsomeres lacking membranous lobes; claws simple, with basal setae. Aedeagus with paramere possessing a defined apical blade.

Range and Numbers. There is one species in North America, distributed in the East and South (Casari 1996b).

Discussion. The genus was revised by Casari (1996b) and contains two Neotropical species, one of which occurs in the United States. They are distinctive beetles and in the United States are not readily confused with any other genus.

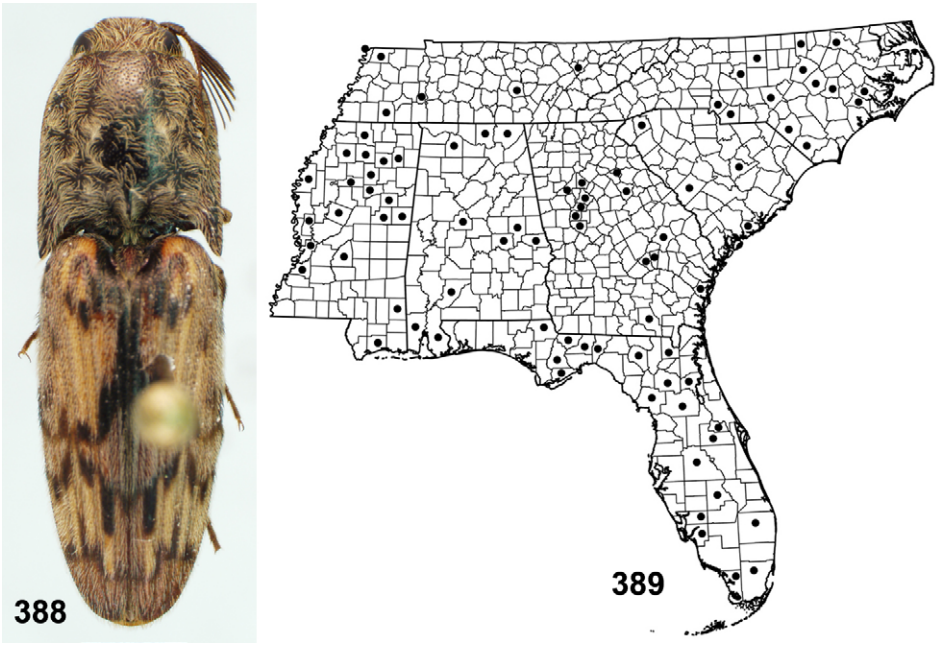
Pherhimius fascicularis (Fabricius, 1787)

Figures 388–389

Elater fascicularis Fabricius, 1787: 171
Hemirhipis venosus Laporte de Castelnau, 1838: 13

Diagnosis. Size moderate to large, 14.0–25.0 mm in length. Pronotum red-brown to brown; elytron yellow with irregular dark brown maculae forming a marbled pattern; vestiture yellow, whorled on pronotum, short and decumbent on elytron. Antenna 11-segmented, short, barely reaching middle of pronotum; antennomere II small; III subequal to II with spinose extension in both sexes; flagellar antennomeres strongly pectinate in both sexes. Pronotum wider than long with four rounded impressions; punctures shallow, sub-umbilicate, separated by approximately their own diameters. Elytral striae coarsely punctate; interspaces slightly convex and micropunctate; apex rounded. Aedeagus with median lobe widened subapically, abruptly narrowing to rounded apex; paramere with defined apical blade. Female similar to male externally.

Distribution. Northeastern United States, from Pennsylvania south to Florida and west to Texas, south to Argentina (Casari 1996b). In the Southeast, previously recorded from Alabama, Florida, Georgia, North Carolina, South Carolina, and Tennessee (LeConte 1853; Champion 1896; Leng 1910, 1920; Brimley 1938; Löding 1945; Fattig 1951; Frost 1969; Kirk 1969, 1970; Downie and Arnett 1996; Casari 1996b; Peck and Thomas 1998; Campbell et al. 2008b; Vlach et al. 2010). The following records from Mississippi represent a **New State Record**.



Figures 388–389. *Pherhimius fascicularis*. **388)** Habitus. **389)** Distributional data.

Specimens Examined. Alabama (Baldwin, Bibb, Elmore, Jackson, Lawrence, Lee, Madison, Mobile, Monroe, Tallapoosa); **Florida** (Alachua, Baker, Charlotte, Franklin, Gadsden, Highlands, Jackson, Jefferson, Lee, Leon, Levy, Liberty, Marion, Miami-Dade, Monroe, Orange, Palm Beach, Polk, Putnam, Seminole, Suwannee); **Georgia** (Clinch, Clarke, DeKalb, Emanuel, Fulton, Greene, Henry, McIntosh, Montgomery, Pike, Spalding, Upson, Wheeler); **Mississippi** (Bolivar, Calhoun, Claiborne, Greene, Grenada, Harrison, Holmes, Lafayette, Lee, Marshall, Noxubee, Oktibbeha, Panola, Pontotoc, Rankin, Sharkey, Warren, Webster, Winston); **North Carolina** (Columbus, Craven, Davidson, Granville, Guilford, Halifax, Johnston, Jones, Mecklenburg, Moore, Robeson, Union, Wake, Wayne); **South Carolina** (Aiken, Charleston, Pickens, Sumter, York); **Tennessee** (Anderson, Decatur, Hardeman, Lake, Obion, Warren). May–September. (Figure 389)

Discussion. This is a fairly easy species to recognize in the study area. Casari (1996b) did not comment on its biology. Kirk (1969, 1970) recorded it at light in South Carolina. Specimens examined in the study area were collected at ultraviolet and mercury vapor light and in window and panel traps.

Pityobiinae Hyslop, 1917

The classification here follows Stibick (1979) and treats the Pityobiinae as a distinct subfamily; Johnson (2002) treated the group as a tribe of Prosterninae. Kundrata et al. (2016) redefined the subfamily to include the North American genus *Pityobius* and tentatively the South American genus *Tibionema* Solier and transferred the Australian and New Zealand pityobiine genera to the new subfamily Parablacinae.

Adults are moderate to large, elongate. Supra-antennal carinae incomplete or complete and well-separated from labrum. Antenna 12-segmented, bipectinate in males, serrate in females. Prosternum normally arcuate anteriorly; prosternal process elongate. Pronotosternal sutures closed. Meso- and metasternum not fused, joined by a definite suture. Mesocoxa open to both mesepimeron and mesepisternum. Tarsomeres with or with membranous lobes; claw simple, without basal setae.

Pityobius LeConte, 1853

Pityobius LeConte, 1853: 428

Diagnosis. Size moderate to large, elongate. Color dark brown to black. Supra-antennal carinae complete and well-separated from labrum. Antenna 12-segmented, bipectinate in males, serrate in females. Pronotosternal sutures closed anteriorly. Prosternum arcuate anteriorly; prosternal process elongate. Meso- and metasternum not fused, joined by a definite suture. Mesocoxa open to both mesepimeron and mesepisternum. Tarsomeres with membranous lobes; claw simple, without basal setae. Marked sexual dimorphism.

Range and Numbers. There are two species in North America, *P. murrayi* LeConte in California and Oregon and *P. anguinus* in the East (Johnson 2002).

Discussion. These beetles are usually readily recognized by their size, shape, and 12-segmented bipectinate antennae in the males. Adults are usually collected at light or in association with pine.

Pityobius anguinus LeConte, 1853

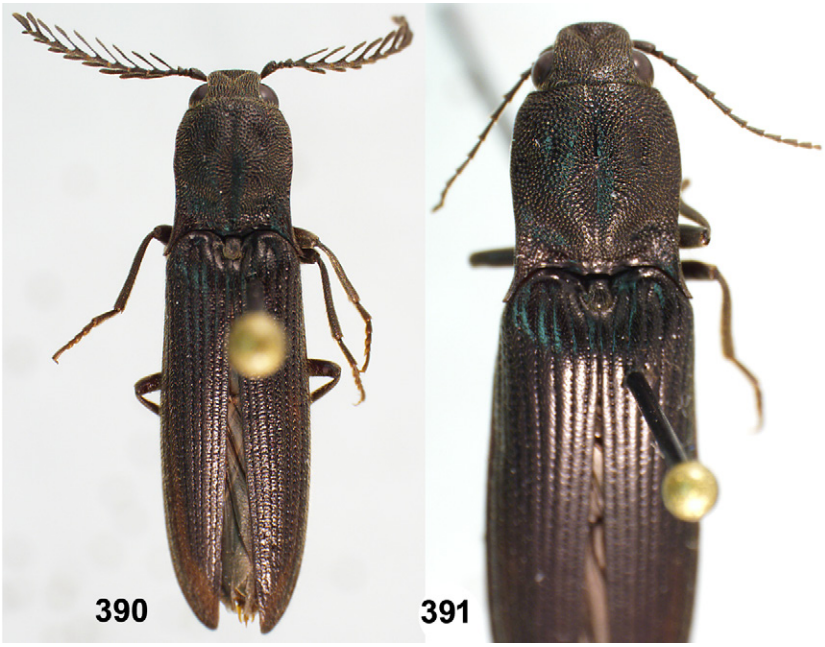
Figures 390–392

Pityobius anguinus LeConte, 1853: 428

Diagnosis. Size moderate to large, 15.0–30.0 mm in length. Color dark brown, nearly black; vestiture yellow, short. Front with prominent triangular depression. Antenna 12-segmented; antennomere II small; III slightly longer than II, triangular; IV–XI bipectinate; XII elongate. Pronotum longer than wide, subparallel, uneven and canaliculate medially; punctures coarse, umbilicate, very dense and nearly contiguous; hind angles slender, pointed, divergent, unicarinate. Elytral striae deeply, coarsely punctate; intervals rugose and punctate. Tarsomeres I–IV with membranous lobes. Aedeagus with median lobe gradually tapering to rounded apex; paramere with large, defined apical blade. Marked sexual dimorphism; female (Figure 391) larger and with shorter, serrate antennae.

Distribution. Eastern North America, west to Indiana (Downie and Arnett 1996). In the Southeast, previously recorded from Alabama, Florida, Georgia, South Carolina, and Tennessee (Leng 1920; Löding 1945; Fattig 1951; Kirk 1970; Downie and Arnett 1996; Peck and Thomas 1998; Ferro et al. 2012c). The following records from Mississippi and North Carolina represent **New State Records**.

Specimens Examined. Alabama (Bibb, Blount, Jackson, Jefferson, Lee, Madison, Mobile, Monroe, Tallapoosa, Walker); **Florida** (Alachua, Baker, Citrus, Duval, Franklin, Hernando, Highlands, Jackson, Liberty, Marion, Orange, Seminole, Sumter); **Georgia** (Clarke, Effingham, Emmanuel Fannin, Greene, Habersham, Henry, Oglethorpe, Tift); **Mississippi** (Lafayette, Marshall, Smith, Union); **North Carolina** (Carteret, Columbus,



Figures 390–391. *Pityobius anguinus*. **390)** Male habitus. **391)** Female habitus.

Halifax, Johnston, New Hanover); **South Carolina** (Aiken, Barnwell, Charleston, Greenville, Pickens, Spartanburg); **Tennessee** (Blount, Warren). April–July, September–October. (Figure 392)

Discussion. This is a very distinctive species in the study area. Larvae live in decaying wood, where they are predators of beetle larvae and probably other insects (Majka and Johnson 2008). They are not commonly collected; specimens in the study area have been collected at ultraviolet and mercury vapor light, in Lindgren funnel traps, and under pine bark.

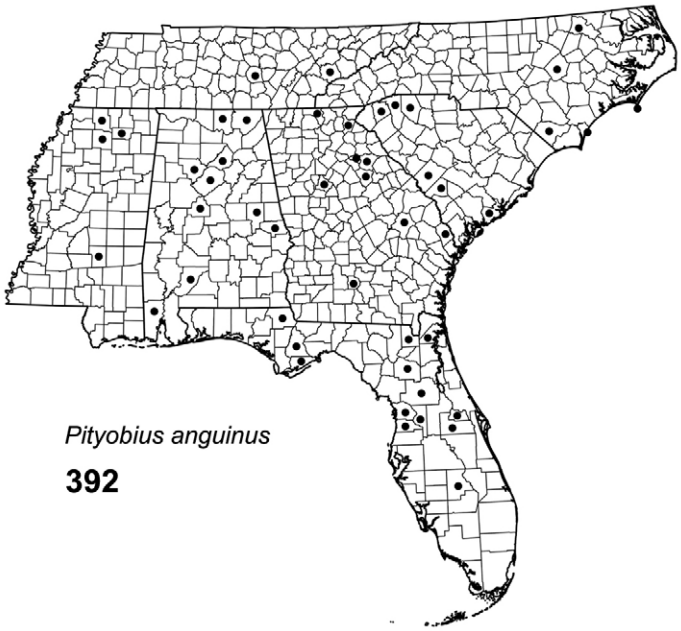


Figure 392. Distributional data for *Pityobius anguinus*.

Oxynopterinae Candèze, 1857

The classification here follows Bouchard et al. (2011) and treats the Oxynopterinae as a distinct subfamily; Johnson (2002) treated the group as a tribe of Dendrometrinae (as Prosterninae). Stibick (1979) placed *Melanactes* in the tribe Melanactini of the subfamily Agrypninae (as Pyrophorinae). Previously, three genera had been assigned to this subfamily in North America: *Melanactes*, *Oistus* Candèze, and *Perissarthron* Hyslop (Johnson 2002). *Oistus* is found in California and Oregon. *Perissathron* is found in Oklahoma and Texas. *Melanactes* occurs in most of the eastern states and in Oregon, California, and Baja California. Herein the genus *Dixicollis* is described for *Corymbites crassus* LeConte and transferred from Prosternini. Adults are highly variable at the subfamily level. As such, the morphological descriptions are kept at the generic and specific levels.

Dixicollis Johnson, new genus

Type Species: *Corymbites divaricatus* LeConte 1853: 446, here designated

Corymbites (part), LeConte, 1853: 435; Candèze, 1863: 77, 1891: 164; Horn, 1890: 53, 69; Blatchley, 1910: 763
Ludius (part), Schwarz, 1906: 220; Leng, 1920: 169; Van Dyke, 1932: 389
Selatosomus (part), Schenkling 1927: 394
Ctenicera (part), Gurjeva 1989: 23

Description. Body fusiform (male) to subparallel (female), moderately convex, more strongly convex on pronotum of female. Integument moderately coarsely, umbilicately punctured; pubescence pallid, decumbent. Head with frons flat to shallowly concave; supra-antennal ridge transverse, not conjoint on frons. Antenna moderately to strongly serrate; antennomere 3 coarsely punctate and subcylindrical. Thorax with pronotum wider than long to quadrate; disc shallowly convex, occasionally with shallow linear depression on posterior declivity; hind angle with strong carina; basal incisures short. Prosternum with anterior lobe elongate, planar; intercoxal process planar to shallowly convex between coxae; pronotosternal sutures anteriorly closed. Hypomeron with medial margin simple; posterior margin deeply emarginate. Scutellum subparallel, broadly rounded posteriorly. Mesepimeron narrowly adjacent to coxal cavity. Metasternum with anterior intercoxal process broad, truncate to broadly rounded. Elytral striae shallowly to moderately sulcate, intervals flat to shallowly convex. Tarsomeres lacking membranous lobes; claws simple, without basal setae. Aedeagus with median lobe deflexed apically; paramere hooked apically and setose on membranous apex. Gonocoxites lightly sclerotized; baculi relatively short, less than 0.5× length of ventrites 1–5; vagina elongate, narrow, without evident colleterial glands, anterior constriction narrow; bursa copulatrix saccate, arcuate; spermatheca with duct narrow, apex bulbous, moderately sclerotized; accessory spermatheca similar to spermatheca, positioned distally along thickened basal portion of accessory gland duct.

Name derivation. The generic name is a combination of *Dix*, an arbitrary combination of letters, and *collis*, in reference to the pronotum of the included species, neuter in gender.

Range and Numbers. Monotypic, endemic to the southeastern quadrant of the United States.

Discussion. *Dixicollis* was provisionally suggested by Johnson (1992) who found that the species assigned were only distantly related to prosternines and best assignable to the Oxynopterini, based on both adult and larval characters.

Dixicollis divaricatus (LeConte, 1853), new combination

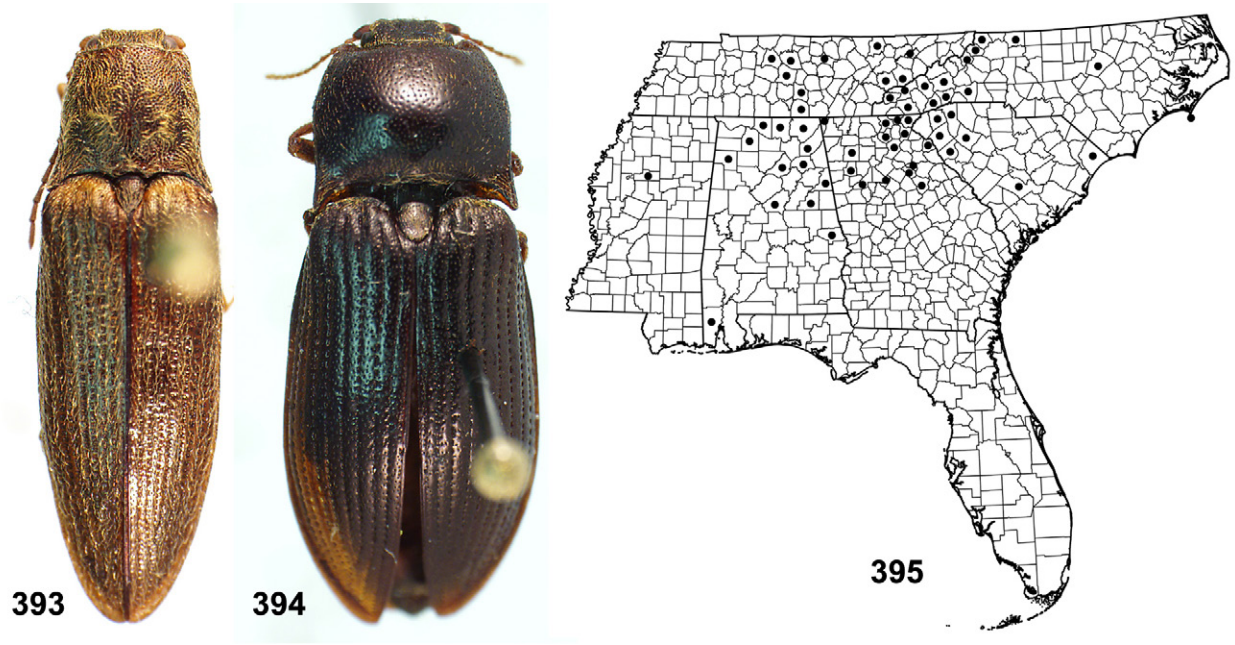
Figures 393–395

Corymbites divaricatus LeConte, 1853: 446
Corymbites crassus LeConte, 1853: 440
Diacanthus afflictitius Candèze 1863: 112 (not available, ICZN 1999, Art. 11.6)
Corymbites floridanus Candèze, 1889: 117, **new synonym** (ex Johnson 1992)

Diagnosis. Size small to moderate, 10.0–12.0 mm in length, form broad. Color dark red-brown, slightly bronzed; vestiture yellow, dense, wiry. Antenna 11-segmented, serrate, extending three antennomeres beyond apex of pronotal hind angle; antennomere II small, III similar to following. Pronotum slightly longer than wide, punctures coarse and very dense, nearly contiguous; hind angles strongly diverging, with single, strong carina running parallel with lateral margin. Pronotosternal sutures closed anteriorly. Elytron subparallel in basal two-thirds, gently tapering to apex; striae coarsely punctured, intervals flat, punctate. Tarsus lacking membranous lobes; claw simple, without basal setae. Aedeagus with median lobe deflexed apically; paramere hooked apically and setose on membranous apex. Marked sexual dimorphism (Figure 394); female larger and broader, with a broad, arcuate pronotum that is less densely punctured, and antennae that do not reach the apex of the pronotal hind angles.

Distribution. Mid-Atlantic states (Van Dyke 1932). In the Southeast, previously recorded from Alabama, Georgia, North Carolina, and South Carolina (LeConte 1853; Candèze 1865, 1889; Leng 1910, 1920; Van Dyke 1932; Brimley 1938; Löding 1945; Fattig 1951; Kirk 1969, 1970). The type locality for *C. divaricatus* is 'Georgia and Carolina' (not further restricted). The following records from Mississippi and Tennessee represent **New State Records**.

Specimens Examined. Alabama (Blount, Clay, Cleburne, DeKalb, Etowah, Jackson, Lawrence, Lee, Limestone, Madison, Marion, Mobile, Shelby); **Georgia** (Bartow, Clarke, Dade, Fulton, Greene, Habersham, Hall, Hart, Lumpkin, Oconee, Paulding, Rabun, Rockdale, Towns, Union); **Mississippi** (Grenada); **North Carolina** (Ashe, Avery, Buncombe, Carteret, Graham, Haywood, Henderson, Macon, Rutherford, Surry, Swain,



Figures 393–394. *Dixicollis divaricatus*. **393)** Male habitus. **394)** Female habitus. **395)** Distributional data.

Transylvania, Wake, Watauga); **South Carolina** (Abbeville, Anderson, Greenville, Horry, Laurens, Orangeburg, Pickens); **Tennessee** (Blount, Campbell, Coffee, Davidson, Franklin, Loudon, Putnam, Rutherford, Sevier, Wilson). May–September. (Figure 395)

Discussion. LeConte (1853) described *C. divaricatus* from 'Georgia and Carolina'. *Corymbites crassus* is the female of *C. divaricatus*. Candèze (1889) described *C. floridanus* from "Floride", then it was listed as a variety of *D. divaricatus* by Henshaw (1895) and a synonym by Horn (1890). Candèze (1891) listed *C. crassus* as a synonym of *C. divaricatus*, but *C. floridanus* as a valid species. Specimens examined of *D. divaricatus* express morphological variations that overlap with the essential characters of *C. floridanus*.

The new combination and synonymy of *Corymbites floridanus* Candèze as proposed by Johnson (1992) are here validated and should be credited to Johnson in this work.

In the study area, *Dixicollis divaricatus* is similar to *Hadromorphus inflatus*, which has its pronotosternal sutures open anteriorly. Specimens in the study area have been collected at ultraviolet light, by beating and sweeping vegetation, in flight intercept, Malaise, and pitfall traps, and netted while in flight.

Melanactes LeConte, 1853

Melanactes LeConte, 1853: 493

Diagnosis. Size large. Color black. Supra-antennal carinae incomplete, frons depressed. Antenna 11-segmented; flagellar antennomeres serrate. Lateral margin of pronotum prominent and clearly visible from above. Prosternum arcuate anteriorly, large and protruding. Pronotosternal sutures closed. Scutellum elongate. Sides of mesosternal fossa raised and protuberant. Mesocoxa open to mesepimeron but closed to mesepisternum, Meso- and metasternum distinct, joined by a definite suture. Elytron elongate, weakly to strongly seriately striate. Tarsus lacking membranous lobes, but with dense golden brush of setae; claw simple, without basal setae. Aedeagus with paramere with weak apical blade. Females similar to males externally but generally larger and more robust.

Range and Numbers. The genus is endemic to North America and contains six species, distributed throughout the East and along the West Coast (Mathieu 1961). Four species occur in the Southeast.

Discussion. The genus was revised by Mathieu (1961). These beetles are usually easily recognized by their size, shape, and solid black, and often shining, color. In the Southeast the only other species that may be mistaken for *Melanactes* is *Neopristilophus aethiops*, which has more strongly serrate antennae. Adults can at times be difficult to identify to the species level, and a variety of features should be examined and compared for a confident determination. Important external characters for identification include the sculpturing and setation of the pronotum and elytron, length-to-width ratio of pronotum, and size. Aedeagi are fairly uniform throughout the genus, although female genitalia show some differences between the species. Most specimens examined from the study area were collected at light.

Key to the species of *Melanactes* in the Southeast
(adapted from Mathieu 1961)

1. Pronotum finely and uniformly punctate, each puncture bearing an appressed seta which is at least as long as the distance between the punctures . . . . . ***M. reichei* (Germar)**
— Pronotum more irregularly punctate, punctures lacking setae or with very minute erect ones **2**

2(1). Elytral striae well-marked at the base but becoming obsolete along length of elytron; interspaces flat and feebly rugose, with elytron appearing shiny and smooth . . . . . ***M. piceus* (De Geer)**
— Elytral striae canaliculate and well-marked for their entire length; interspaces weakly to strongly convex **3**

3(2). Elytral striae deeply impressed and coarsely punctate; interspaces strongly convex . . . . . ***M. morio* (Fabricius)**

— Elytral striae shallower, punctate; interspaces weakly to moderately convex . . . . . ***M. puncticollis* (LeConte)**

Melanactes morio (Fabricius, 1798)

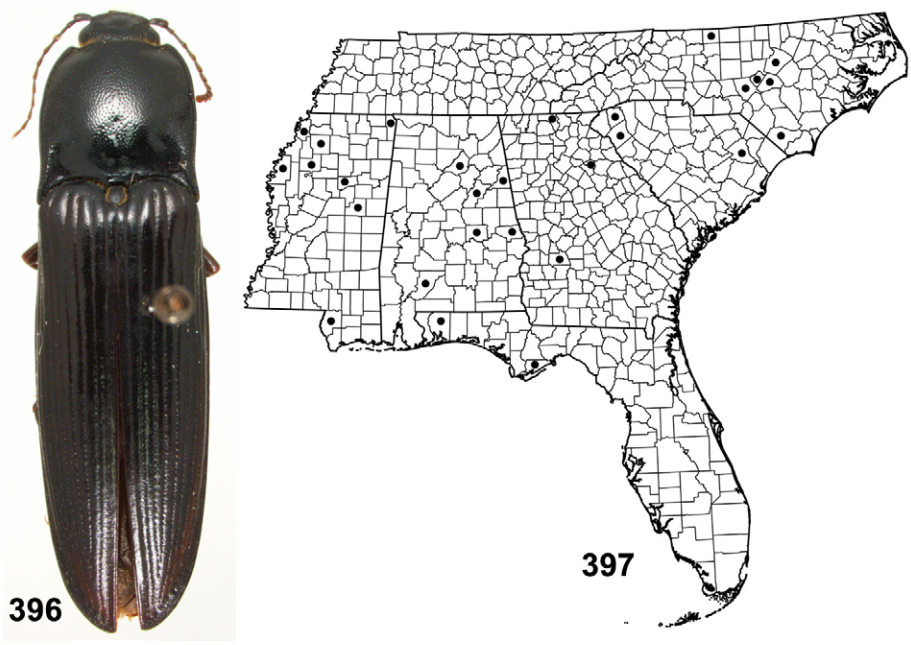
Figures 396–397

Elater morio Fabricius, 1798: 138
Elater lacunosus Fabricius, 1801: 224

Diagnosis. Size large, 19.5–30.0 mm in length. Color black. Antenna 11-segmented; antennomere II small; III elongate but not serrate; IV and beyond serrate. Pronotum slightly convex; sulcus in basal third; punctures shallow to deep, sometimes confluent; minute, white, erect setae present in most punctures. Elytral striae deep, coarsely punctured; interspaces strongly convex, punctate and rugose. aedeagus with median lobe evenly tapering to subacute apex; paramere with weak apical blade, apically pointed, lateral margin of base of blade with acute tooth, small cluster of apical setae. Female similar to male externally but larger and with pronotal punctures often more defined.

Distribution. Eastern United States, west to Kansas and Oklahoma (Mathieu 1961). Previously recorded from all seven states in the current study area (Leng 1910; Brimley 1938; Löding 1945; Fattig 1951; Mathieu 1961; Kirk 1969, 1970; Peck and Thomas 1998).

Specimens Examined. Alabama (Blount, Cleburne, Elmore, Lee, Monroe, Talladega); **Florida** (Franklin, Santa Rosa); **Georgia** (Clarke, Fannin, Sumter counties; also Atlanta); **Mississippi** (Bolivar, Panola, Pearl River, Tallahatchie, Tishomingo, Tunica, Webster, Winston); **North Carolina** (Columbus, Harnett, Lee, Moore, Stokes, Wake); **South Carolina** (Anderson, Florence, Pickens). March–June, December. (Figure 397)



Figures 396–397. *Melanactes morio*. **396)** Habitus. **397)** Distributional data. Photo courtesy Kyle Schnepp (Florida State Collection of Arthropods, FDACS-DPI, Gainesville, FL, USA).

Discussion. This species is usually easily recognized among *Melanactes* by the dense, irregular pronotal punctures and deeply striate elytra. Adults in the study area have been collected at ultraviolet and mercury vapor light.

Melanactes piceus (De Geer, 1775)

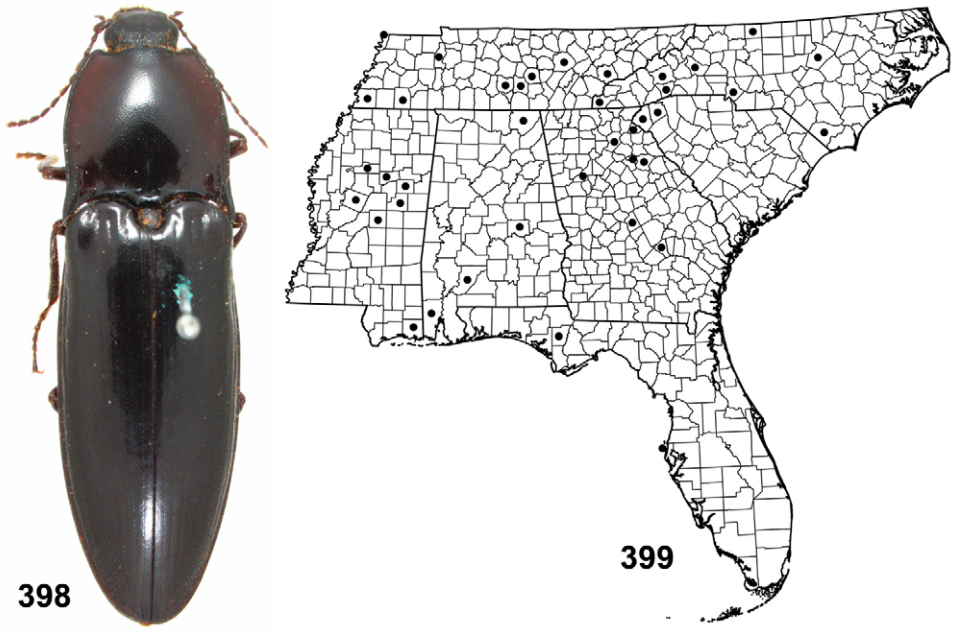
Figures 398–399

Elater piceus De Geer, 1775: 162
Elater laevigatus Fabricius, 1798: 138
Pristilophus femoralis Melsheimer, 1844: 216
Melanactes procerus LeConte, 1853: 493

Diagnosis. Size large, 21.0–33.0 mm in length. Color black, polished. Antenna 11-segmented; antennomere II small; III elongate but not serrate; IV and beyond serrate. Pronotum broad; punctures sparse and shallow, minute, white, erect seta in some. Elytral striae well-marked basally but becoming obsolete along the length of the elytron, not impressed and indicated by rows of shallow, elongate punctures; interspaces flat, minutely and indistinctly punctate. Aedeagus as in *M. morio*. Female similar to male externally but larger and broader.

Distribution. Northeastern North America, south and west to Arkansas and Texas (Mathieu 1961). In the Southeast, previously recorded from Alabama, Georgia, North Carolina, South Carolina, and Tennessee (Leng 1910, 1920; Brimley 1938; Löding 1945; Fattig 1951; Mathieu 1961; Kirk 1970; Buck et al. 2005). The following records from Florida and Mississippi represent **New State Records**.

Specimens Examined. Alabama (Elmore, Jackson, Mobile, Monroe); **Florida** (Calhoun, Pinellas); **Georgia** (Clarke, Fulton, Hall, Oglethorpe, Stephens, Twiggs, Wheeler); **Mississippi** (Grenada, Holmes, Jackson, Leake, Oktibbeha, Webster, Winston); **North Carolina** (Buncombe, Burke, Cherokee, Columbus, Henderson, Mecklenburg, Stokes, Wake); **South Carolina** (Oconee, Pickens); **Tennessee** (Bedford, Benton, Blount, Coffee, Cumberland, Hardeman, Lake, Shelby, Warren). April–August. (Figure 399)



Figures 398–399. *Melanactes piceus*. **398)** Habitus. **399)** Distributional data. Photo courtesy Kyle Schnepp (Florida State Collection of Arthropods, FDACS-DPI, Gainesville, FL, USA).

Discussion. This is the largest and most widely distributed member of the genus. It is usually easily recognized by its smooth and polished appearance. Adults in the study area have been collected at ultraviolet and mercury vapor light and in Malaise traps.

Melanactes puncticollis (LeConte, 1852)

Figures 400, 402

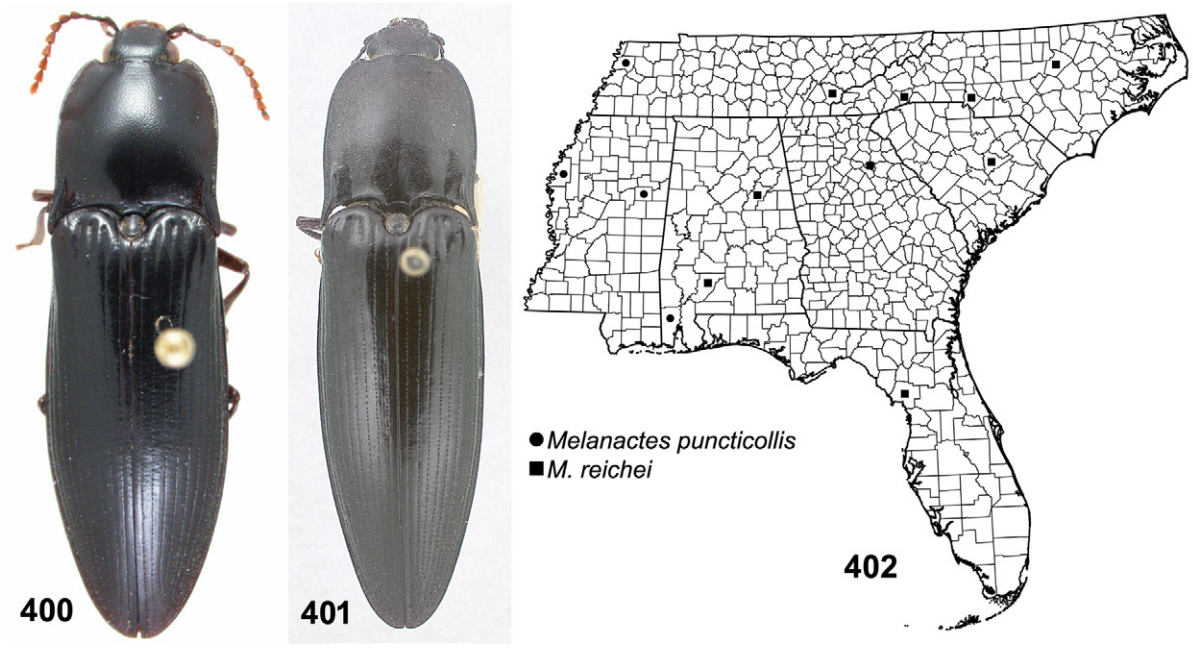
Pristilophus puncticollis LeConte, 1852: 68

Diagnosis. Size moderate to large, 17.5–24.0 mm in length. Color black, somewhat shiny. Antenna 11-segmented; antennomere II small; III elongate but not serrate; IV and beyond serrate. Disc of pronotum flat; shallow median sulcus limited to basal third; punctures dense, becoming denser laterally, some with minute, erect white seta. Elytral striae well-marked at base, shallowly canaliculate along remainder of elytron, punctures separated by their own diameter; interspaces I–III flat, remaining becoming convex, slightly rugose and punctate. Aedeagus as in *M. morio*. Female similar to male externally but larger and broader.

Distribution. East-central United States, from Virginia to Arkansas, north to the Great Lakes (Mathieu 1961). In the Southeast, previously recorded from Alabama, Georgia, Mississippi, North Carolina, and Tennessee (Hepting 1935; Brimley 1938; Löding 1945; Fattig 1951; Mathieu 1961). Brimley's (1938) records from North Carolina are based on a misidentification (see below).

Specimens Examined. Alabama (Mobile); **Mississippi** (Bolivar, Oktibbeha); **Tennessee** (Dyer). May–August. (Figure 402)

Discussion. In the study area, this species is most similar to *M. piceus* but is generally smaller and has more pronounced elytral striae (although not as deep as seen with *M. morio*). It is allopatric with *M. consors* LeConte, the latter of which occurs in the central United States in Nebraska, Kansas, and Oklahoma (Mathieu 1961). I have



Figures 400–402. *Melanactes* spp. **400)** *M. puncticollis* (habitus). **401)** *M. reichei* (habitus). **402)** Distributional data for *M. puncticollis* and *M reichei*. Photos courtesy Kyle Schnepp (Florida State Collection of Arthropods, FDACS-DPI, Gainesville, FL, USA).

examined the specimens (NCSU) that were the basis for Brimley's (1938) records from Black Mountain, NC and determined them to be *Neopristilophus aethiops*. Given the known distribution of *M. puncticollis*, however, its presence in North Carolina seems likely.

Melanactes reichei (Germar, 1843)

Figures 401–402

Pristilophus reichei Germar, 1843: 85

Diagnosis. Size large, 20.5–28.0 mm in length. Color dark red-brown to black. Antenna 11-segmented; antennomere II small; III elongate but not serrate; IV and beyond serrate. Pronotum longer than wide, flat, narrowing anteriorly; median sulcus in basal third well-impressed; punctures dense and relatively evenly distributed, each puncture with an appressed white seta at least as long as the distance between punctures. Elytral striae and strial punctures distinct; interspaces convex, rugose. Aedeagus similar to *M. morio*, but more elongate and with a more rounded apex on the paramere. Female externally similar to male but larger.

Distribution. United States, east of the Mississippi River (Mathieu 1961). In the Southeast, previously recorded from Georgia, Mississippi, North Carolina, and South Carolina (LeConte 1853; Leng 1910, 1920; Brimley 1938; Fattig 1951; Mathieu 1961; Kirk 1969, 1970). The following records from Alabama, Florida, and Tennessee represent **New State Records**.

Specimens Examined. Alabama (Monroe, Talladega); **Florida** (Levy); **Georgia** (Clarke); **North Carolina** (Henderson, Mecklenburg, Wake); **South Carolina** (Sumter); **Tennessee** (Monroe). April–August. (Figure 402)

Discussion. This species is superficially similar to *M. puncticollis* in the study area. Microscopic examination of the pronotum will reveal the distinct punctation and setation that is diagnostic for this species. Specimens in the study area have been collected at ultraviolet light and in sugar bait traps.

Dendrometrinae Gistel, 1848

The subfamily Dendrometrinae, as delineated here, is analogous to the Prosterninae of Johnson (2002), with the exception of the elevation of Pityobiini and Oxynopterini to the subfamily level. The subfamily contains three tribes in North America, all of which occur in the Southeast: Dendrometrini (=Athoini), Prosternini, and Hypnoidini. The group is highly variable and difficult to characterize at the subfamily level. Tribal characters, especially those separating Dendrometrini and Prosternini, are not always well-defined in the adults. Diagnostic morphological features will be discussed in more detail at the tribal and lower levels. The subfamily as a whole has not been dealt with in North America. Stibick (1976, 1978) revised the Hypnoidini (as a subfamily). Tarnawski (1996, 2001) catalogued the Prosternini (as Ctenicerini) on a World basis, although he neglected to place several North American taxa. Several genera have been revised, and these will be discussed at the tribal and generic levels.

Dendrometrini Gistel, 1848

The tribe Dendrometrini here is the same as Athoini in Johnson (2002). There are 13 genera in North America, ten of which occur in the Southeast, although some genera currently placed in Prosternini will eventually be transferred to Dendrometrini (P. Johnson, pers. comm. 2019). The genera *Barrelater* Johnson (northwestern United States), *Pheletes* (Pacific Northwest), and *Diacanthous* Reitter (transcontinental in the North) do not occur in the Southeast. All genera have been revised or treated for North America at some point, some more recently than others. Adults are highly variable morphologically. The supra-antennal carinae complete or not, when complete often projecting anteriorly. Antenna 11-segmented, flagellar antennomeres filiform to serrate. Prosternum usually arcuate, sometimes short, rarely truncate. Hypomeron with or without elevated margin along pronotosternal sutures. Pronotosternal sutures closed or open anteriorly. Mesocoxa open to both mesepimeron and mesepisternum in most (mesepisternum does not connect in *Tetralimonius* and some *Limonius*). Meso- and metasternum not fused, joined by a definite suture. Tarsomeres with or without membranous lobes; claws simple, without basal setae.

Athous Eschscholtz, 1829

Athous Eschscholtz, 1829: 33
Pedetes Kirby, 1837: 145 (in part) (nec *Pedetes* Illiger, 1811: 81)

Diagnosis. Size small to moderate. Color variable, some bicolored or patterned. Supra-antennal carinae complete, well elevated above clypeus or depressed; front often with a prominent triangular depression. Antenna 11-segmented; flagellar antennomeres filiform to strongly serrate. Hypomeron with basal margin more or less straight, shallowly arcuate or sinuate; lacking elevated margin along prosternal sutures; hind angle not distinctly projecting from hypomeron. Pronotosternal sutures closed anteriorly. Metacoxal plate gradually widening inwards. Tarsomeres II and III, or II–IV, or I–III with membranous lobes (lobes appearing as hairy pads in *A. rufifrons*); claws simple, without basal setae. Aedeagus with paramere with or without defined apical blade or lateral subapical spine. Female similar to male externally, usually larger and stouter.

Range and Numbers. There are 39 species generally distributed in America north of Mexico, two of which are introduced from Europe (Becker 1979b; Douglas 2011b). Twelve species have been previously recorded from the Southeast with a thirteenth added here; records by Fattig (1951) and Kirk (1970) of *A. fossularis* from Georgia and South Carolina, respectively, seem doubtful and remain unconfirmed.

Discussion. Becker (1974) revised the eastern Nearctic species of *Athous* and discussed the diagnostic problems with this and related genera. He later (Becker 1979a, 1979b) revised the western Nearctic species and provided a key to the species north of Panama, including several generic transfers that helped stabilize the genus for

North America. *Athous* is most similar to *Hemicrepidius* and at times the characters separating adults (namely the degree of extension of the pronotal hind angle from the hypomeron) are vague and hard to clearly define. In the East, most species are northern, and few species get below the Piedmont into Southeastern and Southern Coastal Plains. Adults can be collected by a variety of methods, but most commonly at light. Not much is known about the biology of North American species. Known larvae are found in leaf litter and decaying logs. Some European species have been implicated as agricultural pests, but this does not appear to be the case for native Nearctic species (Becker 1974).

Key to the species of *Athous* in the Southeast
(adapted from Becker 1974)

1. Tarsomeres lacking defined membranous lobes, but rather with a hairy pad . . ***A. rufifrons* (Randall)**
— Membranous lobes on tarsomeres II and III or II–IV (may be small) **2**

2(1). Hypomeron with punctures simple; pronotum with punctures simple, hind angles ecarinate **3**
— Hypomeron with punctures shallow, umbilicate; pronotum with punctures usually umbilicate on disc, hind angles usually carinate (may be faint, absent in *A. productus*) **7**

3(2). Elytron distinctly bicolored, black with yellow-red humeral, submedial, and apical maculae (humeral macula elongate and nearly reaching mid-elytron) . . . . . ***A. ornatipennis* (LeConte)**
— Elytron unicolored (may be paler in the humeral or scutellar regions) **4**

4(3). Pronotum quadrate, side subparallel; membranous lobes on tarsomeres II and IV small, on III large; tarsomere IV long, extending well beyond lobe on III; currently known only from the southern portion of the Appalachian Mountains . . . . . ***A. appalachius* Van Dyke**
— Pronotum longer than wide, usually widest at center; membranous lobes on tarsomeres III and IV well-defined; tarsomere IV short, usually extending to end of lobe on tarsomere III; more generally distributed in the East **5**

5(4). Size larger, 10.5–17.0 mm; unicolored . . . . . ***A. brightwelli* (Kirby)**
— Size smaller, 5.5–11.0 mm; pronotum often bicolored **6**

6(5). Eyes larger; antenna longer, extending 3–5 (male) or 2–3 (female) antennomeres beyond apex of pronotal hind angle; size larger, 7.0–11.0 mm in length; color variable, pronotum rarely bicolored . . . . . ***A. acanthus* (Say)**
— Eyes smaller; antenna shorter, extending 2–3 (male) or 1–3 (female) antennomeres beyond apex of pronotal hind angle; size smaller, 5.5–9.0 mm in length; color variable, pronotum often red-orange with dark, oval central macula . . . . . ***A. neacanthus* Becker**

7(2). Antennomeres II and III subequal, together subequal to IV . . . . . ***A. posticus* (Melsheimer)**
— Antennomere II small; III long, as long or longer than IV **8**

8(7). Pronotal hind angle ecarinate; color black with lateral margins and sometimes anterior margin of pronotum pale; antennomeres beyond II strongly serrate . . . . . ***A. productus* (Randall)**
— Pronotal hind angle carinate; color variable, never as above; antennae various **9**

9(8). Body unicolored **10**
— Body distinctly bicolored; scutellum not as above **11**

10(9). Scutellum with anterior margin prominent, straight, acute and raised above adjacent part of elytra; color red-brown to brown . . . . . ***A. cucullatus* (Say)**
— Scutellum with anterior margin slightly elevated, rounded, and not overhanging rest of scutellum; color pale yellow-brown . . . . . ***A. orvus* Becker**

11(9). Dark brown to black with anterior portion of pronotum orange-red; male antenna strongly serrate . . . . . ***A. equestris*** **(LeConte)**

— Dark brown to black with pronotal hind angle and humeral areas of elytron orange-red; male antennomeres serrate, but posteroventral angle of flagellar antennomeres not prolonged . . . . . ***A. scapularis*** **(Say)**

Athous acanthus (Say, 1839)

Figures 403, 405

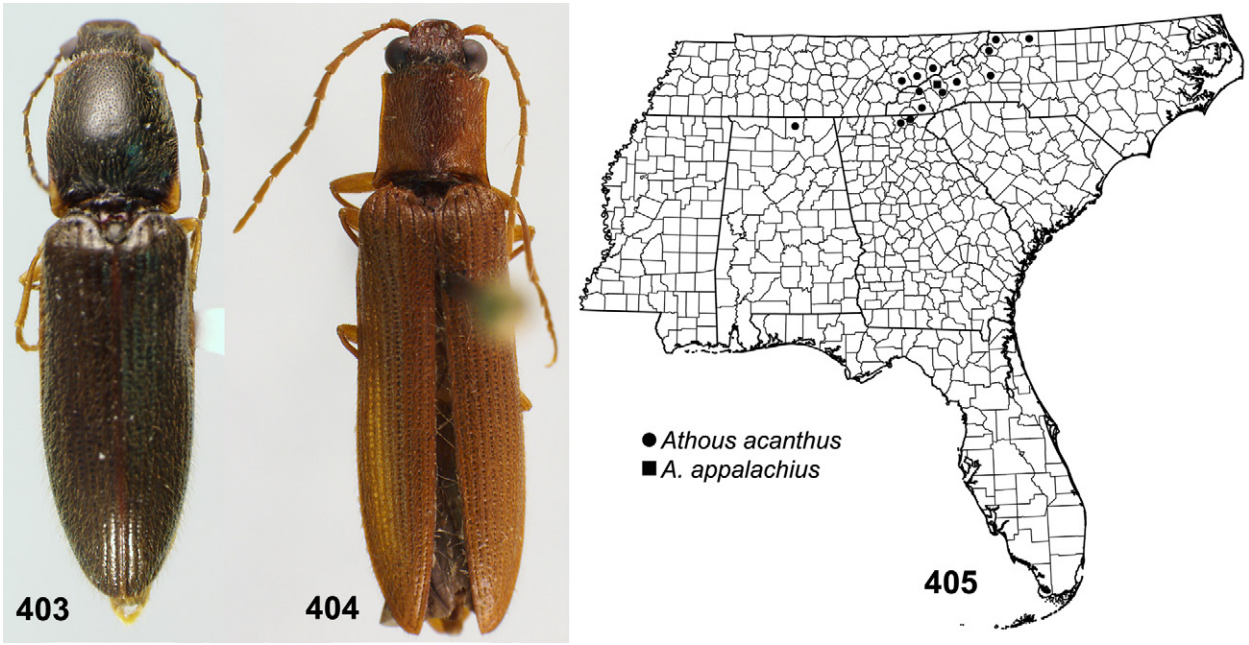
Athous mendicus Dejean, 1837: 102 (*nomen nudum*)
Elater acanthus Say, 1839: 178
Athous maculicollis LeConte, 1863: 85
Athous flavangularis Horn, 1871: 317
Athous carolinus Van Dyke, 1932: 374

Diagnosis. Size small, 7.0–11.0 mm in length. Color highly variable; elytron uniformly light to dark brown; pronotum often darker than elytron, sometimes pale with dark central macula or with pale lateral margins; antennae usually same color as pronotum; legs usually same color as elytra or paler; vestiture yellow, moderate in density. Supra-antennal carinae well-elevated above clypeus; front with a prominent triangular depression. Antenna 11-segmented, slender, extending 3–5 antennomeres beyond apex of pronotal hind angle; antennomere II small; III subequal between II and IV; IV and beyond elongate, weakly serrate. Pronotum longer than wide, usually widest at middle; punctures simple, separated by their diameters or slightly more, denser laterally; hind angles slightly divergent, ecarinate. Hypomeron with punctures similar to, but denser than, those on disc of pronotum; impunctate area on posterior area extending anteriorly along inner margin. Scutellum flattened to slightly convex; anterior margin slightly emarginate, not overhanging rest of scutellum. Tarsomeres II and III with large membranous lobes; tarsomere IV short, barely extending past apex of lobe on tarsomere III. Aedeagus with median lobe gradually tapering to rounded or subacute apex; paramere with large, broad subapical tooth; apex rounded to subacute. Female similar to male externally but larger, pronotum subquadrate, and antennae shorter, extending 2–3 antennomeres beyond the apex of pronotal hind angle.

Distribution. Northeastern North America, west to Iowa and south to Georgia (Becker 1974). In the Southeast, it appears to be limited to the southern Appalachian and Blue Ridge Mountains where it has previously been recorded from Alabama, Georgia, North Carolina, South Carolina, and Tennessee (Leng 1910; Van Dyke 1932; Brimley 1938; Löding 1945; Fattig 1951; Kirk 1969; Becker 1974; Downie and Arnett 1996; Ferro et al. 2012c). The type locality of *A. carolinus* is the Black Mountains in Buncombe County, NC.

Specimens Examined. Alabama (Madison); **Georgia** (Towns, Union); **North Carolina** (Ashe, Buncombe, Burke, Haywood, Macon, Surry, Swain, Watauga counties; also, along the Blue Ridge Parkway); **Tennessee** (Blount, Cocke, Sevier). June-September. (Figure 405)

Discussion. In the study area, this species is most similar to *A. neacanthus*. Both species can be common where their ranges overlap. Typically, *A. acanthus* is larger, has longer antennae, larger eyes, and less commonly has a bicolored pronotum. *Athous neacanthus* is smaller (5.5–9.0 mm), has shorter antennae (in male extending 2–3 antennomeres beyond apex of pronotal hind angle), smaller eyes, and more commonly has a bicolored pronotum (red-orange with a dark central macula). The aedeagi of the two species are similar, although in *acanthus* the median lobe and parameres are usually longer and more slender. *Athous neacanthus* also has a slightly more southern distribution, reaching central Georgia and Alabama. In the study area, adults have been collected at ultraviolet light, by beating vegetation, and in Lindgren funnel, Malaise, and in flight intercept traps.



Figures 403–405. *Athous* spp. **403)** *A. acanthus* (habitus), **404)** *A. appalachius* (habitus), **405)** Distributional data for *A. acanthus* and *A. appalachius*.

Athous appalachius Van Dyke, 1932

Figures 404–405

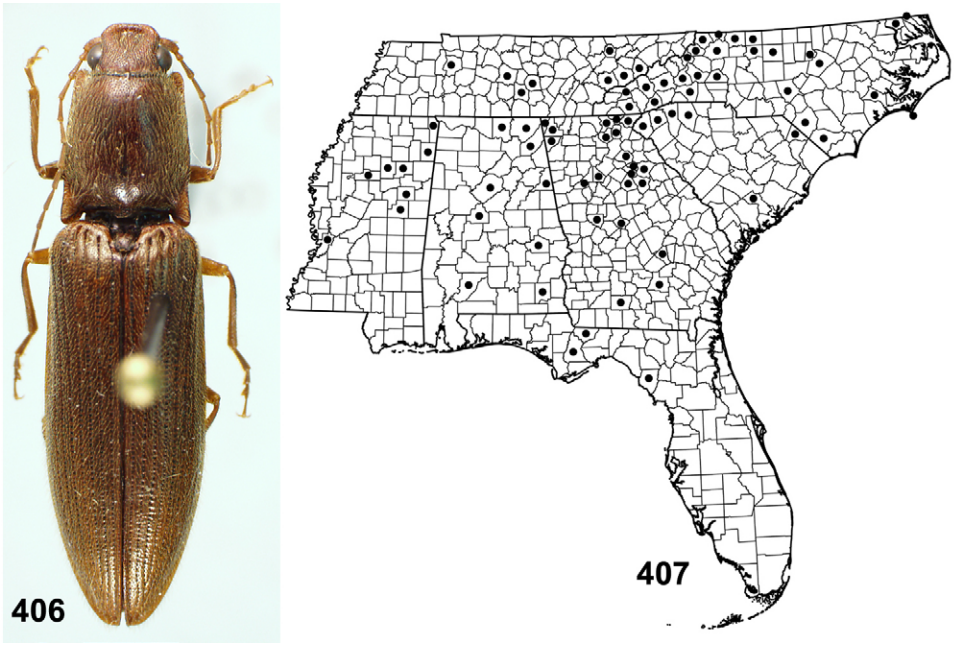
Athous appalachius Van Dyke, 1932: 372
Denticollis quadrosa Becker, 1952: 108

Diagnosis. Size moderate, 10.0–14.0 mm in length. Unicolored, light red-brown to brown, occasionally head and pronotum darker; legs and antennae light brown; vestiture yellowish, moderate in density. Supra-antennal carinae well-elevated above clypeus; front with a prominent triangular depression. Antenna 11-segmented, extending 3–4 antennomeres beyond apex of pronotal hind angle; antennomere III intermediate between II and IV; V–X with sides parallel and narrow than preceding. Pronotum subquadrate, sides subparallel before hind angle; punctures coarse and dense, separated by less than their own diameters; hind angles slightly divergent, ecarinate. Hypomeron with punctures similar to, but smaller than, those on disc of pronotum; impunctate area on posterior area extending anteriorly along inner margin. Scutellum flat, slightly longer than wide; anterior margin straight, not overhanging rest of scutellum. Tarsomeres II and IV with small lobe; tarsomere IV long, with larger lobe. Aedeagus with median lobe gradually tapering to narrowly rounded apex; paramere with small apical blade; defined emargination at base of blade, rounded laterally and evenly tapering to subacute apex. Female similar to males externally but slightly larger.

Distribution. Known only from higher elevations of the southern Appalachian Mountains of Georgia, North Carolina, and Tennessee (Van Dyke 1932; Brimley 1938; Fattig 1951; Becker 1952, 1974). The type locality of *A. appalachius* is Mt. Mitchell in Yancey County, NC. The type locality of *D. quadrosa* is Gatlinburg in Sevier County, TN.

Specimens Examined. North Carolina (Haywood). June. (Figure 405)

Discussion. Becker (1974) indicated this species is rare in collections. It is most similar to *A. brightwelli* and *A. acanthus* but is best recognized by its quadrate pronotum. Specimens in the study area have been collected at ultraviolet light.



Figures 406–407. *Athous brightwelli*. **406)** Habitus. **407)** Distributional data.

Athous brightwelli (Kirby, 1837)

Figures 406–407

Pedetes brightwelli Kirby, 1837: 146
Athous oblongicollis Melsheimer, 1844: 155
Athous arcticollis Melsheimer, 1844: 156

Diagnosis. Size moderate, 10.5–17.0 mm in length. Unicolored, light red-brown to dark brown; legs and antennae usually concolorous with elytra; vestiture yellow-gray, long and dense on pronotum. Supra-antennal carinae well-elevated above clypeus; front with a prominent triangular depression. Antenna 11-segmented, extending 2–3 antennomeres beyond apex of pronotal hind angle; antennomere II small; III slightly shorter than IV; IV and beyond slender, weakly serrate. Pronotum longer than wide, widest at middle, narrowing anteriorly; anterior angles frequently flared; often with shallow median groove in basal half; punctures simple, separated less than their own diameters and nearly contiguous laterally; hind angles slightly divergent, ecarinate. Hypomeron with punctures simple, nearly contiguous; impunctate area near base. Scutellum convex, anterior margin slightly emarginate, not overhanging rest of scutellum, densely setose. Tarsomere I with small lobe; II and III with larger, more obvious lobes; tarsomere IV short, not extending past lobe of tarsomere III. Aedeagus with median lobe gradually tapering to rounded or subacute apex; paramere with large, broad subapical tooth, apex rounded. Female similar to male externally except slightly larger.

Distribution. Eastern North America, south to Florida and west to Kansas and Nebraska (Becker 1974). In the Southeast, previously recorded from Alabama, Florida, Georgia, North Carolina, South Carolina, and Tennessee (Brimley 1938; Fattig 1951; Kirk 1970; Becker 1974; Downie and Arnett 1996; Peck and Thomas 1998; Buck et al. 2005; Ferro et al. 2012c). The following records from Mississippi represent a **New State Record**.

Specimens Examined. Alabama (Bibb, Cleburne, Dale, DeKalb, Jackson, Jefferson, Macon, Madison, Monroe); **Florida** (Dixie, Gadsden, Liberty); **Georgia** (Bibb, Chattooga, Clarke, Coffee, Colquitt, Dade, DeKalb, Fulton, Greene, Jackson, Lumpkin, Morgan, Oconee, Oglethorpe, Rabun, Towns, Union, Upson, Walker Wheeler, White); **Mississippi** (Calhoun, Chickasaw, Grenada, Itawamba, Oktibbeha, Tishomingo, Warren,

Winston); **North Carolina** (Alleghany, Ashe, Avery, Buncombe, Burke, Camden, Carteret, Catawba, Columbus, Durham, Forsyth, Gates, Guilford, Haywood, Jones, Macon, McDowell, Moore, Robeson, Rutherford, Stokes, Surry, Swain, Transylvania, Wake, Watauga, Wilkes counties; also Blowing Rock State Park); **South Carolina** (Dillon, Dorchester, Greenville, Oconee, Pickens, Spartanburg); **Tennessee** (Blount, Cocke, Coffee, Humphreys, Rutherford, Sevier, Union, Warren). April-August. (Figure 407)

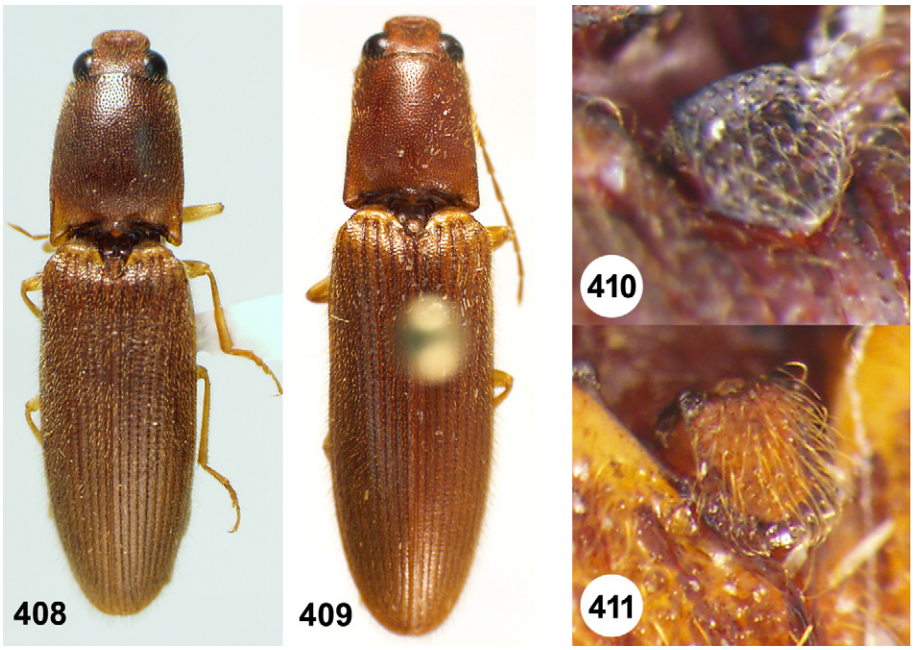
Discussion. This is one of the more widely distributed species of *Athous* in the East, reaching northern Florida to the south. It is most similar to *A. rufifrons* but has more slender antennae and defined membranous lobes on tarsomeres II and III. Specimens in the study area have been collected at ultraviolet light, in Lindgren funnel, canopy, flight intercept, pitfall, and Malaise traps, by beating vegetation, and netted while in flight.

Athous cucullatus (Say, 1825)

Figures 408, 410, 412

Elater cucullatus Say, 1825: 264
Athous strigatus Melsheimer, 1844: 154
Athous hypoleucus Melsheimer, 1844: 155
Athous procericollis Melsheimer, 1844: 156

Diagnosis. Size small to moderate, 9.5–15.0 mm in length. Unicolored red-brown to brown; vestiture yellow-gray to yellow-gold. Supra-antennal carinae well-elevated above clypeus; front with a prominent triangular depression. Antenna 11-segmented, extending two antennomeres beyond apex of pronotal hind angle; antennomere II small; III longer than IV; III and beyond weakly serrate. Pronotum longer than wide, arcuate and widest at middle; punctures on disc coarse, simple to slightly umbilicate; hind angle with single, pronounced carina. Hypomeron with punctures shallow and umbilicate, small impunctate area near base. Scutellum (Figure 410) relatively flat; anterior margin prominent, raised, acute, elevated above adjacent part of elytra and hanging over rest of scutellum. Tarsomeres II and III with prominent lobes; tarsomere IV short, extending just beyond lobe of tarsomere III. Aedeagus with median lobe broad, subparallel, narrowing subapically to subacute apex;



Figures 408–411. *Athous* spp. **408)** *A. cucullatus* (habitus). **409)** *A. orvus* (habitus). **410)** *A. cucullatus* (scutellum). **411)** *A. orvus* (scutellum).

paramere broadly rounded subapically, without defined apical blade or subapical tooth, apex acute. Female similar to male externally but larger, often with a more robust pronotum and shorter antennae, just reaching the apex of the pronotal hind angle.

Distribution. Northeastern North America, west to North Dakota and South to Florida and Texas (Becker 1974). Previously recorded from all seven states in the study area (Leng 1910; Brimley 1938; Löding 1945; Fattig 1951; Kirk 1969, 1970; Becker 1974; Downie and Arnett 1996; Peck and Thomas 1998; Ferro et al. 2012b, 2012c).

Specimens Examined. Alabama (Baldwin, Cherokee, Dale, Etowah, Jackson, Jefferson, Lee, Mobile, Monroe, Walker); **Florida** (Baker, Clay, Putnam, Seminole, Taylor); **Georgia** (Bulloch, Chattooga, Cherokee, Clarke, Cobb, Colquitt, Decatur, Dougherty, Emanuel, Fulton, Gilmer, Greene, Jackson, Jeff Davis, Meriwether, Morgan, Murray, Rockdale, Towns, Union, Walker); **Mississippi** (Attala, Bolivar, Claiborne, Grenada, Hinds, Lee, Noxubee, Oktibbeha, Pontotoc, Winston, Yalobusha); **North Carolina** (Alleghany, Ashe, Beaufort, Bladen, Buncombe, Burke, Columbus, Cumberland, Forsyth, Gates, Guilford, Halifax, Haywood, Henderson, Mecklenburg, McDowell, New Hanover, Orange, Rutherford, Stokes, Surry, Wake); **South Carolina** (Aiken, Berkeley, Chesterfield, Dorchester, Greenville, Horry, Pickens, Richland, Sumter); **Tennessee** (Anderson, Blount, Coffee, Franklin, Knox, Sequatchie, Sevier, Warren). May-October. (Figure 412)

Discussion. This is the most widely distributed species of *Athous* in the East, reaching North Dakota and Texas in the west and Florida to the south. It is relatively easy to recognize in the Southeast, based on the carinate pronotal hind angles, umbilicate punctures on the hypomeron, and distinctive scutellum (Figure 410). In the northern part of its range, it is very similar to *A. orvus* and *A. fossularis* (LeConte), the latter of which has not been confirmed in the current study area. From *A. orvus* it can be separated by the shape of the scutellum and generally being darker. Specimens in the study area have been collected at ultraviolet and mercury vapor light, by beating oak, and in Lindgren funnel, flight intercept, panel, Malaise, and vane traps.

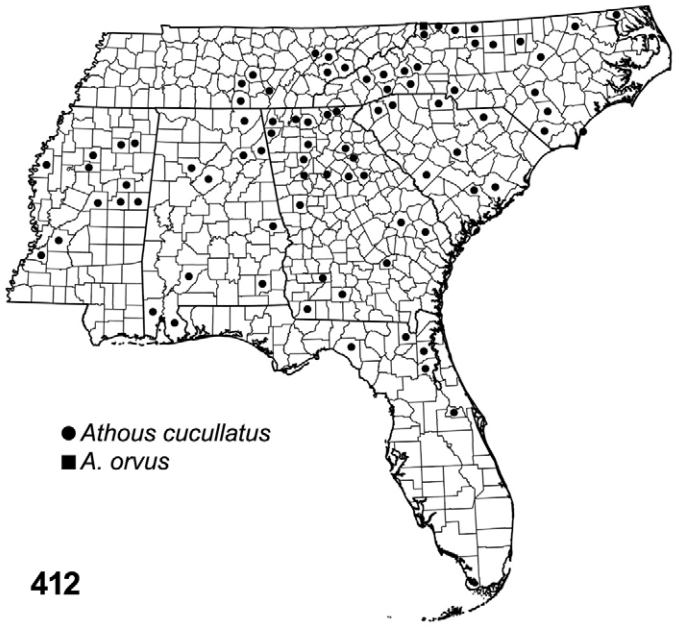


Figure 412. Distributional data for *Athous cucullatus* and *A. orvus*.

Athous equestris (LeConte, 1853)

Figures 413, 415

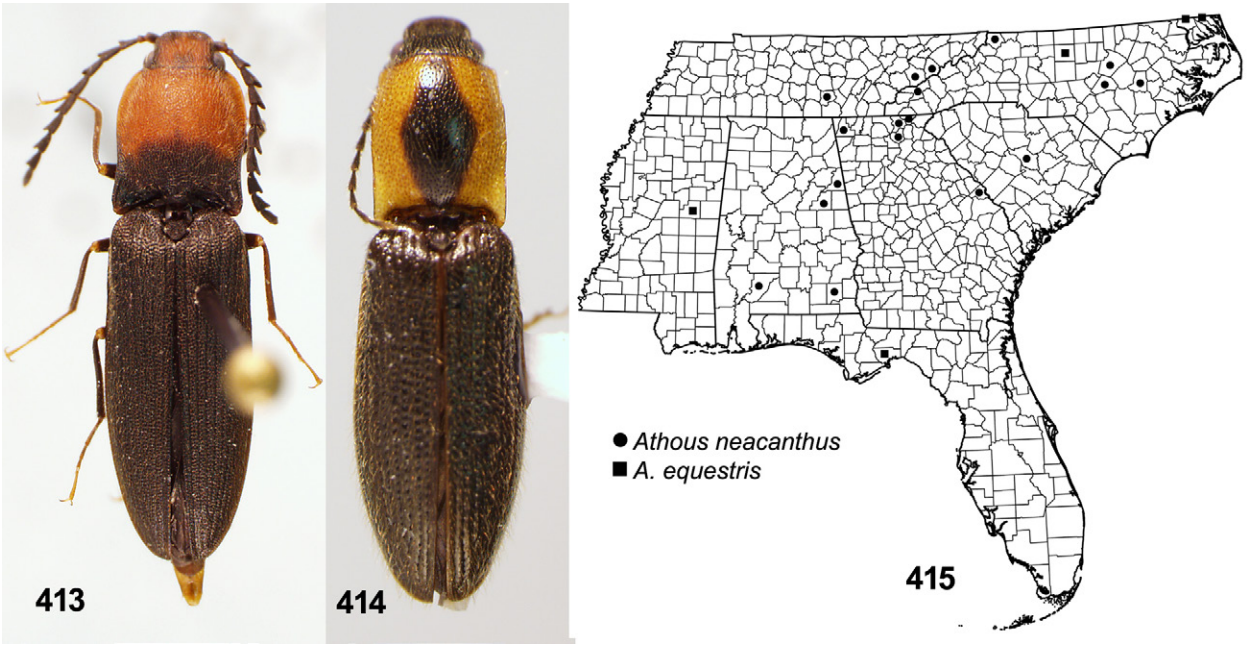
Pedetes equestris LeConte, 1853: 426

Diagnosis. Size moderate, 12.0–14.5 mm in length. Bicolored, dark brown to nearly black with head and anterior half to two-thirds of pronotum red-orange; vestiture yellow-gray, short, fine. Supra-antennal carinae well-elevated above clypeus; front with a prominent triangular depression. Antenna 11-segmented, extending two antennomeres beyond apex of pronotal hind angle; antennomere II small; III subequal to IV; III–X strongly serrate; XI elongate. Pronotum slightly longer than wide, slightly arcuate, widest at middle; punctures large, umbilicate, and dense, nearly contiguous on disc and more so laterally; hind angles slightly divergent, unicarinate. Hypomeron with punctures umbilicate, shallow, smaller than those on pronotum. Scutellum slightly longer than wide, narrowed posteriorly with apex slightly elevated; anterior margin rounded and not overhanging rest of scutellum. Tarsomere I with very small lobe; II and III with small lobes; IV without lobe. aedeagus with median lobe subparallel, suddenly tapering subapically to rounded apex; paramere broad with defined broad apical blade, lateral tooth of blade rounded, apex rounded. Female similar to male externally, but slightly larger and with a wider pronotum and shorter antennae, just reaching the apex of the pronotal hind angle.

Distribution. Generally distributed in the East, from New Jersey south to Georgia and Mississippi and west to South Dakota (Becker 1974). In the Southeast, previously recorded from Georgia and Mississippi (LeConte 1853; Leng 1920; Fattig 1951; Becker 1974; Downie and Arnett 1996). The type locality is Georgia (not further restricted). The following records from Florida and North Carolina represent **New State Records**.

Specimens Examined. Florida (Wakulla); **Mississippi** (Winston); **North Carolina** (Camden, Gates, Guilford). April-June. (Figure 415)

Discussion. This species does appear to be commonly collected but is readily recognized in the study area by its color alone. Specimens in the study area have been collected at ultraviolet and mercury vapor light. The specimen from Florida (FSCA) was collected in an EAB (emerald ash borer, *Agrilus planipennis* Fairmaire) trap.



Figures 413–415. *Athous* spp. **413)** *A. equestris* (habitus). **414)** *A. neacanthus* (habitus). **415)** Distributional data for *A. neacanthus* and *A. equestris*.

Athous neacanthus Becker, 1974

Figures 414–415

Athous neacanthus Becker, 1974: 731

Diagnosis. Size small, 5.5–9.0 mm in length. Color highly variable; pronotum commonly orange with central dark elliptical macula (more commonly so than in *acanthus*), sometimes uniformly brown with only hind angle paler; elytron uniformly light to dark brown; antennae usually same color as elytra, basal antennomeres sometimes paler; legs pale; vestiture yellow, moderate in density. Supra-antennal carinae well-elevated above clypeus; front with a prominent triangular depression. Antenna 11-segmented, extending 2–3 antennomeres beyond apex of pronotal hind angle; antennomere II small; III subequal to IV; III and beyond weakly serrate. Pronotum longer than wide, sides arcuate, wider at middle; anterior angles slightly flared; punctures simple, separated by up to twice their own diameters, denser laterally; hind angle ecarinate. Hypomeron with punctures similar to, but denser, than those on pronotum; impunctate area on posterior area extending anteriorly along inner margin. Scutellum convex (more so than in *acanthus*), anterior margin slightly emarginate or not, rounded, not overhanging rest of scutellum. Tarsomere I without membranous lobe; II and III with obvious lobes; IV without lobe and short, not extending past apex of lobe on tarsomere III. Aedeagus similar to that of *acanthus*, but the median lobe and parameres tend to be shorter and stouter. Females similar to male externally, but slightly larger and with shorter antennae, extending 1–2 antennomeres beyond the apex of the pronotal hind angle.

Distribution. Northeastern North America, south and west to central Georgia and Alabama (Becker 1974). In the Southeast, previously recorded from Alabama, Georgia, North Carolina, South Carolina, and Tennessee (Becker 1974). As this species was not described until 1974, it is possible some of the earlier records of *A. acanthus* from South Carolina (Kirk 1969), Georgia (Fattig 1951), and North Carolina (Brimley 1938) pertain to this species.

Specimens Examined. Alabama (Clay, Cleburne, Dale, Monroe); **Georgia** (Lumpkin, Richmond, Towns, Union, Walker); **North Carolina** (Ashe, Harnett, Swain, Wake, Wayne); **South Carolina** (Richland); **Tennessee** (Cocke, Grundy, Sevier). April-September. (Figure 415)

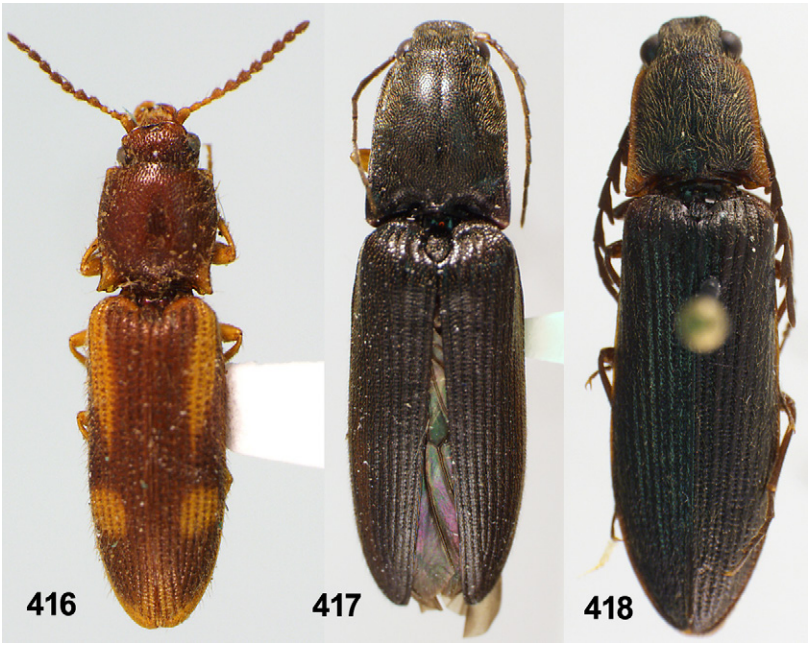
Discussion. This species is most similar to *A. acanthus* (see Discussion under the latter for a comparison of the two species). The specimens from Richmond County, GA (BAM) and Clay (MEM) and Monroe (RHTC) counties, AL seem a bit disjunct, being collected in the Southeastern Plains, and probably represent the southernmost edge of the species' range. Specimens in the study area have been collected at ultraviolet light, in Lindgren funnel traps, in flight intercept traps, and by sweeping and hand picking from vegetation. Specimens from Grundy County, TN (MEM) were collected by beating hemlock.

Athous ornatipennis (LeConte, 1863)

Figures 416, 419

Limonius ornatipennis LeConte, 1863: 84
Athous exclamationis Schwarz, 1903: 58

Diagnosis. Size small, 5.5–6.5 mm in length. Bicolored; head dark brown to black; pronotum dark brown to black with hind angles yellow-red, sometimes extending anteriorly along lateral margins; elytron dark brown to black with three yellow-red maculae: humeral, post-medial, and apical, the humeral macula elongate, extending over half the length of elytron; antennae blackish, basal antennomeres pale; legs pale; vestiture yellowish, semi-erect. Supra-antennal carinae complete, weakly elevated above clypeus; front lacking triangular depression. Antenna 11-segmented, extending to or up to one antennomere beyond apices of pronotal hind angles; antennomere III slightly longer than II; IV and beyond serrate. Pronotum slightly longer than wide, arcuate and widest at middle; anterior angles flared; punctures simple, deep, separated less than their own diameter, denser



Figures 416–418. *Athous* spp. **416)** *A. ornatipennis* (habitus). **417)** *A. posticus* (habitus). **418)** *A. productus* (habitus).

laterally; hind angles slightly divergent, ecarinate. Hypomeron with punctures simple, smaller and denser than those on disc of pronotum. Scutellum very convex, anterior margin not emarginate, rounded and not overhanging rest of scutellum. Tarsomeres I and II without lobes; III slanting forming an obscure lobe; IV lacking lobe. Aedeagus with median lobe subparallel for basal two thirds, then gradually tapering to rounded apex; paramere with sharply pointed subapical tooth. Female similar to male externally but with a subquadrate pronotum and shorter antennae, failing to reach the apex of the pronotal hind angle.

Distribution. Eastern United States, from New Jersey south to Alabama and west to Illinois (Becker 1974). In the Southeast, previously recorded from Alabama, Georgia, North Carolina, and South Carolina (Leng 1920; Löding 1945; Kirk 1970; Becker 1974; Downie and Arnett 1996; Hinson et al. 2019). The type locality of *A. exclamationis* is Alabama (not further restricted).

Specimens Examined. North Carolina (Union). April. (Figure 419)

Discussion. As this species lacks some of the typical features seen in North American *Athous* (e.g., a triangular depression on front and prominent tarsal lobes), it may not be readily recognized as such. The color may be confused with *Anchastus binus*, *Ampedus areolatus*, or the *Idolus* spp. Becker (1974) considered it a rare species. Specimens in the study area have been collected in Malaise traps and at ultraviolet light. Kirk and Taft (1970) recorded it from forest litter in South Carolina. Hinson et al. (2019) recorded it from Malaise traps set along wood piles.

Athous orvus Becker, 1974

Figures 409, 411–412

Athous orvus Becker, 1974: 742

Diagnosis. Size small to moderate, 9.5–13.0 mm. Color pale yellow-brown to light brown; vestiture yellow-gold. Supra-antennal carinae well-elevated above clypeus; front with prominent triangular depression.

Antenna 11-segmented, extending 2.5 antennomeres beyond apex of hind pronotal hind angle; antennomere II small; III slightly longer than IV; III and beyond serrate. Pronotum longer than wide, sides straight to slightly arcuate; punctures shallow, umbilicate, separated by less than their own diameters; hind angle with short, fine carina (may be difficult to see). Hypomeron with punctures shallow, umbilicate. Scutellum (Figure 411) relatively flat; anterior margin not overhanging rest of scutellum, broadly emarginate with prominent anterolateral angles. Tarsomeres II and III with prominent lobes; I and IV with or without a small lobe. Aedeagus with median lobe broad, subparallel, narrowing subapically to subacute apex; paramere broadly rounded subapically, without defined apical blade or subapical tooth, apex rounded. Female similar to male externally, but generally broader and with shorter antenna, extending one antennomere beyond apex of pronotal hind angle.

Distribution. Northeastern North America, south to Virginia (Becker 1974). Previously not recorded from the Southeast. The following records from North Carolina represent a **New State Record**.

Specimens Examined. North Carolina (Ashe). June–July. (Figure 409)

Discussion. *Athous orvus* is most similar to *A. cucullatus* from which it can be separated externally by the form of the scutellum (Figures 410–411). Specimens in the study area have been collected at ultraviolet light.

Athous posticus (Melsheimer, 1844)

Figures 417, 419

Limonius posticus Melsheimer, 1844: 158
Athous erebus Van Dyke, 1932: 385

Diagnosis. Size moderate, 11.5–15.0 mm in length. Color uniformly brown to dark brown or black, or with elytron and narrow basal and sometimes anterior margins pale; antennae dark, basal three antennomeres occasionally pale; legs brown; vestiture yellow to yellow-gold. Supra-antennae carinae complete, well-elevated above clypeus; front with weakly to strongly developed triangular depression. Antenna 11-segmented, extending just beyond apices of pronotal hind angle; antennomeres II and III subequal; IV–X weakly serrate. Pronotum slightly

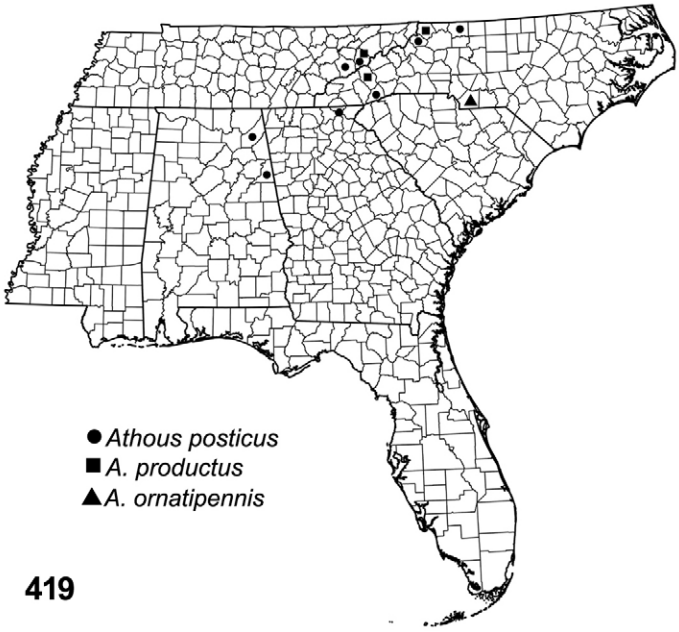


Figure 419. Distributional data for *Athous posticus*, *A. productus*, and *A. ornatipennis*.

longer than wide; median groove running entire length of pronotum; punctures shallow, umbilicate, dense, contiguous laterally; hind angle unicarinate. Hypomeron with punctures shallow, umbilicate, contiguous, about the same size as those on disc of pronotum; impunctate area near base. Scutellum slightly longer than wide, conspicuously narrowed posteriorly; apex slightly elevated; anterior margin rounded and not overhanging rest of scutellum. Tarsomere I with small membranous lobe; II and III with well-developed lobed; IV with very small lobe. Aedeagus with median lobe gradually tapering to rounded apex; paramere with sharp subapical tooth, small notch just anterior to tooth, apex rounded. Female similar to male externally, but slightly larger, with antennae not reaching the apex of the pronotal hind angle, and lacking a membranous lobe on tarsomere IV.

Distribution. Northeastern North America, west to Michigan and south to North Carolina (Becker 1974). In the Southeast, previously recorded from North Carolina and Tennessee (Becker 1974; Downie and Arnett 1996; Buck et al. 2005). Becker (1974) suggested that, despite its rarity in collections, this species is widely distributed in the East. The following records from Alabama and Georgia represent **New State Records**.

Specimens Examined. Alabama (Cleburne, DeKalb); **Georgia** (Towns); **North Carolina** (Surry, Transylvania, Watauga); **Tennessee** (Cocke, Sevier). May–July. (Figure 419)

Discussion. In the Southeast, this species should be readily recognized by its shallow, dense, umbilicate pronotal punctures, carinate pronotal hind angles, and subequal antennomeres II and III. Specimens in the study area have been collected at ultraviolet and mercury-vapor light.

Athous productus (Randall, 1838)

Figures 418–419

Elater productus Randall, 1838: 8
Athous bipunctatus Provancher, 1877: 387

Diagnosis. Size moderate, 12.0–18.5 mm in length. Color very dark brown to black; lateral margins and occasionally anterior margin of pronotum pale reddish-yellow; vestiture yellow-gray, fine, recumbent. Supra-antennal carinae complete, well-elevated above clypeus; front with prominent triangular depression. Antenna 11-segmented, extending 2–4 antennomeres beyond apices of pronotal hind angles; antennomere II small; III–X strongly serrate. Pronotum subquadrate, slightly narrowing anteriorly; punctures umbilicate, dense, separated by less than their own diameters; hind angle ecarinate. Hypomeron with punctures umbilicate but slightly sparser than on pronotum; impunctate area basally. Scutellum subquadrate. Elytral striae noticeably impressed. Tarsomeres II–IV with hairy membranous lobes. Aedeagus with median lobe gradually tapering to rounded apex; paramere with projecting, subacute subapical tooth, apex subacute. Female similar to male externally except for being slightly larger and with a wider, more arcuate pronotum.

Distribution. Northeastern North America (Becker 1974). In the Southeast, previously recorded only from North Carolina (Brimley 1938). Roble and Hoffman (2012) recorded it from Virginia. While the presence of this species in North Carolina has been confirmed in this study, two of Brimley's (1938) records are based on misidentifications (see below). The following record from Tennessee represents a **New State Record**.

Specimens Examined. North Carolina (Ashe, Haywood); **Tennessee** (Cocke). May–June. (Figure 419)

Discussion. This distinctive species should be easily recognized by having a subquadrate pronotum with dense umbilicate punctures and ecarinate hind angles, long, strongly serrate antennae, elytra with impressed striae, and color. Becker (1974) considered this species an intermediate between *Athous* and *Denticollis*, due in part to the pointed metasternum as seen in *Denticollis*, but felt the key morphological features were a better fit for the former. I have examined the specimens (NCSU) that were the basis for Brimley's (1938) records from Craggy Mountain and Mt. Mitchell, NC, and determined them to be *D. denticornis*. Brimley's third record from Spruce, NC was not present in the NCSU so that record could not be confirmed. Specimens in the study area were collected at mercury vapor and ultraviolet light and in Lindgren funnel traps.

Athous rufifrons (Randall, 1838)

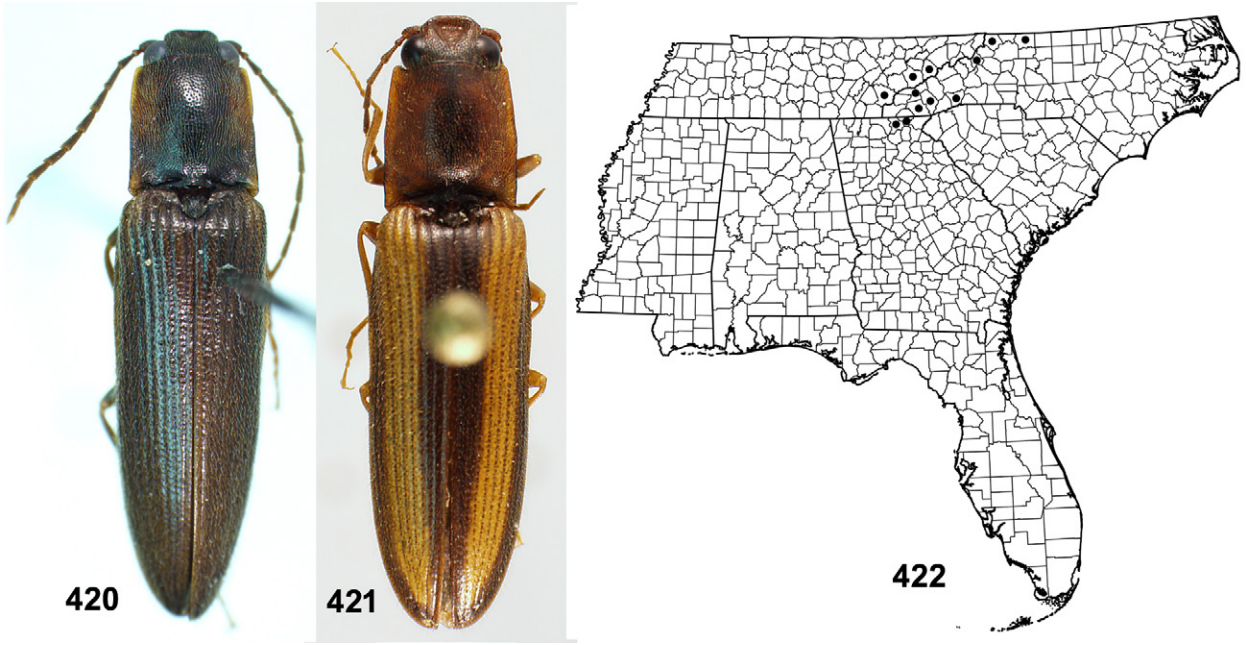
Figures 420–422

Elater rufifrons Randall, 1838: 6
Athous reflexus LeConte, 1853: 427
Athous lengi Dury, 1911: 275

Diagnosis. Size moderate, 11.0–17.0 mm in length. Color variable; light to dark brown, frequently with broad, reddish lateral margins on the pronotum and a broad red median stripe running nearly the entire length of the elytron; antennae and legs usually lighter than body color; vestiture yellow-gray, sparse. Supra-antennal carinae complete, well elevated above clypeus; front with prominent triangular depression. Antenna 11-segmented, extending beyond apex of pronotal hind angle by up to three antennomeres; antennomere III longer than II and just shorter than IV; IV–XI elongate, subparallel. Pronotum subquadrate, lateral margins subparallel, slightly arcuate and widest just before middle; no median groove; punctures simple to slightly umbilicate, dense, laterally shallow, umbilicate, and nearly contiguous; hind angle ecarinate. Hypomeron with punctures shallow, umbilicate, and nearly contiguous anteriorly, same size as those on disc of pronotum; impunctate area basally. Scutellum relatively flat, approximately in same plane as adjacent elytra; anterior margin not overhanging rest of scutellum. Tarsomeres lacking membranous lobes; tarsomeres II–IV with hairy pads. Aedeagus with median lobe gradually tapering to rounded apex; paramere with projecting, subacute subapical tooth, rounded apically. Female similar to male externally but slightly larger and with shorter antennae, exceeding the apex of the pronotal hind angle by up to one antennomere.

Distribution. Northeastern North America, west to Michigan and south to northern Georgia (Becker 1974). In the Southeast, previously recorded from Georgia, North Carolina, South Carolina, and Tennessee (Dury 1811; Leng 1920; Van Dyke 1932; Brimley 1938; Wray 1950; Fattig 1951; Becker 1974; Downie and Arnett 1996; Buck et al. 2005; Ferro et al. 2012b, 2012c). The type locality of *lengi* is Clayton in Rabun County, GA.

Specimens Examined. Georgia (Towns, Union); **North Carolina** (Ashe, Avery, Henderson, Jackson, Macon, Surry, Swain); **Tennessee** (Cocke, Monroe, Sevier). May–July. (Figure 422)



Figures 420–422. *Athous rufifrons*. **420)** Habitus (dark form). **421)** Habitus (bicolored form). **422)** Distributional data.

Discussion. This species is unique among eastern *Athous* in lacking membranous tarsal pads. This may cause some problems in keying at the generic level and specimens may consequently be misidentified as *Elathous*. The vittate form (Figure 421) is rather distinctive in color alone. Specimens in the study area have been collected at ultraviolet light and in Lindgren funnel, Malaise, and canopy traps.

Athous scapularis (Say, 1839)

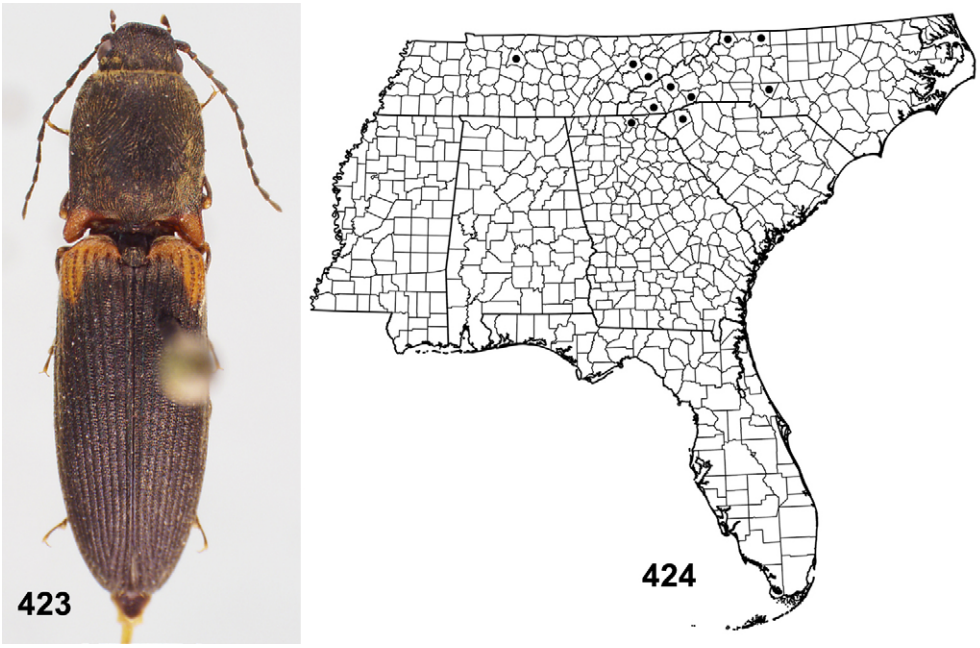
Figures 423–424

Elater scapularis Say, 1839: 178

Diagnosis. Size small to moderate, 9.5–12.0 mm in length. Bicolored; dark brown to black with pronotal hind angles and humeral area of elytron red-orange; antennae and legs dark; vestiture golden-yellow, dense on pronotum. Supra-antennae carinae complete, well-elevated above clypeus; front with prominent triangular depression. Antenna 11-segmented, extending beyond apex of pronotal hind angle by 1–2 antennomeres; antennomere II small; III slightly longer than IV; flagellar antennomeres serrate. Pronotum longer than wide, arcuate near base of hind angle; punctures umbilicate, very dense, contiguous laterally; hind angles slightly divergent, unicarinate. Hypomeron with punctures similar to those on disc of pronotum; impunctate area basally. Scutellum slightly wider than long; anterior margin rounded, not overhanging rest of scutellum. Tarsomere I with small membranous lobe; II and III with obvious lobe; IV with small lobe. aedeagus with median lobe gradually tapering to subacute apex; paramere with large, broadly rounded apical blade, subacute apically. Female similar to male externally except slightly larger and with slightly shorter antennae.

Distribution. Northeastern North America, south to South Carolina and west to Michigan and Kansas (Becker 1974). In the Southeast, previously recorded from Georgia, North Carolina, South Carolina, and Tennessee (Leng 1910; Brimley 1938; Fattig 1951; Kirk 1970; Becker 1974; Downie and Arnett 1996; Buck et al. 2005; Ferro et al. 2012b, 2012c).

Specimens Examined. Georgia (Union); **North Carolina** (Ashe, Cabarrus, Haywood, Henderson, Macon, Surry); **South Carolina** (Pickens); **Tennessee** (Davidson, Knox, Sevier). April–August. (Figure 424)



Figures 423–424. *Athous scapularis*. **423)** Habitus. **424)** Distributional data.

Discussion. This species should be readily recognized by its color. Some specimens of *A. posticus* may have a similarly colored pronotum, but always have uniformly dark elytra. Specimens in the study area have been collected at ultraviolet and mercury vapor light and in Lindgren funnel and Malaise traps.

Denticollis Piller and Mitterpacher, 1783

Denticollis Piller and Mitterpacher, 1783: 86
Lepturoides Herbst, 1784: 103
Campylus Fischer von Waldheim, 1824: 153
Exophthalmus Berthold, 1827: 335
Hammonius Latreille, 1829: 456

Diagnosis. Small to moderate in size, elongate, somewhat flattened. Brown or brown and yellow in color. Supra-antennae carinae complete, arcuate, well-elevated above clypeus. Antenna 11-segmented, serrate to slightly pectinate. Pronotum subquadrate, sides subparallel, slightly wavy. Prosternum arcuate anteriorly. Pronotosternal sutures closed. Elytral intervals reticulate. Metasternum pointed anteriorly; mesocoxae appearing contiguous. Tarsomere III and IV with weak membranous lobes; claws simple, without basal setae. Aedeagus with paramere possessing subapical notch or tooth.

Range and Numbers. There are two species, boreal in North America (Johnson 2002). One species reaches the Southeast.

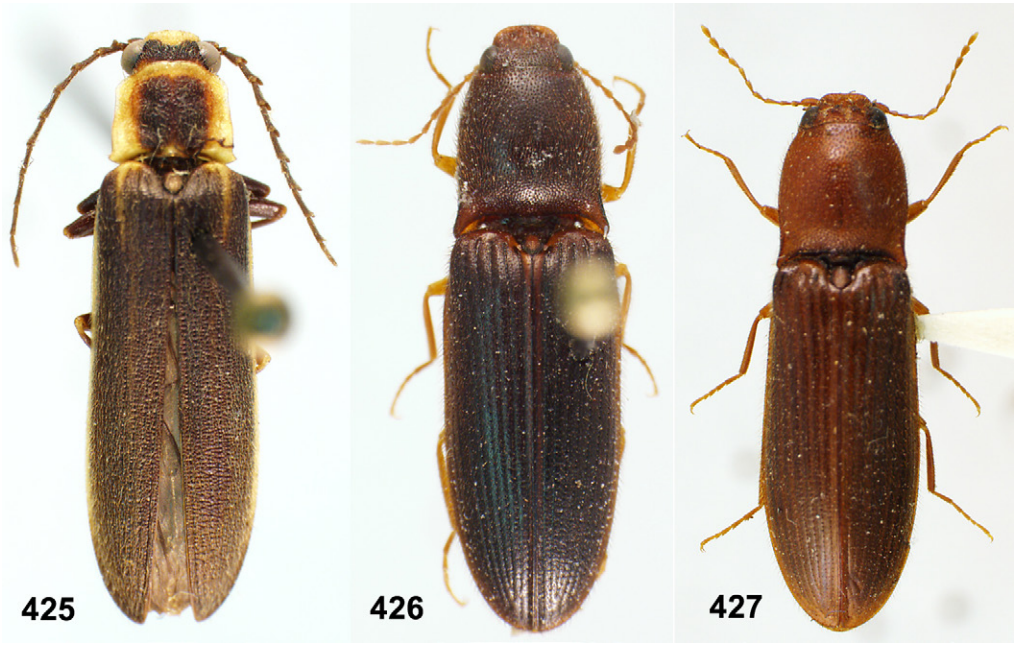
Discussion. The genus was revised for North America by Becker (1952). At the time, four species were recognized. Becker later (1974) transferred *D. productus* to *Athous* and placed *D. quadrosa* in synonymy with *Athous appalachius*. Two species remain in the genus, *D. varians* (Germar) in Canada and Alaska and *D. denticornis* in the Northeast. Only the latter reaches the Southeast. *Denticollis* species are superficially similar to members of the family Cantharidae or Lampyridae and are readily recognized by their pointed metasternum, complete, projecting supra-antennae carinae, and strongly serrate antennae.

Denticollis denticornis (Kirby, 1837)

Figures 425, 428

Campylus denticornis Kirby, 1837: 145
Campylus flavinasus Melsheimer, 1845: 219

Diagnosis. Size small to moderate, 9.0–14.0 mm in length, elongate, somewhat flattened. Bicolored; head brown to dark brown, frontal area yellow; pronotum with lateral, anterior, and posterior margins yellow, central area black; hypomeron with lateral margins yellow; prosternal sutures yellow; elytron brown to dark brown with yellow median stripe starting at humerus (may be short and reduced to humeral macula); legs and antennae dark; vestiture grayish, dense. Supra-antennae carinae complete, arcuate, well-elevated above clypeus. Antenna 11-segmented, extending at least three antennomeres beyond apices of pronotal hind angles; antennomere II small; III and beyond strongly serrate to slightly pectinate. Pronotum wider than long, narrower than elytra; sides subparallel, slightly wavy; punctures large, umbilicate, nearly contiguous on disc; hind angles pointed, divergent, ecarinate. Elytron subparallel for basal three-fourths, narrowing to rounded apices; striae slightly impressed, punctate; intervals flat, rugose but shiny. Tarsomeres III and IV with weak membranous lobes. Aedeagus with median lobe serrate laterally in basal half, then gradually narrowing to rounded apex; paramere considerably shorter than median lobe, widened subapically, then narrowing to small, apical projection; apically truncate. Female similar to male externally but eyes slightly smaller and antennae extend beyond the apex of the pronotal hind angle by 1–3 antennomeres.



Figures 425–427. Dendrometrini. **425)** *Denticollis denticornis* (habitus). **426)** *Elathous bicolor* (habitus). **427)** *Elathous discalceatus* (habitus).

Distribution. Northeastern North America, west to Illinois and Alberta (Becker 1952). In the Southeast, it has been recorded from North Carolina and Tennessee (Becker 1952; Ferro et al. 2012b). Roble and Hoffman (2012) also recorded it from Virginia. Brimley's (1938) records for *Athous productus* from Craggy Mountains and Mt. Mitchell, NC pertain to this species.

Specimens Examined. North Carolina (Buncombe, Haywood, Swain, Yancey); **Tennessee** (Cocke, Sevier). May–July. (Figure 428)

Discussion. This species is fairly easy to recognize in the study area. It superficially resembles a member of the families Lampyridae or Cantharidae. It is a boreal species that reaches the southern limits of its range in the northern part of the current study area. Specimens in the study area have been collected in canopy and Malaise traps.

Elathous Reitter, 1890

Elathous Reitter, 1890: 247
Elathouina Reitter, 1905: 19
Athouinus Reitter, 1905: 114 (incorrect subsequent misspelling of *Elathouina*)
Athoina Reitter in Heyden et al., 1906: 399 (incorrect subsequent misspelling of *Elathouina*)

Diagnosis. Size small to moderate. Color usually red-brown to brown. Supra-antennal carinae complete, well-elevated above clypeus; front with marked triangular depression. Antenna 11-segmented, serrate, not extending beyond apex of pronotal hind angle. Pronotal hind angle unicarinate; not distinctly projecting from hypomeron. Hypomeron with elevated margin along pronotosternal sutures; pronotosternal sutures open anteriorly. Tarsomere without membranous lobes; tarsomere IV long (typically longer than as seen with *Athous*); claw simple, without basal setae.

Range and Numbers. There are seven species in the US and Canada, eastern and west coastal in distribution (Etzler 2019). Only one species has formerly been recorded from the Southeast, with a second added here.

Discussion. The first treatment of the genus for North America as a was by Van Dyke (1932), who recognized three species. Dietrich (1945) and Downie and Arnett (1996) keyed the northeastern species but their keys and diagnoses are not reliable. Van Dyke (1932) synonymized *E. oberndorfferi* with *E. discalceatus*, but Becker (1961) later placed it in synonymy with *E. bicolor*. Etzler (2019) followed Van Dyke but stated later (pers. comm. 2020) that he had overlooked Becker's (1961) action. Etzler (2019) provided clarity for this genus and listed the species on a world basis. Adults are superficially similar to members of the genus *Athous* but lack membranous lobes on the tarsomeres. The one southeastern *Athous* that lacks tarsal lobes (*A. rufifrons*) also lacks a carina on the pronotal hind angles but has a smaller tarsomere IV.

Key to the species of *Elathous* in the Southeast
(adapted from Van Dyke 1932)

1. Color dark red-brown to dark brown, antennae and legs yellow; pronotal punctures very dense, becoming contiguous laterally; punctures on elytral intervals dense . . . . . ***E. bicolor*** **(LeConte)**
— Color light to dark red-brown, antennae and legs concolorous with, or slightly paler than, body; pronotal punctures close, not becoming contiguous laterally; punctures on elytral intervals sparse . . . . . ***E. discalceatus*** **(Say)**

Elathous bicolor (LeConte, 1853)

Figures 426, 428

Athous bicolor LeConte, 1853: 428
Elathous oberndorfferi Schwarz, 1903: 207
Limonius kondratieffi Al Dhafer, 2009: 299

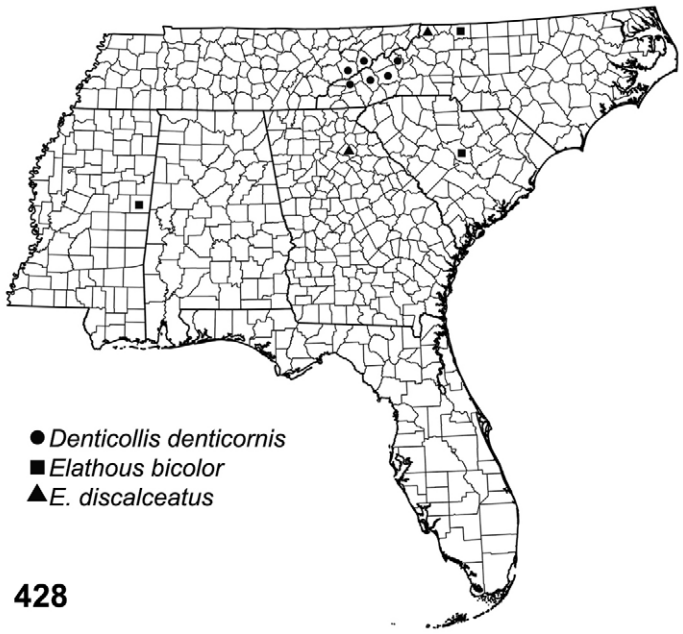


Figure 428. Distributional data for *Denticollis denticornis*, *Elathous bicolor*, and *E. discalceatus*.

Diagnosis. Size small to moderate, 8.5–12.0 mm in length. Dorsally color dark red-brown to dark brown; venter often paler; head and pronotum sometimes paler; antennae and legs yellow; vestiture yellow, coarse, suberect. Front with marked triangular depression; frontal margin formed by supra-antennal carinae strongly projecting forward. Antenna 11-segmented, serrate; antennomere II small, but longer than wide; III intermediate between II and IV. Pronotum longer than wide; punctures shallow, umbilicate, dense, becoming contiguous laterally, interspaces shiny; hind angles slightly divergent, unicarinate. Hypomeron with elevated margin along pronotosternal sutures; punctures shallow, umbilicate, sparser than on pronotum. Elytral striae distinctly punctured; intervals rugose and coarsely punctured. Aedeagus not described.

Distribution. Northeastern North America, south to Indiana (Downie and Arnett 1996). Previously not recorded from the Southeast. The following records from Mississippi, North Carolina, and South Carolina represent **New State Records**.

Specimens Examined. Mississippi (Noxubee); **North Carolina** (Surry); **South Carolina** (Richland). August–September. (Figure 428)

Discussion. This species is superficially similar to *E. discalceatus* but darker in color and has denser punctures on the pronotum and elytral intervals. Not much is known about the biology of the species. Specimens in the study area have been collected at ultraviolet light and in flight intercept traps. Specimens from Noxubee County, MS (MEM) were collected in pine litter.

Elathous discalceatus (Say, 1839)

Figures 427–428

Elater discalceatus Say, 1839: 169

Diagnosis. Size small to moderate, 9.0–12.0 mm in length. Dorsally pale to dark red brown; venter and sutural area often paler; legs concolorous with body or slightly paler; vestiture yellowish, coarse, suberect. Front with triangular depression; frontal margin formed by supra-antennal carinae slightly projecting anteriorly. Antenna 11-segmented, serrate; antennomere II small; III intermediate between II and IV. Pronotum longer than wide; punctures shallow, umbilicate, dense but not becoming contiguous laterally, interspaces shining; hind angles slightly divergent, unicarinate. Hypomeron with elevated margin along pronotosternal sutures; punctures shallow, umbilicate, sparser than on pronotum. Elytral intervals distinctly punctate; intervals shiny, punctures sparse. Aedeagus with median lobe tapering subapically; parameres with acute lateral expansion; apical portion of expansion with long row of setae.

Distribution. Northeastern North America (Downie and Arnett 1996). In the Southeast, recorded only from Georgia (Fattig 1951). The following record from North Carolina represents a **New State Record**. (Figure 428)

Specimens Examined. Georgia (Jackson); **North Carolina** (Ashe). August–September.

Discussion. This species is similar to *E. bicolor* but it usually paler in color and has sparser punctures on the pronotum and elytral intervals. Adults superficially resemble *Hemicrepidius bilobatus* but lack membranous lobes on the tarsomeres and have a carina on the pronotal hind angles.

Euplastius Schwarz, 1903

Euplastius Schwarz, 1903: 60

Diagnosis. Size small to moderate. Bicolored, pale yellow-brown with dark longitudinal maculae on the pronotum and/or elytron. Supra-antennal carinae incomplete, front depressed. Antenna very long, running at least half the length of the body; flagellar antennomeres filiform. Eyes large. Pronotum distinctly longer than wide; hind angle distinctly projecting, carinate or not (carina may be fine). Hypomeron lacking elevated margin

along prosternal suture. Pronotosternal sutures closed. Metasternum broad between mesocoxae. Tarsomeres lacking membranous lobes; claws simple, without basal setae. Aedeagus with paramere possessing subapical lateral tooth. Females previously unknown (see under *E. bivittatus*, below).

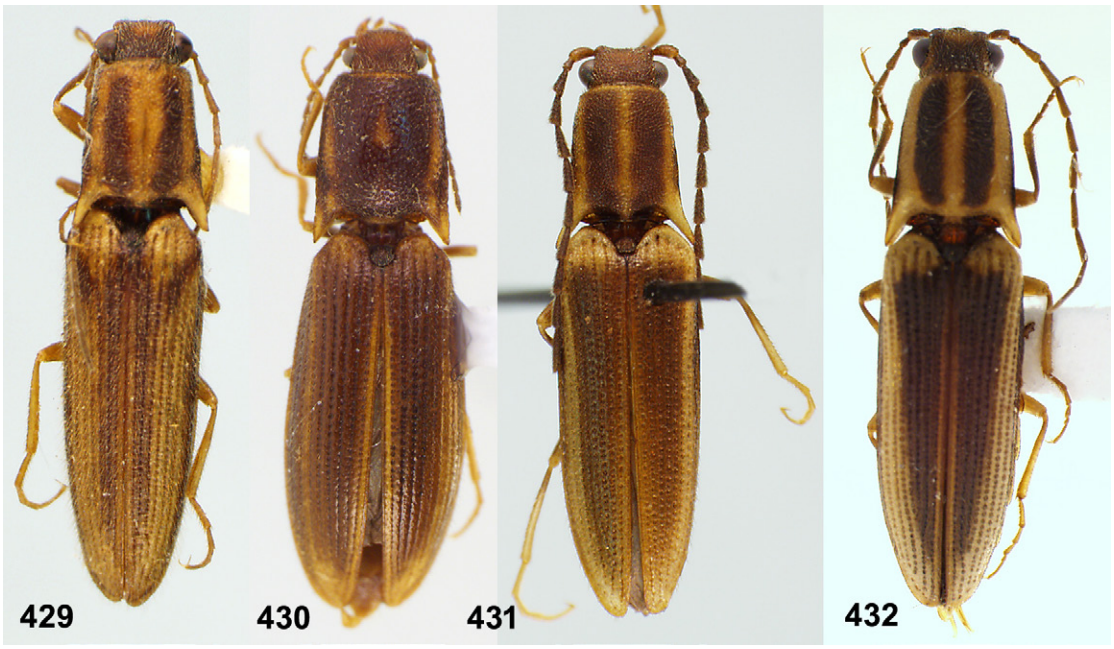
Range and Numbers. Endemic to the southeastern United States, north to the Ohio River Valley and west to Texas (Becker 1961). There are five described species, four of which have been recorded from the current study area, although Kirk's (1969) record of *E. melsheimeri* (Becker) from South Carolina seems doubtful.

Discussion. This genus was revised by Becker (1961) as the *bivittata* group of *Ctenicera*. Tarnawski (1996) placed *Ctenicera bivittata* in the genus *Poemnites* Buysson, 1894, but not any of the other species in the complex. Johnson (2002) placed the U.S. species in *Euplastius* within his Athoini (Dendrometrini, here). Becker (1961) indicated many of the species are fairly restricted geographically to various river valleys or mountains. This creates the potential for undescribed species being found in the study area. In some cases, specimens of some species have been recorded outside the ranges presented by Becker. Not much is known about the biology of the species; most adults are collected at light. Females were undescribed at the time of Becker's revision.

Key to the species of *Euplastius* in the Southeast
(adapted from Becker 1961)

1. Pronotum with distinct median groove . . . . . ***E. bivittatus*** **(Melsheimer)**
— Pronotum lacking distinct median groove **2**

2(1). Elytron with only intervals VII and VIII paler (not including sutural area) . . . . . ***E. knulli*** **(Becker)**
— Elytron with intervals V–VIII paler (not including sutural area) . . . . . ***E. mimicus*** **(Becker)**



Figures 429–432. *Euplastius* spp. **429)** *E. bivittatus* (male habitus). **430)** *E. bivittatus* (female habitus). **431)** *E. knulli* (habitus). **432)** *E. mimicus* (habitus).

Euplastius bivittatus (Melsheimer, 1846)

Figures 429–430, 433

Campylus? bivittatus Melsheimer, 1846: 219
Euplastius athoiformis Schwarz, 1903: 61

Diagnosis. Size small, 6.5–10.0 mm in length, form elongate. Bicolored; head dark; pronotum pale yellow-brown with two elongate dark vittae extending nearly the length of the pronotum; elytron pale yellow-brown with intervals II, III (sometimes IV), and VIII and IX dark; antennae and legs yellow-brown; vestiture grayish, suberect. Antenna long, filiform, extending 3–4 antennomeres beyond apex of pronotal hind angle; antennomere III longer than II, closer in length to IV. Pronotum longer than wide, sides subparallel; distinct median groove on posterior half, strongest post-middle; punctures shallow, umbilicate, dense; hind angle elongate, slightly divergent, unicarinate (carina fine). Elytron elongate, subparallel over basal half, then gradually tapering to apex; striae strongly punctured with large, deep, punctures, sometimes connected by a small longitudinal groove; interspaces slightly convex, rugose but not distinctly punctured. Aedeagus with median lobe gradually tapering to rounded apex; paramere outwardly curved apically with blunt subapical lateral tooth. Marked sexual dimorphism: female broader; antenna short, filiform, not reaching apex of the pronotal hind angle; pronotum slightly arcuate medially, lacking median groove, punctures large, shallow, and distinctly umbilicate, hind angle subparallel, unicarinate; elytron broadest post-medially.

Distribution. Generally distributed in the Southeast, west of the Appalachians and Piedmont (Becker 1961). In the current study area, it has been recorded from Alabama, Georgia, Mississippi, North Carolina, and Tennessee (Brimley 1938; Löding 1945; Fattig 1951; Becker 1961; Kirk 1970). Brimley's (1938) record from North Carolina represents a misidentification (see below). Records from Georgia (Fattig 1951) and South Carolina (Kirk 1970) should also be confirmed. Melsheimer gave the type locality of *C. bivittatus* as Virginia, but that record has not been verified and should be verified (Becker 1961). The type locality of *E. athoiformis* is Alabama (not further restricted).

Specimens Examined. Alabama (Colbert, Jefferson, Lawrence, Madison, Tuscaloosa); **Mississippi** (Claiborne, Monroe, Pontotoc, Prentiss, Scott, Tishomingo, Winston); **Tennessee** (Franklin, Humphreys, Marshall, Rutherford). May–July. (Figure 433)

Discussion. This species is easily recognized from its congeners by the median groove on the pronotum and the blunt subapical tooth on the parameres. The color is variable, and some specimens have the pronotum almost entirely dark except for the hind angles, or may have reduced markings on the elytron. The female was undescribed at the time of Becker (1961). The above observations are based on a single specimen (Figure 430) from the H. P. Löding collection (GSAT) with male associations. This species may be more widely distributed then Becker (1961) indicated, but further collecting needs to be done to confirm the previous published records in Georgia, South Carolina, and Virginia. I have examined the specimen (NCSU) that was the basis for Brimley's (1938) record from Linville Falls, NC and determined it to be a female of *Vittathous horni*. Specimens in the study area have been collected at ultraviolet light and by sweeping vegetation.

Euplastius knulli (Becker, 1961)

Figures 431, 433

Ctenicera knulli Becker, 1961: 174

Diagnosis. Size small, 8.5–9.5 mm in length. Bicolored; head dark; pronotum light yellow-brown with two elongate dark vittae extending nearly the length of the pronotum; elytron light yellow brown with intervals II–VI and IX dark, sutural are pale; antennae dark; legs yellow-brown; vestiture yellow, short. Antenna long, filiform, extending beyond apex of pronotal hind angle by 3–4 antennomeres; antennomere II small but longer than wide; III subequal to IV. Pronotum longer than wide, sides subparallel; median groove lacking; punctures

shallow, umbilicate, nearly contiguous on disc; hind angles slender, divergent, ecarinate. Elytron elongate, subparallel over basal half, then gradually tapering to apex; striae strongly punctured with large, deep, punctures that are not connected by longitudinal grooves; intervals slightly convex, rugose, punctate. Aedeagus with median lobe broad, subparallel, tapering subapically to rounded apex; paramere broad with acute lateral subapical tooth, broadly rounded apically. Female unknown.

Distribution. Previously recorded only from higher elevations in the Great Smoky Mountains in Tennessee (Becker 1961). The following record from North Carolina represents a **New State Record**.

Specimens Examined. North Carolina (Swain); **Tennessee** (Sevier). July–August. (Figure 433)

Discussion. The elytral color pattern seems fairly consistent among specimens of this species. This, in combination with the characters of the elytral striae and aedeagus, should make this species fairly easy to identify. Specimens in the study area were collected in flight intercept traps.

Euplastius mimicus (Becker, 1961)

Figures 432–433

Ctenicera mimica Becker, 1961: 179

Diagnosis. Size small to moderate, 8.0–10.0 mm in length. Bicolored; head dark; pronotum light yellow-brown with two elongate dark vittae extending nearly the length of the pronotum; elytron light yellow brown with intervals II–IV and IX dark, sutural area lighter; antennae dark; legs yellow-brown; vestiture yellowish, short. Antenna long, filiform, extending beyond apex of pronotal hind angle by 3–4 antennomeres; antennomere II small, but longer than wide; III subequal to IV. Pronotum longer than wide, sides subparallel; median groove lacking; punctures shallow, umbilicate, dense but not contiguous on disc; hind angle slender, divergent, ecarinate. Elytron elongate, subparallel over basal half, then gradually tapering to apex; striae strongly punctured with large, deep, punctures, sometimes connected by a small longitudinal groove; interspaces slightly convex,

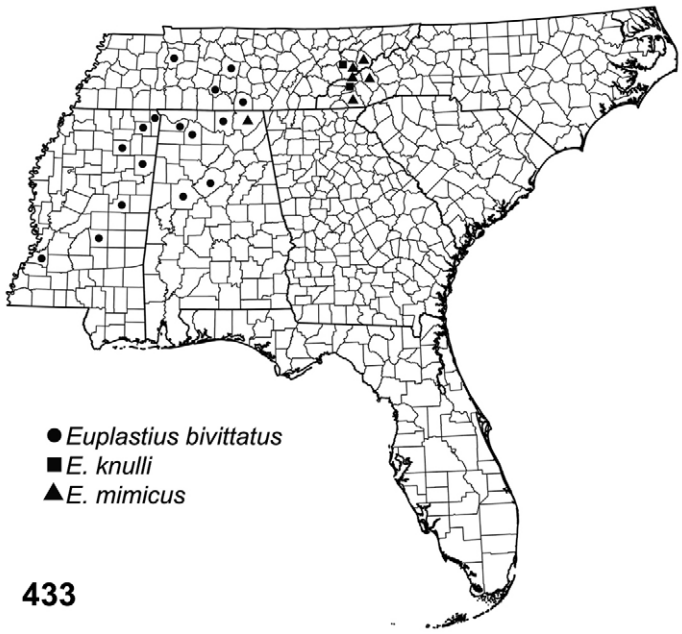


Figure 433. Distributional data for *Euplastius bivittatus*, *E. knulli*, and *E. mimicus*.

smooth but distinctly punctate. Aedeagus with median lobe gradually tapering to rounded apex; paramere outwardly curved apically with acute subapical lateral tooth. Female unknown.

Distribution. This species is known from the Great Smoky Mountains and surrounding areas in North Carolina and Tennessee (Becker 1961; Ferro et al. 2012c). The type locality is Mills River in Henderson County, NC. Kirk (1969) recorded it from South Carolina but this record should be confirmed. The following record from Alabama represents a **New State Record** (see Discussion below).

Specimens Examined. Alabama (Jackson); **North Carolina** (Haywood, Macon, Swain); **Tennessee** (Cocke, Sevier). June–July. (Figure 433)

Discussion. This species occurs in the same area as *E. knulli* but can be separated based on the characters described above. The record from Alabama is based on a single specimen (BAM) that matches the description of *E. mimicus* both externally as well as in aedeagal shape. The locality is quite disjunct from previous published records for this species and so this specimen could represent a new species. However, in the absence of more material from the area, I am hesitant to declare it as such. It is possible *E. mimicus* occurs throughout the Tennessee River Valley (which includes Jackson County, MS) and has a much broader distribution than previously thought. Further collecting in the region could help shed some light on the situation. Kirk's (1969) record from Dillon County, SC seems less likely for this species, however. He indicated specimens were collected by sweeping vegetation in swamps in Latta, SC. This area lies within the Northern Coastal Plains and is in quite a different habitat from those in the other states. Specimens in the study area have been collected at ultraviolet light, by sweeping vegetation, and in Malaise traps.

Gambrinus LeConte, 1853

Gambrinus LeConte, 1853: 435
Limoniscus Reitter, 1905: 12
Sichuanelater Platia and Gudenzi, 2005: 137

Diagnosis. Size small to moderate, subcylindrical to cylindrical, lustrous or dull, but quite variable in color, some bicolored. Frontal margin formed by supra-antennae carinae complete, frons depressed or flattened. Antennae 11-segmented, serrate. Pronotum longer than wide, unicarinate; hypomeron emarginate near apex; pronotosternal sutures double, usually open anteriorly. Tarsomeres lacking membranous lobes; claws simple, lacking basal setae.

Range and Numbers. There are 29 species, generally distributed in North America (Etzler 2019). There are seven species in the Southeast, not including species removed from synonymy by Etzler (2019) (see Discussion under individual species' treatments). Brimley's (1938) record of *G. fulvipilis* Candèze from North Carolina is based on a misidentification of *Limonius auripilis*.

Discussion. Etlzer (2019) brought *Gambrinus* out of synonymy with *Limonius* based on the emargination of the posterior edge of the hypomeron and the characteristics of both male and female genitalia. Etlzer (2019) divided *Gambrinus* into two species groups separated by characters of male and female genitalia: the *stigma* species group and the *griseus* species group, the latter of which is endemic to North America. Species groups are not taken into consideration here with regards to organization.

Key to the species of *Gambrinus* in the Southeast

1. Base of elytron with distinct, defined red-orange macula **2**
— Elytron unicolored **3**

2(1). Pronotosternal sutures open anteriorly . . . . . ***G. meridianus* (Knull)**
— Pronotosternal sutures closed anteriorly . . . . . ***G. stigma* (Herbst)**

3(1). Pronotum clearly longer than wide . . . . . ***G. flavomarginatus* (Knull)**
— Pronotum as wide or wider than long **4**

4(3). Antennomere III longer than II and subequal to IV **5**
— Antennomeres II and III subequal, combined barely longer than IV **6**

5(4). Elytron red-brown to black with pale margin; pronotal hind angle subparallel; prosternum and hypomeron reddish; aedeagus with median lobe slender, subparallel, gently tapering to rounded apex . . . . . ***G. griseus* (Palisot de Beauvois)**
— Elytron black, lacking pale margin; pronotal hind angle slightly divergent; prosternum black, hypomeron black often with anterior and basal margins reddish; aedeagus with median lobe broad, tapering subapically to subacute apex . . . . . ***G. rudis* Brown**

6(4). Antenna not extending beyond apex of pronotal hind angle; aedeagus with paramere having apical blade slightly longer than wide . . . . . ***G. plebejus* (Say)**
— Antenna extending beyond apex of pronotal hind angle by 2–3 antennomeres; aedeagus with paramere having apical blade twice as long as wide . . . . . ***G. confusus* LeConte**

Gambrinus confusus (LeConte, 1853)

Figures 434, 436

Limonius confusus LeConte, 1853: 430
Limonius aenescens LeConte, 1853: 431

Diagnosis. Size small to moderate, 8.5–10.0 mm in length. Head and pronotum black (basal margin of hypomeron often paler); elytron brown; vestiture yellow, appressed. Frontal margin formed by supra-antennal carinae entire, not well-separated from the labrum. Antenna 11-segmented, serrate, extending 2–3 antennomeres beyond apex of pronotal hind angle; antennomeres II and III combined slightly longer than IV. Pronotum longer than wide, broadly rounded (rarely subtrapezoidal); punctures coarse, deep, dense; hind angle subparallel, unicarinate. Hypomeron with elevated margin along pronotosternal sutures; emarginate basally. Pronotosternal sutures open anteriorly. Aedeagus with median lobe slender, gently tapering subapically to rounded apex; paramere subparallel, apical blade longer than wide, gently curving anteriorly to rounded right-angle apex. No sexual dimorphism noted.

Distribution. Northeastern North America (Al Dhafer 2009). In the Southeast, previously recorded from North Carolina and Tennessee (Brimley 1938; Al Dhafer 2009).

Specimens Examined. North Carolina (Haywood). May, July. (Figure 436)

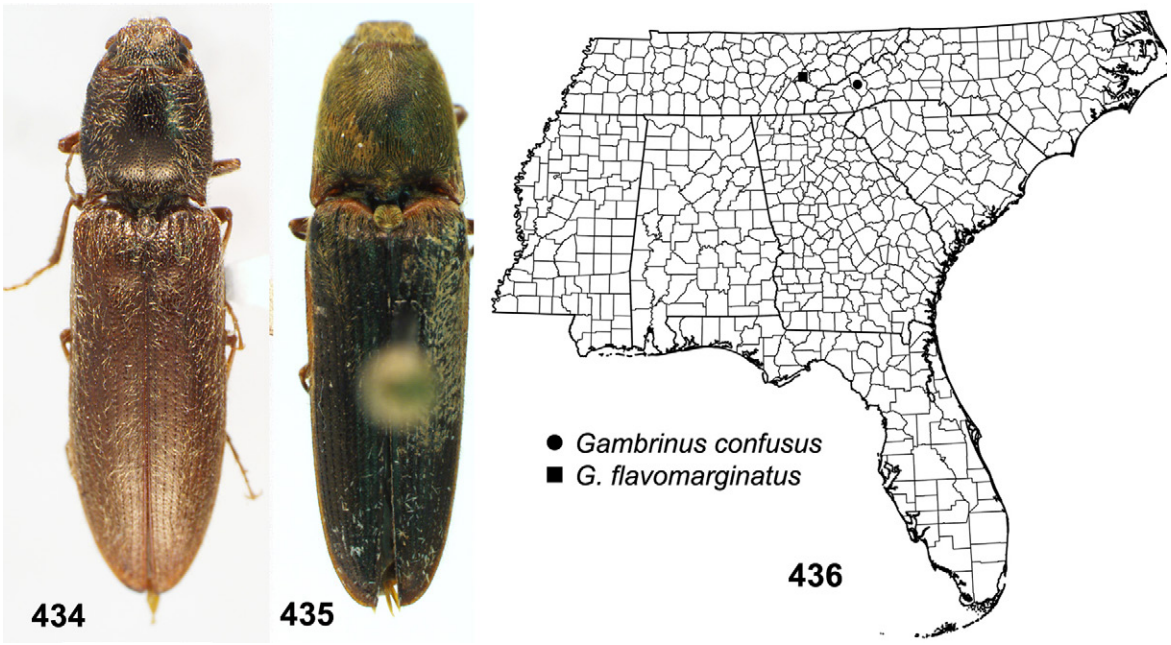
Discussion. In the study area, this species is most similar to *G. plebejus* and *Limonius ectypus*. From *L. ectypus* it can be separated externally by having the pronotosternal sutures open anteriorly; from *L. plebejus* it can be separated externally by having longer antennae. Specimens in the study area have been collected in Lindgren funnel traps.

Gambrinus flavomarginatus (Knull, 1938)

Figures 435–436

Limonius flavomarginatus Knull, 1938: 20

Diagnosis. Size small to moderate, 8.5–11.0 mm in length. Head and pronotum black, pronotal hind angles yellow; elytron brown; vestiture golden-yellow, appressed. Frontal margin formed by supra-antennal carinae entire. Antenna 11-segmented, serrate, extending up to one antennomere beyond apex of pronotal hind angle; antennomeres II and III combined slightly longer than IV. Pronotum as long as broad, widest at base and



Figures 434–436. *Gambrinus* spp. **434)** *G. confusus* (habitus). **435)** *G. flavomarginatus* (habitus). **436)** Distributional data for *G. confusus* and *G. flavomarginatus*.

gradually narrowing anteriorly; punctures deep, coarse, dense; hind angle gradually enlarged; unicarinate with short carina. Hypomeron with elevated margin along pronotosternal sutures. Pronotosternal sutures open anteriorly. Aedeagus with median lobe slender, gradually tapering to rounded apex; paramere long, broad, subparallel, narrowing to defined emargination at base of apical blade, blade triangular, longer than broad, rounded at apex. No sexual dimorphism noted.

Distribution. East-central United States, from Ohio to Missouri (Al Dhafer 2009). In the study area, currently known only from Tennessee (Al Dhafer 2009).

Specimens Examined. Tennessee (Loudon). May. (Figure 436)

Discussion. In the study area this species is most similar to *Limonius auripilis*, from which it is best separated by the aedeagus and form of the frontal margin formed by the supra-antennal carinae. Specimens in the study area have been collected at ultraviolet light.

Gambrinus griseus (Palisot de Beauvois, 1805)

Figures 437, 439

Elater griseus Palisot de Beauvois, 1805: 214
Elater cylindriformis Say, 1823: 176
Limonius hirticollis Melsheimer, 1846: 215
Limonius interstitialis Melsheimer, 1846: 215
Limonius propexus Candèze, 1860: 386

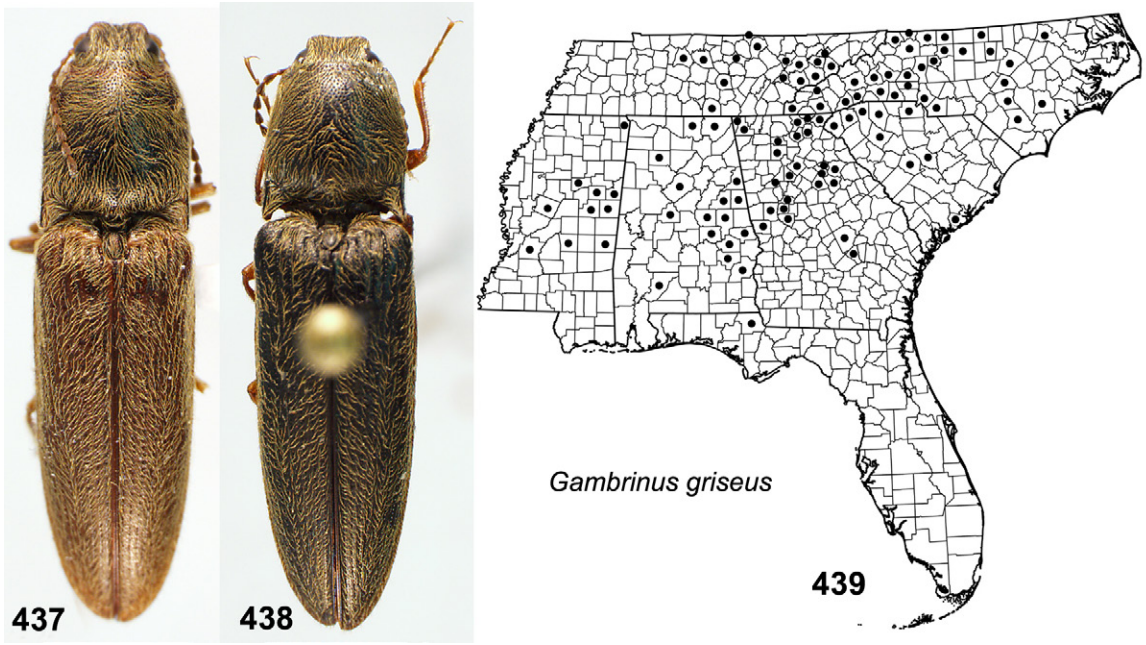
Diagnosis. Size moderate, 10.6–18.0 mm in length. Color red-brown to nearly black; elytral margin, hypomeron, prosternum, and legs paler, reddish; vestiture yellow, dense, appressed. Frontal margin formed by supra-antennal carinae slightly recurved medially. Antenna 11-segmented, serrate, not reaching apices of pronotal hind angle; antennomere II small; III slightly shorter than IV. Pronotum longer than broad, sides broadly

rounded; punctures coarse, dense, becoming subumbilicate laterally; hind angles parallel, unicarinate, carina parallel with lateral margin of hind angle. Hypomeron with elevated margin along pronotosternal sutures. Pronotosternal sutures open anteriorly. Aedeagus with median lobe subparallel, gradually narrowing subapically to rounded apex; paramere broad, constricted at base of apical blade, blade as wide as long, gradually narrowing to rounded apex. Female similar to male externally but usually larger and with shorter antennae.

Distribution. Eastern United States, west to Kansas and Texas (Al Dhafer 2009). Previously recorded from all seven states in the study area (Leng 1910; Brimley 1938; Löding 1945; Fattig 1951; Kirk 1969, 1970; Morrill 1978; Downie and Arnett 1996; Buck et al. 2005; Al Dhafer 2009; Vlach et al. 2010; Ferro et al. 2012c). (Figure 439)

Specimens Examined. Alabama (Barbour, Bibb, Bullock, Clay, Cleburne, Coosa, DeKalb, Elmore, Jackson, Jefferson, Lee, Macon, Madison, Monroe, Randolph, Tallapoosa, Winston); **Florida** (Jackson); **Georgia** (Cherokee, Clarke, Dade, DeKalb, Fulton, Greene, Gwinnett, Harris, Laurens, Lumpkin, Meriwether, Morgan, Oconee, Oglethorpe, Pickens, Pike, Rabun, Spalding, Towns, Union, Upson, Walker, Wheeler, White); **Mississippi** (Hinds, Holmes, Lauderdale, Lowndes, Monroe, Noxubee, Oktibbeha, Scott, Tishomingo, Webster, Winston); **North Carolina** (Alleghany, Ashe, Bladen Buncombe, Burke, Caswell, Catawba, Cherokee, Cleveland, Cumberland, Davie, Duplin, Forsyth, Guilford, Halifax, Harnett, Henderson, Iredell, Lincoln, Macon, McDowell, Mecklenburg, Orange, Rutherford, Stokes, Surry, Swain, Transylvania, Union, Wake, Wilkes counties; also along the Blue Ridge Parkway, Kings Mountain, Rocky Mount); **South Carolina** (Charleston, Greenville, Laurens, Lexington, Oconee, Pickens, Richland, Spartanburg, York); **Tennessee** (Anderson, Blount, Cocke, Davidson, Fentress, Franklin, Hamblen, Jefferson, Knox, Loudon, Pickett, Putnam, Sevier, Warren, Wilson). March–August.

Discussion. Etzler (2019) brought *L. interstitialis* and *L. propexus* out of synonymy with *G. griseus* but did not explain why or indicate how to separate the species. Specimens of *G. interstitialis* and *G. propexus* will key to *G. griseus* herein. Because most specimens examined in this study could not be re-examined in time, those changes are not reflected here. However, it should be understood that specimens that I identified as *G. griseus* (as *Limonius griseus*) may belong to *G. interstitialis* or *G. propexus*.



Figures 437–439. *Gambrinus* spp. **437)** *G. griseus* (habitus). **438)** *G. rudis* (habitus). **439)** Distributional data for *G. griseus*.

This species is most similar to *G. rudis* in the study area. They can be separated by *G. griseus* having the pronotal hind angles parallel-sided (slightly divergent in *G. rudis*) and a having reddish prosternum and hypomeron (both black, sometimes with a reddish tinge, in *L. rudis*), as well as differences in the aedeagus. This species has been commonly and readily collected in the study area, and by a variety of methods, including at ultraviolet and mercury vapor light, in Lindgren funnel, Malaise, and flight intercept traps, and from sweeping and hand picking from vegetation.

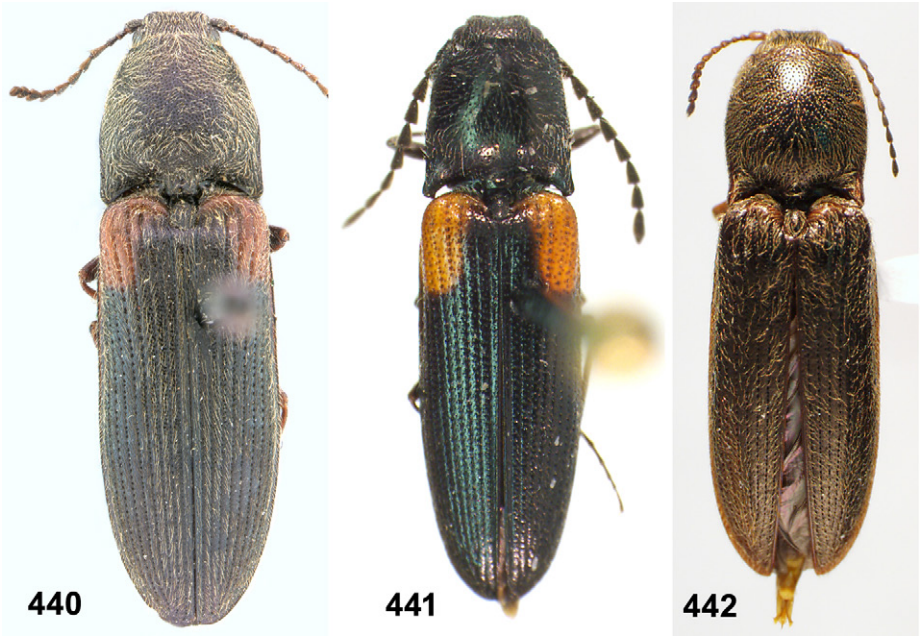
Gambrinus meridianus (Knull, 1947)

Figure 440

Limonius meridianus Knull, 1947b: 177

Diagnosis. Size small to moderate, 8.5–11.0 mm in length. Bicolored; head black; pronotum dark blue to black; elytron black with base of elytra orange; vestiture yellow-gold, appressed. Frontal margin formed by supra-antennal carinae entire or slightly recurved medially. Antenna 11-segmented, serrate, extending up to one antennomere beyond apex of pronotal hind angle; antennomeres II and III small, combined slightly longer than IV. Pronotum slightly longer than wide or subequal length and width, sides broadly rounded; punctures subumbilicate, sparse, separated by greater than their own diameter; hind angles subparallel, unicarinate, carina short, strong, and convergent. Hypomeron with elevated margin along pronotosternal sutures. Pronotosternal sutures open anteriorly. Aedeagus with median lobe subparallel, constricted subapically, apex rounded; paramere subparallel, defined emargination at base of apical blade, blade longer than side, gently tapering to rounded apex. Female similar to male externally but with antennae shorter, not reaching apex of pronotal hind angle.

Distribution. Northeastern United States, from Pennsylvania to Ohio, south to North Carolina (Al Dhafer 2009). In the Southeast, previously recorded only from North Carolina (Knull 1947b; Wray 1950; Al Dhafer 2009); one of Knull's paratypes (Figure 468) was collected in Cranberry, Avery County, NC.



Figures 440–442. *Gambrinus* spp. **440)** *G. meridianus* (habitus - PARATYPE). **441)** *G. stigma* (habitus). **442**) *G. plebejus* (habitus). Paratype of *Limonius meridianus* photo courtesy Luciana Musetti (C. A. Triplehorn Insect Collection, Ohio State University, Columbus, OH, USA).

Specimens Examined. None.

Discussion. This species is most similar to *G. stigma* and *Limonius auripilis*, based on the color of the elytra. *Limonius auripilis* has a more deeply recurved frontal margin and has longer, denser pronotal setae. The aedeagi are also quite distinct among the species.

Gambrinus plebejus (Say, 1825)

Figures 442–443

Elater plebejus Say, 1825: 263
Limonius metallescens Melsheimer, 1846: 158

Diagnosis. Size small to moderate, 7.5–10.0 mm in length. Color red-brown to dark brown, elytron often slightly paler than pronotum; vestiture yellow. Frontal margin formed by supra-antennal carinae entire to slightly recurved medially. Antenna 11-segmented, serrate, not reaching apex of pronotal hind angle; antennomeres II and III combined slightly longer than IV. Pronotum slightly longer than wide, lateral margins broadly rounded; punctures coarse, dense, deep, becoming contiguous laterally; hind angles subparallel, unicarinate. Hypomeron with elevated margin along pronotosternal sutures; emarginate basally. Pronotosternal sutures open anteriorly. Aedeagus with median lobe gently tapering to subacute apex; paramere gradually tapering to base of apical blade, blade longer than wide, narrowly rounded apically.

Distribution. Eastern North America, west to Kansas (Al Dhafer 2009). In the Southeast, previously recorded from Florida, Georgia, North Carolina, and South Carolina (Brimley 1938; Fattig 1951; Kirk 1969, 1970; Downie and Arnett 1996; Al Dhafer 2009).

Specimens Examined. Georgia (Walker); **North Carolina** (Alleghany, Mecklenburg, Watauga). May–June. (Figure 443)

Discussion. In the study area, this species is most similar to *G. confusus* but can be separated by differences in the aedeagus and by having shorter antennae that do not reach the apex of the pronotal hind angle. Specimens may also resemble a small *G. griseus*. Specimens in the study area have been collected at ultraviolet light and by hand picking from vegetation.

Gambrinus rudis (Brown, 1933)

Figures 438, 443

Limonius rudis Brown, 1933b: 175

Diagnosis. Size moderate, 11.5–14.0 mm in length. Color black; hypomeron and prosternum sometimes with reddish margins; vestiture yellow, appressed, denser on pronotum. Frontal margin formed by supra-antennal carinae slightly recurved medially. Antenna 11-segmented, serrate, not reaching apex of pronotal hind angle; antennomere III small, intermediate between II and IV. Pronotum longer than wide, sides broadly rounded; punctures deep, coarse, separated by approximately their own diameter; hind angles slightly divergent, unicarinate. Hypomeron with elevated margin along pronotosternal sutures. Pronotosternal sutures open anteriorly. Aedeagus with median lobe broad, tapering subapically to slightly rounded apex; paramere broad basally, narrowing to base of apical blade, blade with acute lateral spine, broadly arcuate to rounded apex. No sexual dimorphism noted.

Distribution. Eastern North America, west to Wisconsin and Nebraska (Al Dhafer 2009). In the Southeast, previously recorded only from North Carolina (Al Dhafer 2009). The following records from Mississippi and Tennessee represent **New State Records**.

Specimens Examined. Mississippi (Calhoun); **North Carolina** (Avery, Mecklenburg); **Tennessee** (Davidson, Franklin, Rutherford, Wilson). June. (Figure 443)

Discussion. In the study area, this species is externally most similar to *G. griseus*. In addition to the characteristics of the aedeagus, they can be separated by *G. rudis* having the pronotal hind angles slightly divergent (subparallel in *G. griseus*) and being darker in color (the hypomeron, border of elytron, and often prosternum reddish in *G. griseus*). Specimens in the study area have been collected at ultraviolet light.

Gambrinus stigma (Herbst, 1806)

Figures 441, 443

Elater stigma Herbst, 1806: 86
Elater armus Say, 1839: 171

Diagnosis. Size small to moderate, 6.5–10.5 mm in length. Bicolored, black with base of elytron red-orange; vestiture yellow on head and elytron, reddish on pronotum, sparse, appressed. Frontal margin formed by supra-antennal carinae entire or slightly recurved medially. Antenna 11-segmented, serrate, extending up to two antennomeres beyond apex of pronotal hind angle; antennomeres II and III combined subequal to IV. Pronotum longer than wide; sides subparallel; punctures coarse, sparse; hind angles subparallel, unicarinate, carina short. Hypomeron without elevated margin along pronotosternal sutures. Pronotosternal sutures closed anteriorly. Aedeagus with median lobe subparallel for most of length, suddenly tapering subapically to subacute apex; paramere long, narrow, slight rounded emargination at base of apical blade, blade longer than wide, gradually rounding to subacute apex. No sexual dimorphism noted.

Distribution. Northeastern North America, south to Georgia and west to Indiana (Al Dhafer 2009). In the Southeast, previously recorded only from Georgia (LeConte 1853; Candèze 1860; Leng 1920; Fattig 1951; Downie and Arnett 1996; Al Dhafer 2009). The type locality of *E. stigma* is Georgia (not further restricted). The following records from North Carolina and Tennessee represent **New State Records**.

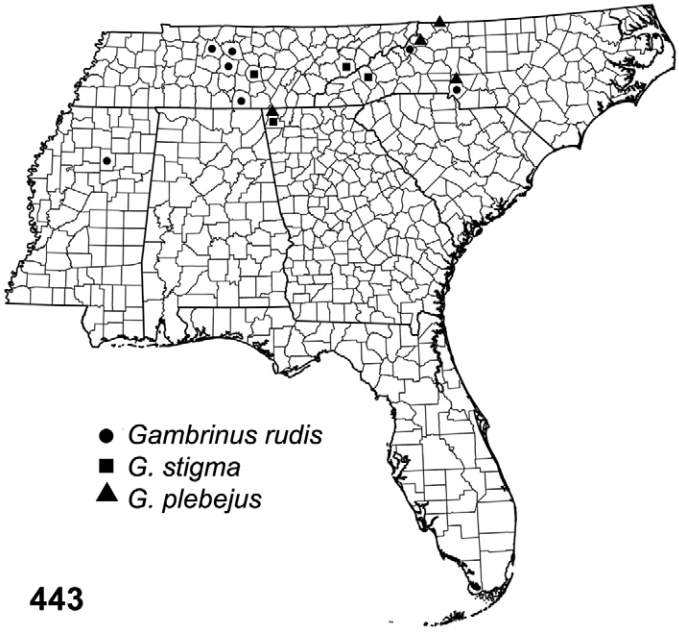


Figure 443. Distributional data for *Gambrinus rudis*, *G. stigma*, and *G. plebejus*.

Specimens Examined. Georgia (Walker); **North Carolina** (Haywood); **Tennessee** (Sevier, Warren). March–May. (Figure 443)

Discussion. The color of the elytra of this species is similar to *Limonius auripilis* and *G. meridianus*. Both of the latter species however have the pronotosternal sutures clearly open anteriorly. Specimens in the study area have been collected in Lindgren funnel and Malaise traps.

Hemicrepidius Germar, 1839

Pedetes Kirby, 1837: 212 (nec *Pedetes* Illiger, 1811: 81), in part
Asaphes Kirby, 1837: 146
Hemicrepidius Germar, 1839: 212
Heterathous Reitter, 1905: 32
Pseudathous Méquignon, 1930: 95
Miwacredpidius Ôhira, 1962: 263
Yukara Kishii, 1962: 21
Medakathous Kishii, 1964: 17

Diagnosis. Size small to large. Typically, uniformly dark brown to black beetles, occasionally pale or bicolored. Supra-antennal carinae complete, but depressed, not well-elevated above the clypeus; front often with triangular depression. Antennae 11-segmented, serrate. Pronotum variable; hind angles distinctly produced from base of hypomeron, usually carinate (ecarinate in one species); base of pronotum with notches anterior of scutellum. Hypomeron lacking elevated margin along pronotosternal sutures; variably punctured, often with impunctate area basally. Pronotosternal sutures closed. Tarsomeres I–IV with prominent membranous lobes; tarsomere IV short; claws simple, without basal setae.

Range and Numbers. There are 20 species in the United States (Etzler 2020b). Seven species (all native) have been recorded from the Southeast (Etzler 2020b); however, only four are included here (see below).

Discussion. The first comprehensive treatment and key for *Hemicrepidius* in North America was by Horn (1880) as the genus *Asaphes*. Becker (1979a) redescribed the genus, transferred several species from *Athous*, and provided a key to related genera. Etzler (2020b) revised the genus for the New World. Because Etlzer's work (2020b) was published after submission of this manuscript, and because specimens examined during the course of this study could not be re-examined, his taxonomic changes are not expressed here. I made notes below where his changes occur. Adults are superficially similar to *Athous* in having prominent membranous lobes on tarsomeres II and III and a triangular depression on the front of the head. Historically, separation of these genera has been challenging due to traditional key features shared among the genera. There are a couple features that may be helpful separating North American members of these two genera. One is the projection of the hind angles from the hypomeron in *Hemicrepidius*, a feature that is not always easy to discern. Another is the presence of a posterior medial notch on the pronotum anterior the scutellum. This character is absent in all North American *Athous*. Becker (1974, 1979a) discussed the issues with these and related genera. Van Dyke (1932) felt that several of the characters used by Horn (1880) to define the species are variable, including characters of the prosternal process, clypeus, and density of punctures at the base of the hypomeron.

Key to the species of *Hemicrepidius* in the Southeast
(adapted from Horn 1880)

1. Pronotal hind angle ecarinate . . . . . ***H. bilobatus* (Say)**
— Pronotal hind angle carinate **2**

2(1). Pronotum at hind angle subparallel, not divergent, carina straight, strong; antennomere III similar to IV in shape and texture, albeit slightly shorter . . . . . ***H. nemnonius* (Herbst)**

— Pronotum at hind angle slightly sinuate to distinctly sinuate with hind angle distinctly divergent, carina slightly to clearly sinuate, weak to strong; antennomere III similar to II in shape and texture, albeit slightly longer **3**

3(2). Aedeagus with paramere possessing dense cluster of setae along upper angle of apical blade (Figure 448); pronotal hind angle generally noticeably divergent . . . . . ***H. hemipodus* (Say)**

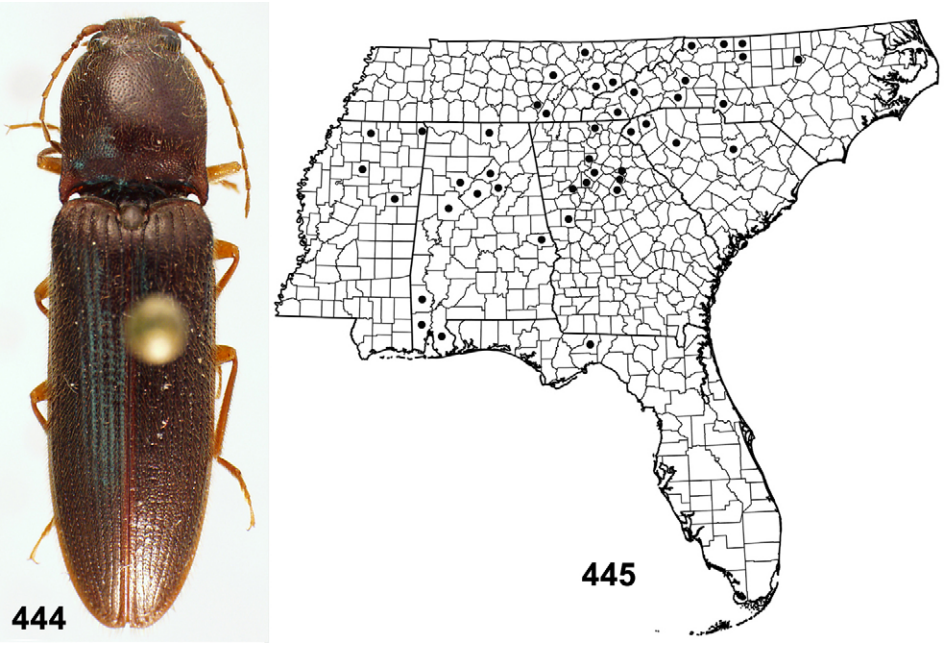
— Aedeagus with paramere possessing few to no setae along upper angle of apical blade (Figure 449); pronotal hind angle subparallel to slightly divergent . . . . . ***H. indistinctus* (LeConte)**

Hemicrepidius bilobatus (Say, 1839)

Figures 444–445

Athous fastiditus Dejean, 1837: 101 (*nomina nuda*)
Elater bilobatus Say, 1839: 452
Athous melanophthalmus Melsheimer, 1844: 451
Asaphes cavifrons Melsheimer, 1844: 223
Asaphes tener LeConte, 1853: 452
Asaphes consentaneus LeConte, 1853: 452
Asaphes planatus LeConte, 1853: 453

Diagnosis. Size moderate, 13.0–16.0 mm in length. Color variable, from light red-brown to dark brown; vestiture brown, sparse. Antenna 11-segmented, weakly serrate, extending beyond apex of pronotal hind angle by 2–3 antennomeres; antennomere III longer than II, subequal to IV. Pronotum slightly longer than wide, sides subparallel to arcuate, widest at middle; punctures coarse, dense, becoming more shallow and umbilicate laterally; hind angle ecarinate. Hypomeron with punctures shallow, umbilicate, less dense than on pronotum; impunctate area basally. Prosternal process bent apically. Elytral striae shallow but punctured; intervals slightly



Figures 444–445. *Hemicrepidius bilobatus*. **444)** Habitus. **445)** Distributional data.

convex and coarsely punctured. Aedeagus undescribed. Females similar to males externally, but slightly larger, with more arcuate pronotum, and shorter antennae.

Distribution. Northeastern United States, west to Indiana and south to Georgia (Downie and Arnett 1996). In the Southeast, previously recorded from Alabama, Georgia, North Carolina, and South Carolina (LeConte 1853; Horn 1880; Leng 1920; Brimley 1938; Löding 1945; Fattig 1951; Kirk 1970; Downie and Arnett 1996). The following records from Florida, Mississippi, and Tennessee represent **New State Records**.

Specimens Examined. Alabama (Baldwin, Blount, Jefferson, Lee, Madison, Mobile, St. Clair, Tuscaloosa, Walker, Washington); **Florida** (Leon); **Georgia** (Clarke, DeKalb, Floyd, Forsyth, Fulton, Gwinnett, Meriwether, Morgan, Oconee, Union); **Mississippi** (Marshall, Oktibbeha, Tishomingo, Yalobusha); **North Carolina** (Ashe, Burke, Durham, Forsyth, Haywood, Macon, Mecklenburg, Rutherford, Stokes, Surry); **South Carolina** (Kershaw, Laurens, Oconee, Pickens); **Tennessee** (Blount, Campbell, Cumberland, Hamilton, Sequatchie, Sevier). May–October. (Figure 436)

Discussion. This species is highly variable in form and color, hence a large number of synonyms are associated with it. It is readily recognized being the only member of its genus having ecarinate pronotal hind angles. From the specimens I have examined pale forms of this species predominate in the north, while darker forms predominate in the south. Specimens in the study area have been collected at ultraviolet light, in Lindgren funnel, flight intercept, and pitfall traps, and netted while in flight. One specimen from Oconee County, SC (CUAC) was collected under a beehive. Etzler (2020b) elevated *H. melanophthalmus* to species status and included *A. cavifrons* as a synonym therein. Because specimens examined during the course of this study could not be re-examined, those changes are not reflected here.

Hemicrepidius hemipodus (Say, 1825)

Figures 446–448, 451

Elater hemipodus Say, 1825: 254
Elater decoloratus Say, 1839: 180
Diacanthus corporosus Germar, 1843: 72
Athous aereus Melsheimer, 1844: 156
Asaphes aeneolus Melsheimer, 1844: 156

Diagnosis. Size small to moderate, 9.0–15.0 mm in length. Color dark red-brown to black; elytra often yellowish to red-brown; legs reddish; vestiture grayish, dense, long on pronotum. Antenna 11-segmented, weakly serrate, extending approximately two antennomeres beyond apices of pronotal hind angles; antennomere III longer than II, closer in length to IV but more slender. Pronotum longer than wide, sides arcuate, widest at middle; punctures simple, coarse, relatively dense; hind angles clearly divergent, unicarinate. Hypomeron with punctures dense, shallow, umbilicate; large impunctate area basally. Prosternal process horizontal or slightly flexed. Elytral striae impressed, coarsely punctured; interspaces coarsely punctate. Aedeagus (Figure 448) with median lobe slender, gradually tapering to rounded apex; paramere with broad apical blade bearing an acute tooth, dense cluster of setae along upper angle of blade. Female similar to male externally but generally stouter and with a wider and more convex pronotum.

Distribution. Northeastern United States, west to Missouri (Horn 1880). In the Southeast, previously recorded from Alabama, Georgia, Mississippi, North Carolina, South Carolina, and Tennessee (Leng 1910; Brimley 1938; Löding 1945; Fattig 1951; Richmond 1968; Kirk 1969; Becker 1979a). Two of Brimley's (1938) records from North Carolina are based on misidentifications (see below). The following record from Florida represents a **New State Record**. (Figure 451)



Figures 446–449. *Hemicrepidius* spp. **446)** *H. hemipodus* (habitus - bicolored form). **447)** *H. hemipodus* (habitus). **448)** *H. hemipodus* (aedeagus). **449)** *H. indistinctus* (aedeagus).

Specimens Examined. Alabama (Madison); **Florida** (Alachua); **Mississippi** (George, Oktibbeha, Union); **North Carolina** (Ashe, Buncombe, Rockingham counties; also Blowing Rock State Park); **Tennessee** (Blount, Greene, Jefferson, Sevier). May–July.

Discussion. This is another highly variable species, which can easily be confused for an *Athous* (especially the forms with pale elytra). Variation within the species may require a re-evaluation of the species currently considered synonymous with *H. hemipodus*. Within this genus in the Southeast, it is most likely to be confused with *H. indistinctus*. Several of the characters used by Horn (1880) seem variable among both species, including the color of the legs, the form of the mesosternal fossa, the density of punctures on the hypomeron, and the degree to which the prosternal process is bent. In dissecting specimens from the Northeast as well as in the current study area, the best character I currently feel comfortable using to separate them is the form of the apical blade on the paramere, especially the presence and density of setae along the upper angle of the blade. In *H. hemipodus*, there is a denser cluster of long setae along the upper angle of the apical blade; in *H. indistinctus* there are no or few long setae. This interpretation should be considered tentative until a formal revision is ever done, as it may just represent clinal variation over geographic space. Also, the pronotal hind angles tend to be more divergent in *H. hemipodus*, but again this is a somewhat variable character in *H. indistinctus*. I have examined the specimens (NCSU) that were the basis for Brimley's (1938) records from Blowing Rock State Park, Linville Falls, and Walkertown, NC. The specimen from Blowing Rock State Park was correctly identified; but I determined the Walkertown specimen is *H. indistinctus*. The two specimens that were the basis for his Linville Falls records are females of *Setasomus aratus*. Etzler (2020b) elevated *H. decoloratus* to species status. Because specimens examined during the course of this study could not be re-examined, those changes are not reflected here.

Hemicrepidius indistinctus (LeConte, 1853)

Figures 449–451

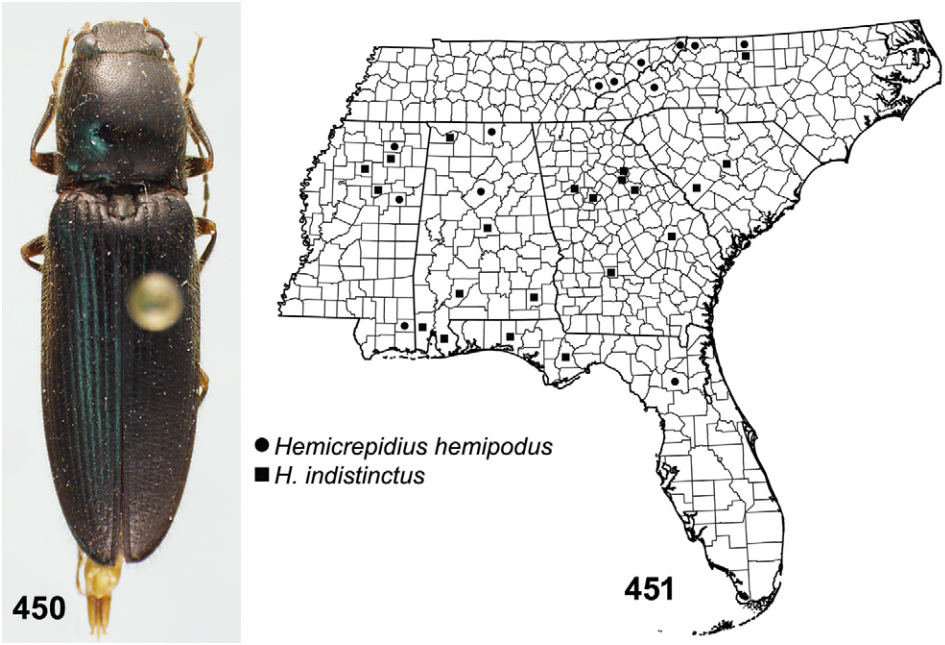
Asaphes indistinctus LeConte, 1853: 451

Diagnosis. Size moderate, 10.0–12.0 mm in length. Black, legs sometimes yellow; vestiture grayish, sparse. Antenna 11-segmented, serrate, extending approximately two antennomeres beyond apex of pronotal hind angle; antennomere III slightly longer than II, shorter than IV. Pronotum slightly longer than wide, slightly arcuate, convex; punctures simple, sparse; hind angles subparallel to slightly divergent (not as obviously so as in *H. hemipodus*), unicarinate, carina strong. Hypomeron with punctures shallow, umbilicate; impunctate area basally. Prosternal process apically flexed inwards toward body. Elytral striae impressed, punctate; intervals convex, punctate but not densely so. Aedeagus (Figure 449) with median lobe gradually tapering to rounded apex; paramere with long, slightly curved, subapical lateral tooth, gradually tapering to subacute apex, upper angle of blade with no or few long setae. No sexual dimorphism noted.

Distribution. Northeastern United States, from Ohio south to Georgia (Downie and Arnett 1996). In the Southeast, previously recorded from Alabama, Georgia, and South Carolina (LeConte 1853; Horn 1880; Leng 1920; Löding 1945; Fattig 1951; Downie and Arnett 1996). Brimley's (1938) record of *H. hemipodus* from Walkertown, NC refers to this species. The type locality if Georgia (not further restricted). The following records from Florida, Mississippi, and North Carolina represent **New State Records**.

Specimens Examined. Alabama (Baldwin, Chilton, Colbert, Dale, Jefferson, Mobile, Monroe); **Florida** (Liberty, Walton); **Georgia** (Clark, Crisp, Emanuel, Fulton, Greene, Henry, Oconee); **Mississippi** (Pontotoc, Webster, Yalobusha); **North Carolina** (Forsyth); **South Carolina** (Aiken, Richland). May–July. (Figure 451)

Discussion. This species is most likely to be confused with *H. hemipodus* (see the Discussion under *H. hemipodus* for separating the two species). Specimens in the study area have been collected at ultraviolet light and in Malaise and Lindgren funnel traps.



Figures 450–451. *Hemicrepidius* spp. **450)** *H. indistinctus* (habitus). **451)** Distributional data for *H. hemipodus* and *H. indistinctus*.

Hemicrepidius nemnonius (Herbst, 1806)

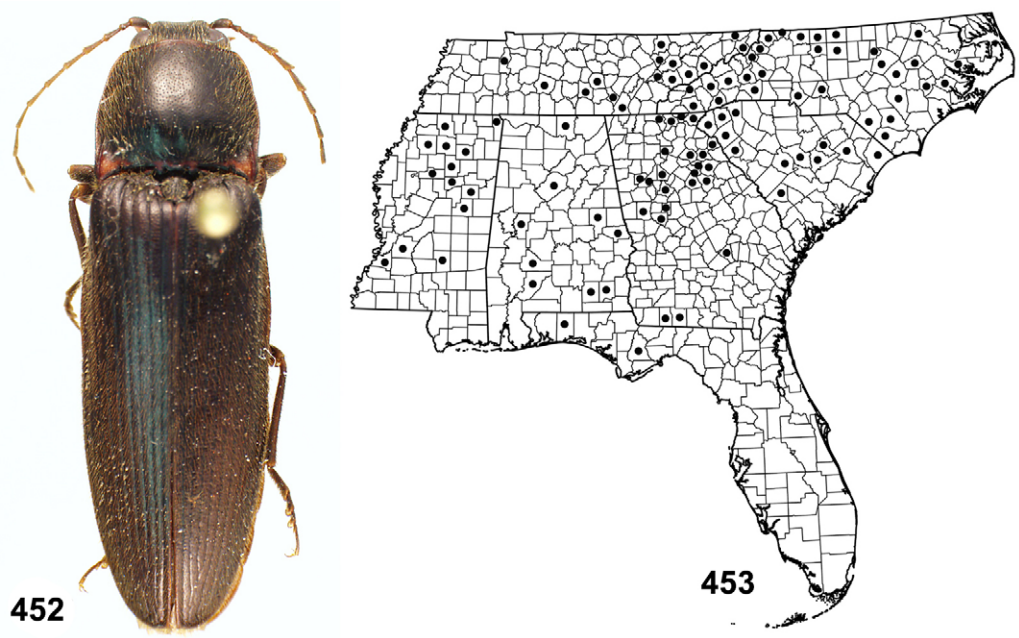
Figures 452–453

Elater nemnonius Herbst, 1806: 29
Elater memnonius Herbst, 1806 (unjustified emendation, Say, 1839: 176)
Elater baridius Say, 1839: 176
Hemicrepidius thomasi Germar, 1843: 213
Pedetes ruficornis Kirby, 1837: 146
Asaphes brevicollis Candèze, 1863: 212

Diagnosis. Size moderate to large, 13.0–26.0 mm in length; form variable, from slender and nearly subparallel to stout and robust. Color dark red-brown; legs usually paler; vestiture brown, sparse. Antenna 11-segmented, weakly serrate, extending 1–3 antennomeres beyond apex of pronotal hind angle; antennomere III subequal to IV in length. Pronotum about as long as wide, slightly arcuate to nearly parallel-sided; punctures simple, coarse, relatively dense; hind angles subparallel, unicarinate, carina strong. Hypomeron with punctures umbilicate, shallow, dense; impunctate area basally. Prosternal process apically flexed inwards toward body. Elytral striae deeply, coarsely punctured; interspaces convex, coarsely and densely punctured. Aedeagus with median lobe gradually tapering to rounded apex; paramere with long, slightly curved, subapical lateral tooth, gradually tapering to subacute apex. Female similar to male externally, often larger and more robust; pronotum wider, more arcuate; elytral striae shallower near suture.

Distribution. Eastern North America, west to Colorado (Horn 1880; Downie and Arnett 1996). In the Southeast, previously recorded from Alabama, Florida, Georgia, North Carolina, South Carolina, and Tennessee (LeConte 1853; Horn 1880; Leng 1910, 1920; Brimley 1938; Löding 1945; Fattig 1951; Kirk 1969, 1970; Downie and Arnett 1996; Peck and Thomas 1998; Buck et al. 2005; Gibbs et al. 2008; Ferro et al. 2012c). The following records from Mississippi represent a **New State Record**.

Specimens Examined. Alabama (Coffee, Dale, Hale, Jefferson, Lee, Madison, Monroe, Tallapoosa, Wilcox); **Florida** (Liberty, Okaloosa); **Georgia** (Clarke, DeKalb, Douglas, Fannin, Forsyth, Fulton, Grady, Greene,



Figures 452–453. *Hemicrepidius nemnonius*. **452)** Habitus. **453)** Distributional data.

Hart, Henry, Jackson, Lamar, Madison, Meriwether, Morgan, Oconee, Oglethorpe, Rabun, Thomas, Towns, Union, Upson, Wheeler); **Mississippi** (Calhoun, Claiborne, Grenada, Hinds, Lafayette, Marshall, Oktibbeha, Panola, Pontotoc, Smith, Tishomingo, Webster, Winston); **North Carolina** (Alleghany, Ashe, Avery, Beaufort, Bladen, Buncombe, Burke, Columbus, Craven, Durham, Forsyth, Guilford, Halifax, Haywood, Johnston, Lenoir, Macon, McDowell, Mecklenburg, Robeson, Rockingham, Rutherford, Sampson, Stanly, Stokes, Surry, Swain, Transylvania, Wake, Watauga, Wayne, Wilson); **South Carolina** (Abbeville, Anderson, Barnwell, Florence, Greenville, Horry, Lee, Lexington, Oconee, Pickens, Richland, Sumter); **Tennessee** (Anderson, Benton, Blount, Campbell, Carter, Cocke, Coffee, Hamilton, Knox, Loudon, Maury, Sequatchie, Sevier, Sullivan, Warren). May–September. (Figure 453)

Discussion. In most literature, this species is referred to as *H.* "*memnonius*", based on a misspelling. This species is highly variable but should be fairly easy to distinguish from its relatives. Smaller specimens may be confused for *H. indistinctus*, the latter having a shorter antennomere III and a less densely punctate and more setose pronotum. The pronotal punctures can be quite variable in *H. nemnonius*, however, and the aedeagi are inadequate to separate the two. I am keeping a conservative approach and following Horn (1880) and Dietrich (1945) in leaving *P. ruficornis* (including *A. brevicollis*) in synonymy with *H. nemnonius*, although in some works the two species are treated as distinct. Specimens in the study area have been readily collected, and by a variety of methods, including at ultraviolet and mercury vapor light, and in Lindgren funnel, panel, flight intercept, and sticky traps. Etzler (2020b) elevated *H. ruficornis* to species status and included *A. brevicollis* as a synonym therein. Because specimens examined during the course of this study could not be re-examined, those changes are not reflected here.

Limonius Eschscholtz, 1829

Limonius Eschscholtz, 1829: 33
Cidnopus Thomson, 1859: 106
Nothodes LeConte, 1861: 171
Dendrometrius Gistel, 1848: xi
Kibunea Kishii, 1966: 46
Micrathous Lane, 1971: 24
Solskyana Dolin, 1978: 45
Neoathousius Schimmel and Platia, 1991: 881

Diagnosis. Size variable, small to moderate. Color variable, may be unicolored, bicolored, or patterned. Supra-antennal carinae variable, usually complete, but may be weakened, depressed, undulate, or emarginate medially, well-elevated above the labrum or not. Antenna 11-segmented, serrate, variable in length; antennomeres II and III individually always shorter than IV. Pronotum variable; hind angles subparallel or slightly divergent, with or without carina. Hypomeron with or without elevated margin along pronotosternal sutures, not emarginate. Pronotosternal sutures open anteriorly or not. Tarsomeres lacking membranous lobes; claws simple, without basal setae. Aedeagus; paramere with or without apical blade. Female similar to male externally, but usually larger and with shorter antennae.

Range and Numbers. Twenty species, generally distributed in North America (Etzler 2019). Nine species have been recorded from the Southeast, although the records of *L. aeger* LeConte from Georgia (Fattig 1951) and South Carolina (Kirk 1969, 1970) seem doubtful and that species is not included in the current study.

Discussion. The first comprehensive treatment of *Limonius* in North America was by Van Dyke (1932). In that work, he recognized two subgenera, *Limonius* and *Pheletes*. The genus was later revised for North America by Al Dhafer (2009), who continued to use Van Dyke's subgeneric concepts. Etzler (2019) reclassified the species of *Limonius* on a world basis at the genus level, moving many North American species to the genera *Gambrinus*, *Pheletes*, and *Tetralimonius*. Adults are highly variable in form, color, and characteristics of the aedeagus. Some

taxa show similarities with other genera, including with members of Prosternini. Important diagnostic characters in adults include size and color, relative lengths of antennomeres II–IV, form of the pronotosternal sutures and the frontal margin formed by the supra-antennal carinae, and characteristics of the aedeagus. Adults are often readily collected and by a variety of methods. Adults can often be found 'perching' on the leaves of shrubs and trees in hardwood forests, especially in the mountains and Piedmont of the Southeast. Several species have been implicated as economic pests, especially those in the *canus* group (Lanchester 1946; Glen 1950).

Key to the species of *Limonius* in the Southeast
(adapted from Al Dhafer 2009)

1. Elytron bicolored, black with basal area with defined orange to red . . . . . ***L. auripilis* (Say)**
— Elytron unicolored (margins or extreme basal area may be paler) **2**

2(1). Frontal margin formed by supra-antennal carinae strongly recurved or undulate medially; smaller species < 7.0 mm in length **3**
— Frontal margin formed by supra-antennal carinae entire, slightly recurved, or weakly emarginate medially; size variable **4**

3(2). Pronotum black with hind angle and hypomeral margin yellow; antennomeres II and III combined subequal to IV; lateral lobes of aedeagus subparallel, apical blades longer than wide . . . . . ***L. basilaris* (Say)**
— Pronotum solid black; antennomeres II and III combined longer than IV; lateral lobes of aedeagus narrowing anteriorly, apical blades as long as wide . . . . . ***L. quercinus* (Say)**

4(2). Head and pronotum metallic red-purple; elytron dark brown to black . . . . . ***L. aurifer* LeConte**
— Head, pronotum, and elytron typically concolorous (margins of elytron may be paler), color never as above **5**

5(4). Size smaller, < 8.0 mm in length; pronotum solid black; known only from higher elevations in North Carolina . . . . . ***L. beutenmuelleri* Van Dyke**
— Larger species, 8.0 mm or greater in length **6**

6(5). Frontal margin formed by supra-antennal carinae complete . . . . . ***L. ectypus* (Say)**
— Frontal margin formed by supra-antennal carinae weakened medially, not joining carinae 7

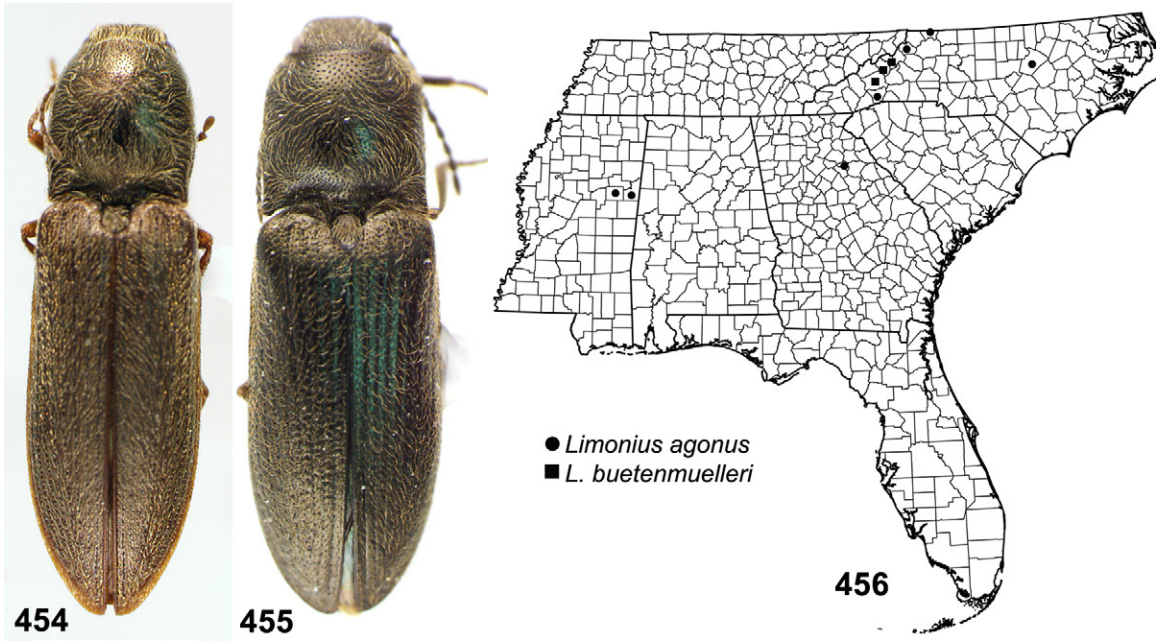
7(6). Antennomere II spherical, about as wide as long, II and III combined subequal to IV; aedeagus with paramere broad basally, curving inwards to base of apical blade, lateral spine of blade acutely pointed, gradually tapering to broadly rounded apex . . . . . ***L. agonus* (Say)**
— Antennomere II small, III often triangular, similar in shape and subequal to IV; aedeagus with paramere subparallel and constricted at base of apical blade, blade sloping inwards to rounded apex . . . . . ***L. subauratus* LeConte**

Limonius agonus (Say, 1839)

Figures 454, 456

Elater agonus Say, 1839: 171
Limonius dubitans LeConte, 1853: 433

Diagnosis. Size small to moderate, 9.0–12.0 mm in length. Color dark brown to black, elytron often lighter than pronotum; pronotal hind angle and hypomeral margin sometimes yellowish; vestiture yellow, long, dense, even longer and denser on pronotum. Frontal margin formed by supra-antennal carinae weakened medially, weakly separated from labrum. Antenna 11-segmented, serrate, extending 2–3 antennomeres beyond apex of pronotal hind angle; antennomere II spherical, II and III combined subequal to IV. Pronotum about as wide



Figures 454–456. *Limonius* spp. **454)** *L. agonus* (habitus). **455)** *L. beutenmuelleri* (habitus). **456)** Distributional data for *L. agonus* and *L. beutenmuelleri*.

as long, sides broadly rounded; punctures coarse, deep, dense, separated by less than their own diameters; hind angles short, scarcely divergent; carinate, carina short and indistinct. Hypomeron lacking elevated margin along pronotosternal sutures; not emarginate basally. Pronotosternal sutures closed anteriorly. Aedeagus with median lobe evenly tapering to rounded apex; paramere broad basally, laterally curving inwards to base of apical blade, lateral spine of blade acutely pointed, gradually tapering to broadly rounded apex. No external sexual dimorphism noted.

Distribution. Eastern North America, west to Minnesota and Illinois (Al Dhafer 2009). In the Southeast, previously recorded from Georgia, North Carolina, South Carolina, and Tennessee (Leng 1910; Kirk 1970; Al Dhafer 2009). The following records from Mississippi represent a **New State Record**.

Specimens Examined. Georgia (Clarke); **Mississippi** (Lowndes, Oktibbeha); **North Carolina** (Alleghany, Henderson, Wake, Watauga). March-June. (Figure 456)

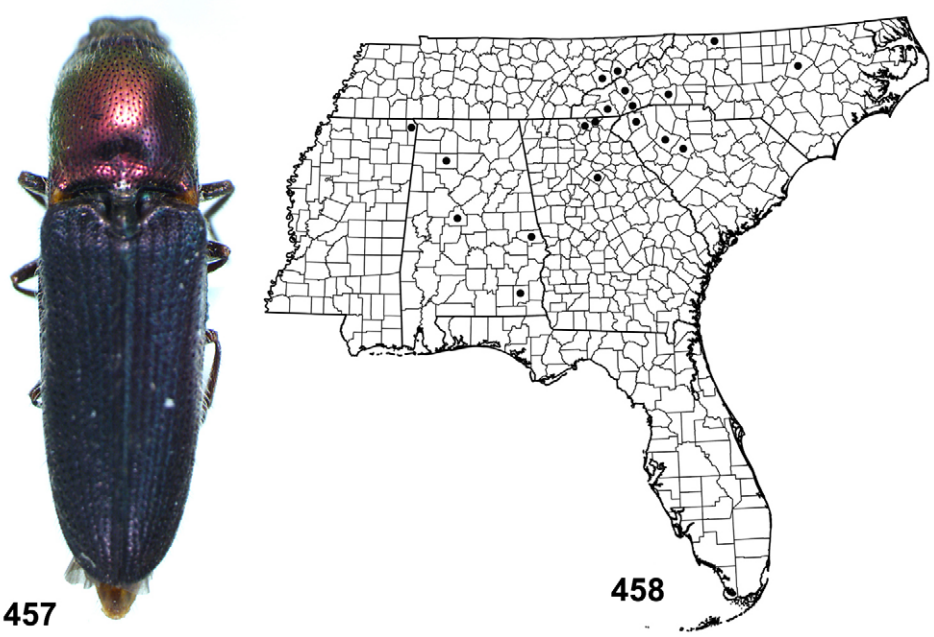
Discussion. Etzler (2019) removed *L. dubitans* from synonymy with *L. agonus* but did not explain why nor describe how to separate them. Because specimens examined in this study could not be re-examined, that change is not reflected here. However, it should be understood that specimens of *L. dubitans* will key to *L. agonus* herein and specimen I previously identified as *L. agonus* might actually represent *L. dubitans*. In the study area, this species is most similar to *L. ectypus*, from which it can be separated by the characteristics of the frontal margin formed by the supra-antennal carinae and aedeagus.

Limonius aurifer LeConte, 1853

Figures 457–458

Limonius aurifer LeConte, 1853: 429

Diagnosis. Size small, 5.5–7.0 mm in length. Bicolored; head and pronotum metallic red-purple; elytron dark brown to black; antennae brown; vestiture yellow, short, sparse. Frontal margin formed by supra-antennal



Figures 457–458. *Limonius aurifer*. **457)** Habitus. **458)** Distributional data.

carinae slightly recurved medially. Antenna 11-segmented, serrate, extending two antennomeres beyond apex of pronotal hind angle; antennomeres II and III small, combined slightly shorter than IV. Pronotum longer than wide, subparallel, narrowing slightly anteriorly; punctures coarse, deep, separated by more than their own diameter; hind angles short, subparallel, unicarinate. Hypomeron with elevated margin along pronotosternal sutures. Pronotosternal sutures open anteriorly. Aedeagus with median lobe long, slender, subparallel, tapering subapically to rounded apex; paramere long, slender, apical blade triangular, gently curving to subacute apex. No external sexual dimorphism noted.

Distribution. Eastern North America, west to Illinois (Al Dhafer 2009). In the Southeast, previously recorded from Alabama, Georgia, Mississippi, North Carolina, South Carolina, and Tennessee (Brimley 1938; Löding 1945; Fattig 1951; Kirk 1970; Downie and Arnett 1996; Al Dhafer 2009; Ferro et al. 2012c).

Specimens Examined. Alabama (Bibb, Dale, Lee, Winston); **Georgia** (Towns, Union, Walton); **Mississippi** (Tishomingo); **North Carolina** (Haywood, Macon, Mecklenburg, Rutherford, Surry, Transylvania, Wake); **South Carolina** (Laurens, Newberry, Pickens); **Tennessee** (Cocke, Sevier). May-August. (Figure 458)

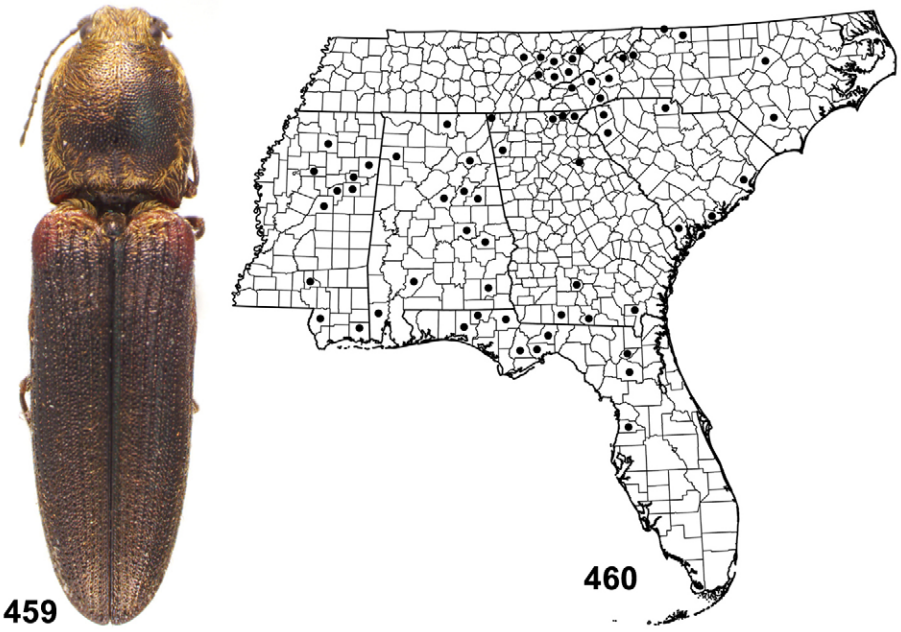
Discussion. This species should be readily recognized by its size and color alone. Specimens in the study area have been collected in Malaise traps, flight intercept traps, by hand picking from, beating, and sweeping vegetation, and netted while in flight. Specimens have also been collected on a variety of plants, including tupelo, dogwood, and hickory.

Limonius auripilis (Say, 1823)

Figures 459–460

Elater auripilis Say, 1823: 172
Limonius pubicollis LeConte, 1853: 429

Diagnosis. Size small to moderate, 8.5–11.5 mm in length. Bicolored; head black; pronotum black with posterior border of pronotal hind angles red-yellow; elytron black with red basal maculae; vestiture golden-yellow,



Figures 459–460. *Limonius auripilis*. **451)** Habitus. **452)** Distributional data.

dense, longer and denser on pronotum. Frontal margin formed by supra-antennal carinae deeply incised medially. Antenna 11-segmented, serrate, extending up to one antennomere beyond apex of pronotal hind angle; antennomere II small; III subequal to IV. Pronotum almost as long as wide, broadly rounded, widest at middle, narrowing anteriorly and posteriorly; punctures deep, coarse, and dense; hind angle sub-parallel, broadly rounded, unicarinate with carina short. Hypomeron with elevated margin along pronotosternal sutures. Pronotosternal sutures open anteriorly. Aedeagus with median lobe subparallel, tapering subapically to subacute apex; paramere broad basally, narrowing and broadly curving inward at base of large apical blade, broadly rounded apically. No sexual dimorphism noted.

Distribution. Much of eastern and central North America (Al Dhafer 2009). Previously recorded from all seven states in the study area (LeConte 1853; Candèze 1860; Leng 1910, 1920; Dozier 1918; Brimley 1938; Löding 1945; Fattig 1951; Kirk 1969, 1970; Downie and Arnett 1996; Peck and Thomas 1998; Al Dhafer 2009). The type locality of *L. pubicollis* is Georgia (not further restricted). Brimley's (1938) record of *Gambrinus fulvipilis* (as *Limonius fulvipilis*) from Black Mountain, NC refers to this species.

Specimens Examined. Alabama (Clay, Dale, Elmore, Etowah, Macon, Madison, Marion, Mobile, Monroe, Shelby, Talladega); **Florida** (Alachua, Hernando, Holmes, Jackson, Leon, Liberty, Union, Wakulla, Walton); **Georgia** (Clarke, Charlton, Dade, Floyd, Lowndes, Rabun, Thomas, Tift, Towns, Union); **Mississippi** (Attala, Choctaw, Clay, Grenada, Jackson, Jefferson Davis, Lafayette, Monroe, Oktibbeha, Pearl River); **North Carolina** (Alleghany, Avery, Bladen, Buncombe, Haywood, Mitchell, Surry, Swain, Transylvania, Wake counties; also along the Blue Ridge Parkway, Council); **South Carolina** (Anderson, Charleston, Georgetown, Jasper, Pickens, York); **Tennessee** (Anderson, Blount, Hamblen, Jefferson, Knox, Loudon, Morgan, Sevier). March–August, October. (Figure 460)

Discussion. This species is readily recognized in the study area by its color and deeply incised frontal margin. I have seen melanic specimens from Knox County, TN (ECUT) and Haywood County, NC (UCFC) that lack pale pronotal hind angles and the red shoulders of the elytra; the antennae are also darker. *Gambrinus meridianus* has similarly colored elytra but has a slightly (if at all) incised frontal margin and shorter, sparser pronotal setae. Adults in the study area have been collected at ultraviolet light, in Lindgren funnel, canopy, and Malaise

traps, and on vegetation, including hydrangea, ash, oak, tick clover, sabal, and hackberry. Specimens from Swain County, NC (LSAM) were collected in forest litter. Dozier (1918) reported it on buckeye in Florida.

Limonius basilaris (Say, 1823)

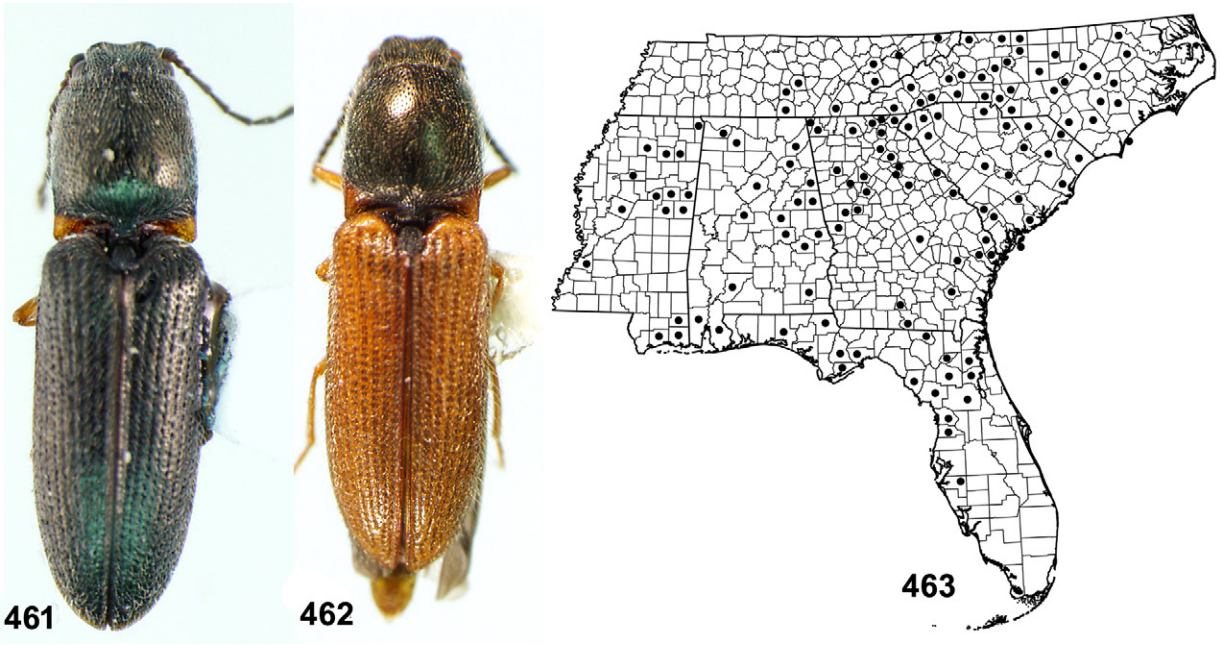
Figures 461–463

Elater basilaris Say, 1823: 172
Limonius semianeus LeConte, 1853: 432

Diagnosis. Size small, 5.0–6.5 mm in length. Color black; pronotal hind angle and often antennomeres II and III paler; southern populations (form '*semianeus*', Figure 462) with pale elytron; legs reddish; vestiture yellow, appressed. Frontal margin formed by supra-antennal carinae strongly undulate and recurved medially. Antenna 11-segmented, serrate, extending 2–3 antennomeres beyond apex of pronotal hind angle; antennomeres II and III combined slightly shorter than IV. Pronotum longer than wide, subparallel basally; punctures simple, coarse, dense; hind angles subparallel, unicarinate. Hypomeron without elevated margin along pronotosternal sutures. Pronotosternal sutures open anteriorly. Aedeagus with median lobe broad, tapering subapically to rounded apex; paramere elongate, subparallel, with slight emargination at base of narrow apical blade, apex subacute. No sexual dimorphism noted.

Distribution. Eastern North America (Al Dhafer 2009). In the Southeast, previously recorded from all seven states in the study area (LeConte 1853; Leng 1920; Brimley 1938; Löding 1945; Fattig 1951; Kirk 1969, 1970; Downie and Arnett 1996; Peck and Thomas 1998; Al Dhafer 2009; Vlach et al. 2010). The type locality of *L. semianeus* is Georgia (not further restricted).

Specimens Examined. Alabama (Baldwin, Bibb, Clay, Cleburne, Colbert, Coosa, Dale, DeKalb, Elmore, Escambia, Etowah, Jefferson, Lawrence, Lee, Macon, Mobile, Monroe, Randolph); **Florida** (Alachua, Citrus, Clay, Dixie, Franklin, Hamilton, Hernando, Jackson, Levy, Liberty, Manatee, Marion, Putnam, Union, Wakulla, Walton); **Georgia** (Bryan, Chatham, Chattooga, Clarke, Cook, Dade, DeKalb, Effingham, Fulton, Gilmer, Greene, Hall, Harris, Henry, Jackson, Laurens, Lincoln, Lowndes, Meriwether, Oconee, Paulding, Pierce, Pike, Rabun, Richmond, Tattnall, Towns, Union, Walker, White); **Mississippi** (Choctaw, Claiborne,



Figures 461–463. *Limonius basilaris*. **461)** Habitus. **462)** Habitus (form *semianeus*). **463)** Distributional data.

George, Grenada, Harrison, Holmes, Jackson, Lafayette, Lee, Lowndes, Noxubee, Oktibbeha, Pontotoc, Tishomingo, Winston); **North Carolina** (Alamance, Ashe, Bladen, Burke, Cabarrus, Catawba, Davie, Duplin, Edgecombe, Forsyth, Gaston, Halifax, Haywood, Henderson, Iredell, Johnston, Lee, Macon, McDowell, Mecklenburg, Moore, New Hanover, Randolph, Robeson, Rutherford, Sampson, Stokes, Surry, Transylvania, Union, Wake, Wayne); **South Carolina** (Allendale, Anderson, Beaufort, Calhoun, Charleston, Chesterfield, Dillon, Dorchester, Florence, Georgetown, Greenville, Hampton, Horry, Lancaster, Lee, Lexington, Oconee, Pickens, York); **Tennessee** (Blount, Bradley, Coffee, Franklin, Hamblen, Knox, Sullivan, Warren). February–July. (Figure 463)

Discussion. In the study area, this species is most similar to *L. quercinus* but can be separated by having the pronotal hind angles yellowish, antennomeres II and III combined shorter than IV, usually being slightly smaller, and by the characteristics of the aedeagus. *Limonius quercinus* has a unicolored pronotum, antennomeres II and III combined are longer than IV, is usually slightly larger than *L. basilaris,* and has wider parameres on the aedeagus. The two species can be found together in hardwood forests, displaying a similar perching behavior on the leaves of deciduous trees. As such, every specimen should be examined in a series collected to verify the identification. The form *L. semianeus* was described for specimens having pale yellowish elytra. This form seems restricted to southern populations in the Southeastern and Southern Coastal Plains. Etzler (2019) removed *L. semianeus* from synonymy with *L. basilaris*. Because specimens could not be re-examined in time of publication, that change is not reflected here. *Limonius basilaris* has been readily collected in the study area, and by a variety of methods, including at ultraviolet and mercury vapor light, in Lindgren funnel, flight intercept, and Malaise traps, by sifting soil, and by beating, sweeping and hand picking from vegetation.

Limonius beutenmuelleri Van Dyke, 1932

Figures 455–456

Limonius beutenmuelleri Van Dyke, 1932: 351

Diagnosis. Size small, 6.0–7.0 mm in length. Color black; vestiture yellow, appressed. Frontal margin formed by supra-antennal carinae entire, not recurved medially. Antenna 11-segmented, serrate, extending up to one antennomere beyond apex of pronotal hind angle; antennomere II small; III equal to IV. Pronotum as long as wide, broadly rounded; punctures coarse, separated by greater than their own diameters; hind angles subparallel, unicarinate. Hypomeron with elevated margin along pronotosternal sutures. Pronotosternal sutures open anteriorly. Aedeagus with median lobe broad, narrowing subapically to rounded apex; paramere broad, narrowing slightly at base of apical blade, blade large, broad, evenly rounding anteriorly, inner anterior angle nearly 90 degrees. No sexual dimorphism noted.

Distribution. Currently known only from high elevations in the Blue Ridge of North Carolina and Georgia (Van Dyke 1932; Brimley 1938; Fattig 1951; Al Dhafer 2009). The type locality is Mt. Mitchell in Yancey County, NC, the highest peak in the eastern United States.

Specimens Examined. North Carolina (Buncombe, Mitchell, Yancey). June, August. (Figure 456)

Discussion. In the study area, this species is most similar externally to *L. quercinus*, from which it can be separated by having a straight, entire frontal margin and relative lengths of the basal antennomeres.

Limonius ectypus (Say, 1839)

Figures 465–466

Elater ectypus Say, 1839: 167
Limonius pilosus LeConte, 1853: 431
Limonius vernalis Fall, 1910: 129

Diagnosis. Size small to moderate, 8.0–11.0 mm in length. Color brown to dark brown, elytron often paler than head and pronotum; vestiture yellow, appressed, longer and denser in pronotum. Frontal margin formed by supra-antennal carinae complete, entire or slightly recurved medially, widely separated from labrum. Antenna 11-segmented, serrate, extending up to two antennomeres beyond apex of pronotal hind angle; antennomere II small; III triangular, subequal between II and IV. Pronotum as long as wide, sides broadly rounded; punctures on disc sub-umbilicate, sparse, becoming denser laterally. Hypomeron without elevated margin along pronotosternal sutures; not emarginate basally. Pronotosternal sutures closed anteriorly. Aedeagus with median lobe short, broad, subparallel, apex broadly rounded; parameres wide basally, narrowing to base of apical blade, blade triangular, rounded apically. No sexual dimorphism noted.

Distribution. Widespread over much of North America (Al Dhafer 2009). In the Southeast, previously recorded from Florida, Georgia, North Carolina, and South Carolina (Brimley 1938; Fattig 1951; Kirk 1970; Al Dhafer 2009).

Specimens Examined. Georgia (Rabun); **North Carolina** (Buncombe, Wake). April-June. (Figure 466)

Discussion. In the study area, this species is most similar to *L. agonus*, *L. subauratus*, and *Gambrinus confusus*. From *G. confusus* it can be separated by lacking an emarginate base of the pronotum. From *L. agonus* and *L. subauratus* it differs by having the supra-antennal carinae complete across the frontal margin.

Limonius quercinus (Say, 1825)

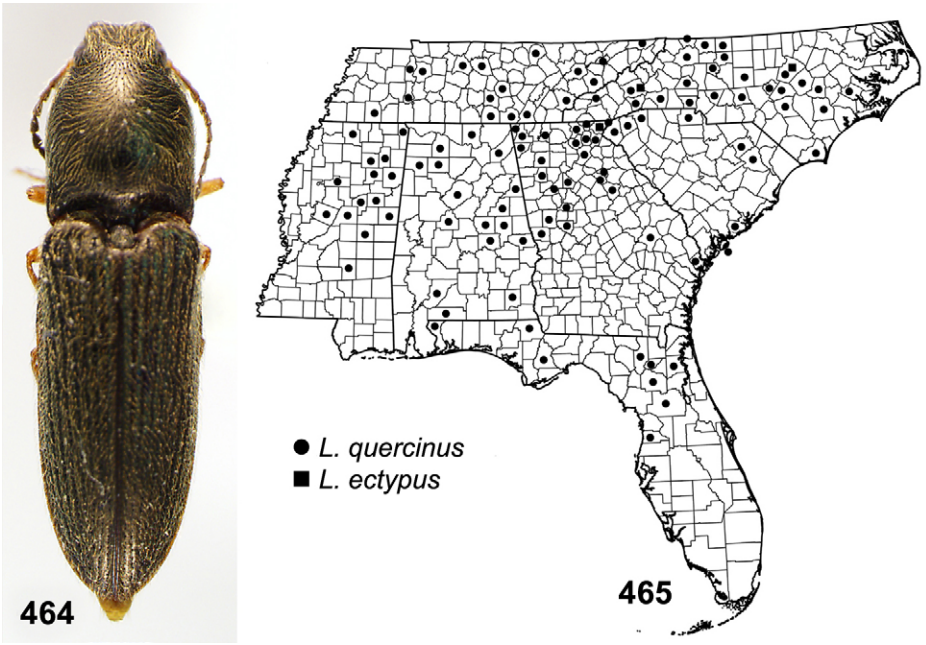
Figures 464–465

Elater quercinus Say, 1825: 262

Diagnosis. Size small, 5.5–6.5 mm in length. Color black, basal antennomeres often yellow; vestiture yellow, appressed. Frontal margin formed by supra-antennal carinae strongly undulate and recurved medially. Antenna 11-segmented, serrate, extending beyond apex of pronotal hind angle by 2–3 antennomeres; antennomeres II and III combined longer than IV. Pronotum subequal in length and width or slightly longer than wide, sides subparallel; punctures coarse, dense; hind angles subparallel, unicarinate. Hypomeron with elevated margin along pronotosternal sutures. Pronotosternal sutures open anteriorly. Aedeagus with median lobe subparallel, gradually tapering to rounded apex; paramere broad, concave along apical third to bade of apical blade, blade as long as wide with lateral spine, narrowing to broadly rounded apex. No sexual dimorphism noted.

Distribution. Eastern North America, west to Texas and Oklahoma (Al Dhafer 2009). Previously recorded from all seven states in the current study area (Leng 1920; Brimley 1938; Fattig 1951; Kirk 1960; Kirk 1970; Downie and Arnett 1996; Peck and Thomas 1998; Al Dhafer 2009; Vlach et al. 2010; Klepzig et al. 2012). (Figure 465)

Specimens Examined. Alabama (Bibb, Clay, Cleburne, Coosa, Dale, DeKalb, Elmore, Escambia, Etowah, Jefferson, Lawrence, Lee, Madison, Marion, Monroe, Tallapoosa, Winston); **Florida** (Alachua, Clay, Columbia, Dixie, Escambia, Hernando, Jackson, Liberty, Marion, Union); **Georgia** (Bartow, Chatham, Chattooga, Clarke, Dade, DeKalb, Emanuel, Fulton, Greene, Hall, Habersham, Harris, Lumpkin, Meriwether, Murray, Oconee, Paulding, Rabun, Spalding, Towns, Union, Upson, Walker, White); **Mississippi** (Attala, Chickasaw, Choctaw, Grenada, Holmes, Lee, Marshall, Monroe, Neshoba, Noxubee, Oktibbeha, Pontotoc, Smith, Tishomingo, Webster, Winston); **North Carolina** (Alleghany, Brunswick, Buncombe, Cabarrus, Catawba, Craven,



Figures 464–465. *Limonius* spp. **454)** *L. quercinus* (habitus). **465)** Distributional data for *L. quercinus* and *L. ectypus*.

Cumberland, Davie, Duplin, Forsyth, Gaston, Harnett, Henderson, Johnston, Lee, Montgomery, Randolph, Rutherford, Stokes, Surry, Swain, Wake, Wayne, Wilkes); **South Carolina** (Beaufort, Charleston, Darlington, Florence, Greenville, Oconee, Pickens, Sumter); **Tennessee** (Benton, Coffee, Davison, Decatur, Fentress, Franklin, Hamblen, Hamilton, Hardeman, Humphreys, Knox, Marion, Monroe, Sevier, Sullivan, Warren, Wilson). February-August.

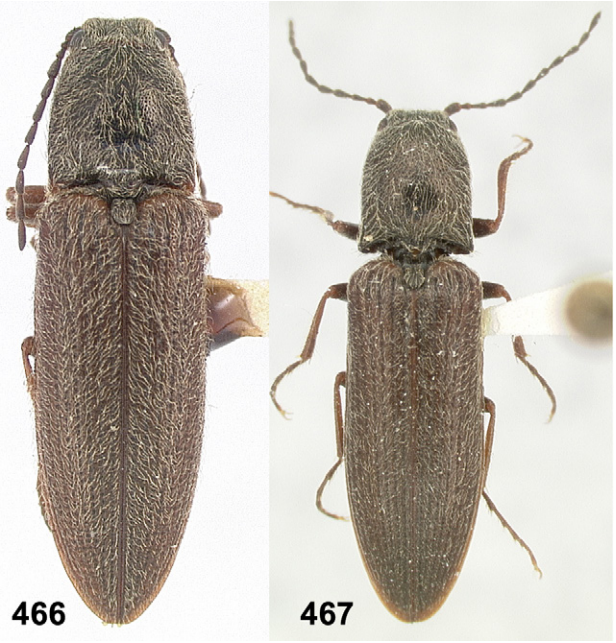
Discussion. This species is common and readily collected in the study area. It is most similar to *L. basilaris* but differs externally in having the pronotum entirely black (hind angles yellow in *L. basilaris*) and antennomeres II and III combined longer than IV (II and III combined shorter than IV in *L. basilaris*). They also have noticeably different aedeagi. The two species can be found together in hardwood forests, displaying a similar perching behavior on the leaves of deciduous trees. As such, every specimen should be examined in a series collected to verify the identification. When series of the two species are compared side by side, *L. quercinus* specimens will typically appear larger than those of *L. basilaris*. Specimens in the study area have been collected by a variety of methods, including at ultraviolet and mercury vapor lights, in Lindgren funnel, flight intercept, and Malaise traps, and by beating, sweeping, and hand picking from vegetation.

Limonius subauratus LeConte, 1853

Figure 467

Limonius subauratus LeConte, 1853: 432

Diagnosis. Size small to moderate, 8.0–10.5 mm in length. Head and pronotum black (pronotal hind angle may be paler); elytron light to dark brown; vestiture yellow. Frontal margin formed by supra-antennal carinae weakened medially, not recurved medially. Antenna 11-segmented, serrate, extending 2–3 antennomeres beyond apex of pronotal hind angle; antennomere II small, III intermediate between II and IV. Pronotum longer than wide, sides broadly rounded; punctures subumbilicate on disk, becoming more umbilicate laterally; hind angles subparallel, unicarinate. Hypomeron without elevated margin along pronotosternal sutures; not



Figures 466–467. *Limonius* spp. **466)** *L. ectypus* (habitus). **467)** *L. subauratus* (habitus). *Limonius subauratus* photo courtesy Kyle Schnepp (Florida State Collection of Arthropods, FDACS-DPI, Gainesville, FL, USA).

emarginate basally. Pronotosternal sutures closed anteriorly. Aedeagus with median lobe gradually tapering to rounded apex; paramere subparallel, constricted before base of apical blade, blade triangular, lateral angle acute, sinuate to rounded apex. No sexual dimorphism noted.

Distribution. Northern North America (Al Dhafer 2009). In the Southeast, it has only previously been recorded from Mississippi (Al Dhafer 2009).

Specimens Examined. None.

Discussion. In the study area, this species is most similar to *L. ectypus* and *L. agonus*, from which it is best separated based on aedeagus. It also differs from *L. ectypus* by the form of the supra-antennal carinae. Etzler (2019) removed *L. anceps* LeConte from synonymy with *L. subauratus*. It is possible that records from Mississippi pertain to the former.

Nitidolimonius Johnson, 2008

Nitidolimonius Johnson in Majka and Johnson, 2008: 23

Diagnosis. Size moderate, form narrow, elongate, subparallel, slightly to moderately convex. Shining, usually strongly metallic coppery, green, blue, or purple. Supra-antennal carinae nearly complete, weakened and depressed medially. Antenna 11-segmented, serrate, just reaching apex of pronotal hind angle or shorter; antennomeres II and III unlike remaining antennomeres. Pronotum with length subequal to width, slightly convex, narrowly explanate laterally, sometimes medially canaliculate basally, punctures variable; hind angles divergent, strongly unicarinate. Hypomeron emarginate basally; pronotosternal sutures open anteriorly. Elytron subparallel; striae finely impressed and punctate; intervals flat to slightly convex, sparsely punctured. Tarsus simple, lacking membranous lobes; claw simple, without basal setae. Aedeagus with median lobe attenuate; paramere with broad apical blade, ventrally setose apically. No extreme sexual dimorphism described.

Range and Numbers. Four species in North America, generally distributed (Majka and Johnson 2008). One species has been recorded from the Southeast, with a second added here.

Discussion. Members of the genus *Nitidolimonius* are readily recognized by their shiny, usually metallic green or coppery, color. *Nitidolimonius* was originally described in Prosternini, but characters of the larvae indicate it belongs in Dendrometrini near *Limonius* (Paul Johnson pers. comm. 2013). The genus has yet to be formally revised. The type species, *N. resplendens*, is highly variable throughout its range and a formal revision may reveal that one or more species in the genus may be placed in synonymy with *resplendens*. Adults are found in a variety of forest types. Known larvae are predaceous.

Key to the species of *Nitidolimonius* in the Southeast
(adapted from Van Dyke 1932)

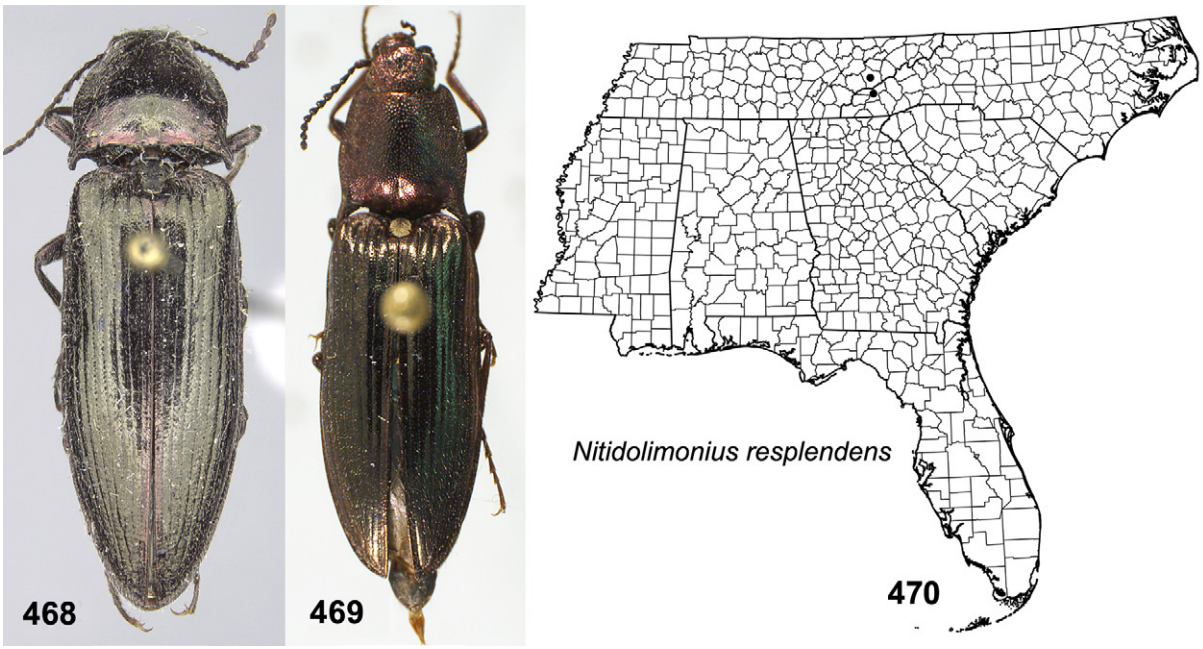
1. Pronotum coarsely, densely punctured; antennomere III subequal to IV in length . . . . . ***N. resplendens* (Eschscholtz)**
— Pronotum sparsely, finely punctured; antennomere III shorter than IV . . ***N. appalachius* (Van Dyke)**

Nitidolimonius appalachius (Van Dyke, 1932)

Figure 468

Ludius appalachius Van Dyke, 1932: 425

Diagnosis. Size moderate, 13.0 mm in length on average, form elongate, narrow, moderately convex. Color dark coppery-bronze, shining; vestiture white, fine, sparse. Antenna 11-segmented, weakly serrate, not reaching apex pronotal hind angles; antennomere III intermediate between II and IV, slightly shorter than IV. Pronotum about as long as wide, widest post-medially, gradually narrowing anteriorly, sinuate at base of hind angles,



Figures 468–470. *Nitidolimonius* spp. **468)** *N. appalachius* (habitus - HOLOTYPE). **469)** *N. resplendens* (habitus). **470)** Distributional data for *N. resplendens*. *Nitidolimonius appalachius* photo courtesy Michael Krasnobrod and Michele Esposito (California Academy of Sciences, San Francisco, CA).

punctures sparse; hind angles divergent, strongly unicarinate. Hypomeron finely but closely punctate. Elytron subparallel medially, narrowing apically; striae finely impressed, closely punctured; intervals flat to slightly convex, sparsely punctured. Aedeagus undescribed. No sexual dimorphism described.

Distribution. Eastern United States, from the Catskill Mountains of New York south to the Blue Ridge of North Carolina (Van Dyke 1932). In the Southeast previously recorded only from North Carolina (Van Dyke 1932; Brimley 1938; Downie and Arnett 1996). The type locality is Mt. Mitchell in Yancey County, NC.

Specimens Examined. None.

Discussion. In the Southeast, this species should be distinguished from *N. resplendens*, which has been collected in the Great Smoky Mountains National Park in North Carolina and Tennessee. *Nitidolimonius appalachius* has a less densely punctate pronotum, shorter antennomere III, and sparse yet evident vestiture, whereas *N. resplendens* has densely punctate pronotum, antennomeres III and IV subequal in length, and vestiture very sparse, not evident.

Nitidolimonius resplendens (Eschscholtz, 1829)

Figures 469–470

Ludius resplendens Eschscholtz, 1829: 34
Elater aerarius Randall, 1838: 7
Corymbites viridis Germar, 1843: 61
Diacanthus racinei Chevrolat, 1852: 578
Corymbites junki Schenkling, 1927: 392

Diagnosis. Size moderate, 13.0–15.0 mm in length. Color brilliant green, purplish, blue, or bronze, shining; vestiture fine, white, very sparse. Antenna 11-segmented, serrate, extending to apex of pronotal hind angle; antennomere III slender, glabrous, subequal to IV in length. Pronotum slightly longer than wide, widest medially, punctures shallow, umbilicate, dense, separated by less than their own diameters; hind angles divergent, strongly unicarinate. Hypomeron closely, coarsely punctured, Elytron subparallel medially, tapering apically; striae coarsely punctate; intervals convex, finely punctate. Aedeagus with median lobe subparallel, tapering subapically to subacute apex; paramere with broadly triangular apical blade. Female similar to male externally but slightly larger and with slightly shorter antenna.

Distribution. Northern North America (Downie and Arnett 1996). Previously not recorded from the Southeast. The following records from North Carolina and Tennessee represent **New State Records**.

Specimens Examined. North Carolina (Swain); **Tennessee** (Sevier). May–July. (Figure 470)

Discussion. This species is highly variable throughout its range. If *Nitidolimonius* is ever formally revised, one or two currently recognized species may be synonymized with *N. resplendens*. In the study area, *N. resplendens* can be distinguished from *N. appalachius*. *Nitidolimonius appalachius* has a less densely punctate pronotum, shorter antennomere III, and sparse yet evident vestiture, whereas *N. resplendens* has densely punctate pronotum, antennomeres III and IV subequal in length, and vestiture very sparse, not evident. I have examined three specimens from the Great Smoky Mountains, all females (see Figure 469 for one of the three). All three specimens are larger and darker than those observed from other regions farther north but have the pronotal and antennal characteristics of *N. resplendens*. Larvae are subterranean predators (Majka and Johnson 2008). Specimens in the study area have been collected in Lindgren funnel and Malaise traps.

Tetralimonius Etzler, 2019

Tetralimonius Etzler, 2019: 327

Diagnosis. Size small, species less than 10 mm in length, form subparallel, integument dull or shining. Antenna 11-segmented, weakly serrate to filiform; antennomere II subcylindrical, wider than III. Pronotum quadrate, subparallel, truncate at base and not forming extensions of the hind angle, single carina, if present, weak. Hypomeron with pronotosternal sutures double (carina running along edge of suture), weakly grooved anteriorly and closed to receive antennae. Scutellum posteriorly pointed. Legs slender; tarsi lacking membranous tarsal pads but densely setose; claw simple, lacking basal setae. Aedeagus with median lobe narrow; paramere lacking lateral expansion. Sexual dimorphism not pronounced.

Range and Numbers. Five species, two in the East and three along the West Coast (Etzler, 2019). The two eastern species have both been recorded from the Southeast.

Discussion. Etzler (2019) described this genus to accommodate small members from the genus *Limonius* that possess truncated pronotal hind angles, a posteriorly pointed scutellum, and nearly closed pronotal coxal cavities, as well by characteristics of both male and female genitalia. In North America, *Tetralimonius* contains five small, relatively ornate species with greatest diversity in the Pacific Northwest.

Key to the species of *Tetralimonius* in the Southeast
(adapted from Al Dhafer 2009)

1. Antennomeres II and III combined longer than IV; aedeagus with paramere slender, inwardly curved, gradually tapering to apex . . . . . ***T. definitus* Ziegler**

— Antennomeres II and III combined shorter than IV; aedeagus with paramere broader, subparallel, tapering subapically . . . . . ***T. nimbatus* (Say)**

Tetralimonius definitus (Ziegler, 1845)

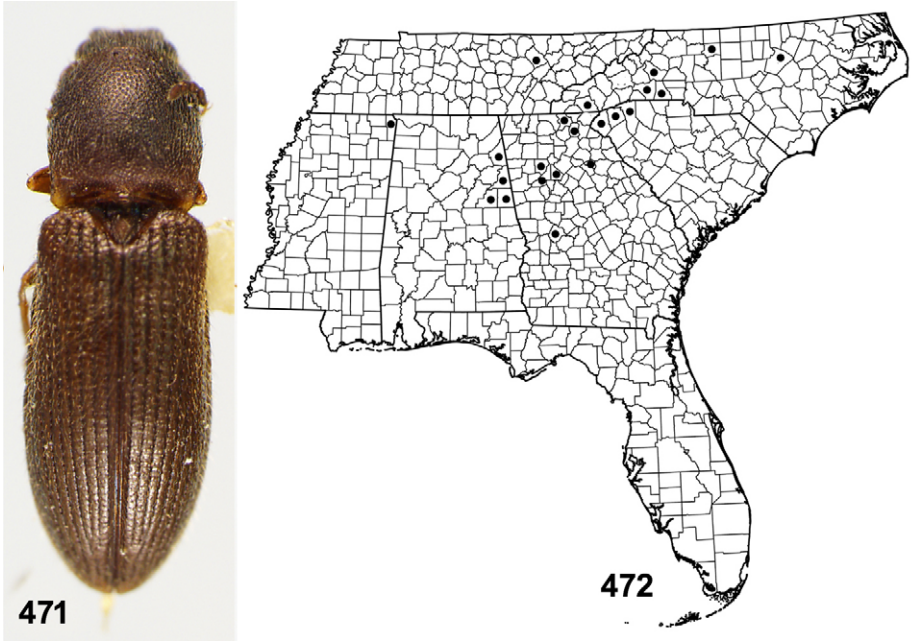
Figures 471–472

Limonius definitus Ziegler, 1845: 268

Diagnosis. Size small, 4.5–6.0 mm in length. Brown to dark brown; thin basal margin of pronotum and hind angle yellow; vestiture yellow, appressed. Frontal margin formed by supra-antennal carinae entire or slightly recurved medially. Antenna 11-segmented, serrate, extending 2–3 antennomeres beyond apex of pronotal hind angle; antennomeres II and III combined longer than IV. Pronotum subquadrate, sides broadly rounded, concave at base of hind angle; punctures dense, shallow, umbilicate; hind angles subparallel, carina, if present, scarcely visible. Hypomeron without elevated margin along pronotosternal sutures. Pronotosternal sutures closed anteriorly. Aedeagus with median lobe long, slender, subparallel; apex truncated; paramere slender, inwardly curved, gradually tapering to apex, no apical blade. No sexual dimorphism noted.

Distribution. Eastern North America, west to Mississippi (Al Dhafer 2009). In the Southeast, previously recorded from Alabama, Georgia, Mississippi, North Carolina, South Carolina, and Tennessee (Brimley 1938; Leng 1920; Fattig 1951; Kirk 1970; Downie and Arnett 1996; Al Dhafer 2009).

Specimens Examined. Alabama (Cherokee, Clay, Cleburne, Randolph); **Georgia** (Clarke, Cobb, DeKalb, Fulton, Taylor, Union, White); **Mississippi** (Tishomingo); **North Carolina** (Burke, Cleveland, Forsyth, Macon, Rutherford, Wake); **South Carolina** (Greenville, Oconee, Pickens); **Tennessee** (Morgan). March–June. (Figure 472)



Figures 471–472. *Tetralimonius definitus*. **471)** Habitus. **472)** Distributional data.

Discussion. In the study area, this species is most similar to *T. nimbatus*. Specimens of *T. definitus* tend to be slightly larger and darker and differ in the characteristics of the basal antennomeres and aedeagus. Previously published records for *Limonius aeger* (Fattig 1951; Kirk 1969, 1970) may pertain to this species (see Excluded Species). Specimens in the study area have been collected in Malaise, Lindgren funnel, and flight intercept traps, by Berlese extraction of leaf litter, and by sweeping vegetation. Specimens from Clarke County, GA (UGCA) were collected on pyracantha flowers.

Tetralimonius nimbatus (Say, 1825)

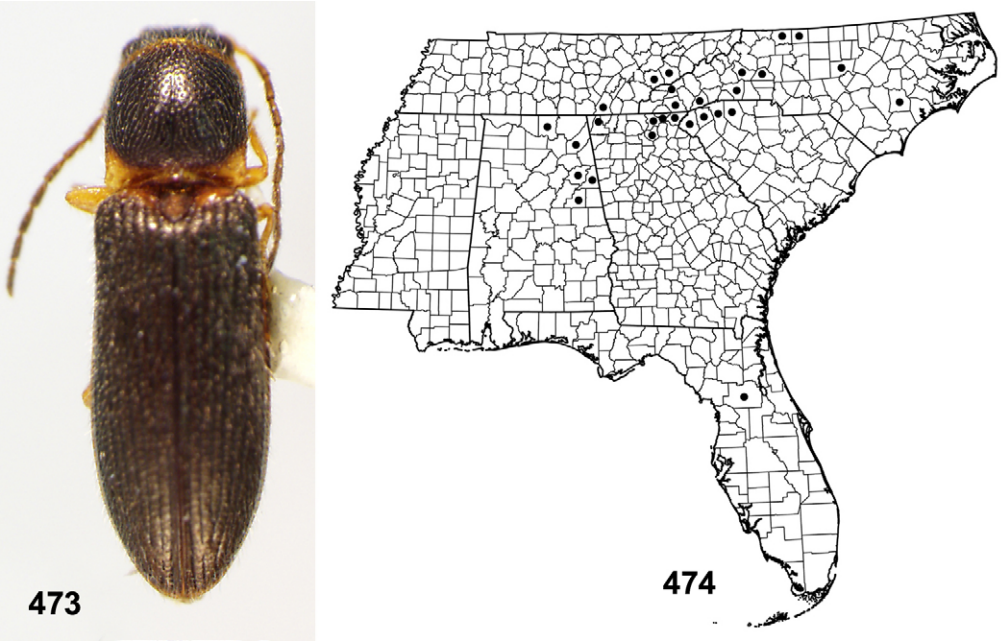
Figures 473–474

Elater nimbatus Say, 1825: 265
Limonius infernus LeConte, 1853: 434

Diagnosis. Size small, 3.5–4.5 mm in length. Color brown to dark brown, pronotal hind angle and sometimes basal margin of pronotum and legs yellow; vestiture yellow, appressed. Frontal margin formed by supra-antennal carinae entire to slightly recurved medially. Antenna 11-segmented, serrate, extending 3–4 antennomeres beyond apex of pronotal hind angle; antennomeres II and III small, combined shorter than IV. Pronotum subquadrate, lateral margins rounded to subparallel; punctures large, umbilicate, dense; hind angle short, parallel, ecarinate. Hypomeron without elevated margin along pronotosternal sutures. Pronotosternal sutures closed anteriorly. Aedeagus with median lobe elongate, subparallel, broadly rounded apically; paramere elongate, subparallel, gently tapering subapically to subacute apex. No sexual dimorphism noted.

Distribution. Eastern United States, west to Kentucky and Tennessee (Al Dhafer 2009). In the Southeast, previously recorded from Alabama, Florida, Georgia, North Carolina, South Carolina, and Tennessee (Leng 1910; Brimley 1938; Fattig 1951; Kirk 1970; Downie and Arnett 1996; Al Dhafer 2009; Ferro et al. 2012a, 2012c).

Specimens Examined. Alabama (Calhoun, Clay, Cleburne, DeKalb, Madison); **Florida** (Marion); **Georgia** (Lumpkin, Rabun, Towns, Union, Walker); **North Carolina** (Burke, Catawba, Chatham, Duplin, Macon,



Figures 473–474. *Tetralimonius nimbatus*. **473)** Habitus. **474)** Distributional data.

Rutherford, Stokes, Surry, Swain, Transylvania); **South Carolina** (Greenville, Oconee, Pickens, Spartanburg); **Tennessee** (Blount, Hamilton, Sevier). March–June. (Figure 474)

Discussion. In the study area, this species is most similar to *T. definitus*. When series of the two species are compared side by side, *T. definitus* appears consistently larger. The two species are best separated by the relative lengths of antennomeres II–IV and the aedeagus. Specimens in the study area have been collected at light, in Lindgren funnel and flight intercept traps, by sweeping, beating, and hand picking from vegetation, and netting while in flight.

Vittathous Johnson, new genus

Type Species. *Corymbites longicornis* Horn 1870: 79, here designated

Corymbites (part), Horn 1870: 79; Candèze 1891: 164.
Ludius (part), Schwarz 1906: 220; Leng 1920: 169; Van Dyke 1932: 389.
Ctenicera (part), Lane 1971: 29.

Description. Body narrowly elongate, subparallel, shallowly to moderately convex. Integument coarsely, densely, umbilicately punctured, shining between punctures; vestiture pale yellow to red-brown. Head with frons flat to shallowly concave; supra-antennal ridge anteromedially directed, not conjoint on frons. Antenna 11-segmented, narrowly serrate; antennomere 3 coarsely punctate and serrate. Pronotum longer than wide; disc moderately convex; hind angle with fine to obsolescent; basal incisures absent. Prosternum with anterior lobe short, planar; intercoxal process subplanar, shallowly convex between coxae; pronotopleural sutures anteriorly closed. Hypomeron with medial margin simple; posterior margin broadly, convex to transverse, notched at midwidth. Scutellum subparallel, broadly rounded posteriorly. Mesepimeron broadly adjacent to coxal cavity. Metasternum with anterior intercoxal process broad, truncate. Elytral striae shallowly to moderately sulcate, intervals flat. Tarsus lacking membranous lobes; claws simple, without basal setae. Aedeagus with median lobe shallowly deflexed apically; paramere expanded, with acute angle, and setose on sclerotized apex. Gonocoxites

heavily sclerotized; baculi relatively long, reaching to ventrite 2; vagina narrow, with pair of large saccate colleterial glands anteriorly; bursa copulatrix contorted, corrugated, lightly sclerotized; spermatheca absent; accessory spermatheca saccate, with transverse striations; accessory gland duct coiled.

Name derivation. The name of this genus is formed from *Vitt-* for "vittae" and combined with *Athous,* referring to the longitudinal elytral vittae of the type species and most of the included species, and the relationship to other taxa in Dendrometrini. Genus is masculine in gender.

Range and Numbers. Four species, one in the Appalachian region, and three in northern California and western Oregon to southwestern Washington.

North American species. These new combinations and synonymy as originally proposed by Johnson (1992) are included here to validate the actions for future works. They are to be credited to Johnson.

Vittathous horni (Schwarz, 1907: 316), **new combination**
Vittathous linearis (Fall, 1910: 132), **new combination**
Ludius patricius Van Dyke, 1932: 415, **new synonym**
Vittathous macer (Fall, 1910: 133), **new combination**
Vittathous manisi (Lane, 1965: 197), **new combination**

Discussion. Upon examination of the types, it became clear that *C. patricius* (Van Dyke) was merely a color variant of *V. linearis*. Other than differences of completeness of the vittae, no substantive morphological differences were found to main separation of these species. *Ludius patricius* Van Dyke is regarded as a **new synonym** of *V. linearis*. *Vittathous* was provisionally suggested by Johnson (1992) who found that the species assigned were only distantly related to prosternines and best assignable to the Athoini (Dendrometrini, here), based on adult characters only as no larvae are associated with any of these species. This conclusion is followed here.

Vittathous horni (Schwarz, 1907), new combination

Figures 475–476

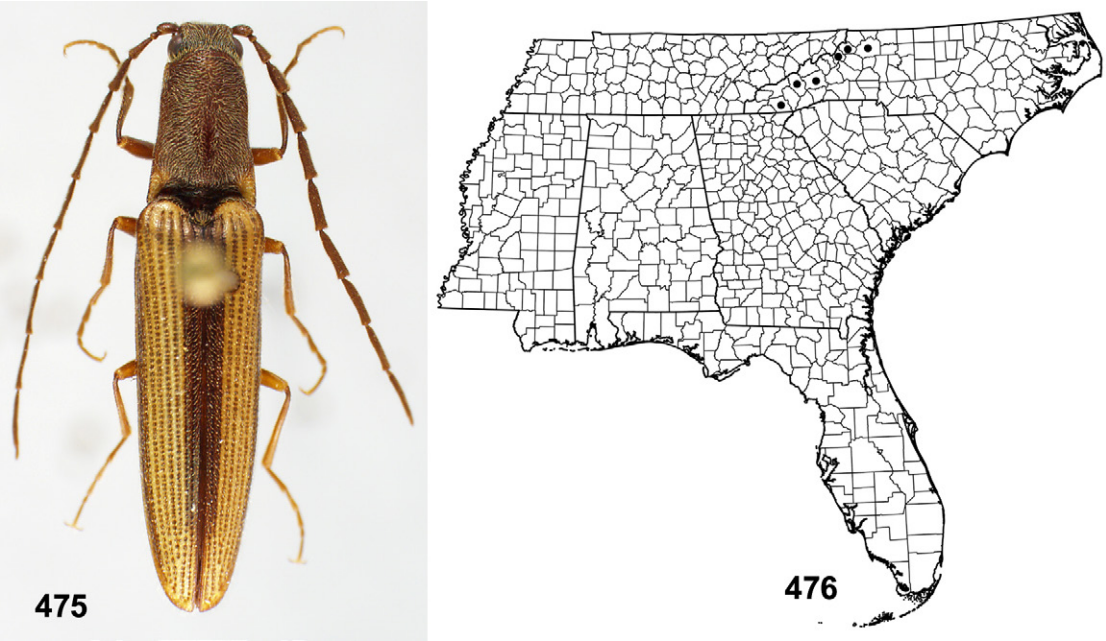
Corymbites longicornis Horn, 1870: 79 (nec *Corymbites longicornis* Boheman, 1851: 392)
Ludius horni Schwarz, 1907: 316, replacement name.

Diagnosis. Size moderate, 13.0–14.0 mm in length; body very elongate and slender. Head and pronotum red-brown to black, hind angles yellow; elytron dark brown with broad median yellow vitta running the entire length of the elytron; legs and antennae red-yellow; vestiture yellow-gray. Antenna 11-segmented, very long, extending more than half-way down the length of the body; antennomere II small; III subequal to IV; flagellar antennomeres filiform and much longer than wide. Pronotum longer than wide, subparallel, punctures coarse, deep, separated by slightly more than their diameter, narrow median impunctate zone running nearly length of entire pronotum, broader in the basal two-thirds; hind angles subparallel, ecarinate. Pronotosternal sutures closed anteriorly. Elytron long, subparallel, gently tapering to apex; striae coarsely punctured. Aedeagus with median lobe shallowly deflexed apically; paramere expanded, with acute angle, and setose on sclerotized apex. Marked sexual dimorphism; female with shorter, broader pronotum with larger, sparser punctures; antennae short, not extending beyond tip of pronotal hind angle.

Distribution. Southern Appalachian Mountains of North Carolina and Georgia (Horn 1870; Leng 1920; Van Dyke 1932; Brimley 1938; Fattig 1951). The type locality is in the "mountains of North Carolina" (not further restricted).

Specimens Examined. North Carolina (Avery, Buncombe, Haywood, Macon, Watauga, Wilkes). May-June. (Figure 476)

Discussion. *Ludius horni* was proposed by Schwarz (1907) to replace *L. longicornis* Horn when he listed this species and *L. longicornis* Boheman (1851) in *Ludius* Eschscholtz. Both names were transferred to *Corymbites*



Figures 475–476. *Vittathous horni*. **475)** Male habitus. **476)** Distributional data.

by Schenkling (1927). Eventually, *C. longicornis* (Boheman) was assigned to *Alyctelater* Laurent and *C. horni* to *Ctenicera*. However, the homonymy must remain due to Art. 57.2 (ICZN 1999). In the original description, Horn (1870) allied this species to what is now *Euplastius bivittatus*.

This species is readily identified by its long, slender body, color, and very long filiform antennae in the male. Specimens in the study area have been collected on vegetation.

Prosternini Gistel, 1856

Prosternini is a large tribe of beetles of considerable morphological and ecological variation. North American members of this tribe have been historically placed in the genera *Corymbites*, *Ludius*, or *Ctenicera*, and many still await generic transfer. Seven southeastern species are herein transferred to newly described genera or transferred to existing Palearctic genera. There are currently 16 genera in the southeastern states. Van Dyke (1932) keyed all described US and Canadian species at the time as *Ludius*. Brown reviewed many species groups (most as *Ludius*) in a series of papers in the 1930s (Brown 1930; 1935a; 1935b; 1935c; 1936a; 1936b; 1936c; 1936d; 1936e). Johnson (in Majka and Johnson 2008) described several new genera to accommodate species in Atlantic Canada. In North America, the tribe is most diverse in the northern and western regions, with fewer species in the southern part of the region.

The tribe is difficult to define morphologically in adults. Species are highly variable in terms of size, shape, color, and density and pattern of vestiture. Supra-antennal carinae incomplete; frons directed downwards. Antenna 11-segmented, highly variable with regards to length and form. Pronotosternal sutures usually closed anteriorly (open anteriorly in *Hadromorphus*). Scutellum various but never incised anteriorly. Mesocoxa open to both mesepimeron and mesepisternum; meso- and metasternum not fused, joined by a definite suture. Tarsus lacking membranous lobes; claw simple, without basal setae. Sexual dimorphism often pronounced.

Actenicerомorphus Kishii, 1955

Actenicerомorphus Kishii, 1955: 19

Diagnosis. Size moderate, form elongate, subparallel, depressed to shallowly convex dorsally. Integument shining, but never metallic; punctation moderately dense, simple; pubescence short to moderately long, recumbent, pallid. Head with frons depressed to shallowly concave; supra-antennal ridge obtuse, transversely prolonged onto frons. Antenna 11-segmented, serrate, moderate in length, reaching apex of pronotal hind angle. Pronotum slightly longer than wide, shallowly convex on disc, narrowly deplanate laterally and posteriorly; basal incisures present, short; hind angle attenuate, apex truncate, with a single fine, evanescent or obsolete dorsal carina.

Range and Numbers. There are 14 species, generally distributed in North America. One species had been recorded from the Southeast.

North American species. These new combinations as originally proposed by Johnson (1992) are included here to validate the actions for future works. They are to be credited to Johnson.

Actenicerомorphus atlas (Van Dyke, 1932: 412), **new combination**
Actenicerомorphus crestonensis (Brown, 1935c: 219), **new combination**
Actenicerомorphus dolorosus (Van Dyke, 1932: 413), **new combination**
Actenicerомorphus kaweanus (Fall, 1937: 31), **new combination**
Actenicerомorphus sagitticollis (Eschscholtz, 1829: 34), **new combination**
Actenicerомorphus sierrae (Van Dyke, 1943: 48), **new combination**
Actenicerомorphus spinosus (LeConte, 1853: 447)
Actenicerомorphus stricklandi (Brown, 1935c: 219)
Actenicerомorphus tahoensis (Van Dyke, 1932: 418), **new combination**
Actenicerомorphus truculentus (Candèze, 1889: 50), **new combination**
Actenicerомorphus umbricolus (Eschscholtz, 1929: 34)
Actenicerомorphus varius (Brown, 1935c: 220), **new combination**
Actenicerомorphus volitans (Eschscholtz, 1829: 34)
Actenicerомorphus vulneratus (LeConte, 1863: 86), **new combination**

Comments. The genus was first treated for North America by Brown (1935c) as the *volitans* group of *Ludius*. In that work, Brown recognized seven species. Many of these were previously treated by Van Dyke (1932) as subspecies of *Liotrichus volitans* (Eschscholtz). Tarnawski (1996, 2001) catalogued the genus on a world-basis as a subgenus of *Liotrichus*. This was the classification considered by Majka and Johnson (2008) for their placement of *Corymbites vulneratus* and *C. spinosus*. Recently, Han et al. (2015) returned *Actenicerомorphus* (type species: *Corymbites selectus* Candèze) to genus status and supported this action with a morphological and genomic comparison showing distinct phylogenetic separations from *Liotrichus* (type species: *Elater affinis* Paykull). This reclassification is adopted and returns those North American species to *Actenicerомorphus* based on adult and larval characters as proposed by Johnson (1992).

Actenicerомorphus vulneratus (LeConte, 1863), new combination

Figure 477

Corymbites vulneratus LeConte, 1863: 86

Diagnosis. Size moderate, 14.0–15.0 mm in length. Bicolored; body black; lateral margins of pronotum, elytral epipleura, hypomeron, and legs red, elytron usually dark, sometimes pale; vestiture fine, yellowish, evenly distributed over the body, denser on scutellum. Antenna 11-segmented, serrate, extending beyond apex of pronotal hind angle by about two antennomeres; antennomeres III and IV subequal; flagellar antennomeres weakly



Figure 477. *Acteniceromorphus vulneratus* (habitus). Photo courtesy Kyle Schnepp (Florida State Collection of Arthropods, FDACS-DPI, Gainesville, FL, USA).

serrate. Pronotum slightly longer than wide, arcuate and widest medially, tapering anteriorly, sinuate at base of hind angles; pronotal punctures coarse, dense, separated by less than their own diameters; hind angles slightly divergent, pointed, finely unicarinate. Elytral striae distinctly punctured. Aedeagus with median lobe subparallel, tapering subapically to subacute apex; paramere with apical blade, base of blade obtuse, broadly rounded, tapering to subacute apex. Female slightly larger than male, with a broader pronotum with width subequal to its length, and shorter antennae.

Distribution. Northeastern North America (Brown 1935c; Downie and Arnett 1996). In the Southeast, previously recorded only from North Carolina (Van Dyke 1932; Brown 1935c; Brimley 1938; Downie and Arnett 1996).

Specimens Examined. None.

Discussion. This species should be readily recognized in the Southeast by its size, shape, and color. Very little is known about its biology. Majka and Johnson (2008) recorded it from spruce and hemlock forests in eastern Canada. Records for North Carolina all seem to refer to Van Dyke's (1932) original record of a single specimen from Mt. Mitchell (Yancey County).

Actenicerus Kiesenwetter, 1858

Actenicerus Kiesenwetter, 1858: 285
Malloea Arnett, 1955: 600

Diagnosis. Body moderately elongate, subparallel; moderately to strongly convex dorsally. Integument shining, occasionally with evanescent virideous or cupreous reflections. Sculpture moderately to densely punctured, umbilicate on head, pronotum, and hypomeron. Pubescence moderately long, cinereous to rufescent, frequently tessellate or forming longitudinal bands on alternate elytral intervals. Head with frons depressed to shallowly convex; supra-antennal ridge transverse or anteromedially directed onto frons. Antenna moderately short, reaching from base to 1–2 antennomeres beyond apex of pronotal hind angle; moderately serrate from antennomere III, the latter coarsely punctured. Pronotum with length 0.87–0.98× width; disc moderately to

strongly convex, subcanaliculate posteromedially; hind angle broadly rounded to subtruncate at apex, with strong dorsal carina; basal incisures short.

Range and Numbers. There are two species in North America, northern and boreal in distribution (Majka and Johnson 2008). One species has been recorded from the Southeast.

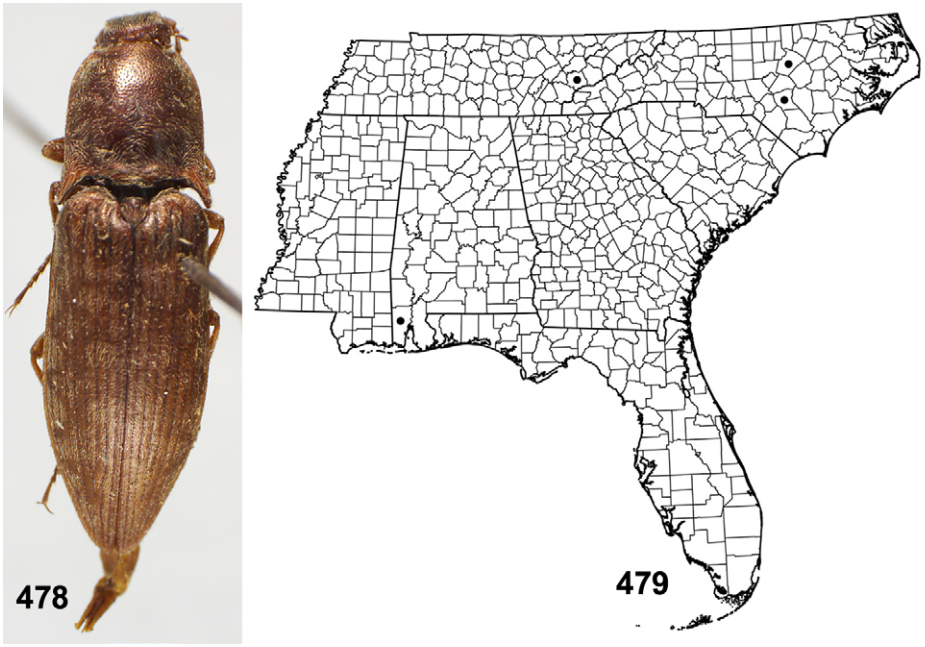
Discussion. Like many of the Prosternini, *Actenicerus* is in need of a formal revision for North America. Tarnawski (1996, 2001) catalogued the genus on a world basis and placed the two North American species in synonymy with the Palearctic *A. sjaelandicus* (Müller, 1764). Majka and Johnson (2008) clarified the identity of *A. cuprascens* and *A. micans* (Germar, 1843) based on genitalic morphology and solidified them both as valid species. A third species, *Elater viridis* Say, 1825, has also at times been placed in association with *Actenicerus* (e.g. Johnson 2002) but was considered *nomen dubium* by Majka and Johnson (2008). Very little is known about the biology of the North American species but *A. cuprascens* is often collected in wet habitats.

Actenicerus cuprascens (LeConte, 1853)

Figures 478–479

Corymbites cuprascens LeConte, 1853: 444

Diagnosis. Size moderate, 13.0–17.0 mm in length, form elongate, fusiform. Color cupreous; vestiture gray, irregularly forming patches along the elytra. Antenna 11-segmented, serrate, extending to apex of pronotal hind angle; antennomere II small; III similar to IV in shape and length. Pronotum about as long as wide, with lateral foveae and a shallow median impression basally, punctures simple, coarse, dense; hind angles divergent, unicarinate. Hypomeron densely punctate, punctures shallow, umbilicate. Scutellum densely setose. Elytra fusiform; striae punctate; intervals slightly convex, densely and coarsely punctate. Median lobe of male genitalia narrow, evenly tapering to rounded apex, not deflexed apically. Paramere with broadly rounded apical blade, each blade with lateral tooth. Female undescribed.



Figures 478–479. *Actenicerus cuprascens*. **478)** Habitus. **479)** Distributional data.

Distribution. Northeastern North America (Downie and Arnett 1996). In the Southeast, previously recorded only from North Carolina (Wray 1950). The following records from Alabama and Tennessee represent **New State Records**.

Specimens Examined. Alabama (Mobile); **North Carolina** (Cumberland, Wake); **Tennessee** (Blount). March, May–June. (Figure 479)

Discussion. This species has a complicated taxonomic history in North America. In many publications prior to 2008 it was considered a synonym of *A. sjaelandicus*, a species believed at the time to be naturally Holarctic. Examination of aedeagal morphology of both American and European specimens revealed the two populations are distinct, and *A. cuprascens* was solidified as a valid species by Majka and Johnson (2008). As currently delineated, *A. sjaelandicus* is strictly Palearctic. Very little is recorded on the biology of the species, but specimens are often collected in association with wet habitats (Brooks 1960; Downie and Arnett 1996). The specimen from Blount County, TN (LSAM) was collected by sweeping in a wet montane meadow. The specimen from Mobile County, AL seems quite disjunct for this species. The specimen is part of the H. P. Löding Collection (GSAT) and, according to label data, was collected by Löding himself on pine in 1929.

Anostirus Thomson, 1859

Anostirus Thomson, 1859: 103
Calostirus Thomson, 1864: 67 (unjustified emendation)
Calosirus Stierlin, 1887: 46
Parastirus Binaghi, 1940: 197
Ipostirus Binaghi, 1940: 198
Pseudostirus Binaghi, 1940: 198

Diagnosis. Size small to moderate, moderately broad. Bicolored; body black; elytron yellow to red with dark maculae and fasciae. Supra-antennal carinae incomplete. Antenna 11-segmented, flagellar antennomeres serrate to strongly serrate, length variable, falling short of or extending beyond apex of pronotal hind angle. Pronotum subquadrate, widest before hind angles, lacking basal median groove; hind angles divergent, ecarinate. Hypomeron emarginate basally. Pronotosternal sutures closed anteriorly. Elytron widest post-medially. Tarsus lacking membranous pads; claw simple, without basal setae. Paramere apically widened but without defined blade; median lobe variable. Females similar to males but with shorter antennae.

Range and Numbers. Three species in North America, one in the Northeast and two in California (Majka and Johnson 2008). The single eastern species has been recorded from the Southeast.

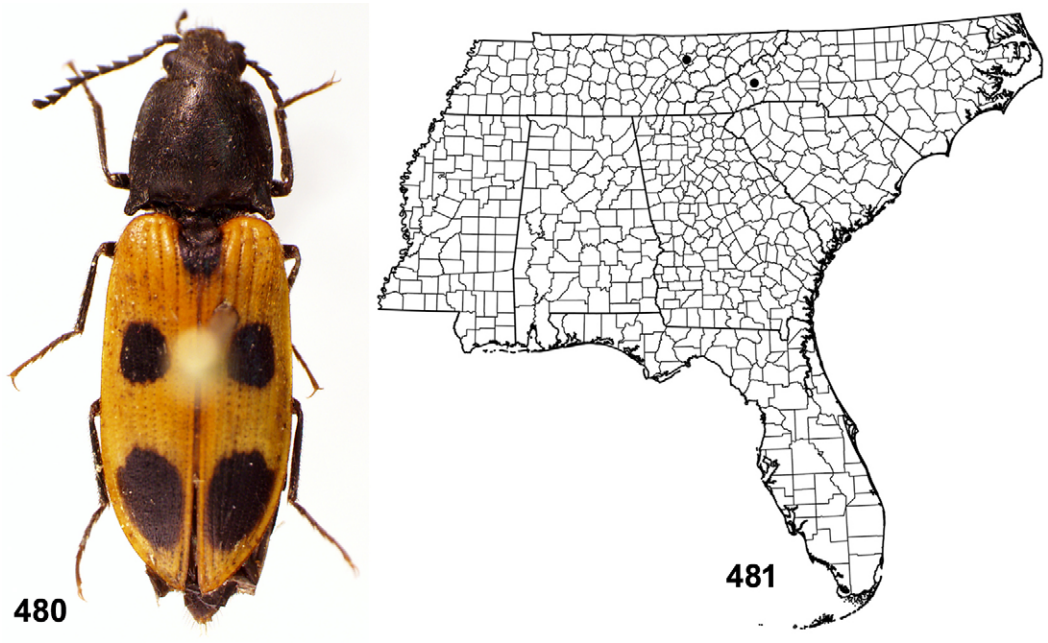
Discussion. The colorful species in this genus are similar to those in *Pseudanostirus*. *Anostirus* has yet to be formally treated for North America. Tarnawski (1996, 2001) catalogued the genus on a world-basis but failed to recognize the three North American species attributable to *Anostirus* that were later formally transferred to the genus by Majka and Johnson (2008). Very little has been recorded on the biology of species in the genus; Majka and Johnson (2008) indicated adults are common on the flowers of Rosaceae and Umbelliferae in early spring in eastern Canada.

Anostirus vernalis (Hentz, 1827)

Figures 480–481

Elater vernalis Hentz, 1827: 374

Diagnosis. Size small to moderate, 8.0–10.0 mm in length, broad, slightly convex. Bicolored, black with yellow to red elytra; each elytron with a black scutellar macula and two large round black maculae, one medial



Figures 480–481. *Anostirus vernalis*. **480)** Habitus. **481)** Distributional data.

and one subapical; vestiture yellow-gray, denser on pronotum. Antenna 11-segmented, extending beyond apex of pronotal hind angle; antennomere II small, III–X strongly serrate, XI elongate. Pronotum about as wide as long, widest post-medially, narrowing anteriorly, punctures dense, sub-umbilicate; hind angles divergent, apices broadly rounded, ecarinate. Hypomeron densely punctate, punctures shallowly umbilicate. Elytron widest most medially; striae strongly punctate; intervals slightly convex finely punctate. Median lobe of aedeagus subparallel over most of its length, tapering sub-apically to rounded, slightly widened apex; paramere slightly widened apically, then tapering to subacute apex, two long subapical setae. No sexual dimorphism described.

Distribution. Northeastern North America (Downie and Arnett 1996). In the Southeast, previously recorded from Georgia and North Carolina (Brimley 1938; Fattig 1951; Downie and Arnett 1996). The following record from Tennessee represents a **New State Record**.

Specimens Examined. North Carolina (Buncombe); **Tennessee** (Anderson). March-April. (Figure 481)

Discussion. This is a very distinctive species and is unlikely to be confused with any other species of Elateridae in the East. Little is recorded on their biology. Majka and Johnson (2008) indicated they have been collected in apple orchards and deciduous forests in eastern Canada. The specimen from Anderson County, TN (ECUT) was collected in a panel trap.

Brownia Johnson, new genus

Type Species. *Corymbites coniungens* LeConte 1853: 440, here designated

Ludius (part), Schwarz 1906: 220; Leng 1920: 169; Beauline 1926: 92; Van Dyke 1932: 389.
Diacanthus (part), Germar 1843: 67
Corymbites (part), Haldeman and LeConte 1853: 72; LeConte 1853: 435; Candèze 1863: 77, 1891: 164; Gemminger and Harold 1869: 1574; Horn 1871: 318; Blatchley 1910: 763; Schenkling 1927: 390, 393 (in subgenera *Haplotarsus* and *Selatosomus*)
Ctenicera (part), Dietrich 1945: 19; Lane 1971: 29

Description. Body elongate-oval, depressed. Integument dull to shining, moderately to densely, simply to umbilicately punctured; vestiture fine, decumbent, pallid. Head with frons shallowly convex; supra-antennal ridge strong, slightly projecting, arching anteriorly and confluent with frontoclypeal margin. Antenna 11-segmented short, reaching to posterior third of pronotum; antennomeres short and triangular; antennomere 3 subcylindrical, coarsely, sparsely punctured. Pronotum with length subequal to width, widest in anterior third; disc shallowly impressed medially; lateral margin strongly beaded and reflexed. Hind angles in ventrolateral aspect rounded ventrally and angular to subdenticulate dorsally; dorsal carinae strong; basal incisures obsolescent. Prosternum with anterior lobe briefly extended, broadly rounded and with thickly beaded margin, planar; intercoxal process planar. Hypomeron with thickened mesal margin flattened, sparsely punctured, narrowing to carinate bead anteriorly; posterior margin broadly emarginate. Scutellum subquadrate, broadly rounded posteriorly. Mesepimeron narrowly reaching coxal cavity. Metasternum with anterior intercoxal process quadrangular. Elytral striae subsulcate, coarsely punctured, becoming shallower apically; intervals flat to shallowly convex basally, punctures largely restricted to portions along striae. Tarsus lacking membranous lobes; claws simple, without basal setae. Aedeagus with median lobe slender, compressed, planar; paramere sagittate, sclerotized and asetose apically, excavate mesally. Gonocoxites lightly sclerotized, lobate, densely setose; styli minute, apical; vagina dilated, posterior portion with darkly sclerotized internal striations, a pair of saccate colleterial glands anteriorly, anterior constriction narrow; bursa copulatrix narrow, elongate; spermatheca emergent at midlength, short, tubular; accessory gland duct long, coiled; accessory spermatheca short, at base of accessory gland duct.

Name derivation. This genus is named in honor of the late W.J. Brown, the first taxonomist to attempt detailed revisions of North American ctenicerine elaterids. Genus is feminine in gender.

Range and Numbers. Seven species, generally distributed in North America. One species has been recorded from the Southeast.

North American species. These new combinations as originally proposed by Johnson (1992) are included here to validate the actions for future works. They are to be credited to Johnson.

Brownia coniungens (LeConte, 1853: 440), **new combination**
  Corymbites conjungens LeConte, 1861: 349, **unjustified emendation**
  Ctenicera conjunctus of Lane 1971: 34 (misspelling)
Brownia copei (Horn, 1871: 31), **new combination**
Brownia lecontei (Candèze, 1881: 94), **new combination**
Brownia obversa (Horn, 1871: 32), **new combination**
Brownia praeses (Horn, 1871: 321), **new combination**
Brownia rupestris (Germar, 1843: 66), **new combination**
Brownia signaticollis (Melsheimer, 1846: 216), **new combination**

Discussion. The name *Corymbites coniungens* was used by LeConte (1853) but was subsequently cited as *Corymbites conjungens* by LeConte (1861) and subsequent authors, and in error as *Ctenicera conjunctus* (Lane 1971). The holotype is clearly labelled with "*conjungens",* but the handwriting appears not to be that of LeConte. There is no evidence of a printer's error or a correction of spelling in the original document or corrigendum. LeConte's (1861) use of "*conjungens*' without reference to his initial spelling constitutes an unjustified emendation (ICZN 1999, Arts. 32.5, 33.2).

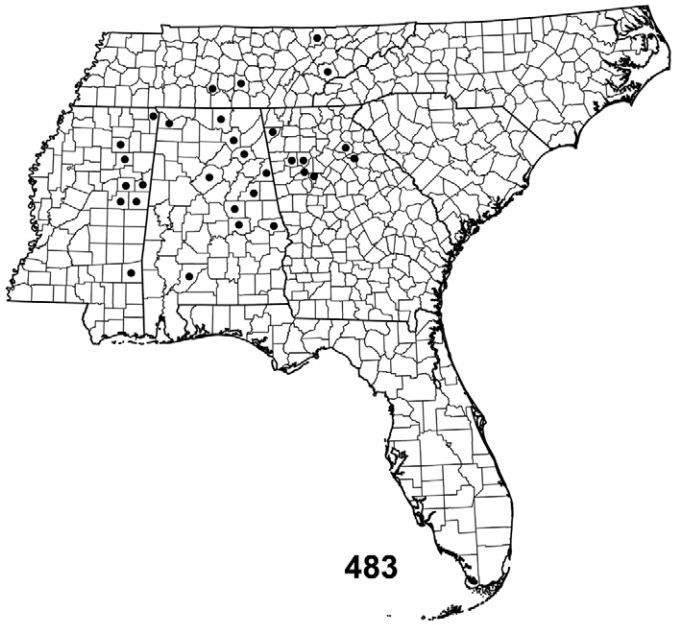
Brownia signaticollis (Melsheimer, 1846), new combination

Figures 482–483

Diacanthus signaticollis Melsheimer, 1846: 216

Diagnosis. Size small to moderate, 8.0–11.0 in length. Bicolored, body black; pronotum red usually with central elongate black macula (rarely entire pronotum except hind angles red); vestiture short, sparse, gray. Antenna





Figures 482–483. *Brownia signaticollis*. **482)** Habitus. **483)** Distributional data.

11-segmented, serrate, extending 2–3 antennomeres beyond apex of pronotal hind angle; antennomere II small; III similar to following antennomeres. Pronotum longer than wide, medially arcuate, punctures fine, sparse, and separated by at least their diameters; hind angles divergent, acute, single carina subparallel to lateral margin. Elytron subparallel in basal two-thirds, gently tapering to apex; striae deep and distinctly punctured; intervals finely punctate. Aedeagus with median slender, compressed, planar; paramere sagittate, sclerotized and asetose apically, excavate mesally.

Distribution. Mid-Atlantic States (Van Dyke 1932). In the Southeast, previously recorded from Alabama, Georgia, and Tennessee (Löding 1945; Fattig 1951; Downie and Arnett 1996; Buck et al. 2005; Vlach et al. 2010). The following records from Mississippi represent a **New State Record**.

Specimens Examined. Alabama (Clay, Cleburne, Colbert, Coosa, Elmore, Etowah, Jefferson, Lee, Madison, Marshall, Monroe); **Georgia** (Chattooga, Clarke, Clayton, Cobb, Fulton, Jackson, Paulding); **Mississippi** (Chickasaw, Lowndes, Noxubee, Oktibbeha, Pontotoc, Tishomingo, Wayne, Winston); **Tennessee** (Blount, Campbell, Coffee, Marshall). April–June. (Figure 483)

Discussion. In the Southeast, this species resembles a small *Tesolasomus trivittatus*, but with entirely black elytra. In rare instances, the entire pronotum is red except for the hind angles. It also resembles *Athous neacanthus* but is larger, has a carina on the pronotal hind angles, and lacks membranous tarsal lobes. Specimens in the study area have been collected at ultraviolet and mercury vapor light, in window traps, and netted while in flight.

Corymbitodes Buysson, 1904

Corymbitodes Buysson, 1904: 58
Metactenicerus Miwa, 1934: 37

Diagnosis. Body elongate, subparallel, shallowly convex and depressed on disc. Integument dull from dense punctures and microreticulation; punctures umbilicate on head and prothorax, often simple on pronotal disc; pubescence moderately long, decumbent, pallid. Head with frons depressed to shallowly convex; supra-antennal

ridge obtuse, transversely directed. Antenna moderately long, extending 1–3 antennomeres beyond apex of hind angle; antennomeres 3–10 narrowly serrate; antennomeres densely, finely punctured. Pronotum with length 1.08–1.10× width; disc shallowly convex, deplanate posterolaterally, lateral margins shallowly arcuate; hind angles flattened, broadly rounded to subtruncate at apex, dorsum with carina fine, evanescent, near to lateral margin, to ecarinate; basal incisures obsolescent.

Range and Numbers. There are currently seven described species in North America (Majka and Johnson 2008), primarily boreal and montane in distribution. One species has been recorded from the Southeast.

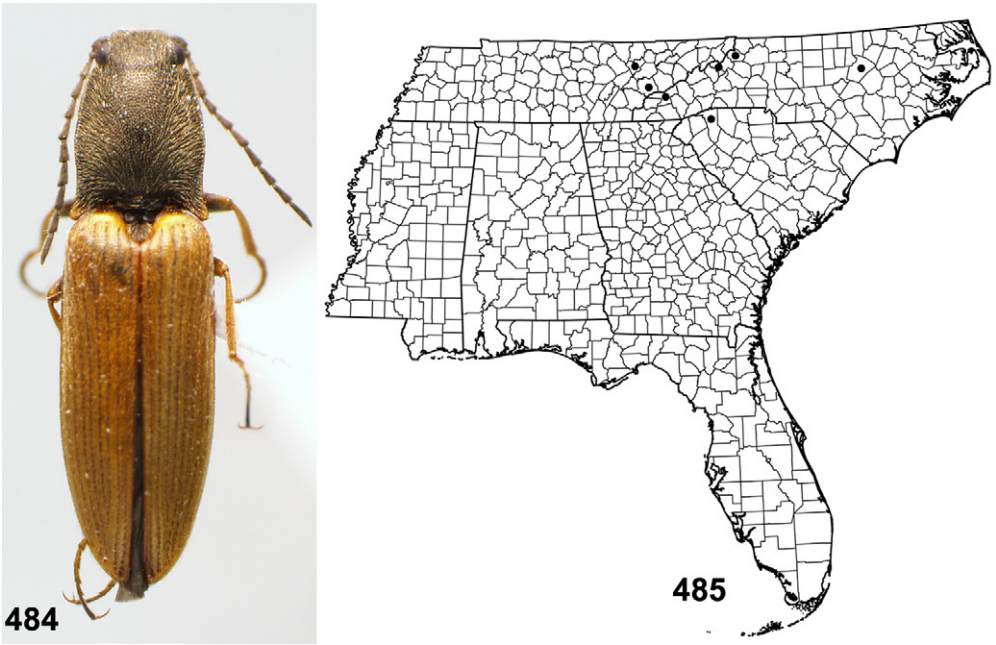
Discussion. Like most of the Prosternini, this genus is in desperate need of revision and may eventually be transferred to Dendrometrini (P. Johnson, pers. comm. 2019). Tarnawski (1996, 2001) catalogued *Corymbitodes* on a world basis, but overlooked six Nearctic species that were later transferred to the genus by Majka and Johnson (2008). The relationships between the Nearctic species are poorly understood, pending a revision. Species can usually be recognized by their elongate, flattened pronotum with broadly rounded hind angles.

Corymbitodes tarsalis (Melsheimer, 1846)

Figures 484–485

Elater ochraceus Melsheimer 1806: 45 (*nomen nudum*)
Athous gilvipennis Dejean, 1833: 102 (*nomen nudum*)
Athous tarsalis Melsheimer, 1846: 157
Elater suturalis LeConte, 1853: 445 (not available, ICZN 1999, Art. 11.6)
Athous gilvipennis Candèze 1863: 120 (not available, ICZN 1999, Art. 11.6)

Diagnosis. Size small to moderate, 8.0–12.0 mm in length. Usually bicolored, black with elytra (except sutural interval) and legs yellow, immaculate (melanic forms may be entirely black). Vestiture short, graying, evenly distributed over the body. Antenna 11-segmented, extending two antennomeres beyond apex of pronotal hind angle; antennomere II small; III–X strongly serrate; XI elongate. Pronotum longer than wide, arcuate, widest post-medially, narrowing anteriorly and posteriorly to hind angles; punctures dense, shallow, distinctly umbilicate; hind



Figures 484–485. *Corymbitodes tarsalis*. **484)** Habitus. **485)** Distributional data.

angles slightly divergent, broadly rounded, ecarinate. Elytron elongate, subparallel; striae punctate, punctures round; interspaces slightly convex, finely punctate. Aedeagus with median lobe gradually tapering to subacute apex; paramere slender, forceps-like, tapering to acute apex. No sexual dimorphism described.

Distribution. Northeastern North America (Downie and Arnett 1996). In the Southeast, previously recorded from Georgia (Fattig 1951) and North Carolina (Brimley 1938). The following records from South Carolina and Tennessee represent **New State Records**.

Specimens Examined. North Carolina (Mitchell, Swain, Wake, Watauga); **South Carolina** (Greenville); **Tennessee** (Anderson, Blount). March–June. (Figure 485)

Discussion. In the study area, this species should be fairly easy to recognize, based on the color and characteristics of the pronotum. Throughout much of its range, however, it is very similar to *C. dorothyea* (Knull) and *C. pygmaeus* (Van Dyke) and a formal revision may show two or more of the three species to be conspecific. Majka and Johnson (2008) indicated it is a common spring and early summer species in the East. Specimens in the study area have been collected in Lindgren funnel, flight intercept, Malaise, and panel traps.

Hadromorphus Motschulsky, 1859

Hadromorphus Motschulsky, 1859: 374
Eanoides Kishii, 1966: 50

Diagnosis. Size small to moderate, moderately broad and convex. Color dark, usually black, often with metallic luster, immaculate; vestiture fine, pale, dense (longer and denser on scutellum). Supra-antennal carinae incomplete. Antenna 11-segmented, serrate, not extending beyond apex of pronotal hind angle; antennomere III subequal to IV in length. Pronotum wider than long, broadly arcuate, slightly sinuate at base of hind angles; hind angles strongly unicarinate. Pronotosternal sutures open anteriorly. Prosternal process apically bent inwards. Elytral striae punctate; intervals weakly convex, micropunctate and weakly wrinkled. Tarsomeres lacking membranous lobes; claw simple, without basal setae. Paramere with lateral subapical tooth. Female similar to male but slightly larger and with slightly shorter antennae.

Range and Numbers. Four species generally distributed in North America (Tarnawski 1995; Johnson 2002). One species has been recorded from the Southeast.

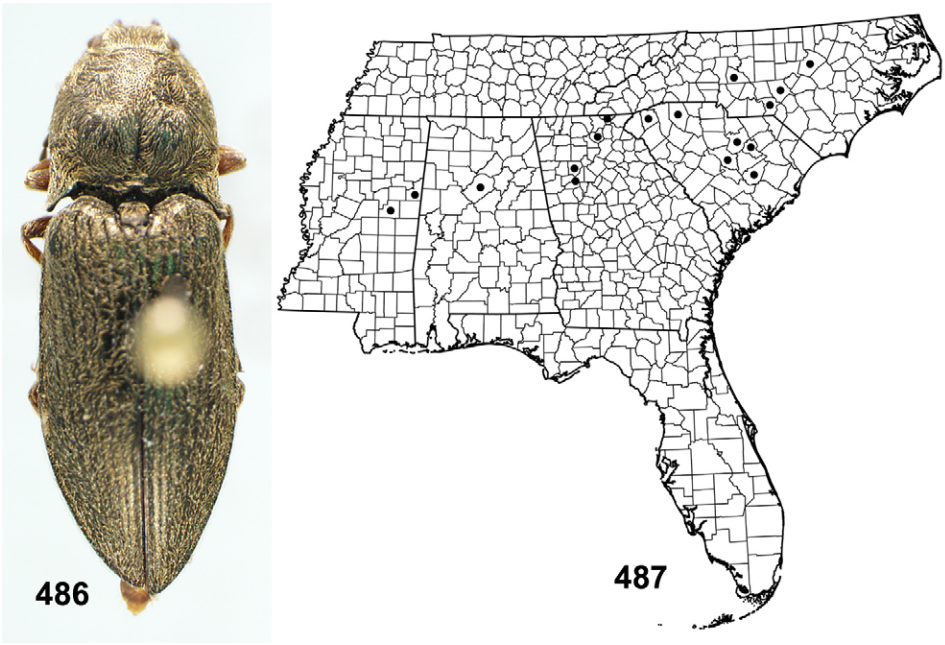
Discussion. *Hadromorphus* was first reviewed by Brown (1936c) as the *inflatus* group of *Ludius*. In that paper, he recognized four species. Tarnawski (1995) revised and later catalogued (Tarnawski 1996, 2001) the group as a subgenus of *Selatosomus*, recognizing the same four species as Brown (1936c). Johnson (2002) considered *Hadromorphus* as a distinct genus, which is followed here. Not much is reported on the biology of species in the genus, however *H. glaucus* (Germar) and *H. inflatus* have been implicated as agricultural pests (Tarnawski 1995).

Hadromorphus inflatus (Say, 1825)

Figures 486–487

Elater metallicus Melsheimer, 1806: 44 (*nomen nudum*)
Elater inflatus Say, 1825: 392

Diagnosis. Size small to moderate, 8.0–12.0 mm in length, moderately broad, convex. Color black with metallic luster; legs red-brown; vestiture yellowish, dense. Antenna 11-segmented, serrate, not reaching apex of the pronotal hind angle; antennomeres II and III sparsely punctate and with few hairs; IV–XI finely and densely punctate and pubescent. Pronotum wider than long, broadest medially, slightly sinuate at base of hind angles; densely punctate, punctures small, fine; median depression strong basally, disappearing before anterior margin; hind angles slightly divergent, strongly unicarinate (carina may be difficult to discern under dense vestiture).



Figures 486–487. *Hadromorphus inflatus*. **486)** Habitus. **487)** Distributional data.

Pronotosternal sutures open anteriorly. Elytral striae punctate; intervals densely, finely punctate. Aedeagus with median lobe gradually tapering to subacute apex; paramere with subapical lateral tooth, gradually tapering to subacute apex. Female similar to male but slightly larger and broader and with slightly shorter antennae.

Distribution. Northeastern North America (Tarnawski 1995). In the Southeast, previously recorded from Georgia, North Carolina, and South Carolina (Brown 1936c; Brimley 1938; Fattig 1951; Kirk 1969, 1970; Tarnawski 1995, 1996; Downie and Arnett 1996). The following records from Alabama and Mississippi represent **New State Records**.

Specimens Examined. Alabama (Jefferson); **Georgia** (Cobb, Fulton, Lumpkin, Towns); **Mississippi** (Lowndes, Winston); **North Carolina** (Moore, Richmond, Rowan, Wake); **South Carolina** (Clarendon, Kershaw, Lee, Pickens, Richland, Spartanburg). March-June. (Figure 487)

Discussion. This species is fairly distinctive in the study area. Most specimens examined did not have label data indicating the method of collection, but specimens from Jefferson County, AL (MEM) and Rowan County, NC (NCSU) were collected in forest litter. Kirk (1969) recorded it from oak and slash pine in South Carolina. Tarnawski (1995) implicated it as an agricultural pest.

Laneganus Johnson, new genus

Type Species. *Elater sulcicollis* Say 1839: 168, here designated

Athous (part), Melsheimer 1853: 70
Corymbites (part), LeConte 1853: 435; Candèze 1863: 77, 1891: 164; Gemminger and Harold 1869: 1574; Blatchley 1910: 763; Schenkling 1927: 393 (subgenus *Selatosomus*)
Ludius (part), Schwarz 1906: 220; Leng 1920: 169; Beauline 1926: 47; Van Dyke 1932: 389
Ctenicera (part), Dietrich 1945: 19; Brooks 1960: 10; Lane 1971 29
Hypoganus (part), Gurjeva 1989: 108

Description. Body elongate, widening posteriorly from elytral base, dorsum shallowly convex to depressed on disc. Integument dull to shining, moderately densely to densely, simply punctured; pubescence rufotestaceous, fine, adpressed. Head with frons shallowly convex; supra-antennal ridge slightly projecting, shallowly arcuate anteriorly, becoming confluent with frontoclypeal margin. Antennae 11-segmented, broadly serrate; short, reaching to posterior third of pronotum; antennomere 3 subcylindrical, coarsely and sparsely punctured. Pronotum with length 1.1–1.2× width; shallowly convex to depressed on disc, subcanaliculate posteriorly, narrowly deplanate anterolaterally; hind angle obliquely subtruncate in ventrolateral aspect, dorsal angle denticulate, dorsum with strong carina; basal incisures obsolete. Prosternum with anterior lobe extended, planar, margin with thick bead; intercoxal process planar, coxal margin elevated. Hypomeron with mesal margin with broad, flat, sparsely punctured bead narrowing anteriorly; posterior margin broadly, shallowly emarginate. Scutellum quadrate, broadly rounded posteriorly. Mesepimeron narrowly adjacent to coxal cavity. Metasternum with anterior intercoxal process quadrangular, shallowly emarginate. Elytral striae deeply impressed, coarsely punctured; intervals flat to shallowly convex, punctures moderately sparse and arranged in 3–4 irregular series. Tarsus lacking membranous lobes; claws simple, without basal setae. Aedeagus short; median lobe slender, deflexed apically; paramere obtuse at apex, desclerotized medio-apically, with setae at apex. Gonocoxites moderately sclerotized; styli short and lateral; baculi long, reaching ventrite 1; vagina large, dilated; bursa copulatrix elongate, tubular, with scattered internal spines arising from darkly sclerotized circular bases; spermatheca absent; accessory spermatheca narrowly tubular, near base of accessory gland duct.

Name derivation. This genus is named in honor of the late M.C. Lane, for his important contributions to elaterid taxonomy. Genus is masculine in gender.

Range and Numbers. Two species, one in the Northeast and one in California. One species had been recorded from the Southeast.

North American species. These new combinations as originally proposed by Johnson (1992) are included here to validate the actions for future works. They are to be credited to Johnson.

Laneganus nunenmacheri (Van Dyke 1932: 422), **new combination**
Laneganus sulcicollis (Say 1839: 168), **new combination**

Discussion. Members of this genus have historically been placed in genus *Hypoganus*. A third, currently undescribed, species occurs in Arizona and New Mexico.

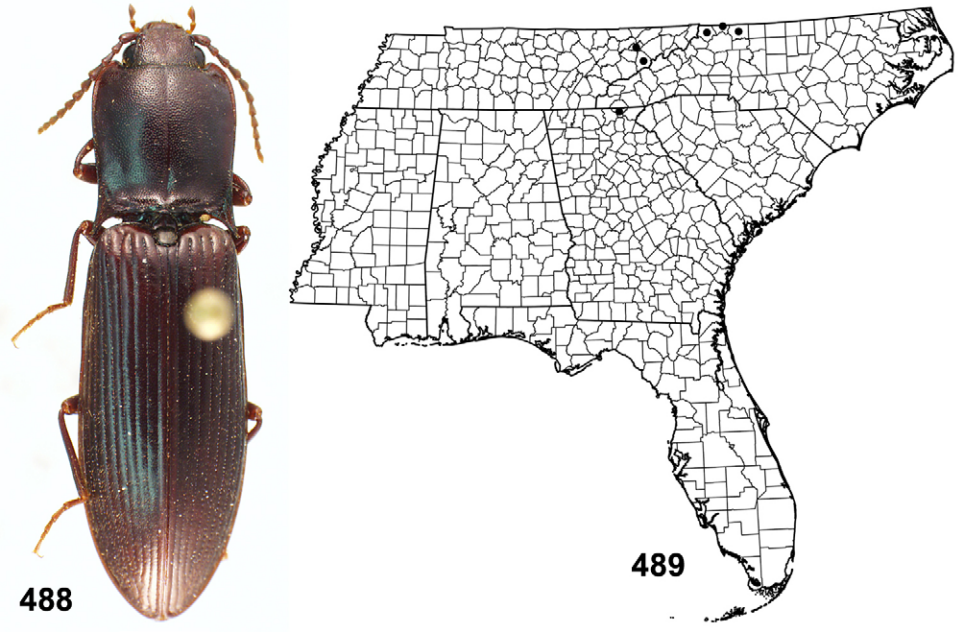
Laneganus sulcicollis (Say, 1839), new combination

Figures 488–489

Elater parallelus Say, 1825: 256 (not *Elater parallelus* Dejean, 1833: 90, *nomen nudum*)
Elater sulcicollis Say, 1839: 168 (homonym replacement name)
Elater inversicoilus Say, 1839: 168

Diagnosis. Size moderate, 15.0–18.0 mm in length, form elongate, subparallel, widening slightly after base of elytra. Color dark red-brown to dark brown, vestiture fine. Antenna 11-segmented, serrate, not reaching apex of pronotal hind angle. Pronotum longer than wide, subparallel, sinuate at base of hind angles, subcanaliculate posteriorly; hind angles divergent, with single, strong carina. Pronotosternal sutures closed anteriorly. Elytral striae deep, punctate; intervals densely, finely punctate. Aedeagus with median lobe slender; paramere obtuse at apex, with setae at apex. Female similar to male externally, but slightly larger and with a slightly broader pronotum.

Distribution. Northeastern North America (Downie and Arnett 1996). In the Southeast, previously recorded only from Georgia (Leng 1910; Fattig 1951). The following records from North Carolina and Tennessee represent **New State Records**.



Figures 488–489. *Laneganus sulcicollis*. **488)** Habitus. **489)** Distributional data.

Specimens Examined. Georgia (Towns); **North Carolina** (Alleghany, Ashe, Surry); **Tennessee** (Cocke, Loudon). April–August. (Figure 489)

Discussion. *Elater parallelus* Say, 1825 was replaced (Say 1833, 1839) with *E. sulcicollis* under the advice of Dejean who noted the prior use of *E. parallelus*. However, the only *Elater parallelus* during Say's time was a name in Dejean (1833) and it is a *nomen nudum*. Though *Elater parallelus* Dejean was treated by Candèze (1860) as a synonym of *Athous castanescens* Mulsant and Guillebeau (1855), it is not available (ICZN 1999, Art. 11.6). This species is fairly distinctive in the study area. Specimens in the study area have been collected in Lindgren funnel and panel traps and at ultraviolet light.

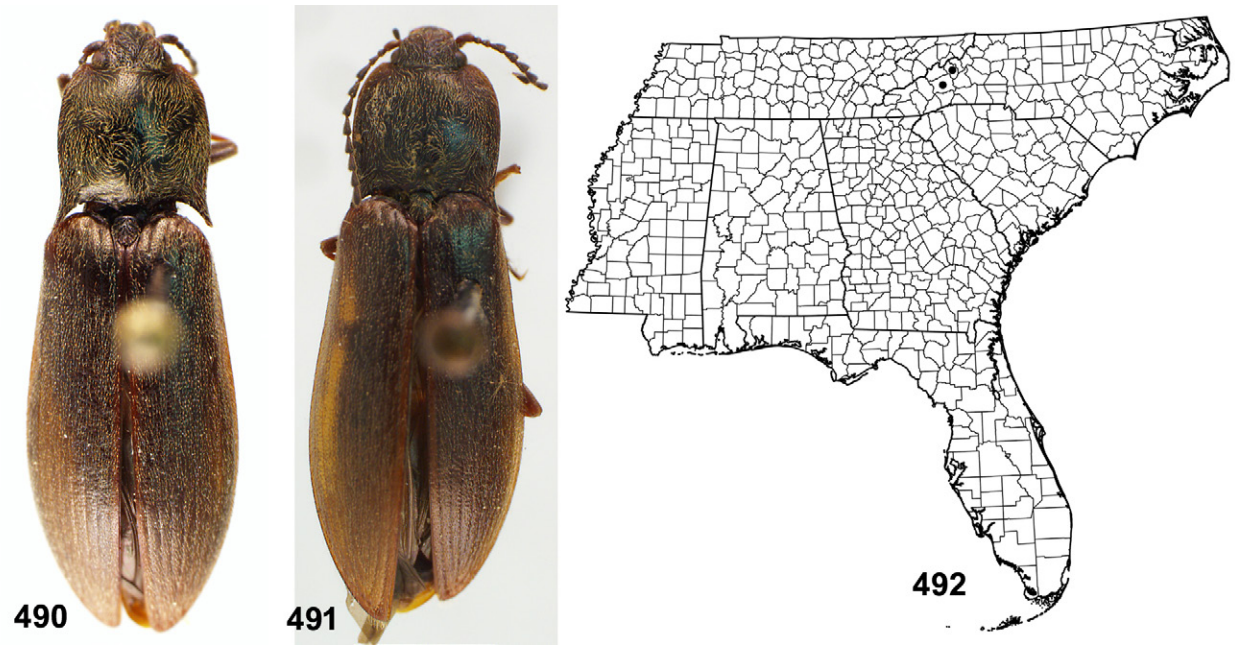
Metanomus Buysson, 1887

Metanomus Buysson, 1887: 132

Diagnosis. Size moderate, form elongate, widest post-medially. Usually bicolored, black with red-brown elytra; vestiture various. Head with frons depressed to shallowly convex; supra -antennal carinae incomplete. Antenna 11-segmented, serrate, extending beyond the apex of pronotal hind angle by 2–4 antennomeres. Pronotum slightly longer than wide, subquadrate, arcuate, gradually narrowing anteriorly, slightly sinuate at base of hind angles; hind angles divergent, slender, acute, unicarinate. Pronotosternal sutures closed anteriorly. Elytron widest basally; striae and intervals various. Tarsus lacking membranous lobes; claw simple, without basal setae. Paramere with apical blade. Sexually dimorphic; female wider post-medially and with a broader pronotum.

Range and Numbers. Three species in North America, two in montane California and one nearly transcontinental in the North (Majka and Johnson 2008), the latter of which has been recorded from the Southeast.

Discussion. Tarnawski (1996, 2001) catalogued *Metanomus* on a world-basis, but neglected to recognize three North American species that were later formally transferred to the genus by Majka and Johnson (2008). Van Dyke (1932) seemed to recognize similarities in the three, as they key out close together in his treatise. The genus has yet to be formally revised for North America. Little is known about the biology of species in the genus.



Figures 490–492. *Metanomus insidiosus*. **490)** Male habitus. **491)** Female habitus. **492)** Distributional data.

Metanomus insidiosus (LeConte, 1853)

Figures 490–492

Corymbites insidiosus LeConte, 1853: 448
Ctenicera lutescens Fall, 1910: 134

Diagnosis. Size moderate, 10.0–12.0 mm in length, form elongate, broadest at elytra post-medially. Color black; elytra dark, dull, red-brown; vestiture golden, evenly distributed over the body. Antenna 11-segmented, weakly serrate; antennomere III intermediate between II and IV. Pronotum subquadrate, arcuate, gradually narrowing anteriorly, slightly sinuate at base of hind angle, punctures coarse, dense, separated by less than their own diameters; hind angles divergent, slender, acute, unicarinate. Elytron widest basally; striae fine, finely punctured; intervals flat, coarsely punctured. Aedeagus with median lobe gradually tapering to subacute apex; paramere apically hooked, with broadly rounded apex. Sexually dimorphic; females wider most medially and with a more broadly rounded, arcuate pronotum.

Distribution. Nearly transcontinental in the North (Downie and Arnett 1996). In the Southeast, previously recorded from Georgia and North Carolina (Brimley 1938; Fattig 1951; Downie and Arnett 1996).

Specimens Examined. North Carolina (Buncombe, Yancey). May–June. (Figure 492)

Discussion. This species is fairly distinctive, based on the shape of the pronotum and elytra and color. In the study area, it is somewhat similar to *Oxygonus montanus*, but is larger and lacks the basal flange present on the tarsal claws of *Oxygonus*. Not much is known about the species' biology.

Neopristilophus Buysson, 1894

Neopristilophus Buysson, 1894: 77

Diagnosis. Size moderate to large. Color black, moderately shining, never metallic; appendages sometimes paler; vestiture fine, sparse. Supra-antennal carinae incomplete. Antenna 11-segmented, length variable,

flagellar antennomeres strongly serrate in both sexes. Pronotum slightly longer than, or subequal to, wide, widest medially, evenly arcuate, more or less canaliculate medially, coarsely punctate; hind angles divergent, strongly unicarinate. Pronotosternal sutures closed anteriorly. Hypomeron not deeply emarginate basally. Elytral striae and intervals distinctly punctate, punctures finer than those on pronotum. Tarsus lacking membranous lobes; claw simple, without basal setae. Aedeagus variable; paramere lacking defined apical blade. Female similar to male, but slightly larger and with a more arcuate pronotum.

Range and Numbers. Four species in North America, three in the West and one in the Northeast (Brown 1935c; Johnson 2002), the latter of which has the southern limits of its distribution in the Southeast.

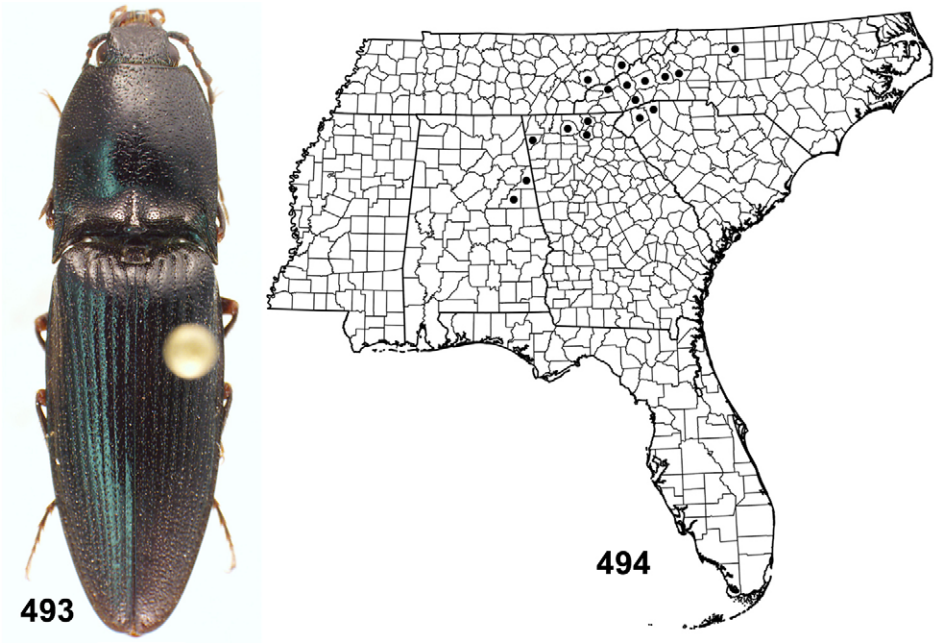
Discussion. Brown (1935c) first treated *Neopristolophus* in North America as the *cribrosus* group of *Ludius*. Tarnawski (1996, 2001) catalogued the genus on a world-basis. The single southeastern species, *N. aethiops*, is somewhat similar to members of the genus *Melanactes* but has a longer pronotum in relation to its width and more strongly serrate antennae. Little is known about the biology of the species.

Neopristilophus aethiops (Herbst, 1806)

Figures 493–494

Elater aethiops Herbst, 1806: 70
Elater laevigatus Herbst, 1806: 45
Ludius nigricans Melsheimer, 1806: 42 (*nomen nudum*)
Ludius nigrans Dejean, 1833: 94 (*nomen nudum*)
Corymbites depressus Gemminger and Harold, 1869: 1574 (nec *Elater depressus* Germar, 1822: 9)
Ludius nigrans Laporte de Castelnau, 1840: 241

Diagnosis. Size moderate to large, 16.0–20.0 mm in length. Color black, somewhat shining; vestiture white, sparse, decumbent. Supra-antennal carinae incomplete, head between eyes depressed. Antenna 11-segmented, extending beyond apex of pronotal hind angle by approximately 1.5 antennomeres; antennomere II small; flagellar antennomeres strongly serrate. Pronotum longer than wide, widest post-medially, narrowing anteriorly,



Figures 493–494. *Neopristilophus aethiops*. **493)** Habitus. **494)** Distributional data.

medially canaliculate, punctures separated by a distance approximately equal to their diameters, denser but not contiguous laterally; hind angles divergent and strongly unicarinate. Elytral striae and intervals strongly, coarsely punctate. Aedeagus with median lobe subparallel, tapering subapically to rounded apex; paramere subparallel, slightly divergent apically, apex broadly rounded. Female similar to male but slightly larger; pronotum broader with width and length subequal; antenna shorter, failing to reach apex of pronotal hind angle, flagellar antennomeres noticeably serrate but not as strong as in males.

Distribution. Northeastern North America (Brown 1935c; Downie and Arnett 1996). In the Southeast, previously recorded from Georgia, North Carolina, South Carolina, and Tennessee (Brown 1935c; Brimley 1938; Fattig 1951; Kirk 1969, 1970; Downie and Arnett 1996; Tarnawski 1996). Brimley's (1938) records of *Melanactes puncticollis* from Black Mountain, NC pertain to this species. The following records from Alabama represent a **New State Record**.

Specimens Examined. Alabama (Clay, Cleburne); **Georgia** (Chattooga, Gilmer, Lumpkin, Union); **North Carolina** (Buncombe, Burke, Forsyth, Haywood, McDowell, Swain, Transylvania); **South Carolina** (Greenville, Pickens); **Tennessee** (Blount, Cocke). May–June. (Figure 494)

Discussion. In the Southeast, this species is similar to members of the genus *Melanactes*. *Neopristilophus aethiops* is generally smaller than *Melanactes* spp. and has a longer pronotum (males) and more strongly serrate antennae. Not much is known about the biology of the species. Specimens in the study area have been collected at mercury vapor and ultraviolet light, netted while in flight, and in Malaise, Lindgren funnel, and canopy traps.

Oxygonus LeConte, 1863

Oxygonus LeConte, 1863: 48

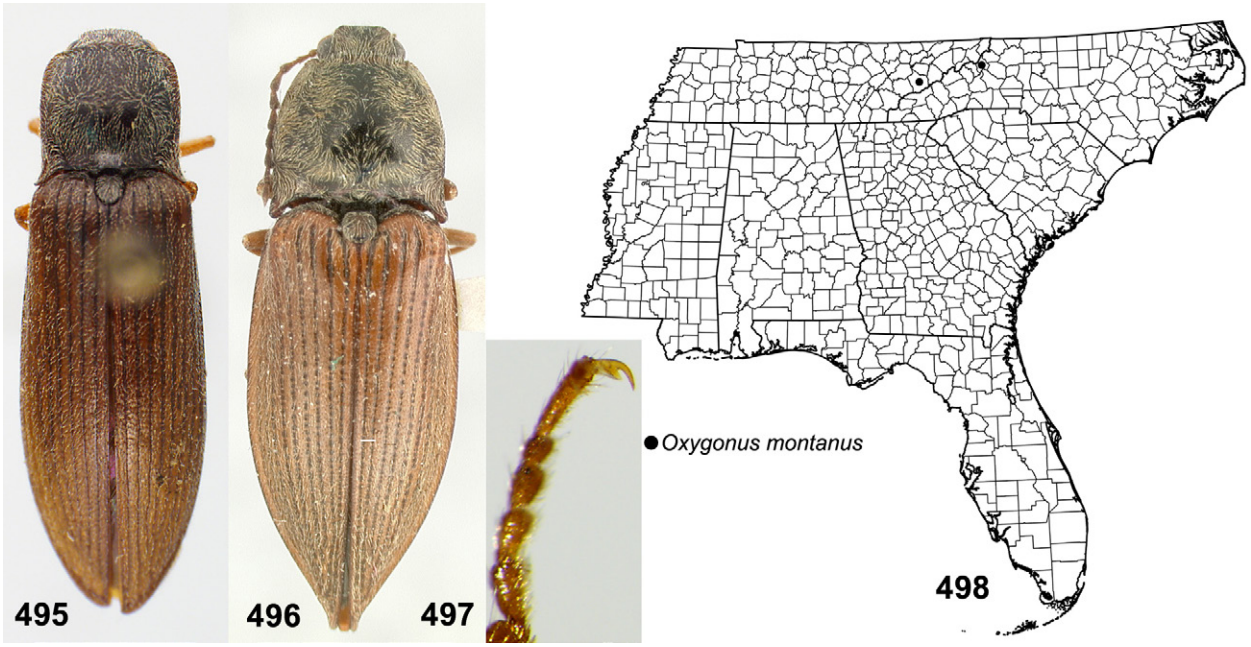
Diagnosis. Size small to moderate, broad, fusiform in dorsal aspect, shallowly convex. Color black or bicolored with pale elytra. Head depressed anteriorly; supra-antennal carinae incomplete. Antenna 11-segmented, serrate, length variable. Pronotum wider than long, weakly to strongly explanate, narrowing anteriorly; hind angles weakly to strongly divergent, carinate or not. Pronotosternal sutures closed anteriorly; prosternal process long, slender. Elytron elongate, lateral margin weakly to strongly explanate; striae punctate; intervals flat to moderately convex. Tarsus lacking membranous lobes; claw with large basal flange (Figure 497), lacking basal setae. Paramere with apical blade. Sexual dimorphism slight.

Range and Numbers. Four species in North America, two along the West Coast and two in the Northeast (Roache 1963). Both eastern species have been recorded from the Southeast.

Discussion. *Oxygonus* was formally revised by Roache (1963). Tarnawski (1996, 2001) did not include this genus in either of his catalogues of the Ctenicerini, probably due to its historical placement in Agriotini (Roache 1963; Downie and Arnett 1996). Johnson (2002) first placed it in Prosternini. *Oxygonus* is a distinctive genus, with a set of character traits that readily separates it from other elaterids. The general habitus is similar to *Prosternon* and *Metanomus*, but the basal tarsal flange is diagnostic. Not much is known about the biology of the species in the genus.

Key to the species of *Oxygonus* in the Southeast
(adapted from Roache 1963)

1. Lateral margin of elytra strongly explanate, apex strongly acuminate in males; pronotal hind angles ecarinate; broader species . . . . . ***O. obesus* (Say)**
— Lateral margin of elytra moderately explanate, apex rounded in males; pronotal hind angles unicarinate; more slender species . . . . . ***O. montanus* Schaeffer**



Figures 495–498. *Oxygonus* spp. **495)** *O. montanus* (habitus). **496)** *O. obesus* (habitus). **497)** *O. montanus* (tarsus). **498)** Distributional data for *O. montanus*. *Oxygonus obesus* photo courtesy Kyle Schnepp (Florida State Collection of Arthropods, FDACS-DPI, Gainesville, FL, USA).

Oxygonus montanus Schaeffer, 1917

Figures 495, 497–498

Oxygonus montanus Schaeffer, 1917: 43

Diagnosis. Size small, 8.0–10.5 mm in length, form elongate. Bicolored, black with elytra red-brown (melanic forms have black elytra); basal antennomeres and legs reddish; vestiture yellow, denser on head and pronotum than elytra. Antenna 11-segmented, weakly serrate, not reaching apex of pronotal hind angle; antennomere III longer than II, subequal to IV. Pronotum slightly longer than wide, widest before hind angles, sides subparallel, slightly explanate, narrowing anteriorly, punctures coarse, dense, separated by less than their own diameters; hind angles slightly divergent, weakly unicarinate. Elytron elongate, wider than pronotum, widest medially, gradually tapering to rounded apex, lateral margin weakly explanate; striae distinctly punctate; intervals flat, punctate. Aedeagus with median lobe medially compressed, apex subacute; paramere with apical blade, gradually tapering to subacute apex. No sexual dimorphism described.

Distribution. Northeastern North America (Roache 1963). Roache (1963) did not record the species south of Pennsylvania, but Downie and Arnett (1996) recorded it from Tennessee. The following record from North Carolina represents a **New State Record**.

Specimens Examined. North Carolina (Avery); **Tennessee** (Sevier). May–June. (Figure 498)

Discussion. This species should be easy to recognize in the study area but needs to be differentiated from *O. obesus*. I have examined two specimens (CUAC, LSAM) that confirmed Downie and Arnett's (1996) record from Tennessee. The specimens were collected at Clingmans Dome on the North Carolina border in the Great Smoky Mountains National Park. This site has produced several southern records of primarily boreal species. Neither specimen had label data indicating its method of capture.

Oxygonus obesus (Say, 1823)

Figure 496

Elater obesus Say, 1823: 168
Elater acutipennis Randall, 1838: 36

Diagnosis. Size moderate, 10.0–11.0 mm, form elongate, moderately convex. Bicolored, black with red-brown elytra; antennae and legs reddish; vestiture yellow, denser on pronotum than elytra, whorled on pronotum. Antenna 11-segmented, weakly serrate, just reaching apex of pronotal hind angle; antennomere III intermediate between II and IV, II and III combined longer than IV. Pronotum wider than long, widest before hind angles, arcuate, narrowing and explanate anteriorly, punctures small, coarse, dense, separated by less than their own diameters; hind angles slightly divergent, ecarinate. Elytron elongate, wider than pronotum, widest medially, lateral margin distinctly explanate, gradually tapering to acuminate apex in male; striae punctate; intervals flat, finely punctate. Aedeagus with median lobe slender, widest subapically, apex subacute; paramere with apical blade, lateral tooth and apices acute. Female similar to male but with shorter antenna and rounded elytral apex.

Distribution. Northeastern North America (Roache 1963). Roache (1963) did not record this species south of Pennsylvania, but Leng (1910) and Fattig (1951) recorded it from Georgia. I have not examined any specimens from the Southeast but am leaving this species in the study due to the presence of several boreal prosternines in the mountains of Tennessee, North Carolina, South Carolina, and northern Georgia. Further collecting should confirm its presence in the study area.

Specimens Examined. None.

Discussion. If this species was to occur in the Southeast, the generic and specific characters should be enough to successfully recognize it. It superficially resembles a member of the genus *Prosternon* (not currently known from the Southeast), but the basal flange on the tarsal claws should readily separate it from that genus.

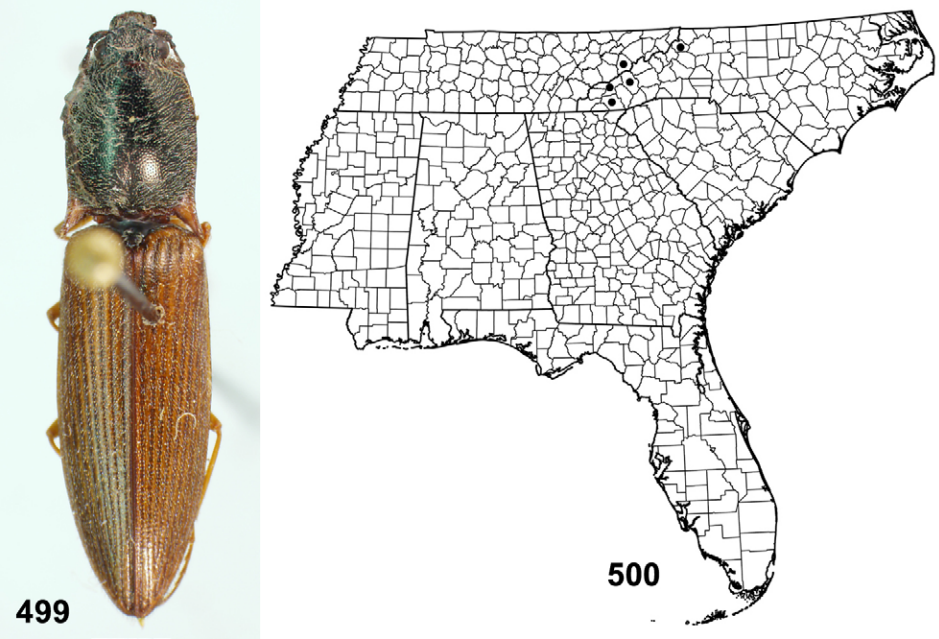
Paractenicera Johnson, 2008

Paractenicera Johnson in Majka and Johnson, 2008: 24

Diagnosis. Size moderate, form elongate, narrow, subparallel. Often bicolored, shining but not metallic; vestiture short. Head with frons weakly concave; supra-antennal carinae incomplete. Antenna 11-segmented, strongly serrate, reaching to or beyond apex of pronotal hind angle. Pronotum longer than wide, medially canaliculate; hind angles subacute, strongly unicarinate. Pronotosternal sutures closed anteriorly; prosternal process straight. Elytron elongate, subparallel; striae punctate; intervals flat to weakly convex. Tarsus lacking membranous lobes; claw simple, without basal setae. Paramere with lateral subapical tooth, apex setose. No sexual dimorphism described.

Range and Numbers. Endemic to North America, with two species in the Northeast (Majka and Johnson 2008). Previously not recorded from the Southeast; one species added herein.

Discussion. This genus was described to accommodate two species in the former *Ctenicera* complex, characterized by a long, narrow habitus, pronotum longer than wide and medially canaliculate, strongly carinate pronotal hind angles, and characteristics of male and female genitalia (Majka and Johnson 2008), although there has yet to be a formal revision. Little is known about the biology of species in the genus.



Figures 499–500. *Paractenicera fulvipes*. **499)** Habitus. **500)** Distributional data.

Paractenicera fulvipes (Bland, 1863)

Figures 499–500

Corymbites fulvipes Bland, 1863: 354

Diagnosis. Size moderate, 13–15 mm in length, form elongate, narrow, subparallel. Bicolored, black with legs, pronotal hind angles, and elytra yellow-red (melanic forms can have the pronotum and elytra entirely black); vestiture gray, short, decumbent. Antenna 11-segmented, serrate, extending beyond apex of pronotal hind angle by up to three antennomeres; antennomere II short; III subequal to IV; IV–X strongly serrate. Pronotum longer than wide, arcuate, tapering apically, slightly sinuate at base of hind angles, medially shallowly canaliculate; punctures coarse, dense, laterally shallow and umbilicate; hind angles divergent, strongly unicarinate. Elytron elongate; striae punctate; intervals slightly convex. coarsely punctate. Aedeagus with median lobe deflexed apically; paramere with subapical lateral tooth. No sexual dimorphism described.

Distribution. Northeastern North America (Downie and Arnett 1996; Majka and Johnson 2008). Previously not recorded from the Southeast. The following records from North Carolina and Tennessee represent **New State Records**.

Specimens Examined. North Carolina (Haywood, Macon, Swain, Watauga); **Tennessee** (Cocke). May–June. (Figure 500)

Discussion. This species should be relatively easy to recognize, based on its long, slender habitus and characteristics of the pronotum. Downie and Arnett (1996) recorded this species from Virginia, so its presence in North Carolina and Tennessee is not surprising. Little is known about the biology of the species; Majka and Johnson (2008) indicated it is more commonly collected in hardwood forests in Atlantic Canada. Specimens in the study area have been collected in canopy and Malaise traps.

Proludius Lane, 1971

Proludius Lane, 1971: 21

Diagnosis. Form elongate, narrow, subparallel, shallowly convex dorsally. Integument with punctures moderately coarse, simple to umbilicate; vestiture moderately long, decumbent, yellow-brown to red-brown. Head with frons flat to shallowly concave; supra-antennal ridge transverse, not conjoint on frons. Antenna 11-segmented, moderately serrate; antennomere III coarsely punctate and subserrate. Pronotum longer than wide; disc moderately convex; hind angle with short, distinct to evanescent carina; basal incisures short. Prosternum with anterior lobe longer than wide, shallowly deflexed; intercoxal process subplanar, shallowly convex between coxae; pronotosternal sutures narrowly open to closed anteriorly. Tarsus lacking membranous lobes; claws simple, without basal setae.

Distribution. Twelve species, generally distributed in North America. One species has been recorded from the Southeast.

North American species.These new combinations as originally proposed by Johnson (1992) are included here to validate the actions for future works. They are to be credited to Johnson.

Proludius angusticollis (Mannerheim, 1843: 241), **new combination**
Proludius anthrax (LeConte, 1861: 348), **new combination**
Proludius aplastoides (Van Dyke, 1932: 411), **new combination**
Proludius captiosus (Brown, 1939: 49), **new combination**
Proludius comes (Brown, 1939: 48), **new combination**
Proludius gibsoni (Lane, 1965: 181), **new combination**
Proludius humboldti (Van Dyke, 1932: 415), **new combination**
Proludius iaculus (LeConte, 1853: 447)
Proludius pyrros (Herbst, 1806: 30) (see below for nomenclature)
Proludius protractus (LeConte, 1859: 85), **new combination**
Proludius silvaticus (Van Dyke, 1932: 409), **new combination**
Proludius tenellus (Van Dyke, 1932: 414), **new combination**

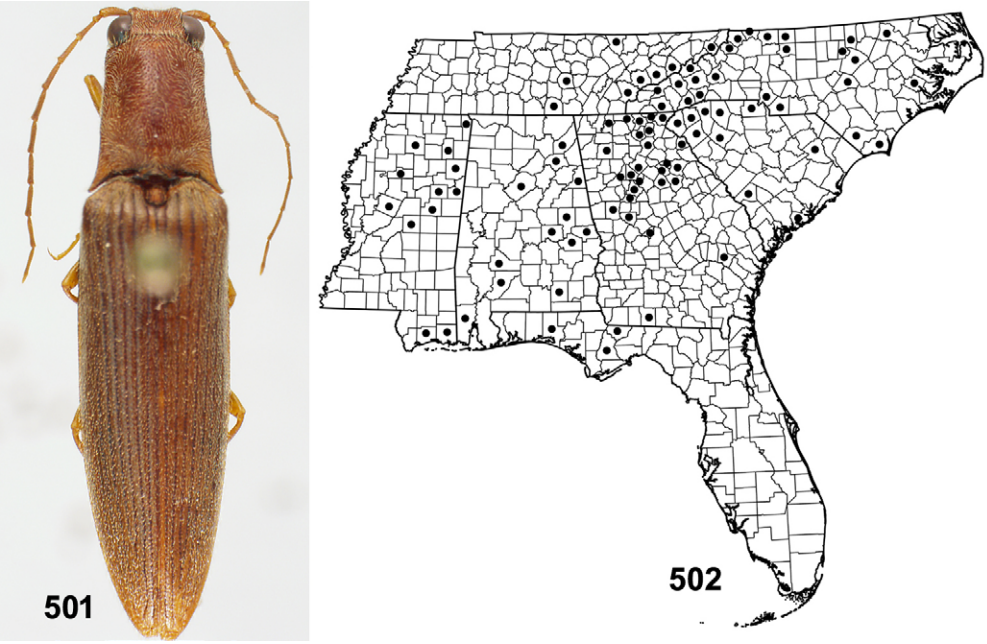
Discussion. Members of this genus can be generally recognized by their long, slender form, long antennae, and slightly divergent, long pronotal hind angles.

Proludius pyrros (Herbst, 1806), new combination

Figures 501–502

Elater pyrros Herbst, 1806: 30
Athous longus Dejean, 1833: 89 (*nomen nudum*)
Athous pyrrhicus Haldemann, 1843: 303
Athous aequalis Melsheimer, 1846: 153
Athous vagans Melsheimer, 1846: 153

Diagnosis. Size moderate to large, 18.0–23.0 mm in length, form slender and elongate. Color uniformly light red-brown to brown; vestiture gray. Antenna 11-segmented, extending three or more antennomeres beyond apex of pronotal hind angle; antennomere II small; III similar to following; flagellar antennomeres filiform and much longer than wide. Pronotum longer than wide, subparallel but widest post-medially, punctures coarse, dense, umbilicate; hind angles divergent with strong carina running parallel with the lateral margin. Pronotosternal sutures closed anteriorly. Elytron elongate, subparallel in basal two-thirds, then slightly tapering to truncate apex; striae impressed, punctate; intervals punctate. Female similar to male but slightly larger and with a broader pronotum, shorter antennae extending approximately two antennomeres beyond tip of hind angle, and with elytron widest post-medially.



Figures 501–502. *Proludius pyrros*. **501)** Habitus. **502)** Distributional data.

Distribution. Eastern North America (Van Dyke 1932). In the Southeast, previously recorded from all states except Mississippi (Leng 1910, 1920; Brimley 1938; Löding 1945; Fattig 1951; Kirk 1969, 1970; Downie and Arnett 1996; Peck and Thomas 1998). The following records from Mississippi represent a **New State Record**.

Specimens Examined. Alabama (Cleburne, Coffee, DeKalb, Elmore, Etowah, Jefferson, Lee, Macon, Mobile, Monroe, Tallapoosa, Wilcox); **Florida** (Gadsden, Liberty, Walton); **Georgia** (Bartow, Clarke, DeKalb, Fannin, Fulton, Greene, Gwinnett, Hall, Hart, Henry, Lumpkin, Meriwether, Morgan, Murray, Oconee, Oglethorpe, Peach, Rabun, Rockdale, Spalding, Tattnall, Thomas, Towns, Union, Upson, White); **Mississippi** (Grenada, Harrison, Holmes, Jackson, Lafayette, Leake, Lee, Lowndes, Monroe, Oktibbeha, Tishomingo, Winston); **North Carolina** (Alleghany, Ashe, Brunswick, Buncombe, Columbus, Craven, Durham, Forsyth, Granville, Halifax, Harnett, Haywood, Henderson, Macon, Madison, McDowell, Mecklenburg, Stokes, Surry, Swain, Transylvania, Union, Wake, Watauga counties; also along the Blue Ridge Parkway, Blowing Rock State Park); **South Carolina** (Anderson, Barnwell, Charleston, Florence, Greenville, Laurens, Oconee, Pickens, Spartanburg, York); **Tennessee** (Blount, Carter, Cocke, Franklin, Monroe, Scott, Sevier, Warren). April–October. (Figure 502)

Discussion. The species commonly named *Ctenicera pyrrhos* had its original name form as *Elater pyrros* Herbst, and this name was used by Harris (1835). The species name spelling was changed to "*pyrrhos*" by Dejean (1833) and attributed to Say but treated as a synonym of his own *Athous longus*. The "*pyrrhos*" spelling remained consistently used through genus reassignments by Dejean (1836), Haldeman and LeConte (1853), LeConte (1853), Schwarz (1906), Schenkling (1927), and Dietrich (1945), and numerous other publications. However, Article 23.9.1 (ICZN 1999) may not be invoked to retain use of "*pyrrhos*" as a species epithet in preference to the original spelling of "*pyrros*" because Bousquet et al. (2013) used the original spelling.

Proludius pyrros has the largest distribution and is the most commonly collected prosternine in the Southeast. Its large size, long, slender antennae, and uniform red-brown color is unlike anything else in the study area. It superficially resembles *Athous brightwelli* but has carinate pronotal hind angles and lacks membranous tarsal pads.

Kirk (1969) recorded it from tanglefoot screen and at ultraviolet light in Florence, SC. Specimens in the study area have been collected at ultraviolet light, alone and in conjunction with mercury vapor light, in Lindgren funnel and Malaise traps, and by sweeping and beating vegetation.

Setasomus Gurjeva, 1985

Setasomus Gurjeva, 1985: 576

Diagnosis. Size small to moderate, form robust. Color black with aeneous luster, appendages often paler; vestiture fine, silvery. Supra-antennal carinae incomplete, frons depressed. Antenna 11-segmented, serrate, not extending beyond apex of pronotal hind angle; antennomere III not similar to following antennomeres. Pronotum about as long as wide, punctation variable; hind angles divergent, strongly unicarinate. Hypomeron emarginate basally. Pronotosternal sutures closed anteriorly. Elytral striae well-impressed, intervals with coarse punctures. Tarsus lacking membranous lobes; claw simple, without basal setae. Aedeagus with median lobe attenuate; paramere with apical thickening or a defined blade. Female similar to male externally but often with shorter antenna.

Range and Numbers. Previously, there were three North American species, northern and eastern montane (Johnson 2002); a fourth is added herein. This genus has not been previously recorded from the Southeast, with one species added new here.

North American Species. These new combination as originally proposed by Johnson (1992) is included here to validate the action for future works. It is to be credited to Johnson.

Setasomus aratus (LeConte, 1853: 438)
Setasomus atropurpureus (Melsheimer, 1846: 215), **new combination**
Setasomus nitidulus (LeConte, 1853: 439)
Setasomus rufopleuralis (Fall, 1933: 188)

Discussion. Gurjeva (1989) described *Setasomus* as a subgenus of *Mosotalesus* Kishii. Cate (2007) placed *Setasomus* as a subgenus of *Paraphotistus* Kishii. Members of the genus *Setasomus* are somewhat similar to *Hadromorphus* but slightly more subcylindrical and do not have the pronotal sutures open anteriorly. The genus was first treated for North America by Brown (1936a) as the *nitidulus* group of *Ludius*. Tarnawski (1996, 2001) catalogued the genus on a world-basis and recognized the same three species as Brown (1936a). Virtually nothing is recorded on their biology.

Setasomus aratus (LeConte, 1853)

Figures 503–504

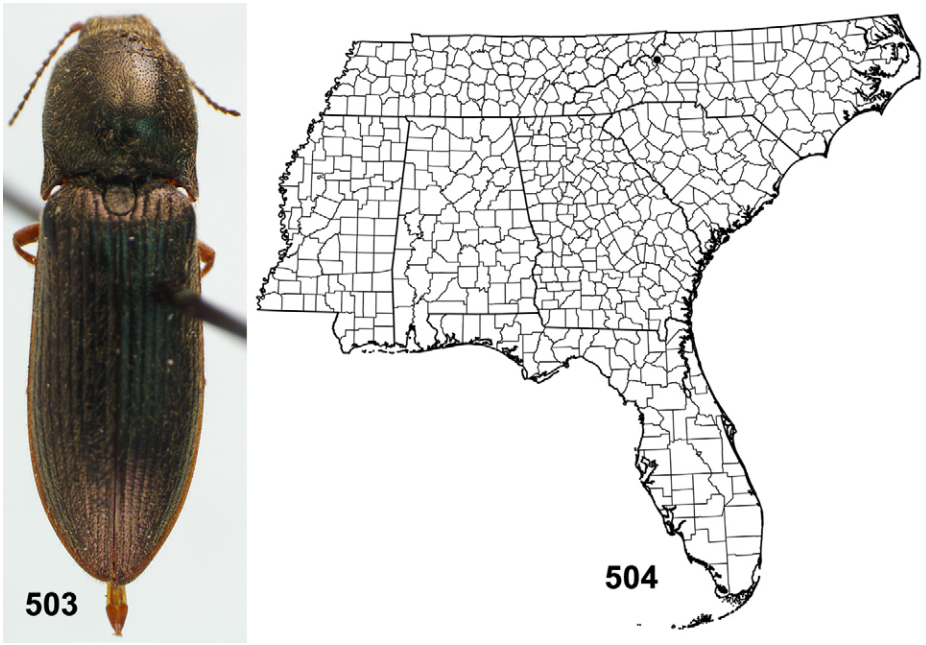
Corymbites aratus LeConte, 1853: 438

Diagnosis. Size moderate, 11.0–13.0 mm in length, widest in posterior third, slightly convex. Color black with aeneous luster; legs, prosternal process, and epipleura reddish; vestiture silvery, fine, evenly distributed over the body, not noticeably denser on scutellum. Antenna 11-segmented, serrate, not reaching apex of pronotal hind angle by 1.0–1.5 antennomeres; antennomere III slender, slightly shorter than IV. Pronotum about as long as wide, strongly arcuate, punctures coarse, separated by approximately their own distances, denser but not contiguous laterally; hind angles slightly divergent, strongly unicarinate. Hypomeron densely punctate, punctures nearly contiguous throughout. Aedeagus with median lobe attenuate; parameres with defined apical blade containing a basal acute tooth, broadly rounded apically. Female similar to male but slightly more slender and with shorter antenna.

Distribution. Northeastern North America (Brown 1936a). Previously not recorded from the Southeast. The following records from North Carolina represent a **New State Record** (see discussion, below).

Specimens Examined. North Carolina (Avery). May–June. (Figure 504)

Discussion. I examined only two specimens (both females), which are housed in the NCSU. These two specimens are the basis for Brimley's (1938) record of *Hemicrepidius hemipodus* (as *H. decoloratus*) from Linville Falls,



Figures 503–504. *Setasomus aratus*. **503)** Habitus. **504)** Distributional data.

NC (see Figure 503 for one of the specimens). Neither specimen had label data indicating its method of capture, and nothing has been recorded on the species' biology.

Stropenron Johnson, new genus

Type Species. *Elater hieroglyphica* Say, 1839: 172, here designated.

Selatosomus (part), Melsheimer 1853: 73
Elater (part), Melsheimer 1853: 71
Corymbites (part), LeConte 1853: 435; 1863: 48; 1866: 48; Candèze 1863: 77; 1891: 164; Gemminger and Harold 1869: 1574; Crotch 1873: 72; Henshaw 1885: 70; Schenkling 1927: 393 (subgenus *Selatosomus*)
Ludius (part), Schwarz 1906: 220; Leng 1920: 169; Beauline 1926: 47; Van Dyke 1932: 389; Brown 1936b: 99 (*fallax* group, in part), 1936d: 177 (*propola* group, in part)
Ctenicera (part), Dietrich 1945: 19; Brooks 1960: 10; Lane 1971: 29
Pseudanostirus (part), Gurjeva 1989: 156

Description. Body moderately elongate, broad, gradually broadening from humerus, shallowly convex. Integument dull to shining, punctures fine and sparse to coarse and umbilicate on head and hypomeron; vestiture dense, fine, recumbent, cinereous to pallid, red to red-brown and coincident with transverse and subangular integumental infuscations on elytron. Head with frons flat to shallowly convex, frequently with mediolateral impressions; supra-antennal ridge obtuse, shallowly arcuate, directed anteromedially. Antenna moderately long, reaching to base or 1–2 antennomeres beyond apex of hind angle; antennomeres 4–10 narrowly serrate; antennomere 3 subcylindrical, sparsely and coarsely punctured. Pronotum with length 0.91–0.93× width; deplanate and narrowly reflexed laterally, shallowly and longitudinal impressed posteriorly; hind angle triangular, broadly rounded at apex, dorsal carina strong; basal incisures short. Prosternum with anterior lobe moderately elongate, 0.32× width, moderately deflexed; intercoxal process shallowly reflexed. Hypomeron with mesal margin simple and coarsely punctured to narrowly polished and sparsely punctured posteriorly, carinate anterior; posterior margin shallowly emarginate. Scutellum subparallel, broadly rounded posteriorly. Mesepimeron narrowly

adjacent to coxal cavity. Metasternum with anterior intercoxal process quadrangular. Elytral striae shallowly striatopunctate; intervals flat to shallowly convex, finely and irregularly punctured. Aedeagus with median lobe planar; paramere sagittate apically and setose on sclerotized apex. Gonocoxites lightly sclerotized; styli apical; baculi short, reaching only to ventrite 4; vagina narrow, without colleterial glands; bursa copulatrix saccate to bulbous, with pair of darkly sclerotized, subcircular to ovoid spinose plates; spermatheca absent; accessory gland duct short, coiled; accessory spermatheca bifurcate or absent.

Name derivation. *Stropenron* is an anagram of *Prosternon.* Genus is feminine in gender.

Range and Numbers. Nine species, generally distributed in North America. One species is recorded from the Southeast.

North American species. These new combinations as originally proposed by Johnson (1992) are included here to validate the actions for future works. They are to be credited to Johnson.

Stropenron californica (Brown, 1936: 186), **new combination**
Stropenron candida (Brown, 1936: 186), **new combination**
Stropenron columbiana (Brown, 1936: 185), **new combination**
Stropenron hamata (Say, 1834: 74), **new combination**
Stropenron hieroglyphica (Say, 1839: 607), **new combination**
Stropenron nigricollis (Bland, 1864: 68), **new combination**
Stropenron pallidipes (Brown, 1936: 185), **new combination**
Stropenron propola (LeConte, 1853: 437), **new combination**
Stropenron pudica (Brown, 1936: 183), **new combination**

Discussion. Most North American members of this genus were treated by Brown (1936d) as the *propola* group of *Ludius*. *Stropenron* is most closely related to *Prosternon* and *Pseudanostirus* and differs by the adult with antennomeres 4–10 obtuse ventro-apically; pronotosternal suture closed anteriorly; elytron red-yellow to red-brown, and with infuscate to black transverse maculae; pronotal hind angle ecarinate; aedeagus with median lobe attenuate, parameters sagittate. The larva has terga yellow to red-brown, and finely punctured, and the nasale with 2–4 basal setae. In contrast, *Pseudanostirus* adults differ with their antennomeres 4–10 strongly serrate, the pronotosternal suture open and open anteriorly, elytral setae whirled on disc, and the larvae have 10–12 subnasalar setae. *Prosternon* adults have the antennomeres 4–10 subangulate ventro-apically; elytron red-brown to black, immaculate; hind angle carinate, and the aedeagus has the parameres obtusely angulate preapically. The larva has the terga red-brown, punctures moderately large, shallow, and the nasale with 6–8 basal setae.

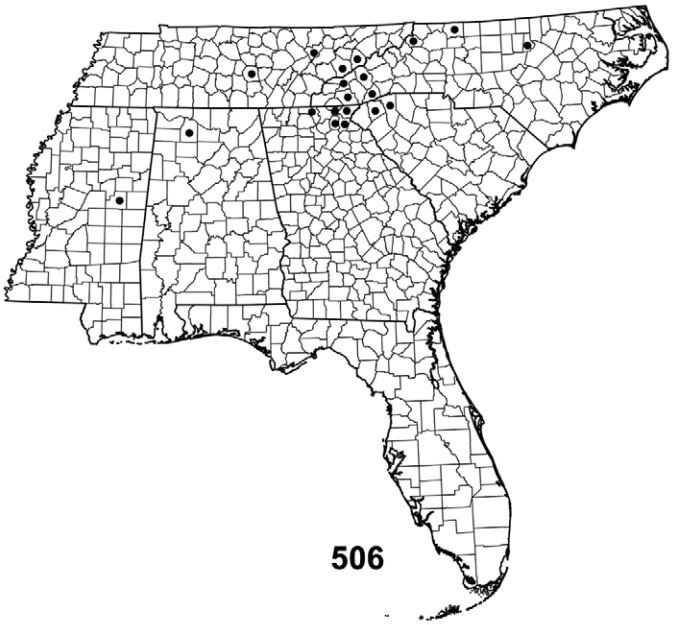
Stropenron hamata (Say, 1834), new combination

Figures 505–506

Elater hamatus Say, 1834: 74

Diagnosis. Size small to moderate, 9.0–11.0 mm in length, form broad. Color red-brown to dark brown; antennae, legs, and pronotal hind angles usually paler; elytron pale yellow with dark lunule apically, often entire apex dark giving a cordate appearance when elytra closed, no humeral maculae; vestiture yellow, longer and denser on pronotum and scutellum. Antenna 11-segmented, weakly serrate, not reaching apex of pronotal hind angle; antennomere III elongate, intermediate between II and IV, IV–X serrate. Pronotum wider than long, broadest medially, narrowing anteriorly, slightly sinuate at base of hind angles, closely, coarsely punctate; hind angles divergent, unicarinate. Hypomeron basally emarginate. Elytron broadest medially, gradually tapering to apices; striae coarsely punctate; intervals slightly convex, finely punctate. Aedeagus with median lobe planar; paramere sagittate apically and setose on sclerotized apex. No sexual dimorphism described.





Figures 505–506. *Stropenron hamata*. **505)** Habitus. **506)** Distributional data.

Distribution. Northeastern North America (Downie and Arnett 1996). In the Southeast, previously recorded only from Georgia and North Carolina (Laurent 1893; Leng 1910; Brimley 1938; Fattig 1951). The following records from Alabama, Mississippi, South Carolina, and Tennessee represent **New State Records**.

Specimens Examined. Alabama (Lawrence); **Georgia** (Fannin, Habersham, Rabun, Towns, White); **Mississippi** (Winston); **North Carolina** (Durham, Haywood, Macon, Surry, Swain, Transylvania, Watauga); **South Carolina** (Greenville, Pickens); **Tennessee** (Anderson, Cocke, Sevier, Warren). May-August. (Figure 506)

Discussion. This species should be readily recognized in the study area by its shape and distinctive color pattern. Nothing is recorded on the biology of this species. Specimens in the study area have been collected in Lindgren funnel, Malaise, flight intercept, and sticky traps.

Sylvanelater Johnson, 2008

Sylvanelater Johnson in Majka and Johnson, 2008: 25

Diagnosis. Size moderate, form elongate, subparallel, convex. Color dark brown to black with metallic reflections; vestiture moderately long, dense. Supra-antennal carinae incomplete. Antenna 11-segmented, serrate, extending 2–4 antennomeres beyond apex of pronotal hind angle. Pronotum slightly longer than wide, convex, medially canaliculate basally, basal plicae short, indistinct; hind angles divergent, ecarinate or weakly carinate. Pronotosternal sutures closed anteriorly. Hypomeron slightly emarginate near hind angle. Elytron subparallel; striae punctate; intervals flat to slightly convex, punctate; apices rounded. Tarsus lacking membranous lobes; claw simple, without basal setae. Paramere with subapical lateral tooth. Sexually dimorphic, females larger than males with less densely punctate pronotum and shorter antenna, reaching approximately mid-length of pronotum.

Range and Numbers. Four species in North America, primarily northern and montane (Majka and Johnson 2008). One species has been recorded from the Southeast.

Discussion. This is a fairly distinctive genus but somewhat similar to *Limonius* in overall appearance. No North American *Limonius* species however have such prolonged, divergent pronotal hind angles. Not much is known of the biology of species in the genus; Majka and Johnson (2008) recorded them from pine, spruce, and larch forests in eastern Canada.

Sylvanelater cylindriformis (Herbst, 1806)

Figures 507–508

Elater cylindriformis Herbst, 1806: 93
Elater brevicornis Say, 1825: 265
Elater appressiformis Say, 1825: 267
Diacanthus parallelipipedus Germar, 1843: 66
Diacanthus submetallicus Germar, 1843: 72

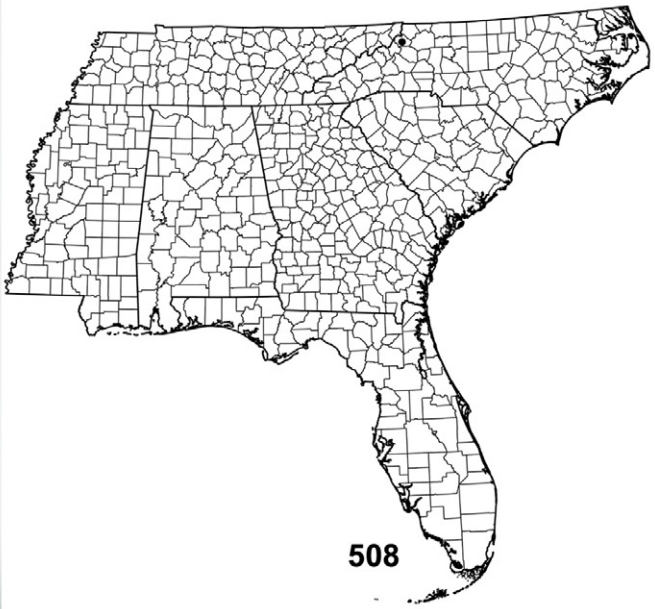
Diagnosis. Size moderate, 12.0–16.0 mm in length, form elongate, subparallel, convex. Color dark red-brown to black with brassy reflections; pronotal hind angles, sutural and lateral elytral margins, and legs often paler red; vestiture gray, long, dense. Antenna 11-segmented, moderately serrate, extending 2–4 antennomeres beyond apex of pronotal hind angle. Pronotum longer than wide, subparallel, medially canaliculate basally, punctures coarse, dense, separated by less than their own diameters; hind angles divergent, weakly carinate (carina obscured by dense vestiture). Elytron subparallel; striae punctate; intervals convex, coarsely punctate. Aedeagus with median lobe narrow, gradually tapering to subacute apex; paramere apically bent outwards, lateral subapical tooth, apex lacking setae. Sexually dimorphic; female larger and broader than male; pronotum length subequal to width and less densely punctate; antenna short, reaching on average mid-length of the pronotum.

Distribution. Northeastern North America (Downie and Arnett 1996). In the Southeast, previously only recorded from North Carolina (Brimley 1938).

Specimens Examined. North Carolina (Watauga). June. (Figure 508)

Discussion. To date, I have examined only one specimen from the study area, from North Carolina (NCSU). Based on label data, this specimen is not the one recorded by Brimley (1938), but it confirms its presence in the





Figures 507–508. *Sylvanelater cylindriformis*. **507)** Habitus. **508)** Distributional data.

state. Little is known about the biology of this species. I have examined a female from Massachusetts that was collected under a rock with *Lasius* sp. ants. Other extralimital specimens were collected by beating or sweeping vegetation and under *Pinus* bark.

Tesolasomus Johnson, new genus

Type Species. *Elater semivittatus* Say 1823: 174, here designated

Ludius (part), Schwarz 1906: 220; Beauline 1926: 27; Van Dyke 1932: 389; Brown 1936a: 11 (*semivittatus* group); Brimley 1938: 166
Corymbites (part), LeConte 1853: 435
Ctenicera (part), Lane 1971: 29
Selatosomus (part), Kishii 1987: 110; Gurjeva 1989: 226

Description. Body elongate, subparallel at midlength, moderately convex. Integument shining, occasionally with evanescent submetallic reflections; punctures moderate to dense, simple to coarsely umbilicate on head and pronotum; vestiture moderately long, appressed, pale yellow to gray. Head with frons shallowly concave; supra-antennal ridge slightly projecting, obtuse, transverse. Antenna 11-segmented, strongly serrate, antennomere III subcylindrical, punctures sparse and coarse; short, reaching to base of hind angle. Pronotum wider than long; disc moderately convex, lateral margins narrowly deplanate; hind angle in ventrolateral aspect subtruncate to broadly rounded at apex; dorsal carina strong; basal incisures indistinct. Prosternum with anterior lobe short, moderately deflexed; intercoxal process shallowly arcuate, reflexed apically. Hypomeron with medial margin simple, punctured, or with fine, flat bead; posterior margin deeply emarginate. Scutellum subparallel, broadly rounded posteriorly. Mesepimeron broadly adjacent to coxal cavity. Metasternum with anterior intercoxal process quadrangular. Elytral striae coarsely striatopunctate; intervals shallowly convex, sparsely, confusedly punctured. Aedeagus with median lobe deflexed apically; paramere hooked apically, apex membranous and setose. Gonocoxites lightly sclerotized, lobate, densely setose; styli minute, apical; baculi short, reaching only to posterior margin of ventrite 4; vagina narrow, without evident colleterial glands; bursa copulatrix elongate, strongly arcuate, with numerous fine spines internally and a cordate plate posteriorly; spermatheca anterior, short, tubular; accessory spermatheca similar and near to spermatheca; accessory gland duct short.

Name derivation. *Tesolasomus* is an anagram of *Selatosomus.* Genus is masculine in gender.

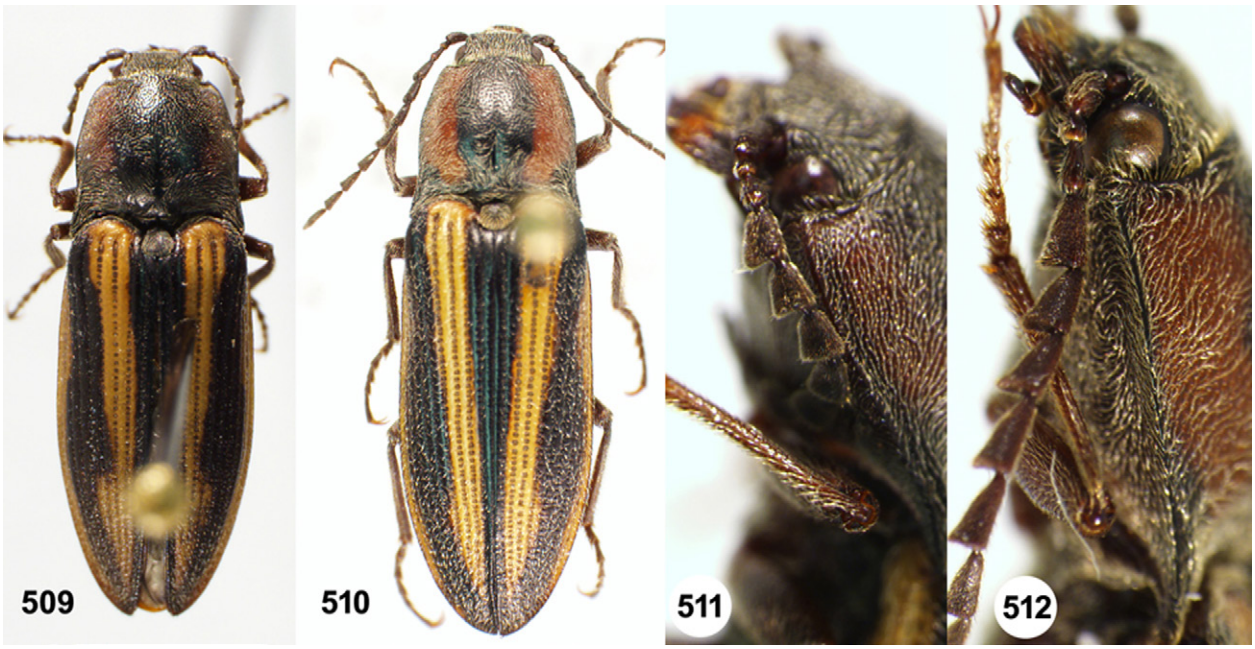
Range and Numbers. Eight species, generally distributed in North America. Two species are recorded from the Southeast.

North American species. These new combinations as originally proposed by Johnson (1992) are included here to validate the actions for future works. They are to be credited to Johnson.

Tesolasomus blanditus (Brown, 1936a: 13), **new combination**
Tesolasomus deceptor (Brown, 1936a: 16), **new combination**
Tesolasomus funereus (Brown, 1936a: 16), **new combination**
Tesolasomus lanei (Becker, 1949: 187), **new combination**
Tesolasomus morulus (LeConte, 1863: 85), **new combination**
Tesolasomus semivittatus (Say, 1823: 113), **new combination**
Tesolasomus sexguttatus (Brown, 1936a: 14), **new combination**
Tesolasomus sexualis (Brown, 1935a: 8), **new combination**
Tesolasomus trivittatus (LeConte, 1853: 443), **new combination**

Discussion. *Tesolasomus* was provisionally proposed by Johnson (1992) who found the included species formed a distinctive group related to *Selatosomus*. This conclusion is followed here and the name, an anagram of *Selatosomus*, is accepted.

Most of the species assigned to this genus were keyed by Brown (1936a) in his *semivittatus* group of *Ludius*.



Figures 509–512. *Tesolasomus* spp. **509)** *T. lanei* (habitus). **510)** *T. trivittatus* (habitus). **511)** *T. lanei* (close up of flagellar antennomeres). **512)** *T. trivittatus* (close-up of flagellar antennomeres).

Key to the species of *Tesolasomus* in the Southeast

1. Pronotum strongly convex; flagellar antennomeres nearly as long as wide (Figure 511); subapical tooth on paramere dull . . . . . ***T. lanei* (Becker)**
— Pronotum less strongly convex; flagellar antennomeres strongly serrate, longer than broad (Figure 512); paramere with sharp, subapical tooth . . . . . ***T. trivittatus* (LeConte)**

Tesolasomus lanei (Becker, 1949), new combination

Figures 509, 511, 513

Ctenicera lanei Becker, 1949: 187

Diagnosis. Size moderate, 15.0 mm in length. Color black; pronotum with two broad lateral red-brown stripes running the length of the pronotum, hind angles black; elytron yellow with scutellar area black and black sutural and humeral stripes; vestiture short, yellow-gray. Antenna 11-segmented, extending up to two antennomeres beyond apex of pronotal hind angle; antennomere II small; III longer than II, cylindrical; IV–X serrate, but about as broad as long (Figure 511). Pronotum slightly longer than wide, disc strongly convex, punctures coarse, separated by their own diameters on the disc, narrow longitudinal area nearly punctureless running entire midline of pronotum; hind angles divergent, each with a strong carina running parallel to the side. Pronotosternal sutures closed anteriorly. Elytron twice as long as wide, widest in apical third, blunt at apex; striae impressed, punctures sparse and moderate; intervals punctulate and transversely wrinkled. Tarsus lacking membranous lobes; claw simple, without basal setae. Aedeagus with median lobe tapering to rounded apex; paramere apically bent outwards with dull subapical tooth. Female similar to male but more robust, having shorter antennae extending only two-thirds the length of the pronotum, and having the median longitudinal area of the pronotum punctured on middle third.

Distribution. Lower Ohio and Mississippi River Valleys and surrounding areas. In the Southeast previously recorded only from Tennessee (Becker 1949). The type locality is Reelfoot Lake in Lake County, TN. The following records from Mississippi represent a **New State Record**. In addition, I have seen several specimens from Louisiana (LSAM).

Specimens Examined. Mississippi (Desoto, Grenada, Harrison, Jefferson Davis, Noxubee, Oktibbeha, Warren); **Tennessee** (Carroll, Hardeman). March–April. (Figure 513)

Discussion. *Tesolasomus lanei* is very similar to *T. trivittatus* in the Southeast but can be separated from the latter by having a more convex pronotum, flagellar antennomeres that are serrate but are nearly as long as wide, and a duller subapical tooth on the parameres. The two species are also allopatrically separated, with *T. lanei* distributed in the lower Ohio and Mississippi River Valleys and surrounding areas and *T. trivittatus* endemic to the Lower Appalachian region of Georgia, North Carolina, South Carolina, and Tennessee. Specimens in the study area have been collected in Lindgren funnel traps.

Tesolasomus trivittatus (LeConte, 1853), new combination

Figures 510, 512–513

Corymbites trivittatus LeConte, 1853: 443

Diagnosis. Size moderate, 12.0–13.5 mm in length. Color black; pronotum with two broad lateral red-brown stripes running the length of the pronotum, hind angles black; elytron yellow with scutellar area black and black sutural and humeral stripes; vestiture short, yellow-gray. Antenna 11-segmented, extending up to three antennomeres beyond apex of pronotal hind angle; antennomere II small; III longer than II, cylindrical; IV–X serrate, distinctly longer than broad (Figure 512). Pronotum slightly longer than wide, disc less convex than *T. lanei*, punctures coarse, separated by their own diameters on the disc, narrow longitudinal area nearly punctureless running entire midline of pronotum; hind angles divergent, each with a strong carina running parallel to the side. Pronotosternal sutures closed anteriorly. Elytron twice as long as wide, widest in apical third, blunt at apex;

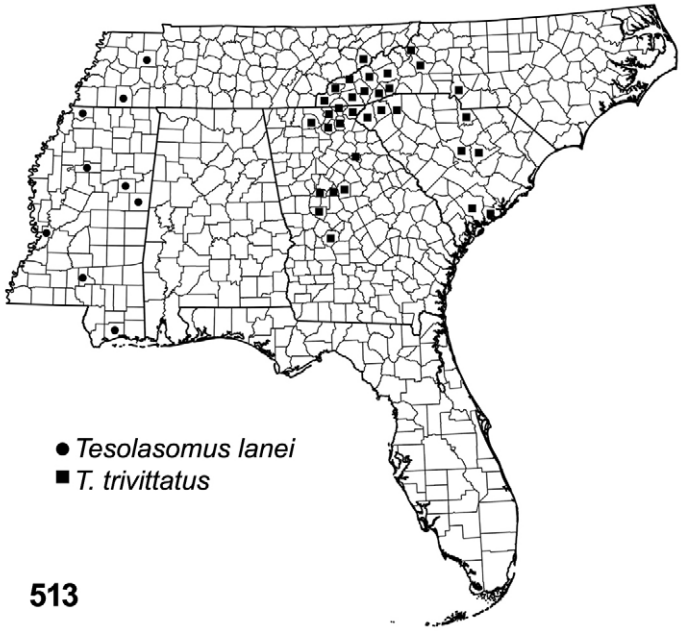


Figure 513. Distributional data for *Tesolasomus lanei* and *T. trivittatus*.

striae impressed, punctures sparse and moderate; intervals punctulate and transversely wrinkled. Tarsus lacking membranous lobes; claw simple, without basal setae. Aedeagus with median lobe tapering narrowly to rounded apex; paramere apically bent outwards with a sharp subapical tooth. Female undescribed.

Distribution. Southern Appalachian Mountains and surrounding areas (Van Dyke 1932). In the Southeast, previously recorded from Florida, Georgia, North Carolina, and South Carolina (Leng 1910; Brown 1936a; Brimley 1938; Fattig 1951; Kirk 1970; Peck and Thomas 1998; Campbell et al. 2008b), although the record from Florida seems doubtful. The type locality is Georgia (not further restricted). The following record from Tennessee represents a **New State Record**.

Specimens Examined. Georgia (Butts, Clarke, Gilmer, Jasper, Lumpkin, Macon, Rabun, Spalding, Towns, Union, Upson, White); **North Carolina** (Avery, Buncombe, Burke, Cherokee, Graham, Haywood, Henderson, Jackson, Macon, Mecklenburg, Swain, Transylvania); **South Carolina** (Charleston, Colleton, Greenville, Lancaster, Oconee, Pickens, Richland, Sumter); **Tennessee** (Cocke). March–June. (Figure 513)

Discussion. This species was treated by Brown (1936a) in his *semivittatus* group of *Ludius* and is aligned with *T. lanei* (above), from which it can be separated by the form of the pronotum, antennae, aedeagus, and geographic distribution (see Discussion under the latter). Specimens in the study area were collected at ultraviolet light, alone and in conjunction with mercury vapor light, by beating and hand picking from vegetation, and netted while in flight.

Hypnoidini Schwarz, 1906

The classification here follows Johnson (2002) and treats the hypnoidines as a tribe of Dendrometrinae (=Athoinae). The group was revised by Stibick (1976, 1978) and given subfamily rank. Several genera have been associated historically with the Negastriinae. There are seven genera in North America (Johnson 2002), mostly northern in distribution. Only two genera, *Hypnoidus* and *Ligmargus*, have the southern limits of their distribution reaching the current study area. Adults are variable in morphology. The supra-antennal carinae are complete or not. Antenna 11-segmented, serrate. Prosternum normally arcuate anteriorly. Scutellum various but never deeply incised anteriorly. Mesocoxa open to mesepimeron but closed to mesepisternum. Meso- and metasternum not fused, joined by a definite suture. Tarsomeres lacking membranous lobes; claws simple, without basal setae. Aedeagus variable and can be helpful for identification at the genus level.

Hypnoidus Dillwyn, 1829

Hypnoidus Dillwyn, 1829: 32

Diagnosis. Size small, moderately convex. Color usually red-brown to black; vestiture various. Supra-antennal carinae complete. Antenna 11-segmented; antennomere I long, II various, III–X weakly serrate, XI elongate. Pronotum slightly convex, side arcuate; punctures dense to sparse, interspaces shining or micro-reticulate, not rugose; hind angle stout, slightly divergent. Scutellum flat, not incised anteriorly. Mesocoxa open to mesepimeron but closed to mesepisternum. Meso- and metasternum not fused, joined by a definite suture. Tarsomeres without membranous lobes; claws simple, without basal setae. Aedeagus with paramere with or without apical blade or lateral tooth. No obvious external sexual dimorphism.

Range and Numbers. There are seven species in North America (Stibick 1978), primarily northern and montane in distribution. One species has been recorded from the Southeast, with a second added here.

Discussion. *Hypnoidus* was revised for North America by Stibick (1978), who considered the genus a well-defined and supported taxonomic unit. Species can be separated externally by pronotal shape and punctuation and form and density of vestiture on the pronotum, scutellum, and abdomen. For the species whose biology is

known, larvae have been documented to feed on the roots of various grasses and perhaps also soft-bodied invertebrates and adults on various herbaceous plants (Stibick 1978).

Key to the species of *Hypnoidus* in the Southeast
(adapted from Stibick 1978)

1. Scutellum densely setose; vestiture on pronotum appressed and usually directed medially or posteriorly, not overlapping at midline; vestiture at elytral apex frequently forming a yellowish patch . . . . . ***H. abbreviatus* (Say)**

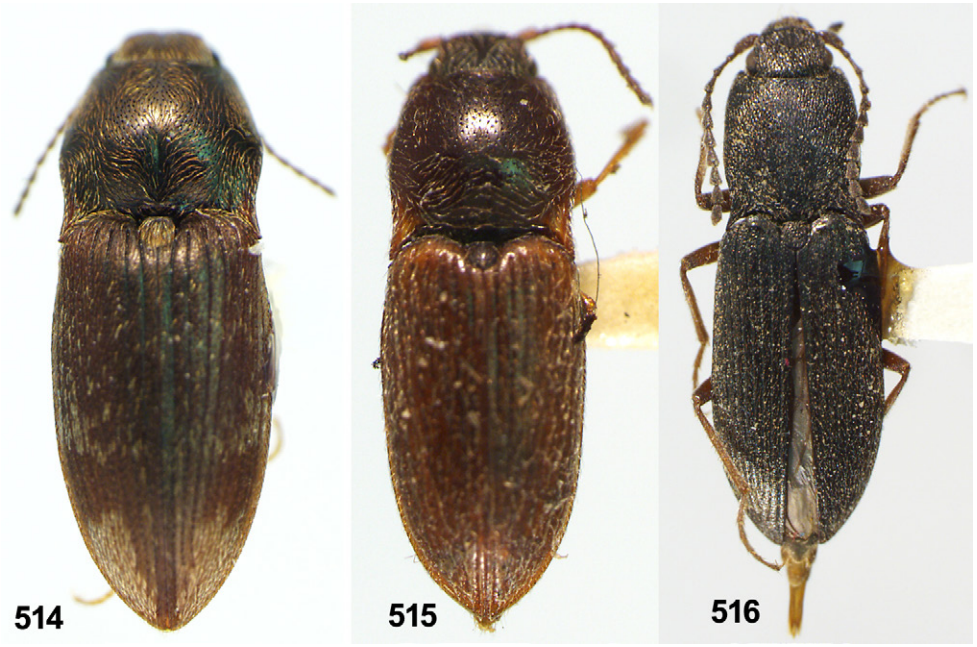
— Scutellum sparsely setose (setae present may be long); vestiture on pronotum long and wiry, usually directed medially and overlapping at midline; vestiture on elytron evenly distributed . . . . . ***H. bicolor* (Eschscholtz)**

Hypnoidus abbreviatus (Say, 1823)

Figure 514

Elater abbreviatus Say, 1823: 173
Cryptohypnus silaceipes Germar, 1844: 134

Diagnosis. Size small, 5.0–6.5 mm in length, form oblong, moderately convex. Color red-brown to black, elytron often paler; vestiture yellow-gray, appressed. Supra-antennal carinae complete, arcuate, but not well-separated from clypeus. Antenna 11-segmented, weakly serrate; antennomere II subequal to III. Pronotum wider than long, side slightly arcuate, with defined curvature at base of hind angle; median impression extending from base usually to apex; punctures coarse, separated by approximately their own diameter on disk; hind angle broad, but acute; unicarinate. Scutellum flat, densely clothed with appressed, grayish setae. Metasternum with punctures of two types, larger punctures intermixed with smaller, coarser punctures. Elytron slightly wider than pronotum, sides arcuate, gradually narrowed in apical two-thirds; striae punctate; intervals flat, moderately and



Figures 514–516. Hypnoidini. **514)** *Hypnoidus abbreviatus* (habitus). **515)** *H. bicolor* (habitus). **516)** *Ligmargus lecontei* (habitus).

finely punctate; apex often with vestiture denser, forming a grayish apical spot. Vestiture on abdomen yellowish, fine, dense. Aedeagus with median lobe broad, gradually narrowing to apex; paramere arcuate externally near apex, lacking apical blade. Female similar to male externally.

Distribution. Transcontinental in the North. In the East, it has been recorded as far south as Tennessee (Stibick 1978; Downie and Arnett 1996), the only state in the Southeast from which it is known.

Specimens Examined. None.

Discussion. This species is generally easily recognized, but may be confused for a member of Negastriinae. The patch of setae on the apex of the elytron can be particularly helpful in recognizing this species and separating it from *H. bicolor*. Most of the specimens I have examined from states outside the current study area were collected under objects (rocks, beach duff, etc.) in sandy locations.

Hypnoidus bicolor (Eschscholtz, 1829)

Figures 515, 517

Hypolithus bicolor Eschscholtz, 1829: 33
Cryptohypnus pumilus Dejean, 1833: 105
Cryptohypnus limbatus Mannerheim, 1853: 133
Cryptohypnus scarificatus Mannerheim, 1853: 133
Cryptohypnus fallax Mannerheim, 1853: 134
Cryptohypnus vestitus Mannerheim, 1853: 135
Cryptohypnus lacustris LeConte, 1853: 486
Cryptohypnus picescens LeConte, 1853: 486

Diagnosis. Size small, 4.0–6.0 mm in length. Color variable, but usually with a black pronotum (hind angle yellow) and brown-red elytron; vestiture while to yellow. Antenna 11-segmented, weakly serrate; antennomere III subequal to IV. Pronotum wider than long, arcuate, widest medially, slightly sinuate at base of hind angle,

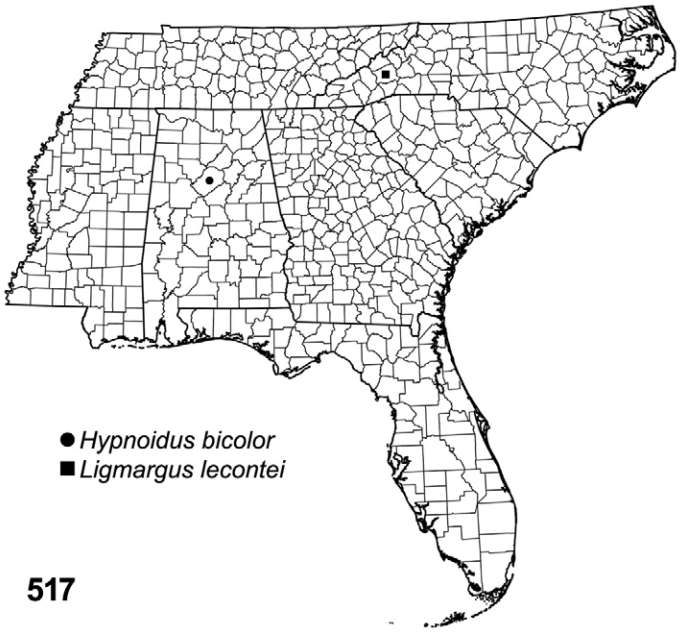


Figure 517. Distributional data for *Hypnoidus bicolor* and *Ligmargus lecontei*.

median impression weak, punctures separated by greater than their own diameters; vestiture long and wiry, directed medially or posteriorly and often crossing at median impression; hind angle weakly unicarinate. Scutellum flat; setae long and wiry but sparse. Elytron wider than pronotum at mid-length; striae punctate; intervals fine and sparsely punctate; vestiture fine and evenly distributed. Aedeagus with paramere short and with prominent apical blade. Female similar to male externally.

Distribution. Transcontinental in Canada and the northern half of the United States. Previously not recorded from the Southeast; the following record from Alabama represents a **New State Record**.

Specimens Examined. Alabama (Jefferson). June. (Figure 517)

Discussion. *Hypnoidus bicolor* is the most widely distributed member of the Hypnoidini (Stibick 1978). The discovery of this species in Alabama noticeably extends its distribution southerly in the east. The above record from Alabama is based on three specimens housed in the H. P. Löding collection (GSAT). Unfortunately, like many of Löding's specimens, the labels do not have any data indicating the method of capture or habitat. Stibick (1978) implicated *H. bicolor* as a pest of wheat and other crops in the Great Plains. This species is most similar to *H. abbreviatus*, from which it can be best separated by the patterns of vestiture on the pronotum, scutellum, and apical portions of the elytron.

Ligmargus Stibick, 1976

Ligmargus Stibick, 1976: 210

Diagnosis. Size small to moderate, form elongate, depressed. Color dark gray to black, usually dull. Supra-antennal carinae incomplete. Antenna 11-segmented; antennomere I elongate, often greatly expanded; II various, III–X weakly serrate; XI elongate. Pronotum elongate to broad, flat; punctures usually double, larger punctures intermixed with smaller ones; hind angle slender, divergent. Scutellum flat, longer than wide. Mesocoxa open to mesepimeron but closed to mesepisternum. Meso- and metasternum not fused, joined by a definite suture. Metacoxal plate suddenly dilated inwardly. Elytral margins subparallel. Tarsomeres lacking membranous lobes; claws simple, without basal setae. Aedeagus with paramere broad, lacking apical blade. No marked external sexual dimorphism.

Range and Numbers. There are four species in North America (Stibick 1976), northern and western in distribution. The sole eastern species reaches the Southeast.

Discussion. The genus was revised by Stibick (1976). *Ligmargus* forms a clear and well-defined group, recognized by the flat habitus, dark, opaque color, shape of pronotal hind angles, and (usually) double punctation of the pronotum.

Ligmargus lecontei (Leng, 1918)

Figures 516–517

Cryptohypnus planatus LeConte, 1863: 84 (nec *Hypolithus planatus* Eschscholtz, 1829: 34)
Cryptohypnus lecontei Leng, 1918: 205

Diagnosis. Size small to moderate, 7.5–10.0 mm in length, form depressed. Color black, often with a faint bronze tinge dorsally, opaque ventrally; vestiture yellowish, but very sparse. Supra-antennal carinae incomplete. Antenna 11-segmented, weakly serrate; antennomere I expanded; III twice the length of II. Pronotum wider than long, widest just behind middle, depressed, side slightly arcuate, noticeably sinuate at base of hind angle; punctures of two types, larger punctures intermixed with smaller, denser punctures; hind angles slender, divergent, strongly unicarinate. Scutellum flat with dark border on all sides. Metasternum with punctures of two types, larger punctures intermixed with smaller, coarser punctures. Elytron scarcely wider than pronotum,

depressed, subparallel; striae punctate; intervals flat, wrinkled and punctate. Aedeagus with median lobe broad, gradually tapering to apex; paramere broad, slightly arcuate laterally, lacking defined apical blade. Female similar to male externally but with slightly a wider pronotum.

Distribution. Northeastern North America, west to Wyoming (Stibick 1976). In the Southeast, Brimley (1938) and Stibick (1976) recorded it from North Carolina. Fattig (1951) also recorded it from Georgia. Stibick (1976) seemed doubtful of Fattig's record but acknowledged the locality (Yonah Mountain in White County) is the most likely place that this species would be found in the state.

Specimens Examined. North Carolina (Buncombe). May. (Figure 517)

Discussion. This species should be fairly recognizable in the study area, although the general form and color may resemble *Heteroderes amplicollis*. Tribal and generic characters should easily separate the two, however.

Negastriinae Nakane and Kishii, 1956

The subfamily Negastriinae contains eight genera in North America (Johnson 2002), four of which have been previously recorded from the Southeast with a fifth added here. The classification here follows Johnson (2002) and does not recognize tribal divisions. Negastriinae was first studied for North America by Horn (1891) who treated all the species under the genus *Cryptohypnus*. Several species in that work are now placed in the tribe Hypnoidini. Stibick (1971) helped stabilize the generic concepts by describing five new genera and keying the genera on the World basis. Stibick later (1990) treated the Negastriinae of eastern North America. His data in the latter work are based heavily on collection records from the Northeast and his distributional records do not reflect the range of species in the current study area. Wells described new species, provided updated keys for *Neohypdonus* (Wells 1991) and *Negastrius* (Wells 1996), and expanded the ranges of some of the species covered by Stibick (1990) to include the Southeast. Etlzer (2020a) reviewed *Paradonus* for North America. Adults are small, among the smallest North American elaterids. Supra-antennal carinae complete. Antenna 11-segmented, filiform to weakly serrate. Pronotum oval, variably punctate. Pronotosternal sutures opened or closed, usually arcuate (sometimes linear). Prosternal process usually elongate. Scutellum various, never incised anteriorly. Elytron with or without defined striae. Mesocoxa closed to mesepimeron and mesepisternum. Tarsomeres with or without membranous lobes; claws simple, with basal tooth, or flanged (never serrate), without basal setae. Aedeagus variable, usually without defined apical blade on the paramere.

Negastrius Thomson, 1859

Negastrius Thomson, 1859: 106

Diagnosis. Size small, 2.5–5.0 mm in length. Color variable, often with patterned elytron. Supra-antennal carinae complete. Antenna 11-segmented, weakly serrate, not reaching apex of pronotal hind angle; antennomeres II and III subequal. Pronotum as long as or longer than wide, widest just before hind angle, gradually arcuate anteriorly; surface rough, rugose, densely punctate; hind angle stout, subparallel, unicarinate. Hypomeron lacking elevated margin at pronotosternal sutures. Pronotosternal sutures slightly arcuate. Prosternum broad; anterior lobe prominent, covering mouthparts. Scutellum elongate, usually widened anteriorly. Elytron with well-defined striae, striae complete. Tarsomeres lacking membranous lobes; claws weakly expanded basally, lacking basal setae. Aedeagus with parameres lacking an apical blade.

Range and Numbers. There are 11 species north of Mexico (Wells 1996), generally distributed. Three species have been recorded in the Southeast.

Discussion. The most recent treatment of this genus for North America was by Wells (1996), when he described four new species and keyed all species north of Mexico. Among negastriines, this genus is readily recognized by the rugose pronotum, hypomeron lacking an elevated margin at pronotosternal sutures, arcuate pronotosternal sutures, and short antennae. Several species are highly variable in color pattern. Specimens have often been collected in sandy habitats.

Key to the species of *Negastrius* in the Southeast
(adapted from Stibick 1990)

1. Lateral margin of pronotum obsolete in anterior fourth . . . . . ***N. choris* (Say)**
— Lateral margin of pronotum complete **2**

2(1). Anterior margin of scutellum flat to slightly emarginate; elytron black with three various, often confluent yellow maculae . . . . . ***N. exiguus* (Randall)**
— Anterior margin of scutellum projecting anteriorly, often with anterior scutellar knob; elytron black with two yellow maculae, one humeral, L-shaped and one subapical, rounded . . . . ***N. arnetti* Stibick**

Negastrius arnetti Stibick, 1990

Figures 518, 523

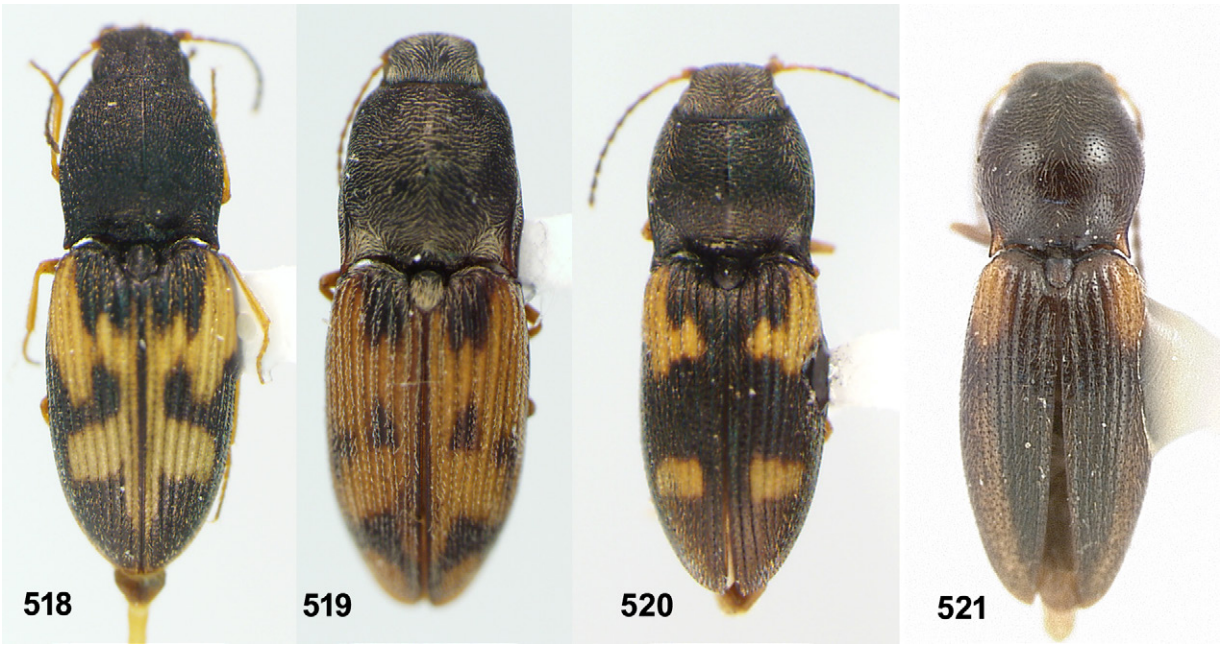
Negastrius arnetti Stibick, 1990: 102

Diagnosis. Size small, 2.5–4.5 mm in length. Bicolored; pronotum black; elytron black with two variable yellow-orange maculae post-humeral and post-medial, maculae may reach and include sutural area; vestiture yellow, appressed, sparse. Antenna 11-segmented, weakly serrate, not reaching apex of pronotal hind angle; antennomere I expanded; II and III subequal. Pronotum about as long as wide, side sinuate at base of hind angle, widest at middle, gently arcuate anteriorly; lateral margin complete; surface rugose and striate, punctures coarse and contiguous; hind angle short, unicarinate, carina prominent. Scutellum elongate, projecting anteriorly and often with prominent anterior knob. Elytron completely, strongly striate, striae punctate; intervals smooth, weakly convex, two rows of setigerous punctures. Aedeagus with median lobe broad basally, narrowing apically, apex laterally notched; paramere gently curving inwards towards subacute apex, lacking apical blade. Female similar to male externally.

Distribution. Northeastern North America, west to North Dakota and Alberta (Wells 1996). In the Southeast, previously recorded from North Carolina and South Carolina (Wells 1996). Brimley's (1938) record of *N. choris* from Swannanoa, NC pertains to this species.

Specimens Examined. North Carolina (Buncombe); **South Carolina** (Pickens). April. (Figure 523)

Discussion. In the study area, this species is most similar to *N. choris*, from which it can be separated by having complete lateral margins on the pronotum (obsolete in anterior fourth in *N. choris*).



Figures 518–521. Negastriinae. **518)** *Negastrius arnetti* (habitus). **519)** *N. choris* (habitus). **520)** *N. exiguus* (habitus). **521)** *Neohypdonus perplexus* (habitus). *Neohypdonus perplexus* photo courtesy Kyle Schnepp (Florida State Collection of Arthropods, FDACS-DPI, Gainesville, FL, USA).

Negastrius choris (Say, 1839)

Figures 519, 523

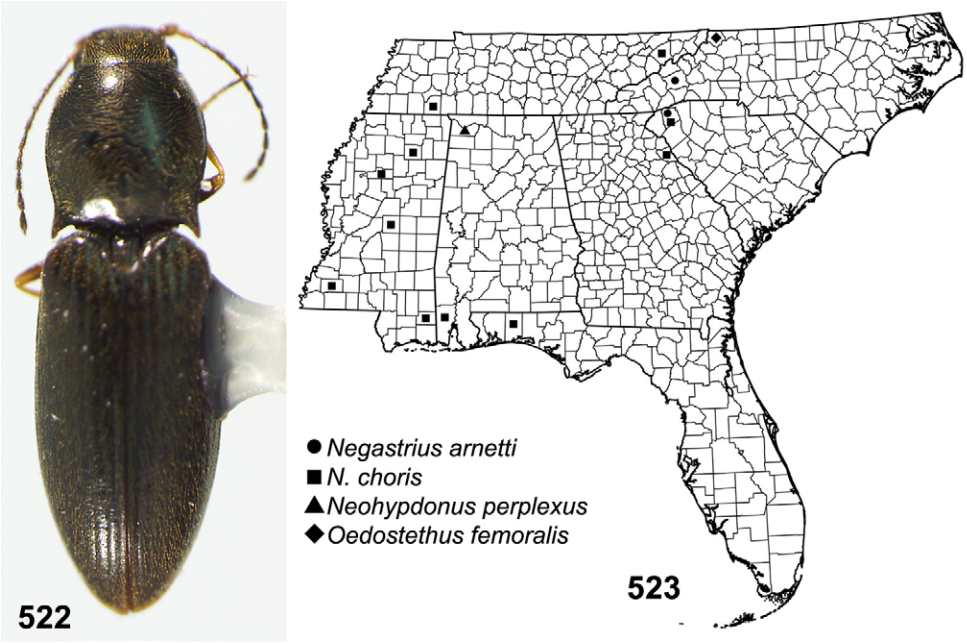
Elater choris Say, 1839: 172

Diagnosis. Size small, 3.5–5.0 mm in length, Bicolored; pronotum black; elytron black with three variable, often confluent, yellow orange maculae, subhumeral, submedial, and apical; vestiture yellow, appressed. Antenna 11-segmented, weakly serrate, not reaching apex of pronotal hind angle; antennomere I expanded; II and III subequal to each other and remaining eight antennomeres. Pronotum longer than wide, sinuate at base of hind angle, widest at middle, gently arcuate anteriorly; lateral margin obsolete in anterior fourth; surface rugose and striate, punctures coarse and contiguous; hind angles subparallel, unicarinate, carina strong. Scutellum elongate, anterior margin produced, often with anterior scutellar knob. Elytron completely striate; striae deep, each with double row of setigerous punctures; intervals convex and micropunctate. Aedeagus with median lobe gradually tapering to rounded apex; paramere broad, gently arcuate inwards, apex subacute, lacking apical blade. Female similar to male externally.

Distribution. Eastern North America, west to Kansas and Nebraska (Wells 1996). In the Southeast, previously recorded from Alabama, Georgia, Mississippi, North Carolina, and South Carolina (Brimley 1938; Löding 1945; Fattig 1951; Kirk 1970; Wells 1996). Wells' (1996) neotype designation is from Lucedale in George County, MS. Brimley's (1938) record from North Carolina is based on a misidentification (see below). The following records from Florida and Tennessee represent **New State Records**.

Specimens Examined. Alabama (Mobile); **Florida** (Okaloosa); **Georgia** (Elbert); **Mississippi** (Franklin, George, Grenada, Leake, Pontotoc); **South Carolina** (Pickens); **Tennessee** (Greene, McNairy). April–July. (Figure 523)

Discussion. In the study area, this species is readily recognized by having the lateral margins of the pronotum being obsolete in the anterior third. I have examined the specimen that was the basis of Brimley's (1938) record from Swannanoa, NC and determined it to be *N. arnetti* (which was not described at the time of Brimley's work). Specimens in the study area have been collected in pitfall traps and on sandbars.



Figures 522–523. Negastriinae. **522)** *Oedostethus femoralis* (habitus). **523)** Distributional data for *Negastrius arnetti*, *N. choris*, *Neohypdonus perplexus*, and *O. femoralis*.

Negastrius exiguus (Randall, 1838)

Figure 520

Cryptohypnus exiguus Randall, 1838: 35
Cryptohypnus guttatulus Melsheimer, 1845: 214

Diagnosis. Size small, 2.5–4.0 mm in length. Bicolored; pronotum black; elytron black with two yellow maculae, one L-shaped, humeral and one rounded, subapical; basal antennomeres and legs yellow; vestiture yellow, appressed. Antenna 11-segmented, antennomeres II and III subequal, elongate; IV and beyond serrate. Pronotum longer than wide, sides broadly rounded; lateral margin complete; surface rugose and striate, punctures coarse and contiguous; hind angles divergent, unicarinate, carina strong. Scutellum flat, anterior margin flat or slightly emarginate. Elytron completely and deeply striate, striae coarsely punctured; intervals convex and punctured. Aedeagus with median lobe broad basally, constricted and suddenly narrowing subapically to rounded apex; paramere broad, gently arcuate inwards; apex subacute; lacking apical blade. Female similar to male externally.

Distribution. Northeastern United States, west to Iowa (Wells 1996). In the Southeast, previously recorded from Georgia, North Carolina, and South Carolina (Leng 1910; Fattig 1951; Kirk 1970; Stibick 1990; Wells 1996).

Specimens Examined. None.

Discussion. This is the smallest *Negastrius* in the study area. It can be recognized by its broadly rounded pronotum with divergent hind angles, elongate flat scutellum, and often by its color pattern.

Neohypdonus Stibick, 1971

Neohypdonus Stibick, 1971: 374

Diagnosis. Size small, 2.0–5.0 mm in length. Supra-antennal carinae complete. Antenna 11-segmented, weakly serrate, extending to at least apex of pronotal hind angle; antennomeres II and III subequal. Pronotum widest at middle, sinuate at base of hind angle; punctures sparse to dense, median ridge sometimes present; hind angle divergent, carinate, carina generally short. Hypomeron lacking elevated ridge at pronotosternal sutures. Pronotosternal sutures arcuate, simple. Prosternum broad, widest at middle; anterior lobe weak, broad, nearly truncate. Scutellum elongate, more or less triangular. Elytron striate, striae strong, obsolete laterally in some species. Tarsomeres lacking membranous lobes; claws simple, often with weak basal lobe, lacking basal setae. Aedeagus variable, paramere lacking defined apical blade. No noted external sexual dimorphism.

Range and Numbers. There are nine species north of Mexico (Wells 1991). One species has been recorded from the Southeast.

Discussion. The last treatment of this genus for North America was by Wells (1991) who described two new species, made one generic transfer, and keyed all the species north of Mexico. Stibick (1990) treated the eastern species. The genus is fairly heterogeneous, but can be recognized by having antennomeres II and III subequal, shining or micro-reticulate pronotum, curved pronotosternal sutures, a short carina on pronotal hind angles, and simple tarsal claws.

Neohypdonus perplexus (Horn, 1891)

Figures 521, 523

Cryptohypnus perplexus Horn, 1891: 25

Diagnosis. Size small, 3.0–3.5 mm in length, form elongate. Color black; basal antennomeres, legs, hind angles of pronotum, and humeral macula on each elytron yellowish; vestiture yellow, sparse. Antenna 11-segmented, weakly serrate; antennomeres II and III subequal. Pronotum longer than wide, widest at middle, sinuate at base of hind angle; punctures fine, sparse; median impunctate ridge present; hind angles divergent, short, acute, unicarinate, carina short. Elytral striae punctate; intervals finely punctate. Aedeagus with median lobe widening anteriorly, then tapering subapically to pointed apex; paramere subparallel, rounded apically. Female similar to male externally.

Distribution. Northeastern North America, west to the Ohio and Mississippi River Valleys (Stibick 1990). In the Southeast, previously recorded from Alabama, South Carolina, and Tennessee (Löding 1945; Kirk 1969; Stibick 1990).

Specimens Examined. Alabama (Colbert). April. (Figure 523)

Discussion. In addition to the generic characters, the body form and color (dark with a pale humeral macula on the elytra) should help identify this species.

Oedostethus LeConte, 1853

Oedostethus LeConte, 1853: 489

Diagnosis. Size small, 2.5–5.0 mm in length. Supra-antennal carinae complete. Antenna 11-segmented, weakly serrate, extending slightly beyond apices of pronotal hind angle; antennomeres II and III subequal. Pronotum widest at middle, arcuate anteriorly and sinuate at base of hind angle; disc smooth, moderately punctate; hind angle slightly divergent, unicarinate, carina short. Hypomeron lacking elevated margin at pronotosternal sutures. Pronotosternal sutures arcuate. Prosternum widest at anterior third, anterior lobe short, nearly truncate, mouthparts partially exposed. Scutellum elongate, nearly triangular. Elytron with defined striae (sometimes obsolete on sides). Tarsomeres lacking membranous lobes; claws with flange in basal half, lacking basal setae. Aedeagus with median lobe broad; paramere lacking apical blade. No sexual dimorphism noted.

Range and Numbers. One species in North America, *O. femoralis* LeConte, 1853, transcontinental in the North (Stibick 1990).

Discussion. This genus is usually recognized by the smooth, simply punctate pronotum, subequal antennomeres II and III, simple pronotosternal sutures, and tarsal claws with a basal flange. Little is known about the biology of this genus; Stibick (1990) recorded it being collected at light.

Oedostethus femoralis LeConte, 1853

Figures 522–523

Oedostethus femoralis LeConte, 1853: 489

Diagnosis. Size small, 2.5–3.0 mm in length. Color dark brown to black; basal antennomeres, tibiae, and tarsi often yellow; vestiture yellow, evenly distributed over body. Supra-antennal carinae complete. Antenna 11-segmented, weakly serrate, extending slightly beyond apex of pronotal hind angle; antennomeres II and III subequal. Pronotum widest at middle, arcuate anteriorly and sinuate at base of hind angle; disc smooth, moderately punctate; hind angles acute, slightly divergent, unicarinate, carina short. Hypomeron lacking elevated margin at pronotosternal sutures. Pronotosternal sutures arcuate. Prosternum widest at anterior third, anterior lobe short, nearly truncate, mouthparts partially exposed. Scutellum elongate, nearly triangular. Elytron with defined striae (sometimes obsolete on sides). Tarsomeres lacking membranous lobes; claws with flange in basal half, lacking basal setae. Aedeagus with median lobe broad; paramere lacking apical blade. Female similar to male externally.

Distribution. Transcontinental in North America (Stibick 1990). Previously not recorded from the Southeast. The following record from North Carolina represents a **New State Record**.

Specimens Examined. North Carolina (Ashe). June. (Figure 523)

Discussion. The generic characters should be sufficient for identifying this species. The single specimen examined (MEM) did not have any accompanying data indicating the method of collection.

Paradonus Stibick, 1971

Paradonus Stibick, 1971: 386

Diagnosis. Size small, 0.9–4.0 mm in length. Supra-antennal carinae complete. Antenna 11-segmented, weakly serrate to filiform, not extending beyond apex of pronotal hind angle; antennomeres II and III subequal. Pronotum widest at middle; disk rugose; hind angle short, slightly divergent, unicarinate with very short carina. Hypomeron lacking elevated margin at pronotosternal sutures. Pronotosternal sutures arcuate. Prosternum widest at middle; anterior lobe moderately narrowed and produced, somewhat truncate, covering mouthparts. Scutellum widest anteriorly. Elytron lacking defined striae. Tarsomeres lacking membranous lobes; claws simple, without basal setae. Aedeagus with paramere short, slender, moderately acuminate. No noted external sexual dimorphism.

Range and Numbers. There are nine described and several undescribed species in North America (Etzler 2020a), generally distributed. Two species have been previously recorded in the Southeast, with a third added here.

Discussion. Some members of the genus *Paradonus* are the smallest elaterids known from North America. Their very small size, in conjunction with the short pronotal hind angles with a short carina and elytra lacking defined striae, should make them readily recognizable. The first treatment of the genus for North America was by Horn (1891) as the *pectoralis* group of *Cryptohypnus*. Stibick (1990) treated the eastern species. Etzler (2020a) reviewed the genus for North America and included new synonymies, new descriptions, and an updated key There are several undescribed species in North America, especially in the Southwest. Etzler's (2020a) review was published after the current study had concluded and specimens examined herein could not be re-examined to determine if any corrections to the identifications need to be made.

Key to the species of *Paradonus* in the Southeast
(adapted from Etzler 2020)

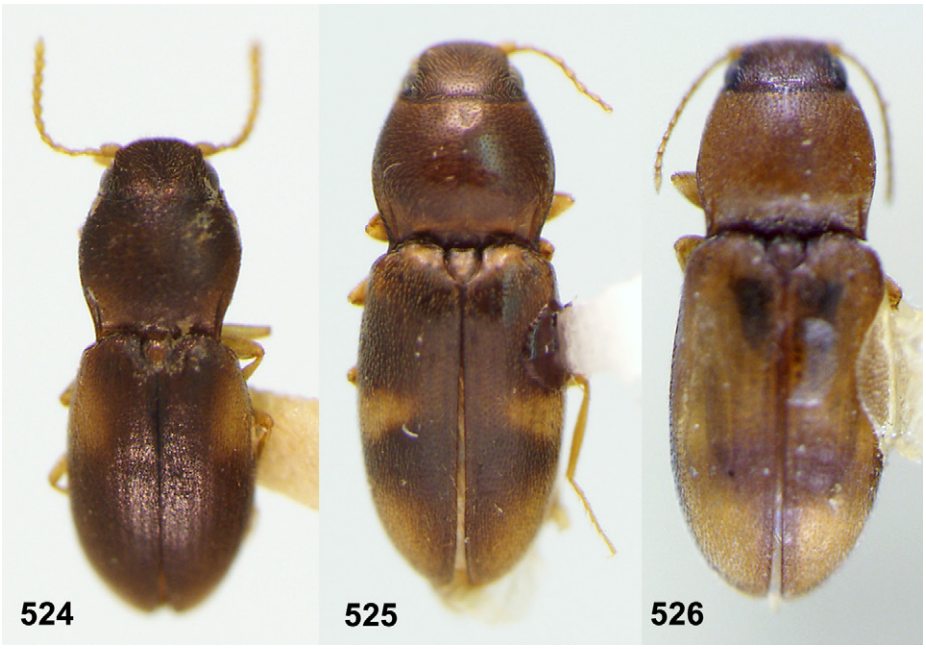
1. Pronotal hind angle with carina connecting at apex of angle . . . . . ***P. stibicki* Etzler**
— Pronotal hind angle with carina connecting to base of pronotum interior to the hind angle **2**
2(1). Elytron unicolored, occasionally with dark infuscations around scutellum . . . . . ***P. pectoralis* (Say)** (in part)
— Elytron bicolored **3**
3(2). Elytron dark with transverse post-median yellow and (often) apical yellow maculae . . . . . ***P. obliquatulus* (Mannerheim)**
— Elytron variable, usually banded but never dark in basal half **4**
4(3). Carina of hind angle broadly arcuate, widely separated from lateral margin, hind angle slender; elytron usually dark with pale humeral spot . . . . . ***P. beckeri* Stibick**
— Carina of hind angle weakly arcuate and moderately divergent from sides, hind angle with broad base; elytron pale with dark band in apical third, often extending up suture to scutellar area . . . . . ***P. pectoralis* (Say)** (in part)

Paradonus beckeri Stibick, 1990

Figures 524, 528

Paradonus beckeri Stibick, 1990: 117

Diagnosis. Size small, 2.5–3.5 mm in length. Bicolored; body dark red-brown; each elytron with elongate yellow humeral macula and (rarely) with yellow apical macula; vestiture yellow-gray. Antenna 11-segmented, weakly serrate, not reaching apex of pronotal hind angle; antennomeres II and III subequal. Pronotum wider than long, moderately rounded; punctures fine, separated by 1–2× their diameter, interspaces smooth to microreticulate; hind angles acute, slightly divergent, unicarinate, carina connecting with base of pronotum on inner side of



Figures 524–526. *Paradonus* spp. **524)** *P. beckeri* (habitus). **525)** *P. obliquatulus* (habitus). **526)** *P. stibicki* (habitus).

hind angle, arcuate and slightly diverging. Elytron without striae; finely punctate, punctures separated by about 3× their own diameters; interspaces smooth to microreticulate. Aedeagus with median lobe subparallel, broadest at middle, gradually tapering to subacute apex; paramere subparallel in apical half, slightly arcuate at basal shoulders, attenuate at apex, single long subapical seta. Female similar to male externally.

Distribution. Northeastern North America, south and west to central Texas (Stibick, 1990). Previously not recorded from the Southeast. The following records from Alabama, Georgia, and North Carolina represent **New State Records**, although Fattig's (1951) records of *P. pectoralis* from Lithonia, GA refer to this species.

Specimens Examined. Alabama (Cherokee); **Georgia** (DeKalb); **North Carolina** (Forsyth). May, October. (Figure 528)

Discussion. This species should be easily recognized in the Southeast by its color pattern; the aedeagus is also diagnostic. This species had previously not been recorded from the current study area. The specimens examined from Georgia (UGCA) belong to a series that were collected at Arabia Mountain in Lithonia, GA (DeKalb County) and were the basis for Fattig's (1951) record of *P. pectoralis* from Lithonia.

Paradonus obliquatulus (Melsheimer, 1845)

Figures 525, 528

Cryptohypnus obliquatulus Melsheimer, 1845: 214
Hypnoidus felti Notman, 1921: 159

Diagnosis. Size small, 3.0–4.0 mm in length. Bicolored; body dark red-brown; each elytron with oblique yellow median band that does not attain the suture and (usually) a yellow apical macula; antennae and legs yellow; vestiture yellow. Antenna 11-segmented, weakly serrate, not reaching apex of pronotal hind angle; antennomeres II and III subequal. Pronotum wider than long, broadly rounded; punctures fine, separated by a distance greater than their own diameters, interspaces micro-reticulate; hind angles acute, divergent, unicarinate, carina arcuate, connecting to base of pronotum on the inner side of hind angle. Elytron without striae; punctures finer than on pronotum. Aedeagus with median lobe subparallel, slightly constricted medially, broadly rounded apically; paramere slender in apical half, evenly narrowing to subacute apex. Female similar to male externally.

Distribution. Northeastern North America, west to Kansas, Nebraska, and South Dakota (Stibick 1990). In the Southeast, previously recorded from Alabama, Georgia, and North Carolina (Brimley 1938; Löding 1945; Fattig 1951). The following records from Mississippi and Tennessee represent **New State Records**.

Specimens Examined. Alabama (Jackson, Lauderdale, Mobile). **Mississippi** (Humphreys, Marshall, Pontotoc, Sharkey, Tunica, Washington); **Tennessee** (Lake). February, June-August, October, December. (Figure 528)

Discussion. The characters in the key and description above should suffice in separating this species from the other southeastern species in the genus. Specimens in the study area have been collected at ultraviolet light and by Berlese extraction or rotten logs and cypress litter. Stibick (1990) recorded this species in association with corn and bluestem grass in the east.

Paradonus pectoralis (Say, 1839)

Elater pectoralis Say, 1839: 173
Paradonus illinoisensis Stibick, 1990: 119
Paradonus olivereae Stibick, 1990: 123

Diagnosis. Size small, 3.0–3.6 mm in length. Color light yellow-brown with dark brown band across posterior third of elytron and extending up the suture to the scutellar area, pronotum yellow-brown to dark brown; vestiture fine, gray. Antenna 11-segmented, weakly serrate, not reaching apex of pronotal hind angle; antennomeres

II and III subequal. Pronotum wider than long, widest at middle; punctures coarse and dense, interspaces micro-reticulate; hind angle sinuate to tip which is curved and noticeably curved laterally, carina straight to slightly arcuate, connecting to base of pronotum on inner side of hind angle. Elytron without striae; punctures similar to those on pronotum. Aedeagus with median lobe broad, widest post-median, slightly tapering to subacute apex; paramere narrow in apical half, apically hooked. Female similar to male externally.

Distribution. Transcontinental in the north, south to Virginia and North Carolina in the East (Etzler 2020a). In the Southeast, previously recorded from Alabama, Florida, Georgia, North Carolina, South Carolina, and Tennessee (Löding 1945; Fattig 1951; Kirk 1970; Stibick 1990; Downie and Arnett 1996; Etzler 2020a), however most of these records are prior to Etzler's (2020a) redescription of the species. Fattig's (1951) record from Lithonia, GA refers to *P. beckeri* (see below). The Florida record by Downie and Arnett (1996) seems doubtful (see below).

Specimens Examined. None.

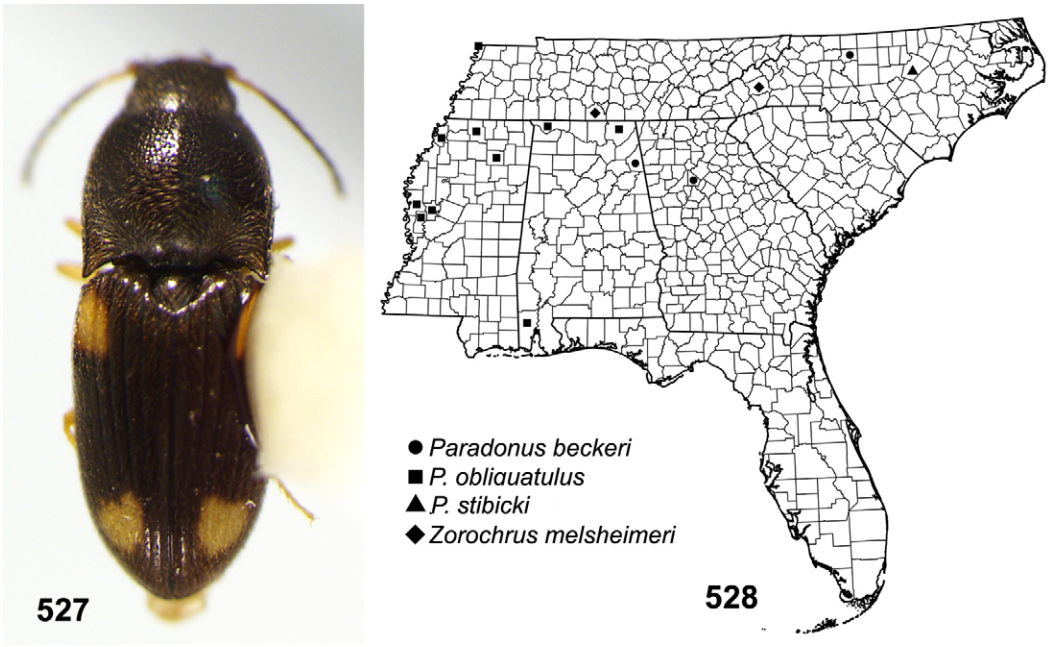
Discussion. This species has a complicated taxonomic history, resulting in many mis-associations in the literature. See Etzler (2020a) for historical discussion of this species. I have seen no specimens of *Paradonus* from Florida, nor did Peck and Thomas (1998) include any in their checklist. The Florida record by Downie and Arnett (1996) may represent an editorial error, data based on misidentified species, or possibly an undescribed species in the complex. I have examined the specimens that were the basis for Fattig's (1951) record from Lithonia, GA and have identified them as *P. beckeri*, which was not described at the time Fattig's checklist was published.

Paradonus stibicki Etzler, 2020

Figures 526, 528

Paradonus pectoralis, *sensu* Stibick 1990
Paradonus stibicki Etzler, 2020a: 542

Diagnosis. Size small, 2.4–2.8 mm in length. Color light yellow brown, often with subtle dark maculations on the elytron or around the scutellum; vestiture yellow, short. Antenna 11-segmented, weakly serrate, not reaching



Figures 527–528. Negastriinae. **527)** *Zorochrus melsheimeri* (habitus). **528)** Distributional data for *Paradonus beckeri*, *P. obliquatulus*, *P. stibicki*, and *Z. melsheimeri*.

apex of pronotal hind angle; antennomeres II and III subequal. Pronotum wider than long, widest at middle; punctures subumbilicate, separated by their diameter or variable, interspaces dull and microreticulate; hind angle straight to slightly arcuate laterally, with a small curve at tip, carina strong, weakly to moderately arcuate, connecting to apex of hind angle. Elytron lacking striae, punctures separated by 1–2× their diameter, interspaces shining and microreticulate. Aedeagus with medium lobe slender; paramere slender without apical expansions. Female similar to male externally.

Distribution. Northeastern North America, west to Montana and south to North Carolina in the East (Etzler 2020a). In the Southeast, previously recorded only from North Carolina (Etzler 2020a).

Specimens Examined. North Carolina (Wake). April. (Figure 528)

Discussion. This species was described by Etzler (2020a) to accommodate Stibick's (1990) concept of *P. pectoralis*. It is most similar to southwestern species *P. futilis* (LeConte). This species is rare in collections (Etzler 2020a).

Zorochros Thomson, 1859

Zorochros Thomson, 1859: 106

Diagnosis. Size small, 2.0–5.0 mm in length. Supra-antennal carinae complete, although frequently weakened in the middle. Antenna 11-segmented, variable in length, weakly serrate to nearly filiform; antennomeres II and III subequal. Pronotum broad, widest post-medially, gradually narrowing anteriorly; punctures dense, often rugose anteriorly with granules or tubercles; hind angles broad, slightly divergent, unicarinate, carina obsolete to strong. Hypomeron with elevated margin at pronotosternal sutures. Pronotosternal sutures arcuate. Prosternum broad, widest medially, anterior lobe prominent and covering mouthparts. Scutellum broad, oval-triangular. Elytron moderately to strongly striate, striae complete. Tarsomeres lacking membranous lobes; claws simple, without basal setae. Aedeagus with paramere lacking apical blade. Some species exhibiting sexual dimorphism, where males may have expanded anterior tibiae or a small tubercle on abdominal sternite I, or females may possess a small pubescent spot on abdominal sternite II.

Range and Numbers. There are five species in North America (Johnson 2002), generally distributed but mainly western. One species occurs in the East and has been recorded in the current study area.

Discussion. Among eastern negastriines, this genus is readily recognized by having completely striate elytra and the hypomeron with an elevated margin at the pronotosternal sutures. The last treatment of this genus as a whole for North America was by Horn (1891) as the *melsheimeri* group of *Cryptohypnus*. Stibick (1990) treated the eastern species. According to Stibick (1971) several undescribed species occur in North America.

Zorochros melsheimeri (Horn, 1891)

Figures 527–528

Cryptohypnus melsheimeri Horn, 1891: 19

Diagnosis. Size small, 2.0–3.0 mm in length. Bicolored; black, each elytron with humeral and subapical yellow maculae; legs yellow; vestiture yellow. Antenna 11-segmented, weakly serrate, not reaching apex of pronotal hind angle; antennomeres II and III subequal. Pronotum wider than long, broadest post-medially, gradually narrowing anteriorly; rugose anteriorly, becoming finely punctate basally, median impunctate line prominent; hind angles slightly divergent, strongly unicarinate, carina running past the middle of the pronotum. Hypomeron with elevated margin at pronotosternal sutures. Scutellum broad. Elytral striae distinct; intervals convex, finely punctate. Aedeagus with median lobe stout, narrowing subapically to subacute apex; paramere gradually narrowing to subacute apex, no defined apical blade. External sexual dimorphism demonstrated by male having an

elevated, broad tubercle on abdominal sternite I and with female having all abdominal sternites normal. Also, the female tends to have shorter antennae with slightly broader antennomeres.

Distribution. Northeastern North America, south to Virginia and West Virginia (Stibick 1990). In the Southeast, previously recorded from Georgia (Fattig 1951) and North Carolina (Brimley 1938). The following record from Tennessee represents a **New State Record**.

Specimens Examined. North Carolina (Buncombe); **Tennessee** (Giles). June, September. (Figure 528)

Discussion. This species should be readily recognized in the study area by the generic characters. Stibick (1990) did not comment on the biology of the species.

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Appendix 1. Corrections of Historical Records

The following table contains corrections to previously published records for Elateridae in the Southeast. It only includes corrections that were made in this study and does not include earlier corrections made by previous authors.

Species	Reference	Location	Collection	Current Identification
Ampedus collaris	Löding 1945	Squaw Shoals, AL	GSAT	*Megapenthes illinoisensis*
Ampedus laesus	Brimley 1938	Raleigh, NC	NCSU	*Ampedus xanthomus*
Ampedus luctuosus (as *Elater manipularis*)	Löding 1945	Madison County, AL	GSAT	*Ampedus fuscatus*
Ampedus luctuosus (as *Elater manipularis*)	Löding 1945	Mobile County, AL	GSAT	*Ampedus fuscatus*
Ampedus melsheimeri (as *Ectamenogonus melsheimeri*)	Löding 1945	Mobile County, AL	GSAT	*Ampedus fuscatus*
Ampedus nigrinus	Brimley 1938	western North Carolina	NCSU	*Ampedus pedalis*
Ampedus pedalis	Fattig 1951	Rabun Bald, GA	UGCA	*Ampedus* sp. 1
Ampedus sellatus	Löding 1945	Mobile County, AL	GSAT	*Ampedus nigricollis*
Ampedus sp.	Fattig 1951	Tray Mountain, GA	UGCA	*Ampedus protervus*
Anchastus bicarinatus	Löding 1945	Mobile County, AL	GSAT	*Anchastus fumicollis*
Anchastus bicolor	Peck and Thomas 1998	Highlands County, FL	FSCA	*Esthesopus atripennis*
Anchastus digitatus	Löding 1945	Mobile County, AL	GSAT	*Anchastus longulus*
Athous productus	Brimley 1938	Craggy Mountain, NC	NCSU	*Denticollis denticornis*
Athous productus	Brimley 1938	Mt. Mitchell, NC	NCSU	*Denticollis denticornis*
Conoderus plagiatus Fall, 1934	Löding 1945	Mobile County, AL	GSAT	*Conoderus rudis*
Dalopius lateralis	Löding 1945	Monte Sano, AL	GSAT	*Dalopius pennsylvanicus*
Dalopius lateralis	Fattig 1951	Blue Ridge, GA	UGCA	*Dalopius virginicus*
Dalopius virginicus	Brimley 1938	Black Mountain, NC	NCSU	*Dalopius cognatus*
Elater abruptus (as *Crigmus abruptus*)	Löding 1945	Mobile County, AL	GSAT	*Parallelostethus attenuatus*
Esthesopus claricollis	Löding 1945	Daphne, AL	GSAT	*Esthesopus praeditus*
Euplastius bivittatus	Brimley 1938	Linville Falls, NC	NCSU	*Vittathous horni*
Gambrinus fulvipilis (as *Limonius fulvipilis*)	Brimley 1938	Buncombe County, NC	NCSU	*Limonius auripilis*
Hemicrepidius hemipodus (as *H. decoloratus*)	Brimley 1938	Walkertown, NC	NCSU	*Hemicrepidius indistinctus*

Species	Reference	Location	Collection	Current Identification
Hemicrepidius hemipodus (as *H. decoloratus*)	Brimley 1938	Linville Falls, NC	NCSU	*Setasomus aratus*
Megapenthes angularis	Löding 1945	Spring Hill, AL	GSAT	*Megapenthes* sp. (not *angularis*)
Melanactes puncticollis	Brimley, 1938	Black Mountain, NC	NCSU	*Neopristilophus aethiops*
Melanotus depressus	Löding 1945	Baldwin County, AL	GSAT	*Melanotus trapezoideus*
Negastrius choris	Brimley 1938	Swannanoa, NC	NCSU	*Negastrius arnetti*
Orthostethus hepaticus	Löding 1945	Mobile County, AL	GSAT	*Diplostethus carolinensis*
Paradonus pectoralis	Fattig 1951	Lithonia, GA	UGCA	*Paradonus beckeri*
Physorhinus sp.	Löding 1945	Mobile County, AL	GSAT	*Anchastus fumicollis*
Selonodon mandibularis	Löding 1945	Mobile County, AL	GSAT	*Selonodon mississippiensis*

Appendix 2. Excluded Species

The following species have been previously recorded from the Southeast in the literature but are excluded from this study, either because they are not believed to occur in the current study area, or their status is currently unknown. The species are listed in alphabetical order.

***Aeolus livens* (LeConte, 1853).** Kirk (1969) recorded this species from several locations in South Carolina. *Aeolus livens* occurs in western North America (Lin 1997) and its presence in South Carolina seems doubtful. Kirk's specimens were not available for examination but probably represent misidentifications of *A. mellillus* or *A. scutellatus*.

***Aeolus minor* (Schwarz, 1903)** [described in *Drasterius*]. This species was described from Alabama (not further restricted) (Leng 1920; Löding 1945; Becker 1961; Lin 1997). The type of this specimen is apparently lost (Lin 1997) and its status is unknown. The species is considered *species inquirendum* (Lin 1997).

***Agrypnus murinus* (Linnaeus, 1758).** LeConte (1853) described *Adelocera mucorea* from a specimen reportedly collected in Georgia. Arnett (1952) examined LeConte's type and concluded it was conspecific with the European *Lacon* (now *Agrypnus*) *murinus*. He speculated it either represented mislabeling or an introduction that never became established.

***Ampedus nigricans* Germar, 1843.** Ramberg (1979) indicated the type is a female that cannot be positively identified and considered the name *nomen dubium*. *Ampedus nigricans* has been recorded several times in the Southeast, including Florida, Georgia, North Carolina, and South Carolina (Leng 1920; Fattig 1951; Kirk 1969, 1970; Peck and Thomas 1998). Based on this species' placement in earlier keys (e.g., Dietrich 1945; Downie and Arnett 1996), many of the southeastern records may pertain to *A. pedalis* or species described as new in Ramberg's (1979) Ph.D. thesis. Ramberg's thesis was not available to me until 2014, and specimens that I identified as *A. nigricans* prior to 2014 (that could not be re-evaluated in time for publication) should be re-examined; many will probably turn out to be *A. pedalis* or other smaller black species with pale legs. To complicate matters, in some checklists (e.g. Peck and Thomas 1998), *A. fuscatus* is placed in synonymy with *A. nigricans*. *Ampedus fuscatus* will not key to *A. nigricans* in published keys by Dietrich (1945) and Downie and Arnett (1996) and are likely to get misidentified as *A. melanotoides*, due in part to the brown color and weakly serrate antennae.

***Ampedus nigrinus* (Herbst, 1784).** Brimley (1938) recorded this species from 'western North Carolina'. I have examined the specimen (NCSU) that this record is based on. The specimen is a female and I have identified it as *A. pedalis*. *Ampedus nigrinus* is a Holarctic species that in North America it is transcontinental in the North (Ramberg 1979; Downie and Arnett 1996) and has not been confirmed as being found in the current study area.

***Anchastus bicolor* LeConte, 1866.** Peck and Thomas (1998) recorded this species from Highlands County, FL. I have examined the specimens (FSCA) that were the basis for this record and identified them as *Esthesopus atripennis*. *Anchastus bicolor* occurs in the southwestern United States (Van Dyke 1932) and its presence in Florida is doubtful.

***Anchastus digitatus* LeConte, 1853**. This species has been recorded several times from the Southeast, including Alabama, Florida, Georgia, and South Carolina (Löding 1945; Fattig 1951; Kirk 1970; Downie and Arnett 1996; Peck and Thomas 1998). These records most certainly pertain to *A. longulus*, which for years was catalogued in synonymy with *A. digitatus* despite Fall's (1934) declaration that it is a valid species. I have examined specimens (GSAT) that were the basis of Löding's (1945) records from Alabama and have identified them as *A. longulus*. *Anchastus digitatus* is apparently a rare species, known only from the Northeast (Fall 1934). A formal revision and analysis of the aedeagi of both species would help to better understand their relationship.

***Athous excavatus* (Motschulsky, 1859).** Leng (1920) recorded this species from Florida. This is a West Coast species (Becker 1979b) and its presence in Florida seems doubtful.

***Athous fossularis* (LeConte, 1853).** Leng (1910) recorded this species from Rabun County, GA. Payne and Crossley (1966) and Kirk (1970) recorded this species from Pickens County, SC. Becker (1974) did not record this species south of Ohio. This species is frequently confused with *A. cucullatus* in collections (Becker 1974) and I speculate previous records of this species from the Southeast also pertain to misidentifications of this species. I have not seen any specimens of this species from the Southeast in this study.

***Dalopius lateralis* (Eschscholtz, 1829).** This species has been recorded from Alabama (Löding 1945), North Carolina (Brimley 1938), and Georgia (Fattig 1951), however the name is preoccupied by *Elater lateralis* Olivier, 1790. According to Brown (1934), Eschscholtz' '*lateralis*' is synonymous with *D. californicus* Mannerheim which is currently only known from California. Confusion may have arisen from Leng's (1920) catalogue, where *D. pauper* LeConte, 1853 was synonymized with Eschscholtz's '*lateralis*'. Brown (1934) indicated *D. pauper* is an 'Atlantic' species that may represent a species complex. Although the full extent of its range is probably not known, the presence of a West Coast species in the current study area seems highly unlikely. I have examined a specimen (UGCA) that was the basis of Fattig's (1951) record from Blue Ridge, GA (Fannin County). The specimen was a male, and after dissection and examination of its genitalia I have determined it to be *D. virginicus*. I have also examined two specimens (NCSU) that were the basis of Brimley's (1938) records from Cataloochee and Nellie, NC (both in Haywood County). Unfortunately, both specimens were females so precise identifications could not be made. I have also examined the specimen (GSAT) that was the basis for Löding's (1945) record from Monte Sano, AL (Madison County). Although this specimen is also a female, I am confident it represents *D. pennsylvanicus*. The size, solid brown color, and subquadrate pronotum are all consistent with other specimens of *D. pennsylvanicus* examined from Tennessee, Pennsylvania, and Indiana.

***Dicrepidius corvinus* Candèze, 1859**. Frost (1975) recorded this species from Highlands County, FL. This is a southwestern species (Clark 1963) and its presence in Florida seems doubtful. The record certainly represents a misidentification of a dark colored *D. palmatus* or *D. ramicornis*.

***Diplostethus texanus* (LeConte, 1853).** Fattig (1951) recorded this species from five counties in Georgia as *Neotrichophorus texanus*. Brimley (1938) recorded this species from Moore County, NC, also in the genus *Neotrichophorus*. This species is known from Arizona east to Texas and Oklahoma (Roache 1961). Neither Brimley's nor Fattig's specimens were available for study but most-certainly represent misidentifications of *D. carolinensis*.

***Dipropus ferreus* (LeConte, 1853).** Leng (1920) recorded this species from Florida (as an *Ischiodontus*). Fattig (1951) recorded this species from several counties in Georgia (also as an *Ischiodontus*). This species is known from southern Texas and New Mexico (Johnson 2016) and its presence in Florida or Georgia seems unlikely. Neither Leng's nor Fattig's specimens were available for study, but these records probably represent misidentifications of another *Dipropus* species.

***Cardiophorus convexulus* LeConte, 1853.** Fattig (1951) recorded this species from three localities in Georgia. Kirk (1969) recorded this species from Kershaw County, SC. This species is not yet known south of Ohio and Douglas (2003) suspected Fattig's records may have referred to *C. gagates*. The same probably applies to Kirk's records. While examining specimens in the CUAC, I found four specimens labeled as *C. convexulus* that were in fact *C. gagates*. While none of the specimens had the exact same label data as the record in Kirk (1969), one of the specimens was collected in the same locality.

***Conoderus delicatus* (Fall, 1929).** Fattig (1951) recorded this species from Clarke and Dougherty counties in Georgia. This species occurs in the southwestern United States and its presence in Georgia seems unlikely. Fattig's specimens were not available for study, but based on the color pattern of *delicatus*, they probably represented misidentifications of *C. suturalis* or *C. vespertinus*.

***Conoderus plagiatus* Fall, 1934.** Löding (1945) recorded this species from Alabama, stating also that the type was collected in Mobile, AL. This is a manuscript name that was removed by the editor prior to publication, as Brown (1933) described *Conoderus rudis* the previous year, making *C. plagiatus* an objective synonym of *C.*

rudis. I have examined the specimens (GSAT) that were the bases for the Löding records and have confirmed them as *C. rudis*.

***Euplastius melsheimeri* (Becker, 1961).** Kirk (1969) recorded this species from Florence County, SC. This species is currently known along the Ohio River Valley, from Pennsylvania to Missouri (Becker 1961). While it is apparent that the distributions of some of the species in this genus are not as restrictive as indicated in Becker's revision, South Carolina seems a bit disjunct for *E. melsheimeri*. Kirk's record of this species probably represents a misidentification of another species. It could even represent an undescribed species. There were a couple specimens Becker examined during his revision that he could not comfortably place at the species level. If *E. melsheimeri* does occur in the current study area, it will most likely be found in western Tennessee.

***Gambrinus fulvipilis* (Candèze, 1860).** Brimley (1938) recorded this species from Buncombe County, NC (as *Limonius fulvipilis*). I have examined the specimen (NCSU) that was the basis for this record and identified it as *L. auripilis*. *Gambrinus fulvipilis* is a western species not known to occur east of Montana (Al Dhafer 2009).

***Glyphonyx quadraticollis* (Champion, 1896).** Brimley (1938) recorded this species from North Carolina (not further restricted). This species does not occur north of Mexico (Smith and Balsbaugh 1984) and the record probably represents a misidentification of *G. bimarginatus*. I did not see this specimen in the NCSU where most of the Brimley collection is housed, but Smith and Balsbaugh examined NCSU specimens for their revision and, if the specimen was present, they probably corrected the identification.

***Heterodderes sordidus* (LeConte, 1853).** Champion (1896) recorded this species from Florida. This species occurs in the Southwest, and its presence in Florida seems unlikely. Champion's specimen was not available for study but probably represents a misidentification of *H. amplicollis* or *Conoderus falli*, or a mislabeling.

***Horistonotus exoletus* (Erichson, 1840).** Fattig (1951) recorded this species from Chatham and Decatur Counties in Georgia. Löding (1945) recorded this species from Mobile County, AL. This species is restricted to the northern Andes in South America and records of *H. exoletus* from the United States pertain to *H. uhleri* (Wells 2000).

***Ignelater luminosus* (Illiger, 1807).** This species was introduced from the Caribbean into Florida in 1943 to aid in control of the scarab, *Euetheola rugiceps* (LeConte), but never became established (Frank and McCoy 1993).

***Limonius aeger* LeConte, 1853.** Leng (1910) recorded this species from northern Georgia. Fattig (1951) recorded this species from four counties in Georgia. Kirk (1969, 1970) recorded this species from Florence County, SC. This is a northern species, not being recorded south of Pennsylvania by Al Dhafer (2009). There is a series of specimens from Georgia in the FSCA that at one time had been identified as *L. aeger* but were determined by Al Dhafer to be *Limonius* (now *Tetralimonius*) *definitus* during his revisionary work. It is possible the records by Fattig and Kirk are also based on misidentifications of *T. definitus* or a similar species.

***Orthostethus hepaticus* (Germar, 1824).** Schimmel and Tarnawski (2010) recorded this species from Florida. Löding (1945) recorded this species from Alabama. This is a South American species and records from the U.S. are probably due to misattributing the species name to *O. infuscatus* or *Diplostethus carolinensis*. I have examined the specimens (GSAT) that were the basis for Löding's (1945) record from Mobile County, AL and identified them as *D. carolinensis*. LeConte (1853) also used Germar's '*hepaticus*' for his record of *Crigmus hepaticus* from Georgia. LeConte's record probably also refers to *Diplostethus carolinensis* (which was undescribed at the time of LeConte's publication).

Appendix 3. Checklist of the Elateridae of the Southeast

The following is a checklist of the species included in the current study. New state records presented in this work are in bold. Questionable and demonstrable erroneous records discussed in the text are not included here. A brief synonymy is presented at the species level only; please refer to the main text for explanations.

Elateridae Latreille, 1815

Cebrioninae Latreille, 1802

Cebrionini Latreille, 1802

***Selonodon* Latreille, 1834**

Selonodon appalachiensis Galley, 1999 [GA, NC, SC]
Selonodon archboldi Galley, 1999 [FL]
Selonodon bicolor (Fabricius, 1801) [NC, SC]
Selonodon ferrugineus Galley, 1999 [FL, GA]
Selonodon floridensis Galley, 1999 [FL]
Selonodon gracilis Galley, 1999 [AL, TN]
Selonodon mandibularis (LeConte, 1863) [FL]
Selonodon medialis Galley, 1999 [AL, MS]
Selonodon mississippiensis Galley, 1999 [AL, MS]
Selonodon obscurus Galley, 1999 [AL]
Selonodon orestes Galley, 1999 [TN]
Selonodon papillatus Galley, 1999 [TN]
Selonodon perplexus Galley, 1999 [AL, GA, TN]
Selonodon santarosae Galley, 1999 [FL]
Selonodon similis Galley, 1999 [FL]
Selonodon simplex (LeConte, 1853) [FL, GA]
Cebrio confusus LeConte, 1953

Elaterinae Leach,1815

Elaterini Leach, 1815

***Diplostethus* Schwarz, 1907**

Diplostethus carolinensis (Schaeffer, 1916) [AL, FL, GA, MS, NC, SC]
Crigmus hepaticus of authors, not Germar, 1824

***Dolerosomus* Motschulsky, 1859**

Dolerosomus silaceus (Say, 1825) [AL, FL, GA, **MS**, NC, SC, TN]
Atractopterus umbricatus LeConte, 1853
Dolerosomus flavipennis Motschulsky, 1859
Sericosomus debilis LeConte, 1859
Agriotes inversus Candèze, 1863

***Elater* Linnaeus, 1758**

Elater abruptus Say, 1825 [AL, GA, **NC**, **TN**]
Ludius coracinus Germar, 1843

***Orthostethus* Lacordaire, 1857**

Orthostethus infuscatus (Germar, 1844) [AL, FL, GA, MS, NC, SC, TN]

Orthostethus praejectus Candèze, 1863
Pristilophus sordidus Melsheimer, 1845

***Parallelostethus* Schwarz, 1906**

Parallelostethus attenuatus (Say, 1825) [**AL**, FL, GA, **MS**, NC, SC, TN]
Ludius fuscus Laporte de Castelnau, 1840

***Sericus* Eschscholtz, 1829**

Sericus honestus (Randall, 1838) [**NC**]
Atracopterus fusiformis LeConte, 1853
Sericus viridanus (Say, 1825) [**AL**, **MS**, SC, **TN**]

Megapenthini Gurjeva, 1973

***Megapenthes* Kiesenwetter, 1863**

Megapenthes angularis LeConte, 1866 [AL, **FL**, **GA**, MS, **NC**, **SC**, **TN**]
Megapenthes illinoisensis Van Dyke, 1932 [**AL**, NC, SC, **TN**]
Megapenthes insignis (LeConte, 1884) [**AL**, FL, GA, MS, **NC**, SC, **TN**]
Megapenthes limbalis (Herbst, 1806) [AL, FL, GA, **MS**, NC, SC, **TN**]
Elater sturmii Germar, 1844
Ectinus granulosus Melsheimer, 1844
Megapenthes rogersi Horn, 1871 [**NC**, **TN**]
Megapenthes rufilabris (Germar, 1843) [AL, FL, GA, MS, NC, SC, **TN**]
Oophorus delicatulus Dejean, 1837
Megapenthes stigmosus (LeConte, 1853) [**TN**]
Megapenthes tarsalis Schaeffer, 1916 [GA, NC, TN]

Agriotini Laporte de Castelnau, 1840

***Agriotes* Eschscholtz, 1829**

Agriotes arcanus Brown, 1933 [NC]
Agriotes collaris (LeConte, 1853) [**NC**]
Agriotes fucosus LeConte, 1853, in part
Agriotes insanus Candèze, 1863 [**AL**, GA, **MS**, NC, SC, TN]
Agriotes isabellinus (Melsheimer, 1845) [GA, NC, SC, TN]
Agriotes mancus (Say, 1823) [**AL**]
Agriotes striatulus Melsheimer, 1845
Agriotes oblongicollis (Melsheimer, 1845) [**AL**, GA, NC, SC, TN]

***Dalopius* Eschscholtz, 1829**

Dalopius allegheniensis Knull, 1947 [**NC**]
Dalopius cognatus Brown, 1934 [**AL**, **GA**, **NC**, **TN**]
Dalopius gentilis Brown, 1934 [**GA**, **NC**, **TN**]
Dalopius mississippiensis Mathison, 2014 [MS]
Dalopius ohioensis Knull, 1947 [**AL**, **NC**, **SC**]
Dalopius pennsylvanicus Brown, 1934 [**AL**, **TN**]
Dalopius porosus (Van Dyke, 1932) [NC]
Dalopius vagus Brown, 1934 [**GA**, **NC**, **TN**]
Dalopius virginicus Brown, 1934 [**AL**, GA, NC, **SC**, **TN**]

Pomachiliini Candèze, 1859

***Idolus* Desbrochers des Loges, 1875**

Idolus bigeminatus (Randall, 1838) [GA, NC, SC, **TN**]
Idolus debilis (LeConte, 1884) [**TN**]
Drasterius debilis Fall, 1964

Synaptini Gistel, 1856

***Glyphonyx* Candèze, 1863**

Glyphonyx bimarginatus Schaeffer, 1916 [AL, FL, GA, MS, NC, SC, TN]
Glyphonyx ferruginosus Schaeffer, 1916 [AL, FL, GA, MS, NC, SC, TN]
Glyphonyx ferrugineus Schenkling, 1927
Glyphonyx gracilis Smith and Balsbaugh, 1984 [AL, GA, NC, SC, TN]
Glyphonyx helix Smith and Balsbaugh, 1984 [FL, **MS**, TN]
Glyphonyx inquinatus (Say, 1839) [AL, FL, GA, NC, **SC**, TN]
Elater pumilus Erichson, 1842
Glyphonyx mimeticus Horn, 1874 [AL, **FL**, MS]
Glyphonyx nanus Smith and Balsbaugh, 1984 [AL, FL, GA, MS, NC, SC]
Glyphonyx quietus (Say, 1839) [AL, FL, GA, MS, NC, SC, TN]
Glyphonyx recticollis (Say, 1823) [AL, FL, GA, MS, NC, SC, **TN**]
Glyphonyx rhopalacanthus Smith and Balsbaugh, 1984 [AL, FL, MS, **NC**, **TN**]
Glyphonyx testaceus (Melsheimer, 1845) [AL, FL, GA, MS, NC, SC, TN]
Ampedus flavescens Dejean, 1837

Ampedini Gistel, 1856

***Ampedus* Dejean, 1833**

Ampedus areolatus (Say, 1823) [AL, FL, GA, MS, NC, SC, TN]
Elater obliquus Say, 1839
Elater scitulus Germar, 1844
Ampedus collaris (Say, 1825) [AL, FL, GA, **MS**, NC, SC, **TN**]
Ampedus fuscatus (Melsheimer) [AL, FL, **GA**, MS, NC, SC]
Ampedus fusculus (LeConte, 1853) [**TN**]
Ampedus impolitus (Melsheimer, 1844) [**NC**, **TN**]
Ampedus laesus (LeConte, 1853) [GA, NC, **TN**]
Ampedus linteus (Say, 1839) [AL, FL, GA, **MS**, NC, SC, **TN**]
Elater lugubris Palisot de Beauvois, 1821
Ampedus luctuosus (LeConte, 1853) [AL, GA, NC, SC]
Elater manipularis Candèze, 1859
Ampedus melanotoides Brown, 1933 [**AL**, FL, GA, MS, NC, SC, TN]
Ampedus melsheimeri (Leng, 1918) [AL, FL, GA, **MS**, NC, SC, **TN**]
Elater hepaticus Melsheimer, 1844
Ampedus militaris (Harris, 1836) [GA, NC, TN]
Ampedus mixtus (Herbst, 1806) [GA, NC]
Ampedus molestus (LeConte, 1853) [NC]
Ampedus nigricollis (Herbst, 1801) [**AL**, FL, GA, **MS**, NC, SC, TN]
Ampedus oblessus (Say, 1833) [AL, FL, GA, **MS**, NC, SC, **TN**]
Elater discoideus Fabricius, 1801
Elater sellatus Leng, 1918
Ampedus palans (LeConte, 1853) [GA, NC]
Ampedus pedalis (Germar, 1843) [AL, FL, GA, **MS**, NC, SC, TN]
Elater rufipes Palisot de Beauvois, 1805
Ampedus protervus (LeConte, 1853) [NC]

Ampedus pusio Germar, 1844 [AL, **FL**, GA, **MS**, NC, SC, TN]
Elater luteolus LeConte, 1853
Ampedus rubricollis (Herbst, 1806) [AL, FL, GA, MS, NC, SC, TN]
Elater verticinus Palisot de Beauvois, 1819
Elater socer LeConte, 1853
Ampedus rubricus (Say, 1825) [NC, TN]
Ampedus sanguinipennis (Say, 1823) [AL, GA, MS, NC, SC, TN]
Ampedus sayi (LeConte, 1853) [GA, SC, **TN**]
Ampedus semicinctus (Randall, 1838) [**GA**, NC, **SC**, TN]
Ampedus vitiosus (LeConte, 1853) [GA, **NC**, **TN**]
Ampedus xanthomus (Germar, 1843) [**FL**, **SC**, NC, **TN**]
Elater humeralis Melsheimer, 1846
Ampedus sp. 1 [GA, NC, TN]
Ampedus sp. 2 [NC]
Ampedus sp. 3 [NC]
Ampedus sp. 4 [AL, FL, MS]

Melanotini Candèze, 1859

***Melanotus* Eschscholtz, 1829**

Melanotus americanus (Herbst, 1806) [AL, FL, GA, **MS**, NC, SC, TN]
Cratonychus angustatus Erichson, 1842
Melanotus castanipes (Paykull, 1800) [GA, NC, **TN**]
Melanotus paradoxus Melsheimer, 1846
Cratonychus inaequalis LeConte, 1853
Cratonychus scrobicollis LeConte, 1853
Melanotus texanus Candèze, 1860
Melanotus clandestinus (Erichson, 1842) [AL, FL, GA, MS, NC, SC]
Melanotus peninsularis Candèze, 1889
Melanotus perplexus Blatchley, 1920
Melanotus communis (Gyllenhal, 1817) [AL, FL, GA, MS, NC, SC, TN]
Melanotus paganus Candèze, 1860
Melanotus corticinus (Say, 1823) [**AL**, **FL**, GA, MS, NC, **SC**, TN]
Cratonychus vetulus Erichson, 1842
Melanotus glandicolor Melsheimer, 1846
Melanotus cribriventris Blatchley, 1910 [**AL**, **FL**, **GA**, **MS**, NC, **SC**, TN]
Melanotus longicornis Blatchley, 1910
Melanotus blatchleyi Leng, 1918
Melanotus decumanus (Erichson, 1842) [AL, FL, GA, NC, SC, TN]
Cratonychus cuneatus LeConte, 1853
Crayonychus incertus LeConte, 1853
Melanotus canadensis Candèze, 1860
Melanotus depressus (Melsheimer, 1846) [AL, FL, GA, MS, NC, SC, TN]
Ctenonychus parumpunctatus LeConte, 1853
Melanotus divarcarinus Blatchley, 1910
Melanotus lixus Blatchley, 1910
Melanotus dietrichi Quate, 1967 [**AL**, **NC**, **SC**, TN]
Melanotus difficilis Blatchley, 1910 [MS, TN]
Melanotus emissus (LeConte, 1853) [AL, GA, NC, **SC**, TN]

Melanotus gradatus LeConte, 1866 [**AL**, **FL**, **MS**, **TN**]
Melanotus hyslopi van Zwaluwenburg, 1921 [**AL**, GA, MS, NC, **SC**, TN]
Melanotus ignobilis Melsheimer, 1846 [AL, FL, GA, MS, NC, SC, TN]
Cratonychus secretus LeConte, 1853
Melanotus despectus Candèze, 1860
Melanotus indistinctus Quate, 1967 [**AL**, MS, **SC**, TN]
Melanotus infaustus (LeConte, 1853) [**AL**, FL, GA, **NC**, **TN**]
Melanotus insipiens (Say, 1825) [AL, FL, GA, **MS**, NC, SC, TN]
Cratonychus tenellus Erichson, 1842
Melanotus lanei Quate, 1967 [FL, **MS**]
Melanotus leonardi (LeConte, 1853) [GA, NC]
Melanotus macer (LeConte, 1853) [GA, MS, MC]
Melanotus miscellus Quate, 1967 [AL, FL, GA, MS, NC, SC, TN]
Melanotus communis var. B Dietrich, 1945
Melanotus morosus Candèze, 1860 [AL, FL, GA, MS, NC, SC, TN]
Cratonychus longulus LeConte, 1853 (not LeConte, 1853, p. 473)
Melanotus debilis Blatchley, 1910
Melanotus simulans Blatchley, 1927
Melanotus obscuratus Blatchley, 1927 [FL, NC]
Melanotus opacicollis LeConte, 1866 [MS]
Melanotus parallelus Blatchley, 1920 [**AL**, FL, GA, NC, **SC**, TN]
Melanotus pertinax (Say, 1839) [**AL**, GA, NC, SC, TN]
Melanotus piceatus Blatchley, 1927 [AL, FL, GA, MS, NC, SC, TN]
Melanotus prasinus Blatchley, 1910 [NC, TN]
Melanotus sagittarius (LeConte, 1853) [**AL**, FL, **GA**, MS, NC, **SC**, TN]
Melanotus carinus Blatchley, 1910
Melanotus similis (Kirby, 1837) [AL, FL, GA, MS, NC, SC, TN]
Elater fissilis Say, 1839
Cratonychus laticollis Erichson, 1842
Ctenonychus ochraceipennis Melsheimer, 1846
Ctenonychus sphenoidalis Melsheimer, 1846
Cratonychus exuberans LeConte, 1853
Melanotus spadix (Erichson, 1842) [**AL**, FL, GA, **MS**, NC, SC, TN]
Melanotus abdominalis of authors, not Erichson, 1842
Melanotus decumanus of authors, not Erichson, 1842
Melanotus tenax (Say, 1839) [AL, GA, NC, SC]
Melanotus testaceus (Melsheimer, 1846) [**AL**, FL, GA, **MS**, NC, **SC**]
Cratonychus dubius LeConte, 1853
Melanotus angustatus of authors, not Erichson, 1842
Melanotus trapezoideus (LeConte, 1853) [**AL**, GA, MS, NC, **SC**, TN]
Melanotus verberans (LeConte, 1853) [AL, FL, GA, MS, NC, SC, **TN**]

Physorhinini Candèze, 1859

***Anchastus* LeConte, 1853**

Anchastus bicarinatus (LeConte, 1853) [AL, FL, GA, NC, **SC**]
Anchastus binus (Say, 1839) [AL, FL, GA, **MS**, **NC**, SC]
Anchastus fumicollis Fall, 1934 [**AL**, FL, **GA**, **SC**]
Anchastus longulus LeConte, 1878 [**AL**, FL, GA, **MS**, **NC**, SC, **TN**]

Anchastus rufiventris Candèze, 1859 [**FL**]
Anchastus rufus Candèze, 1859 [AL]
Anchastus signaticollis (Germar, 1843) [AL, **MS**, SC]
Anchastus splendidus Knull, 1965 [**AL**, **MS**]

***Physorhinus* Germar, 1840**

Physorhinus distigma Candèze, 1859 [**FL**]
Physorhinus sericeus Candèze, 1859
Physorhinus cephalicus Candèze, 1889
Physorhinus moseri Schwarz, 1902
Physorhinus yuccae Wickham, 1903

Dicrepidiini Candèze, 1859

***Blauta* LeConte, 1853**

Blauta cribraria (Germar, 1844) [AL, FL, GA, MS, NC, SC]
Blauta cauta LeConte, 1853
Blauta falli Brown, 1936 [FL]

***Dicrepidius* Eschscholtz, 1829**

Dicrepidius palmatus Candèze, 1859 [AL, FL, GA, **MS**, NC, SC, **TN**]
Dicrepidius ramicornis (Palisot de Beauvois, 1805) [FL]
Elater ceramboides Sturm, 1826
Dicrepidius pectinicornis Eschscholtz, 1829

***Dipropus* Germar, 1839**

Dipropus asper (LeConte, 1878) [**AL**, FL, GA]
Ischiodontus granosus Fall, 1925
Dipropus schwarzi (Becker, 1961) [AL, FL, GA, MS, **NC**, SC, **TN**]
Ischiodontus parallelus Schwarz, 1906
Dipropus simplex (LeConte, 1853) [AL, **FL**, MS, **SC**]
Dipropus soleatus (Say, 1839) [AL, FL, GA, MS, NC, SC, TN]
Ischiodontus oblitus Candèze, 1859
Anchastus fuscus LeConte, 1878
Dipropus tequesta Johnson, 2018 [FL]

Cardiophorinae Candèze, 1859

***Cardiophorus* Eschscholtz, 1829**

Cardiophorus carinatus Mathison and Douglas, 2018 [FL]
Cardiophorus convexus (Say, 1823) [AL, FL, GA, **MS**, NC, SC, TN]
Cardiophorus amictus Melsheimer, 1844
Cardiophorus erythropus LeConte, 1853
Cardiophorus insulus Candèze, 1860
Cardiophorus floridae Candèze, 1865
Cardiophorus angustatus Blanchard, 1889
Cardiophorus destinensis Douglas, 2003 [FL]
Cardiophorus erythropus Erichson, 1840 [AL, FL, GA, NC, SC]
Cardiophorus saturninus LeConte, 1853
Cardiophorus gagates Erichson, 1840 [AL, FL, GA, MS, NC, SC, TN]
Cardiophorus laevicollis Dejean, 1833

Cardiophorus panamapolis Douglas, 2003 [FL]

***Esthesopus* Eschscholtz, 1829**

Esthesopus atripennis Candèze, 1860 [FL, GA]
Esthesopus bicolor Horn, 1874
Esthesopus claricollis (Say, 1839) [AL, FL, GA, MS, SC]
Esthesopus praeditus Horn, 1884 [AL, **FL**, GA, **SC**, TN]
Esthesopus pusio Horn, 1884 [FL, GA]

***Floridelater* Douglas, 2017**

Floridelater americanus (Horn, 1871) [AL, FL, **MS**]

***Horistonotus* Candèze, 1860**

Horistonotus bontai Wells, 2000 [GA]
Horistonotus curiatus (Say, 1839) [AL, FL, GA, **MS**, NC, SC, **TN**]
Cardiophorus areolatus Erichson, 1840
Horistonotus uhleri Horn, 1871 [AL, FL, GA, MS, NC, SC]

***Paracardiophorus* Schwarz, 1895**

Paracardiophorus cardisce (Say, 1839) [AL, FL, GA, NC, SC]
Cardiophorus dejeanii LeConte, 1853

Lissominae Laporte de Castelnau, 1835

***Drapetes* Mergele in Dejean, 1821**

Drapetes exstriatus (Say, 1834) [AL, FL, GA, **MS**, NC, SC, TN]
Elater geminatus Say, 1825
Elater basalis Randall, 1838
Lissomus nitidus Melsheimer, 1846
Drapetes plagiatus (Boheman, 1858) [FL]
Drapetes praesutus Bonvouloir, 1859
Drapetes quadripustulatus Bonvouloir, 1859 [AL, FL, GA, MS, NC, SC]
Drapetes rubricollis LeConte, 1866 [AL, FL, GA, **MS**, NC, SC]

Oestodinae Hyslop, 1917

***Bladus* LeConte, 1861**

Bladus quadricollis (Say, 1839) [**MS**, **NC**]

***Oestodes* LeConte, 1853**

Oestodes tenuicollis (Randall, 1838) [GA, NC]

Agrypninae Candèze, 1857

Agrypnini Candèze, 1857

***Agrypnus* Eschscholtz, 1829**

Agrypnus rectangularis (Say, 1825) [AL, FL, GA, MS, SC, TN]
Adelocera curtus LeConte, 1853

***Danosoma* Thomson, 1859**

Danosoma obtecta (Say, 1839) [GA, NC, TN]

***Lacon* Laporte de Castelnau, 1838**

Lacon auroratus (Say, 1835) [**NC**]

Lacon avitus (Say, 1839) [**AL**, GA, **MS**, **SC**, **NC**, **TN**]
Lacon discoideus (Weber, 1801) [AL, FL, GA, MS, NC, SC, TN]
Elater pennata Fabricius, 1801
Lacon impressicollis (Say, 1825) [AL, FL, GA, **MS**. NC, SC, TN]
Elater fuscus Melsheimer, 1806
Adelocera senilis Germar, 1840
Lacon marmoratus (Fabricius, 1801) [AL, FL, GA, **MS**, NC, SC, TN]
Lacon mexicanus (Candèze, 1857) [FL, **GA**]
Lacon subcostatus (Candèze, 1891) [FL]
Lacon floridanus Knull, 1948

***Meristhus* Candèze, 1857**

Meristhus cristatus Horn, 1871 [AL, **MS**]

***Rismethus* Fleutiaux, 1947**

Rismethus scobinula (Candèze, 1857) [**AL**, FL, GA]
Meristhus texanus Horn, 1871
Rismethus squamiger (Champion, 1896) [**AL**, FL]

Oophorini Gistel, 1856

***Aeolus* Eschscholtz, 1829**

Aeolus amabilis (LeConte, 1853) [AL, GA, NC, SC]
Drasterius fretus Casey, 1884
Aeolus cribratus (LeConte, 1884) [AL, FL, GA, MS]
Aeolus lepidus (LeConte, 1853) **Lin and Johnson, comb. nov.** [AL, FL, GA, SC]
Aeolus mellillus (Say, 1834) [AL, FL, GA, MS, NC, SC, TN]
Elater dorsalis Say, 1823
Oophorus nigrosignatus Candèze, 1859
Drasterius brevipennis Schwarz, 1903
Drasterius curtipennis Schwarz, 1906
Aeolus pseudothoracicus Lin and Johnson [GA, MS, NC, SC, TN]
Aeolus scutellatus (Schaeffer, 1917) [AL, FL, GA, MS, NC, SC, TN]
Conoderus perversus Brown, 1933 **Lin and Johnson, syn. nov.**

***Conoderus* Eschscholtz, 1829**

Conoderus auritus (Herbst, 1806) [AL, **FL**, GA, MS, NC, SC, **TN**]
Oophorus crassicollis Melsheimer, 1844
Monocrepidius finitimus Casey, 1884
Monocrepidius caseyi Leng, 1918
Conoderus aversus (LeConte, 1853) [AL, FL, GA, MS, NC, SC]
Monocrepidius scutellaris Dejean, 1837
Monocrepidius puellus Dejean, 1837
Conoderus bellus (Say, 1823) [AL, FL, GA, MS, NC, SC, **TN**]
Monocrepidius variegatus Steinheil, 1875
Conoderus bifoveatus (Palisot de Beauvois, 1805) [FL]
Conoderus blandulus (LeConte, 1853) [AL, FL, GA, SC]
Conoderus debilitatus (Candèze, 1891) [FL, GA]
Athous debilis LeConte, 1878
Conoderus exsul (Sharp, 1877) [FL, **GA**, **MS**, **NC**, **SC**]

Conoderes bicarinatus Van Dyke, 1932
Conoderus arizonicus Van Dyke, 1939
Conoderus duplicatus Van Dyke, 1943
Conoderus falli (Lane, 1956) [AL, FL, GA, MS, NC, SC **TN**]
Monocrepidius vagus Candèze, 1893
Monocrepidius difformis Fall, 1929
Conoderus lividus (De Geer, 1774) [AL, FL, GA, MS, NC, SC, TN]
Elater castaneus Olivier, 1790
Elater castanipes Herbst, 1806
Elater lobatus Say, 1823
Conoderus pictus (Candèze, 1859) [FL]
Conoderus rudis Brown, 1933 [AL, FL, GA, MS, SC, NC]
Conoderus rufidens (Fabricius, 1801) [FL]
Conoderus scissus (Schaeffer, 1909) [AL, FL, GA, MS, NC, SC]
Conoderus suturalis (LeConte, 1853) [AL, FL, GA, **MS**, NC, SC]
Conoderus vespertinus (Fabricius, 1801) [AL, FL, GA, MS, NC, SC, **TN**]
Elater finitimus Say, 1839
Monocrepidius serotinus Germar, 1839
Monocrepidius peninsularis Candèze, 1889

***Heteroderes* Latreille, 1834**

Heteroderes amplicollis (Gyllenhal, 1817) [AL, FL, GA, MS, NC, SC]
Heteroderes nicholsi Notman, 1922
Monocrepidius fucosus Blatchley, 1925
Heteroderes laurentii of authors, not Guerin-Meneville, 1838

Pseudomelanactini Arnett, 1967

***Lanelater* Arnett, 1952**

Lanelater sallei (LeConte, 1853) [AL, FL, GA, MS, NC, SC]

Pyrophorini Candèze, 1863

***Deilelater* Costa, 1975**

Deilelater atlanticus (Hyslop, 1917) [FL, GA]
Deilelater physoderus (Germar, 1841) [AL, FL, GA]
Pyrophorus texanus Hyslop, 1917
Deilelater ustulatus Costa, 1983 [FL]

***Ignelater* Costa, 1975**

Ignelater havaniensis (Laporte de Castelnau, 1840) [FL]
Pyrophorus causticus Germar, 1841
Pyrophorus impressifrons Sturm, 1843

***Pyrophorus* Billberg, 1820**

Pyrophorus mellifluus Costa, 1972 [**AL**]

Hemirhipini Candèze, 1857

***Alaus* Eschscholtz, 1829**

Alaus myops (Fabricius, 1801) [AL, FL, GA, MS, NC, SC, TN]
Elater luscus Olivier, 1790
Alaus canadensis Candèze, 1889

Alaus oculatus (Linnaeus, 1758) [AL, FL, GA, MS, NC, SC, TN]
Elater luscus Fabricius, 1775
Alaus oklahomensis Hatch, 1928
Alaus patricius (Candèze, 1857) [FL]
Elater luscus Olivier, 1790
Alaus primarius Candèze, 1874

***Chalcolepidius* Eschscholtz, 1829**

Chalcolepidius viridipilis (Say, 1825) [AL, FL, GA, **MS**, NC, SC, TN]
Chalcolepidius prasianus Erichson, 1841
Chalcolepidius debilis Casey, 1907

***Pherhimius* Fleutiaux, 1942**

Pherhimius fascicularis (Fabricius, 1787) [AL, FL, GA, **MS**, NC, SC, TN]
Hemirhipis venosus Laporte de Castelnau, 1838

Pityobiinae Hyslop, 1917

***Pityobius* LeConte, 1853**

Pityobius anguinus LeConte, 1853 [AL, FL, GA, **MS**, **NC**, SC, TN]

Oxynopterinae Candèze, 1857

***Dixicollis* Johnson, gen. nov.**

Dixicollis divaricatus (LeConte, 1853) [AL, FL, GA, **MS**, NC, SC, **TN**]
Corymbites crassus LeConte, 1853
Diacanthus afflictitius Candèze, 1863
Corymbites floridanus Candèze, 1889

***Melanactes* LeConte, 1853**

Melanactes morio (Fabricius, 1798) [AL, FL, GA, MS, NC, SC, TN]
Elater lacunosus Fabricius, 1801
Melanactes piceus (De Geer, 1775) [AL, GA, **FL**, NC, SC, TN]
Elater laevigatus Fabricius, 1798
Pristilophus femoralis Melsheimer, 1844
Melanactes procerus LeConte, 1853
Melanactes puncticollis (LeConte, 1852) [AL, GA, MS, NC, TN]
Melanactes reichei (Germar, 1843) [**AL**, **FL**, GA, MS, NC, SC, **TN**]

Dendrometrinae Gistel, 1848

Dendrometrini Gistel, 1848

***Athous* Eschscholtz, 1829**

Athous acanthus (Say, 1839) [AL, GA, NC, SC, TN]
Athous mendicus Dejean, 1837
Athous maculicollis LeConte, 1863
Athous flavangularis Horn, 1871
Athous carolinus Van Dyke, 1932
Athous appalachius Van Dyke, 1932 [GA, NC, TN]
Denticollis quadrosa Becker, 1952
Athous brightwelli (Kirby, 1837) [AL, FL, GA, **MS**, NC, SC, TN]
Athous oblongicollis Melsheimer, 1844

Athous arcticollis Melsheimer, 1844
Athous cucullatus (Say, 1825) [AL, FL, GA, MS, NC, SC, TN]
Athous strigatus Melsheimer, 1844
Athous hypoleucus Melsheimer, 1844
Athous procericollis Melsheimer, 1844
Athous equestris (LeConte, 1853) [**FL**, GA, MS, **NC**]
Athous neacanthus Becker, 1974 [AL, GA, NC, SC, TN]
Athous ornatipennis (LeConte, 1863) [AL, NC, SC]
Athous exclamationis Schwarz, 1903
Athous orvus Becker, 1974 [**NC**]
Athous posticus (Melsheimer, 1844) [**AL**, **GA**, NC, TN]
Athous erebus Van Dyke, 1932
Athous productus (Randall, 1838) [NC, **TN**]
Athous bipunctatus Provancher, 1877
Athous rufifrons (Randall, 1838) [GA, NC, SC, TN]
Athous reflexus LeConte, 1853
Athous lengi Dury, 1911
Athous scapularis (Say, 1839) [GA, NC, SC, TN]

***Denticollis* Piller and Mitterpacher, 1783**

Denticollis denticornis (Kirby, 1837) [NC, TN]
Campylus flavinasus Melsheimer, 1845

***Elathous* Reitter, 1890**

Elathous bicolor (LeConte, 1853) [**MS**, **NC**, **SC**]
Elathous oberndorfferi Schwarz, 1903
Limonius kondratieffi Al Dhafer, 2009
Elathous discalceatus (Say, 1839) [GA, **NC**]

***Euplastius* Schwarz, 1903**

Euplastius bivittatus (Melsheimer, 1846) [AL, MS, TN]
Euplastius athoiformis Schwarz, 1903
Euplastius knulli (Becker, 1961) [**NC**, TN]
Euplastius mimicus (Becker, 1961) [**AL**, NC, TN]

***Gambrinus* LeConte, 1853**

Gambrinus confusus (LeConte, 1853) [NC, TN]
Limonius aenescens LeConte, 1853
Gambrinus flavomarginatus (Knull, 1938) [TN]
Gambrinus griseus (Palisot de Beauvois, 1805) [AL, FL, GA, MS, NC, SC, TN]
Elater cylindriformis Say, 1823
Limonius hirticollis Melsheimer, 1846
Limonius interstitialis Melsheimer, 1846
Limonius propexus Candèze, 1860
Gambrinus meridianus (Knull, 1947) [NC]
Gambrinus plebejus (Say, 1825) [FL, GA, NC, SC]
Limonius metallescens Melsheimer, 1846
Gambrinus rudis (Brown, 1933) [**MS**, NC, **TN**]
Gambrinus stigma (Herbst, 1806) [GA, **TN**]
Elater armus Say, 1839

***Hemicrepidius* Germar, 1839**

Hemicrepidius bilobatus (Say, 1839) [AL, **FL**, GA, **MS**, NC, SC, **TN**]
Athous melanophthalmus Melsheimer, 1844
Asaphes cavifrons Melsheimer, 1844
Asaphes tener LeConte, 1853
Asaphes consentaneus LeConte, 1853
Asaphes planatus LeConte, 1853
Hemicrepidius hemipodus (Say, 1825) [AL, GA, MS, NC, SC, TN]
Elater decoloratus Say, 1839
Diacanthus corporosus Germar, 1843
Athous aereus Melsheimer, 1844
Asaphes aeneolus Melsheimer, 1844
Hemicrepidius indistinctus (LeConte, 1853) [AL, **FL**, GA, **MS**, **NC**, SC]
Hemicrepidius nemnonius (Herbst, 1806) [AL, FL, GA, **MS**, NC, SC, TN]
Elater baridius Say, 1839
Hemicrepidius thomasi Germar, 1843
Pedetes ruficornis Kirby, 1837
Asaphes brevicollis Candèze, 1863

***Limonius* Eschscholtz, 1829**

Limonius agonus (Say, 1839) [GA, NC, **MS**, SC, TN]
Limonius aurifer LeConte, 1853 [AL, GA, MS, NC, SC, TN]
Limonius auripilis (Say, 1823) [AL, FL, GA, MS, NC, SC, TN]
Limonius pubicollis LeConte, 1853
Limonius basilaris (Say, 1823) [AL, FL, GA, MS, NC, SC, TN]
Limonius semianeus LeConte, 1853
Limonius beutenmuelleri Van Dyke, 1932 [GA, NC]
Limonius ectypus (Say, 1839) [FL, GA, NC, SC]
Limonius pilosus LeConte, 1853
Limonius vernalis Fall, 1910
Limonius quercinus (Say, 1825) [AL, FL, GA, MS, NC, SC, TN]
Limonius subauratus LeConte, 1853 [MS]

***Nitidolimonius* Johnson, 2008**

Nitidolimonius appalachius (Van Dyke, 1932) [NC]
Nitidolimonius resplendens (Eschscholtz, 1829) [**NC**, **TN**]
Elater aerarius Randall, 1839
Corymbites viridis Germar, 1843
Diacanthus racinei Chevrolat, 1852
Corymbites junki Schenkling, 1927

***Tetralimonius* Etzler, 2019**

Tetralimonius definitus (Ziegler, 1845) [AL, GA, MS, NC, SC, TN]
Tetralimonius nimbatus (Say, 1825) [AL, FL, GA, NC, SC, TN]
Limonius infernus LeConte, 1853

***Vittathous* Johnson, new genus**

Vittathous longicornis (Horn, 1870) [GA, NC]
Ludius horni Schwarz, 1907

Prosternini Gistel, 1856

Acteniceromorphus Kishii, 1955

Acteniceromorphus vulneratus (LeConte, 1853) [NC]

***Actenicerus* Kiesenwetter, 1858**

Actenicerus cuprascens (LeConte, 1853) [**AL**, NC, **TN**]

***Anostirus* Thomson, 1859**

Anostirus vernalis (Hentz, 1827) [GA, NC, **TN**]

***Brownia* Johnson, new genus**

Brownia signaticollis (Melsheimer, 1846) [AL, GA, **MS**, TN]

***Corymbitodes* Buysson, 1904**

Corymbitodes tarsalis (Melsheimer, 1846) [GA, NC, **TN**]
Elater ochraceus Melsheimer 1806
Athous gilvipennis Dejean 1833
Athous gilvipennis Candèze 1863
Elater suturalis LeConte, 1853

***Hadromorphus* Motschulsky, 1859**

Hadromorphus inflatus (Say, 1825) [**AL**, GA, **MS**, NC, SC]
Elater metallicus Melsheimer, 1806

***Laneganus* Johnson, new genus**

Laneganus sulcicollis (Say, 1839) [GA, **NC**, **TN**]
Elater parallelus Say, 1825
Elater inversicoilus Say, 1839

***Metanomus* Buysson, 1887**

Metanomus insidiosus (LeConte, 1853) [GA, NC]
Corymbites lutescens Fall, 1910

***Neopristolophus* Buysson, 1894**

Neopristolophus aethiops (Herbst, 1806) [**AL**, GA, NC, SC, TN]
Elater laevigatus Herbst, 1806
Ludius nigricans Melsheimer, 1806
Ludius nigrans Dejean, 1833
Corymbites depressus Gemminger and Harold, 1869
Ludius nigrans Laporte de Castelnau, 1840

***Oxygonus* LeConte, 1863**

Oxygonus montanus Schaeffer, 1917 [**NC**, TN]
Oxygonus obesus (Say, 1823) [GA]
Elater acutipennis Randall, 1839

***Paractenicera* Johnson, 2008**

Paractenicera fulvipes (Bland, 1863) [**NC**, **TN**]

***Proludius* Lane, 1971**

Proludius pyrros (Herbst, 1806) [AL, FL, GA, **MS**, NC, SC, TN]
Athous longus Dejean, 1833
Athous pyrrhicus Haldemann, 1843
Athous aequalis Melsheimer, 1846
Athous vagans Melsheimer, 1846

***Setasomus* Gurjeva, 1985**

Setasomus aratus (LeConte, 1853) [**NC**]

***Stropenron* Johnson, new genus**

Stropenron hamata (Say, 1839) [**AL**, GA, **MS**, NC, **SC**, **TN**]

***Sylvanelater* Johnson, 2008**

Sylvanelater cylindriformis (Herbst, 1806) [NC]

***Tesolasomus* Johnson, new genus**

Tesolasomus lanei (Becker, 1949) [**MS**, TN]
Tesolasomus trivittatus (LeConte, 1853) [FL, GA, NC, SC, **TN**]

Hypnoidini Schwarz, 1906

***Hypnoidus* Dillwyn, 1829**

Hypnoidus abbreviatus (Say, 1823) [TN]
Cryptohypnus silaceipes Germar, 1844
Hypnoidus bicolor (Eschscholtz, 1829) [**AL**]
Cryptohypnus pumilus Dejean, 1833
Cryptohypnus limbatus Mannerheim, 1853
Cryptohypnus scarificatus Mannerheim, 1853
Cryptohypnus fallax Mannerheim, 1853
Cryptohypnus vestitus Mannerheim, 1853
Cryptohypnus lacustris LeConte, 1853
Cryptohypnus picescens LeConte, 1853

***Ligmargus* Stibick, 1976**

Ligmargus lecontei (Leng, 1818) [GA, NC]
Cryptohypnus planatus LeConte, 1863

Negastriinae Nakane and Kishii, 1956

***Negastrius* Thomson, 1859**

Negastrius arnetti Stibick, 1990 [NC, SC]
Negastrius choris (Say, 1839) [AL, **FL**, GA, MS, NC, SC, **TN**]
Negastrius exiguus (Randall, 1838) [GA, NC, SC]
Cryptohypnus guttatulus Melsheimer, 1845

***Neohypdonus* Stibick, 1971**

Neohypdonus perplexus (Horn, 1891) [AL, SC, TN]

***Oedostethus* LeConte, 1853**

Oedostethus femoralis LeConte, 1853 [**NC**]

***Paradonus* Stibick, 1971**

Paradonus beckeri Stibick, 1990 [**AL**, **GA**, **NC**]
Paradonus obliquatulus (Melsheimer, 1845) [AL, GA, **MS**, NC, **TN**]
Hypnoidus felti Notman, 1921
Paradonus pectoralis (Say, 1839) [AL, GA, NC, SC, TN]
Paradonus illinoisensis Stibick, 1990
Paradonus olivereae Stibick, 1990
Paradonus stibicki Etzler, 2020 [NC]

***Zorochros* Thomson, 1859**

Zorochros melsheimeri (Horn, 1891) [GA, NC, **TN**]

Index

abbreviatus (Say, 1823) (*Hypnoidus*) . . . 350
abdominalis of authors, not Erichson, 1842 (*Melanotus*) . . . 147
abruptus Say, 1825 (*Elater*) . . . 36
acanthus (Say, 1839) (*Athous*) . . . 272
***Actenicerомorphus* Kishii, 1955** . . . 321
***Actenicerus* Kiesenwetter, 1858** . . . 322
acutipennis Randall, 1839 (*Elater*) . . . 337
aeger LeConte, 1853 (*Limonius*) . . . 391
aeneolus Melsheimer, 1844 (*Asaphes*) . . . 300
aenescens LeConte, 1853 (*Limonius*) . . . 292
***Aeolus* Eschscholtz, 1829** . . . 217
aequalis Melsheimer, 1846 (*Athous*) . . . 339
aerarius Randall, 1839 (*Elater*) . . . 315
aereus Melsheimer, 1844 (*Athous*) . . . 300
aethiops (Herbst, 1806) (*Neopristolophus*) . . . 334
afflictitius Candèze, 1863 (*Diacanthus*) . . . 264
agonus (Say, 1839) (*Limonius*) . . . 305
***Agriotes* Eschscholtz, 1829** . . . 50
Agriotini Laporte de Castelnau, 1840 . . . 50
Agrypninae Candèze, 1857 . . . 203
Agrypnini Candèze, 1857 . . . 203
***Agrypnus* Eschscholtz, 1829** . . . 203
***Alaus* Eschscholtz, 1829** . . . 253
allegheniensis Knull, 1947 (*Dalopius*) . . . 59
amabilis (LeConte, 1853) (*Aeolus*) . . . 218
americanus (Herbst, 1806) (*Melanotus*) . . . 117
americanus (Horn, 1871) (*Floridelater*) . . . 187
amictus Melsheimer, 1844 (*Cardiophorus*) . . . 177
Ampedini Gistel, 1856 . . . 83
***Ampedus* Dejean, 1833** . . . 83
amplicollis (Gyllenhal, 1817) (*Heteroderes*) . . . 244
***Anchastus* LeConte, 1853** . . . 152
anguinus LeConte, 1853 (*Pityobius*) . . . 261
angularis LeConte, 1866 (*Megapenthes*) . . . 44
angustatus Blanchard, 1889 (*Cardiophorus*) . . . 177
angustatus Erichson, 1842 (*Cratonychus*) . . . 117
angustatus of authors, not Erichson, 1842 (*Melanotus*) . . . 149
angusticollis (Mannerheim, 1843) (*Proludius*) . . . 339
***Anostirus* Thomson, 1859** . . . 324
anthrax (LeConte, 1861) (*Proludius*) . . . 339
aplastoides (Van Dyke, 1932) (*Proludius*) . . . 339
appalachiensis Galley, 1999 (*Selonodon*) . . . 20
appalachius (Van Dyke, 1932) (*Nitidolimonius*) . . . 314
appalachius Van Dyke, 1932 (*Athous*) . . . 273
aratus (LeConte, 1853) (*Setasomus*) . . . 341
arcanus Brown, 1933 (*Agriotes*) . . . 52
archboldi Galley, 1999 (*Selonodon*) . . . 20
arcticollis Melsheimer, 1844 (*Athous*) . . . 274
areolatus (Say, 1823) (*Ampedus*) . . . 86
areolatus Erichson, 1840 (*Cardiophorus*) . . . 190
arizonicus Van Dyke, 1939 (*Conoderus*) . . . 232
armus Say, 1839 (*Elater*) . . . 297
arnetti Stibick, 1990 (*Negastrius*) . . . 355
asper (LeConte, 1878) (*Dipropus*) . . . 168
athoiformis Schwarz, 1903 (*Euplastius*) . . . 289
Athous erebus Van Dyke, 1932 (*Athous*) . . . 280
***Athous* Eschscholtz, 1829** . . . 270
atlanticus (Hyslop, 1917) (*Deilelater*) . . . 248
atlas (Van Dyke, 1932) (*Actenicerомorphus*) . . . 321
atripennis Candèze, 1860 (*Esthesopus*) . . . 184
atropurpureus (Melsheimer, 1846) (*Setasomus*) . . . 341
attenuatus (Say, 1825) (*Parallelostethus*) . . . 39
aurifer LeConte, 1853 (*Limonius*) . . . 306
auripilis (Say, 1823) (*Limonius*) . . . 307
auritus (Herbst, 1806) (*Conoderus*) . . . 225
auroratus (Say, 1835) (*Lacon*) . . . 207
aversus (LeConte, 1853) (*Conoderus*) . . . 227
avitus (Say, 1839) (*Lacon*) . . . 208

baridius Say, 1839 (*Elater*) . . . 303
basalis Randall, 1838 (*Elater*) . . . 195
basilaris (Say, 1823) (*Limonius*) . . . 309
beckeri Stibick, 1990 (*Paradonus*) . . . 360
bellus (Say, 1823) (*Conoderus*) . . . 228
beutenmuelleri Van Dyke, 1932 (*Limonius*) . . . 310
bicarinatus (LeConte, 1853) (*Anchastus*) . . . 153
bicarinatus Reitter, 1891 (*Aeolus*) . . . 232
bicarinatus Van Dyke, 1932 (*Conoderus*) . . . 232
bicolor (Eschscholtz, 1829) (*Hypnoidus*) . . . 351
bicolor (Fabricius, 1801) (*Selonodon*) . . . 20
bicolor (LeConte, 1853) (*Elathous*) . . . 286
bicolor Horn, 1874 (*Esthesopus*) . . . 184
bicolor LeConte, 1866 (*Anchastus*) . . . 389
bifoveatus (Palisot de Beauvois, 1805) (*Conoderus*) . . . 229
bigeminatus (Randall, 1838) (*Idolus*) . . . 68
bilobatus (Say, 1839) (*Hemicrepidius*) . . . 299
bimarginatus Schaeffer, 1916 (*Glyphonyx*) . . . 72
binus (Say, 1839) (*Anchastus*) . . . 154
bipunctatus Provancher, 1877 (*Athous*) . . . 281
bivittatus (Melsheimer, 1846) (*Euplastius*) . . . 289
***Bladus* LeConte, 1861** . . . 199
blanditus (Brown, 1936) (*Tesolasomus*) . . . 346
blandulus (LeConte, 1853) (*Conoderus*) . . . 230
blatchleyi Leng, 1918 (*Melanotus*) . . . 123
***Blauta* LeConte, 1853** . . . 161
bontai Wells, 2000 (*Horistonotus*) . . . 189
brevicollis Candèze, 1863 (*Asaphes*) . . . 303
brevipennis Candèze, 1881 (*Drasterius*) . . . 220
brevipennis Schwarz, 1903 (*Drasterius*) . . . 220
brightwelli (Kirby, 1837) (*Athous*) . . . 274
***Brownia* Johnson, new genus** . . . 325

californica (Brown, 1936) (*Stropenron*) . . . 343
canadensis Candèze, 1860 (*Melanotus*) . . . 125
canadensis Candèze, 1889 (*Alaus*) . . . 254
candida (Brown, 1936) (*Stropenron*) . . . 343
captiosus (Brown, 1939) (*Proludius*) . . . 339
Cardiophorinae Candèze, 1859 . . . 174
***Cardiophorus* Eschscholtz. 1829** . . . 174
cardisce (Say, 1839) (*Paracardiophorus*) . . . 193
carinatus Mathison and Douglas, 2018 (*Cardiophorus*) . . . 176
carinus Blatchley, 1910 (*Melanotus*) . . . 144
carolinensis (Schaeffer, 1916) (*Diplostethus*) . . . 32
carolinus Van Dyke, 1932 (*Athous*) . . . 272
caseyi Leng, 1918 (*Monocrepidius*) . . . 225
castaneus Olivier, 1790 (*Elater*) . . . 235
castanipes (Paykull, 1800) (*Melanotus*) . . . 118
castanipes Herbst, 1806 (*Elater*) . . . 235
causticus Germar, 1841 (*Pyrophorus*) . . . 251
cauta LeConte, 1853 (*Blauta*) . . . 162
cavifrons Melsheimer, 1844 (*Asaphes*) . . . 299
Cebrioninae Latreille, 1802 . . . 17
Cebrionini Latreille, 1802 . . . 17
cephalicus Candèze, 1889 (*Physorhinus*) . . . 160
ceramboides Sturm, 1826 (*Elater*) . . . 165
***Chalcolepidius* Eschscholtz, 1829** . . . 257
choris (Say, 1839) (*Negastrius*) . . . 356
clandestinus (Erichson, 1842) (*Melanotus*) . . . 119

claricollis (Say, 1839) (*Esthesopus*) . . . 185
cognatus Brown, 1934 (*Dalopius*) . . . 60
collaris (LeConte, 1853) (*Agriotes*) . . . 53
collaris (Say, 1825) (*Ampedus*) . . . 87
columbiana (Brown, 1936) (*Stropenron*) . . . 343
comes (Brown, 1939) (*Proludius*) . . . 339
communis (Gyllenhal, 1817) (*Melanotus*) . . . 120
communis var. B Dietrich, 1945 (*Melanotus*) . . . 138
confusus (LeConte, 1853) (*Gambrinus*) . . . 292
confusus LeConte, 1953 (*Cebrio*) . . . 30
coniungens (LeConte, 1853) (*Brownia*) . . . 326
conjunctus (LeConte, 1861) (*Ctenicera*) . . . 326
conjungens LeConte, 1861 (*Corymbites*) . . . 326
***Conoderus* Eschscholtz, 1829** . . . 224
consentaneus LeConte, 1853 (*Asaphes*) . . . 299
convexulus LeConte, 1853 (*Cardiophorus*) . . . 390
convexus (Say, 1823) (*Cardiophorus*) . . . 177
copei (Horn, 1871) (*Brownia*) . . . 326
coracinus Germar, 1843 (*Ludius*) . . . 36
corporosus Germar, 1843 (*Diacanthus*) . . . 300
corticinus (Say, 1823) (*Melanotus*) . . . 121
corvinus Candèze, 1859 (*Dicrepidius*) . . . 390
***Corymbitodes* Buysson, 1904** . . . 327
crassicollis Melsheimer, 1844 (*Oophorus*) . . . 225
crassus LeConte, 1853 (*Corymbites*) . . . 264
crestonensis (Brown, 1935) (*Actenicerомorphus*) . . . 321
cribraria (Germar, 1844) (*Blauta*) . . . 162
cribratus (LeConte, 1884) (*Aeolus*) . . . 219
cribriventris Blatchley, 1910 (*Melanotus*) . . . 123
cristatus Horn, 1871 (*Meristhus*) . . . 213
cucullatus (Say, 1825) (*Athous*) . . . 275
cuneatus LeConte, 1853 (*Cratonychus*) . . . 125
cuprascens (LeConte, 1853) (*Actenicerus*) . . . 323
curiatus (Say, 1839) (*Horistonotus*) . . . 190
curtipennis Schwarz, 1906 (*Drasterius*) . . . 220
curtus LeConte, 1853 (*Adelocera*) . . . 204
cylindriformis (Herbst, 1806) (*Sylvanelater*) . . . 355
cylindriformis Say, 1823 (*Elater*) . . . 293

***Dalopius* Eschscholtz, 1829** . . . 58
***Danosoma* Thomson, 1859** . . . 205
debilis (LeConte, 1884) (*Idolus*) . . . 68
debilis Blatchley, 1910 (*Melanotus*) . . . 138
debilis Casey, 1907 (*Chalcolepidius*) . . . 258
debilis LeConte, 1859 (*Sericosomus*) . . . 34
debilis LeConte, 1878 (*Athous*) . . . 232
debilitatus (Candèze, 1891) (*Conoderus*) . . . 232
deceptor (Brown, 1936) (*Tesolasomus*) . . . 346
decoloratus Say, 1839 (*Elater*) . . . 300
decumanus (Erichson, 1842) (*Melanotus*) . . . 125
decumanus of authors, not Erichson, 1842 (*Melanotus*) . . . 147
definitus (Ziegler, 1845) (*Tetralimonius*) . . . 316
***Deilelater* Costa, 1975** . . . 248
dejeanii LeConte, 1853 (*Cardiophorus*) . . . 193
delicatulus Dejean, 1837 (*Oophorus*) . . . 48
delicatus (Fall, 1929) (*Conoderus*) . . . 390
Dendrometrinae Gistel, 1848 . . . 270
Dendrometrini Gistel, 1848 . . . 270
***Denticollis* Piller and Mitterpacher, 1783** . . . 284
denticornis (Kirby, 1837) (*Denticollis*) . . . 284
depressus (Melsheimer, 1846) (*Melanotus*) . . . 126
depressus Gemminger and Harold, 1869 (*Corymbites*) . . . 334
depressus Germar, 1822 (*Elater*) . . . 334
despectus Candèze, 1860 (*Melanotus*) . . . 131
destinensis Douglas, 2003 (*Cardiophorus*) . . . 178
Dicrepidiini Candèze, 1859 . . . 161
***Dicrepidius* Eschscholtz, 1829** . . . 163
dietrichi Quate, 1967 (*Melanotus*) . . . 128
difficilis Blatchley, 1910 (*Melanotus*) . . . 128
difformis Fall, 1929 (*Monocrepidius*) . . . 233
difformis Fleutiaux, 1920 (*Monocrepidius*) . . . 233
digitatus LeConte, 1853 (*Anchastus*) . . . 389
***Diplostethus* Schwarz, 1907** . . . 31
***Dipropus* Germar, 1839** . . . 166
discalceatus (Say, 1839) (*Elathous*) . . . 287
discoideus (Weber, 1801) (*Lacon*) . . . 209
discoideus Fabricius, 1801 (*Elater*) . . . 97
discoideus Weber, 1801 (*Elater*) . . . 97
distigma Candèze, 1859 (*Physorhinus*) . . . 160
divarcarinus Blatchley, 1910 (*Melanotus*) . . . 126
divaricatus (LeConte, 1853) (*Dixicollis*) . . . 264
***Dixicollis* Johnson, gen. nov.** . . . 263
***Dolerosomus* Motschulsky, 1859** . . . 33
dolorosus (Van Dyke, 1932) (*Actenicerомorphus*) . . . 321
dorsalis Paykull, 1800 (*Elater*) . . . 220
dorsalis Say, 1823 (*Elater*) . . . 220
***Drapetes* Mergele in Dejean, 1821** . . . 194
dubius LeConte, 1853 (*Cratonychus*) . . . 149
duplicatus Van Dyke, 1943 (*Conoderus*) . . . 232

ectypus (Say, 1839) (*Limonius*) . . . 311
***Elater* Linnaeus, 1758** . . . 35
Elaterinae Leach,1815 . . . 31
Elaterini Leach, 1815 . . . 31
***Elathous* Reitter, 1890** . . . 285
emissus (LeConte, 1853) (*Melanotus*) . . . 129
equestris (LeConte, 1853) (*Athous*) . . . 277
erythropus Erichson, 1840 (*Cardiophorus*) . . . 179
erythropus LeConte, 1853 (*Cardiophorus*) . . . 177
***Esthesopus* Eschscholtz, 1829** . . . 183
***Euplastius* Schwarz, 1903** . . . 287
excavatus (Motschulsky, 1859) (*Athous*) . . . 389
exclamationis Schwarz, 1903 (*Athous*) . . . 278
exiguus (Randall, 1838) (*Negastrius*) . . . 357
exoletus (Erichson, 1840) (*Horistonotus*) . . . 391
exstriatus (Say, 1834) (*Drapetes*) . . . 195
exsul (Sharp, 1877) (*Conoderus*) . . . 232
exuberans LeConte, 1853 (*Cratonychus*) . . . 146

fallax Mannerheim, 1853 (*Cryptohypnus*) . . . 351
falli (Lane, 1956) (*Conoderus*) . . . 233
falli Brown, 1936 (*Blauta*) . . . 163
fascicularis (Fabricius, 1787) (*Pherhimius*) . . . 259
felti Notman, 1921 (*Hypnoidus*) . . . 361
femoralis LeConte, 1853 (*Oedostethus*) . . . 359
femoralis Melsheimer, 1844 (*Pristilophus*) . . . 267
ferreus (LeConte, 1853) (*Dipropus*) . . . 390
ferrugineus Galley, 1999 (*Selonodon*) . . . 22
ferrugineus Schenkling, 1927(*Glyphonyx*) . . . 74
ferruginosus Schaeffer, 1916 (*Glyphonyx*) . . . 74
finitimus Casey, 1884 (*Monocrepidius*) . . . 225
finitimus Say, 1839 (*Elater*) . . . 242
fissilis Say, 1839 (*Elater*) . . . 146
flavangularis Horn, 1871 (*Athous*) . . . 272
flavescens Dejean, 1837 (*Ampedus*) . . . 82
flavinasus Melsheimer, 1845 (*Campylus*) . . . 284
flavipennis Motschulsky, 1859 (*Dolerosomus*) . . . 34
flavomarginatus (Knull, 1938) (*Gambrinus*) . . . 292
floridae Candèze, 1865 (*Cardiophorus*) . . . 177
floridanus Candèze, 1889 (*Corymbites*) . . . 264
floridanus Knull, 1948 (*Lacon*) . . . 213
***Floridelater* Douglas, 2017** . . . 187

floridensis Galley, 1999 (*Selonodon*) . . . 22
fossularis (LeConte, 1853) (*Athous*) . . . 390
fretus Casey, 1884 (*Drasterius*) . . . 218
fucosus Blatchley, 1925 (*Monocrepidius*) . . . 244
fucosus LeConte, 1853, in part (*Agriotes*) . . . 53
fulvipes (Bland, 1863) (*Paractenicera*) . . . 338
fulvipilis (Candèze, 1860) (*Gambrinus*) . . . 391
fumicollis Fall, 1934 (*Anchastus*) . . . 155
funereus (Brown, 1936) (*Tesolasomus*) . . . 346
fuscatus (Melsheimer) (*Ampedus*) . . . 87
fusculus (LeConte, 1853) (*Ampedus*) . . . 89
fuscus Laporte de Castelnau, 1840 (*Ludius*) . . . 39
fuscus LeConte, 1878 (*Anchastus*) . . . 171
fuscus Melsheimer, 1806 (*Elater*) . . . 210
fusiformis LeConte, 1853 (*Atracopterus*) . . . 41

gagates Erichson, 1840 (*Cardiophorus*) . . . 180
***Gambrinus* LeConte, 1853** . . . 291
geminatus Germar, 1824 (*Elater*) . . . 195
geminatus Say, 1825 (*Elater*) . . . 195
gentilis Brown, 1934 (*Dalopius*) . . . 61
gibsoni (Lane, 1965) (*Proludius*) . . . 339
gilvipennis Candèze, 1863 (*Athous*) . . . 328
gilvipennis Dejean, 1833 (*Athous*) . . . 328
glandicolor Melsheimer, 1846 (*Melanotus*) . . . 121
***Glyphonyx* Candèze, 1863** . . . 70
gracilis Galley, 1999 (*Selonodon*) . . . 23
gracilis Smith and Balsbaugh, 1984(*Glyphonyx*) . . . 75
gradatus LeConte, 1866 (*Melanotus*) . . . 130
granosus Fall, 1925 (*Ischiodontus*) . . . 168
granulosus Melsheimer, 1844 (*Ectinus*) . . . 46
griseus (Palisot de Beauvois, 1805) (*Gambrinus*) . . . 293
guttatulus Melsheimer, 1845 (*Cryptohypnus*) . . . 357

***Hadromorphus* Motschulsky, 1859** . . . 329
hamata (Say, 1839) (*Stropenron*) . . . 343
havaniensis (Laporte de Castelnau, 1840) (*Ignelater*) . . . 251
helix Smith and Balsbaugh, 1984(*Glyphonyx*) . . . 76
***Hemicrepidius* Germar, 1839** . . . 298
hemipodus (Say, 1825) (*Hemicrepidius*) . . . 300
Hemirhipini Candèze, 1857 . . . 253
hepaticus (Germar, 1824) (*Orthostethus*) . . . 391
hepaticus Germar, 1824 (*Elater*) . . . 93
hepaticus Melsheimer, 1844 (*Elater*) . . . 93
hepaticus of authors, not Germar, 1824 (*Crigmus*) . . . 32
***Heteroderes* Latreille, 1834** . . . 244
hieroglyphica (Say, 1839) (*Stropenron*) . . . 343
hirticollis Melsheimer, 1846 (*Limonius*) . . . 293
honestus (Randall, 1838) (*Sericus*) . . . 41
***Horistonotus* Candèze, 1860** . . . 189
horni (Schwarz, 1907) (*Vittathous*) . . . 319
humboldti (Van Dyke, 1932) (*Proludius*) . . . 339
humeralis Melsheimer, 1846 (*Elater*) . . . 107
Hypnoidini Schwarz, 1906 . . . 349
***Hypnoidus* Dillwyn, 1829** . . . 349
hypoleucus Melsheimer, 1844 (*Athous*) . . . 275
hyslopi van Zwaluwenburg, 1921 (*Melanotus*) . . . 131

iaculus (LeConte, 1853) (*Proludius*) . . . 339
***Idolus* Desbrochers des Loges, 1875** . . . 67
***Ignelater* Costa, 1975** . . . 251
ignobilis Melsheimer, 1846 (*Melanotus*) . . . 131
illinoisensis Stibick, 1990 (*Paradonus*) . . . 361
illinoisensis Van Dyke, 1932 (*Megapenthes*) . . . 44
impolitus (Melsheimer, 1844) (*Ampedus*) . . . 90
impressicollis (Say, 1825) (*Lacon*) . . . 210
impressifrons Sturm, 1843 (*Pyrophorus*) . . . 251
inaequalis LeConte, 1853 (*Cratonychus*) . . . 118
incertus LeConte, 1853 (*Cratonychus*) . . . 125
incongruus Fall, 1964 (*Idolus*) . . . 68
indistinctus (LeConte, 1853) (*Hemicrepidius*) . . . 302
indistinctus Quate, 1967 (*Melanotus*) . . . 133
infaustus (LeConte, 1853) (*Melanotus*) . . . 134
infernus LeConte, 1853 (*Limonius*) . . . 317
inflatus (Say, 1825) (*Hadromorphus*) . . . 329
infuscatus (Germar, 1844) (*Orthostethus*) . . . 37
inquinatus (Say, 1839) (*Glyphonyx*) . . . 77
insanus Candèze, 1863 (*Agriotes*) . . . 53
insidiosus (LeConte, 1853) (*Metanomus*) . . . 333
insignis (LeConte, 1884) (*Megapenthes*) . . . 45
insipiens (Say, 1825) (*Melanotus*) . . . 134
insulus Candèze, 1860 (*Cardiophorus*) . . . 177
interstitialis Melsheimer, 1846 (*Limonius*) . . . 293
inversicoilus Say, 1839 (*Elater*) . . . 331
inversus Candèze, 1863 (*Agriotes*) . . . 34
isabellinus (Melsheimer, 1845) (*Agriotes*) . . . 54

junki Schenkling, 1927 (*Corymbites*) . . . 315

kaweanus (Fall, 1937) (*Acteniceromorphus*) . . . 321
knulli (Becker, 1961) (*Euplastius*) . . . 289
kondratieffi Al Dhafer, 2009 (*Limonius*) . . . 286

***Lacon* Laporte de Castelnau, 1838** . . . 206
lacunosus Fabricius, 1801 (*Elater*) . . . 266
lacustris LeConte, 1853 (*Cryptohypnus*) . . . 351
laesus (LeConte, 1853) (*Ampedus*) . . . 91
laevicollis Dejean, 1833 (*Cardiophorus*) . . . 180
laevigatus Fabricius, 1798 (*Elater*) . . . 267
laevigatus Herbst, 1806 (*Elater*) . . . 334
***Laneganus* Johnson, new genus** . . . 330
lanei (Becker, 1949) (*Tesolasomus*) . . . 346
lanei Quate, 1967 (*Melanotus*) . . . 135
***Lanelater* Arnett, 1952** . . . 246
lateralis (Eschscholtz, 1829) (*Dalopius*) . . . 390
laticollis Erichson, 1842 (*Cratonychus*) . . . 146
laurentii of authors, not Guerin-Meneville, 1838 (*Heteroderes*) . . . 244
lecontei (Candèze, 1881) (*Brownia*) . . . 326
lecontei (Leng, 1818) (*Ligmargus*) . . . 352
lengi Dury, 1911 (*Athous*) . . . 282
leonardi (LeConte, 1853) (*Melanotus*) . . . 136
lepidus (LeConte, 1853) (*Aeolus*) . . . 219
***Ligmargus* Stibick, 1976** . . . 352
limbalis (Herbst, 1806) (*Megapenthes*) . . . 46
limbatus Mannerheim, 1853 (*Cryptohypnus*) . . . 351
***Limonius* Eschscholtz, 1829** . . . 304
linearis (Fall, 1910) (*Vittathous*) . . . 319
linteus (Say, 1839) (*Ampedus*) . . . 91
Lissominae Laporte de Castelnau, 1835 . . . 194
livens (LeConte, 1853) (*Aeolus*) . . . 389
lividus (De Geer, 1774) (*Conoderus*) . . . 235
lixus Blatchley, 1910 (*Melanotus*) . . . 126
lobatus Say, 1823 (*Elater*) . . . 235
longicornis (Horn, 1870) (*Corymbites*) . . . 319
longicornis Blatchley, 1910 (*Melanotus*) . . . 123
longicornis Boheman, 1851 (*Corymbites*) . . . 319
longicornis Candèze, 1860 (*Melanotus*) . . . 123
longulus LeConte, 1853 (*Cratonychus*) . . . 138
longulus LeConte, 1878 (*Anchastus*) . . . 156
longus Dejean, 1833 (*Athous*) . . . 339
luctuosus (LeConte, 1853) (*Ampedus*) . . . 92
lugubris Palisot de Beauvois, 1821 (*Elater*) . . . 91

luminosus (Illiger, 1807) (*Ignelater*) . . . 391
luscus Fabricius, 1775 (*Elater*) . . . 254
luscus Fabricius, 1775 (*Elater*) . . . 255
luscus Olivier, 1790 (*Elater*) . . . 254
luscus Olivier, 1790 (*Elater*) . . . 257
luteolus LeConte, 1853 (*Elater*) . . . 101
lutescens Fall, 1910 (*Corymbites*) . . . 333

macer (Fall, 1910) (*Vittathous*) . . . 319
macer (LeConte, 1853) (*Melanotus*) . . . 137
maculicollis LeConte, 1863 (*Athous*) . . . 272
mancus (Say, 1823) (*Agriotes*) . . . 55
mandibularis (LeConte, 1863) (*Selonodon*) . . . 23
manipularis Candèze, 1859 (*Elater*) . . . 92
manisi (Lane, 1965) (*Vittathous*) . . . 319
marmoratus (Fabricius, 1801) (*Lacon*) . . . 211
medialis Galley, 1999 (*Selonodon*) . . . 24
***Megapenthes* Kiesenwetter, 1863** . . . 43
Megapenthini Gurjeva, 1973 . . . 43
***Melanactes* LeConte, 1853** . . . 265
melanophthalmus Melsheimer, 1844 (*Athous*) . . . 299
Melanotini Candèze, 1859 . . . 112
melanotoides Brown, 1933 (*Ampedus*) . . . 92
***Melanotus* Eschscholtz, 1829** . . . 112
mellifluus Costa, 1972 (*Pyrophorus*) . . . 252
mellillus (Say, 1834) (*Aeolus*) . . . 220
melsheimeri (Becker, 1961) (*Euplastius*) . . . 391
melsheimeri (Horn, 1891) (*Zorochros*) . . . 363
melsheimeri (Leng, 1918) (*Ampedus*)
mendicus Dejean, 1837 (*Athous*) . . . 272
meridianus (Knull, 1947) (*Gambrinus*) . . . 295
***Meristhus* Candèze, 1857** . . . 213
metallescens Melsheimer, 1846 (*Limonius*) . . . 296
metallicus Melsheimer, 1806 (*Elater*) . . . 329
***Metanomus* Buysson, 1887** . . . 332
mexicanus (Candèze, 1857) (*Lacon*) . . . 212
militaris (Harris, 1836) (*Ampedus*) . . . 94
mimeticus Horn, 1874 (*Glyphonyx*) . . . 77
mimicus (Becker, 1961) (*Euplastius*) . . . 290
minor (Schwarz, 1903) (*Aeolus*) . . . 389
miscellus Quate, 1967 (*Melanotus*) . . . 138
mississippiensis Galley, 1999 (*Selonodon*) . . . 25
mississippiensis Mathison, 2014 (*Dalopius*) . . . 62
mixtus (Herbst, 1806) (*Ampedus*) . . . 95
molestus (LeConte, 1853) (*Ampedus*) . . . 96
montanus Schaeffer, 1917 (*Oxygonus*) . . . 336
morio (Fabricius, 1798) (*Melanactes*) . . . 266
morosus Candèze, 1860 (*Melanotus*) . . . 138
morulus (LeConte, 1863) (*Tesolasomus*) . . . 346
moseri Schwarz, 1902 (*Physorhinus*) . . . 160
murinus (Linnaeus, 1758) (*Agrypnus*) . . . 389
myops (Fabricius, 1801) (*Alaus*) . . . 254

nanus Smith and Balsbaugh, 1984 (*Glyphonyx*) . . . 78
neacanthus Becker, 1974 (*Athous*) . . . 278
Negastriinae Nakane and Kishii, 1956 . . . 354
***Negastrius* Thomson, 1859** . . . 354
nemnonius (Herbst, 1806) (*Hemicrepidius*) . . . 303
***Neohypdonus* Stibick, 1971** . . . 357
***Neopristolophus* Buysson, 1894** . . . 333
nicholsi Notman, 1922 (*Heteroderes*) . . . 244
nigrans Dejean, 1833 (*Ludius*) . . . 334
nigrans Laporte de Castelnau, 1840 (*Ludius*) . . . 334
nigricans Germar, 1843 (*Ampedus*) . . . 389
nigricans Melsheimer, 1806 (*Ludius*) . . . 334
nigricollis (Bland, 1864) (*Stropenron*) . . . 343
nigricollis (Herbst, 1801) (*Ampedus*) . . . 96
nigrinus (Herbst, 1784) (*Ampedus*) . . . 389
nigrosignatus Candèze, 1859 (*Oophorus*) . . . 220
nigrostriatus Dejean, 1833 (*Oophorus*) . . . 220
nimbatus (Say, 1825) (*Tetralimonius*) . . . 317
***Nitidolimonius* Johnson, 2008** . . . 313
nitidulus (LeConte, 1853) (*Setasomus*) . . . 341
nitidus Melsheimer, 1846 (*Lissomus*) . . . 195
nunenmacheri (Van Dyke, 1932) (*Laneganus*) . . . 331

oberndorfferi Schwarz, 1903 (*Elathous*) . . . 286
obesus (Say, 1823) (*Oxygonus*) . . . 337
oblessus (Say, 1833) (*Ampedus*) . . . 97
obliquatulus (Melsheimer, 1845) (*Paradonus*) . . . 361
obliquus Say, 1839 (*Elater*) . . . 86
oblitus Candèze, 1859 (*Ischiodontus*) . . . 171
oblongicollis (Melsheimer, 1845) (*Agriotes*) . . . 56
oblongicollis Melsheimer, 1844 (*Athous*) . . . 274
obscuratus Blatchley, 1927 (*Melanotus*) . . . 140
obscurus Galley, 1999 (*Selonodon*) . . . 26
obtecta (Say, 1839) (*Danosoma*) . . . 205
obversa (Horn, 1871) (*Brownia*) . . . 326
ochraceipennis Melsheimer, 1846 (*Ctenonychus*) . . . 146
ochraceus Melsheimer, 1806 (*Elater*) . . . 328
oculatus (Linnaeus, 1758) (*Alaus*) . . . 255
***Oedostethus* LeConte, 1853** . . . 358
***Oestodes* LeConte, 1853** . . . 201
Oestodinae Hyslop, 1917 . . . 199
ohioensis Knull, 1947 (*Dalopius*) . . . 63
oklahomensis Hatch, 1928 (*Alaus*) . . . 255
olivereae Stibick, 1990 (*Paradonus*) . . . 361
Oophorini Gistel, 1856 . . . 217
opacicollis LeConte, 1866 (*Melanotus*) . . . 140
orestes Galley, 1999 (*Selonodon*) . . . 26
ornatipennis (LeConte, 1863) (*Athous*) . . . 278
***Orthostethus* Lacordaire, 1857** . . . 37
orvus Becker, 1974 (*Athous*) . . . 279
***Oxygonus* LeConte, 1863** . . . 335
Oxynopterinae Candèze, 1857 . . . 263

paganus Candèze, 1860 (*Melanotus*) . . . 120
palans (LeConte, 1853) (*Ampedus*) . . . 98
pallidipes (Brown, 1936) (*Stropenron*) . . . 343
palmatus Candèze, 1859 (*Dicrepidius*) . . . 164
panamapolis Douglas, 2003 (*Cardiophorus*) . . . 183
papillatus Galley, 1999 (*Selonodon*) . . . 27
***Paracardiophorus* Schwarz, 1895** . . . 192
***Paractenicera* Johnson, 2008** . . . 337
***Paradonus* Stibick, 1971** . . . 359
paradoxus Melsheimer, 1846 (*Melanotus*) . . . 118
***Parallelostethus* Schwarz, 1906** . . . 39
parallelus Blatchley, 1920 (*Melanotus*) . . . 141
parallelus Candèze, 1859 (*Ischiodontus*) . . . 169
parallelus Say, 1825 (*Elater*) . . . 331
parallelus Schwarz, 1906 (*Ischiodontus*) . . . 169
parumpunctatus LeConte, 1853 (*Ctenonychus*) . . . 126
patricius (Candèze, 1857) (*Alaus*) . . . 257
patricius Van Dyke, 1932 (*Ludius*) . . . 319
pectinicornis Eschscholtz, 1829 (*Dicrepidius*) . . . 165
pectoralis (Say, 1839) (*Paradonus*) . . . 361
pedalis (Germar, 1843) (*Ampedus*) . . . 98
peninsularis Candèze, 1889 (*Melanotus*) . . . 119
peninsularis Candèze, 1889 (*Monocrepidius*) . . . 242
pennata Fabricius, 1801 (*Elater*) . . . 209
pennsylvanicus Brown, 1934 (*Dalopius*) . . . 64
perplexus (Horn, 1891) (*Neohypdonus*) . . . 358

perplexus Blatchley, 1920 (*Melanotus*) . . . 119
perplexus Galley, 1999 (*Selonodon*) . . . 28
pertinax (Say, 1839) (*Melanotus*) . . . 142
perversus Brown, 1933 (*Conoderus*) . . . 223
***Pherhimius* Fleutiaux, 1942** . . . 259
physoderus (Germar, 1841) (*Deilelater*) . . . 249
Physorhinini Candèze, 1859 . . . 152
***Physorhinus* Germar, 1840** . . . 159
piceatus Blatchley, 1927 (*Melanotus*) . . . 143
picescens LeConte, 1853 (*Cryptohypnus*) . . . 351
piceus (De Geer, 1775) (*Melanactes*) . . . 267
pictus (Candèze, 1859) (*Conoderus*) . . . 237
pilosus LeConte, 1853 (*Limonius*) . . . 311
Pityobiinae Hyslop, 1917 . . . 261
***Pityobius* LeConte, 1853** . . . 261
plagiatus (Boheman, 1858) (*Drapetes*) . . . 196
plagiatus Fall, 1934 (*Conoderus*) . . . 387
plagiatus Fall, 1934 (*Conoderus*) . . . 390
planatus Eschscholtz, 1829 (*Hypolithus*) . . . 352
planatus LeConte, 1853 (*Asaphes*) . . . 299
planatus LeConte, 1863 (*Cryptohypnus*) . . . 352
plebejus (Say, 1825) (*Gambrinus*) . . . 296
Pomachiliini Candèze, 1859 . . . 67
porosus (Van Dyke, 1932) (*Dalopius*) . . . 65
posticus (Melsheimer, 1844) (*Athous*) . . . 280
praeditus Horn, 1884 (*Esthesopus*) . . . 185
praejectus Candèze, 1863 (*Orthostethus*) . . . 37
praeses (Horn, 1871) (*Brownia*) . . . 326
praesutus Bonvouloir, 1859 (*Drapetes*) . . . 196
prasianus Erichson, 1841 (*Chalcolepidius*) . . . 258
prasinus Blatchley, 1910 (*Melanotus*) . . . 144
primarius Candèze, 1874 (*Alaus*) . . . 257
procericollis Melsheimer, 1844 (*Athous*) . . . 275
procerus LeConte, 1853 (*Melanactes*) . . . 267
productus (Randall, 1838) (*Athous*) . . . 281
***Proludius* Lane, 1971** . . . 339
propexus Candèze, 1860 (*Limonius*) . . . 293
propola (LeConte, 1853) (*Stropenron*) . . . 343
Prosternini Gistel, 1856 . . . 320
protervus (LeConte, 1853) (*Ampedus*) . . . 99
protractus (LeConte, 1859) (*Proludius*) . . . 339
Pseudomelanactini Arnett, 1967 . . . 246
pseudothoracicus Lin and Johnson (*Aeolus*) . . . 222
pubicollis LeConte, 1853 (*Limonius*) . . . 307
pudica (Brown, 1936) (*Stropenron*) . . . 343
puellus Dejean, 1837 (*Monocrepidius*) . . . 227
pumilus Dejean, 1833 (*Cryptohypnus*) . . . 351
pumilus Erichson, 1842 (*Elater*) . . . 77
puncticollis (LeConte, 1852) (*Melanactes*) . . . 268
pusio Germar, 1844 (*Ampedus*) . . . 101
pusio Horn, 1884 (*Esthesopus*) . . . 186
Pyrophorini Candèze, 1863 . . . 247
***Pyrophorus* Billberg, 1820** . . . 252
pyrrhicus Haldemann, 1843 (*Athous*) . . . 339
pyrros (Herbst, 1806) (*Proludius*) . . . 339

quadraticollis (Champion, 1896) (*Glyphonyx*) . . . 391
quadricollis (Say, 1839) (*Bladus*) . . . 199
quadripustulatus Bonvouloir, 1859 (*Drapetes*) . . . 197
quadrosa Becker, 1952 (*Denticollis*) . . . 273
quercinus (Say, 1825) (*Limonius*) . . . 311
quietus (Say, 1839) (*Glyphonyx*) . . . 78

racinei Chevrolat, 1852 (*Diacanthus*) . . . 315
ramicornis (Palisot de Beauvois, 1805) (*Dicrepidius*) . . . 165
ramicornis LeConte, 1853 (*Dicrepidius*) . . . 164
rectangularis (Say, 1825) (*Agrypnus*) . . . 204
recticollis (Say, 1823) (*Glyphonyx*) . . . 80
reflexus LeConte, 1853 (*Athous*) . . . 282
reichei (Germar, 1843) (*Melanactes*) . . . 268
resplendens (Eschscholtz, 1829) (*Nitidolimonius*) . . . 315
rhopalacanthus Smith and Balsbaugh, 1984 (*Glyphonyx*) . . . 81
***Rismethus* Fleutiaux, 1947** . . . 214
rogersi Horn, 1871 (*Megapenthes*) . . . 48
rubricollis (Herbst, 1806) (*Ampedus*) . . . 102
rubricollis LeConte, 1866 (*Drapetes*) . . . 198
rubricus (Say, 1825) (*Ampedus*) . . . 103
rudis (Brown, 1933) (*Gambrinus*) . . . 296
rudis Brown, 1933 (*Conoderus*) . . . 237
ruficornis Kirby, 1837 (*Pedetes*) . . . 303
rufidens (Fabricius, 1801) (*Conoderus*) . . . 239
rufifrons (Randall, 1838) (*Athous*) . . . 282
rufilabris (Germar, 1843) (*Megapenthes*) . . . 48
rufipes Palisot de Beauvois, 1805 (*Elater*) . . . 98
rufiventris Candèze, 1859 (*Anchastus*) . . . 157
rufopleuralis (Fall, 1933) (*Setasomus*) . . . 341
rufus Candèze, 1859 (*Anchastus*) . . . 158
rupestris (Germar, 1843) (*Brownia*) . . . 326

sagittarius (LeConte, 1853) (*Melanotus*) . . . 144
sagitticollis (Eschscholtz, 1829) (*Actenicerомorphus*) . . . 321
sallei (LeConte, 1853) (*Lanelater*) . . . 246
sanguinipennis (Say, 1823) (*Ampedus*) . . . 104
santarosae Galley, 1999 (*Selonodon*) . . . 29
saturninus LeConte, 1853 (*Cardiophorus*) . . . 179
sayi (LeConte, 1853) (*Ampedus*) . . . 105
scapularis (Say, 1839) (*Athous*) . . . 283
scarificatus Mannerheim, 1853 (*Cryptohypnus*) . . . 351
schwarzi (Becker, 1961) (*Dipropus*) . . . 169
scissus (Schaeffer, 1909) (*Conoderus*) . . . 240
scitulus Germar, 1844 (*Elater*) . . . 86
scobinula (Candèze, 1857) (*Rismethus*) . . . 215
scrobicollis LeConte, 1853 (*Cratonychus*) . . . 18
scutellaris Dejean, 1837 (*Monocrepidius*) . . . 227
scutellatus (Schaeffer, 1917) (*Aeolus*) . . . 223
secretus LeConte, 1853 (*Cratonychus*) . . . 131
sellatus (Leng, 1918) (*Ampedus*) . . . 97
***Selonodon* Latreille, 1834** . . . 17
semianeus LeConte, 1853 (*Limonius*) . . . 309
semicinctus (Randall, 1838) (*Ampedus*) . . . 105
semivittatus (Say, 1823) (*Tesolasomus*) . . . 346
senilis Germar, 1840 (*Adelocera*) . . . 210
sericeus Candèze, 1859 (*Physorhinus*) . . . 160
***Sericus* Eschscholtz, 1829** . . . 40
serotinus Germar, 1839 (*Monocrepidius*) . . . 242
***Setasomus* Gurjeva, 1985** . . . 341
sexguttatus (Brown, 1936) (*Tesolasomus*) . . . 346
sexualis (Brown, 1935) (*Tesolasomus*) . . . 346
sierrae (Van Dyke, 1943) (*Actenicerомorphus*) . . . 321
signaticollis (Germar, 1843) (*Anchastus*) . . . 158
signaticollis (Melsheimer, 1846) (*Brownia*) . . . 326
silaceipes Germar, 1844 (*Cryptohypnus*) . . . 350
silaceus (Say, 1825) (*Dolerosomus*) . . . 34
silvaticus (Van Dyke, 1932) (*Proludius*) . . . 339
similis (Kirby, 1837) (*Melanotus*) . . . 145
similis Galley, 1999 (*Selonodon*) . . . 29
simplex (LeConte, 1853) (*Dipropus*) . . . 170
simplex (LeConte, 1853) (*Selonodon*) . . . 30
simulans Blatchley, 1927 (*Melanotus*) . . . 138
socer LeConte, 1853 (*Elater*) . . . 102
soleatus (Say, 1839) (*Dipropus*) . . . 171
sordidus (LeConte, 1853) (*Heteroderes*) . . . 391

sordidus Illiger, 1807 (*Elater*) 53
sordidus LeConte, 1853 (*Dolopius*) 53
sordidus Melsheimer, 1845 (*Pristilophus*) 37
sp. 1 (*Ampedus*) 108
sp. 2 (*Ampedus*) 109
sp. 3 (*Ampedus*) 110
sp. 4 (*Ampedus*) 110
spadix (Erichson, 1842) (*Melanotus*) 147
sphenoidalis Melsheimer, 1846 (*Ctenonychus*) 146
spinosus (LeConte, 1853) (*Actenicerомorphus*) 321
splendidus Knull, 1965 (*Anchastus*) 159
squamiger (Champion, 1896) (*Rismethus*) 216
stibicki Etzler, 2020 (*Paradonus*) 362
stigma (Herbst, 1806) (*Gambrinus*) 297
stigmosus (LeConte, 1853) (*Megapenthes*) 49
striatulus Melsheimer, 1845 (*Agriotes*) 55
stricklandi (Brown, 1935) (*Actenicerомorphus*) 321
strigatus Melsheimer, 1844 (*Athous*) 275
***Stropenron* Johnson, new genus** 342
sturmii Germar, 1844 (*Elater*) 46
subauratus LeConte, 1853 (*Limonius*) 312
subcostatus (Candèze, 1891) (*Lacon*) 213
sulcicollis (Say, 1839) (*Laneganus*) 331
suturalis (LeConte, 1853) (*Conoderus*) 241
suturalis LeConte, 1853 (*Elater*) 328
***Sylvanelater* Johnson, 2008** 344
Synaptini Gistel, 1856 70

tahoensis (Van Dyke, 1932) (*Actenicerомorphus*) 321
tarsalis (Melsheimer, 1846) (*Corymbitodes*) 328
tarsalis Schaeffer, 1916 (*Megapenthes*) 50
tenax (Say, 1839) (*Melanotus*) 148
tenellus (Van Dyke, 1932) (*Proludius*) 339
tenellus Erichson, 1842 (*Cratonychus*) 134
tener LeConte, 1853 (*Asaphes*) 299
tenuicollis (Randall, 1838) (*Oestodes*) 201
tequesta Johnson, 2018 (*Dipropus*) 173
***Tesolasomus* Johnson, new genus** 346
testaceus (Melsheimer, 1845) (*Glyphonyx*) 82
testaceus (Melsheimer, 1846) (*Melanotus*) 149
***Tetralimonius* Etzler, 2019** 316
texanus (LeConte, 1853) (*Diplostethus*) 390
texanus Candèze, 1860 (*Melanotus*) 118
texanus Horn, 1871 (*Meristhus*) 215
texanus Hyslop, 1917 (*Pyrophorus*) 249
thomasi Germar, 1843 (*Hemicrepidius*) 303
thoracicus Candèze, 1859 (*Drasterius*) 222
thoracicus Schaeffer, 1917 (*Drasterius*) 222
trapezoideus (LeConte, 1853) (*Melanotus*) 150
trivittatus (LeConte, 1853) (*Tesolasomus*) 346
truculentus (Candèze, 1889) (*Actenicerомorphus*) 321

uhleri Horn, 1871 (*Horistonotus*) 191
umbricatus LeConte, 1853 (*Atractopterus*) 34
umbricolus (Eschscholtz, 1929) (*Actenicerомorphus*) 321
ustulatus Costa, 1983 (*Deilelater*) 250

vagans Melsheimer, 1846 (*Athous*) 339
vagus Brown, 1934 (*Dalopius*) 65
vagus Candèze, 1888 (*Monocrepidius*) 233
vagus Candèze, 1893 (*Monocrepidius*) 233
variegatus Steinheil, 1875 (*Monocrepidius*) 228
varius (Brown, 1935) (*Actenicerомorphus*) 321
venosus Laporte de Castelnau, 1838 (*Hemirhipis*) 259
verberans (LeConte, 1853) (*Melanotus*) 152
vernalis (Hentz, 1827) (*Anostirus*) 324
vernalis Fall, 1910 (*Limonius*) 311
verticinus Palisot de Beauvois, 1819 (*Elater*) 102
vespertinus (Fabricius, 1801) (*Conoderus*) 242
vestitus Mannerheim, 1853 (*Cryptohypnus*) 351
vetulus Erichson, 1842 (*Cratonychus*) 121
virginicus Brown, 1934 (*Dalopius*) 66
viridanus (Say, 1825) (*Sericus*) 42
viridipilis (Say, 1825) (*Chalcolepidius*) 258
viridis Germar, 1843 (*Corymbites*) 315
vitiosus (LeConte, 1853) (*Ampedus*) 106
***Vittathous* Johnson, new genus** 318
volitans (Eschscholtz, 1829) (*Actenicerомorphus*) 321
vulneratus (LeConte, 1863) (*Actenicerомorphus*) 321

xanthomus (Germar, 1843) (*Ampedus*) 107

yuccae Wickham, 1903 (*Physorhinus*) 160

***Zorochros* Thomson, 1859** 363

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