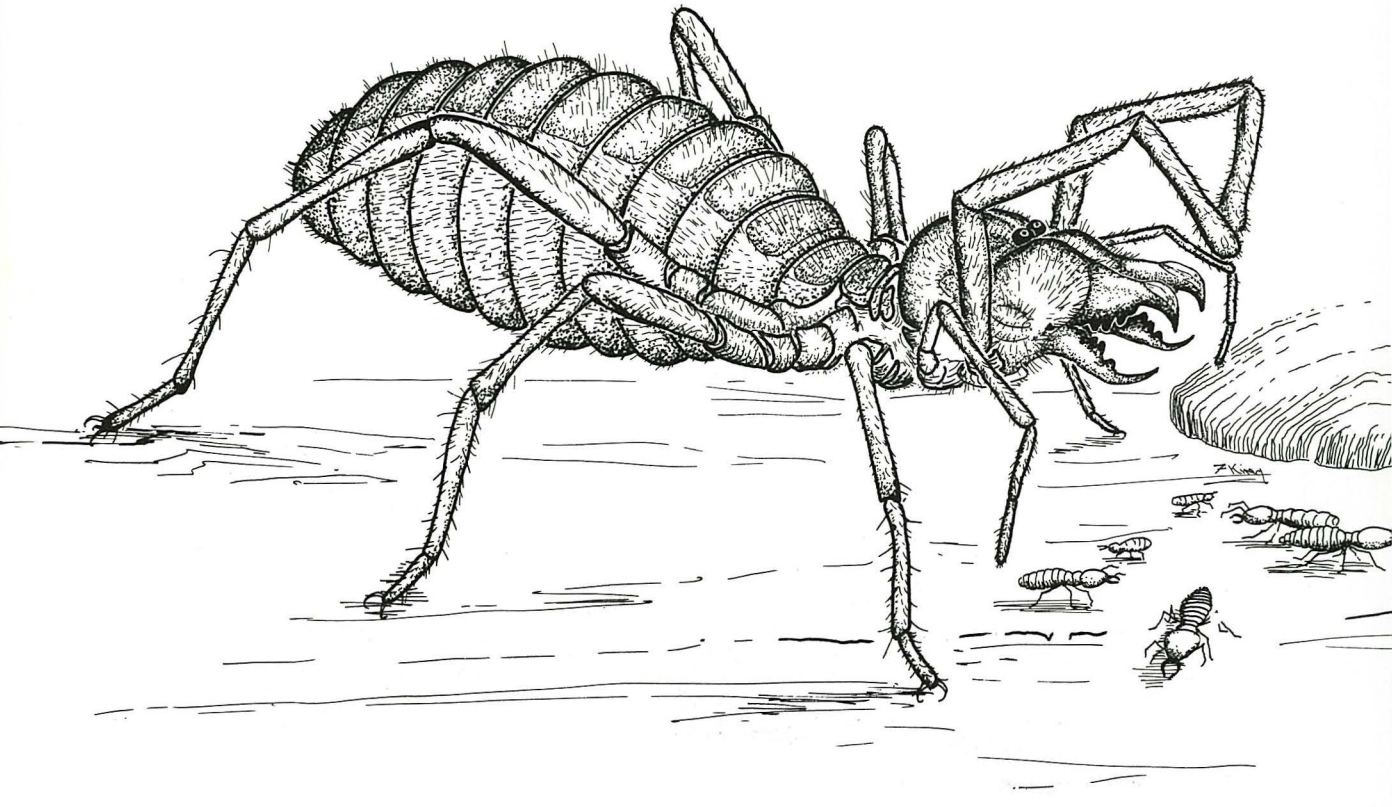
ARTHROPODS OF FLORIDA
AND NEIGHBORING LAND AREAS
VOLUME 5



A SYNOPTIC REVIEW OF NORTH AMERICAN, CENTRAL AMERICAN, AND WEST INDIAN SOLPUGIDA (ARTHROPODA: ARACHNIDA)

MARTIN H. MUMA

FLORIDA DEPARTMENT OF AGRICULTURE AND CONSUMER SERVICES
DOYLE CONNER, COMMISSIONER

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DIVISION OF PLANT INDUSTRY
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FOREWORD

Solpugids or wind scorpions are large ferocious and voracious predatory arachnids that range in size from about one-half inch to over four inches in length. The largest North American species is slightly less than three inches long. Despite their imposing appearance, these curious arachnids are harmless to man. They possess no poison glands, and most species, although they bite viciously, are incapable of breaking the skin and drawing blood. A few large forms in the southwestern United States and Mexico are reported to inflict open wounds and bleeding but with no secondary effects.

Species found in the western hemisphere are predominately nocturnal, with only a few small forms reportedly active during the daylight hours. They are burrowing animals that spend the daylight hours and winter months in specially constructed burrows or nests in the ground. A few species burrow into soft, pithy, or rotten wood. Most solpugids feed readily on termites but are capable of eating spiders, flies, cockroaches, crickets, grasshoppers, beetles, moths, and even earthworms. Certain large species capture and eat large hard-bodied beetles and hawk moths. The life cycle, from egg to adult, of North American solpugids is about one year, involving nine immature stages.

This *Synoptic Review of North American, Central American, and West Indian Solpugida* is the fifth in the series of publications known as the ARTHROPODS OF FLORIDA AND NEIGHBORING LAND AREAS. The areas include the southeastern United States and the islands of and land areas encompassing the Gulf of Mexico and the Caribbean Sea. The present paper not only delineates and characterizes the solpugid species that are found in these relevant areas but also relates these species to the more northerly and westerly Nearctic forms of the order. Further, this *Synopsis* synthesizes the studies of C. L. Koch (1842), Simon (1879), Putnam (1883), Banks (1900), Kraepelin (1901), Roewer (1934), and Muma (1951) into a comprehensive presentation of presently known solpugids in the study area.

This survey is the first comprehensive work on the North and Central American and West Indian fauna of Solpugida. It was made possible by intensive study of types in European museums, supported by a National Science Foundation grant, with resultant synonymy and emendation of many names. It represents the basic work after which monographic studies of the Mexican and Central American faunas can be attempted. Through the years, Dr. Muma has become the world authority on our distinctive fauna and the American Museum the principal depository of the material. In 1951, the American Museum published Muma's revisional study of the Solpugida of the United States, an important paper giving us for the first time a clear picture of our relatively large fauna. This basic work resulted from sound studies on the morphology and laid the foundation for all succeeding work on the group.

The author, Martin H. Muma, was born in Topeka, Kansas, July 24, 1916. His professional training was obtained at Western Maryland College Extension Night School (1933-34), Frostburg State Teachers College (1935-36), and the University of Maryland (1936-43). He received his B.S. degree in 1939, his M.S. in 1940, and his Ph.D. in 1943. From 1940 to 1945 he served as an Instructor in Entomology and Assistant Entomologist at the University of Maryland; from 1945 to 1951 he was Extension Entomologist and then Associate Entomologist, Associate Professor, and Associate Curator of the museum at the University of Nebraska.

Since 1951 he has been an Associate Entomologist, Associate Professor, Entomologist, and Professor at the University of Florida Citrus Experiment Station located near Lake Alfred, Florida. His present projects involve research on the taxonomy, biology, and natural control of citrus mites, the natural and ecological control of injurious citrus

insects and the biological control potential for the Caribbean Fruit Fly.

Although Dr. Muma's formal education and official professional experience have been in the field of entomology, his favorite avocational fields are arachnology and speleology. In entomology he has investigated and contributed to the taxonomy, biology, ecology, and control of deciduous fruit insects, field crop insects, livestock parasites, and citrus insects. In arachnology he has studied and contributed to the taxonomy, biology, and ecology of mites, spiders, tarantulas, scorpions, whip-scorpions, and solpugids. In speleology he has examined and contributed to cave biology, cave ecology, and cave terminology. He is the author of a book, "Common Spiders of Maryland," and the author or coauthor of 143 scientific bulletins or papers, 47 in entomology, 63 in arachnology, 21 in extension entomology, and 12 in speleology.

HOWARD V. WEEMS, JR.
Editor

Bureau of Entomology
Division of Plant Industry
Florida Department of Agriculture
and Consumer Services
April 29, 1969

TABLE OF CONTENTS

Introduction 1
Key to Families of North American, Central American and West Indian Solpugida 3
Family Eremobatidae 3
Key to Subfamilies and Genera of Eremobatidae 3
Subfamily Eremobatinae 4
Genus *Eremorhax* 4
Genus *Eremobates* 10
Genus *Eremothera* 29
Genus *Horribates* 29
Subfamily Therobatinae 30
Genus *Eremochelis* 30
Genus *Chambria* 36
Genus *Hemerotrecha* 37
Family Ammotrechidae 44
Key to North American Subfamilies and Genera of Ammotrechidae 44
Subfamily Ammotrechinae 44
Genus *Ammotrechella* 45
Genus *Ammotrechona* 48
Genus *Ammotrecha* 49
Genus *Ammotrechinus* 50
Genus *Ammotrechesta* 52
Genus *Ammotrechula* 52
Subfamily Saronominae 55
Genus *Innesa* 55
Genus *Branchia* 56
Literature Cited 58
Index to Scientific Names 60

TABLES

Table 1. Type depositories and curators of North American solpugids 2
Table 2. Species, the types of which were not seen during this study 2
Table 3. Some male diagnostic characters of *Eremorhax magnus* species-group 5
Table 4. Some male diagnostic characters of *Eremorhax striatus* species-group 7
Table 5. Some male diagnostic characters of the *Eremobates scaber* species-group 11
Table 6. Some male diagnostic characters in the *Eremobates palpisetulous* Species-group 15
Table 7. Some male diagnostic characters for *Eremobates pallipes* species-group 24
Table 8. Some male diagnostic characters for the *Eremochelis branchi* species-group 31
Table 9. Some male diagnostic characters of the *Eremochelis arcus* species-group 34
Table 10. Some male diagnostic characters of the *Hemerotrecha banksi* species-group 38
Table 11. Some male diagnostic characters of the *Hemerotrecha texana* species-group 40
Table 12. Some male diagnostic characters for the *Hemerotrecha branchi* species-group 42
Table 13. Some diagnostic characters of species of *Ammotrechinae* 45

A SYNOPTIC REVIEW OF NORTH AMERICAN, CENTRAL AMERICAN, AND WEST INDIAN SOLPUGIDA (ARTHROPODA: ARACHNIDA)[1, 2, 3]

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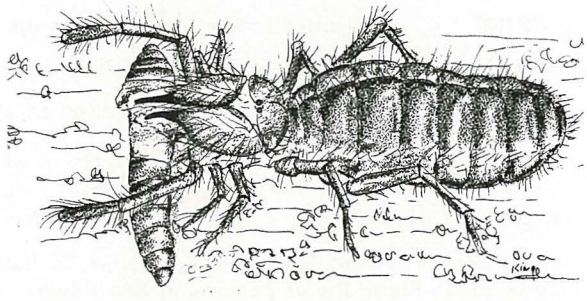
Solpugids of North America, Central America, and the West Indies were diagnosed in the world-wide reviews of C. L. Koch (1842), Simon (1879), Kraepelin (1899 and 1901), and Roewer (1934). A more detailed account of North American species was presented by Putnam (1883), and a key to North American forms was included in Banks (1900). More recently, Muma (1951, 1962, and 1963) has reviewed the species occurring within the United States. Unfortunately, none of the above authors had access to the types of species described by authors from other continents. As a result, taxonomic evaluations of species identity were, in a number of instances, based on published, often inadequate, descriptions and illustrations. Such evaluations frequently add synonyms to the literature or at best doubt as to the identity of many forms. The identity of pertinent species was further clouded by Muma's (1951 and 1962) reevaluation of the diagnostic characters utilized in distinguishing subfamilies, genera, and species in the Eremobatidae and Ammotrechidae, the only families of solpugids known to occur in the Western Hemisphere.

The purpose of the present paper is to evaluate and clarify the taxonomic status of described species on the basis of an examination of the relevant available type material: holotypes, syntypes, lectotypes, or paratypes.

This is possible because the author is already familiar with most of the types deposited in North American institutions and was able, with the assistance of a National



Eremorhax magnus ♀ feeding on earthworm

Science Foundation grant[1], to study types in European institutions and, through the courtesies of curators, to examine types or type compared specimens from other institutions. The assistance of all curators and other authorities in the type depositories that cooperated with this study is hereby gratefully acknowledged (See Table 1).

Despite all efforts and assistance, however, the identity of 14 species is still uncertain (Table 2).

Since 156 species of solpugids have been described from North America, Central America, and the adjacent islands, and 140 species are recorded here, only primary diag-

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[2] Florida Agricultural Experiment Stations Journal Series No. 3188.

[3] Contribution No. 154, Bureau of Entomology, Division of Plant Industry, Florida Department of Agriculture and Consumer Services, Gainesville.

[4] Research Associate, Florida State Collection of Arthropods, Division of Plant Industry, Florida Department of Agriculture and Consumer Services.

Table. 1. Type depositories and curators of North American solpugids. Code letters only are used in text.

Code Letters	*Institutions and curators*
AMNH	American Museum of National History, New York, New York, USA, Dr. W. J. Gertsch (retired).
ANS	Academy of Natural Sciences, Philadelphia, Pennsylvania, USA, H. J. Grant (deceased).
BMNH	British Museum (Natural History), London, England, Mr. D. J. Clark.
BNHM	Boston Society of Natural History Museum, Boston, Massachusetts, USA.
CUM	Cornell University Museum, Ithaca, New York, USA.
DZUU	Department of Zoology, University of Utah, Salt Lake City, Utah, USA, Wilton Ivie (deceased).
IZUF	Instituto de Zoologia dell'Universita, Firenze, Italy, Dr. Laura Delle Cave.
MCZ	Museum of Comparative Zoology, Harvard University, Cambridge, Massachusetts, USA, Dr. H. W. Levi.
MNHN	Museum National d'Histoire Naturelle, Paris, France, Prof. M. Vachon.
NMWA	Naturhistorisches Museum, Wien, Austria, Dr. E. Kritscher.
SMF	Natur-Museum und Forschungs-Institut Senchenberg, Frankfurt am Main, West Germany, Dr. O. Kraus (presently director ZSM).
UCBC	University of California, Berkeley, California, USA, Dr. P. D. Hurd (not presently curator).
USNM	United States National Museum, Washington, D. C., USA, Dr. R. Crabill.
ZMHU	Zoologisches Museum der Humboldt Universität, East Berlin, East Germany.
ZSM	Zoologisches Staatsinstitut ad Museum, Hamburg, West Germany, Dr. Gisela Rack.

Table 2. Species, the types of which were not seen during this study.

Ammotrecha picta Pocock, ♂ and ♀ types from Guatemala. Location of types not known.

Ammotrechella bolivari Mello-Leitão, ♀ from La Esperanza, Chiapas, Mexico, by Candido Bolivar. Type may be in La Plata, Rio de Janeiro, or São Paulo.

Ammotrechesta schlueteri Roewer, type from Honduras, supposed to be but not in ZSM.

Ammotrechula boneti Mello-Leitão, ♂ from Mazatlán, Sinaloa, Mexico, by D. Pelaez. Type may be in La Plata, Rio de Janeiro, or São Paulo.

Eremobates audax Hirst, ♂ type from Mexico. Location of type not known.

Eremobates durangonus Roewer, ♀'s from Dinamita, Durango, Mexico. Supposed to be but not in MNHN.

Eremoperna hystrix Mello-Leitão, ♂ from Mexico, D. F., by F. Bonet. Type may be in La Plata, Rio de Janeiro, or São Paulo.

Eremoperna ingens Mello-Leitão, ♀ from Villa Obregón, Mexico, D. F., by Candido Bolivar y Pieltain. Type may be in La Plata, Rio de Janeiro, or São Paulo.

Galeodes limbatus Lucas, lectotype from Guatemala, supposed to be but not in ZSM.

Gluvia elongatas C. L. Koch, ♂ from Mexico. Location of type not known.

Gluvia geniculata C. L. Koch, lectotype from Bahamas, supposed to be but not in ZSM.

Gluvia praecox C. L. Koch, ♂ type from Mexico. Location of type not known.

Gluvia tolteca Pocock, ♂ from Mexico. Supposed to be but not in BMNH.

Solpuga gryllipes Gervais, lectotype from Jamaica, supposed to be but not in ZSM.

nostic characters are included in the following keys, diagnoses, illustrations, and tables. Further, only important name changes are included in the synonymies, and only systematically pertinent statements are made in the discussions. Brief redescriptions of species are based only on the types and follow the format established by Muma (1951).

KEY TO FAMILIES OF NORTH AMERICAN, CENTRAL AMERICAN AND WEST INDIAN SOLPUGIDA

1. Propeltidium truncate with anterior margin straight. Tarsus of leg I with 1 or 2 claws. Tarsi of legs II and III with dorsal terminal spinelike seta. Male chelicerae with a complex of modified and non-modified setae forming a flagellum-complex on or at the base of the fixed finger. Female genital opercula exhibit apparent, specific differences ..... Eremobatidae Roewer (p. 3)

   Propeltidium not truncate but with anterior margin connate or recurved. Tarsus of leg I without claw. Tarsi of legs II and III without dorsal terminal spinelike seta. Male chelicerae with an immovable, translucent, elliptical, membranous flagellum attached to the mesal surface of the fixed finger. Female genital opercula generalized and not exhibiting apparent specific differences, except perhaps in proportion .... Ammotrechidae Roewer (p. 44)

Family Eremobatidae Roewer, 1934

This family is known only from North America but may extend into the drier regions of Central America. Recorded here are 111 species.

Roewer's (1934) eremobatid generic separations, based on patterns and counts of ventral, spinelike tarsal setae, were found to be invalid by Muma (1951). Therefore, generic separations here are based primarily on secondary sexual characteristics found on the male chelicerae which are in most instances supported by female opercular patterns.

In several instances, generic status of certain species is still in question. *Horribates* Muma was described and is still known only from females. Several long legged species of the *Eremorhax striatus* species-group resemble and behave like species of *Eremobates* Banks as shown by Muma (1966). Furthermore, several species of the resurrected genus *Eremochelis* Roewer are known only from females which have *Hemerotrecha*-like dentition and opercula.

KEY TO SUBFAMILIES AND GENERA OF EREMOBATIDAE

(MALES AND FEMALES)

1. Leg I with 1 claw; large, robust, short legged species .... Eremobatinae Roewer-2

   Leg I with 2 claws; small, slender, long legged species ....Therobatinae Muma-5

2. Palpus with 2 ventral rows of long, robust, spinelike, erectile and deflectile setae on femur, tibia, metatarsus, and tarsus .....*Horribates* Muma

   Palpus with or without spinelike setae; when present, apparently not movable and not on metatarsus and tarsus 3

(MALES ONLY)

3. Fixed finger short and dorsally lobate or sculptured .....*Eremothera* Muma

   Fixed finger elongate and needlelike or stylelike 4

4. Mesoventral groove of fixed finger extending to base of finger; apical seta of flagellum-complex flattened and plumose ..... *Eremobates* Banks

   Mesoventral groove of fixed finger not extending to base of finger; apical seta of flagellum-complex tubular, at most striate ..... *Eremorhax* Roewer

5. Dorsal setae of flagellum-complex simple and tubular ..... *Eremochelis* Roewer
Dorsal setae of flagellum-complex striate, plumose, spatulate, or otherwise modified 6

6. Fixed finger distinctly sinuate, bent upward and bent or curved downward; dorsal setae plumose ..... *Chanbria* Muma
Fixed finger straight, weakly curved, undulate or bent downward at tip; dorsal setae striate, spatulate or hooked ..... *Hemerotrecha* Banks

SUBFAMILY EREMOBATINAE ROEWER, 1934

Eremobatinae Roewer, 1934, p. 553.
Eremorhaxinae Roewer, 1934, p. 553.
Eremobatinae Roewer, Muma, 1951, p. 41 (combination of Roewer's subfamilies).

Genus *Eremorhax* Roewer, 1934

Eremorhax Roewer, 1934, p. 553.
Eremopus Roewer, 1934, p. 561 (in part).
Eremocosta Roewer, 1934, p. 561 (in part).
Eremorhax Roewer, Muma, 1951, p. 41.

KEY TO SPECIES-GROUPS

(MALES)

1. Abdominal ctenidia present; movable finger with normal principal, intermediate, and anterior teeth ..... *montezuma* group
Abdominal ctenidia absent; movable finger with abnormally fewer or more teeth and processes 2

2. Fixed finger weakly creased or hollowed mesoventrally; movable finger lacking anterior tooth ..... *magnus* group
Fixed finger distinctly grooved or hollowed mesoventrally; movable finger with extra process in front of anterior tooth ..... *striatus* group

MAGNUS GROUP

(See Table 3.)

Eremorhax formidabilis (Simon)

Figures 1 and 2.

Datames formidabilis Simon, 1878, p. 136.
Eremobates formidabilis (Simon), Kraepelin, 1901, p. 127.
Eremoperna formidabilis (Simon), Roewer, 1934, p. 558.

DIAGNOSIS: The 3 denticules on the anterior margin of the large principal tooth of the movable cheliceral finger, the ventrally dusky femur and tibia, and the entirely dark metatarsus and tarsus of the palpus distinguish this species.

MALE TYPE: Total length 32.0 mm (abdomen damaged).

	Length	*Width*
Chelicerae	9.0 mm	4.0 mm
Propeltidium	5.0 mm	7.0 mm

Legs not measured

Color in alcohol yellow. Eye tubercle dark. Propeltidium faintly dusky purple on

Table 3. Some male diagnostic characters of *Eremorhax magnus* species-group.

Species	Size	Dentition	Coloration of palpus
E. puebloensis Brookhart	Small 25.0 mm	No denticules anterior to principal tooth on movable finger	Dark tarsus and metatarsus and ventrally dusky on tibia
E. pulcher Muma	Small to large 20.0 to 31.0 mm	2 denticules and ridge anterior to principal tooth on movable finger	Dark tarsus, metatarsus, tibia, and apical half of femur
E. magnus (Hancock)	small to large 27.0 to 38.0 mm	2 denticules anterior to principal tooth on movable finger	Dark tarsus and metatarsus and ventrally dusky on tibia
E. latus Muma	Small 27 mm	Broad flattened fixed finger	Dark tarsus and metatarsus
E. formidabilis (Simon)	Large 32 mm	3 denticules on principal tooth of movable finger	Dark tarsus and metatarsus and ventrally dusky on femur and tibia

anterior third. Abdominal tergites faintly dusky. Palpi dark purple on tarsi and metatarsi and faintly to distinctly purple laterally and ventrally on tibiae and femora.

Dentition as shown in figure 1. Mesal groove of fixed finger an indistinct shallow longitudinal groove. Mesal tooth of movable finger strong and acute. Palpi with usual spinal, setal, and bristle clothing, but no scopula; palpal tibia with a series of strong spines basally on mesal face. First postspiracular abdominal sternite without ctenidia.

TYPE LOCALITY: Male type from Guanajuato, Mexico, No. 1805 (Roewer No. 9130), in MNHN. The female and young with the type are not conspecific. A female paratype from "Arkansas" in ZSM is conspecific; its chelicerae are shown in figure 2.

DISTRIBUTION: Mexico; USA: Arkansas.

DISCUSSION: Roewer (1934) questionably recorded this species from Arizona and California, USA. Muma (1951) did not record the species.

Eremorhax latus Muma

Eremorhax latus Muma, 1951, p. 44.

DIAGNOSIS: This species is distinguished by the dark propeltidium, the lack of dusky markings on the palpal tibia, and the broad, flattened, mesally hollowed tip of the fixed finger.

The species is adequately described by Muma (1951).

TYPE LOCALITY: Male holotype without locality data from Nathan Banks collection in MCZ.

DISTRIBUTION: Unknown.

DISCUSSION: Although Muma (1951) recorded the species from the USA, only the type is known.

Eremorhax magnus (Hancock)

Datames magna Hancock, 1888, p. 107.

Gluvia nigrimanus Pocock, 1895, p. 94 (new synonymy).

Eremobates magnus (Hancock), Kraepelin, 1901, p. 127.

Eremorhax magnus (Hancock), Roewer, 1934, p. 553.

Eremopus mexicanus Roewer, 1934, p. 563.

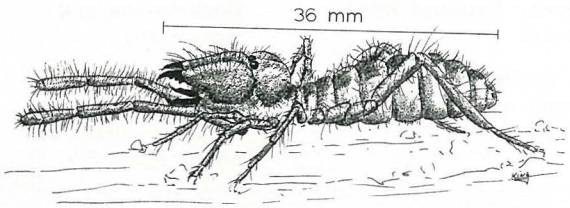
DIAGNOSIS: This species is distinguished from closely related species by the presence of 2 minute, abortive, intermediate teeth anterior to the principal tooth of the movable cheliceral finger, and the dark purple to black color on the tarsus, metatarsus, and apical ventral surface of tibia of palpus.

The species is adequately described by Hancock (1888) and Muma (1951).

TYPE LOCALITY: Male type of *Datames magna* Hancock from Laredo, Texas, USA, deposition unknown. Female type of *Eremopus mexicanus* Roewer from Mexico, SMF/RII/1353. Male type of *Gluvia nigrimanus* Pocock, labeled "probably Meshed, Afghanistan," No. 1952, in BMNH.

DISTRIBUTION: USA: Arizona, California, Nevada, New Mexico, Texas; Mexico.

DISCUSSION: This species is readily identified by the excellent description and illustrations of Hancock (1888). The Afghanistan record of Pocock must be considered spurious since Eremobatidae are not known to occur outside of North America. Pocock's type is the same as the *E. magnus* variant illustrated by Muma (1962), but is of the size and coloration recorded by Muma (1951). This species still exhibits variation which may or may not be intraspecific.



Eremorhax magnus ♀

Eremorhax puebloensis Brookhart

Eremorhax puebloensis Brookhart, 1965, p. 154.

DIAGNOSIS: The lack of a ridge or abortive teeth in front of the principal tooth of the movable cheliceral finger and the lack of dusky purplish markings on the palpal femur identify this species.

Brookhart's (1965) description and figures are adequate for identification.

TYPE LOCALITY: Male holotype from Pueblo, Colorado, in AMNH.

DISTRIBUTION: USA: Colorado.

DISCUSSION: This species is most closely related to *E. magnus* and *E. pulcher* Muma.

Eremorhax pulcher Muma

Eremorhax pulcher Muma, 1963, p. 2.

DIAGNOSIS: This species is closely related to *E. magnus* but is much smaller, has the palpus dusky purple on tarsus, metatarsus, tibia, and apical half of the femur with the metatarsus darker than the other segments, and has the mesal groove of the fixed cheliceral finger an indistinct hollow.

Muma's (1963) description and figures are adequate for identification.

TYPE LOCALITY: Male holotype from 11 miles north of Mercury, Nevada, 2/10 mile east of Mercury highway, south of Well 5B road, on June 10, 1961, in AMNH.

DISTRIBUTION: USA: Nevada.

DISCUSSION: *E. pulcher, E. magnus* and *E. puebloensis* form a compact species-group within the genus.

MONTEZUMA GROUP

Eremorhax montezuma (Roewer)

Figures 3 and 4.

Eremopus montezuma Roewer, 1934, p. 564.

DIAGNOSIS: Males of this species are distinguished from all other known *Eremorhax* by the possession of 4 abdominal ctenidia and normally developed principal, intermediate, and anterior teeth on the movable cheliceral finger. Females are not known.

MALE TYPE: Total length 29.5 mm.

	Length	*Width*
Chelicerae	7.0 mm	3.5 mm
Propeltidium	3.6 mm	5.5 mm
Palpus	23.0 mm	
Leg I	fragmented	
Leg IV	fragmented	

Color in alcohol yellow. Eye tubercle dark. Mesopeltidium, metapeltidium, and abdominal tergites dusky purple though less distinct posteriorly. Propeltidium, chelicerae, palpi, and legs pale yellow.

Dentition as shown in figures 3 and 4. Mesal groove of fixed finger an indistinct, shallow, longitudinal groove. Mesal tooth of movable finger present but broken off on

Table 4. Some male diagnostic characters of *Eremorhax striatus* species-group.

Species	Dentition	Leg IV and palpal coloration
E. gigas (Roewer)	Fixed finger groove mesal; movable finger with quadrate distal process	Pale
E. gigasellus, new species	Fixed finger groove ventral; movable finger with rounded serrate distal process	Pale except partially dusky on femora and tibiae
E. striatus (Putnam)	Fixed finger groove meso-ventral; movable finger with toothlike distal process	Pale except partially dusky on femora and tibiae
E. calexicensis Muma	Fixed finger groove meso-ventral; movable finger without distal process	Pale except faintly dusky at apical ends of femora and basal ends of tibia
E. titania Muma	Fixed finger groove ecto-ventral; movable finger without distal process	Pale except ventrally dusky on femora and tibiae

both chelicerae. Palpi with usual setae, cylinder bristles, spines, and long whiplike setae, but no scopula. First post-spiracular abdominal sternite with 4 ctenidia, but their form is unknown since all are broken off at the distinct ctenidial sockets.

TYPE LOCALITY: Male type from Orizaba, Mexico, Roewer No. 8076, in NMWA.

DISTRIBUTION: Mexico.

DISCUSSION: The type is badly fragmented and the chelicerae damaged, but it is obviously a species of *Eremorhax*. A paratype (SMF/RII/3056) is in better condition. The ctenidia on the paratype are white, short (about 1/3 the length of the succeeding abdominal sternite), thickened, and lanceolate. This species seems to have alliances with the *angustus* group of *Eremobates* Banks.

STRIATUS GROUP

(See Table 4.)

Eremorhax calexicensis Muma

Eremorhax calexicensis Muma, 1961, p. 50.

DIAGNOSIS: This species is closely related to *E. titania* Muma. It is distinguished by the mesoventral position of the apically located groove of the male fixed cheliceral finger and the anteriorly parallel female genital opercula.

The species is adequately described by Muma (1951).

TYPE LOCALITY: Male holotype, female allotype, and male paratype from Calexico, California, by M. G. Armstrong, in USNM.

DISTRIBUTION: USA: Arizona, California; Mexico: Baja California.

DISCUSSION: *E. titania* Muma and this species are closely related.

Eremorhax gigas (Roewer)

Figures 5 and 6.

Eremocosta gigas Roewer, 1934, p. 569.

DIAGNOSIS: The mesal position of the apical mesal groove of the male cheliceral fixed finger, the quadrate distal process of the male cheliceral movable finger, and the completely pale yellow legs and palpi are distinctive. Females are unknown. This species is closely related to *E. gigasellus*, new name, and *E. striatus* Putnam.

MALE TYPE: Total length 50.0 mm.

	Length	*Width*
Chelicerae	16.0 mm	7.4 mm
Propeltidium	8.0 mm	11.6 mm
Palpus	44.0 mm	
Leg I	38.0 mm	
Leg IV	Both fragmented	

Color in alcohol pale yellow with eye tubercle dark, propeltidium dark purple on anterior margin, mesopeltidium purplish medially, abdominal peltidia dusky purplish, legs and palpi pale yellow, and malleoli white.

Dentition as shown in figures 5 and 6. Mesal groove of fixed finger a distinct, cuplike, distal structure. Mesal tooth of movable finger present and distinct. Distal process of movable finger quadrate and toothlike. Palpi with typical setation but few cylinder bristles and no scopula. Abdominal ctenidia absent.

TYPE LOCALITY: Male type from Tampico, Mexico, SMF/RII/3344.

DISTRIBUTION: Mexico.

DISCUSSION: This is not the species listed as *E. gigas* by Muma (1951); it is distinctive.

The type is well preserved and in good condition, although legs and parts of legs have been broken off and are in the vial.

Eremorhax gigasellus, new name

Eremorhax gigas (Roewer), *sensu* Muma, 1951, p. 48 (not *E. gigas* Roewer).

DIAGNOSIS: This species is readily distinguished from *E. gigas* and *E. striatus* by the rounded, serrated distal process of the male cheliceral movable finger, the ventral position of the apical groove of the male cheliceral fixed finger, and the dusky purplish femoral and tibial markings on the legs and palpi.

This species is adequately described by Muma (1951) as *E. gigas* (Roewer).

TYPE LOCALITY: Male holotype from Boquillas, Texas, on June 7, 1948, by C. and P. Vaurie, in AMNH.

DISTRIBUTION: USA: New Mexico, Texas.

DISCUSSION: This is not the species described as *E. gigas* by Roewer (1934), but is closely related.

Eremorhax spinipalpis (Kraepelin)

Figure 7.

Datames spinipalpis Kraepelin, 1899, p. 243.

Eremobates spinipalpis (Kraepelin), Kraepelin, 1901, p. 126.

DIAGNOSIS: This species, known only from the type, is related to *E. striatus*. It is distinguished by the lack of markings on the legs and palpi, and the curved lateral margins of the median caudal opercular notch.

FEMALE TYPE: Total length 35.0 mm.

	Length	*Width*
Chelicerae	10.0 mm	4.8 mm
Propeltidium	5.7 mm	8.0 mm
Palpus	27.0 mm	
Leg I	21.0 mm	
Leg IV	38.0 mm	

Color in alcohol pale yellow. Eye tubercle, propeltidium, mesopeltidium, and abdominal tergites colored and marked as in *E. striatus*. Legs and palpi pale yellow and without markings.

Structure typical of group. Chelicerae as in *E. calexicensis* except mesal tooth distinct. Abdomen with usual setal clothing but without ctenidia. Palpi without scopula and with typical cylinder bristles, setae, and spines of *striatus* group.

Opercula as shown in figure 7.

TYPE LOCALITY: Female type from Santa Rosalia, Lower California, Mexico, by S. Diguet, No. 33-97, in MNHN.

DISTRIBUTION: Mexico: Baja California.

DISCUSSION: This type is in good condition. This species may well be the female of *E. gigas* (Roewer).

Eremorhax striatus (Putnam)

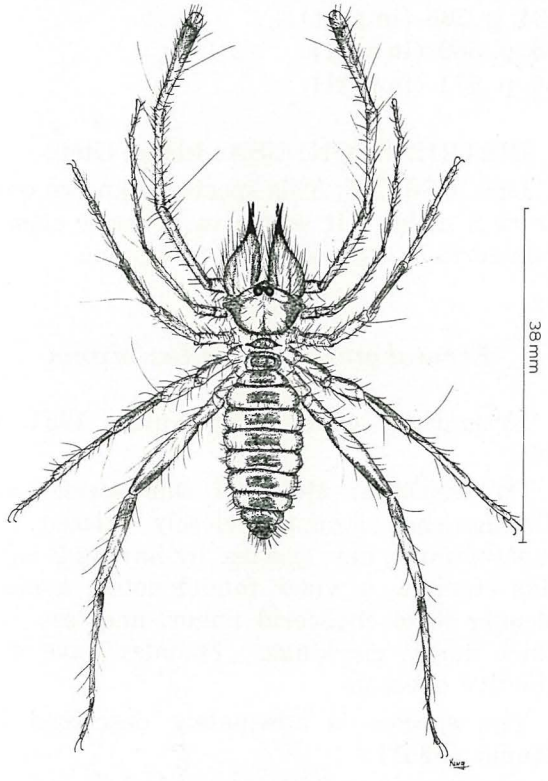
Datames striatus Putnam, 1883, p. 255.

Datames cinerea Putnam, 1883, p. 260.

Eremobates cinereus (Putnam), Kraepelin, 1901, p. 124.

Eremorhax striatus (Putnam), Muma, 1951, p. 45.

DIAGNOSIS: The flat toothlike anterior process on the movable cheliceral finger of the male, and the partially dusky femora and tibiae of the legs and palpi identify this species. The female opercula are parallel



Eremorhax striatus ♀

anteriorly and triangularly divergent posteriorly.

This species is adequately described by Muma (1951).

TYPE LOCALITY: Female type of *D. striatus* from Camp Grant, Arizona, by E. Palmer, in BNHM. Male types of *D. cinerea*, locality unknown, in ANS.

DISTRIBUTION: USA: Arizona, California, Texas; Mexico.

DISCUSSION: *E. spinipalpis* may later prove to be a synonym of this species.

Eremorhax titania Muma

Eremorhax titania Muma, 1951, p. 48.

DIAGNOSIS: The ecto-ventral or ventral position of the groove of the male cheliceral fixed finger and the broad median notch of the female opercula distinguish this species from *E. calexicensis*.

This species is adequately described by Muma (1951).

TYPE LOCALITY: Male holotype and 2 male paratypes from Twenty-nine Palms, California, July to August 1945, by Jefferson H. Branch, in AMNH.

DISTRIBUTION: USA: California, Nevada.

DISCUSSION: This species and *E. calexicensis* are closely related.

NOMEN DUBIUM
Eremorhax robusta (Roewer)

Eremocantha robusta Roewer, 1934, p. 571.

Eremocantha robusta Roewer, Muma, 1951, p. 119.

TYPE LOCALITY: Immature type from Santiago, California, No. 996 (Roewer No. 8338), in ZMHU.

DISTRIBUTION: USA: California.

DISCUSSION: Although the type is immature, this species is obviously a species of *Eremorhax* near *E. striatus* and *E. formidabilis* that cannot be properly placed because of a lack of sexual characters.

Genus *Eremobates* Banks

Datames Simon, 1879, p. 113 (preoccupied).
Eremobates Banks, 1900, p.426 (new name for *Datames* Simon).
Eremoperna Roewer, 1934, p. 557 (in part).
Eremopus Roewer, 1934, p. 561 (in part).
Eremognatha Roewer, 1934, p. 566 (in part).
Eremocosta Roewer, 1934, p. 569 (in part).
Eremostata Roewer, 1934, p. 571 (in part).

KEY TO SPECIES-GROUPS

(MALES)

1. Fixed cheliceral finger in dorsal view with wide basal notch .... *scaber* group
   Fixed cheliceral finger in dorsal view without wide basal notch 2
2. Mesal groove of fixed finger mesodorsal in position ..... *aztecus* group
   Mesal groove of fixed finger mesoventral in position 3
3. Fixed cheliceral finger with ectodorsal toothlike process near base .... *palpisetulosus* group
   Fixed cheliceral finger without such process 4
4. Mesoventral groove of fixed cheliceral finger distinctly dilated basally .... *pallipes* group
   Mesoventral groove of fixed cheliceral finger narrow, not dilated basally .... *angustus* group

SCABER GROUP

(See Table 5.)

Eremobates ascopulatus Muma

Eremobates ascopulatus Muma, 1951. p. 60.

DIAGNOSIS: Males are distinguished by the lack of a palpal scopula, the presence of 2 abdominal ctenidia, the deeper-than-wide fondal notch, and the pale coloration. Females are unknown.

This species is adequately described by Muma (1951).

TYPE LOCALITY: Male holotype from Richfield, Utah, June 20, 1930, by W. J. Gertsch, in AMNH.

DISTRIBUTION: USA: Idaho, Utah.

DISCUSSION: This species is known only from 2 males. It seems to be most closely related to *E. septentrionis,* new name.

Eremobates ctenidiellus Muma

Eremobates ctenidiellus Muma, 1951, p. 57.

DIAGNOSIS: Males of this species are distinguished from the closely related *E. septentrionis,* new species, by having 2 hair-like ctenidia, a wider fondal notch, a more slender fixed cheliceral finger, and less distinct dusky markings. Females have distinctive opercula.

The species is adequately described by Muma (1951).

TYPE LOCALITY: Male holotype from 2 miles east of Glenwood, Sevier County, Utah, June 30, 1940, by Gertsch and Hook, in AMNH.

DISTRIBUTION: USA: California, Colorado, Nevada, Oregon, Washington, Utah; Mexico.

DISCUSSION: *E. scaber* (Kraepelin), *E. septentrionis,* new name, *E. geniculatus* (Simon), and this species are closely related and are more readily distinguished in the males.

Eremobates geniculatus (Simon)

Figure 8.

Datames geniculatus Simon, 1879, p. 138 (not *E. geniculatus* Simon, *sensu* Muma 1951).

Eremocosta geniculata (Simon), Roewer, 1934, p. 570.

Table 5. Some male diagnostic characters of the *Eremobates scaber* species-group.

Species	No. and form of ctenidia	No. of papillae	Other
E. ascopulatus Muma	2 short, flattened	None	Deep fondal notch and pale coloration
E. ctenidiellus Muma	2 hairlike	30+	Deep fondal notch, slender fixed finger, and indistinct markings
E. gladiolus Muma	2 scimitarlike	80	Deep fondal notch and pale legs and palpi
E. septentrionis new name	2 short, flattened	40-160	Deep fondal notch, and legs and palpi distinctly marked with dusky purple
E. mormonus (Roewer)	4 elongate, flattened	40-160	Shallow fondal notch and pale coloration
E. similis Muma	4 short, needlelike	None	Shallow fondal notch, and legs and palpi distinctly marked with dusky purple
E. zinni Muma	4 short, flattened	None	Deep fondal notch and dark palpal tarsus and metatarsus

DIAGNOSIS: Females are distinguished by the presence of 2 trace ctenidia, evanescent inner marginal tubercles on the opercula, and pale yellow palpi and legs except for the palpal tarsi and distal two-thirds of the palpal metatarsi, which are dusky purple but not as dark as on *E. zinni* Muma. Males are unknown.

FEMALE TYPE: Total length 23.0 mm.

	Length	*Width*
Chelicerae	5.4 mm	2.5 mm
Propeltidium	2.3 mm	4.3 mm
Palpus	13.0 mm	
Leg I	10.5 mm	
Leg IV	14.5 mm	

Color in alcohol yellow. Peltidia and abdominal tergites dusky purple as on *E. scaber* (Kraepelin). Chelicerae pale with indistinct dusky stripes. Palpi and legs pale except for dusky purple on the palpal tarsus and distal two-thirds of palpal metatarsi.

Cheliceral dentition as on *E. septentrionis,* new name. Palpi without scopula. Abdomen with 2 hairlike, barely distinguishable trace ctenidia.

Opercula as in figure 8.

TYPE LOCALITY: Female type from Mexico, No. 2129 (Roewer No. 9135), in MNHN.

DISTRIBUTION: Mexico.

DISCUSSION: This species is closely related to *E. ctenidiellus, E. scaber,* and *E. septentrionis,* new species.

Eremobates gladiolus Muma

Eremobates gladiolus Muma, 1951, p. 57.

DIAGNOSIS: Males are distinguished by a scopula of about 80 rounded papillae in the scopula, 2 flattened scimitarlike abdominal ctenidia, and unmarked pale legs and palpi. Females have distinctive opercula.

The species is adequately described by Muma (1951).

TYPE LOCALITY: Male holotype from Maupin, Oregon, July 19, 1934, by J. M. Pierson, in AMNH.

DISTRIBUTION: USA: Oregon, Utah, Washington.

DISCUSSION: Males and females of this species never have been collected together, but their similar coloration and structure indicate conspecificity. Except for ctenidial form, the species is closely related to *E. septentrionis,* new name.

Eremobates mormonus (Roewer)

Figure 9.

Eremoperna mormona Roewer, 1934, p. 561.

Eremobates geniculatus (Simon), *sensu* Muma, 1951, p. 55 (not *E. geniculatus* Simon).

DIAGNOSIS: Males are distinguished from *E. septentrionis,* new name, by 4 elongate flattened abdominal ctenidia and paler coloration. Females have 4 distinct hairlike trace ctenidia and opercula as in figure 9.

This species is adequately described as *E. geniculatus* (Simon) in Muma (1951). The type measures 19.0 mm in length and lacks a palpal scopula.

TYPE LOCALITY: Female type from Utah, SMF/RII/3446.

DISTRIBUTION: USA: Arizona, California, Colorado, Nevada, Utah, Washington, Wyoming.

DISCUSSION: This species is most closely related to *E. zinni* Muma. One of the indicated females in the type vial is immature; both specimens are in good condition.

Eremobates scaber (Kraepelin)

Figure 10.

Datames scaber Kraepelin, 1899, p. 243.

Eremobates scaber (Kraepelin), Kraepelin, 1901, p. 124.

Eremostata scabra (Kraepelin), Roewer, 1934, p. 573.

DIAGNOSIS: Females of this species are distinguished from the closely related *E. septentrionis,* new name, by unmarked legs and palpi, and the anteriorly located, undulate inner marginal opercular lobes. Males are unknown.

FEMALE TYPE: Total length 25.0 mm.

	Length	*Width*
Chelicerae	7.3 mm	3.6 mm
Propeltidium	3.0 mm	3.9 mm
Palpi	19.0 mm	
Leg I	13.5 mm	
Leg IV	23.0 mm	

Color in alcohol as in *E. gladiolus,* except there are no distinct markings on the fourth legs. Peltidial and abdominal tergites dusky purple as on most species of the *E. scaber* group.

Cheliceral dentition as on *E. septentrionis,* new name, except that the mesal tooth of the movable finger is tiny but distinct. There is no palpal scopula, and there are 2 trace ctenidia on the first post-spiracular abdominal sternite.

Opercula as in figure 10.

TYPE LOCALITY: Female type from Washington Territory, No. 5141, Roewer No. 9137, in MNHN.

DISTRIBUTION: USA: Washington Territory.

DISCUSSION: This species, *E. septentrionis,* new name, *E. ctenidiellus,* and *E. gladiolus* are closely related but can be separated in both sexes.

Eremobates septentrionis, new name

Eremobates scaber (Kraepelin), *sensu* Muma, 1951, p. 52 (not *E. scaber* Kraepelin).

DIAGNOSIS: Females of this species are distinguished from *E. scaber* by legs and palpi distinctly marked with dusky purple, and less distinct, more posterior inner marginal opercular lobes. Males have 2 short,

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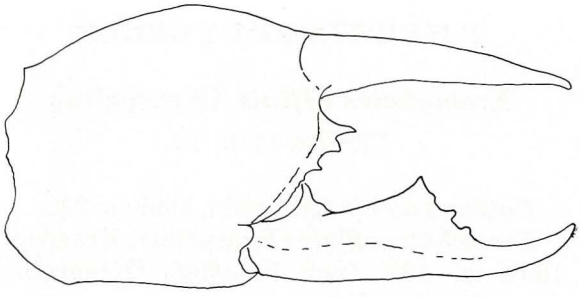
Figs. 1 and 2. *Eremorhax formidabilis* (Simon). 1. Ectal view of right male chelicera. 2. Ectal view of right female chelicera.

Figs. 3 and 4. *Eremorhax montezuma* (Roewer). 3. Ectal view of right male chelicera. 4. Mesal view, fixed finger, right male chelicera.

Figs. 5 and 6. *Eremorhax gigas* (Roewer). 5. Ectal view of right male chelicera. 6. Mesal view, fixed finger, right male chelicera.

Fig. 7. *Eremorhax spinipalpus* (Kraepelin), ventral view of female genital opercula.

Fig. 8. *Eremobates geniculatus* (Simon), ventral view of female genital opercula.



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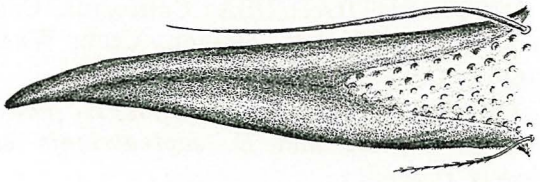

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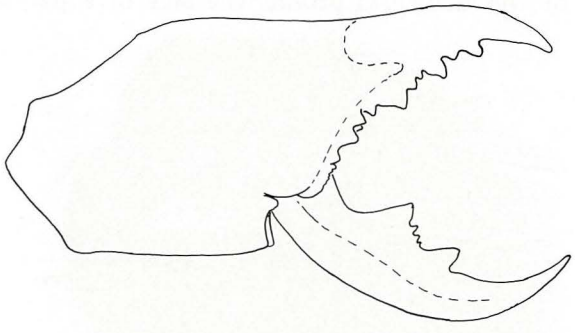

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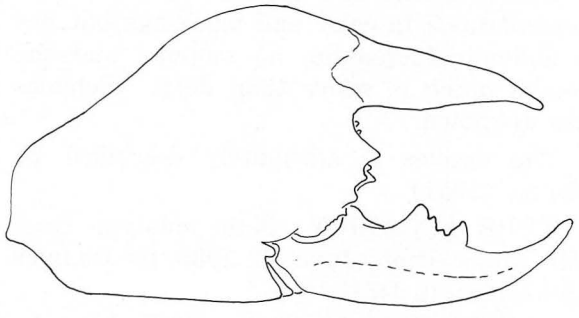

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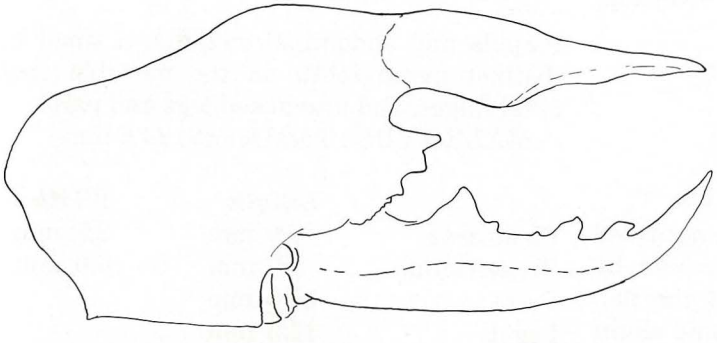

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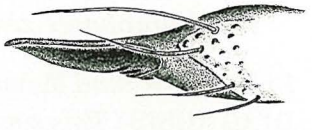

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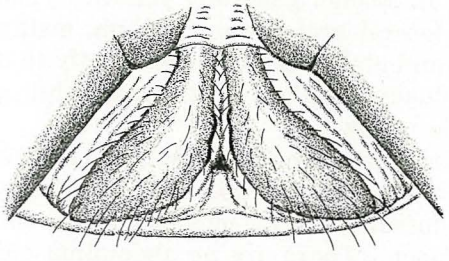

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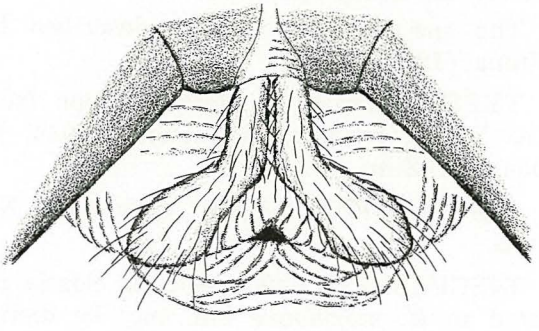


7

flattened abdominal ctenidia and 40-160 papillae in the scopula.

This species is adequately described as *E. scaber* by Muma (1951).

TYPE LOCALITY: Male holotype from East Bench, Salt Lake City, Utah, August 27, 1931, by W. J. Gertsch, in AMNH.

DISTRIBUTION: USA: California, Colorado, Idaho, Nevada, Oregon, Utah, Washington; Canada.

DISCUSSION: *E. ctenidiellus, E. gladiolus, E. scaber,* and *E. septentrionis* are closely related.

Eremobates similis Muma

Eremobates similis Muma, 1951, p. 60.

DIAGNOSIS: This species is similar to *E. septentrionis* in color and markings but has 4 abdominal ctenidia, no scopula, and the fondal notch is wider than deep. Females are unknown.

The species is adequately described by Muma (1951).

TYPE LOCALITY: Male holotype from Elk Ridge, Utah, June 13, 1936, by Douglas Henriques, in DZUU.

DISTRIBUTION: USA: Utah, Nevada, Arizona.

DISCUSSION: Only the type is known.

Eremobates zinni Muma

Eremobates zinni Muma, 1951, p. 58.

DIAGNOSIS: This species is distinguished from the closely related *E. mormonus* by the dark tarsus and metatarsus of the palpus, the different cheliceral profile and slight differences in the opercula.

The species is adequately described by Muma (1951).

TYPE LOCALITY: Male holotype from Las Vegas, Nevada, May-August 1944, by Donald J. Zinn, in AMNH.

DISTRIBUTION: USA: California, Nevada.

DISCUSSION: This species is closely related to *E. mormonus* but may be distinguished in both sexes.

PALPISETULOSUS GROUP

Eremobates affinis (Kraepelin)

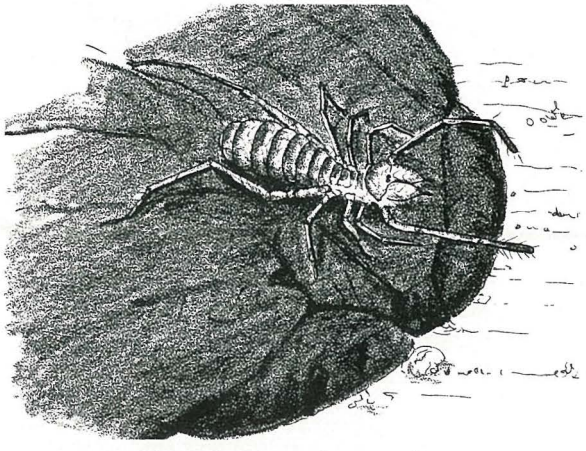
Figures 11 to 13.

Datames affinis Kraepelin, 1899, p. 242.

Eremobates affinis (Kraepelin), Kraepelin, 1901. p. 128 (not *E. affinis* [Kraepelin], *sensu* Muma, 1951).

Eremoperna affinis (Kraepelin), Roewer, 1934, p. 558.

DIAGNOSIS: The species is distinguished by the cheliceral profile, the lack of a palpal



Eremobates on "cow pie" ♂

scopula and abdominal ctenidia, a small but distinct mesal tooth on the movable cheliceral finger, and unmarked legs and palpi.

MALE TYPE: Total length 24.5 mm.

	Length	*Width*
Chelicerae	7.0 mm	3.5 mm
Propeltidium	4.0 mm	5.0 mm
Palpi	20.0 mm	
Leg I	17.5 mm	
Leg IV	26.0 mm	

Color in alcohol generally yellow. Propeltidium, lateral arci, mesopeltidium, metapeltidium, and abdominal tergites faintly to distinctly dusky purple. Chelicerae, palpi, and legs pale yellow.

Dentition as shown in figure 11; mesal groove of fixed finger normal for genus and group; mesal tooth of movable finger small but distinct. There are no abdominal ctenidia on the first post-stigmatic abdominal

Table 6. Some male diagnostic characters in the *Eremobates palpisetulosus* species-group.

Species	No. and form of ctenidia	No. of papillae	Other
E. guenini (Roewer)	None	None	No mesal tooth; legs pale; an intermediate tooth on principal tooth of movable finger
E. affinis (Kraepelin)	None	None	Mesal tooth; unmarked legs and palpi; dorsal spur indistinct; anterior tooth of movable finger obscure
E. tuberculatus (Kraepelin)	None	60±	Mesal tooth; legs and palpi pale; dorsal spur obscure
E. girardi (Putnam)	None	Many on both tibia and metatarsus	Mesal tooth not mentioned; dark colored; fondal notch narrow; movable finger denticulate
E. hessei (Roewer)	2 flattened	None	Indistinct mesal tooth; color pale; an intermediate tooth on principal tooth of movable finger
E. bantai Brookhart	2 broad, flat	None	Mesal tooth; color pale except for palpal tarsus and distal end of metatarsus; dorsal spur small and obscure
E. marathoni Muma	2 hairlike	None	Mesal tooth; chelicerae dark; dorsal spur indistinct; movable finger denticulate
E. tejonus Chamberlin	2 long, flattened	100±	Mesal tooth not distinguishable; narrow fondal notch
E. kraepelini, new name	4 short, distinct	None	Mesal tooth; pale palpi and legs; fondal notch wide and shallow; movable finger notched
E. palpisetulosus Fichter	4 elongate, hairlike	None	Mesal tooth; dark palpal tarsi and metatarsi; notched movable cheliceral finger
E. nanus Muma	4 short, distinct	80±	No mesal tooth; marked palpi and legs; fixed finger apically constricted; fondal notch narrow
E. gracilidens Muma	6 hairlike	None	Mesal tooth; unmarked legs and palpi; slender teeth and movable finger
E. papillatus, new species	6 elongate, distinct	60-90	Indistinct mesal tooth; dark palpal and leg tibia; fondal notch narrow; movable finger notched
E. purpusi (Roewer)	6 elongate, distinct	10-40	Indistinct mesal tooth; dark palpal and leg tibiae; dorsal spur distinct; fondal notch wide and shallow

Table 6. (Continued)

E. titschacki (Roewer)	8 elongate, distinct	None	Indistinct mesal tooth; pale except for faint marks on legs and palpi; indistinct dorsal spur; movable finger not denticulate
E. villosus, new species	8 elongate, distinct	150±	No mesal tooth; legs and palpi pale; fondal notch wide and bearing denticules
E. vicinus Muma	8 elongate, distinct	60±	Indistinct mesal tooth; dark palpal and leg tibia; dorsal spur distinct; movable finger notched

sternite, but the type has what appears to be an abortive setal socket. See figure 11a. (The paratype at ZSM has no ctenidia; its dentition is shown in figure 12.) The palpus has the usual cylinder bristles and elongate spinelike setae but no scopula.

FEMALE TYPE: Total length 28.0 mm.

	Length	*Width*
Chelicerae	9.0 mm	4.0 mm
Propeltidium	3.8 mm	6.0 mm
Palpi	16.0 mm	
Leg I	12.0 mm	
Leg IV	20.0 mm	

Color similar to that of the male.

Structure typical of genus and group. Palpus without scopula; abdomen without ctenidia. Opercula as shown in figure 13.

TYPE LOCALITY: Male and female types from Arizona (Arkansas?), No. 7297, Roewer No. 9129, in MNHN.

DISTRIBUTION: USA: Arizona; Mexico.

DISCUSSION: The types in MNHN agree with Kraepelin's (1899) description in color and structure but not with Roewer's (1934) statement of 4:4 ctenidia on the male. The female paratype (*ex typis*) in ZSM is not conspecific with the male; it is a specimen of *Eremorhax formidabilis* (Simon).

Eremobates bantai Brookhart

Eremobates bantai Brookhart, 1965, p. 153.

DIAGNOSIS: This species is distinguished from *E. marathoni* Muma by the cheliceral profile and 2 broad, flat ctenidia, and from *E. hessei* (Roewer) by the cheliceral profile and pale coloration except for palpal tarsus and distal end of metatarsus.

The species is adequately described by Brookhart (1965) except the toothlike process on the fixed cheliceral finger is small, obscure, and not figured, and there is no scopula on the palpus. Unfortunately, Brookhart did not figure the female operacula.

TYPE LOCALITY: Male holotype from Phantom Canyon, Fremont County, Colorado by Jack Brookhart, in AMNH.

DISTRIBUTION: USA: Colorado.

DISCUSSION: This species is closely related to *E. marathoni, E. hessei, E. fagei* (Roewer), and *E. guenini* (Roewer).

Eremobates fagei (Roewer)

Figures 14 and 15.

Eremopus fagei Roewer, 1934, p. 563.

DIAGNOSIS: The species is distinguished by pale unmarked legs and palpi, the lack of a scopula, the presence of 5 (1 apparently spurious) trace ctenidia, an indistinct mesal tooth, and the presence of only 1 intermediate tooth between the anterior and medial teeth of the fixed finger. Males are unknown.

FEMALE TYPE: Total length 21.0 mm.

	Length	*Width*
Chelicerae	4.7 mm	2.5 mm
Propeltidium	2.7 mm	4.3 mm
Palpi	13.5 mm	
Leg I	(one missing, other broken)	
Leg IV	21.0 mm	

Color in alcohol pale to discolored yellow. Peltidia and abdominal tergites with dusky markings typical of group but indistinct owing to alcohol discoloration of old specimen. Legs and palpi pale yellow with no dusky markings, but faint markings may have been overlooked owing to alcohol discoloration.

Cheliceral dentition typical of *palpisetulosus* species-group, except there is only 1 intermediate tooth between medial and anterior tooth of fixed cheliceral finger, and mesal tooth of movable cheliceral finger is an indistinct ridge. Abdomen with 5 trace ctenidia as shown in figure 14. Palpus without a scopula. Opercula typical of group as shown in figure 15.

TYPE LOCALITY: Female type from California, No. 4801, Roewer No. 9134, in MNHN. The type and a young in the vial are both in good condition.

DISTRIBUTION: USA: California.

DISCUSSION: This species is apparently related to *E. hessei* (Roewer) and related species. Since the male is unknown, only group placement is certain.

Eremobates girardi (Putnam)

Datames girardi Putnam, 1883, p. 257.

Eremobates girardi (Putnam), Roewer, 1934, p. 575.

DIAGNOSIS: This species apparently is closely related to *E. palpisetulosus* from which it is distinguished by its dark coloration and lack of markings, the lack of abdominal ctenidia, and the presence of a scopula on both the palpal tibia and metatarsus.

The species is adequately described by Putnam (1883).

TYPE LOCALITY: Male type from Arkansas by Capt. Marcy, reportedly deposited in ANS, cannot be found and apparently is lost or destroyed.

DISTRIBUTION: USA: Arkansas.

DISCUSSION: Even though the type is no longer available, Putnam's (1883) description and figures indicate a distinctive spcies that should be readily recognized.

Eremobates gracilidens Muma

Eremobates gracilidens Muma, 1951, p. 66.

DIAGNOSIS: The lack of a scopula, 6 hairlike ctenidia, unmarked legs and palpi, and the cheliceral profile distinguish this species.

This species is adequately described by Muma (1951).

TYPE LOCALITY: Male holotype from Twentynine Palms, California, March-April 1945, by Jefferson H. Branch, in AMNH.

DISTRIBUTION: USA: Arizona, California.

DISCUSSION: This species seems to be closely related to *E. titschacki* (Roewer).

Eremobates guenini (Roewer)

Figures 16 and 17.

Eremognatha guenini Roewer, 1934, p. 567.

DIAGNOSIS: This species is distinguished from the closely related *E. hessei* (Roewer) by the lack of paired abdominal ctenidia, a slightly different cheliceral profile, and the absence of a mesal tooth on the movable finger.

MALE TYPE: Total length 31.5 mm.

	Length	*Width*
Chelicerae	8.2 mm	4.6 mm
Propeltidium	3.3 mm	5.9 mm
Palpi	20.0 mm	
Leg I	17.0 mm	
Leg IV	30.0 mm	

Color in alcohol pale yellow with mesopeltidium, metapeltidium, and abdominal tergites dusky purple; pleurites also dusky on dorsal surfaces adjacent to tergites. Propeltidium pale and legs pale without markings.

Structure identical with that of *E. hessei* (Roewer) except for the lack of a mesal tooth on the movable cheliceral finger and the lack of abdominal ctenidida. Figure 16 portrays the cheliceral profile, and figure 17 shows an enlarged, forked seta on the first post-stigmatic abdominal sternite.

TYPE LOCALITY: Male type from Dinamita, Durango, Mexico, Roewer No. 8390, in MNHN. The type is dismembered but in good condition. A male from Mexico in SNG also is labeled *typus* and is conspecific.

DISTRIBUTION: Mexico: Durango.

DISCUSSION: This species is very closely related to *E. hessei* (Roewer), and the two may someday prove to be synonymous.

Eremobates hessei (Roewer)

Figures 18 and 19.

Eremopus hessei Roewer, 1934, p. 563.

Eremobates nodularis Muma, 1951, p. 69; 1962, p. 4 (new synonymy).

DIAGNOSIS: This species is distinguished by its pale yellow coloration, the cheliceral profiles of both males and females, the indistinct mesal tooth on the movable cheliceral finger, 2 abdominal ctenidia, and the opercular structure.

The species is adequately described by Muma (1951 and 1962) as *E. nodularis*. Measurements and notes on Roewer's type are given below.

FEMALE TYPE: Total length 25.0 mm.

	Length	*Width*
Chelicerae	6.2 mm	2.8 mm
Propeltidium	2.8 mm	4.7 mm
Palpi	11.0 mm	
Leg I	10.0 mm	
Leg IV	16.5 mm	

Color in alcohol entirely pale yellow except eye tubercle dark, anterior margin of propeltidium narrowly purple, and femora of fourth legs dusky at apical end.

Chelicerae as shown in figure 18; mesal tooth lacking or very indistinct; no scopula and no trace ctenidia.

Opercula as in figure 19.

TYPE LOCALITY: Female type of *Eremopus hessei* Roewer from Mexico, by Daume, Roewer No. 7972, in ZMHU. Male type of *Eremobates nodularis* Muma from Carlsbad, New Mexico, July 26, 1938 (Bjorkman), in AMNH.

DISTRIBUTION: Mexico; USA: Arizona, New Mexico, Texas.

DISCUSSION: This species is very closely related to *E. guenini* which may later prove to be a synonym.

Eremobates kraepelini, new name

Eremobates mormonus (Roewer), *sensu* Muma, 1951, p. 67 (not *Eremopera mormona* Roewer, 1934, p. 561).

DIAGNOSIS: This species is distinguished by the male cheliceral profile, the absence of a scopula, 4 short distinct ctenidia, pale palpi and legs, and highly arched opercula.

TYPE LOCALITY: Male holotype from dry valley 14 miles SE of Monterey, Monterey County, California, by E. F. Ricketts, in AMNH.

DISTRIBUTION: USA: Arizona, California, Nevada, New Mexico, Texas, Utah.

DISCUSSION: Roewer's (1934) illustration of the opercula of his *E. mormonus* indicated that the species was a member of the *palpisetulosus* group; but as figure 8 shows, *E. mormonus* is a species of the *scaber*-group, and therefore Muma's (1951) specimens had to be renamed.

Eremobates marathoni Muma

Eremobates marathoni Muma, 1951, p. 63.

DIAGNOSIS: This species is distinguished by its cheliceral profile, the lack of a scopula, the presence of 2 barely distinguishable hairlike ctenidia, and its cheliceral coloration.

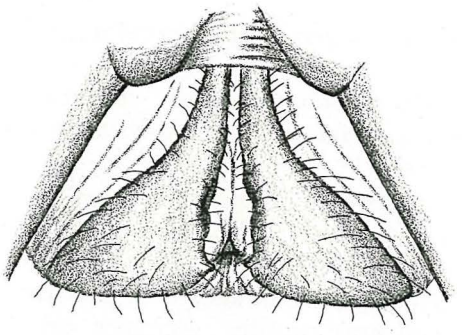
Fig. 9. *Eremobates mormonus* (Roewer), ventral view of female genital opercula.

Fig. 10. *Eremobates scaber* (Kraepelin), ventral view of female genital opercula.

Figs. 11 to 13. *Eremobates affinis* (Kraepelin). 11. Ectal view of right male chelicera. 11A. Abortive ctenidial setal socket, holotype. 12. Ectal view of left male chelicera, paratype. 13. Ventral view of female genital opercula.

Figs. 14 and 15. *Eremobates fagei* (Roewer). 14. Female abdominal ctenidia. 15. Ventral view of female genital opercula.

Figs. 16 and 17. *Eremobates guenini* (Roewer). 16. Ectal view of right male chelicera. 17. Male abdominal ctenidia.



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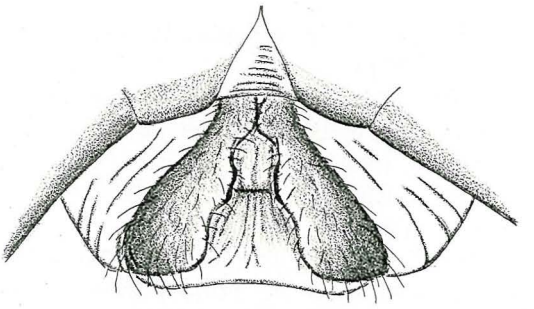

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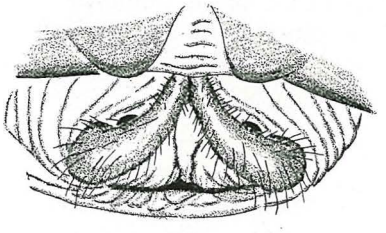

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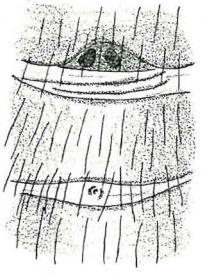

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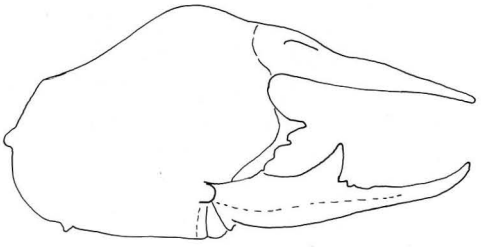

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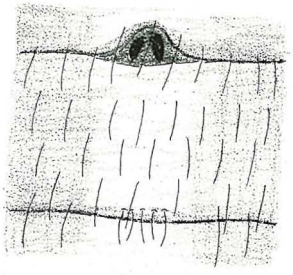

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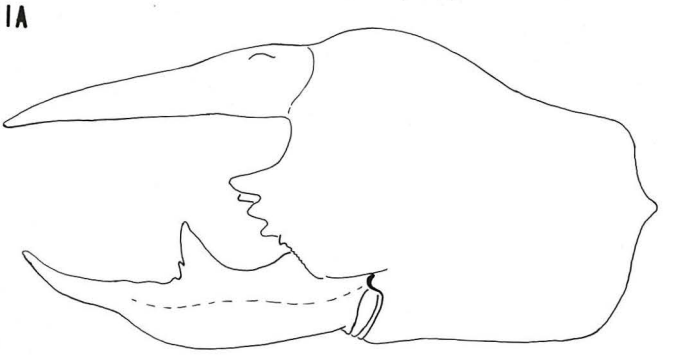

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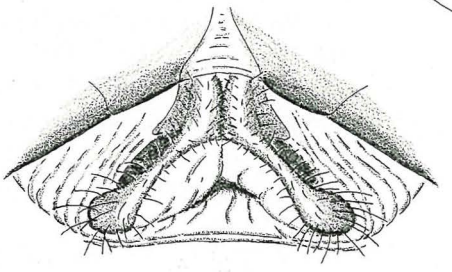

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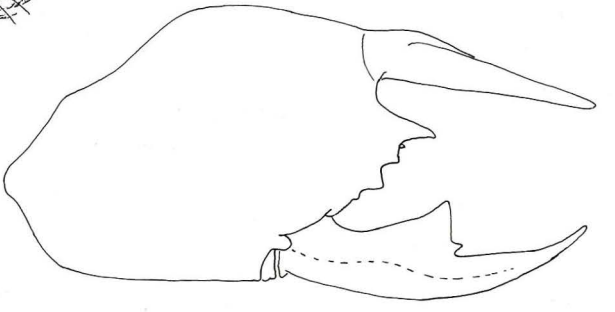

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The species is adequately described by Muma (1951).

TYPE LOCALITY: Male holotype from Marathon, Texas, on June 12, 1948, by M. A. Cazier, in AMNH.

DISTRIBUTION: USA: Arizona, New Mexico, Texas.

DISCUSSION: The close relationship of this species and *E. palpisetulosus* Fichter was discussed by Muma (1951).

Eremobates nanus Muma

Eremobates nanus Muma, 1962, p. 4.

DIAGNOSIS: Distinguished by a basal metatarsal scopula of 80 papillae, 4 short distinct ctenidia, the cheliceral profile, and distinctly marked femora and tibiae of palpi and legs.

The species is adequately described and illustrated by Muma (1962).

TYPE LOCALITY: Male holotype from Riverton, Eldorado County, California, July 11, 1952, by W. J. Gertsch, in AMNH.

DISTRIBUTION: USA: California.

DISCUSSION: This species is closely related to *E. palpisetulosus* Fichter and *E. villosus,* new name.

Eremobates palpisetulosus Fichter

Eremobates palpisetulosus Fichter, 1941, p. 179.

Eremobates palpisetulosus Fichter, Muma, 1951, p. 61.

DIAGNOSIS: This species is distinguished by dark palpal metatarsi and tarsi, 4 elongate hairlike ctenidia, the cheliceral profile, and lack of a scopula. Females have typical but distinguishable opercula.

The species is described adequately by Fichter (1941) and Muma (1951).

TYPE LOCALITY: Male cotypes (syntypes) from Sidney, Nebraska, July 19, 1939, by J. C. Swinbank; one in AMNH, and one in the collections of the University of Nebraska.

DISTRIBUTION: USA: Arizona, Colorado, Kansas, Nebraska, Oklahoma, Texas; Mexico.

DISCUSSION: This species is closely related to *E. marathoni.*

Eremobates papillatus, new name

Eremobates tuberculatus (Kraepelin), *sensu* Muma, 1951, p. 72 (not *E. tuberculatus* [Kraepelin]).

DIAGNOSIS: Distinguished from *E. tuberculatus* (Kraepelin) by dark markings on the tibiae of the legs and palpi, the possession of 6 elongate ctenidia, and differences in the cheliceral profile. Females are unknown.

This species is adequately described by Muma (1951).

TYPE LOCALITY: Male holotype from Mount Palomar State Park, San Diego County, California, July 13, 1950, by W. J. and J. W. Gertsch, in AMNH.

DISTRIBUTION: USA: California.

DISCUSSION: The relationship of this species to others of the group is obscure.

Eremobates purpusi (Roewer)

Figures 20 and 21.

Eremopus purpusi Roewer, 1934, p. 561 (not *E. purpusi* [Roewer], *sensu* Muma, 1951).

Eremobates scopulatus Muma, 1951, p. 67 (new synonymy).

DIAGNOSIS: Males are distinguished by a narrow basal scopula of 10-40 papillae, 6 abdominal ctenidia, a distinctive cheliceral profile, and dark markings on the tibiae of the legs and palpi. Females have the same coloration and distinctive opercula.

The species is adequately described as *E. scopulatus* by Muma (1951). The chelicerae and opercula of the type are as in figures 20 and 21.

TYPE LOCALITY: Female type of *Eremopus purpusi* Roewer from Tlaquiloxepec, Mexico, by C. H. Purpus, Roewer No. 8332, in ZMHU. Male holotype of *Eremobates scopulatus* Muma from Las Vegas, New Mexico, 1931, in AMNH.

DISTRIBUTION: Mexico; USA: California, Nevada, New Mexico, Utah.

DISCUSSION: This species is unique within the group.

Eremobates tejonus Chamberlin

Eremobates tejonus Chamberlin, 1925, p. 236.

DIAGNOSIS: Males have 2 long flattened ctenidia, a scopula of about 100 papillae, and a long narrow fondal notch. Females are unknown.

The species never has been adequately described or measured, but it can be identified by utilizing the descriptions of Chamberlin (1925) and Muma (1951).

TYPE LOCALITY: Male type from stomach of *Bufo* sp. at Ft. Tejon, California, in MCZ.

DISTRIBUTION: USA: California.

DISCUSSION: The species is most closely related to *E. villosus,* new name.

Eremobates titschacki (Roewer)

Figures 22 and 23.

Eremoseta titschacki Roewer, 1934, p. 569.

Eremobates affinis (Kraepelin), *sensu* Muma, 1951, p. 65 (not *E. affinis* Kraepelin).

DIAGNOSIS: Males have no scopula, 8 elongate abdominal ctenidia, and a distinctive cheliceral profile. Females are unknown.

The species is adequately described as *E. affinis* in Muma (1951). The chelicera and ctenidia of the type are shown in figures 22 and 23.

TYPE LOCALITY: Male type from California, 1900, by Banks, Roewer No. 8485, in ZSM.

DISTRIBUTION: USA: California.

DISCUSSION: This species is most closely related to *E. gracilidens.*

Eremobates tuberculatus (Kraepelin)

Figure 24.

Datames tuberculatus Kraepelin, 1899, p. 241.

Eremobates tuberculatus (Kraepelin), Kraepelin, 1901, p. 122 (not *E. tuberculatus* [Kraepelin], *sensu* Muma, 1951).

Eremognatha tuberculatus (Kraepelin), Roewer, 1934, p. 567.

DIAGNOSIS: Distinguished from the closely related *E. papillatus* by the lack of abdominal ctenidia and a slightly different cheliceral profile.

MALE TYPE: Total length 23.0 mm.

	Length	*Width*
Chelicerae	6.3 mm	2.8 mm
Propeltidium	2.4 mm	4.2 mm
Palpi	21.0 mm	
Leg I	18.0 mm	
Leg IV	28.0 mm	

Color in alcohol pale yellow except as follows: propeltidium lightly dusky purple except for pale median ovate area; mesopeltidium, metapeltidium, and abdominal tergites mottled with purple.

Structure similar to *E. papillatus*; there are no abdominal ctenidia, cheliceral movable finger with mesal tooth, 60 papillae in a basal scopula, and the dorsal spur of the fixed cheliceral finger is distinct in dorsal view but indistinct in lateral view (figure 24).

TYPE LOCALITY: Male type from California, No. 2839 (Roewer No. 8374), in ZSM, is in good condition.

DISTRIBUTION: USA: California.

DISCUSSION: This species is closely related to *E. purpusi, E. papillatus,* and *E. vicinus* Muma.

Eremobates vicinus Muma

Eremobates vicinus Muma, 1963, p. 3.

DIAGNOSIS: Distinguished from the closely related *E. purpusi* and *E. papillatus* by 8 elongate abdominal ctenidia, a scopula of about 60 distinct papillae, and a distinctive cheliceral profile.

The species is adequately described in Muma (1963).

TYPE LOCALITY: Male holotype from 11 miles north of Mercury, Nevada, 2/10 mile east of Mercury highway, south of Well 5B road on May 19, 1961, (5AA5C), in AMNH.

DISTRIBUTION: USA: Nevada.

DISCUSSION: *E. papillatus, E. purpusi, E. villosus,* new name, and this species all seem to be closely related.

Eremobates villosus, new name

Eremobates purpusi (Roewer), *sensu* Muma, 1951, p. 70 (not *E. purpusi* [Roewer]).

DIAGNOSIS: Males are distinguished by 8 elongate abdominal ctenidia, a dense scopula of about 150 papillae, and a distinctive cheliceral profile. Females have a highly arched, semicircular median area of the opercula.

The species is adequately described as *E. purpusi* in Muma (1951).

TYPE LOCALITY: Male holotype and female allotype from Point McCloud Campground, Shasta Lake, Shasta County, California, early June 1959, by R. Graham, in AMNH.

DISTRIBUTION: USA: California.

DISCUSSION: The relationship of this species with other species of the group is obscure.

PALLIPES GROUP

(See Table 7.)

Eremobates dilatatus (Putnam)

Datames dilatatus Putnam, 1883, p. 259.

Eremobates dilatatus (Putnam), Muma, 1951, p. 78.

DIAGNOSIS: The type of this species is badly discolored and mangled, but it is distinguishable as a member of this group and is closely related to *E. durangonus* Roewer. The opercula seem to be significantly different from other species of the group.

The type is described as well as possible in Muma (1951).

TYPE LOCALITY: Female type with no data in ANS.

DISTRIBUTION: Unknown.

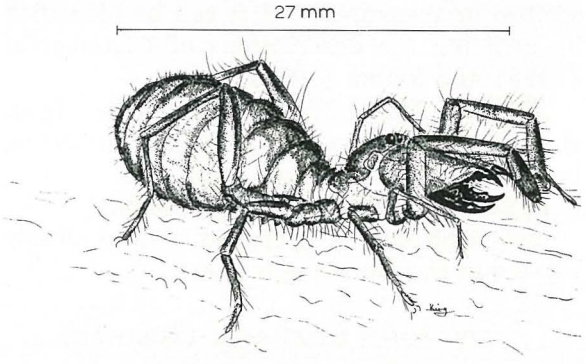
Eremobates durangonus Roewer

Eremobates durangonus Roewer, 1934, p. 557.

DIAGNOSIS: Males are distinguished by dusky palpal tarsi and metatarsi, a scopula of 10-40 widely spaced papillae, no ctenidia, and the cheliceral profile. Females have the same coloration and a posterior median notch in the opercula.

The species is adequately described in Muma (1951).

TYPE LOCALITY: Type females (2) are recorded by Roewer from Dinamita, Durango, Mexico (Roewer No. 9256), as in MNHN. The types cannot be located and



Eremobates durangonus ♀

are presumed to be lost, destroyed, or not deposited as cited.

DISTRIBUTION: Mexico: Durango; USA: Arizona, California, Texas.

DISCUSSION: Although the types of the species have not been seen, Roewer's (1934) description and figures permit placement.

The opercula of this widespread species are quite variable, and one or more additional species may be confused here. *E. dilatatus* is closely related but seemingly distinct.

Eremobates pallipes (Say)

Figures 25 to 27.

Galeodes pallipes Say, 1823, p. 3.

Galeodes subulata Say, 1823, p. 3.

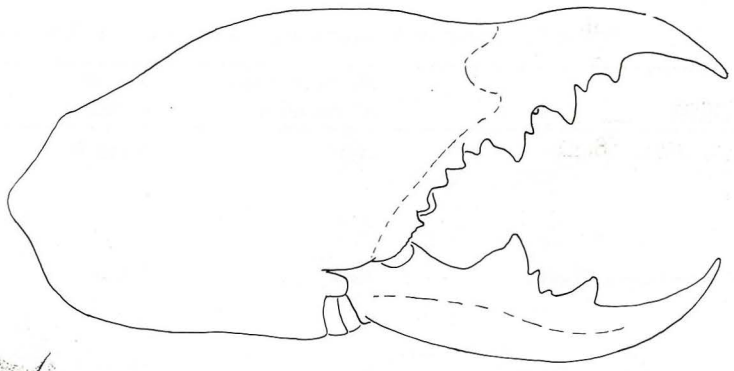
Gluvia cinerascens C. L. Koch, 1842, p. 355.

Gluvia formicarius C. L. Koch, 1842, p. 355 (new synonymy).

Figs. 18 and 19. *Eremobates hessei* (Roewer). 18. Ectal view right female chelicera. 19. Ventral view of female genital opercula.

Figs. 20 and 21. *Eremobates purpusi* (Roewer). 20. Ectal view right female chelicera. 21. Ventral view of female genital opercula.

Figs. 22 and 23. *Eremobates titschacki* (Roewer). 22. Ectal view left male chelicera. 23. Male abdominal ctenidia.



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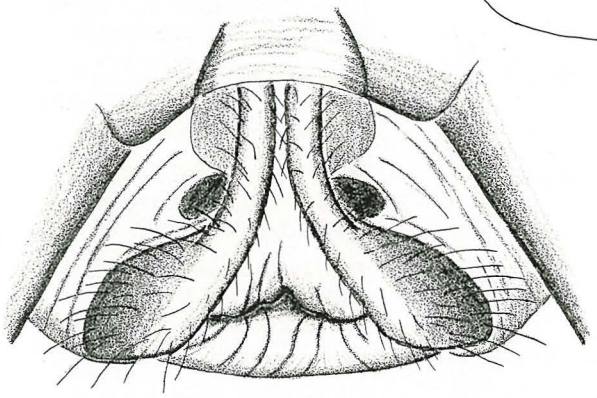

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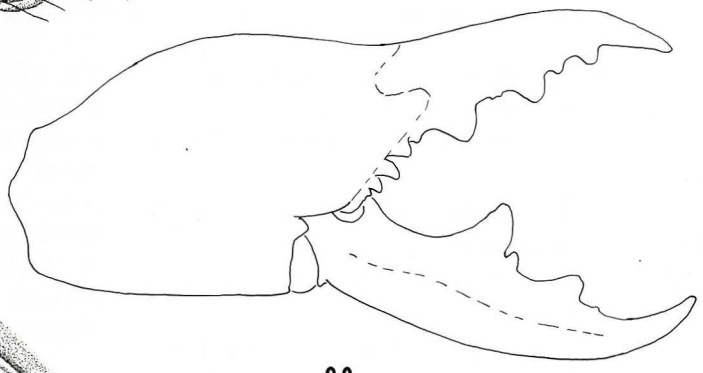

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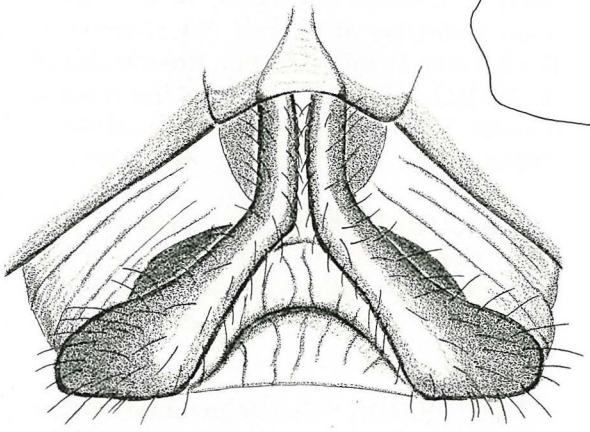

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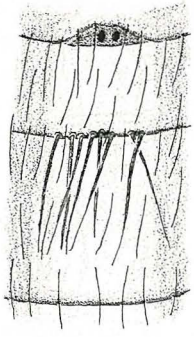

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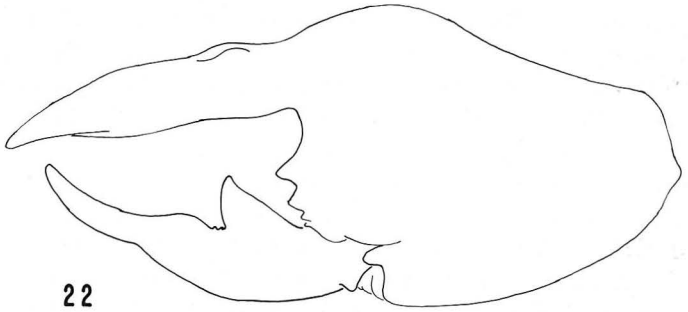

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Table 7. Some male diagnostic characters for *Eremobates pallipes* species-group.

Species	No. and form of ctenidia	No. of papillae	Other
E. pallipes (Say)	None	None-70	Pale to faintly dusky palpal tarsi and metatarsi; fixed finger straight: fondal notch wide
E. suspectus Muma	None	None	Dusky palpal tarsi and metatarsi; fixed finger and lightly curved; fondal notch wide
E. durangonus Roewer	None	10-40	Dusky to dark palpal tarsi and metatarsi; fixed finger lightly curved; fondal notch wide
E. simoni, new name	2 flattened	50-100	Dark palpal tarsi and metatarsi; fixed finger curved; fondal notch narrow
E. putnami (Banks)	4 flattened	None	Pale eye tubercle and black malleoli; fixed finger straight; fondal notch wide

Datames lentiginosus Kraepelin, 1899, p. 244 (new synonymy).

Eremostata arizonica Roewer, 1934, p. 572.

Eremostata californica Roewer, 1934, p. 573 (new synonymy).

Eremostata dinamita Roewer, 1934, p. 573 (new synonymy).

Eremobates pallipes (Say), *sensu* Fichter, 1940, p. 355 (not *E. pallipes* [Say] of other authors).

DIAGNOSIS: Males are distinguished by pale legs and palpi, a scopula of 0-70 papillae, no ctenidia, and the cheliceral profile. Females are similarly colored and have distinctive though somewhat variable opercula.

The species is adequately described by Fichter (1940) and Muma (1951).

TYPE LOCALITY: Female type of *Galeodes pallipes* Say and male type of *Galeodes subulata* Say from 20 miles south of Denver, Colorado, near the mouth of the Platte Canyon, in the foothills of the Rocky Mountains, have been lost or destroyed. Male lectotype of *Gluvia cinerascens* C. L. Koch, Roewer No. 9131, from Colorado, in MNHN. Female type of *Eremostata arizonica* Roewer from Arizona, Roewer No. 8481, in ZSM. Female type of *Eremostata californicus* Roewer from California, Roewer No. 9132, in MNHN. Female type of *Eremostata dinamita* Roewer (labeled *Eremogyna dinamita* Roewer) from Dinamita, Durango, Mexico, Roewer No. 8389, in MNHN. Female lectotype of *Gluvia formicarius* C. L. Koch, from Pribla, Mexico, Roewer No. 8335, in ZMHU. Female type of *Datames lentiginosis* Kraepelin, no data, in Museum of Turin, Italy.

DISTRIBUTION: USA: Arizona, California, Colorado, Idaho, Kansas, Missouri, Montana, Nebraska, New Mexico, North Dakota, Oklahoma, Texas, Utah, Wyoming; Mexico: Durango.

DISCUSSION: The determination and fixing of this species have been adequately discussed by Fichter (1940) and Muma (1951). The opercula of the types of *E. californica*, *E. dinamita*, and *E. arizonica* are shown in figures 25, 26, and 27, respectively, for comparison with those of *E. pallipes* in Muma (1951). The opercula of the type of *G. formicarius* approximate those shown in figure 114 in Muma (1951). Two specimens in the museum at Turin, Italy, are labeled *D. lentiginosus, typus*, but only one agrees with Kraepelin's (1899) description; the other is a female of *Eremobates aztecus* Pocock.

Eremobates putnami (Banks)

Datames putnami Banks, 1898, p. 290.

Eremobates putnami (Banks), Muma, 1951, p. 79.

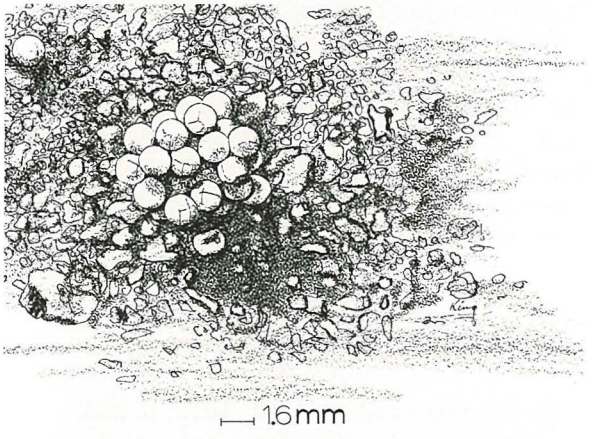
DIAGNOSIS: Males are distinguished by a light eye tubercle, black malleoli, 4 flattened scimitarlike ctenidia, the lack of a scopula, and the cheliceral profile. Females are unknown.

The species is adequately described in Muma (1951).

TYPE LOCALITY: Cotype (♂) and immature from San José del Cabo, Mexico (?), in MCZ.

DISTRIBUTION: Mexico.

DISCUSSION: Muma (1951) has discussed the group placement of this species.



Eremobates durangonus egg cluster in soil

Eremobates simoni, new name

Eremobates californicus (Simon), *sensu* Muma, 1951, p. 76 (not *Datames californicus* Simon).

DIAGNOSIS: Males have a dorsally curved fixed cheliceral finger, a scopula of 50-100 papillae, and 2 short thickened ctenidia. Females are readily distinguished by medially bowed opercula.

The species is adequately described as *E. californicus* by Muma (1951).

TYPE LOCALITY: Male holotype from Gillespie County, Texas, June 14, 1934, by J. N. Knull, in AMNH.

DISTRIBUTION: USA: Arizona, California, New Mexico, Texas.

DISCUSSION: This species was referred to as *E. californicus* on the basis of Roewer's (1934) description and figures. Examination of Simon's type has revealed that it is immature and cannot be properly placed according to presently recognized characters and systematics. The specimens described by Muma (1951) are, therefore, renamed here.

Eremobates suspectus Muma

Eremobates suspectus Muma, 1951, p. 79.

DIAGNOSIS: Males are readily distinguished from *E. pallipes* by the lack of a scopula and dusky segments on the legs and palpi. The lack of ctenidia distinguishes it from *E. putnami* and *E. simoni*. Placement of females is questionable.

The species is adequately described in Muma (1951).

TYPE LOCALITY: Male holotype from White Mountains, 10 miles northeast of White River, Arizona, July 8-11, 1940, by Gertsch and Hook, in AMNH.

DISTRIBUTION: USA: Arizona, Colorado.

DISCUSSION: This species, as discussed by Muma (1951), may be a synonym of *E. durangonus* or *Eremobates toltecus* (Pocock); additional study specimens are needed before a decision can be reached.

ANGUSTUS GROUP

Eremobates angustus Muma

Eremobates angustus Muma, 1951, p. 80.

DIAGNOSIS: Males of this species are distinguished from the closely related *Eremobates cruzi* Muma by the lack of a scopula and minor differences in the cheliceral profile. Females can be identified by the opercular structure.

The species is adequately described in Muma (1951).

TYPE LOCALITY: Male holotype from Madera Canyon, Santa Rita Mountains, Arizona, July 16, 1940, by Gertsch and Hook, in AMNH.

DISTRIBUTION: USA: Arizona, Texas.

Eremobates cruzi Muma

Eremobates cruzi Muma, 1951, p. 82.

DIAGNOSIS: Males of this species are distinguished from those of *E. angustus* by a scopula of 30-40 papillae and minor differences in cheliceral profile. Females are unknown.

The species is adequately described in Muma (1951).

TYPE LOCALITY: Male holotype from Bear Valley, Santa Cruz County, Arizona, July 20, 1949, in MCZ.

DISTRIBUTION: USA: Arizona.

DISCUSSION: This species is known only from 3 males.

AZTECUS GROUP

Eremobates aztecus Pocock

Figures 28 to 31.

Eremobates aztecus Pocock, 1902, p. 60.

Eremoperna azteca (Pocock), Roewer, 1934, p. 558.

DIAGNOSIS: Males are distinguished by the lack of a scopula, the lack of ctenidia, and pale palpi and legs. Females are similarly colored with distinctive opercula.

MALE TYPE: Total length 24.0 mm.

	Length	*Width*
Chelicerae	5.8 mm	2.8 mm
Propeltidium	3.0 mm	4.2 mm
Palpus	21.0 mm	
Leg I	18.0 mm	
Leg IV	28.0 mm	

Color in alcohol pale yellow except as follows: propeltidium narrowly dusky on anterior margin; abdominal tergites dusky purple.

Dentition as shown in figures 28 and 29, movable finger with distinct mesal tooth, anterior tooth of movable finger reduced to an indistinct ridge, and fondal notch with aborted teeth. Palpi with usual clothing except cylinder bristles fewer than usual and no scopula. Abdominal ctenidia absent.

FEMALE TYPE: Total length 33.5 mm.

	Length	*Width*
Chelicerae	8.0 mm	3.7 mm
Propeltidium	4.2 mm	6.9 mm
Palpus	20.0 mm	
Leg I	19.0 mm	
Leg IV	27.0 mm	

Color in alcohol same as that of male except abdominal tergites darker.

Structure typical of genus. Dentition as shown in figure 30; mesal tooth of movable finger present. Abdomen with trace ctenidia. Palpi without scopula but otherwise with typical bristles, setae, and spines.

Opercula as shown in figure 31.

TYPE LOCALITY: Male and female types from Guanajuato, Mexico, in BMNH.

DISTRIBUTION: Mexico.

DISCUSSION: The mesodorsal position of the male cheliceral mesal groove, the multiple intermediate teeth of the female movable cheliceral finger, and the distinctive opercula have prompted the placement of this species in a separate species group.

NOMINA DUBIA

Eremobates audax Hirst

Eremobates audax Hirst, 1912, p. 234.

DISCUSSION: The type has not been located, and the species was inadequately described; so no placement can be made at this time.

Eremobates californicus (Simon)

Datames californicus Simon, 1879, p. 143.

Eremobates californicus (Simon), Kraepelin, 1901, p. 125 (not *E. californicus* [Simon], *sensu* Muma, 1951).

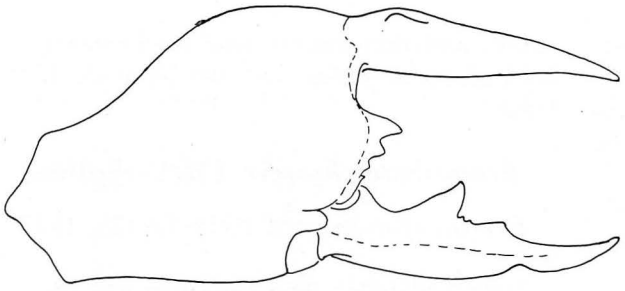
Eremopus californicus (Simon), Roewer, 1934, p. 564.

TYPE LOCALITY: Female type from

Fig. 24. *Eremobates tuberculatus* (Kraepelin), ectal view of right male chelicera.

Figs. 25 to 27. *Eremobates pallipes* (Say), variations of female genital opercula from ventral view.

Figs. 28 to 31. *Eremobates aztecus* Pocock. 28. Ectal view of right male chelicera. 29. Mesal view of male fixed finger. 30. Ectal view of left female chelicera. 31. Ventral view of female genital opercula.



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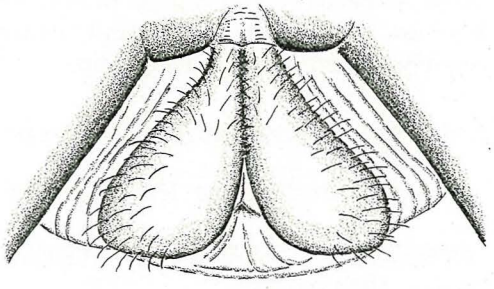

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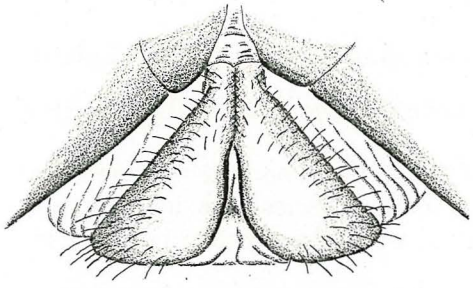

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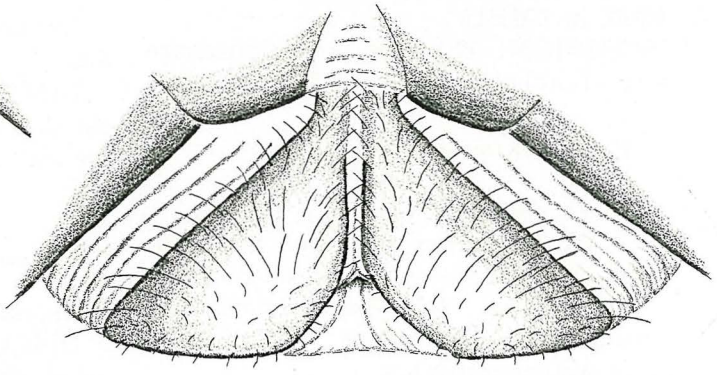

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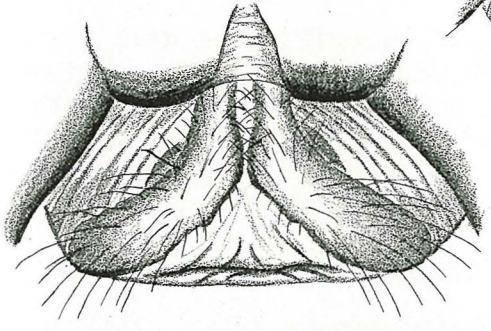

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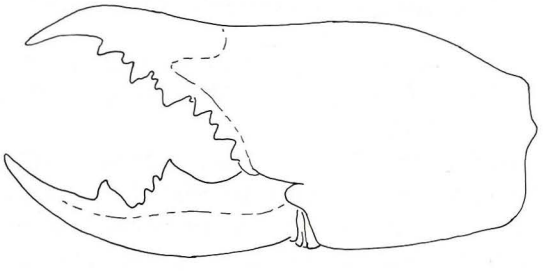

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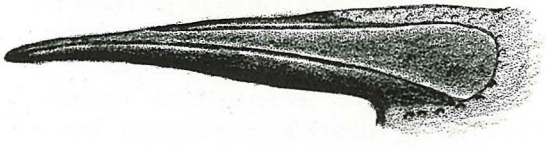

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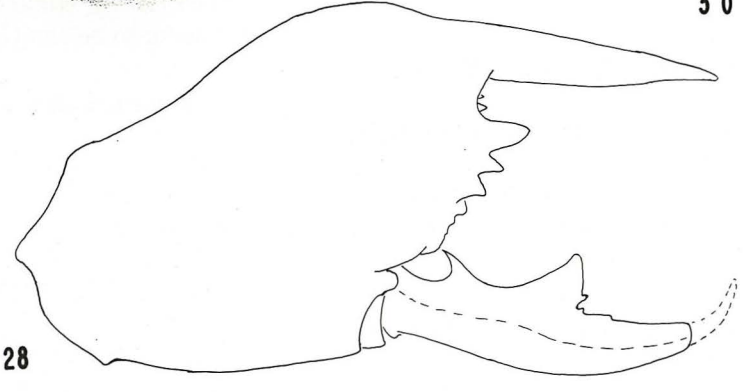


28

Mariposa, California, No. 1516, Roewer No. 9133, in the MNHN.

DISCUSSION: The type is immature, possibly an immature male, and cannot be properly placed in a species group.

Eremobates carolinianus (Kraepelin)

Datames carolinianus Kraepelin, 1899, p. 244.

Eremostata caroliniana (Kraepelin), Roewer, 1934, p. 573.

TYPE LOCALITY: Female type from North Carolina, 1900, by Morrison, Roewer No. 8330, in ZMHU.

DISCUSSION: The type is an immature female and cannot be properly placed.

Eremobates caspari (Marx)

Datames caspari Marx, 1892, p. 254.

DISCUSSION: Marx described the feeding habits of this species but cited no diagnostic characters. This species must then be considered *nomen nudum*, without taxonomic or systematic status.

Eremobates constricta (Putnam)

Datames constricta Putnam, 1883, p. 258.

TYPE LOCALITY: Male type with no data in ANS.

DISCUSSION: As stated in Muma (1951), the specimen in the type vial does not conform in size, coloration, or structure with Putnam's description and figures, and must be considered invalid. This species cannot be placed from Putnam's description and figures.

Eremobates dorsalis (Roewer)

Eremopus dorsalis Roewer, 1934, p. 564.

TYPE LOCALITY: Female type from California, Roewer No. 3016, in SNG.

DISCUSSION: The type is immature and cannot be properly placed.

Eremobates elongatus (C. L. Koch)

Gluvia elongatus C. L. Koch, 1842, p. 355.

DISCUSSION: The type has not been located, and the species was inadequately described, so no placement can be made at this time.

Eremobates hystrix (Mello-Leitão)

Eremoperna hystrix Mello-Leitão, 1942, p. 307.

DISCUSSION: The type has not been located, and the species was inadequately described, so no placement can be made at this time.

Eremobates ingens Mello-Leitão

Eremobates ingens Mello-Leitão, 1942, p. 305.

DISCUSSION: The type has not been located, and the species was inadequately described, so no placement can be made at this time.

Eremobates praecox (C. L. Koch)

Gluvia praecox C. L. Koch, 1842, p. 355.

DISCUSSION: The type has not been located, and the species was inadequately described, so no placement can be made at this time. As stated by Pocock (1902), this species probably was erroneously labeled.

Eremobates subulata (Girard)

Galeodes subulata Girard, 1853, p. 270 (not *Galeodes subulata* Say, 1823).

TYPE LOCALITY: Male type from northwest Texas deposited in ANS has been lost or destroyed.

DISCUSSION: The species cannot be placed from Girard's description but does not seem to be the *Galeodes subulata* of Say.

Eremobates sulfureus (Simon)

Datames sulfureus Simon, 1879, p. 142.

Eremostata sulfurea (Simon), Roewer, 1934, p. 572.

TYPE LOCALITY: Female type from Colorado, No. 1315, Roewer No. 9136, in MNHN.

DISCUSSION: The type is immature, possibly a penultimate male, and cannot be properly placed in a species group.

Eremobates toltecus (Pocock)

Gluvia tolteca Pocock, 1895, p. 95.

Eremobates toltecus (Pocock), Kraepelin, 1901, p. 125.

DISCUSSION: The type has not been located, and the species was inadequately described, so no placement can be made at this time.

Genus *Eremothera* Muma

Eremothera Muma, 1951, p. 82.

Eremothera barberi Muma

Eremothera barberi Muma, 1951, p. 83.

DIAGNOSIS: Females are distinguished by dark palpal tips and the divergent opercula. Males are unknown.

The species is adequately described in Muma (1951).

TYPE LOCALITY: Female holotype from Brownsville, Texas, by H. S. Barber, in USNM.

DISTRIBUTION: USA: Texas.

DISCUSSION: This species was placed in this genus on the basis of fondal dentition. Females of *Eremothera sculpturata* Muma exhibit similar fondal dentition.

Eremothera sculpturata Muma

Eremothera sculpturata Muma, 1951, p. 82.

DIAGNOSIS: Males are distinguished by 6 elongate hairlike ctenidia and no palpal scopula. Females have pale palpi and parallel opercula.

The species is adequately described in Muma (1951).

TYPE LOCALITY: Male holotype from Arizona, 1923, by Mr. Ortembery, in AMNH.

DISTRIBUTION: USA: Arizona.

DISCUSSION: This unique species has been collected at several localities in Arizona, but to date the sexes have not been collected together.

Genus *Horribates* Muma

Horribates Muma, 1962, p. 7.

Horribates spinigerus Muma

Horribates spinigerus Muma, 1962, p. 7.

DIAGNOSIS: Since this species is the only known representative of the genus, it is readily distinguished by the generic characters. Females have flattened, poorly defined opercula bearing a pair of distinct pits. Males are unknown.

The species is adequately described in Muma (1962).

TYPE LOCALITY: Female holotype from 2 miles east of Anza, Borrego State Park, San Diego County, California, April 22, 1960, by W. J. Gertsch, in AMNH.

DISTRIBUTION: USA: California, Nevada.

DISCUSSION: The above Nevada record is based on 2 immatures from Mercury. The species or genus may prove to be a widely distributed but rare form.

SUBFAMILY THEROBATINAE MUMA, 1951

Therobatinae Muma, 1951, p. 85.

Genus *Eremochelis* Roewer

Eremochelis Roewer, 1934, p. 570.
Therobates Muma, 1951, p. 85 (new synonymy).

KEY TO SPECIES-GROUPS

(MALES)

1. Apical plumose bristle of flagellum complex conspicuously enlarged and flattened 2
   Apical plumose bristle of flagellum complex not enlarged or flattened 4
2. Groove of fixed finger dorsal to dorsomesial in position ..... *striodorsalis* group
   Groove of fixed finger mesoventral in position 3
3. Mesoventral groove weakly hollowed and ridged; movable finger modified apically ..... *andreasana* group
   Mesoventral groove a distinct cup or slot; movable finger not modified apically ..... *branchi* group
4. Mesoventral groove indistinct; movable finger modified apically ..... *imperialis* group
   Mesoventral groove distinct; movable finger not modified apically 5
5. Mesoventral groove a wide hollow cup with distinct carinae .. *bilobatus* group
   Mesoventral groove a narrow slot without distinct carinae ..... *arcus* group

BRANCHI GROUP

(See Table 8.)

Eremochelis bidepressus (Muma)

Hemerotrecha bidepressa Muma, 1951, p. 105.

Therobates arcellus Muma, 1962, p. 13 (male, not female).

Therobates bidepressus (Muma), Muma, 1963, p. 6.

DIAGNOSIS: Males are distinguished by 2 elongate bladelike ctenidia, no palpal scopula, characteristic chelicerae, and distinctive coloration. Females similarly colored with distinctive pits in the opercula.

The species is adequately described in Muma (1951 and 1962).

TYPE LOCALITY: Female holotype from Reno, Nevada, June 1, 1941, by Ira La Rivers, in AMNH.

DISTRIBUTION: USA: Nevada.

DISCUSSION: This species was originally placed in *Hemerotrecha* Banks because of the opercular structure. Correct association of the sexes by Muma (1963) indicated the above cited generic placement and the close relationship of *Eremochelis insignitus* Roewer, *E. morrisi* (Muma), and this species.

Eremochelis branchi (Muma)

Therobates branchi Muma, 1951, p. 85.

DIAGNOSIS: Males are distinguished by the cheliceral profile, a palpal scopula of 40-50 wide spaced papillae, and 4 linear ctenidia that are longer than the succeeding abdominal sternite. Females have emarginate lateral margins of the opercula.

The species is adequately described in Muma (1951).

TYPE LOCALITY: Male holotype from Twentynine Palms, California, July-August 1945, by Jefferson H. Branch, in AMNH.

DISTRIBUTION: USA: Arizona, California, Nevada.

DISCUSSION: *E. gertschi* (Muma), *E. medialis* (Muma), and this species seem to form a compact species-group within the *branchi* group.

Eremochelis coloradensis (Muma)

Therobates coloradensis Muma, 1962, p. 9.

DIAGNOSIS: This species is distinguished from the apparently closely related *E. iviei* (Muma) and *E. malkini* (Muma) by the presence of 6 trace ctenidia, a thin scopula of about 20 widely spaced papillae, and details of the opercular structure. Males are unknown.

This species is adequately described in Muma (1962).

TYPE LOCALITY: Female holotype from Grand Canyon, Arizona, July 2, 1956, in AMNH.

DISTRIBUTION: USA: Arizona.

DISCUSSION: The present generic placement should be considered tentative, as final placement of a species usually is predicated on male sexual characteristics.

Eremochelis gertschi (Muma)

Therobates gertschi Muma, 1951, p. 86.

DIAGNOSIS: This species is distinguished from the apparently closely related *E. branchi* by dusky palpal femora and angularly emarginate lateral margins of the opercula. Males are not known.

This species is adequately described in Muma (1951).

TYPE LOCALITY: Female holotype from Zion National Park, July 4-5, 1932, at light, by W. J. Gertsch, in AMNH.

DISTRIBUTION: USA: Utah.

DISCUSSION: It is possible that this is the female of *E. medialis,* but the difference in size and widely separated type localities indicate otherwise.

Eremochelis insignitis Roewer

Eremochelis insignitis Roewer, 1934, p. 570.

Hemerotrecha insignita (Roewer), Muma, 1951, p. 108 (misplaced).

Therobates cameronensis Muma, 1951, p. 90 (new synonymy).

Therobates cameronensis Muma, Muma, 1962, p. 10 (morphologic correction).

Therobates arcellus Muma, 1962, p. 13 (female, not male).

DIAGNOSIS: Males are distinguished by small size, characteristic cheliceral profile, a long narrow palpal scopula of 20-25 papillae, and 4 hairlike ctenidia that are longer than the succeeding abdominal sternite. Females have elongate, laterally lobate opercula.

This species is adequately described by Muma (1951) as *T. cameronensis* with a correction in ctenidial number by Muma (1962).

TYPE LOCALITY: Male type of *E. insignitis* Roewer from California, no cited locality, Roewer No. 3014, in SNG; male holotype of *T. cameronensis* Muma from Cameron, Arizona, April 30, 1936, at 4,500 feet, by O. Bryant, in AMNH; female allotype of

Table 8. Some male diagnostic characters for the *Eremochelis branchi* species-group.

Species	No. of ctenidia	No. of papillae	Other
E. bidepressus (Muma)	2 bladelike	None	Dusky striped legs and palpi; meso-ventral groove long
E. morrisi (Muma)	2 short, heavy	40±	Dusky legs and propeltidium; meso-ventral groove short
E. medialis (Muma)	4 linear	None	Palpal tarsi and distal ends of metatarsi faintly dusky; meso-ventral groove short
E. branchi (Muma)	4 linear	40-50	Palpal tarsi and distal ends of metatarsi faintly dusky; meso-ventral groove long
E. insignitis Roewer	4 hairlike	20-25	Palpal tarsus and metatarsus dark; meso-ventral groove long

T. arcellus Muma from Mercury, Nevada, April 7, 1960, by Elden Beck, in AMNH.

DISTRIBUTION: USA: Arizona, California, Colorado, Nevada.

DISCUSSION: The ctenidia on the type have been broken off, which apparently caused Roewer (1934) to figure them incorrectly.

This species, *E. morrisi* (Muma), and *E. bidepressus* (Muma) seem to be closely related.

Eremochelis iviei (Muma)

Therobates iviei Muma, 1951, p. 88.

DIAGNOSIS: Females are distinguished by 6 barely distinguishable trace ctenidia and lobate but divergent opercula. Males are unknown.

The species is adequately described in Muma (1951).

TYPE LOCALITY: Female holotype from Colossal Cave Camp, Arizona, September 8, 1941, by Wilton Ivie, in DZUU.

DISTRIBUTION: USA: Arizona.

DISCUSSION: The present generic placement must be considered tentative until males have been identified.

Eremochelis malkini (Muma)

Therobates malkini Muma, 1951, p. 88.

DIAGNOSIS: Females differ from the closely related *E. iviei* and *E. coloradensis* in color pattern and details of the opercula. Males are unknown.

The species is adequately described in Muma (1951).

TYPE LOCALITY: Female holotype from southern rim of Grand Canyon, Arizona, June 29, 1947, by Borys Malkin, in AMNH.

DISTRIBUTION: USA: Arizona, California, Utah.

DISCUSSION: This generic placement must be considered tentative, since males are required for accurate generic placement.

Eremochelis medialis (Muma)

Therobates medialis Muma, 1951, p. 90.

DIAGNOSIS: Males are distinguished from *E. branchi* by a shorter mesoventral groove, details of the cheliceral profile, and no scopula. Females are unknown.

The species is adequately described in Muma (1951).

TYPE LOCALITY: Male holotype from California; no further data in the DZUU.

DISTRIBUTION: USA: California.

DISCUSSION: This species is very closely related to *E. branchi* and may be the male of *E. gertschi.*

Eremochelis morrisi (Muma)

Therobates morrisi Muma, 1951, p. 90.

DIAGNOSIS: Males of this species are distinguished from *E. insignitis* by uniformly dusky legs and propeltidium, a shorter mesoventral cheliceral groove, 40 papillae in the scopula, and 2 short heavy ctenidia. Females are unknown.

The species is adequately described in Muma (1951).

TYPE LOCALITY: Male holotype from one mile north of San Dimas Park in San Dimas Canyon, Los Angeles, California, August 6, 1947, by G. D. Morris, in AMNH.

DISTRIBUTION: USA: California.

DISCUSSION: This species, *E. insignitis,* and *E. bidepressus* all seem to be closely related.

BILOBATUS GROUP

Eremochelis acrilobatus (Muma)

Therobates acilobatus Muma, 1962, p. 10.

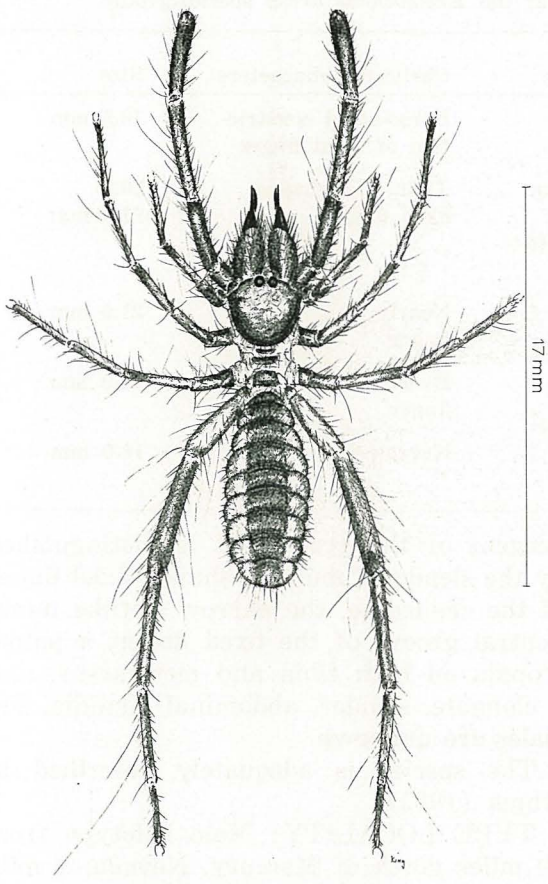
DIAGNOSIS: Females are distinguished from those of *E. bilobatus* (Muma) by lighter coloration and acutely pointed median lobes of the opercula. Males are unknown.

The species is adequately described in Muma (1962).

TYPE LOCALITY: Female holotype from Quail Springs, Joshua Tree National Monument, California, April 12, 1950, by W. F. Barr, in AMNH.

DISTRIBUTION: USA: California.

DISCUSSION: This species seems to be closely related to *E. bilobatus,* but the fondal tooth formula differs. Further, the lobate inner margins of the opercula may not sig-



Eremochelis bilobatus ♂

nify relationship since *Hemerotrecha serrata* Muma also has lobate opercula.

Eremochelis bilobatus (Muma)

Datames pallipes (Say), *sensu* Simon, 1879, p. 139 (not *pallipes* Say).

Eremobates pallipes (Say), *sensu* Banks, 1900, p. 427 (also Kraepelin [1901] and Roewer [1934] but not *pallipes* Say).

Therobates bilobatus Muma, 1951, p. 92.

DIAGNOSIS: Males are distinguished by the striking coloration, distinctive cheliceral profile, lack of a scopula, and 4 linear blunt-tipped ctenidia. Females have small rounded medial lobes of the opercula.

The species is adequately described in Muma (1951). It can be recognized from the descriptions as *E. pallipes* of Kraepelin (1901) and Roewer (1934).

TYPE LOCALITY: Male holotype from Davis Mountains, Texas, July 2, 1936, by J. N. Knull, in AMNH.

DISTRIBUTION: USA: Arizona, California, Colorado, New Mexico, Texas.

DISCUSSION: This species was misidentified for many years. It seems to form a somewhat heterogeneous species group with *E. acrilobatus* and *E. plicatus*.

Eremochelis plicatus (Muma)

Therobates plicatus Muma, 1962, p. 11.

DIAGNOSIS: Males are readily identified by the folded tip of the fixed cheliceral finger, the narrow curved fondal notch, the short mesoventral groove, a narrow linelike scopula of 10-20 papillae, and the lack of ctenidia. Females have distinctive ovate opercula.

The species is adequately described in Muma (1962).

TYPE LOCALITY: Male holotype from Mercury, Nevada, July 15, 1960, by D. Elden Beck and Associates, in AMNH.

DISTRIBUTION: USA: Nevada.

DISCUSSION: Since the females of this species have the ectal fondal tooth formula different from that of the males, it is possible that the species will later have to be moved to a different species group.

There is a possibility that this species is the *Gluvia elongatus* of Koch (1842), but the type of the latter has not been located.

ARCUS GROUP

(See Table 9.)

Eremochelis arcus (Muma)

Therobates arcus Muma, 1962, p. 15.

DIAGNOSIS: Males are distinguished by the evenly arched fixed cheliceral finger, a palpal scopula of 50-60 widely spaced papillae, and 4 long flattened ctenidia. Females have the opercula extended laterally and truncate.

The species is adequately described in Muma (1962).

Table 9. Some male diagnostic characters of the *Eremochelis arcus* species-group.

Species	No. and form of ctenidia	No. of papillae	Cheliceral characters	Size
E. nudus (Muma)	None	None	Dorso-basal constriction of fixed finger	13.5 mm
E. flexacus (Muma)	2 long, slender	Many on tibia and metatarsus	Tubular S-shaped fixed finger	20.0-21.0 mm
E. cuyamacanus (Muma)	4 long, flattened	40	Nearly straight fixed finger	21.0 mm
E. arcus (Muma)	4 long, flattened	50-60	Evenly arched fixed finger	14.0 mm
E. macswaini (Muma)	4 short, linear	50-60	Narrow fondal notch	16.0 mm

TYPE LOCALITY: Male holotype from Taft, California, February 25, 1921, by E. O. Essig, in AMNH.

DISTRIBUTION: USA: California, Nevada.

DISCUSSION: At the present time, the species included in the *arcus* group seem to be somewhat heterogeneous, but all appear to be at least loosely related to this species.

Eremochelis cuyamacanus (Muma)

Therobates cuyamacanus Muma, 1962, p. 17.

DIAGNOSIS: This species is very closely related to *E. arcus,* but males have the fixed cheliceral finger nearly straight and a scopula of 40 or fewer papillae. Females are not known.

The species is adequately described in Muma (1962).

TYPE LOCALITY: Male holotype from Cuyamaca, California, April 20, 1950, by Linsley and McSwain, in AMNH.

DISTRIBUTION: USA: California.

DISCUSSION: Since this species varies from *E. arcus* in the fondal tooth formula, additional specimens could well indicate another group placement.

Eremochelis flexacus (Muma)

Therobates flexacus Muma, 1963, p. 3.

DIAGNOSIS: This species is the most divergent of the group. It is distinguished by the slender, tubular S-shaped fixed finger of the chelicerae, the narrow slotlike mesoventral groove of the fixed finger, a palpal scopula on both tibia and metatarsus, and 2 elongate, slender, abdominal ctenidia. Females are unknown.

The species is adequately described in Muma (1963).

TYPE LOCALITY: Male holotype from 10 miles north of Mercury, Nevada, 1 mile east of Mercury Highway, March 2, 1961 (5EL4C), by D. M. Allred and D. Elden Beck, in AMNH.

DISTRIBUTION: USA: Nevada.

DISCUSSION: Similar coloration to *E. arcus*; the fondal tooth formula I, III, II, IV prompts placement in the *arcus* species-group for the present. Otherwise, this species is distinctive for the genus.

Eremochelis macswaini (Muma)

Therobates macswaini Muma, 1962, p. 17.

DIAGNOSIS: Males are distinguished from the closely related *E. arcus* by the narrow, fondal notch and 4 short needlelike ctenidia. The fondal tooth formula is I, II, III, IV. Females are unknown.

The species is adequately described in Muma (1962).

TYPE LOCALITY: Male holotype from Crystal Lake, Los Angeles County, California, June 29, 1950, by J. W. McSwain, in AMNH.

DISTRIBUTION: USA: California.

DISCUSSION: This species is similar to *E. cuyamacanus* in fondal tooth formula, but has fewer ctenidia in the scopula and short ctenidia.

Eremochelis nudus (Muma)

Therobates nudus Muma, 1963, p. 4.

DIAGNOSIS: This species is distinguished from other species of the group by the dorso-basal constriction of the fixed finger and the lack of a scopula or ctenidia. Females are unknown.

The species is adequately described in Muma (1963).

TYPE LOCALITY: Male holotype from 28 miles north of Mercury, Nevada, 3 miles west of Mercury Highway, April 20, 1961 (1BH20C), by D. M. Allred and D. Elden Beck, in AMNH.

DISTRIBUTION: USA: Nevada.

DISCUSSION: The fondal tooth formula and similar cheliceral profile relate this species to *E. arcus,* but it is much smaller.

ANDREASANA GROUP

Eremochelis andreasana (Muma)

Therobates andreasana Muma, 1962, p. 16.

DIAGNOSIS: Males are distinguished by a shallow mesal groove on the movable finger, an undulate ventral margin of the fixed finger, and 2 very long ctenidia that extend beyond the anterior margin of the succeeding abdominal sternite. Females have bootlike opercula and reduced cheliceral dentition.

The species is adequately described in Muma (1962).

TYPE LOCALITY: Male holotype from Andreas Canyon, Riverside County, California, April 24, 1954, by J. G. Rosen, in AMNH.

DISTRIBUTION: USA: California; Mexico: Baja.

DISCUSSION: Although this species is described as typical of the group, it probably represents an extreme of intra-group variation with *E. larreae* (Muma) representing the other extreme.

Eremochelis larreae (Muma)

Therobates larreae Muma, 1962, p. 21.

DIAGNOSIS: Males have a cuplike mesal groove on the movable cheliceral finger, an apically hooked fixed finger, and 4 very long abdominal ctenidia. Females have the bootlike opercula pitted anteriorly and produced posteriorly near the mesal margin.

The species is adequately described in Muma (1962).

TYPE LOCALITY: Male holotype from Mule Canyon, Calico Mountains, San Bernardino, California, by beating *Larrea,* March 17, 1955, by P. D. Hurd, in AMNH.

DISTRIBUTION: USA: California.

DISCUSSION: See discussion under *E. andreasana.*

IMPERIALIS GROUP

Eremochelis imperialis (Muma)

Therobates imperialis Muma, 1951, p. 94.

Therobates attritus Muma, 1963, p. 4 (new synonymy).

DIAGNOSIS: Males are distinguished by a cuplike dorso-mesal groove on the movable cheliceral finger, the lack of a scopula, and 4 long slender ctenidia. Females have laterally hooked and truncate opercula.

Males are adequately described in Muma (1951), females in Muma (1963).

TYPE LOCALITY: Male holotype of *T. imperialis* from Palo Verde, Imperial County, California, August 17, 1946, by P. D. Hurd, in UCBC. Female holotype of *T. attritus* from 28 miles north of Mercury, Nevada, 3 miles north of Mercury Highway, April 27, 1961 (1BB1C), in AMNH.

DISTRIBUTION: USA: California, Nevada. Mexico: Sonora.

DISCUSSION: Males and females of this species were related by simultaneous collection at Mercury, Nevada, in 1965. Males generally tend to be smaller than the holotype.

See discussion under *E. rothi* (Muma) for relationships.

Eremochelis rothi (Muma)

Therobates rothi Muma, 1962, p. 24.

DIAGNOSIS: Males are distinguished from those of *E. imperialis* by the ridged meso-apical hollow of the movable finger and 2 very long abdominal ctenidia that extend across the succeeding abdominal sternite. Females are unknown.

The species is adequately described by Muma (1962).

TYPE LOCALITY: Male holotype from Wellton, Yuma County, Arizona, by Gene Lorance, in AMNH.

DISTRIBUTION: USA: Arizona.

DISCUSSION: This species and *E. imperialis* seem to be closely related, but the enlarged, flattened, apical, dorsal, striate bristles of the flagellum complex indicate that this species may later prove to be a *Hemerotrecha* Banks.

STRIODORSALIS GROUP

Eremochelis striodorsalis (Muma)

Therobates striodorsalis Muma, 1962, p. 25.

DIAGNOSIS: Males are readily recognized by the dark purplish coloration, the dorso-basal ridge on the fixed cheliceral finger, a palpal scopula of 20 small papillae, and 2 short bladelike ctenidia. Females are unknown.

The species is adequately described by Muma (1962).

TYPE LOCALITY: Male holotype from Pine Valley, San Diego County, California, July 10, 1953, by N. J. and J. W. Gertsch, in AMNH.

DISTRIBUTION: USA: California

DISCUSSION: The apical plumose bristle of the flagellum complex is expanded and flattened basally as in some species of *Hemerotrecha*; but otherwise, this species seems to have more affinity with the *branchi* and *bilobatus* species groups of *Eremochelis*.

Genus *Chanbria* Muma

Chanbria Muma, 1951, p. 96.

KEY TO SPECIES-GROUPS

(MALES)

1. Fixed finger sinuate and lacking aborted teeth ..... *serpentinus* group
   Fixed finger strongly bent dorsally and bearing aborted teeth .. *regalis* group

REGALIS GROUP

Chanbria rectus Muma

Chanbria rectus Muma, 1962, p. 30.

DIAGNOSIS: Males are distinguished from those of *C. regalis* Muma by the straight tip of the fixed finger from a dorsal view and a reduced number of aborted teeth on the fixed finger. Females are unknown.

The species is adequately described in Muma (1962).

TYPE LOCALITY: Male holotype from Barstow, San Bernardino County, California, June 16, 1950, J. W. McSwain, in AMNH.

DISTRIBUTION: USA: California.

DISCUSSION: This species, *C. regalis* Muma, and *C. tehachapianus* Muma form a compact species-group within the genus. The presence of a scopula and the straight fixed cheliceral finger from a dorsal view distinguish this species from *C. tehachapianus*.

Chanbria regalis Muma

Chanbria regalis Muma, 1951, p. 96.

DIAGNOSIS: Males are distinguished by the mesally bent fixed finger of the chelicerae, 150 papillae in the palpal scopula, and at least 5 aborted teeth on the fixed cheliceral finger. The female has supernumerary cheliceral denticules and triangular opercula.

The species is adequately described in Muma (1951, 1962).

TYPE LOCALITY: Male holotype from Twentynine Palms, California, July 1-15, by Jefferson H. Branch, in AMNH.

DISTRIBUTION: USA: California.

DISCUSSION: This species is widely distributed in southern California and probably will be found in Baja California.

Chanbria tehachapianus Muma

Chanbria tehachapianus Muma, 1962, p. 29.

DIAGNOSIS: Males of this species are distinguished by an attenuate and mesally bent fixed cheliceral finger and the lack of a palpal scopula. Females are unknown.

The species is adequately described in Muma (1962).

TYPE LOCALITY: Male holotype from Tehachapi Mountains, California, September 8, 1914, in AMNH.

DISTRIBUTION: USA: California.

DISCUSSION: See discussion under *C. rectus*.

SERPENTINUS GROUP

Chanbria serpentinus Muma

Chanbria serpentinus Muma, 1951, p. 98.

DIAGNOSIS: Males are distinctively small with an S-curved fixed cheliceral finger that bears no distinguishable aborted teeth. Females are unknown.

The species is adequately described in Muma (1951).

TYPE LOCALITY: Male holotype from Tucson, Arizona, by O. Bryant (no further data), in AMNH.

DISTRIBUTION: USA: Arizona.

DISCUSSION: Although this species was originally believed to be closely related to *C. regalis*, the discovery of *C. rectus* and *C. tehachapianus* indicate that it is sufficiently distinctive to merit species-group segregation.

Genus *Hemerotrecha* Banks

Cleobis Banks, 1899, p. 314 (preoccupied).
Hemerotrecha Banks, 1934, p. 78.
Eremognatha Roewer, 1934, p. 566 (in part).
Hemerotrecha Banks, Muma, 1951, p. 98.

KEY TO SPECIES-GROUPS

(MALES)

1. Eyes separated by 1-1/2-2 diameters ..... *banksi* group
   Eyes separated by 1 or less than 1 diameter 2
2. Striate bristles of flagellum complex setiform ..... *texana* group
   Some striate bristles of flagellum complex flattened or plumose 3
3. Apical striate bristle of flagellum complex flattened and spatulate ..... *serrata* group
   Apical striate bristle of flagellum complex tubular, blunt tipped, and hooked ..... *branchi* group

BANKSI GROUP

(See Table 10.)

Hemerotrecha banksi Muma

Hemerotrecha californica Banks, 1903, p. 314 (not *Cleobis californica* Banks, 1899).

Hemerotrecha banksi Muma, 1951, p. 99 (new name for *Hemerotrecha californica* Banks because of homonymy).

DIAGNOSIS: Males are distinguished by a normally tapered fixed cheliceral finger, dark metatarsus and tarsus of the palpus, and distinct but short ctenidia. Females have the opercula smoothly rounded at the posterior mesal angle.

This species is adequately described in Muma (1951).

Table 10. Some male diagnostic characters of the *Hemerotrecha banksi* species-group.

Species	Ctenidial length	Tip of fixed finger	Palpal coloration
H. banksi Muma	Shorter than segment	Normally tapered	Dark tarsus and metatarsus
H. marginata (Kraepelin)	Shorter than segment	Bulbous	Dark tarsus and metatarsus
H. californica (Banks)	As long as segment	Bulbous	Metatarsus dark medially
H. truncata Muma	Longer than segment	Truncate	Dark tarsus and metatarsus

TYPE LOCALITY: Male type from Pacific Grove, California, by Harold Heath, in MCZ.

DISTRIBUTION: USA: California, Idaho.

DISCUSSION: This species-group contains 4 morphologically distinguishable forms. They seem to be closely related, and may eventually prove to intergrade to a single species.

Hemerotrecha californica (Banks)

Cleobis californica Banks, 1899, p. 314 (not *Hemerotrecha californica* Banks, 1903).

DIAGNOSIS: Males are distinguished by a bulbous tip on the cheliceral fixed finger, a dark median band on the palpal metatarsus, and long flattened ctenidia. Females have the posterior mesal angle of the opercula produced mesally.

The species is adequately described in Muma (1951).

TYPE LOCALITY: Female type from Los Angeles, California, by A. Davidson, in MCZ.

DISTRIBUTION: USA: California, Oregon, Idaho, Nevada, Washington.

DISCUSSION: This species seems to be more closely related to *H. marginata* (Kraepelin) than to *Hemerotrecha banksi* Muma.

Hemerotrecha marginata (Kraepelin)

Figures 32 to 35.

Eremobates marginatus Kraepelin, 1901, p. 103.

Eremognatha marginata (Kraepelin), Roewer, 1934, p. 567.

Hemerotrecha marginata (Kraepelin), Muma, 1951, p. 102.

DIAGNOSIS: Males have the same cheliceral profile as *H. californica,* but the 2 ctenidia are only half as long as the width of the succeeding abdominal sternite. They have the palpi colored like those of *H. banksi,* but the propeltidium is entirely pale yellow. Females have the posterior mesal angles of the opercula with undulate margins.

Since this species has not been either correctly or adequately described by previous workers, figures of the male chelicerae, male ctenidia, female chelicerae, and female opercula of the types are included here as 32, 33, 34, and 35, respectively.

TYPE LOCALITY: Male and female types from San Pedro, California, June 5, 1867, Roewer No. 8376, in ZSM.

DISTRIBUTION: USA: California.

DISCUSSION: Roewer's (1934) illustrations of the male chelicerae and male ctenidia, reproduced by Muma (1951), are in error. These structures are as shown in figures 32 and 33.

Since this species seems to be a curious mixture of, and intermediate between *H. banksi* and *H. californica,* the 3 may later prove to be conspecific.

Hemerotrecha truncata Muma

Hemerotrecha truncata Muma, 1951, p. 102.

DIAGNOSIS: Males are readily distinguished by the bluntly squared tip of the cheliceral fixed finger, the dark palpal metatarsus and tarsus, and 2 ctenidia that extend beyond the margin of the succeeding abdominal sternite. Females are unknown.

This species is adequately described in Muma (1951).

TYPE LOCALITY: Male holotype from Exeter, Tulare County, California, May 16, 1909, in AMNH.

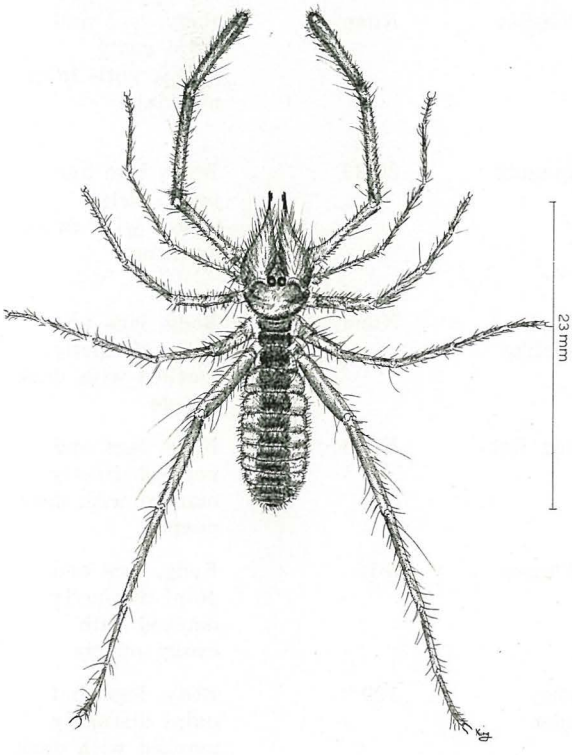
DISTRIBUTION: USA: California.

DISCUSSION: This species is the most distinctive of the group.

SERRATA GROUP

Hemerotrecha serrata Muma

Hemerotrecha serrata Muma, 1951, p. 102.



DIAGNOSIS: Males of this species are readily distinguished by the serrate upper margin of the fixed cheliceral finger, lack of abdominal ctenidia, and lack of a palpal scopula. Females have opercula with a pair of rounded, medial lobes.

The species is adequately described in Muma (1951 and 1962).

TYPE LOCALITY: Male holotype from Twentynine Palms, California, July-August, 1945, by Jefferson H. Branch, in AMNH.

DISTRIBUTION: USA: California, Nevada.

DISCUSSION: This species is uniquely different from all others of the genus.

TEXANA GROUP

(See Table 11.)

Hemerotrecha denticulata Muma

Hemerotrecha denticulata Muma, 1951, p. 105.

DIAGNOSIS: Males are distinguished by the denticulate fixed cheliceral finger, 120 papillae in the palpal scopula, and 4 very slender, elongate, abdominal ctenidia. Females have broad anterior and posterior lateral lobes on the opercula.

The species is adequately described in Muma (1951).

TYPE LOCALITY: Male holotype from Reno, Nevada, October 12, 1941, by Ira La Rivers, in AMNH.

DISTRIBUTION: USA: Colorado, Nevada, Utah.

DISCUSSION: Two males recorded from Utah above have 6 abdominal ctenidia but otherwise seem to be conspecific. This species is closely related to *H. proxima* Muma.

Hemerotrecha fruitana Muma

Hemerotrecha fruitana Muma, 1951, p. 106.

Hemerotrecha fruitana Muma, Brookhart, 1965, p. 154.

DIAGNOSIS: Males are distinguished by the smooth, stocky, fixed cheliceral finger, lack of a distinct anterior tooth on the

movable cheliceral finger, 4 short needlelike abdominal ctenidia and lack of palpal scopula. Females have the posterior lobes of the opercula convexly swollen.

The males are adequately described in Muma (1951), the females in Brookhart (1965).

TYPE LOCALITY: Male holotype from Fruita, Utah, July 17, 1931, by W. J. Gertsch, in AMNH.

DISTRIBUTION: USA: California, Colorado, Nevada, New Mexico, Utah, Wyoming.

DISCUSSION: This species seems to be more closely related to *H. simplex* Muma than to other members of the group. Brookhart's studies indicate that it is a montane form.

Hemerotrecha jacintoana Muma

Hemerotrecha jacintoana Muma, 1962, p. 33.

DIAGNOSIS: Females of this species are distinguished by elongate, ovate, posterior lateral lobes of the opercula. Males are unknown.

The species is adequately described in Muma (1962).

TYPE LOCALITY: Female holotype from Idyllwild, San Jacinto Mountains, California, June 17-18, 1952, by M. Cazier, W. Gertsch, and R. Schrammel, in AMNH.

DISTRIBUTION: USA: California.

DISCUSSION: Muma (1951) stated that this species might be the female of *H. fruitana,* but since Brookhart (1965) described the female of *H. fruitana,* the above females are obviously distinct. The species may be closely related to *H. nevadensis* Muma.

Table 11. Some male diagnostic characters of the *Hemerotrecha texana* species-group.

Species	Cheliceral characters	No. of ctenidia	No. of papillae	Color differences
H. werneri Muma	Slender, tapered fixed finger; intermediate and anterior teeth on movable finger	8 elongate	None	Body, legs and palpi rusty yellow with faint markings
H. simplex Muma	Slender, tapered fixed finger; no intermediate or anterior teeth on movable finger	6 elongate	20-30	Body, legs and palpi rusty yellow with faint markings
H. fruitana Muma	Smooth, stocky fixed finger; no anterior tooth on movable finger	4 short, needlelike	None	Body, legs and palpi distinctly marked with dark purple
H. texana Muma	Ventrally uneven fixed finger	2 long flat	None	Body, legs and palpi distinctly marked with dark purple
H. proxima Muma	Denticulate fixed finger	2 elongate	5-15	Body, legs and palpi distinctly marked with dusky purple
H. denticulata Muma	Denticulate fixed finger	4 long, slender	120±	Body, legs and palpi distinctly marked with dark purple

Hemerotrecha nevadensis Muma

Hemerotrecha nevadensis Muma, 1951, p. 110.

DIAGNOSIS: Females of this species are distinguished from *H. jacintoana* by their pale coloration, different dentition, and the elongate, triangular posterior lateral lobes of the opercula. Males are unknown.

The species is adequately described in Muma (1951).

TYPE LOCALITY: Female holotype from Las Vegas, Nevada, July 21, 1940, by Ira La Rivers, in AMNH.

DISTRIBUTION: USA: Nevada.

DISCUSSION: The opercula of this species and *H. jacintoana* are similar, but the different dentition belies the relationship. At present, their status is obscure.

Hemerotrecha proxima Muma

Hemerotrecha proxima Muma, 1963, p. 4.

DIAGNOSIS: Males are distinguished from *H. denticulata* Muma by their much smaller, linelike palpal scopula of 5-15 papillae, and only 2 elongate abdominal ctenidia. Females have the posterior, lateral opercular lobes straight and knifelike on the posterior margin.

The species is adequately described in Muma (1963).

TYPE LOCALITY: Male holotype from 28 miles north of Mercury, Nevada, 3 miles west of Mercury Highway, October 10, 1961 (IBH30C), by D. Allred and D. Elden Beck, in AMNH.

DISTRIBUTION: USA: Nevada.

DISCUSSION: The close relationship of this species and *H. denticulata* are indicated by the aborted, forward directed teeth on the male fixed cheliceral finger.

Hemerotrecha simplex Muma

Hemerotrecha simplex Muma, 1951, p. 110.

DIAGNOSIS: Males are distinguished by the slender, tapered, fixed and movable cheliceral fingers, a narrow palpal scopula of 20-30 papillae, and 6 elongate abdominal ctenidia. Females are unknown.

The species is adequately described in Muma (1951).

TYPE LOCALITY: Male holotype from Dry Lake Station, San Diego, California on September 17, 1935 by Bearg, in CUM.

DISTRIBUTION: USA: Arizona, California.

DISCUSSION: This species and *Hemerotrecha werneri* Muma are closely related.

Hemerotrecha steckleri Muma

Hemerotrecha steckleri Muma, 1951, p. 111.

DIAGNOSIS: Females have a similar cheliceral dentition to *H. nevadensis,* but the unusual quadrate, posteriorly separated opercula are distinctive. Males are unknown.

The species is adequately described in Muma (1951).

TYPE LOCALITY: Female holotype from Canada del Oro, Santa Catalina Mountains, Arizona, August 1, 1931, by Steckler, in AMNH.

DISTRIBUTION: USA: Arizona.

DISCUSSION: This species does not seem to be closely related with any species of the group.

Hemerotrecha texana Muma

Hemerotrecha texana Muma, 1951, p. 104.

DIAGNOSIS: Males have an uneven lower margin on the fixed cheliceral finger, no palpal scopula, and 2 strong, flat, outwardly curving abdominal ctenidia. Females are unknown.

The species is adequately described in Muma (1951).

TYPE LOCALITY: Male holotype from 10 miles north of Hot Springs, Texas, on the Marathon Road, July 21, 1938, by Stanley Mulaik, in AMNH.

DISTRIBUTION: USA: Texas.

DISCUSSION: This, the typical species of the group, does not seem to be closely related with any of the included species. Muma (1951) indicated this heterogeneity when the group was defined.

Hemerotrecha werneri Muma

Hemerotrecha werneri Muma, 1951, p. 111.

DIAGNOSIS: Males are distinguished from the closely related *H. simplex* by the presence of intermediate and anterior teeth on the movable finger, and 8 elongate abdominal ctenidia, and lack of scopula. Females are unknown.

The species is adequately described in Muma (1951).

TYPE LOCALITY: Male holotype from Cutter, Gila County, Arizona, July 30, 1949, by F. Werner, in AMNH.

DISTRIBUTION: USA: Arizona.

DISCUSSION: This species and *H. simplex* are closely related and allied more closely with *H. texana* than many other species of the group.

BRANCHI GROUP

(See Table 12.)

Hemerotrecha branchi Muma

Hemerotrecha branchi Muma, 1951, p. 112.

DIAGNOSIS: Males are distinguished from closely related forms by slight differences in the cheliceral profile and coloration, 2 long flattened ctenidia that extend beyond the anterior edge of the succeeding abdominal sternite, and a linelike scopula of about 30 conical papillae. Females are unknown.

The species is adequately described in Muma (1951).

TYPE LOCALITY: Male holotype from Twentynine Palms, California, July 1-15, 1945, by Jefferson H. Branch, in AMNH.

DISTRIBUTION: USA: Arizona, California, Nevada, New Mexico.

DISCUSSION: Four species of this group are known only from males, three only from females.

Hemerotrecha elpasoensis Muma

Hemerotrecha elpasoensis Muma, 1962, p. 39.

DIAGNOSIS: Females have posteriorly bulbous opercula similar to those of *H. fruitana* reported by Brookhart (1965). They also have 4 trace ctenidia. Males are unknown.

The species is adequately described in Muma (1962) and Brookhart (1965).

TYPE LOCALITY: Female holotype from a dry hillside near El Paso, Texas, March 20, 1960, by W. J. Gertsch, Wilton Ivie, and R. J. Schrammel, in AMNH.

DISTRIBUTION: USA: Texas.

DISCUSSION: This species is only provisionally placed in this species-group since the other known species have the female opercula juvenile in appearance.

Table 12. Some male diagnostic characters for the *Hemerotrecha branchi* species-group.

Species	No. of papillae	Cheliceral characters	Palpal coloration
H. macra Muma	20±	Two aborted teeth and an obscure basal ventral spur on fixed finger	Dusky on tarsi, metatarsi, tibia, and apical ends of femora; darker on tarsi and metatarsi
H. xena Muma	None	Three aborted teeth and an obscure apical ventral spur on fixed finger	Dusky above on tarsi, metatarsi, tibiae, and apical ends of femora
H. branchi Muma	30±	Three aborted teeth and a distinct apical ventral spur on fixed finge	Dusky above on tarsi, metatarsi, tibiae, and apical ends of femora
H. minima Muma	None	Three large and 2 or 3 tiny aborted teeth on fixed finger	Dusky on tibiae, dark on metatarsi and tarsi

Hemerotrecha macra Muma

Hemerotrecha macra Muma, 1951, p. 114.

DIAGNOSIS: Males have only 2 aborted teeth on the fixed cheliceral finger, a palpal scopula of about 20 papillae, and 2 flat ctenidia similar in form and length to those of *H. branchi*. Females are unknown.

The species is adequately described in Muma (1951).

TYPE LOCALITY: Male holotype from Lugert, Oklahoma, June 11, 1937, by Standish-Kaiser, in DZUU.

DISTRIBUTION: USA: Oklahoma.

DISCUSSION: If this species is properly placed in this species-group, it is the most divergent form. The fondal teeth are graded III, II, I, IV in size.

Hemerotrecha marathoni Muma

Hemerotrecha marathoni Muma, 1962, p. 37.

DIAGNOSIS: Females have 2 intermediate teeth on the cheliceral fixed finger and nearly round opercula with a longitudinal vulvular opening. Males are unknown.

The species is adequately described in Muma (1962).

TYPE LOCALITY: Female holotype from 60 miles southeast of Marathon, Brewster County, Texas, by W. W. Milstead, in AMNH.

DISTRIBUTION: USA: Texas.

DISCUSSION: This species is closely related to *H. milsteadi* Muma.

Hemerotrecha milsteadi Muma

Hemerotrecha milsteadi Muma, 1962, p. 35.

DIAGNOSIS: Females have only one intermediate tooth on the cheliceral fixed finger and sub-posterior median lobe on the opercula with a longitudinal vulvular opening. Males are unknown.

The species is adequately described in Muma (1962).

TYPE LOCALITY: Female holotype from Sierra Vieja, 11 miles west of Valentine, Presidio County, Texas, by W. W. Milstead, in AMNH.

DISTRIBUTION: USA: Texas.

DISCUSSION: The species may be the female of *H. minima* Muma, but additional material must be collected before the sexes can be associated.

Hemerotrecha minima Muma

Hemerotrecha minima Muma, 1951, p. 114.

DIAGNOSIS: Males are distinguished from related forms by a more slender fixed cheliceral finger, the lack of a palpal scopula, and 2 heavy flattened ctenidia that are about as long as the width of the succeeding abdominal sternite. Females are unknown.

The species is adequately described in Muma (1951).

TYPE LOCALITY: Male holotype from Laredo, Texas, fall 1941, by Ekhomb, in AMNH.

DISTRIBUTION: USA: Colorado, Texas.

DISCUSSION: *H. milsteadi* may be the female of this species.

Hemerotrecha xena Muma

Hemerotrecha xena Muma, 1951, p. 112.

DIAGNOSIS: Males are most readily distinguished from the closely related *H. branchi* by the lack of a scopula; the cheliceral profile is also slightly different. Females are unknown.

The species is adequately described in Muma (1951).

TYPE LOCALITY: Male holotype from Coyote Wells, Colorado Desert, California, August 11, 1914, by Bradley, in CUM.

DISTRIBUTION: USA: California.

DISCUSSION: This species is most closely related to the typical species of the group, *H. branchi*.

Family Ammotrechidae Roewer, 1934.

This family is known from South America, Central America, and North America. Only North and Central America genera and species are considered here; twenty-nine species are recorded.

Muma (1951, 1962, and 1963) supported Roewer's (1934) ammotrechid generic separation based on the ventral tarsal number and arrangement. However, examination of previously unseen types and numerous additional specimens of described and new species has indicated a problem. Either the ventral spinelike setae are very difficult to distinguish or variation in number and arrangement exists.

Since solution of this problem involves study of series of unavailable specimens of a number of species, the present generic concept is maintained even though inconsistencies, heterogeneities, and synonymies are indicated.

KEY TO NORTH AMERICAN SUBFAMILIES AND GENERA OF AMMOTRECHIDAE

(MALES AND FEMALES)

1. Tarsi of fourth legs with 3 segments .... Ammotrechinae Roewer 2
   Tarsi of fourth legs with 1 segment .... Saronominae Roewer 7
2. Distal segment of tarsi IV with one pair of ventral spinelike setae 3
   Distal segment of tarsi IV with more than one pair of ventral spinelike setae 4
3. Tarsi II and III with 1,2,2,1 formula of ventral spinelike setae .... *Ammotrechella* Roewer
   Tarsi II and III with 1,2,2,2 formula of ventral spinelike setae .... *Ammotrechona* Roewer
4. Tarsi IV with 2,2-2-2,2 formula of ventral spinelike setae ..... 5 ..... *Ammotrechula* Roewer
   Tarsi IV with 2,2-2-2,1 formula of ventral spinelike setae 5
5. Tarsi II and III without unpaired ventral spinelike setae .... *Ammotrechinus* Roewer
   Tarsi II and III with unpaired ventral spinelike setae 6
6. Tarsi II and III with ventral spinelike setae arranged 1,2,2,1 ....*Ammotrecha* Banks
   Tarsi II and III with ventral spinelike setae arranged 1,2,2,2,1 .... *Ammotrechesta* Roewer
7. Tarsi II and III with one pair of ventral spinelike setae; tarsi IV with setae arranged 1,2,2,1 .....*Innesa* Roewer
   Tarsi II and III with more than one pair of ventral spinelike setae; tarsi IV with setae arranged 2,2,2,2,2 .... *Branchia* Muma

SUBFAMILY AMMOTRECHINAE ROEWER, 1934

Ammotrechinae Roewer, 1934, p. 590.

Ammotrechinae Roewer, Muma 1951, p. 123.

See Table 13 which compares diagnostic characters of known North and Central American species of this subfamily.

Genus *Ammotrechella* Roewer

Ammotrecha Banks, 1900, p. 426 (in part)
Ammotrechella Roewer, 1934, p. 594.
Ammotrechella Roewer, Muma, 1951, p. 125.

Ammotrechella bolivari Mello-Leitão

Ammotrechella bolivari Mello-Leitão, 1942, p. 309.

DISCUSSION: The type of this species has not been seen. The species is placed here on the assumption that tarsal and setal counts on the leg will prove to be valid and usable (see discussion under *Ammotrechona cubae* [Lucas]).

Table 13. Some diagnostic characters of species of Ammotrechinae.

Genus and species	Palpal Coloration	Pairs of palpa spine-like setae	Cheliceral characters
♂s and ♀s			
Ammotrechella geniculata (Koch)	Tarsus and metatarsus dark	♂-6 ♀-3	♂ keeled fixed finger
A. stimpsoni (Putnam)	Tarsus and metatarsus dark	5	♂ slight indentation of fixed finger above flagellar attachment disc
Ammotrechona cubae (Lucas)	All segments pale distally	5	♂ fixed finger not modified
Ammotrecha limbata (Lucas)	Tarsus and basal half of metatarsus dark	♂-4 ♀-0	♂ fixed finger not modified
A. stolli (Pocock)	Tarsus and metatarsus dark	5	♂ slight identation of fixed finger above flagellar attachment disc
Ammotrechinus gryllipes (Gervais)	Tarsus and apical half of metatarsus dark	5	♂ fixed finger not modified
Ammotrechula lacuna Muma	Femur, tibia, and basal margin of metatarsus dusky	0	♂ fixed finger slender, evenly tapered; 2 modified teeth
A. peninsulana (Banks)	All segments except distal end of tarsus dusky	8	♂ fixed finger with dorsal constriction above anterior tooth
A. pilosa Mima	All segments except coxa and trochanter dusky	0	♂ fixed finger attenuate with teeth only slightly modified
A. saltatrix (Simon)	Metatarsus slightly dusky apically	5	♂ fixed finger slender above flagellum but teeth not modified

Table 13. (continued)

♂s only			
Ammotrecha cobinensis Muma	Tarsus and metatarsus faintly dusky	8	Fixed finger not modified
A. nigrescens Roewer	Tarsus and metatarsus dark	5	Slight indentation of fixed finger above flagellar attachment disc
Ammotrechesta schlueteri Roewer	Not stated		Fixed finger not modified
Ammotrechula dolabra Muma	All segments except for coxa, trochanter, and distal end tarsus dark	0	Fixed finger thick, tapered and undulate ventrally
A. mulaiki Muma	Tarsus, metatarsus, tibia, and distal half of femur dark	4	Fixed finger with 2 modified teeth
A. venusta Muma	All segments dark	7	Fixed finger slender with 2 modified teeth
A. wasbaueri Muma	All segments except coxa, trochanter, and basal end of femur dusky	2 and 1 unpaired	Fixed finger slender, attenuate with 2 tiny modified teeth
♀s only			
Ammotrechella setulosa Muma	All segments annulate medially with dark	2 and 1 unpaired	Fixed finger with carina
A. tabogana (Chamberlin)	Apical end of femur and all distal segments dark	12-14 unpaired	Fixed finger with carina
A. pseustes (Chamberlin)	All segments dark	3	Fixed finger with long low carina
Ammotrechesta brunnea Roewer	All segments dusky except for basal pale band on metatarsus	5	Fixed finger with carina
Ammotrechula borregoensis Muma	All segments of palpus and leg I dusky; other legs pale	10 unpaired	Fixed finger with carina

Ammotrechella geniculata (C. L. Koch)

Gluvia geniculata C. L. Koch, 1842, p. 355.

Ammotrecha geniculata (C. L. Koch), Kraepelin, 1901, p. 114.

Ammotrechella geniculata (C. L. Koch), Roewer, 1934, p. 594.

DIAGNOSIS: Roewer (1934) made this species the type of the genus, citing spinelike setation of tarsus II and III to be 1,2,2,1 and that of tarsus IV to be 2,2-2-2. He also described the male immovable finger with a strong chitinized keel and the male metatarsus of the palpus with 6 ventral pairs of strong spinelike setae.

TYPE LOCALITY: A lectotype from

Venezuela, supposedly deposited under Roewer No. 8349 in ZSM, is not there and apparently has been lost or destroyed.

DISTRIBUTION: South America: Venezuela, Colombia, Ecuador, Curaçao; West Indies: St. Vincent, Guadeloupe, the Bahamas.

DISCUSSION: Although Roewer's description and figures of this species delineate distinctive characters, the absence of a type will probably preclude identification. For instance, a Roewer identified female specimen in ZSM has 5 ventral pairs of spinelike setae on the metatarsus of the palpus; but the key in Roewer (1934) cites only 3 pairs of short spinelike setae on the palpal metatarsus.

Ammotrechella pseustes (Chamberlin)

Ammotrecha pseustes Chamberlin, 1925, p. 235.

Ammotrechella sexspicata Muma, 1951, p. 129 (new synonymy).

DIAGNOSIS: Females with propeltidium pale except for a dark seam on the anterior margin; eye tubercle dark except for a thin median stripe; dorsal sclerite on mesopeltidium, metapeltidium, and abdominal tergites pale medially and dark laterally form a pale median and 2 dark longitudinal stripes that contrast with the otherwise dusky purple segments; palpi dark on tarsi, metatarsi, tibiae, and apical three-fourths of femora; chelicerae pale except for dark dentition; leg I pale; legs II, III, and IV dark medially on anterior and posterior faces of femora, tibia, and metatarsi; venter pale.

The above cited coloration, the 3 small but distinct pairs of spinelike setae on the palpal metatarsus, and long low dorsal cheliceral carina described and illustrated by Muma (1951) distinguish the females. Males are not known, however, so the species must be considered to be inadequately described.

TYPE LOCALITY: Female holotype from nest of *Kalotermes marginipennis* on Remo Island, Largo, Canal Zone, August 31, 1923, by J. Zetek, in MCZ. Female holotype of *A. sexspicata* Muma from Clermont, California, in DZUU.

DISTRIBUTION: Central America: Panama Canal Zone. USA: California.

DISCUSSION: The specimen described by Muma (1951) is badly discolored, but otherwise is obviously this species. This species could be a synonym of *A. geniculata,* but this cannot be determined in the absence of a type for the latter species.

Ammotrechella setulosa Muma

Ammotrechella setulosa Muma, 1951, p. 125.

DIAGNOSIS: Females distinguished by the dark, median, dorsal abdominal band, annulate legs and palpi, and 2 paired and 1 or 2 unpaired, scarcely distinguishable, ventral spinelike setae on the palpal metatarsi. Males are unknown.

Males must be described before the species can be considered to be adequately known.

TYPE LOCALITY: Female holotype from Eagle Pass, Texas, 1940, in USNM.

DISTRIBUTION: USA: Texas.

DISCUSSION: This species does not seem to be closely related to any other member of the genus.

Ammotrechella stimpsoni (Putnam)

Galeodes (*Cleobis*) *stimpsoni* Putnam, 1883, p. 261.

Ammotrecha cubae (Lucas), Banks, 1900, p. 427 (not *Galeodes cubae* Lucas).

Ammotrechella stimpsoni (Putnam), Muma, 1951, p. 127.

DIAGNOSIS: Males and females vary in color from light yellow to brown, but the abdomen is always strikingly marked with dark lateral stripes and the palpi distad of the femora are always dusky. Both sexes have the metatarsi of the palpi provided with 5 pairs of short stout spinelike setae. The fixed cheliceral finger of the male is not modified or aborted except for a slight dorsal indentation above the flagellar attachment disc.

The species is adequately described in Muma (1951).

TYPE LOCALITY: Female cotype from Florida by Mr. Wurdeman, in MCZ. The Stimpson specimen originally described by

Putnam from MCZ apparently has been lost or destroyed.

DISTRIBUTION: USA: Florida.

REMARKS: The identity of this species is clear; it is not the same as the species exemplified by the female type of *Ammotrechona cubae* Lucas. Except for the tarsal setal formulae, it is, however, identical to the types of *Ammotrecha stolli* (Pocock) and *Ammotrecha nigrescens* (Roewer).

Ammotrechella tabogana (Chamberlin)

Figures 36 to 38.

Ammotrecha tabogana Chamberlin, 1919, p. 11.

DIAGNOSIS: The distinctive markings and 2 rows of 12-14 unpaired strong cylinder bristles on the metatarsus of the palpus readily distinguish females of the species.

Males are unknown.

FEMALE SYNTYPE: Total length 18.6 mm. Chelicerae 2.0 mm wide and 5.3 mm long. Propeltidium 3.8 mm wide and 3.5 mm long.

Coloration in alcohol: chelicerae and propeltidium purplish brown; chelicerae with 1 lateral and 2 dorsal darker stripes; propeltidium with a pale ovate area on each side of the black eye tubercle, and a pale median diamond-shaped area and a pair of submedian, pale, ovate areas on the posterior margin; mesopeltidium dark; metapeltidium and abdominal tergites pale medially and dark laterally, forming 1 pale and 2 dark longitudinal stripes; abdominal pleurites dusky; venter pale; palpus dark on apical end of femur and all of tibia, metatarsus, and tarsus; leg I faintly dusky; leg II pale; leg III dusky on femur, tibia, and metatarsus, with the femur pale dorsally and all segments paler at each end; leg IV dark on femur, tibia, and metatarsus except at extreme proximal and distal ends of each segment.

Dentition typical of subfamily and genus as shown in figure 36; mesal tooth present. Palpal tibia ventrally with 2 rows of unpaired strong cylinder bristles as in figure 37. Genital plate wider than long by a ratio of 1:1.6 as shown in figure 38.

TYPE LOCALITY: Female types from nest of *Armitermes medina* Banks, Taboga Island, Republic of Panama, June 23, 1919, by H. F. Dietz, in MCZ.

DISTRIBUTION: Central America: Panama.

DISCUSSION: This is a distinctive species of this genus.

Genus *Ammotrechona* Roewer

Ammotrecha Banks, 1900, p. 426 (in part).
Ammotrechona Roewer, 1934, p. 595.

Ammotrechona cubae (Lucas)

Galeodes cubae Lucas, 1835: Class VIII, pl. II.

Ammotrecha cubae (Lucas), Kraepelin, 1901, p. 114.

Ammotrechona cubae (Lucas), Roewer, 1934, p. 596.

DIAGNOSIS: Females are pale yellowish brown with the abdomen darker at the lateral margins of the tergites; legs and palpi pale brown but somewhat darker near the distal end of each segment. Females have chelicerae with a typical dorsal carina, palpi with 5 pairs of ventral spinelike setae on the metatarsi, and the opercula are wider than long by a ratio of 1:1.4. Males, described by Roewer (1934), reportedly have no dorsal carina on the chelicerae, an unmodified fixed cheliceral finger, and 5 pairs of ventral spinelike setae on the palpal metatarsi.

The species cannot be considered to be

adequately described, although Roewer's (1934) keys, diagnosis, and figures permit placement.

TYPE LOCALITY: Female type from Cuba by M. F. Prevost, Roewer No. 9095, in MNHN.

DISTRIBUTION: West Indies: Cuba.

DISCUSSION: Roewer (1934) found only 4 pairs of ventral, palpal, metatarsal, spinelike setae; the more slender basal, fifth pair is easily overlooked. Roewer cited ventral setal formulae for legs II and III as 1,2,2,2 and for leg IV as 2,2-2-2; the present author found 1,2,2,2 and 2,2-2-2,4, respectively on the type. This difference indicated that different students of Ammotrechidae may vary in their ability to distinguish between ventral spinelike setae and the normal tarsal setal clothing. It is also possible that the setal formulae are subject to intraspecific variation. In either case, the use of tarsal setal formulae for distinguishing genera of Ammotrechidae is suspect.

Genus *Ammotrecha* Banks

Ammotrecha Banks, 1900, p. 426 (in part).
Ammotrecha Banks, Roewer, 1934, p. 596.
Ammotrecha Banks, Muma, 1951, p. 123.

Ammotrecha cobinensis Muma

Ammotrecha cobinensis Muma, p. 135.

DIAGNOSIS: Males have the legs and palpi pale except for a faint duskiness on the palpal metatarsus and tarsus, unmodified chelicerae, no dorsal carina, and 8 pairs of stout cylindrical spinelike setae on the palpal metatarsus and tibia. Females are unknown.

Description cannot be considered adequate until undamaged males and females have been described.

TYPE LOCALITY: Male holotype from Cobina, California, December 30, 1927, by J. C. Chamberlin, in DZUU.

DISTRIBUTION: USA: California; Mexico.

DISCUSSION: This species was doubtfully placed and is retained in this genus owing to the lack of both fourth legs on the only 2 specimens known.

Ammotrecha limbata (Lucas)

Galeodes limbatus Lucas, 1835, Cl. 8, t. 5.

Ammotrecha limbata (Lucas), Kraepelin, 1901, p. 112.

Ammotrecha limbata (Lucas), Roewer, 1934, p. 597.

DIAGNOSIS: Males and females with basal half of palpal metatarsus and all of tarsus dark brown. Males with 4 pairs of ventral spinelike setae on the palpal metatarsus. Females without pairs of setae on the palpal metatarsus.

The species probably can be placed by Roewer (1934), but it is not adequately described.

TYPE LOCALITY: A lectotype supposedly deposited from Guatemala under Roewer No. 8356 in ZSM has been lost or destroyed and is unavailable for study.

DISTRIBUTION: Mexico; Central America: Guatemala.

DISCUSSION: This species, on the basis of published descriptions, seems to be distinctive. Roewer's (1934) diagnosis of females as having no pairs of ventral spinelike setae on the palpal metatarsus may be in error since the sexes usually have similar palpal setal characteristics.

Ammotrecha nigrescens Roewer

Figure 39.

Ammotrecha nigrescens (Pocock), *in schedula,* Roewer, 1934, p. 598.*

DIAGNOSIS: Except for the tarsal setal formulae, this species is identical with pale brown typically marked specimens of *Ammotrechella stimpsoni* (Putnam). The tarsi of leg III have a spinelike setal formula of 1,2,-2,1 and those of leg IV of 2,2-2-2,1 or as for *Ammotrecha* of Roewer (1934). The metatarsal spinelike setae are, however, somewhat longer than on *A. stimpsoni.* Females are unknown. Figure 39 is of the only chelicera remaining with the type.

Roewer's (1934) description permits placement if the tarsal setal formulae are correct.

TYPE LOCALITY: Male type from Guatemala, by Stoll, in 1894, in BNHM.

DISTRIBUTION: Central America: Guatemala, Costa Rica.

DISCUSSION: If tarsal setal formulae are diagnositic, this is a valid species (though referrable to Roewer, 1934); otherwise the species is a junior synonym of *Ammotrechella stimpsoni* (Putnam).

Ammotrecha stolli (Pocock)

Cleobis stolli Pocock, 1895, p. 97.

Ammotrecha stolli (Pocock), Kraepelin, 1901, p. 115.

Ammotrecha picta Pocock, 1902, p. 65.

Ammotrecha stolli (Pocock), Roewer, 1934, p. 597.

DIAGNOSIS: Males and females colored and marked as for *Ammotrechella stimpsoni* (Putnam). Cheliceral and palpal characters also the same as for *A. stimpsoni.* The tarsal spinelike setal formula agrees with that of *Ammotrecha* Banks, *sensu stricto,* of Roewer (1934).

The combined descriptions of Pocock (1902) and Roewer (1934) are adequate for identification except for the enigma of the tarsal setal formula.

TYPE LOCALITY: Female type from Retalhuleau, Guatemala (Roewer No. 8605), in BMNH. The types of *A. picta* have not been located.

DISTRIBUTION: Central America: Guatemala, Costa Rica, Grenada, Nicaragua; Mexico; USA: Louisiana.

DISCUSSION: If tarsal setal formulae are valid, this species is a senior synonym of *A. nigrescens*; otherwise it is a junior synonym of *A. stimpsoni.*

Genus *Ammotrechinus* Roewer

Ammotrechinus Roewer, 1934, p. 599.

Ammotrechinus gryllipes (Gervais)

Solpuga gryllipes Gervais, 1842, p. 76.

Ammotrecha gryllipes (Gervais), Kraepelin, 1901, p. 115.

Ammotrechinus gryllipes (Gervais), Roewer, 1934, p. 599.

DIAGNOSIS: Roewer (1934) characterized males of this species by unmodified chelicerae with 1 mesal and 2 intermediate teeth on the movable finger, 5 pairs of ventral spinelike setae on the palpal metatarsus, and with only the apical half of the metatarsus and the tarsus of the palpus dark brown. Females were reportedly similar to males in coloration and setation.

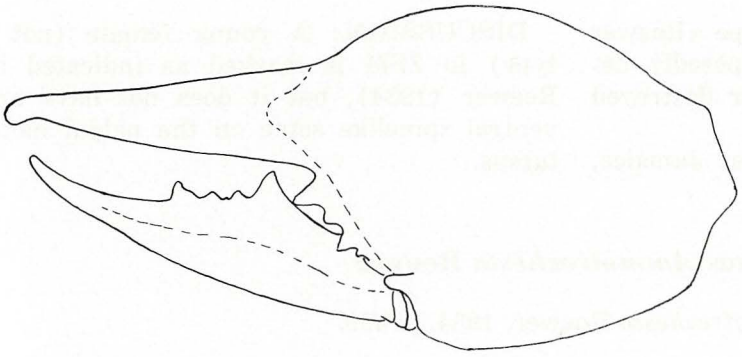
The species is not adequately described.

*Pocock never, to the author's knowledge, published this name. Roewer is the author to use until this has been clarified.

Figs. 32 to 35. *Hemerotrecha marginata* (Kraepelin). 32. Ectal view of left male chelicera. 33. Male abdominal ctenidia. 34. Ectal view of right female chelicera. 35. Ventral view of female genital opercula.

Figs. 36 to 38. *Ammotrechella tabogana* (Chamberlin). 36. Ectal view of right female chelicera. 37. Mesal view of apical segments of left female palpus. 38. Ventral view of female genital opercula.

Fig. 39. *Ammotrecha nigrescens* Roewer, ectal view of right male chelicera (only chelicera remaining with type).



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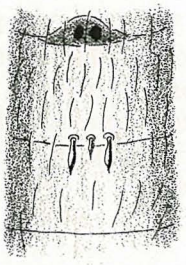

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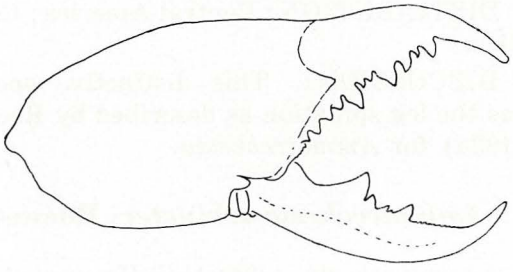

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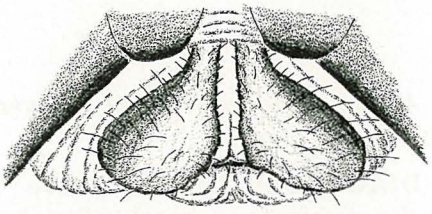

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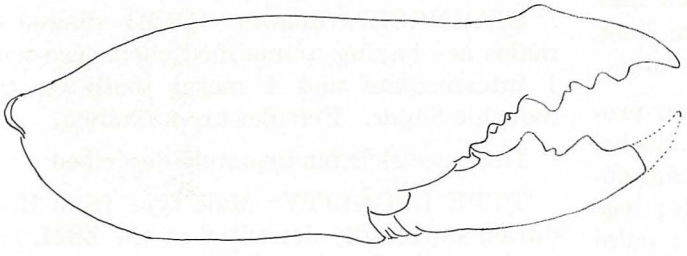

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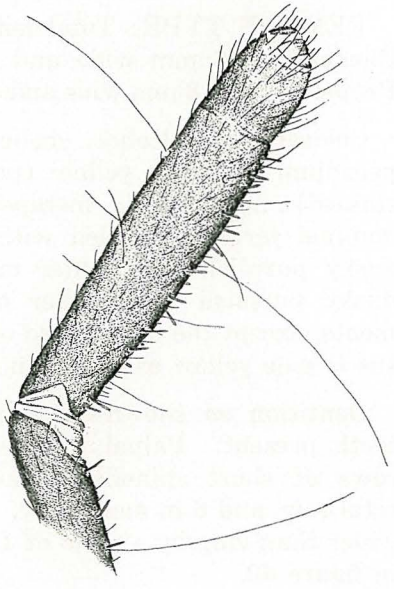

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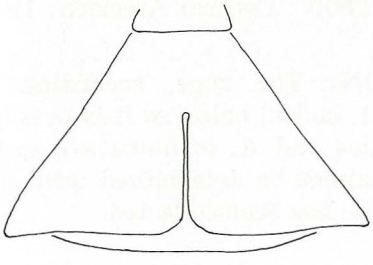

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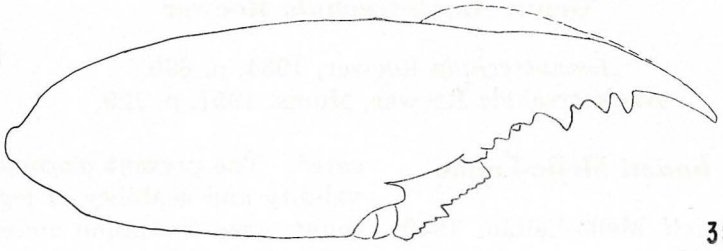


39

TYPE LOCALITY: A lectotype (Roewer No. 8357) of this species supposedly deposited in ZSM has been lost or destroyed and is unavailable for study.

DISTRIBUTION: West Indies: Jamaica, Haiti.

DISCUSSION: A young female (not a type) in ZSM is marked as indicated by Roewer (1934), but it does not have any ventral spinelike setae on the palpal metatarsus.

Genus *Ammotrechesta* Roewer

Ammotrechesta Roewer, 1934, p. 599.

Ammotrechesta brunnea Roewer

Figures 40-42.

Ammotrechesta brunnea Roewer, 1934, p. 600.

DIAGNOSIS: Females have the palpi dusky except for a basal yellow band on the metatarsi, and 5 pairs of short stout spinelike setae on the palpal metatarsi. Males are unknown.

FEMALE TYPE: Total length 23.5 mm. Chelicerae 1.6 mm wide and 4.9 mm long. Propeltidium 3.8 mm wide and 3.2 mm long.

Coloration in alcohol: chelicerae and propeltidium brownish yellow (perhaps alcohol stained); mesopeltidia, metapeltidia, and abdominal tergites mottled with purple; legs dusky purplish and lighter on tarsi; palpi dusky purplish and darker on distal segments, except the basal third of the metatarsus is pale yellow as shown in figure 40.

Dentition as shown in figure 41; mesal tooth present. Palpal tibia with 2 uneven rows of short spinelike setae, 5 setae in ectal row, and 6 in mesal row. Genital plate wider than long by a ratio of 1:1.8 as shown in figure 42.

TYPE LOCALITY: Female type from Tristan, Costa Rica, SMF/RII/4757.

DISTRIBUTION: Central America: Costa Rica.

DISCUSSION: This distinctive species has the leg spination as described by Roewer (1934) for *Ammotrechesta*.

Ammotrechesta schlueteri Roewer

Ammotrechesta schlueteri Roewer, 1934, p. 599.

DIAGNOSIS: Roewer (1934) diagnosed males are having unmodified chelicerae with 1 intermediate and 1 mesal tooth on the movable finger. Females are unknown.

This species is inadequately described.

TYPE LOCALITY: Male type from Honduras, supposedly deposited in the ZSM, has been lost or destroyed and is unavailable for study.

DISTRIBUTION: Central America: Honduras.

DISCUSSION: The type, according to Roewer (1934), lacked palpi, so it is possible that this species and *A. brunnea* are synonyms. This cannot be determined until additional material has been collected.

Genus *Ammotrechula* Roewer

Ammotrechula Roewer, 1934, p. 600.
Ammotrechula Roewer, Muma, 1951, p. 129.

Ammotrechula boneti Mello-Leitão

Ammotrechula boneti Mello-Leitão, 1942, p. 312.

DISCUSSION: The type has not been located. The present placement presumes the validity and usability of leg tarsal and setal counts (see discussion under *Ammotrechona cubae* [Lucas]).

Ammotrechula borregoensis Muma

Ammotrechula borregoensis Muma, 1962, p. 41.

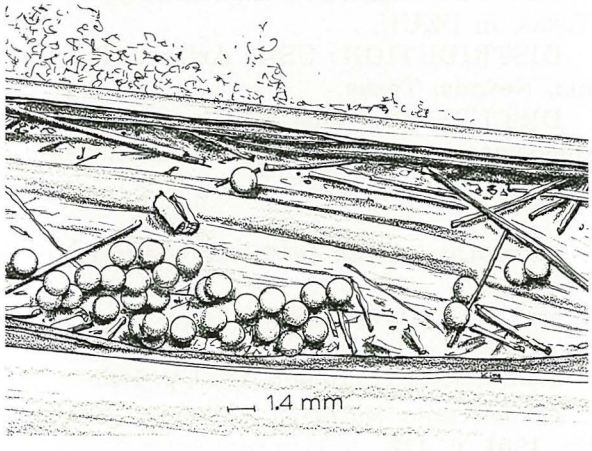
DIAGNOSIS: Females are distinguished by having the palpus and leg I dusky, the other legs pale, and 2 rows of 10 or more unpaired short, strong, cylindrical spinelike setae on the palpal metatarsi and tibiae. Males are unknown.

The female is adequately described in Muma (1962), but the species cannot be considered to be so until males are described.

TYPE LOCALITY: Female holotype from Borrego State Park, San Diego, California, April 28, 1955, by R. O. Schuster, in AMNH.

DISTRIBUTION: USA: California.

DISCUSSION: Males of this distinctive species should be readily recognized by the coloration of the legs and palpi.



Ammotrechula eggs in dead wood

Ammotrechula dolabra Muma

Ammotrechula dolabra Muma, 1963, p. 5.

DIAGNOSIS: Males have palpi and legs dusky except for coxae, trochanters, and distal portions of tarsi; fixed finger of chelicerae thick and tapered from base to tip with only undulate traces of dentition; palpi without serial spinelike setae. Females are unknown.

The species is adequately described in Muma (1963).

TYPE LOCALITY: Male holotype from Cane Springs, 12 miles north-northwest of Mercury, Nevada, June 8, 1961 (CBA10C), in AMNH.

DISTRIBUTION: USA: Nevada.

DISCUSSION: In this species, dental abortion is maximal and the affinities of the species are difficult to determine.

Ammotrechula lacuna Muma

Ammotrechula lacuna Muma, 1963, p. 5.

DIAGNOSIS: Males have the legs dusky on the lateral surfaces of the femora, tibiae, and metatarsi; the fixed finger of the chelicerae is slender and tapered to the tip with 1 large and 1 small aborted tooth near the base. The only male known lacks palpi. Females are similar to males in color with palpi dusky on femora, tibiae, and basal margin of metatarsi, so male palpi are probably similarly marked. Females also lack serial spinelike setae, so male palpi probably also lack such setae.

TYPE LOCALITY: Male holotype from 34.5 miles north of Mercury, Nevada, 1/2 mile east of Groom Lake road, June 26, 1961 (10DL4C), in AMNH.

DISTRIBUTION: USA: Nevada.

DISCUSSION: This species and *A. mulaiki* are closely related.

Ammotrechula mulaiki Muma

Ammotrechula mulaiki Muma, 1951, p. 130.

DIAGNOSIS: Males are distinguished by the dark palpal tarsus, metatarsus, tibia, and apical half of femur; 4 pairs of strong, cylindrical, spinelike setae on the palpal metatarsus; and 2 aborted teeth on the fixed finger of the chelicerae. Females are unknown.

The species is adequately described in Muma (1951).

TYPE LOCALITY: Male holotype from Edinburg, Texas, 1934, by S. Mulaik, in AMNH.

DISTRIBUTION: USA: Texas.

DISCUSSION: A group of species, including *A. venusta* Muma, *A. pilosa* Muma, *A. wasbauer*i Muma, and *A. lacuna* Muma all have aborted teeth on the fixed finger that differ by size and configuration. These spe-

cies also differ by coloration and palpal armature.

Ammotrechula peninsulana (Banks)

Cleobis peninsulana Banks, 1898, p. 290.

Ammotrecha peninsulana (Banks), Kraepelin, 1901, p. 112.

Cleobis hirsuta Banks, 1898, p. 291.

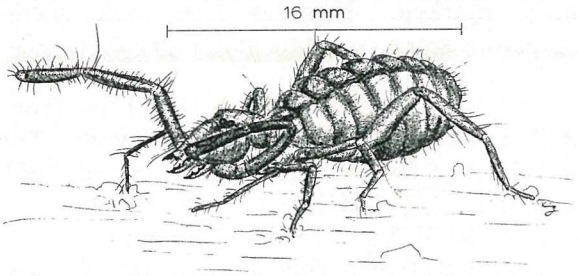
Cleobis texana Kraepelin, 1899, p. 239.

Ammotrecha texana (Kraepelin), Kraepelin, 1901, p. 112.

Ammotrechula texana (Kraepelin), Roewer, 1934, p. 601.

Ammotrechula peninsulana (Banks), Muma, 1951, p. 130.

DIAGNOSIS: Males are distinguished by a dorsal constriction of the cheliceral fixed finger above the anterior tooth, and 8 pairs of strong, cylindrical spinelike setae on the venter of both the palpal tibia and metatarsus. Females are distinguished by a similar palpal armature, and the genital plate is wider than long by a ratio of 1:1.5.



Ammotrechula peninsulana ♀

TYPE LOCALITY: Female type from San José del Cabo, Baja California, Mexico, in MCZ. Male type of *C. hirsuta* from San Miguel Horcasitas, Baja California, Mexico, in MCZ. Female type of *C. texana* from Texas, (C6-m), Roewer No. 9099, in MNHN.

DISTRIBUTION: Mexico: Baja California. USA: Arizona, Texas.

DISCUSSION: This species is quite variable in coloration. The base color is light to dark yellow with some specimens marked with light brown, others with dark brown. Legs and palpi are dusky on the femora, tibiae, metatarsi, and proximal ends of the tarsi; however, some specimens have pale annuli on the apical ends of the metatarsi and light tarsi. The two color forms are frequently collected within yards of each other.

Ammotrechula pilosa Muma

Ammotrechula pilosa Muma, 1951, p. 134.

Ammotrechula pilosa Muma, 1962, p. 43.

DIAGNOSIS: Males have the palpi dusky except for the coxae and trochanters, the fixed cheliceral finger attenuate with the teeth only slightly aborted, no mesal tooth on the movable finger, and no serial ventral spinelike setae on the palpal tibia or metatarsus. Females are colored like males, have a dorsal cheliceral carina, the genital plate wider than long by a ratio of 1:1.2, and no serial ventral spinelike setae on the palpi.

The species is adequately described in Muma (1951, 1962).

TYPE LOCALITY: Female holotype from Texas, in DZUU.

DISTRIBUTION: USA: Arizona, California, Nevada, Texas.

DISCUSSION: This species seems to be somewhat variable in color, as is *A. peninsulana.*

Ammotrechula saltatrix (Simon)

Figures 43 and 44.

Cleobis saltatrix Simon, 1879, p. 146.

Ammotrecha saltatrix (Simon), Kraepelin, 1901, p. 113.

Ammotrechula saltatrix (Simon), Roewer, 1934, p. 602.

DIAGNOSIS: Females with slender chelicerae, 2 intermediate teeth and a mesal tooth on the movable finger, a dorsal carina, 5 pairs of small spinelike setae on the palpal metatarsus, and the legs and palpi pale except for a light duskiness apically on the palpal metatarsus, apically on the femur, and basally on the metatarsus of leg IV. Males are similar to females in coloration and have the chelicerae long and slender but without modified teeth.

The palpus and opercula of the type are shown in figures 43 and 44, respectively.

Simon's (1879) and Roewer's (1934) de-

scriptions and figures are adequate for placement of the species, except that both workers did not refer to the more slender basal fifth pair of spinelike setae on the palpal metatarsus.

TYPE LOCALITY: Female type from Mexico, Roewer No. 9098, in MNHN.

DISTRIBUTION: Mexico.

DISCUSSION: Simon (1879), by describing the male first and in more detail, seems to have considered it the type; however, the female is clearly marked *typus*, and no male could be found in the MNHN.

Ammotrechula venusta Muma

Ammotrechula venusta Muma, 1951 p. 134.

DIAGNOSIS: Males are distinguished by a dark purple to nearly black coloration with slightly paler legs and palpi; the slender fixed cheliceral finger is provided with 2 aborted teeth and 7 pairs of ventral spinelike setae on the palpal tibiae and metatarsi. Females are unknown.

The species is adequately described in Muma (1951).

TYPE LOCALITY: Male holotype from Tucson, Arizona, June 15, 1936, by O. Bryant, in AMNH.

DISTRIBUTION: USA: Arizona; Mexico.

DISCUSSION: One other male of this beautiful little species is labeled "Eastern United States" and is in DZUU.

Ammotrechula wasbaueri Muma

Ammotrechula wasbaueri Muma, 1962, p. 43.

DIAGNOSIS: Males have the palpi dusky except for the coxae, trochanters, and bases of the femora, 2 pairs and 1 unpaired spinelike setae on the palpal metatarsi, and the fixed cheliceral finger attenuate, slender, and with 2 tiny aborted teeth. Females are unknown.

The species is adequately described in Muma (1962).

TYPE LOCALITY: Male holotype from Andreas Canyon, Riverside County, California, April 24, 1954, by M. Wasbauer, in AMNH.

DISTRIBUTION: USA: California.

DISCUSSION: This species and *A. pilosa* seem to be closely related.

SUBFAMILY SARONOMINAE ROEWER

Saronominae Roewer, 1934, p. 580.
Saronominae Roewer, Muma, 1951, p. 135.

Genus *Innesa* Roewer

Innesa Roewer, 1934, p. 581.

Innesa vittata (Pocock)

Figures 45 to 48.

Hemiblossia vittata Pocock, 1902, p. 67.

Innesa vittata (Pocock), Roewer, 1934, p. 581.

DIAGNOSIS: Females are distinguished by the wide white abdominal stripe, a long dorsal cheliceral carina, no serially arranged spinelike setae on the palpus, and the genital plate wider than long by a ratio of 1:1.6. Males are unknown.

The type is described below.

FEMALE TYPE: Total length, 14.5 mm. Chelicerae, 1.1 mm wide and 2.6 mm long. Propeltidium, 2.1 mm wide and 1.9 mm long. Palpus, 3.5 mm long. Leg IV, 5.6 mm long.

Coloration in alcohol: legs, palpi, chelicerae, and peltidia all dark purplish brown; ventral surfaces of mesopeltidium, metapeltidium, palpi, and legs lighter; abdominal tergites very dark on lateral margins and almost white medially so that abdomen appears striped. Malleoli dark along apical margins.

Dentition as shown in figure 45. Tarsi II and III with spinelike setae arranged 1,2,2,1

(figure 46) ; tarsi IV not segmented and with spinelike setae arranged 2,2,2,2 (figure 47). Palpi without distinguishable series of spinelike setae but with usual scattered cylindrical bristles, long and short setae, and long slender tactile setae. Metatarsus of palpus only twice as long as tarsus. Genital plate wider than long by a ratio of 1:1.5 (figure 48).

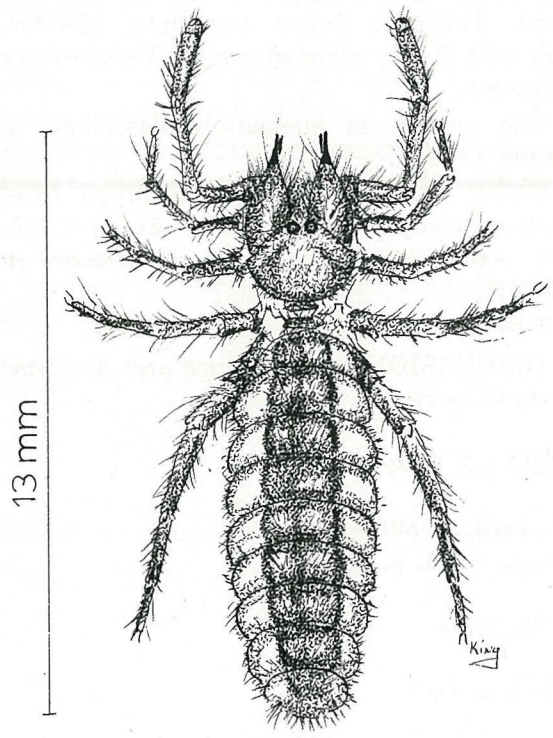
TYPE LOCALITY: Female type from Guatemala, Central America, in BMNH. The type is skewered from chelicerae to anus on an insect pin but is a dark, distinctly marked specimen.

DISTRIBUTION: Central America: Guatemala.

DISCUSSION: This is a unique species.

Genus *Branchia* Muma

Branchia Muma, 1951, p. 135.



Branchia brevis ♀

Branchia angustus Muma

Branchia angustus Muma, 1951, p. 135.

DIAGNOSIS: Males are distinguished from related species by pale leg tarsi and an attenuate fixed finger of the chelicerae that is slender between the anterior and primary teeth. Females are similarly colored and have both the propeltidium and genital plate wider than long by a ratio of 1:1.1.

TYPE LOCALITY: Male holotype from Twentynine Palms, California, July 1-15, 1945, by Jefferson H. Branch, in AMNH.

DISTRIBUTION: USA: Arizona, California.

DISCUSSION: This and the following 2 species are closely related.

Branchia brevis Muma

Branchia brevis Muma, 1951, p. 137.

DIAGNOSIS: Males have all or part of the tarsi dusky and an attenuate fixed chelicerал finger that is broad between the anterior and primary teeth. Females are unknown.

TYPE LOCALITY: Male holotype from Edinburg, Texas, March 15, 1939, by Stanley Mulaik, in AMNH.

DISTRIBUTION: USA: Arizona, Texas.

DISCUSSION: This species seems to be distinct from but could be graded into *B. angustus* or *B. potens* Muma.

Branchia potens Muma

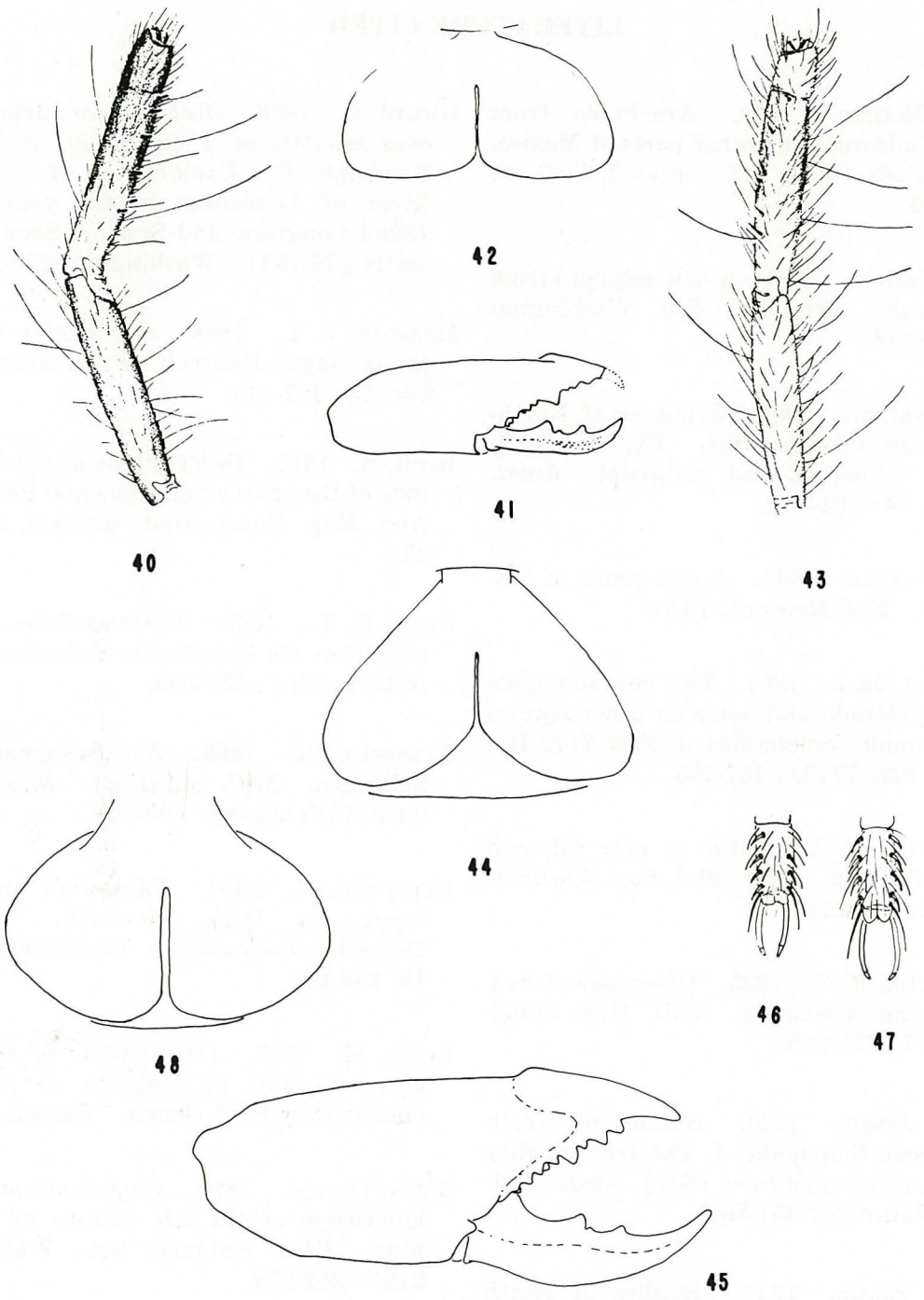
Branchia potens Muma, 1951, p. 138.

DIAGNOSIS: Males are distinguished by the dusky leg tarsi and non-attenuate thickened fixed finger of the chelicerae. Females are similarly colored and also have thickened chelicerae.

TYPE LOCALITY: Male holotype from Twentynine Palms, California, July 1-15, 1945, by Jefferson H. Branch, in AMNH.

DISTRIBUTION: USA: California, Nevada, Utah.

DISCUSSION: This species is the most easily recognized of the 3 known species in the genus.



Figs. 40 to 42. *Ammotrechesta brunnea* Roewer. 40. Mesal view of left female palpus. 41. Ectal view of right female chelicera. 42. Ventral view of female genital opercula.

Figs. 43 and 44. *Ammotrechula saltatrix* (Simon). 43. Mesal view of right female palpus. 44. Ventral view of female genital opercula.

Figs. 45 to 48. *Innesa vittata*. 45. Ectal view of right female chelicera. 46. Leg III tarsus, ventral view. 47. Leg IV tarsus, ventral view. 48. Ventral view female genital opercula.

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Index to Scientific Names

(Italicized page numbers indicate major reference)

A page

acrilobatus, Eremochelis ... 32
acrilobatus, Therobates ... 32
affinis, Datames ... 14
affinis, Eremobates ... *14*, 15, 18, 21
affinis, Eremoperna ... 14
arizonica, Eremostata ... 24
Ammotrecha ... 44, 45, 48, *49*
Ammotrechella ... *44*, 45
Ammotrechesta ... 44, *52*
AMMOTRECHIDAE ... 3, *44*
AMMOTRECHINAE ... *44*, 45
Ammotrechinus ... 44, *50*
Ammotrechona ... 44, *48*
Ammotrechula ... 44, *52*, 53
andreasana, Eremochelis ... 35
andreasana group ... 30, *35*
andreasana, Therobates ... 35
angustus, Branchia ... 56
angustus, Eremobates ... 25, *26*
angustus group ... 7, 10, *25*
arcellus, Therobates ... 30, 31
arcus, Eremochelis ... *33*, 34
arcus group ... 30, *33*, 34
arcus, Therobates ... 33
ascopulatus, Eremobates ... *10*, 11
attritus, Therobates ... 35
audax, Eremobates ... 2, *26*
azteca, Eremoperna ... 26
aztecus, Eremobates ... 24, *26*
aztecus group ... 10, *26*

B

banksi group ... *37*, 38
banksi, Hemerotrecha ... *37*, 38
bantai, Eremobates ... 15, *16*
barberi, Eremothera ... 29
bidepressa, Hemerotrecha ... 30
bidepressus, Eremochelis ... *30*, 31, 32
bidepressus, Therobates ... 30
bilobatus, Eremochelis ... 32, *33*
bilobatus group ... 30, *32*, 36
bilobatus, Therobates ... 33
bolivari, Ammotrechella ... 2, *45*
boneti, Ammotrechula ... 2, *52*
borregoensis, Ammotrechula ... 46, *53*
Branchia ... 56
branchi, Eremochelis ... *30*, 31, 32, 36
branchi group ... *30*, 31, 37, *42*
branchi, Hemerotrecha ... *42*, 43
branchi, Therobates ... 30
brevis, Branchia ... 56
brunnea, Ammotrechesta ... 46, *52*, 57

C

calexicensis, Eremorhax ... *7*, 9
californica, Cleobis ... 38
californica, Eremostata ... 24
californica, Hemerotrecha ... 37, *38*

page

californicus, Datames ... 25, 26
californicus, Eremobates ... 25, *26*
californicus, Eremopus ... 26
cameronensis, Therobates ... 31
caroliniana Eremostata ... 28
carolinianus, Datames ... 28
carolinianus, Eremobates ... 28
caspari, Datames ... 28
caspari, Eremobates ... 28
Chambria ... 4, *36*
cinerascens, Gluvia ... 22, 24
cinerea, Datames ... 8, 9
cinereus, Eremobates ... 8
Cleobis ... 37
cobinensis, Ammotrecha ... 46, *49*
coloradensis, Eremochelis ... *31*, 32
coloradensis, Therobates ... 31
constricta, Datames ... 28
constricta, Eremobates ... 28
cruzi, Eremobates ... 25, *26*
ctenidiellus, Evemobates ... *10*, 11, 12, 13
cubae, Ammotrecha ... 47, 48
cubae, Ammotrechona ... 45, *48*
cubae, Galeodes ... 48
cuyamacanus, Eremochelis ... *34*
cuyamacanus, Therobates ... 34

D

Datames ... 10
denticulata, Hemerotrecha ... *39*, 40, 41
dilatatus, Datames ... 22
dilatatus, Eremobates ... 22
dinamita, Eremogyna ... 24
dinamita, Eremostata ... 24
dolabra, Ammotrechula ... 46, *53*
dorsalis, Eremobates ... 28
dorsalis, Eremopus ... 28
durangonus, Eremobates ... 2, *22*, 24, 25

E

elongata, Gluvia ... 2, 28, 33
elongatus, Eremobates ... 28
elpasoensis, Hemerotrecha ... 42
Eremobates ... 3, 7, *10*
EREMOBATIDAE ... 3
EREMOBATINAE ... 3, *4*
Eremochelis ... 3, 4, *30*
Eremocosta ... 4, 10
Eremognatha ... 10, 37
Eremoperna ... 10
Eremopus ... 4, 10
Eremorhax ... 3, *4*, 7, 9
EREMORHAXINAE ... 4
Eremostata ... 10
Eremothera ... 3, *29*

F

fagei, Eremobates ... *16*, 18
fagei, Eremopus ... 16

page

flexacus, Eremochelis 34
flexacus, Therobates 34
formicarius, Gluvia 22, 24
formidabilis, Datames 4
formidabilis, Eremobates 4
formidabilis, Eremoperna 4
formidabilis, Eremorhax *4*, 5, 9, 12, 16
fruitana, Hemerotrecha *39*, 40, 42

G

geniculata, Ammotrecha 46
geniculata, Ammotrechella 45, *46*, 47
geniculata, Eremocosta 10
geniculata, Gluvia 2, 46
geniculatus, Datames 10
geniculatus, Eremobates *10*, 12
gertschi, Eremochelis 30, *31*, 32
gertschi, Therobates 31
gigas, Eremocosta 7
gigas, Eremorhax *7*, 8, 12
gigasellus, Eremorhax 7, *8*
girardi, Datames 17
girardi, Eremobates 15, *17*
gladiolus, Eremobates *11*, 12, 14
gracilidens, Eremobates 15, *17*, 21
gryllipes, Ammotrecha 50
gryllipes, Ammotrechinus 45, *50*
gryllipes, Solpuga 2, 50
guenini, Eremobates 15, 16, *17*
guenini, Eremognatha 17, 18

H

Hemerotrecha 3, 4, 30, 36, *37*
hessei, Eremobates 15, 16, 17, *18*, 22
hessei, Eremopus 18
hirsuta, Cleobis 54
Horribates 29
hystrix, Eremobates 28
hystrix, Eremoperna 2, 28

I

imperialis, Eremochelis 35
imperialis group 30, *35*
imperialis, Therobates 35
ingens, Eremobates *28*
ingens, Eremoperna 2, 28
Innesa 55
insignita, Hemerotrecha 31
insignitis, Eremochelis 30, *31*, 32
iviei, Eremochelis 31, *32*
iviei, Therobates 32

J

jacintoana, Hemerotrecha 40

K

kraepelini, Eremobates 15, *18*

L

lacuna, Ammotrechula 45, *53*
larreae, Eremochelis 35
larreae, Therobates 35
latus, Eremorhax 5
lentiginosus, Datames 24
limbata, Ammotrecha 45, *49*
limbatus, Galeodes 2, 49

M

page

macra, Hemerotrecha 42, *43*
macswaini, Eremochelis 34
macswaini, Therobates 34
magna, Datames 5, 6
magnus, Eremobates 5
magnus, Eremorhax *5*, 6
magnus group *4*, 5
malkini, Eremochelis 31, *32*
malkini, Therobates 32
marathoni, Eremobates 15, 16, *18*, 20
marathoni, Hemerotrecha 43
marginata, Eremognatha 38
marginata, Hemerotrecha *38*, 50
marginatus, Eremobates 38
medialis, Eremochelis 30, 31, *32*
medialis, Therobates 32
mexicanus, Eremopus 5, 6
milsteadi, Hemerotrecha 43
minima, Hemerotrecha 42, *43*
montezuma, Eremopus 6
montezuma, Eremorhax *6*, 12
montezuma group 4, *6*
mormona, Eremoperna 12, 18
mormonus, Eremobates 11, *12*, 14, 18
morrisi, Eremochelis 30, 31, *32*
morrisi, Therobates 32
mulaiki, Ammotrechula 46, *53*

N

nanus, Eremobates 15, *20*
nevadensis, Hemerotrecha 40, *41*
nigrescens, Ammotrecha 46, 48, *50*
nigrimanus, Gluvia 5, 6
nodularis, Eremobates 18
nudus, Eremochelis 34
nudus, Therobates 34

P

pallipes, Datames 33
pallipes, Eremobates *22*, 24, 26, 33
pallipes, Galeodes 22, 24
pallipes group 10, *22*, 24
palpisetulosus, Eremobates 14, 15, 17, *20*
palpisetulosus group 10, 14, 15
papillatus, Eremobates 15, *20*, 21
peninsulana, Ammotrecha 54
peninsulana, Ammotrechula 45, *54*
peninsulana, Cleobis 54
picta, Ammotrecha 2
pilosa, Ammotrechula 45, 53, *54*, 55
plicatus, Eremochelis 33
plicatus, Therobates 33
potens, Branchia 56
praecox, Eremobates 28
praecox, Gluvia 28
proxima, Hemerotrecha 39, 40, *41*
pseustes, Ammotrecha 47
pseustes, Ammotrechella 47
puebloensis, Eremorhax 5, *6*
pulcher, Eremorhax 5, *6*
purpusi, Eremobates 15, *20*, 21, 22
purpusi, Eremopus 20

page

putnami, Datames 25
putnami, Eremobates 24, *25*

R

rectus, Chanbria 36
regalis, Chanbria 36
regalis group 36
robusta, Eremocantha 9
robusta, Eremorhax 9
rothi, Eremochelis 35, *36*
rothi, Therobates 36

S

saltatrix, Ammotrecha 54
saltatrix, Ammotrechula 45, *54*, 57
saltatrix, Cleobis 54
SARONOMINAE 55
scaber, Datames 12
scaber, Eremobates 10, *12*, 14, 18
scaber group *10*, 11
scabra, Eremostata 12
schlueteri, Ammotrechesta 2, 46, *52*
scopulatus, Eremobates 20
sculpturata, Eremothera 29
septentrionis, Eremobates 10, 11, *12*, 14
serpentinus, Chanbria 37
serpentinus group 36, *37*
serrata group 37, *39*
serrata, Hemerotrecha 33, *39*
setulosa, Ammotrechella 46, *47*
sexspicata, Ammotrechella 47
similis, Eremobates 11, *14*
simoni, Eremobates 24, *25*
simplex, Hemerotrecha 40, *41*, 42
spinigerus, Horribates 29
spinipalpus, Datames 8
spinipalpus, Eremobates 8
spinipalpus, Eremorhax *8*, 9
steckleri, Hemerotrecha 41
stimpsoni, Ammotrechella 45, *47*, 50
stimpsoni, Galeodes (Cleobis) 47
stolli, Ammotrecha 45, 48, *50*
stolli, Cleobis 50
striatus, Datames 8
striatus, Eremorhax 3, 7, *8*, 9

page

striatus group 4, *7*
striodorsalis, Eremochelis *36*
striodorsalis group 30, *36*
striodorsalis, Therobates 36
subulata, Eremobates 28
subulata, Galeodes 22, 24, 28
sulfurea, Eremostata 28
sulfureus, Datames 28
sulfureus, Eremobates 28
suspectus, Eremobates 24, *25*

T

tabogana, Ammotrecha 48
tabogana, Ammotrechella 46, *48*, 50
tehachapianus, Chanbria 36, *37*
tejonus, Eremobates 15, *21*
texana, Ammotrecha 54
texana, Ammotrechula 54
texana group 37, *39*, 40
texana, Hemerotrecha 40, *41*, 42
Therobates 30
THEROBATINAE 3, *30*
titania, Eremorhax 7, *9*
titschacki, Eremobates 16, 17, *21*, 22
titschacki, Eremoseta 21
tolteca, Gluvia 2, 29
toltecus, Eremobates 25, *29*
truncata, Hemerotrecha 38, *39*
tuberculatus, Detames 21
tuberculatus, Eremobates 15, 20, *21*, 26
tuberculatus, Eremognatha 21

V

venusta, Ammotrechula 46, 53, *55*
vicinus, Eremobates 16, *21*
villosus, Eremobates 16, 20, *21*
vittata, Hemiblossia 55
vittata, Innesa *55*, 57

W

wasbaueri, Ammotrechula 46, 53, *55*
werneri, Hemerotrecha 40, 41, *42*

X

xena, Hemerotrecha 42, *43*

Z

zinni, Eremobates 11, *14*