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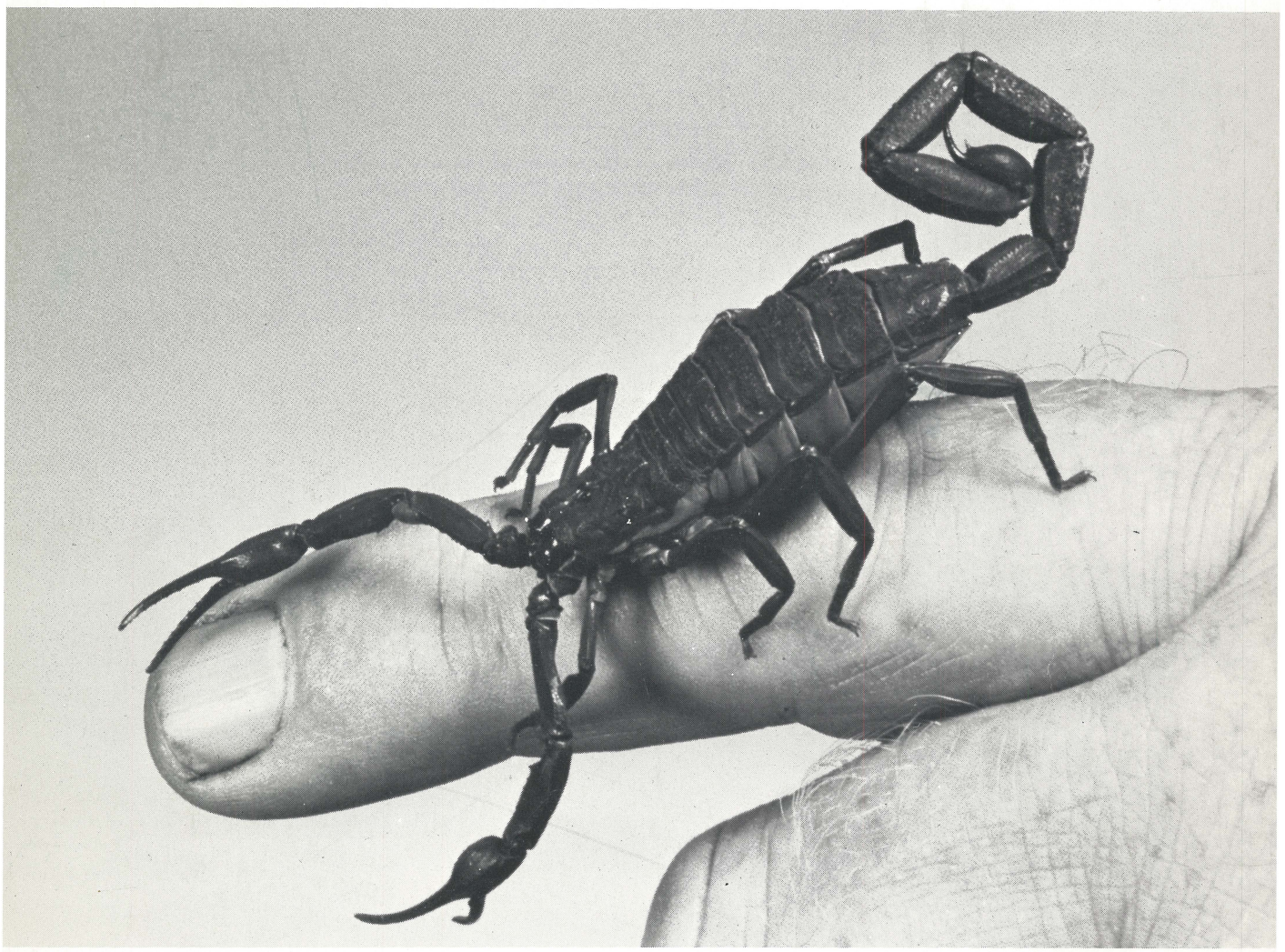
ARTHROPODS OF FLORIDA

AND NEIGHBORING LAND AREAS

VOLUME 4



SCORPIONS, WHIP SCORPIONS AND WIND SCORPIONS OF FLORIDA

MARTIN H. MUMA

FLORIDA DEPARTMENT OF AGRICULTURE

DOYLE CONNER, COMMISSIONER

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1967

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MARTIN H. MUMA

University of Florida Citrus Experiment Station
Lake Alfred

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DIVISION OF PLANT INDUSTRY

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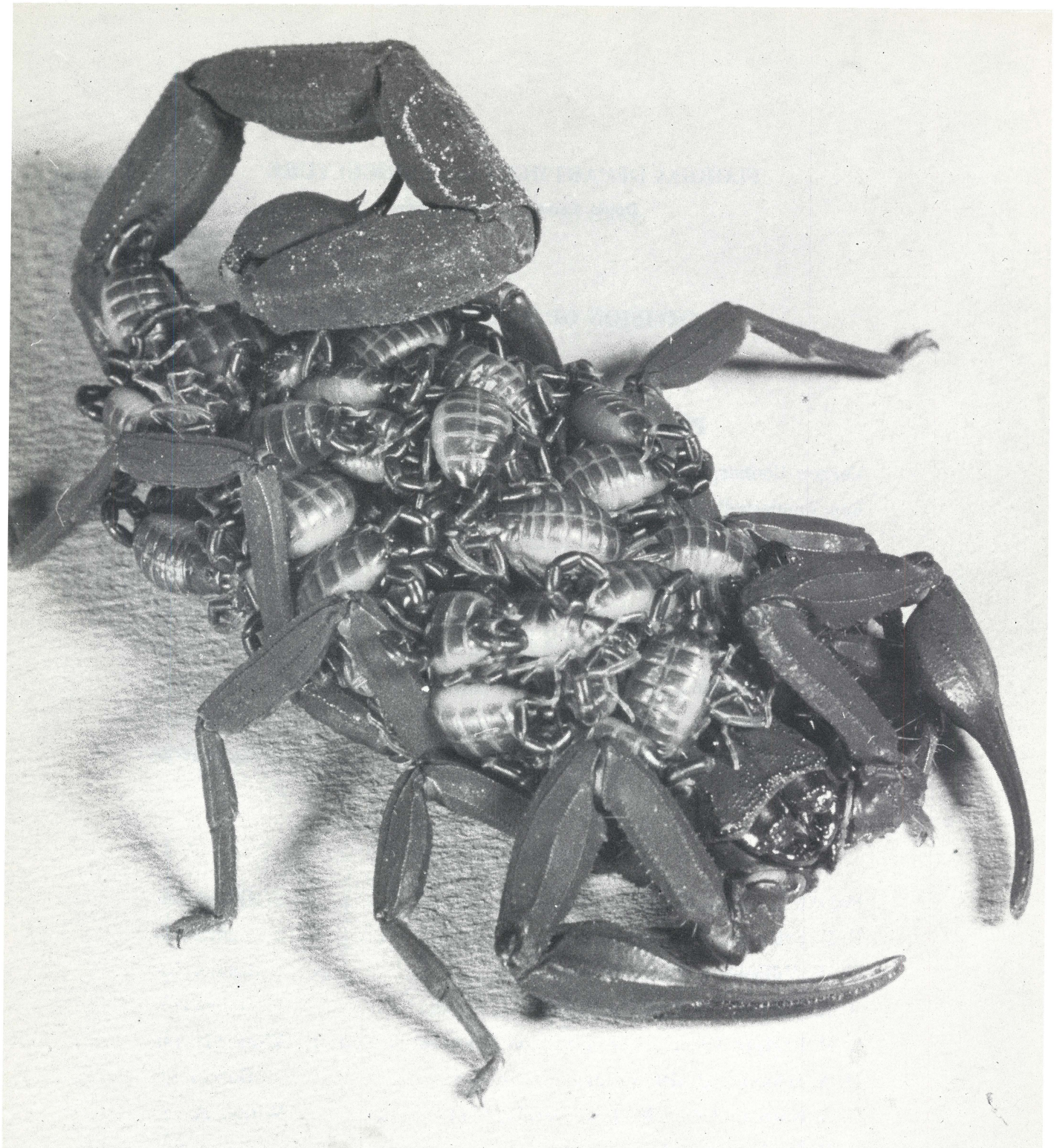

Female scorpion, *Centruroides gracilis* (Latreille), and young

Cover: Scorpion, *Centruroides gracilis* (Latreille)

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FOREWORD

Entomologists of the Division of Plant Industry, Florida Department of Agriculture, provide an identification service for the State of Florida of insects, mites, spiders, scorpions, millipedes, centipedes and other arthropods. Fairly frequently, scorpions and other arachnids closely related to scorpions are received for identification and information is requested concerning the virulence of their stings or bites, their recognition characters, their habits and their control. The accurate identification of these groups in Florida has been confused due to the inadequacy of identification keys, the occurrence of highly questionable records for Florida which have appeared in the literature, and the lack of detailed descriptions of those species which are known to occur in Florida; at least two Florida species have been undescribed. Dr. Martin H. Muma, Research Associate of The Florida State Collection of Arthropods and Technical Advisor to the Florida Department of Agriculture, was asked to prepare a bulletin stressing the recognition and distribution of the species found in the state.

Scorpions, whip scorpions and wind scorpions are predaceous on other small animals, mostly upon soft-bodied insects, but as the author indicates in this bulletin, only the scorpions possess poison glands and constitute any danger to man. None of the several species of scorpions which occur in Florida is capable of inflicting a lethal sting, although the site of the sting may be painful for several hours. Scorpion venom, a neurotoxin, is comparable in toxicity and in its mode of action to that of the cobra, but the dose injected by the scorpion usually is insufficient to prove fatal to the human adult. The potency of the venom varies considerably from one species to another, and even closely related species may differ widely in this respect. In North America, species highly dangerous to humans, especially to children, occur only in arid regions of the extreme southwestern United States and Mexico.

Scorpions, Whip Scorpions and Wind Scorpions of Florida is the fourth of an irregularly appearing series of publications relating to the insects and other arthropods of Florida and neighboring land areas—the southeastern United States, the Bahama Islands, the Greater and Lesser Antilles, and the land areas in an around the Gulf of Mexico and the Caribbean Sea—with emphasis on taxonomy, ecology, biology, and zoogeography.

The files and preserved specimens of the Florida State Collection of Arthropods provided a basis for many of the records in this publication. This collection is being developed by the staff members of the Entomology Section, Division of Plant Industry, Florida Department of Agriculture, and more than fifty Research Associates of the state arthropod collection. Close support is provided by staff members in several departments of the University of Florida, including those in the Department of Entomology, the Department of Biological Sciences, the Department of Zoology and the Florida State Museum. The collection is housed in the entomology building of the new Division of Plant Industry headquarters located on the campus of the University of Florida.

The author, Dr. Muma, was born in Topeka, Kansas, July 24, 1916. He received his B. S. degree from Frostburg State Teachers College in 1939, his M. S. degree from Western Maryland College in 1940, and his Ph. D. degree from the University of Maryland in 1943. From 1940 into 1945 he served as an Instructor and Assistant Entomologist at the University of Maryland, then as an Extension Entomologist and Associate Professor and Entomologist at the University of Nebraska from 1945 into 1951. Since 1951 he has been an Associate Professor, and then a full Professor of Entomology at the University of Florida Citrus Experiment Station located at Lake Alfred, working primarily on research relating to the biological control

of citrus insects and mites. In the field of taxonomy he has made important contributions on the taxonomy and biology of citrus mites, and he is one of the foremost North American authorities on the taxonomy, biology and behavior of Arachnida, including spiders, scorpions and wind scorpions. He is the author or coauthor of forty articles in the field of entomology and forty-five articles in the field of arachnology, in addition to 21 extension bulletins concerning insects and other arthropods and six articles on speleology.

Howard V. Weems, Jr.
Editor

Entomology Section
Division of Plant Industry
Florida Department of Agriculture
October 4, 1967

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SCORPIONS, WHIP SCORPIONS, AND WIND SCORPIONS OF FLORIDA

(Arachnida: Scorpionida, Pedipalpida, and Solpugida)

Martin H. Muma[1]
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University of Florida Citrus Experiment Station
Lake Alfred

Arachnids of the orders Scorpionida, Pedipalpida, and Solpugida in Florida have received no attention as a group since Nathan Banks' (1904) presentation of "The Arachnida of Florida" 63 years ago. The present publication reviews the recorded species of scorpions and their allies in Florida, cites additional distribution records and, where possible, gives biological and ecological data of both scientific and popular interest.

Although an intensive literature search and a systematic, morphologic investigation were required to properly identify and name some included species, this is not primarily a taxonomic paper. It is, rather, a zoogeographic presentation of the species found in the state. Because of a general public interest in scorpions and scorpion-like animals, information on the habits and habitats of the various species is included. For the same reason, known effects of the stings or bites are cited.

Morphologic drawings have been restricted to those absolutely essential for accurate, scientific diagnosis of new or little-known species. Most species have been illustrated by photographs of living or carefully arranged museum specimens. These will help interested Florida residents to identify these "scorpions" so that they may read the appropriate paragraphs of this report and better understand these overly feared and often maligned animals.

[1] Research Associate, Florida State Collection of Arthropods, Division of Plant Industry, Florida Department of Agriculture.

Keys to orders, families, genera, and species have been prepared for those interested in technical species identification. Paragraphs entitled "coloration" and "measurements" also contain technical information. Paragraphs entitled "remarks" and "records" contain both general and technical information on the occurrence, distribution, and bites or stings of the cited forms.

Persons interested in learning more about the lives, habits, and histories of scorpions and their allies are referred to the following general works which contain excellent summaries and bibliographies: *The Spider Book* by J. H. Comstock (1912, revised 1940); *American Spiders* by W. J. Gertsch (1949); *The Arachnida* by T. H. Savory (1935); *Spiders, Men and Scorpions* by T. H. Savory (1961).

I acknowledge and express my appreciation and thanks to the following persons for special assistance that they have given me: Dr. W. J. Gertsch of the American Museum of Natural History for the loan of study materials, encouragement, and personal assistance; Dr. H. W. Levi of the Harvard University Museum of Comparative Zoology for the loan of types and study specimens and personal assistance; Dr. H. V. Weems, Jr., of the Florida State Department of Agriculture, Division of Plant Industry, Entomology Section, for the loan of study specimens and encouragement; Dr. R. E. Crabill, Jr., of the United States National Museum for the loan of Florida specimens; and Mr. A. G. Selhime, Mrs. Harriet Long, Mr. Ernest M. Collins, Jr., and Mr. Robert C. Hermes for the photographs.

KEY TO "SCORPION" ORDERS AND FAMILIES IN FLORIDA

1. Pedipalps chelate, swollen at tip into a grasping hand with opposable fingers; cephalothorax undivided: venter provided with a pair of comb-like pectines; abdomen prolonged into a tail-like, six segmented, post-abdomen provided with a sting; with four pairs of book-lungs..... Order Scorpionida-2

1A. Pedipalps raptorial, armed mesally with spurs and spine for clutching; cephalothorax undivided or divided at most into two recognizable segments; post-abdomen, when present, not provided with a sting; with one or two pairs of book-lungs ..... Order Pedipalpida-3

1B. Pedipalps leg-like with retractable adhesive organ at tip; cephalothorax divided into head and thoracic-like segments; coxae, trochanters of fourth legs provided with racquet organs; post-abdomen absent; without book-lungs..... Order Solpugida (Family Ammotrechidae), p. 26.

2. Sternum triangular; post-abdomen slender, much longer than body..... Family Buthidae, p. 3.

2A. Sternum pentagonal; post-abdomen thick, only slightly longer than body..... Family Vejovidae, p. 14.

3. Post-abdomen long, slender, and many-segmented; two pairs of book-lungs; large species (1 to 5 cm in length)..... Family Thelyphonidae, p. 21.

3A. Post-abdomen short, and three or four segmented; one pair of book-lungs; tiny species (less than 1 cm in length)..... Family Schizomidae, p. 18.

3B. Post-abdomen absent; two pairs of book-lungs; medium sized species (1 to 3 cm in length)....Family Tarantulidae, p. 23.

KEY TO THE GENERA AND SPECIES OF SCORPIONS IN FLORIDA[1]

1. Sternum pentagonal; post-abdomen thick and only slightly longer than body; no spine at the base of the sting..... *Vejovis carolinianus* (Beauvois) p. 14.

   Sternum triangular; post-abdomen slender and much longer than body; distinct spine or spur at the base of the sting....2

2. Median denticules on movable fingers of chelae flanked by rows of supernumerary denticules..... Genus *Centruroides* Marx-4

   Median denticules on movable fingers of chelae not flanked by rows of supernumerary denticules 3

[1]Figure 1 shows the comparative sizes, color, and color patterns of Florida scorpions.

3. Median denticules in strongly overlapping oblique rows; a large uniformly brown species ..... *Tityus floridanus* Banks, p. 13.

   Median denticules seemingly in a continuous row; a slender yellow and brown spotted species ..... *Isometrus maculatus* (DeGeer), p. 11.

4. Movable fingers of chelae with eight oblique rows of median denticules; a large slender red-brown species ..... *Centruroides gracilis* (Latreille), p. 8

   Movable fingers of chelae with nine oblique rows of median denticules; yellow species marbled and striped with brown 5

5. Large species (36 to 73 mm); females lack a pit on the basal sclerite of the pectines; males generally larger than females; found in the southern keys, Miami area, and southern part of west coast ..... *Centruroides keysi* new species, p. 6.

   Small species (32 to 44 mm); females have a pit on the basal sclerite of the pectines; males generally smaller than females; found on the peninsula, northern keys, and in the panhandle counties .....*Centruroides hentzi* (Banks), p. 3.

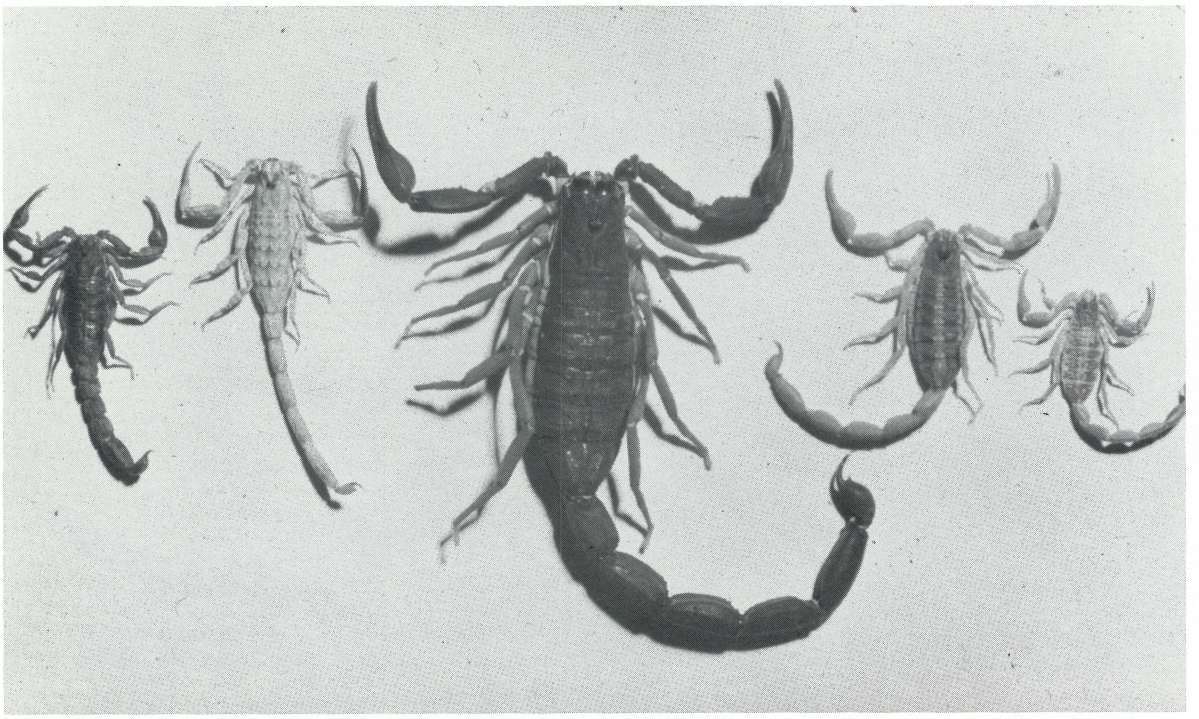


Fig. 1.—Left to right *Vejovis carolinianus* (Beauvois), *Isometrus maculatus* (DeGeer), *Centruroides gracilis* (Latreille), *Centruroides keysi* new species, *Centruroides hentzi* (Banks). (Approximately 85 per cent of life size).

Order Scorpionida

Family Buthidae

Centruroides hentzi (Banks)

(Hentz's Striped Scorpion)

Fig. 2 and 3

Centrurus hentzi Banks, 1900, Amer. Nat., Vol. 34, No. 401, p. 426.

Centrurus hentzi, Banks, 1904, Proc. Acad. Nat. Sci. Phila., Vol. 8, p. 142.

Centruroides hentzi, Comstock, 1912, The Spider Book (revised W. J. Gertsch, 1940) Doubleday Doran and Co., Inc., N. Y., p. 27.

COLORATION: Color in alcohol pale to dark yellow, heavily marked with brown (Fig. 2). Carapace black on eye tubercle but otherwise symmetrically marked with brown blotches and lines that radiate laterally and anteriorly from a narrow pale yellow median stripe. Abdominal tergites margined with brown and marked with two broad, sub-median, mottled, brown stripes. Chelicerae, pedipalps, and legs marbled with brown on the dorsal and lateral surfaces. Ventral surface of legs pale and unmarked. Coxae, endites, genital sclerites, pectines, and first abdominal sternites pale but narrowly margined with brown. Second, third, and fourth abdominal sternites medially dusky and narrowly margined with brown. Fifth abdominal sternite darker yellow, margined with brown and marked with two short sub-median brown stripes that extend anteriorly from the posterior margin about one-half the length of the sclerite. Postabdomen pale dorsally but marbled with brown on the lateral and ventral surfaces of the segments, the basal segment and apical segment, or vesicle, are least marked. Sting dark brown on the apical third to half of its

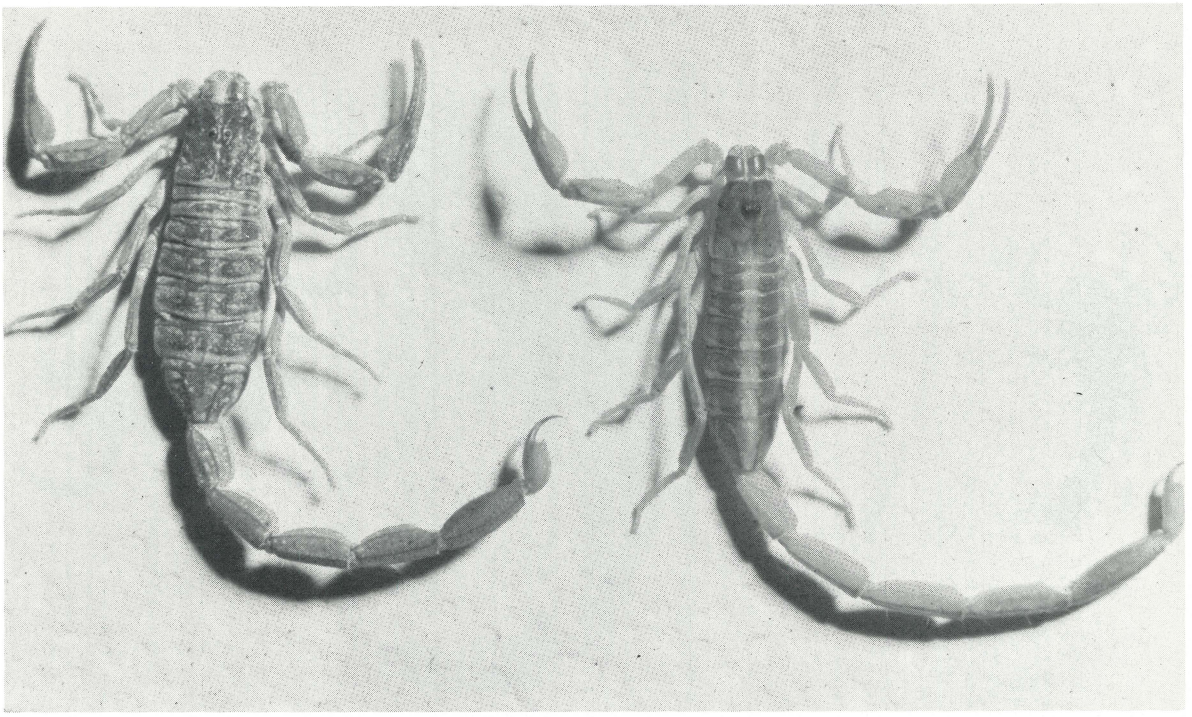


Fig. 2—*Centruroides hentzi* (Banks), female and male (about 2.7 times life size).

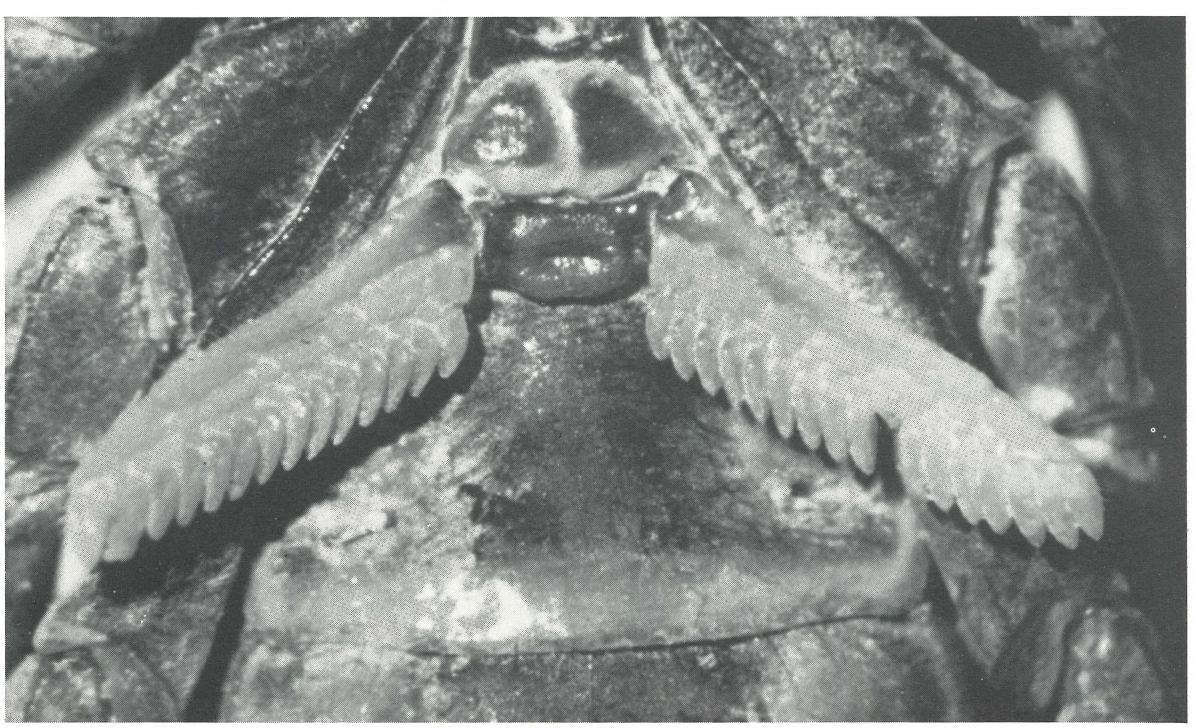


Fig. 3.—*Centruroides hentzi* (Banks), pectines of female (18X).

Table 1.—Comparative morphologic characters of *Centruroides hentzi* Banks and *Centruroides keysi* new species.

Species and sex	Lengths in mm			Carapace post-abdomen ratio	Number pectinal teeth
	Total	Carapace	Post-abdomen		
Centruroides hentzi (Banks)					
Males (8)					
Max	41.0	3.6	27.5	1:7.6	18
Min	32.0	3.0	19.0	1:6.3	16
Mean	37.1	3.3	24.0	1:7.2	18
Females (14)					
Max	44.0	4.5	25.0	1:6.2	18
Min	35.5	3.7	20.0	1:4.5	16
Mean	38.9	4.1	22.1	1:5.4	17
Female basal sclerite of pectines (jugum) with large transverse pit, Fig. 3.					
Centruroides keysi n. sp.					
Males (8)					
Max	73.0	5.5	55.0	1:11.0	21
Min	49.0	4.0	32.0	1:8.0	19
Mean	60.0	4.8	42.2	1:8.8	20
Females (14)					
Max	55.0	5.8	33.5	1:6.5	21
Min	36.0	4.0	21.0	1:5.2	18
Mean	43.5	4.8	27.6	1:5.7	19
Female basal sclerite of pectines (jugum) smooth (Fig. 5).					

length. Pectines pale, teeth with dusky spots.

MEASUREMENTS: Diagnostic measurements and characters of this species are compared with those of *Centruroides keysi* new species in Table 1.

REMARKS: Banks (1904) reported specimens from Runnymede (Osceola County) in October and Fort Reed (Seminole County). The type vial, in the Museum of Comparative Zoology at Harvard University, Cambridge, Massachusetts, is labeled Runnymede, 1891, October, and contains two small males and an immature as well as two centipedes.

This species and *Centruroides keysi* n. sp. resemble *Centruroides thorelli* Kraeplin, a Central American species, in size, coloration, and markings but have a much greater number of teeth in the pectines. *Centruroides vittatus* (Say) also is closely related but differs by having a distinct dark brown triangular spot over the interocular area, no brown marbling on the upper surfaces of the chelicerae, 22 to 24 teeth in the pectines, and a minute central pit in the basal sclerite of the female's pectines.

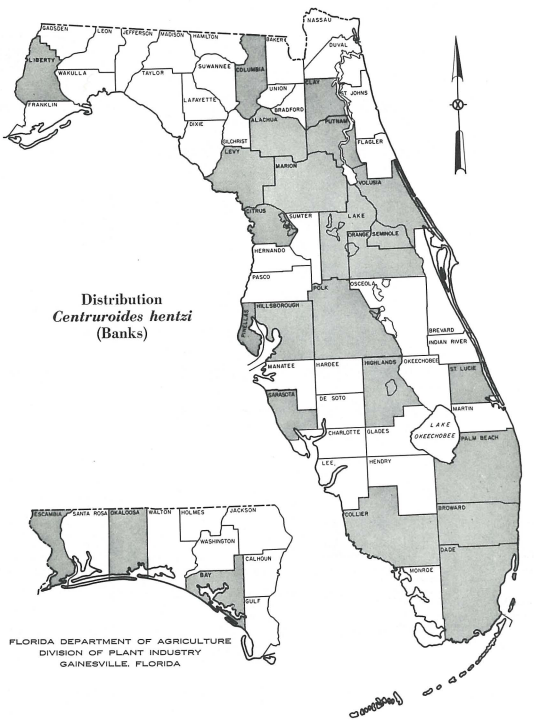
The author has been stung several times by this species with little or no ill effect. There is a mild local stinging and burning for a few minutes and tenderness for a few hours.

Although this species is collected frequently under stones, logs, and litter on the ground, it is also common under the bark of dead standing trees, as high as 20 feet off the ground, and commonly invades houses. It readily eats crickets and roaches under laboratory conditions, and the young feed on termites.

RECORDS: There are numerous records of this species from the peninsula and panhandle of the state and from northern islands or keys, but it has not been collected from the southern keys. A few representative records are given.

ALACHUA COUNTY, one female, July 14, 1959, under bark of rotting oak log, H. V. Weems, Jr.; Gainesville, one female, July 22, 1959, under bark of pine log, W. J. Platt, III; BAY COUNTY, Panama City, one female, January 12, 1960, in decaying pine log, Tom Johnson; BROWARD COUNTY, one female and immatures, April 16, 1949, H. K. Wallace; CITRUS COUNTY, Homosassa Springs, one female, April 25, 1943, B. Malkin; CLAY COUNTY, Ortega, one male and two females, 1920; COLLIER COUNTY, one female, November 30, 1955, H. A. Denmark;

COLUMBIA COUNTY, two males, three females, February 18, 1960, under bark of oak, H. V. Weems, Jr.; DADE COUNTY, one female, January 7, 1956, under oak bark; Florida City, one female, January 30, 1959, under trash, M. H. Muma; ESCAMBIA COUNTY, Pensacola, one male, two females, and young; HIGHLANDS COUNTY, Highlands Hammock State Park, one female, December 15, 1957, under bark of punk tree, H. V. Weems, Jr.; HILLSBOROUGH COUNTY, Hillsborough River State Park, one male, one female, March 23, 1958, under logs and boards, M. H. Muma; LAKE COUNTY, Tavares, one male, May 19, 1961, on concrete block, J. R. Hey; LEVY COUNTY, Sea Horse Key, two females, October 10, 1955, under wood walk, C. H. Wharton; LIBERTY COUNTY, Rock Bluff, one young, November 20, 1961, under pine log bark, M. H. Muma; MARION COUNTY, Ocala, two young, July 4, 1959, under bark of dead pine, W. J. Platt, III; OKALOOSA COUNTY, Valparaiso, one female, Fall, 1943, Edwards; ORANGE COUNTY, Winter Park, one female, March 21, 1938, W. J. Gertsch; PALM BEACH COUNTY, Lake Worth, two young, June 16, 1960, G. W. Desin; PINELLAS COUNTY, Tarpon Springs, one male, one female, March 21, 1943, B. Malkin; POLK COUNTY, Winter Haven, one female with immatures, 1953, in house, M. H. Muma; Winter Haven, one female, May 15, 1957, in house, M. H. Muma. PUTNAM COUNTY, near Hawthorne, one male, January 6, 1960, under bark of dead pine, H. V. Weems, Jr.; ST. LUCIE COUNTY, one male, September 9, 1959, under log, G. W. Campbell; SARASOTA COUNTY, Sarasota, one young, February 6, 1958, under bark of pine, H. V. Weems, Jr.; SEMINOLE COUNTY, Longwood, one female, April 30, 1962, on ground in wooded area, G. W. Desin; VOLUSIA COUNTY, one male, December 8, 1950, H. K. Wallace.



Centruroides keysi new species
(Keys Striped Scorpion)
Fig. 4 and 5

COLORATION: Color and markings in alcohol nearly identical with those of *C. hentzi*. Brown markings on cephalothorax, abdomen, and appendages not quite as dark or extensive as those on *C. hentzi*, mottling interrupted by yellow more frequently (Fig. 4). Post-abdomen marked below with a dark mottling on every segment including vesicle.

MEASUREMENTS: Diagnostic measurements and characters are compared with those of *C. hentzi* in Table 1.

TYPE LOCALITY: Female holotype collected under coconut on Loggerhead Key in Monroe County, Florida, September 1, 1962, deposited in the American Museum of Natural History, New York, New York. Eight males and 13 females have been designated as paratypes; paratypes have been deposited in the American Museum of Natural History,

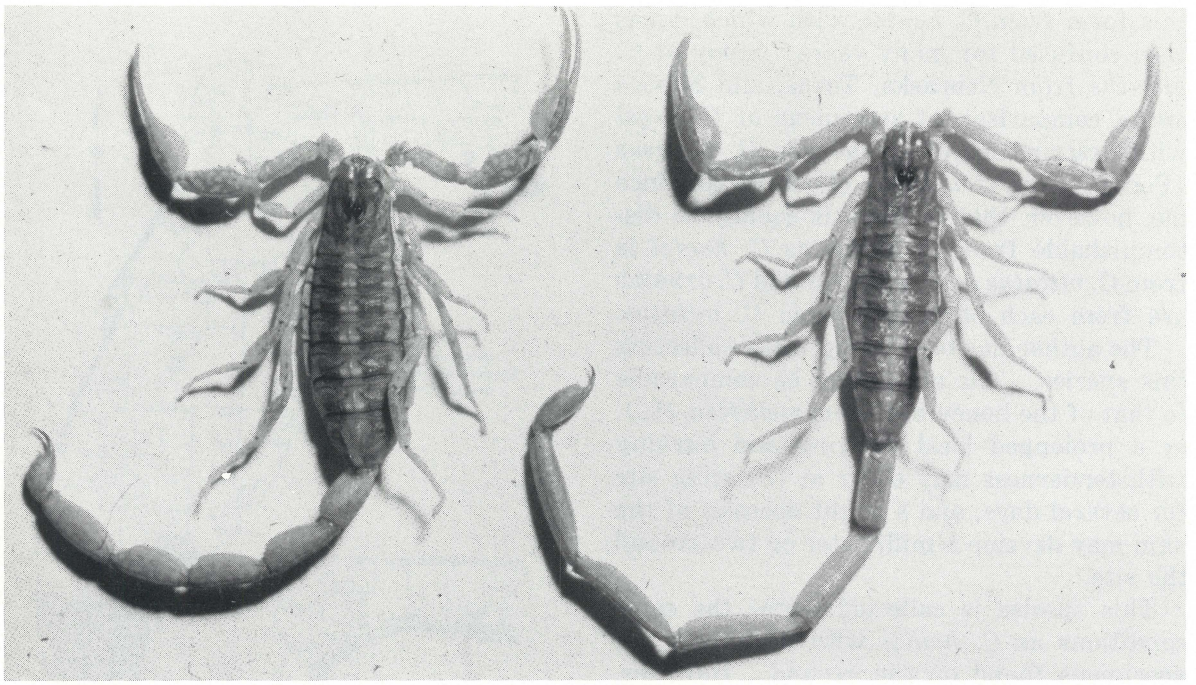


Fig. 4.—*Centruroides keysi* new species, female and male (about 2.2 times life size).

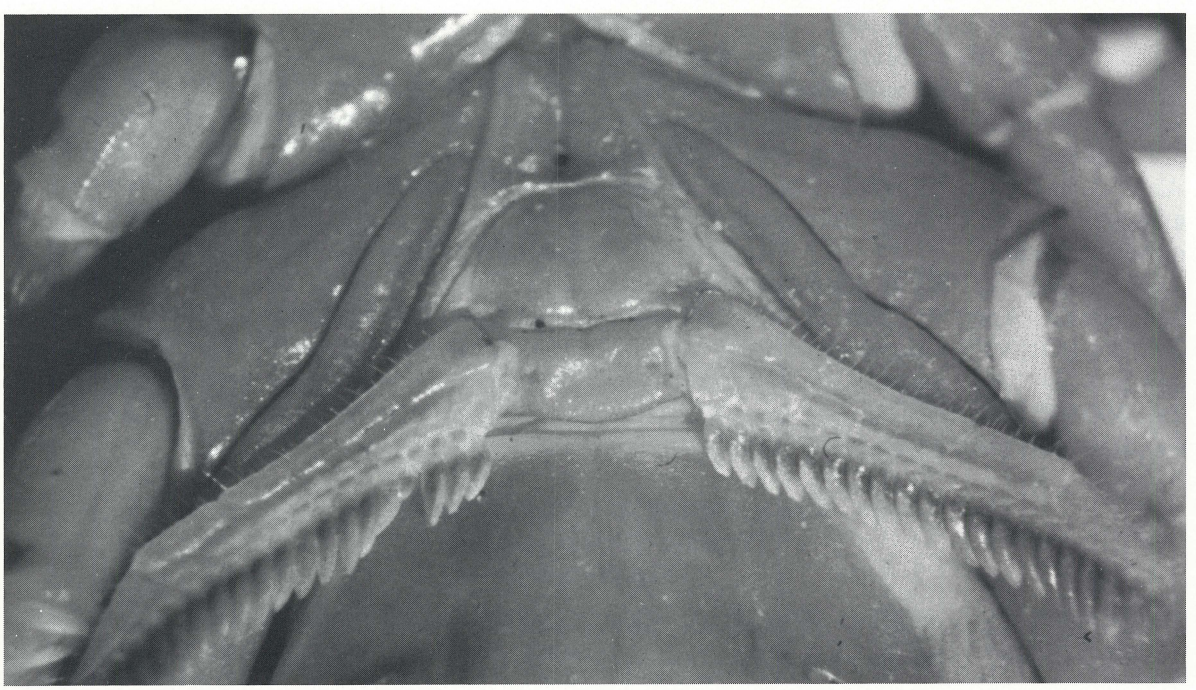


Fig. 5.—*Centruroides keysi* new species, pectines of female (18X).

New York, New York; United States National Museum, Washington, D. C.; and Florida State Collection of Arthropods, Gainesville, Florida.

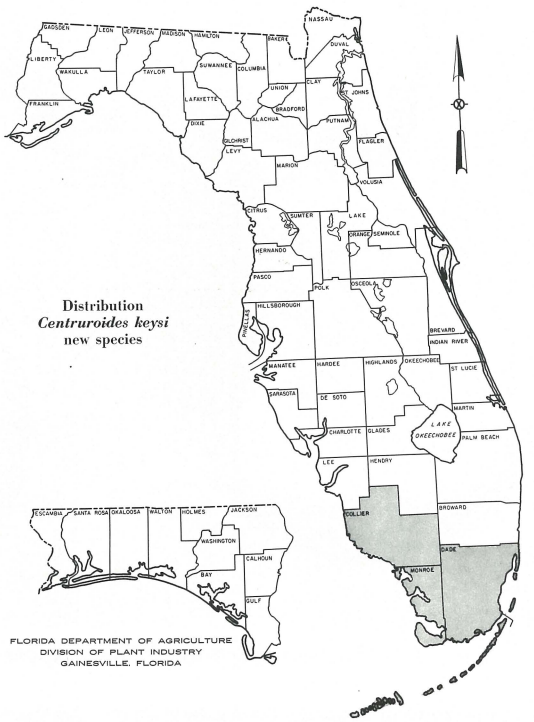
REMARKS: The larger size, longer postabdomen, comparatively larger males, more pectinal teeth, and absence of a pit on the basal sclerite of the female pectines distinguish this species from *C. hentzi*.

I hesitated for some time to separate

this form from *C. hentzi,* with which it has been confused for many years. Study of *C. vittatus* from Nebraska, Texas, and Mexico and a comparison of specimens of *C. keysi* with descriptions of *C. thorelli, C. suffusus* (Pocock), and *C. ornatus* (Pocock) convince me, however, that *C. keysi* is equally as distinguishable from *C. hentzi* as *C. hentzi* is from *C. vittatus* or *C. suffusus* and *C. ornatus* are from each other and from *C. vittatus.*

The author has been stung while collecting this species. The sting may be comparable to that of the honey bee, *Apis mellifera* (L.), or a prolonged local stinging and burning with tenderness may occur at the sting site for several days, and a slight necrosis of the skin may develop a millimeter or two around the site.

This species is collected under the same conditions as *C. hentzi* with perhaps more specimens found on the ground. However, it is found frequently under the bark of dead pine and buttonwood trees, especially those infested with large termites.



RECORDS: Key records other than that from which the type was taken include Key Largo, Plantation, Upper Matecumbe, Lower Matecumbe, Sugarloaf, Torch, and Big Pine. Also, it has been collected from the Miami area and Collier County. Representative records are given.

COLLIER COUNTY, Corkscrew Swamp, one female, April 9, 1958, R. E. Woodruff; DADE COUNTY, Homestead, one female, January 30, 1959, under rock, H. V. Weems, Jr.; MONROE COUNTY, Big Pine Key, two females, one young, April 10, 1959, under weathered cardboard, H. V. Weems, Jr.; Key Largo, one female, January 30, 1959, under bark, H. A. Denmark; Lower Matecumbe Key, one male, one female, December 16, 1959, R. E. Woodruff; Sugarloaf Key, one male, September 5, 1961, under bark of dead limb, H. V. Weems, Jr.; Torch Key, two males, two females, June 8, 1960, under bark of small dead trees, H. V. Weems, Jr.; Plantation Key, two males, three females, January 4, 1964, under bark of dead trees, M. H. and K. E. Muma.

Centruroides gracilis (Latreille)

(Slender Brown Scorpion)

Fig. 6 and 7

Scorpio gracilis Latreille, 1804, Hist. Nat. Gen. Crust. et Ins., Vol. 7, p. 127.

Centrurus gracilis, Karsch, 1879, Mittheil. Munch. ent. Ver., Vol. 3, p. 18.

Centruroides gracilis, Pocock, 1902, Biol. Centr. Amer., Arachn. Scorp., Vol. 3, p. 32.

COLORATION: Color in alcohol predominantly brown to reddish brown with pale brown and yellowish markings (Fig. 6). Carapace black over median eye tubercle and marginal eyes; median furrow behind eyes narrowly yellow which terminates in a short yellow transverse bar at posterior border of carapace; otherwise carapace mottled and reticulate with dark and light brown. Abdominal tergites dark brown marked with a pair of pale brown laterally extending V-shaped marks, a pair of pale yellow to brown spots and a pair of pale

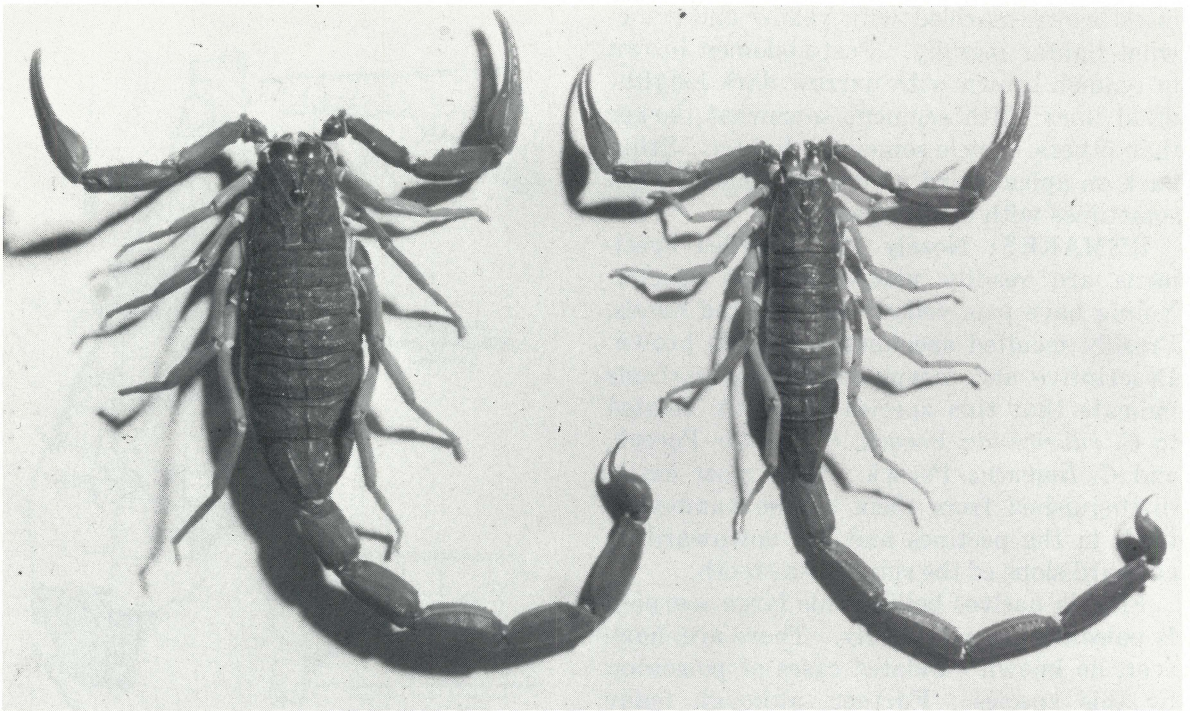


Fig. 6.—*Centruroides gracilis* (Latreille), female and male (1.3 times life size).

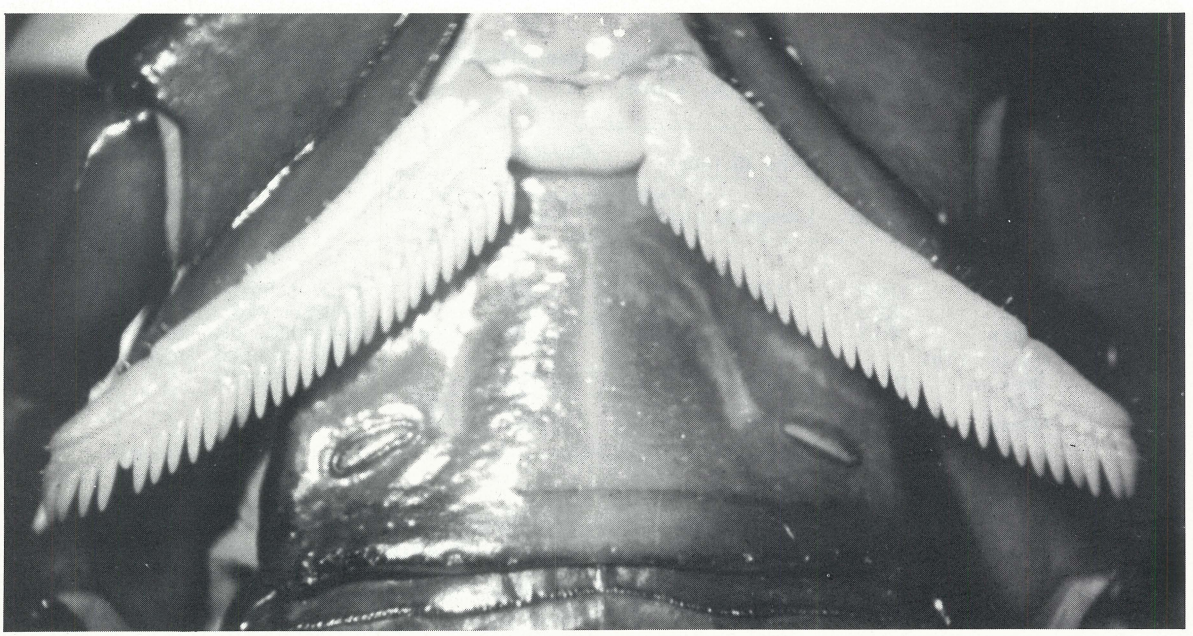


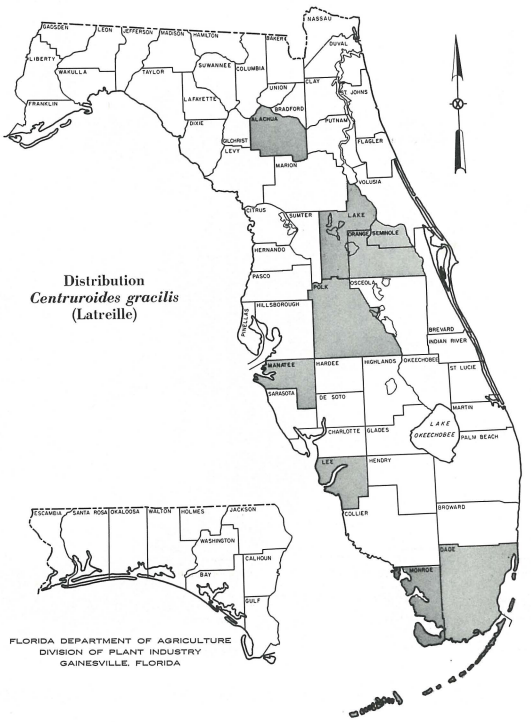
Fig. 7.—*Centruroides gracilis* (Latreille), pectines of female (9X).

yellow to brown longitudinal dashes on each of the first five segments; sixth segment lighter brown marked with narrow dark longitudinal stripes. Chelicerae pale with a fine dark reticulation. Pedipalps brown to reddish brown with narrow dark longitudinal lines, hand somewhat lighter than basal segments, but fingers darker. Legs somewhat paler than pedipalps with narrow dark longitudinal lines. Venter, including coxae and endites, pale yellowish brown, narrowly margined with dark brown. Abdominal ster-

nites brown marbled with yellow and somewhat lighter mesally. Post-abdomen brown to reddish brown with narrow dark longitudinal lines; fifth segment somewhat darker than others, vesicle somewhat lighter. Sting dark on apical third. Pectines yellow; teeth sometimes with dusky spots.

REMARKS: Nearly 100 recorded specimens are readily placed in this species. Young have pale yellow legs and red hands. Freshly moulted specimens are pale brown. Descriptive and morphological comparisons indicate that this species is closely related to *C. rubricauda* Pocock, *C. bicolor* Pocock, and *C. limbatus* Pocock. It is most easily distinguished from them by the number of teeth in the pectines and the downward or outward slope of the sub-aculear tooth.

Florida natives believe this large scorpion is poisonous, if not deadly. There are, however, no known validated cases of poisoning by this species. Further, although many specimens have been collected, the scorpion has not succeeded in stinging the author.



MEASUREMENTS: The following are measurements and morphological details of 10 females and six males collected in the state.

	Lengths in mm			Carapace Post-abdomen ratio	Number pectinal teeth	Miscellaneous characters
	Total	Carapace	Post-abdomen			
Males (6)						
Max	110.0	10.0	73.0	1:8.1	32	Basal sclerite of female pectines with distinct to indistinct, oval to diamond-shaped median mark, Fig. 7.
Min	83.0	8.0	53.0	1:6.2	31	
Mean	96.9	8.7	63.8	1:7.2	32	
Females (10)						
Max	107.0	10.0	58.0	1:6.3	31	
Min	70.0	8.5	44.5	1:5.2	26	
Mean	90.3	9.0	52.5	1:5.8	29	

The species seems to be lethargic, not antagonistic like *C. hentzi* and *C. keysi*. Other collectors have been stung, but the reported effects are minor.

This species is most frequently taken under or in objects on the ground and on stone walls but has been collected in most of the places inhabited by the other species of *Centruroides*. It feeds readily on roaches.

RECORDS: There are more than 50 collections of this scorpion. Selected records are given.

ALACHUA COUNTY, Gainesville, two females; DADE COUNTY, Homestead, one female, May 28, 1954, O. D. Link; LAKE COUNTY, Clermont, one female, in home. LEE COUNTY, Fort Myers, one female, March 3, 1962, Joe Kelley; MANATEE COUNTY, one female, October 1, 1962, D. C. Chancey; MONROE COUNTY, Garden Key, males, females, August 31, 1961, on coconut palm trunks at night, H. V. Weems, Jr.; Key West, three females, W. W. Warner;

ORANGE COUNTY, Rockdale, one female, November 13, 1957, under can, R. W. Swanson; POLK COUNTY, Lakeland, one female, August 26-27, 1961, in building; ST. LUCIE COUNTY, Ft. Pierce, one male, one female, May 10, 1960, E. W. Campbell; SEMINOLE COUNTY, Sanford, two females, January 20, 1961, G. W. Desin.

Isometrus maculatus (DeGeer)

(Spotted Scorpion)

Fig. 8 and 9

Scorpio maculatus DeGeer, 1778, Mem. Hist. Ins., Vol. 7, p. 346, pl. 41, figs. 9, 10.

Isometrus maculatus, Thorell, 1876, Ann. and Mag. Nat. Hist., Vol. 17, No. 4, p. 8.

COLORATION: Color in alcohol pale to dark yellow, heavily spotted with brown (Fig. 8). Carapace black on eye tubercle; larger brown spots posterior to eye tubercle arranged in rows to form a pair of marginal stripes, a pair of sub-median stripes, and a single median stripe; anterior to eye tubercle, larger spots arranged in a diverging pair of stripes that extend nearly to the margin just in front of the marginal eye groups. Abdominal tergites marked with brown in the same manner as the posterior part of the carapace. Chelicerae pale, reticulate with brown, and with both fingers brown. Pedipalps marbled and spotted with brown on the dorsal and lateral surfaces and with the fingers brown fading to pale yellow at the tips. Legs marbled and spotted with brown on the dorsal and lateral surfaces. Endites, coxae, sternites, and venter of the abdomen pale yellow except for the fifth abdominal segment which is lightly spotted with brown. Post-abdomen heavily spotted with brown, less so on the dorsal surface and more so at the distal end of each segment. Sting brown, darker on apical half. Pectines pale with a dusky spot at the base of each tooth.

REMARKS: I have seen only one specimen of this species from the state. It is badly damaged and appears to be a small female but may be an immature. Males are so slender they appear fragile.

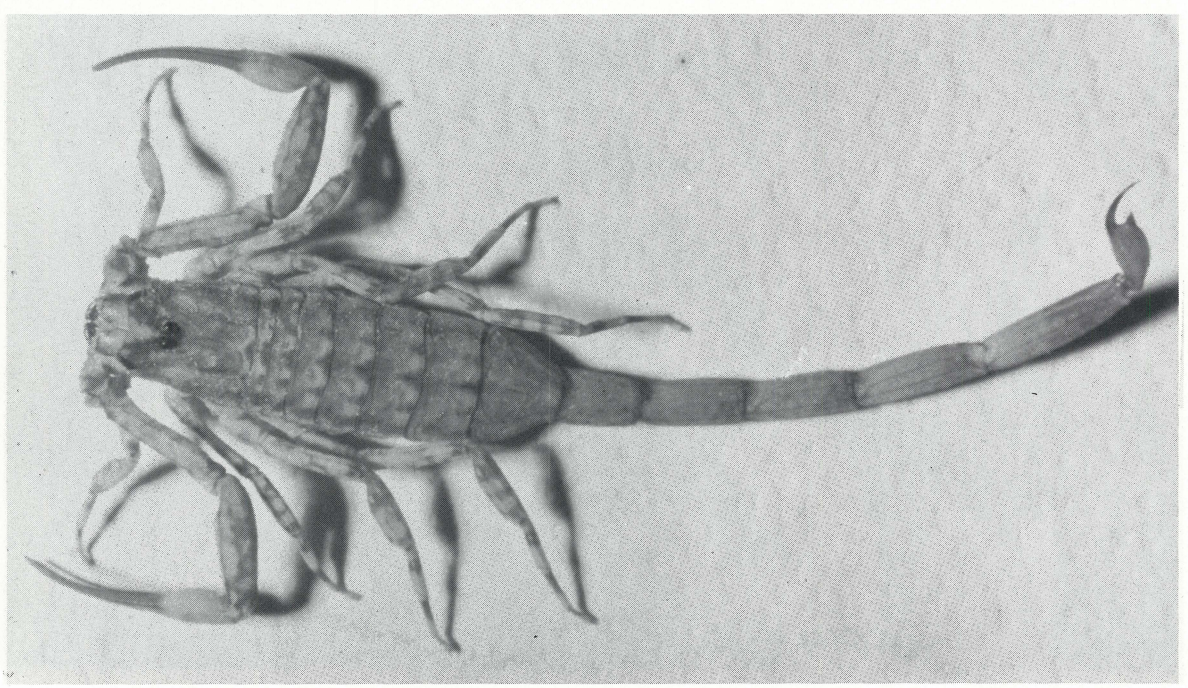


Fig. 8.—*Isometrus maculatus* (DeGeer), female (3.2 times life size).

Despite diligent collecting in the southern Florida keys and in the Miami area, I have not found the species. However, it is known to occur throughout the tropics and is fairly common in the West Indies so it should occasionally be found in the southern-most parts of the state.

This scorpion, although commonly referred to as the "spotted scorpion," might well be called the house scorpion as it is almost invariably collected on or in buildings. The sting reportedly is innocuous.

RECORDS: One female Florida ?, in M. C.Z./Banks (1904) stated that Dr. Marx had the species from Key West. Ewing (1928) stated that there were two specimens in the U.S.N.M., both from Key West, Florida.

MEASUREMENTS: The following measurements and morphological details of six females and four males are of specimens from other tropical and subtropical areas.

	Lengths in mm			Carapace post-abdomen ratio	Number pectinal teeth	Miscellaneous characters
	Total	Carapace	Post-abdomen			
Males (4)						Basal sclerite of pectines of both sexes deeply invaded by the anterior median marginal notch, Fig. 8. Genital opercula of both sexes with a median dark shadow.
Max	59.0	5.5	43.0	1:8.1	18	
Min	54.0	4.5	36.0	1:7.2	16	
Mean	56.1	5.0	38.7	1:7.7	17	
Females (6)						
Max	52.0	6.5	31.0	1:5.6	19	
Min	43.0	5.0	25.0	1:4.2	18	
Mean	47.6	5.8	28.3	1:5.0	18	

Fig. 9.—*Isometrus maculatus* (DeGeer), pectines of female (14X).

Tityus floridanus Banks

Fig. 10

Tityus floridanus Banks, 1900, The Amer., Nat., Vol. 34, No. 401, p. 425.

Tityus floridanus, Banks, 1904, Proc. Acad. Nat. Sci. Phila., Vol. 8, p. 142.

Tityus floridanus, Ewing, 1928, No. 2730, Proc. U. S. Nat. Mus., Vol. 73, Art. 9, p. 22.

COLORATION: Color in alcohol brown with appendages slightly lighter (Fig. 10); legs pale on tips of metatarsi and tarsi; chelae somewhat darker on fingers of hand; chelicerae pale brown; fifth and sixth segments of post-abdomen slightly darker than segments one through four; pectines yellow; sternite of third abdominal segment with pale yellow triangular mark on caudal margin.

TYPE LOCALITY: Type from Florida in Museum of Comparative Zoology, Harvard University, Cambridge, Massachusetts.

REMARKS: Except for the name and depository labels, there are no data in the type jar, except the letter FLA on the back of Banks' original name label. At the time the species was described, however, Banks stated that the specimen was from Key West.

Although several hundred scorpions have been collected and/or examined during the course of the present study, no additional Florida specimens have been seen. It is my opinion that the Florida record of the species is spurious.

The species is probably Mexican or Central American. A comparison of R. I. Pocock's (1902) descriptions of the typical and sub-specific forms of *Tityus cambridgei* Pocock, with Banks' description of *T. floridanus* indicates that the latter is either a synonym or a very closely related species.

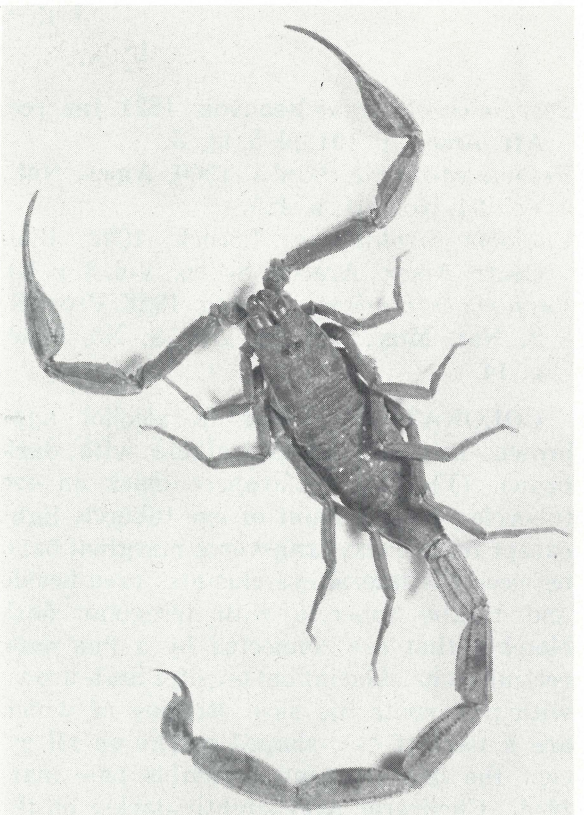


Fig. 10.—*Tityus floridanus* Banks, female holotype (about 1.3 times life size).

MEASUREMENTS: Holotype female in mm.

Total length	88.0	Pedipalp total	41.7
Carapace length	8.0	Femur	10.0 long, 2.5 wide
Anterior width	3.8	Tibia	10.5 long, 3.3 wide
Posterior width	8.0	Hand	18.0 long, 3.9 wide
Abdomen length	18.0	Movable finger	11.0 long
Greatest width	9.2	Vesicle	5.0 long, 3.3 wide
Post-abdomen total	50.0	Sting	4.2 long
Seg. 1 - 7.5 long, 4.7 wide			
Seg. 2 - 9.0 long, 4.6 wide			
Seg. 3 - 10.0 long, 4.7 wide			
Seg. 4 - 11.5 long, 4.8 wide			
Seg. 5 - 12.0 long, 4.9 wide			

Family Vejovidae

Vejovis carolinianus (Beauvois)

(Southern Unstriped Scorpion)

Fig. 11 and 12

Scorpio carolinianus Beauvois, 1821, Ins. rec. Afr. Amer., p. 191, pl. 5, fig. 3.

Vejovis carolinus, Banks, 1900, Amer. Nat., Vol. 34, No. 401, p. 425.

Vaejovis carolinianus, Pocock, 1902, Biol. Centr. Amer., Arachn. Scorp., Vol. 3, p. 24.

Vaejovis carolinianus, Ewing, 1928, Proc. U. S. Nat. Mus., Vol. 75, Art. 9, No. 2730, p. 14.

COLORATION: Color in alcohol light brown, mottled and reticulated with dark brown (Fig. 11). Carapace black on eye tubercle; area in front of eye tubercle light except for a dusky transverse marginal band between the lateral eye clusters; area beside and behind tubercle with irregular dark blotches that are connected by a fine dark reticulation. Abdominal tergites dark brown with pale spots the most striking of which are a pair of ><-shaped marks on all except the last segment, which is pale marbled. Chelicerae pale, slightly darker on the fingers and frequently with a dusky median dorsal blotch. Pedipalps dark brown with dusky spots and reticulations which form longitudinal stripes on the hand; fingers somewhat paler than hands and basal segments, fading to yellow at the tips. Legs pale yellow-brown marked with dusky spots and stripes on anterior surfaces of the femora, patellae, and tibiae. Endites, coxae, sternites, and venter of abdomen pale yellowish-brown with dusky shadows, the most prominent of which are an anterior marginal band on the sternum, dark margins on the abdominal segments, and a pair of dark submarginal bands on the fifth abdominal segment. Post-abdomen dark brown, with pale spots and bars in most inter-carinal areas; vesicle somewhat lighter than other segments and finely reticulate. Sting dark brown on apical third. Pectines pale yellow with the usual dusky spots on the teeth and some duskiness on the lamellae (Fig. 11).

REMARKS: Unquestionably the above described specimens are the eastern species of *Vejovis* known as the southern unstriped scorpion. The material seen does not agree, however, with descriptions given by Banks (1900) and Ewing (1928).

To date, no specimens of this species have been collected within the state boundary, but its occurrence in southern Georgia and Alabama indicates that it may be found in the northern and panhandle counties.

No species of this genus has ever been incriminated as poisonous. It seems unlikely that this species is highly poisonous to man.

MEASUREMENTS: The following measurements and morphological details are of nine females from Georgia, Alabama, and Kentucky.

	Lengths in mm			Carapace post-abdomen ratio	Number pectinal teeth	Miscellaneous characters
	Total	Carapace	Post-abdomen			
Females (9)						Distinct granular indications of ventral submedian keels occur on the first four segments of the post-abdomen. Similar granular indications of keels are found on the hands.
Max	40.0	5.0	21.0	1:4.5	14	
Min	30.0	4.3	17.5	1:4.0	12	
Mean	34.9	4.6	19.2	1:4.2	13	

Doubtful Records

The following species of scorpions have been recorded from Florida but the records are believed to be spurious, either because of misidentification or mislabeling. It is, of course, possible that they were collected from the state, but if so, they were accidental introductions of non-endemic forms that have not become established. Extensive collecting from Key West to Pensacola for 15 years has not produced additional identifiable specimens under natural conditions.

Centruroides biaculeatus (Lucas)

Androctonus biaculeatus Lucas, 1835, in Webb and Berthelot, Hist. Nat. Canar., Arachn., p. 45.

There are three females from Florida, three females from Key West, and two females from Dry Tortugas Keys bearing this name, all labeled by Marx in the United States National Museum. One vial in the same collection is labeled *Centrurus biaculeatus* Lucas and contains two females, a Key West, Florida, label and a Jacksonville, Florida, label, all Marx's. All of these specimens appear to be *Centruroides gracilis* (Latreille), of which Pocock (1902) records *C. biaculeatus* as a synonym.

Centruroides margaritatus (Gervais)

Scorpio margaritatus Gervais, 1841, Voyage de la Bonite 1, p. 281.

There is one female bearing this name from Tortugas, Florida, collected by Marx, in the United States National Museum. Banks (1900 and 1904) also recorded the species from the state. This Central American species is easily distinguished from *C. gracilis*, the common large brown scorpion in Florida. The above records are either spurious or are the chance collections of introductions of a species that is not normally capable of reproducing and living under the ecological conditions that presently exist in this state.

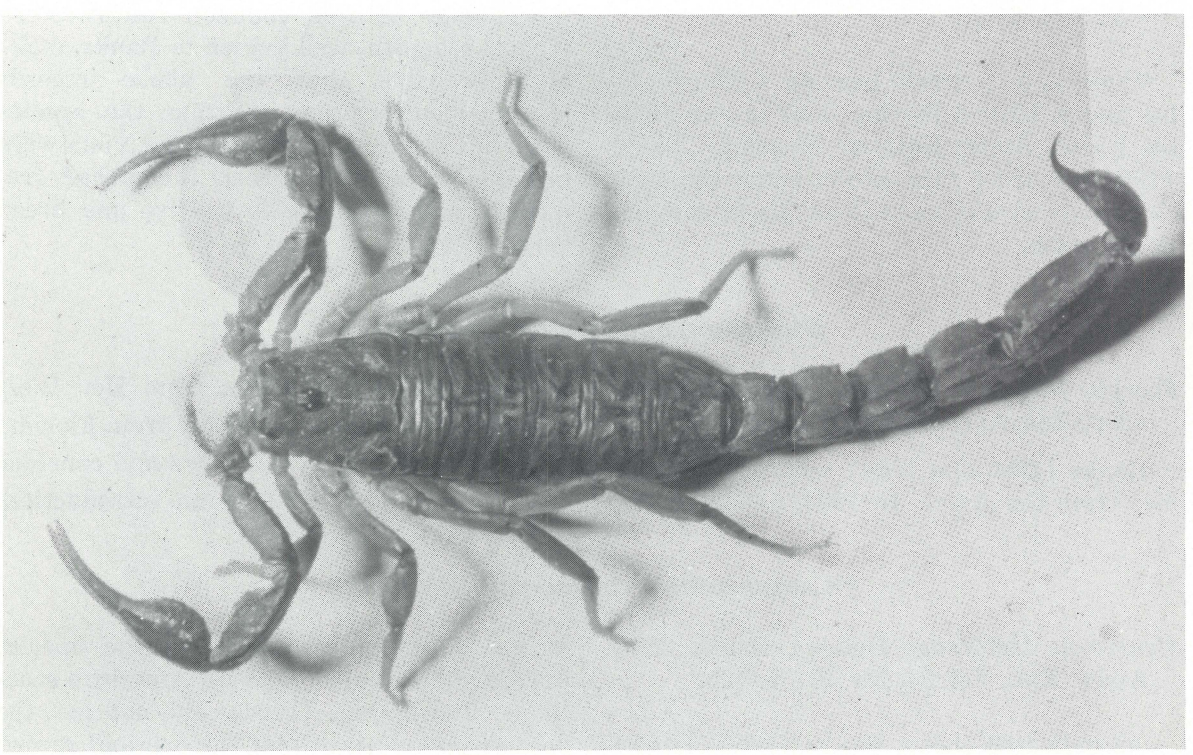


Fig. 11.—*Vejovis carolinianus* (Beauvois), female (about four times life size).

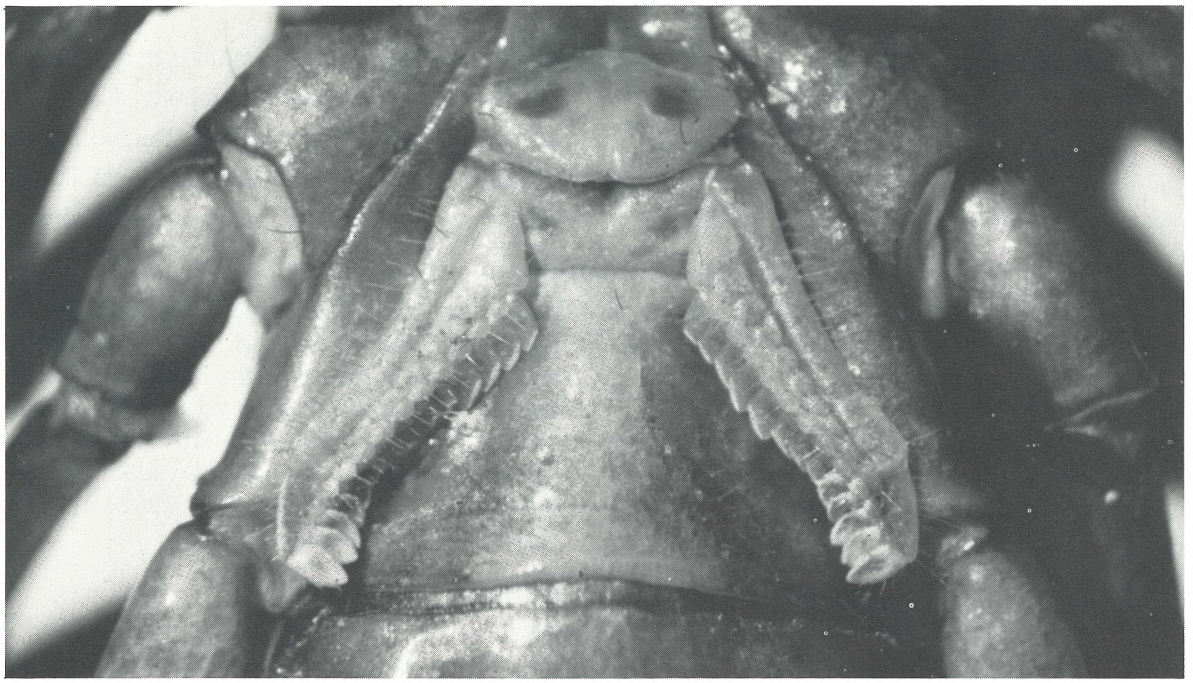


Fig. 12—*Vejovis carolinianus* (Beauvois), pectines of female (18X).

Centruroides vittatus (Say)

Buthus vittatus Say, 1821, Jour. Acad. Sci., Vol. 2, p. 61-62.

There is one female bearing a Florida label and a 1930 collection date in Jar 19 at the United States National Museum. Banks (1904) recorded this species under the name *Centrurus carolinianus* Beauvois as common in the state.

The distinctive coloration, markings, and morphology of this common southwestern striped scorpion, well known to Banks, make it improbable that the above records are misidentifications. Either the species occurred in the state at one time, vials were mislabeled, or it has been introduced frequently and is unable to survive and breed here.

Diplocentrus lesueurii (Gervais)

Scorpio lesueurii Gervais, 1844, in Walcknaer's Ins. Apteres, Vol. 3, p. 69.

Banks (1900 and 1904) recorded this species from the state. In 1904, he stated that he had seen one specimen from Key West and that the type was probably from Florida. I have not collected the species and consider the single record to be of an introduction.

"Centruroides" testaceous (DeGeer)

Centrurus testaceous DeGeer, Banks, 1900, Amer. Nat., Vol. 34, No. 401, p. 425.

As indicated above, Banks (1900) recorded this species from South Florida. There is no additional reference to the species among publications on North American scorpions, and Banks (1904) did not list the species, so I suspect that the original record was the result of a misidentification.

Anuroctonus phaiodactylus (Wood)

Centrurus phaiodactylus Wood, 1863, Proc. Acad. Nat. Sci. Phila., p. 111.

Anuroctonus phaeodactylus, Pocock, 1893, Ann. and Mag. Nat. Hist., Vol. 6, No. 7, p. 328.

Anuroctonus phaiodactylus, Ewing, 1928, Proc. U. S. Nat. Mus., Vol. 73, Art. 9, No. 2730, p. 14.

There is one male of this species, in the Museum of Comparative Zoology, collected by A. N. Harrison before 1962 in East Florida. There are two males labeled "Florida" in the United States National Museum collection. As this scorpion is a western and southwestern species, I agree with Ewing (1928) that "the species probably does not occur in a state of nature in eastern United States." The specimens recorded here undoubtedly were introductions.

Order Pedipalpida

KEY TO THE GENERA AND SPECIES OF WHIP SCORPIONS IN FLORIDA

1. With one pair of book-lungs; post-abdomen short, only three segments; tiny pale yellow, to grey species ..... *Schizomus floridanus* new species, p. 18.

   With two pair of book-lungs; post-abdomen long and whip-like or absent; moderate to large brown, red-brown or black species 2

2. Post-abdomen long, slender, and many segmented; large, swollen, red-brown to black species with clumsy movements.... *Mastigoproctus giganteus* (Lucas), p. 21.

   Post-abdomen absent; moderate-sized, flattened, yellow-brown to red-brown species with extremely rapid movements 3

3. With two short spines between the principal (longest) dorsal spines on the tibia of the pedipalps ..... *Tarantula fuscimana* (C. L. Koch), p. 23.

   With one short spine between the principal (longest) dorsal spines on the tibia of the pedipalps ..... *Tarantula marginemaculata* (C. L. Koch), p. 24.

Family Schizomidae

Schizomus floridanus new species

Fig. 13 to 15

Female holotype in alcohol 3.43 mm long from anterior projection of propeltidium to tip of telson. Four slide-mounted female paratypes measure in length a maximum of 3.31 mm, a minimum of 3.01 mm, and a mean of 3.16 mm. Leg formula 1423. Telson with three segments.

COLORATION: Sclerites in alcohol somewhat variable in color but generally a pale yellowish brown with the chelicerae, especially the movable finger, and pedipalpi pale reddish brown (Fig. 13). Basal leg segments slightly darker than apical segments, which also tend to be lighter toward the ends. There are no identifiable leg markings as occur on some species of this genus. Second through sixth abdominal tergites exhibit an indistinct to distinct circular dark spot on each side near the lateral margin. Most sternites and coxae similar in color to but somewhat paler than dorsal sclerites, but coxal endites of the palpi are pinkish along their mesal margins. Obviously immature specimens off-white to pale yellow in color. Some apparently penultimate and mature specimens have a greyish or greenish cast. There are pale eye spots on the propeltidium, and the metapeltidium is pale mesally but not divided.

STRUCTURE: Generalized and basically the same as other females of the genus. Diagnostic characters that distinguish fe-

MEASUREMENTS: Comparative measurements of schizomid appendages, those studied and those previously recorded, indicate specific differences. These measurements are recorded here for a paratype of this species.

Measurements in mm

Segment	Leg 1	Leg 2	Leg 3	Leg 4	Pedipalpus
Trochanter	0.28	0.19	0.18	0.25	0.35
Femur	0.91	0.70	0.63	0.98	0.42
Patella	1.05	0.39	0.29	0.43	0.46
Tibia	0.77	0.46	0.35	0.70	0.39
Metatarsus	0.32	0.39	0.42	0.60	
Tarsus	0.42	0.33	0.35	0.39	0.19
Total	3.75	2.46	2.22	3.35	1.81

males of this species include the following: pedipalp claw less than one-half the length of pedipalp tarsus, five to six pits or "sensoria" on the mesal surface of the pedipalp tarsus, and 12 to 16 on the mesal surface of the pedipalp tibia. Fixed finger of the chelicerae with one major and six to seven minor teeth. Mesal surface of cheliceral base provided with dorsal row of six strong, elongate setae and two short, basally swollen, widely spaced median setae. Movable finger of the chelicerae with 16 to 18 teeth in the ventral or caudal comb. Distinguishing characters of the chelicerae as in Fig. 14; those of the pedipalpi as in Fig. 15.

Because of the paucity of such data for many species, no diagnostic analyses of these measurements can be made at the present time. This study has indicated that certain ratios may be of value also in the separation of species. These ratios for this species are as follows: pedipalp to propeltidial length, 1.6:1; sternal length to width, 1.15:1; metatarsus of leg 1 equal to five basal tarsal segments; sixth tarsal segment about one-half length of metatarsus; leg 1 patella to tibia 1.4:1; leg 4 patella to tibia 1:1.6 and apical to sub-apical segment of telson 4.6:1.

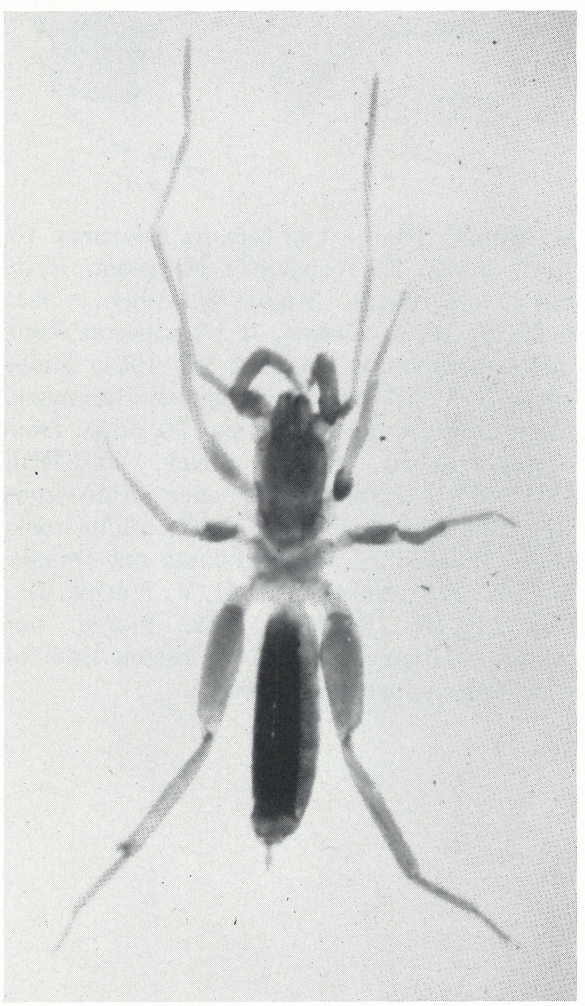


Fig. 13.—*Schizomus floridanus* new species, female (about 16 times life size).

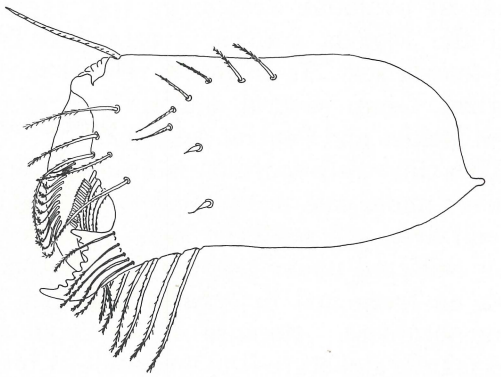


Fig. 14.—*Schizomus floridanus* new species, right chelicera, mesal view.

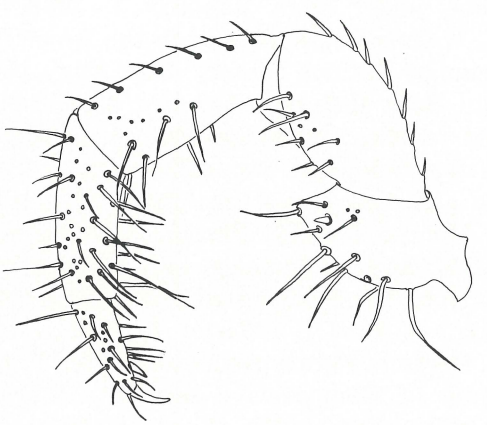


Fig. 15.—*Schizomus floridanus* new species, right palpus mesal view.

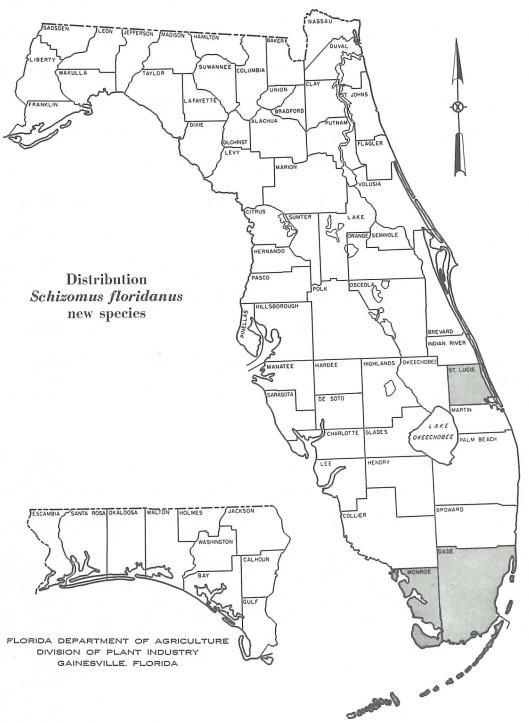
REMARKS: This species has been known to occur in Florida since 1936, but it has not been described previously because the male was unknown. At the present time, there are a dozen collections representing more than 50 females, and immatures have been taken in all seasons of the year, seven of the 12 months. It would seem that the male either is short lived, is rare, or does not

exist. Therefore, comparative study was made of available *Schizomus* spp. females, and the Florida species is described from the female sex. It is closely related to, but distinct from, several undescribed species from Mexico and Central America.

This tiny whip-scorpion is quite secretive. It lives under and in the porous marl in the Miami area and southern keys. It has also been collected under and in the crevices of bark on trees and in organic debris in the same localities. Because of its small size and fragile structure it is incapable of biting humans, and it has no sting.

TYPE LOCALITY: Female holotype from Ross and Castellow Hammock, Dade County, Florida, under bark, January 1, 1958, by H. V. Weems, Jr., deposited in the American Museum of Natural History, New York, New York. Both slide-mounted and alcohol-preserved females are designated as paratypes from the following two collections: 16 females and two immatures from Plantation Key, Monroe County, Florida, on February 29, 1936, and 20 females and seven immatures from 2 to 5 miles south of Florida City, Florida, on April 1, 1957, by R. Forster and W. J. Gertsch. Paratypes are deposited in the Museum of Comparative Zoology, Harvard University, Cambridge, Massachusetts; the United States National Museum, Washington, D. C.; and the Florida State Collection of Arthropods, Gainesville, Florida.

RECORDS: This species has been taken only in Dade, Monroe, and St. Lucie Counties. Additional records are cited. DADE COUNTY: Everglades west of Homestead, one young, December 17, 1962, by Wilton Ivie; Everglades National Park, four females, January 3, 1952, under stones, by M. H. Muma; Miami, one female, February 10, 1961, by R. E. Woodruff; Matheson Hammock, one female, August 29, 1961, in leaf mold, by H. V. Weems, Jr.; Matheson Hammock, two young, August 29, 1961, under bark, H. V. Weems, Jr.; Brickell Hammock, Miami, one young, November 30, 1961, from organic debris, F. W. Mead; MONROE COUNTY: Islamorada, Upper Matecumbe Key, one female, May 6, 1961, under rock, H. V. Weems, Jr.; Stock Island, one female, May 12, 1961, under rock, H. V. Weems, Jr.; ST. LUCIE COUNTY: Ft. Pierce, one female, January 6, 1965, in rotten limb of Brazilian pepper, M. H. Muma.



Family Thelyphonidae

Mastigoproctus giganteus (Lucas)
(Giant Whip-Scorpion)
Fig. 16

Thelyphonus giganteus Lucas, 1835, Mag. Zool., Vol. 8, pl. 8.
Thelyphonus excubitor Girard, 1853, in Marcy's Rept., Red River Expedition, p. 265, pl. 17, Fig. 1 to 3.
Thelyphonus giganteus, Marx, 1886, Entom. Amer., Vol. 2, No. 2, p. 38.
Mastigoproctus giganteus, Pocock, 1894, Ann. and Mag. Nat. Hist., Vol. 6, No. 14, p. 130.

COLORATION: Color in alcohol reddish brown to black with the carapace and chelae somewhat darker and the venter and appendages somewhat lighter. Young specimens and newly moulted adults may be pale brown to red in color.

The single male has the carapace 18.0 mm long, abdomen 27.0 mm long, total length 45 mm, and the telson broken, not measurable. Florida specimens, Fig. 16, agree in most details with the descriptions and figures of this species by Marx (1886) and Pocock (1902). Marx's and Pocock's descriptions and figures agree almost exactly, except that Florida females are much smaller. The Florida male, on the other hand, differs in several comparative details from those previously described. It is only slightly smaller than the female with which it was collected, and it is subequal to the mean of Florida females. Marx (1886), who

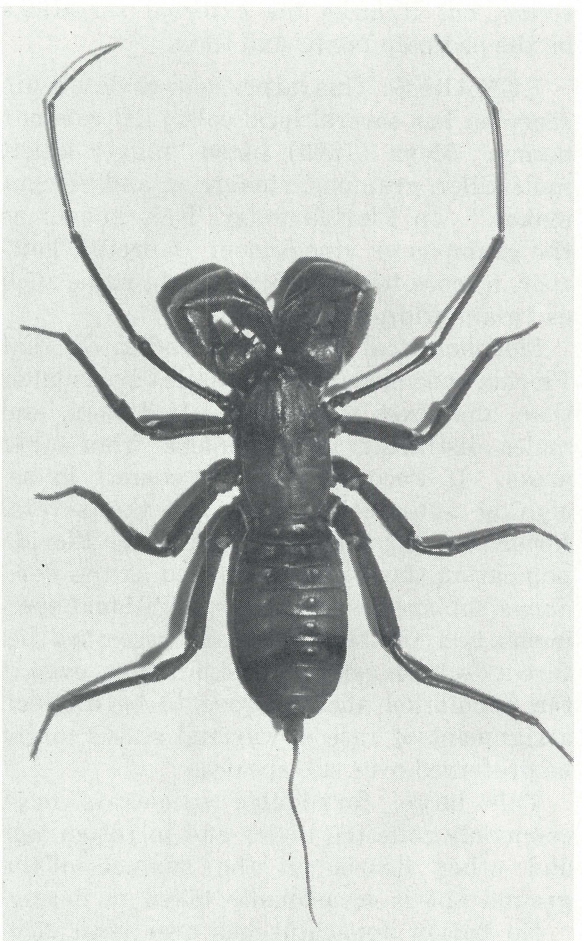


Fig. 16.—*Mastigoproctus giganteus* (Lucas), female (about life size).

MEASUREMENTS: Although more than 50 specimens from Florida were examined, only one was a male. The following measurements and morphological details are of 10 females.

	Lengths in mm			
	Total	Carapace	Abdomen	Telson
Females (10)				Most broken, a few were as long as body.
Max	50.0	21.0	30.0	
Min	38.0	11.0	24.0	
Mean	45.3	18.5	27.9	

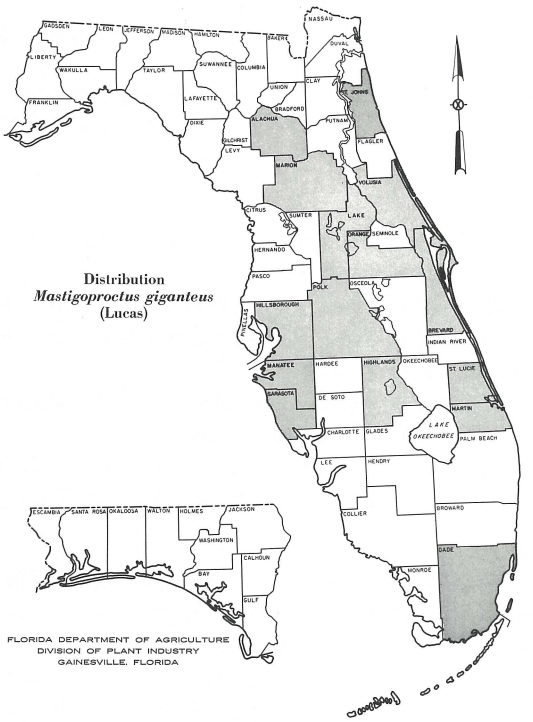
may have illustrated a Florida female with a Texas male, described and figured the male as larger than the female. Pocock (1902) described and figured the male as much smaller than the female. The armature of the pedipalp trochanter of the Florida male is quite similar to Pocock's subspecies *mexicanus,* but it lacks the external serrations on the pedipalp femur and tibia.

REMARKS: This large, semi-chelate whip scorpion has several local colloquial common names. Marx (1886) listed "nigger killer, mule killer, grampus, vinaigrier, and vinegar maker." In Florida today, it is known as the grampus or vinegaroon. I prefer, however, a more technically accurate name such as "giant whip-scorpion."

Morphological data have indicated that Florida specimens of this species are smaller than, the sexes more equal sized than, and males distinct from specimens from other areas. If Pocock (1902) is correct in assigning sub-species status to the several forms recognized in Mexico, then the Florida population should be recognized as the *floridanus* sub-species. However, additional specimens and further study are necessary before a decision can be made. Further, even if the population should prove to be distinct, assignment of race or varietal status might be preferred over sub-species.

This large, formidable species is most commonly collected under and in rotten logs and other debris on the surface of the ground but is occasionally taken in houses.

No poison apparatus has ever been demonstrated for the giant whip-scorpion, but the large powerful pedipalps appear capable of inflicting a nasty wound which would probably be subject to secondary infection. Further, Eisner, *et al.* (1961) demonstrated the effectiveness of the acetic acid-caprylic acid containing defensive spray of the species. The spray originates at the base of the slender tail or telson and could cause discomfort to an unwary person sprayed in the face. The author can attest to this. A living laboratory study specimen sprayed my face from a distance of 18 inches to two feet, causing a mild burning of the skin, smarting eyes, and choking nausea for several minutes.



RECORDS: To date, the giant whip-scorpion has been collected only from peninsular Florida and the southern keys. The records include: ALACHUA COUNTY, Gainesville, one female, September 10, 1966, at porch steps, Ladonia O'Berry; BREVARD COUNTY, Cocoa, one female, October 4, 1961, H. C. Levan; one female, August 31, 1960, under board at water tower, H. C. Levan; DADE COUNTY, North Miami, one female, February 5, 1966, L. D. Ober; HIGHLANDS COUNTY, Sebring, one female, December 25, 1953, under rocks, H. V. Weems, Jr.; Sebring, one young, June 21, 1959, in trash pile, Pamela Weems; HILLSBOROUGH COUNTY, one female, October 14, 1955, J. Bean; LAKE COUNTY, Mt. Dora, one young, March 1936; MANATEE COUNTY, Anna Maria Island, one female, April 1949, N. C. Smith; Palmetto, one female, January 21, 1966, under rotten palmetto log, E. H. Frederic; MARION COUNTY, Ocala, one female, September 28, 1963, in house, Darrel Bucklen and E. A. Graham; MARTIN COUNTY, one young, February 19, 1962, F. Campbell; ORANGE COUNTY, Orlando, two young, Winter 1911-1912; POLK COUNTY, Winter Haven, one female, October 8, 1955,

M. F. Oberbacher; Winter Haven, one male, one female, 1953, under trash, M. H. Muma; SARASOTA COUNTY, Englewood, one female, August 28, 1963, in house, Mrs. W. Knull; ST. JOHNS COUNTY, St. Augustine, one female, July 31, 1959, in decaying wood, P. R. McMullen; ST. LUCIE COUNTY, Ft. Pierce, one female, September 19, 1956, F. Campbell; one female, January 27, 1959, R. E. Woodruff; VOLUSIA COUNTY, Allandale, one female, August 29, 1960, E. B. Smith.

Family Tarantulidae

Tarantula fuscimana (C. L. Koch)

(Dusky-handed Tail-less Whip-Scorpion)
Fig. 17

Phrynus fuscimanus C. L. Koch, 1848, Die Arachniden, 15:67, Fig. 1463.

Tarantula fuscimanus, Kraepelin, 1899, Scorpiones et Pedipalpi, Das Tierreichs: 243.

COLORATION: Color in alcohol predominately brown to reddish-brown; pedipalps, endites, and carapace reddish-brown; legs and abdomen brown, the latter with a pair of sub-median pale spots on each tergite; sternum, leg coxae, and genital sternite yellowish-brown. Spines, granulations, and margins of sclerites and segments all tend to be darker than other areas. Juveniles and males have a tendency to be somewhat paler than females but otherwise are similar.

REMARKS: This species is not common in Florida. The only specimens seen to date have been from Key West. The presence of two intermediate spines on the upper surface of the palpal tibia (Fig. 17) and the larger size are the most striking characters

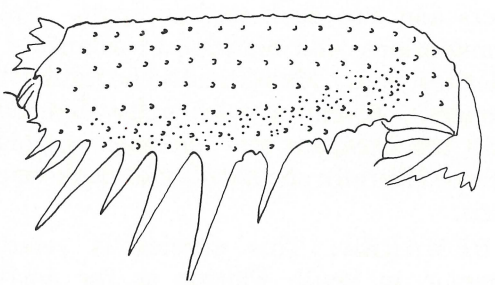


Fig. 17—*Tarantula fuscimana* (Koch), tibia of palpus.

that separate this species from the common *Tarantula marginemaculata* (Koch).

Because of its rarity, little is known about the habits of this species in Florida. A female from Key West has a case of about 48 eggs attached to the venter of her abdomen.

RECORDS: MONROE COUNTY, Key West, one female, August 15, 1952, W. W. Warner; Key West, one female, March 30, 1961, in outside privy, W. W. Warner.

MEASUREMENTS: Five females and two males were utilized for the following measurements.

Millimeters

	Maximum		Minimum		Mean	
Structure	♀	♂	♀	♂	♀	♂
Total length	24.0	22.0	17.5	19.0	20.7	20.5
Carapace						
length	11.0	8.0	8.0	7.0	9.0	7.5
width	14.0	11.0	11.0	10.0	12.1	10.5
Palpus						
femur	8.0	7.5	6.5	6.0	7.2	6.7
tibia	10.0	8.0	8.0	8.0	9.1	8.0
metatarsus	4.0	4.0	3.5	3.5	3.9	3.7
tarsus	4.5	4.0	3.0	3.5	3.8	3.7

Tarantula marginemaculata (C. L. Koch)

(Spotted Tail-less Whip-Scorpion)
Fig. 18 and 19

Phrynus marginemaculatus C. L. Koch, 1841, Die Arachniden 8: 6, Fig. 597.
Tarantula marginemaculatus, Kraepelin, 1899, Scorpiones et Pedipalpi, Das Tierreichs: 245, Fig. 89.

COLORATION: Color in alcohol similar to that of *T. fuscimana* (Koch), brown to reddish-brown; carapace with one to three pale yellow spots on each posterior ectal angle (Fig. 19); sternum with six dark marginal spots and two dark median spots. Spines, granulations, and margins of segments and sclerites dark. Males tend to be lighter than females. Juveniles much paler than adults with the carapace and abdomen completely pale or liberally sprinkled with dark maculations.

REMARKS: This species is relatively common in South Florida as far north as Sunniland, Collier County, in the center of the state, Martin County on the east coast, and Punta Gorda on the west coast. It is distinguished from *T. fuscimana* by its smaller size, narrower carapace, and the presence of only one intermediate spine on the upper surface of the palpal tibia (Fig. 18).

Although it is found commonly under boards, logs, and trash on the ground, under the bark of dead trees, and on and in houses, no common name is known for this species. The name maculate or spotted tail-less whip-scorpion is suggested here. The animal is

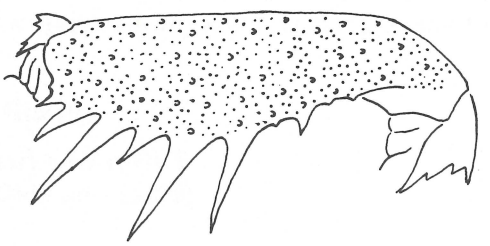


Fig. 18 — *Tarantula marginemaculata* (Koch), tibia of palpus.

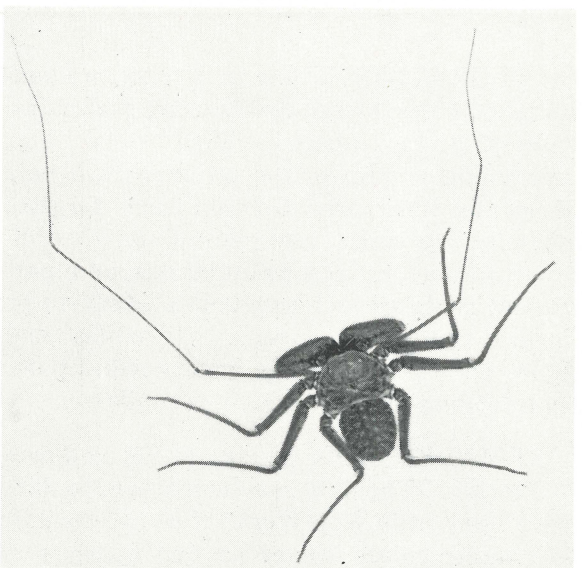


Fig. 19 — *Tarantula marginemaculata* (Koch), female (about 1.6 times life size).

MEASUREMENTS: Ten females and 10 males were utilized for the following measurements.

Millimeters

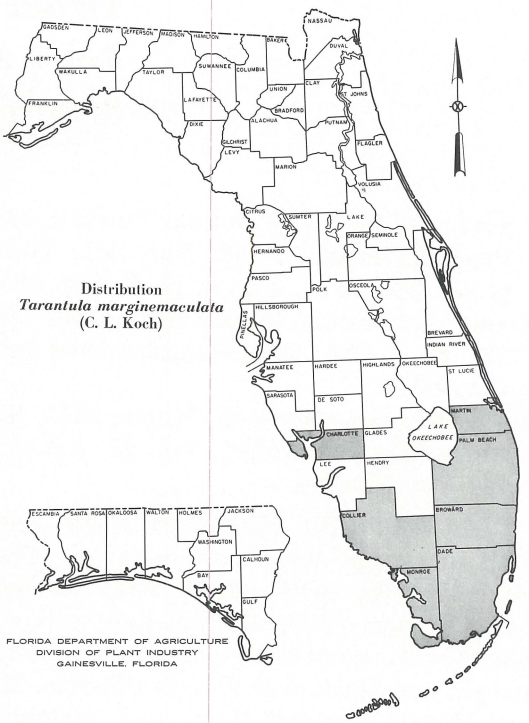
	Maximum		Minimum		Mean	
Structure	♀	♂	♀	♂	♀	♂
Total length	17.0	17.0	12.5	10.5	14.4	14.7
Carapace						
length*	7.0	7.0	5.0	4.0	5.9	5.7
width	9.5	9.5	6.5	6.0	7.7	7.5
Palpus						
femur	6.0	6.0	3.5	3.5	4.5	4.7
tibia	7.0	7.0	4.5	4.5	5.5	5.8
metatarsus	3.0	3.0	2.0	1.5	2.6	2.4
tarsus	3.0	3.0	2.0	1.5	2.6	2.5

capable of biting or pinching, but the teeth and spines seem to be too weak to puncture the skin of adult humans.

Living specimens have been maintained in the laboratory for longer than one year in flat run-ways provided with termites. Feeding, mating, and egg-laying have not been observed. Six preserved females carried transparent lens-shaped egg cases pressed tightly to the venter of the abdomen. The number of eggs in these cases ranged from 17 to 36 with a mean of 24.

RECORDS: Sixty-six collections from South Florida and the keys were examined. Those cited below represent the state distribution both geographically and seasonally.

BROWARD COUNTY, Ft. Lauderdale, one male, October 29, 1959, R. E. Woodruff; Ft. Lauderdale, three females, March 1919, T. Barbour and H. W. Smith; CHARLOTTE COUNTY, Englewood, one female and one young, November 5, 1934, sawdust pile in pine flatwoods, Elsa Bass; Punta Gorda, males, females, and young, Mrs. Slosson and N. Banks; COLLIER COUNTY, Sunniland, one female, January 31, 1959, under crossties, M. H. Muma; DADE COUNTY, Homestead area, two males and one female, January 30, 1959, under old fertilizer bags, H. V. Weems, Jr.; Miami, two males and one female, February to March 1903, J. H. Comstock; Flamingo, Everglades National Park, one female, March 9, 1963, under pieces of sand, H. L. Levi; Royal Palm Park, two females, one male, and one young, May 17, 1912, Blatchley; Homestead, one male, August 25, 1955, D. O. Wolfenbarger; Matheson Hammock, one female, September 12, 1959, on wall of stone building at night, H. V. Weems, Jr.; Coconut Grove, Fairchild Estate, males and females, December 26, 1956, F. and C. Phillips, MARTIN COUNTY, one male, January 27, 1959, at Station No. 4, R. E. Woodruff; MONROE COUNTY, Key Largo Key, one male and one young, January 30, 1959, under rock, H. V. Weems, Jr.; Key West, one female, February 12, 1878; Plan-



tation Key, one male, March 11, 1963, edge hardwood forest, H. L. Levi; Big Pine Key, males, females, and young, April 10, 1959, under weathered cardboard and rocks, H. V. Weems, Jr.; Islamorada, Upper Matecumbe Key, males, females, and young, May 6, 1961, under rocks, H. V. Weems, Jr.; Loggerhead Key, one female, May 8, 1961, under fallen coconuts, H. A. Denmark; Palmetto Key, males, females, and young, June 11-18, 1942, in laboratory, C. Breder; Garden Key, one female, July 12, 1963, on wall of Ft. Jefferson at night, Ernest M. Collins, Jr.; Garden Key, one young, August 31, 1961, on outer walls of Ft. Jefferson; Big Pine Key, two young, November 20, 1958, R. E. Woodruff; Big Pine Key, females, males, and young, December 28, 1956, F. and C. Phillips; PALM BEACH COUNTY, Hobe Sound, one male, September 17, 1957, under board, Howard Josephson; Palm Beach, two males, 1897.

Order Solpugida

Family Ammotrechidae

Ammotrechella stimpsoni (Putnam)

(Stimpson's Solpugid)

Fig. 20

Galeodes (*Cleobis*) *Stimpsoni* Putnam, 1883, Proc. Davenport Acad. Nat. Sci., Vol. 3, p. 261-266, pl. 1, Fig. 4, pl. 3, Fig. 19-31.

Ammotrecha cubae, Banks, 1900, Amer. Nat., Vol. 34, p. 427. Not *Ammotrechona cubae* (Lucas).

Ammotrechella stimpsoni, Muma, 1951, Bull. Amer. Mus. Nat. Hist., Vol. 97, Art. 2, p. 127 Fig. 280-284.

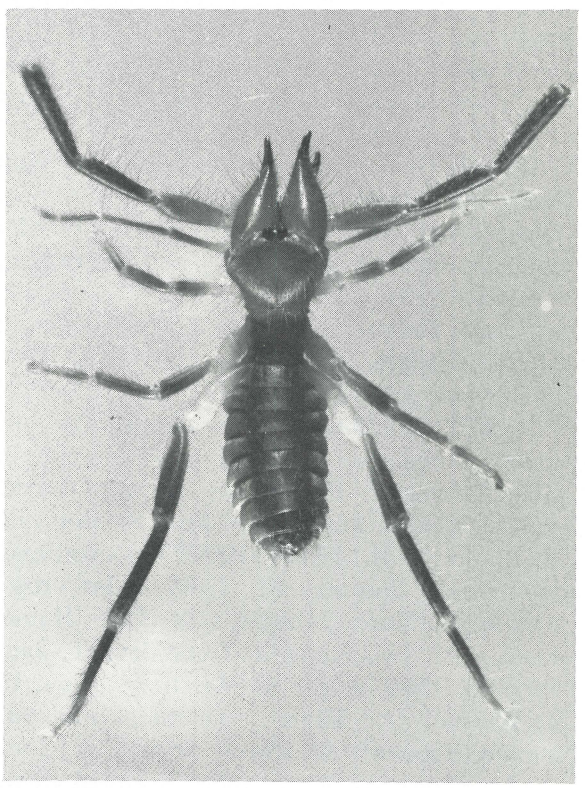


Fig. 20.—*Ammotrechella stimpsoni* (Putnam), female (about 3.2 times life size).

COLORATION: Light to rusty yellow with markings somewhat variable. Chelicerae light to rusty yellow with the teeth red to brown. Propeltidium light yellow to pale brown, somewhat darker on anterior margin and black over the eye tubercle. Mesopeltidium, metapeltidium, and abdominal tergites pale with a pair of broad light to dark, purple to brown lateral stripes on each sclerite (These stripes are indistinct on living specimens.) that unite into a single stripe on the posterior abdominal segments. Legs pale with a duskiness on the ends of the femora and all of the tibiae and metatarsi that fades at the joints. Palpi dark on the ends of the femora, and all of the tibiae, metatarsi, and tarsi, somewhat darker on the last two segments. Malleoli white to light yellow. Coxae, venter, and sternites pale and unmarked.

Dentition typical of sub-family, male flagellum attached to fixed finger over first mesal fondal tooth, female dorsal carina with peak just behind principal tooth of fixed finger. Palpi with normal setal clothing, metatarsi with a ventral series of five short stout spines. Male propeltidium wider than long by a ratio of 1:1.1; female 1:1.3. Fe-

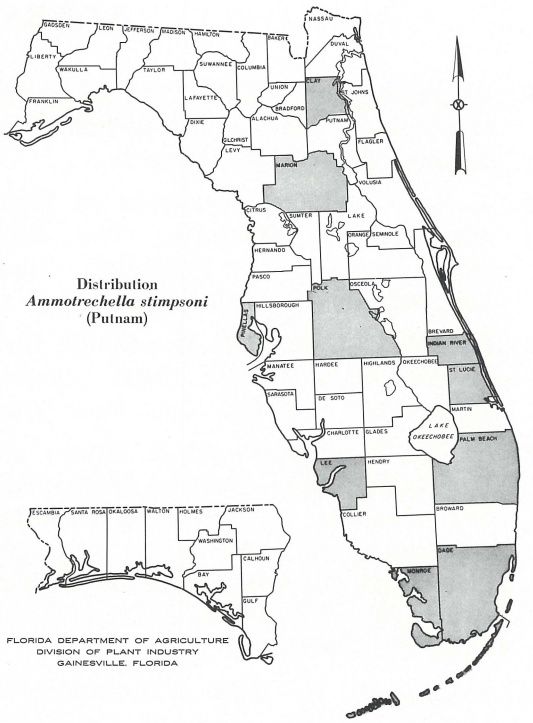
MEASUREMENTS: The following measurements and morphological details from Muma (1951) give the range for 10 males and 10 females.

	Measurements in mms				
		Chelicerae		Propeltidium	
Sex and range	Total length	width	length	width	length
Males					
Min	12.0	0.8	3.3	2.4	2.2
Max	18.0	1.4	5.0	3.6	3.1
Females					
Min	14.0	1.2	3.8	2.7	2.2
Max	22.0	1.8	5.6	4.9	3.5

male genital plate wider than long by a ratio of 1:1.6.

REMARKS: This, the state's only solpugid or wind scorpion, is found throughout peninsular Florida but is most common in the keys and along the lower east coast. Muma (1951) gives a complete discussion of its relationship to other species of the family. In general features, it closely resembles *Ammotrechona cubae* (Lucas).

Although the species will bite, the chelicerae are not sharp nor strong enough to break the skin.



RECORDS: The following are representative records of the species. CLAY COUNTY, one female, October 25, 1959, in *Geomys* mound, R. H. Mount; DRY TORTUGAS, Garden Key, two females, one young, May 8, 1961, off wall of Ft. Jefferson; INDIAN RIVER COUNTY, Sebastian, two immatures, November 4, 1965, under pine bark, M. H. Muma and H. L. Greene; MONROE COUNTY, Plantation Key, one male, May 3, 1957, H. V. Weems, Jr.; Bush Key, one female, January 13, 1962, beating dead bay cedar, H. A. Denmark; Windley Key, one female, July 15, 1961, Don Payne; Big Pine Key, one male, May 15, 1955, W. W. Warner; ST. LUCIE COUNTY, Ft. Pierce, one male, April 22, 1960, on ground, E. W. Campbell.

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