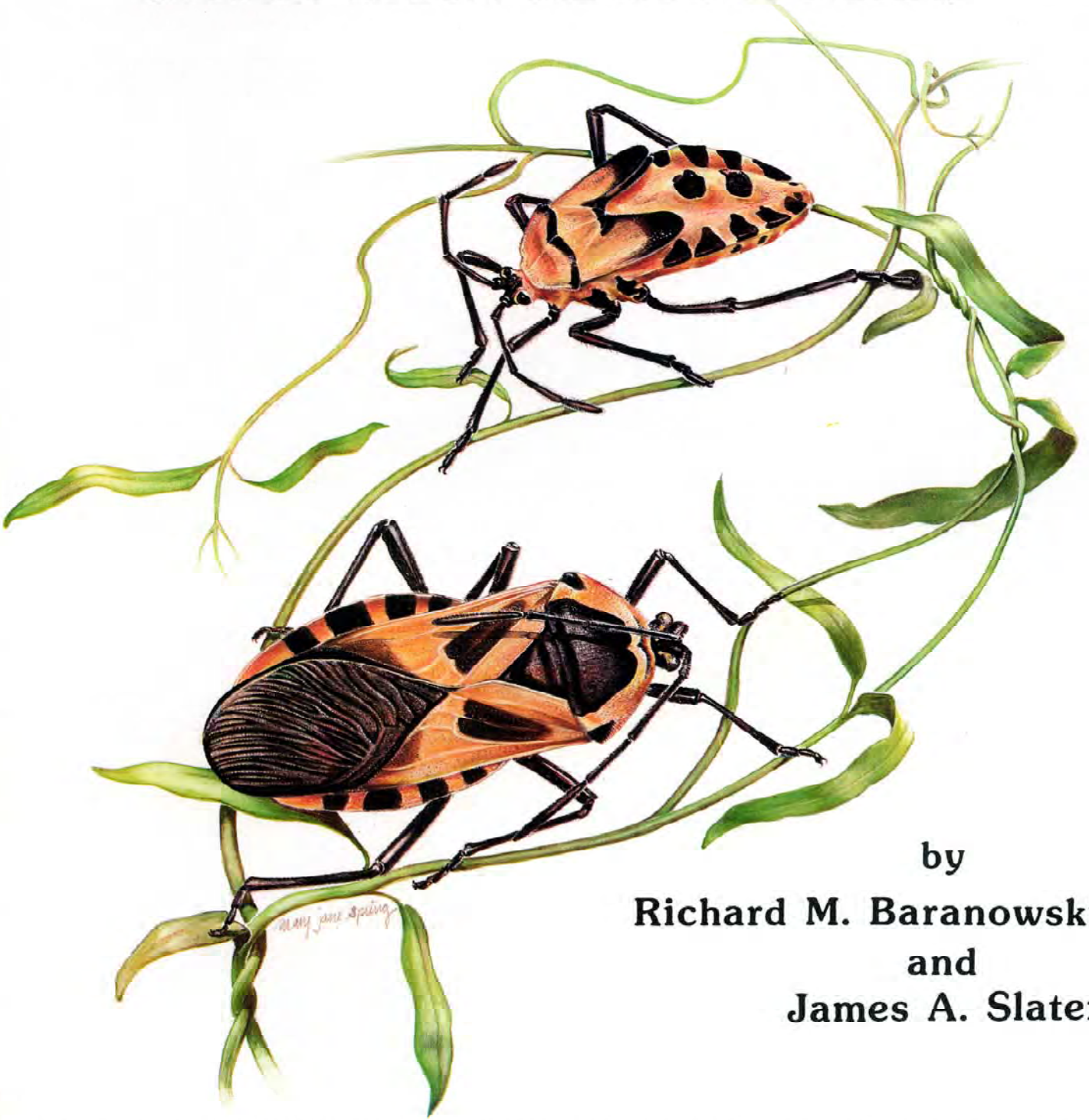
ARTHROPODS OF FLORIDA
AND NEIGHBORING LAND AREAS

Volume 12

COREIDAE OF FLORIDA
(HEMIPTERA: HETEROPTERA)



by
Richard M. Baranowski
and
James A. Slater

FLORIDA DEPARTMENT OF AGRICULTURE AND CONSUMER SERVICES
Doyle Conner, Commissioner

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COREIDAE OF FLORIDA
(HEMIPTERA: HETEROPTERA)

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FOREWORD

Thirty-three genera and 120 species of Hemiptera, family Coreidae, commonly called the squash bug family, are known to occur in the United States and Canada. Many of these are found only in the extreme southern or southwestern states. Both nymphs and adults of most Coreidae are sap suckers which feed on ripe or ripening seeds, fruits, stems, and foliage of their host plants. The family is a large one of world-wide distribution which includes some important pests, such as *Amblypelta cocophaga* China on coconuts in the Solomon Islands, *Dasynus piperis* China on pepper in Indonesia, *Pseudotheraptus* on coconuts in East Africa, and *Anasa tristis* DeGeer on squash, pumpkin, cucumber, and other members of the cucurbit family in the United States. *Leptoglossus phyllopus* (Linnaeus), one of the most common species of coreids in the southeastern United States, sometimes damages cotton, various fruits, and truck crops, while *Leptoglossus occidentalis* Heidemann and *Leptoglossus corculus* (Say) breed on conifers and often are destructive to the seed crop. *Leptoglossus gonagra* (Fabricius) will attack and damage early varieties of citrus, including tangerines and oranges.

Coreidae of Florida is the first of several volumes on Hemiptera currently under preparation to be published in *Arthropods of Florida and neighboring land areas*. It provides a reference useful both for field identification of most species and for the accurate identification in the laboratory of all species known to occur or which are likely to be found in Florida. Dr. S. W. Blatchley (1926) reported 33 species of Coreidae from Florida. In this publication the authors report on 41 species that have been recorded for Florida, but Florida specimens of 4 of these species were not seen by the authors, and the authors believe that at least 2 of these species do not occur in Florida. An extensive list of plants with which Florida Coreidae have been associated, data on parasites, and an extensive list of references are included.

Dr. Richard Matthew Baranowski, or "Dick" as he is generally called, was born in Utica, New York, on 1 March 1928, son of Agnes and Walter Baranowski. On 16 June 1951 he married Helen B. Venn. They have 3 children: Gena, Alison, and Lisa. Dick was educated in the public schools of Utica, New York. He received the Bachelor of Arts degree in 1951 from Utica College of Syracuse University with a major in biology. In 1953 he received the Master of Science degree and in 1959 the Doctor of Philosophy degree, both from the University of Connecticut with a major in entomology. He served as a Graduate Research Assistant during 1952-54 and as a Graduate Teaching Assistant during 1954-56 at the University of Connecticut. In 1956 Dick joined the staff of the University of Florida's Agricultural Research and Education Center at Homestead (for many years known as the Sub-Tropical Experiment Station) where he served as an Assistant Entomologist until 1963, as an Associate Entomologist from 1963-67, as an Entomologist and Professor from 1967-84. In 1984 he became Center Director of the University of Florida center at Homestead, which is now known as the Tropical Research and Education Center, and he continues to serve in this capacity. He also served (half time) during 1979-81 as United States Department of Agriculture, Plant Pest Quarantine Technical Advisor, National Biological Control Program. Dr. Baranowski has been a Research Associate of the Florida State Collection of Arthropods since 1969. He is a member of several academic and professional societies: Florida Entomological Society (President, 1975), Entomological Society of America, International Organization for Biological Control (Secretary/Treasurer, 1980-84; President, 1984-85), Florida State Horticultural Society, American Association for the Advancement of Science, Council on Agricultural Science and Technology, Sigma Xi, and Gamma Sigma Delta. His biography is included in *American Men and Women of Science*. In 1971 he was selected as Outstanding Research Faculty Member at AREC-Homestead, and in 1973 he received the Florida Department of Agriculture's Plant Protection Award of Eminence. He has been the recipient of more than $685,000 in research grants pertaining to the biology, ecology, mass rearing procedures, biological control, and detection of fruit flies; US/Latin American Cooperative Science Program; study of phenological relationships between broad mites, rust mites, and lime trees and between mirids, avocado trees, and alternate hosts; and other investigations. He is author of a 1964 volume titled *Insects* in *The Golden Bookshelf of Natural History* series published by Golden Press, coauthor with Dr. J. A. Slater of *How to know the Hemiptera* published in 1978, and author or coauthor of 64 other scientific publications, with 2 manuscripts in press. His primary current research areas are

the management of subtropical fruit pests including fruit flies and the biology and systematics of the Hemiptera of Florida and the Caribbean. His discipline-oriented work has taken him to Austria, Bahamas, Costa Rica, Dominica, England, France, Guadeloupe, Jamaica, Martinique, Puerto Rico, St. Lucia, St. Vincent, and Switzerland. Consultative missions have involved work in Bolivia, El Salvador, Mexico, and Trinidad. He is a member of Sacred Heart Catholic Church in Homestead, Florida. His hobbies include photography and woodworking.

Dr. James Alexander Slater, "Jim" to his many friends, was born in Belvidere, Illinois, on 10 January 1920, son of Gladys Banks Slater and Ray Alvin Slater. He and Elizabeth Thackston were married on 20 February 1943, and they have 4 children: James Alexander II, Jacquelyn Rae, Samuel Thackston, and Lydia Ann. During 1943-46, he served as an officer in the United States Navy; Deck officer in the Mediterranean; Malaria Control Officer, North Carolina and Okinawa. Jim received the Bachelor of Arts degree in 1942 from the University of Illinois, graduating with high honors. He received the Master of Science degree in 1947 from the University of Illinois and the Doctor of Philosophy degree in 1950 from Iowa State University with a major in entomology. He served as an Instructor, then Assistant Professor at Iowa State University during 1950-53. At the University of Connecticut he served as an Assistant Professor during 1953-56; Associate Professor, 1956-61; Professor, 1961-date; Department Head: Systematic and Evolutionary Biology Section, Biological Sciences Group, 1970-80. During 1960-61 he was a Research Fellow at the British Museum (Natural History). He was State Ornithologist in Connecticut during 1962-81; a Research Associate of the National Insect Collection, Pretoria, South Africa, 1967-68; Research Associate, American Museum of Natural History, 1977-date, and Research Associate, Florida State Collection of Arthropods (1986-date). Academic and professional societies of which he is a member are: Entomological Society of America, New York Entomological Society, Kansas Entomological Society, Washington Entomological Society, Entomological Society of South Africa, Royal Entomological Society (London), Society of Systematic Zoology, Florida Entomological Society, Association for Tropical Biology, Connecticut Entomological Society, Connecticut Herpetological Society, Connecticut Academy of Arts and Sciences, Connecticut Academy of Science and Engineering, American Society of Zoologists, Phi Beta Kappa, Sigma Xi, Phi Kappa Phi, Gamma Sigma Delta, Association for Gravestone Studies, and Katchaug Ornithological Society. His biography is included in *American Men and Women of Science* and in *Who's Who in the East*. Dr. Slater received the University of Connecticut Faculty Research Award in 1972. He was the Eastern Branch Nominee for Distinguished Achievement Award in Teaching, Entomological Society of America, in 1977. In 1982 he won the Harriett Merriefield Forbes Award of the Association for Gravestone Studies. He served on the Selection Committee of Phi Beta Kappa in 1979; University of Connecticut Retirement Committee (Chairman, 1982-85), 1982-date; Vice President of Connecticut Academy of Arts and Sciences, 1980-date; Connecticut Non-Game Advisory Committee, 1981-date; Friends of Trail Wood Committee (Edwin Way Teale Sanctuary), 1981-date. His professional activities include: Editor, *Entomologica Americana*, 1957-67; Editorial Board and Archives Board, Connecticut Entomological Society, 1974-81; National Science Foundation Advisory Panel, Systematic Biology, 1963-65; University of Connecticut Research Foundation Advisory Board, 1964-67; Task Force on Establishment of an Environmental College, 1958-59; Commissioner, Connecticut Geological and Natural History Survey, 1963-73; Commissioner, Accrediting Education, 1968-71; President, Connecticut Chapter of Sigma Xi, 1973-74; Alternate, International Institute of Ecology, 1970-74; U.S.D.A. Review Panel; Department of Entomology, Texas A. & M. University, March 1978; President-elect, 1979-81, and President, 1981-83, Society of Systematic Zoology; Chairman, Nominating Committee, Society of Systematic Zoology, 1982; Evaluation Committee, California Academy of Sciences, May 1982; Evaluation Committee, Department of Entomology, Cornell University, April 1984-85. Biological Sciences Group; Service on national committees includes: Entomological Society of America: Undergraduate Scholarship Committee, 1980, Nominating Committee, Section A, 1980; Committee to Investigate Formation of a Federation of Systematics, 1980-84; Thomas Say Foundation Publication Committee, 1977-80 (Chairman, 1979-80); Convenor and Chairman: Symposium "Present and Future Trends in Hemipteran Systematics", International Congress of Entomology, Washington, D.C., 1976. Workshops attended include the Danforth Foundation Workshop on Educa-

tional Innovation, Colorado Springs, Colorado, June-July 1966; National Science Foundation Workshop on "Basic Systematic Biology: Future Trends", 11-13 June 1980, Ohio State University, Columbus, Ohio. Field experience has included work in South Africa, and Mauritius Island (1967-68, 1970), Australia (1970-71), Costa Rica (1965), Panama (1974), Trinidad (1965, 1973, 1982), and the West Indies (1969, 1972, 1973, 1982). Dr. Slater's field of specialization is Systematic Entomology, including research interests in systematics, biogeography, speciation, plant and animal interrelationships, and faunistics. He is author of a 2-volume catalogue of the Lygaeidae of the world published in 1964 and senior author with Dr. Baranowski of a 1978 Pictured Key Nature Series volume, *How to know the true bugs*. He is author of 6 reviews, coauthor of 1 conference proceedings, and author or coauthor of 206 publications in scientific journals, with 10 additional manuscripts in press. Jim collects milk glass as a hobby. He is a member of the Presbyterian Church.

Howard V. Weems, Jr.
Editor
Bureau of Entomology
Division of Plant Industry
Florida Department of Agriculture
and Consumer Services
25 April 1986

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We thank Mrs. Holly Glenn, Tropical Research and Education Center for preparation of the distribution maps, assistance in collecting specimens and checking on data; Dr. Carl Schaefer, University of Connecticut, and Dr. Paula Levin Mitchell, formerly University of Texas, for allowing us to use their unpublished notes on host plants; also Drs. T. Yonke, University of Missouri, R. I. Sailer, University of Florida, and F. W. Mead, Florida Department of Agriculture and Consumer Services, Division of Plant Industry for critically reviewing the manuscript; Dr. R. T. Schuh, American Museum of Natural History, Dr. R. C. Froeschner and Mr. T. J. Henry, United States National Museum of Natural History, Mr. James Alexander Slater, II, University of Kansas, Dr. D. S. Chandler, U. New Hampshire, and Dr. M. Deyrup, Archbold Biological Station, for the loan of specimens and providing some of the collecting data.

Additionally, we want to thank Dr. and Mrs. R. C. Froeschner for the loan of some of the illustrations.

INTRODUCTION

The Hemiptera of Florida have been of much interest to students of the order for many years. Although the Hemiptera have never attracted the number of students as have the Coleoptera, Lepidoptera and Hymenoptera, the fauna of Florida has been studied as intensively as has that of any other part of the country, other than the immediate area where a specialist of a given family has lived. This is not to say that the fauna is as well known as that of any other state. Florida, with its diverse habitats, great climatic differences from north to south, and complex geologic history, has an unusually large and diverse fauna. This requires more comprehensive collecting and a wider knowledge of extra-territorial faunas for the maturity of knowledge of the state fauna to reach that of many other states. Furthermore, Hemipterology has never had the number of devoted amateurs that other orders have had, and thus life histories, habitats, host plants, etc. are relatively poorly known.

Although many of the early students of American Hemiptera described species from Florida, the first comprehensive publication on the fauna was that of Barber (1914a). Essentially a list, this publication did have locality data and is especially important as it brought together the extensive records from the collecting of Annie Trumbull Slosson and E. P. Van Duzee. Also included were records of most of the leading collectors of the period such as Engelhardt, Sleight, and Johnson as well as material from the collections of the Florida Experiment Station at Lake City, and those of Uhler, McAtee, Heidemann, Banks, the United States National Museum of Natural History and Barber's own collection. Barber's paper (which also included the auchenorrhynchus Homoptera) listed 372 species of Heteroptera including 29 species of Coreidae. Van Duzee (1909a) had published previously an extensive paper detailing the results of his collecting in the state in which he listed 168 species of Hemiptera.

As early as 1911, W. S. Blatchley began to spend his winters in Florida. In 1926 his famous "Heteroptera or True Bugs of Eastern North America" appeared, a work that was to become the standard reference work on North American Heteroptera. Students sometimes forget that this work is subtitled "with especial reference to the faunas of Indiana and Florida". It is replete with host plant and distributional data on Florida species and remains of inestimable value in working with the Florida fauna. In this work, 33 species of Coreidae were reported.

Subsequent to Blatchley's work the major advances in knowledge of the Florida Hemiptera have been of two kinds. First, much more extensive knowledge of the systematics of various taxa by a number of leading taxonomists. Second, the development of extensive collections within the state. Chief among these have been the collection of R. F. Hussey, most of which is now at the University of Michigan, the Florida State Collection of Arthropods at Gainesville, and the collection of R. M. Baranowski at Homestead.

R. F. Hussey was a professor first at Florida Southern University, and later at the University of Florida, Gainesville. It had been his intention to produce a new "Hemiptera of Florida", and he had collected extensively and published a number of papers on the fauna, some together with his student, Jon Herring.

Two most important events in the history of Hemipterology in Florida have been: (1) The expansion of the state collections during recent decades under the control of the Florida Department of Agriculture and Consumer Services, Division of Plant Industry. Under the direction of Mr. Harold Denmark, Drs. Howard Weems, Jr., Robert Woodruff, and Frank Mead, extensive collections from Florida have been brought together making it possible to understand the distributions of many species in a much more mature manner than has been possible previously. (2) The location of the senior author at the University of Florida Tropical Research and Education Center at Homestead which has enhanced the opportunity to observe the fauna throughout the seasons. The senior author's collecting in the area has added a number of species to the North American fauna as well as the Floridian fauna and enabled him to obtain life history, ecological, and distributional data that previously had not been available for species restricted to southern Florida.

Despite this, knowledge of the Coreidae of Florida remains fragmentary. For some species the distribution, host plants, and general life history are reasonably well known. For others, only a few collecting records are available. Ecological, behavioral, and seasonal information usually is lacking or are of a very preliminary nature. This is due in part to the lack of a coreid specialist working in the state and due in part to the restricted ranges, relative scarcity, and host plant specificity of a number

of species. Thus, there is an opportunity for field naturalists to contribute a great deal by careful attention to host plant associations (taking particular care to note when nymphs are present since this is one of the primary methods of establishing a "breeding host" as contrasted to a plant that may merely represent a "sitting record" or one that an adult is feeding upon largely by chance). Nymphs of a number of Florida Coreidae remain neither described nor illustrated. Behavioral patterns and more precise ecological associations are needed for almost all of the species.

DEFINITION

The Coreidae once included groups now considered as the separate families Alydidae and Rhopalidae (= Corizidae). We treat the family in the more restricted sense, exclusive of these latter groups. So restricted, the Coreidae may be defined as generally medium to large insects usually elongate-ovoid or elliptical; antennae 4-segmented, inserted above a line drawn longitudinally through the eye; membrane of fore wing with numerous veins, these frequently forked or anastomosing; metathoracic scent gland auricle distinct, short, and usually rounded; female ovipositor plates flattened, "plate-like"; nymphs with dorsal abdominal scent gland openings between terga 4-5 and 5-6; eggs with a distinct pseudoperculum.

FEEDING HABITS

All species, as far as known, are phytophagous. While some species live in ground litter, almost the entire Florida fauna occurs above the ground both in the nymphal and adult stages where they may feed upon the seeds, fruits, stems, and/or leaves of the host plant. They are, however, predominantly sap suckers on stems and fruits. In Africa they often are called "twig wilters". Schaefer and O'Shea (1979) reported on the host plants of the Mictini, Acanthocerini, and Nematopodini, stating "the members of these tribes, like many other coreids prefer fruits and/or rapidly growing parts of plants, that is, those parts rich in highly concentrated nutrients".

As may be seen by examination of the individual species accounts, Florida contains species that appear to breed successfully upon an astonishing number and variety of plants as well as others that are restricted to a single specific host. These differences can be seen even between members of the same genus. For example: *Leptoglossus phyllopus* (Linnaeus), *L. gonagra* (Fabricius), and *L. balteatus* (Linnaeus) breed upon plants in several different families and often are reported as abundant enough (breeding?) to do considerable damage to many more. By way of contrast, *Leptoglossus ashmeadi* Heidemann breeds only on mistletoe, *L. corculus* (Say) on species of *Pinus*, and *L. fulvicornis* (Westwood) on magnolias.

This variation in feeding habits causes some species to become destructive to specific crops whereas others become destructive because of the catholicity of their feeding habits. Nevertheless, most Florida Coreidae are not of major economic importance, and only a few are of any major significance to crop production in the state.

The two most injurious species appear to be the squash bug, *Anasa tristis* DeGeer, which is frequently a serious pest on cultivated cucurbits, and *Leptoglossus corculus*, which can cause as much as 60-100% conelet abortion and heavy seed loss in species of *Pinus* in northern Florida.

The other economically important species tend to be more general feeders, and thus their injury is more sporadic. *Leptoglossus phyllopus* is common and feeds on a great variety of plants, sometimes damaging citrus and garden crops. *Anasa armigera* (Say) occasionally is destructive to cucurbits and *Leptoglossus fulvicornis* to magnolias.

In southern Florida such essentially Neotropical species as *Phthia picta* (Drury), *Leptoglossus gonagra*, and *Leptoglossus balteatus* occur. These species are of considerable economic importance in the Neotropics, damaging a wide variety of cultivated plants, but none of these is abundant or widespread enough in Florida to be considered a serious problem, although each has the potential of becoming so.

Schaefer and Mitchell (1983) have published a summary of "food plants" in the Coreoidea. The paper is a valuable summary although only plant genera, not species, are listed. Schaefer and Mitchell have made their original notes available, and plant species are mentioned here where appropriate.

COMPOSITION OF THE FLORIDA FAUNA

I. ENDEMIC SPECIES (5%)

Only two species are endemic, *Merocoris*

typhaeus (Fabricius) and *Catorhintha viridipes* Blatchley. *M. typhaeus* represents the Floridian sister species of the widespread northern *M. distinctus* (Dallas). There are several such Floridian endemics in various insect groups. However, *distinctus* and *typhaeus* have been confused in the literature for many years, and it is uncertain whether *typhaeus* will actually prove to be endemic to Florida, although we believe that it will.

Catorhintha viridipes is known only from southern Florida. It is very closely related to the West Indian *Catorhintha borinquensis* Barber. Some authors treat it as a subspecies. Whether or not it should be considered as an endemic species is perhaps of lesser importance than that it is representative of the West Indian element in the Florida fauna.

II. WIDESPREAD NORTH AMERICAN SPECIES (21%)

This element consists of species that are widely distributed in the eastern and midwestern states. Within this category two subgroups can be recognized. First is a subgroup with a widespread distribution in the northern states, that becomes relatively scarce in Florida, or may even be confined, largely or entirely, to northern Florida. Such species are: *Acanthocephala terminalis* (Dallas), *Leptoglossus oppositus* (Say), *L. corculus*, probably *Anasa armigera* and *Euthochtha galeator* (Fabricius) — in other words — a subgroup whose main "center" of distribution seems to be well north of Florida. Second is a subgroup with a more southern distributional center. In this subgroup the distribution of the species may extend well into the northern states, but each is scarce in the northern portion of its range which tends to terminate well south of the transition zone. Such species as *Chariesterus antennator* (Fabricius) and *Piezogaster alternatus* (Say) typify this subgroup.

III. SOUTHEASTERN OR GULF COAST (CAROLINIAN) SPECIES (13%)

The range of the species in this group usually extends at most from Louisiana or eastern Texas across the Gulf Coast states, sometimes northward into North Carolina on the coastal plain. Some of these species seem to be restricted to northern and central Florida. Examples are: *Acanthocephala confraterna* (Uhler), *Leptoglossus ashmeadi, L. fulvicornis, Cimolus obscurus* Stal and *Piezogaster calcarator* (Fabricius).

IV. SOUTHERN UNITED STATES SPECIES INCLUDING THE SOUTHWEST (13%)

Species in this group frequently have ranges similar to species in the above group except that they extend through the arid southwest, sometimes well into Mexico and even into Central America. Examples are: *Chelinidea vittiger* Uhler, *Acanthocephala femorata* (Fabricius), *A. declivis* (Say), *Leptoglossus phyllopus*, and perhaps *Ceraleptus americanus* Stal.

V. DISJUNCT FLORIDA AND SOUTHWESTERN UNITED STATES SPECIES (10%)

This is a particularly interesting element, as in a number of other animal groups (gopher tortoises, burrowing owls, etc.) It seems to represent the fragmentation of a formerly continuous range, presumably resulting from a more arid period in the southern United States. It is not a strongly marked component of the coreid fauna and indeed may prove to be due to recent accidental introduction, or the species may eventually be found to occur in favorable habitats in the intervening area. At present three species appear to represent this faunal component: *Mozena obesa* Montandon, *Narnia femorata* Stal, and *Corecoris fuscus* (Thunberg). In at least the first two cases the genus is represented by a number of species in the southwestern states but by only a single species in Florida. *Namacus annulicornis* Stal is known only from Mexico and Florida and may represent this element or be essentially a group VI element not yet taken (or extinct) in the West Indies.

VI. FLORIDA, WEST INDIAN AND CENTRAL AMERICAN SPECIES (21%)

This is a particularly interesting component of the Floridian coreid fauna. It represents a Neotropical element, but whether the present distribution is the result of fragmentation of a formerly continuous range or whether the presence of the species in Florida is due to dispersal is an unresolved question. In other words, do such distributions represent vicariant events or dispersal events? There has been great interest in this question in recent years, and a careful zoogeographic study of these species and their relatives similar to that undertaken for certain poeciliid fishes by Rosen (1978) is most desirable. Species belonging to this group tend to have south Florida distributions, and

some are rare or local in the state even though apparently common in parts of their Neotropical range. Such species are: *Leptoglossus gonagra, Leptoglossus concolor* (Walker), *Phthia picta, Althos obscurator* (Fabricius), *Catorhintha guttula* (Fabricius), *Catorhintha divergens* Barber, *Anasa andresii* (Guerin), and *Anasa scorbutica* (Fabricius).

VII. WEST INDIAN AND FLORIDA SPECIES (16%)

Species belonging to this group often are confined to the southern part of the state. Several are found in the Greater Antilles and southern Florida, a few only in Cuba and Florida. Here the question arises as to whether such distributions are the result of vicariance or of dispersal. The evidence seems to us to suggest that the presence of some, and possibly all, of these species in Florida is the result of dispersal. *Zicca taeniola* (Dallas) is particularly instructive in this regard. It was not taken by any of the early collectors and was first reported from Florida by Hussey in 1956. Yet today it occurs in large numbers in southern Florida in disturbed habitats. It seems highly unlikely that it was overlooked by collectors for so many years. *Acanthocerus lobatus* (Burmeister), while said to be abundant in Cuba, is known from Florida only from a series of 11 old specimens. If these are not mislabeled it suggests that this species temporarily established itself but has not maintained its population.

The whole general thrust of this group of species (as well as several in group VI) suggests to us that there is a constant seepage of West Indian coreids into southern Florida, particularly into the Keys and that occasionally these find suitable host plants and habitats and establish themselves. Species of this group, in addition to those mentioned above, are *Chondrocera laticornis* Laporte, *Leptoglossus balteatus, Sephina gundlachi* (Guerin), and *Sethenira ferruginea* (Stal) (which, however, may occur in South America. See text.).

A Synonymized Checklist of the Vascular Flora of the United States, Canada and Greenland, vol. II was used as the final authority for the names of plants occurring in North America; the *Gray Herbarium Index* for New World plant names not in the preceding; and *Index Kewensis* for the few Old World plant introductions included.

The following acronyms are used in the text: AMNH — American Museum of Natural History, FSCA — Florida State Collection of Arthropods, FSCACC — Florida State Collection of Arthropods Card Catalog, JAS — James A. Slater collection, KU — University of Kansas, NMNH — United States National Museum of Natural History, RMB — Richard M. Baranowski collection, ABS — Archbold Biological Station, and UNH — University of New Hampshire.

Black circles are used on the distribution maps for known localities within counties. A triangle is used if specific locality data within a county are lacking.

All measurements are given in mm.

KEY TO FLORIDA SUBFAMILIES OF COREIDAE

1. Posterior tibiae with a distinct tooth or spine at distal ends ..... Meropachydinae, p. 4

1′. Posterior tibiae lacking a distinct spine or tooth at distal ends 2

2. Head anterior to eyes with a median sulcus; tibiae usually sulcate on outer surface ..... Coreinae, p. 7

2′. Head anterior to eyes lacking a median sulcus; tibiae not sulcate on outer surface ..... Pseudophloeinae, p. 69

MEROPACHYDINAE Stal

A small subfamily with species having the ends of posterior tibiae ending below in a short projecting spine. Fourth antennal segment elongate, longer than combined length of segments 2 and 3; posterior femora curved, strongly thickened distally with proximal half slender; posterior coxae far separated, rather laterally placed.

A Neotropical subfamily consisting of approximately 14 genera of which only 1 occurs north of Mexico.

MEROCORIS Perty, 1830

Type Species: *Coreus acridioides* Fabricius 1803, p. 200. = *Lygaeus typhaeus* Fabricius 1798, p. 537. By subsequent designation.

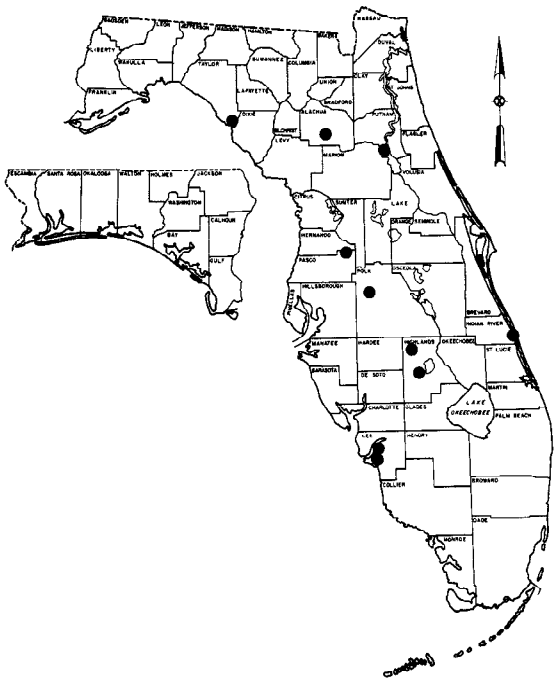
Diagnosis: Readily recognized by the short, stout, thickly pubescent body (7-9); posterior femora curved, slender on proximal half, strongly swollen distally with a series of large ventral spines. Head short, armed with a short sharp spine at base of each antenna. Pronotum strongly declivent. Scutellum carinate mesally, irregularly sculptured laterally.

Schaefer and Mitchell (1983) cited Yonke (unpub.) as believing *Polygala* spp. to be the preferred hosts of members of this genus and cited Mitchell (unpub.) as taking adults and nymphs on *Baccharis* and *Solidago*.

Three species have been described, one western and two in the eastern states.

MEROCORIS TYPHAEUS (Fabricius)
(fig. 1, map I)

Lygaeus typhaeus Fabricius 1798, p. 537.
Coreus acridioides Fabricius 1803, p. 200.
Merocoris rugosus Amyot and Serville 1843, p. 244.
Merocoris typhaeus Dallas 1852, p. 419.



Map I. Distribution of *Merocoris typhaeus*.

Diagnosis: Thick bodied, oblong ovoid, thickly clothed with a mat of woolly pubescent hairs; dark red brown to black; central area of corium with a group of large black glabrous spots forming an irregular black patch. First 3 antennal segments reddish brown, 4th blackish. Ocelli set on tubercles. Lateral margins of pronotum with 3-4 large teeth; humeral angles acute, posterior margin deeply emarginate.

The status of *typhaeus* is uncertain. Barber (1914), Blatchley (1926), and Torre-Bueno (1941) all treated it as a distinct species. However, McAtee (1919) maintained that it could only be considered to be a geographic race of *distinctus* (Dallas). Although limited Florida material has been available we have dissected the male genitalia of a specimen from Florida and compared it with material from New York and Illinois. The parameres of the Floridian specimen are quite distinct, particularly in the development of a large flange at the base of the distal "hook" or blade. The shape of and length of pubescence on the first antennal segment seem to differ noticeably between Florida and northern material. In *typhaeus* the first antennal segment bears only short relatively inconspicuous hairs and tapers strongly to the base. In *distinctus* the hairs of the first antennal segment are elongate, sometimes nearly as long as the antennal diameter, and the segment is nearly as broad near the base as at the disal end. While an intensive study with series from many localities may show *typhaeus* to only represent a geographic race, we believe that present evidence supports treatment as a distinct species.

M. distinctus (fig. 2), despite literature records, is not known from Florida.

Biology: Little is known of the biology. Blatchley (1926) reported it from avocado and also from flowers of *Polygala lutea* L. Interestingly, the related *distinctus* has been reported twice coming in numbers to carrion (Engelhardt 1912, Parshley 1914).

Distribution: Possibly confined to Florida (see McAtee 1919). There are literature records for Alabama, North Carolina, and Virginia. Because of past confusion with *distinctus* some or all of these records probably pertain to the latter.

Florida Distribution: Reported by Van Duzee (1909) as *Corynocoris distinctus* from Crescent City and Estero; by Barber (1914) in the same genus from Ft. Myers, Lakeland, and Indian River District, and by Blatchley (1926) from Dunedin. ALACHUA CO.: Gainesville, 23-V-56, 5-IV-78, F. W. Mead; same, 22-X-58, H. V.

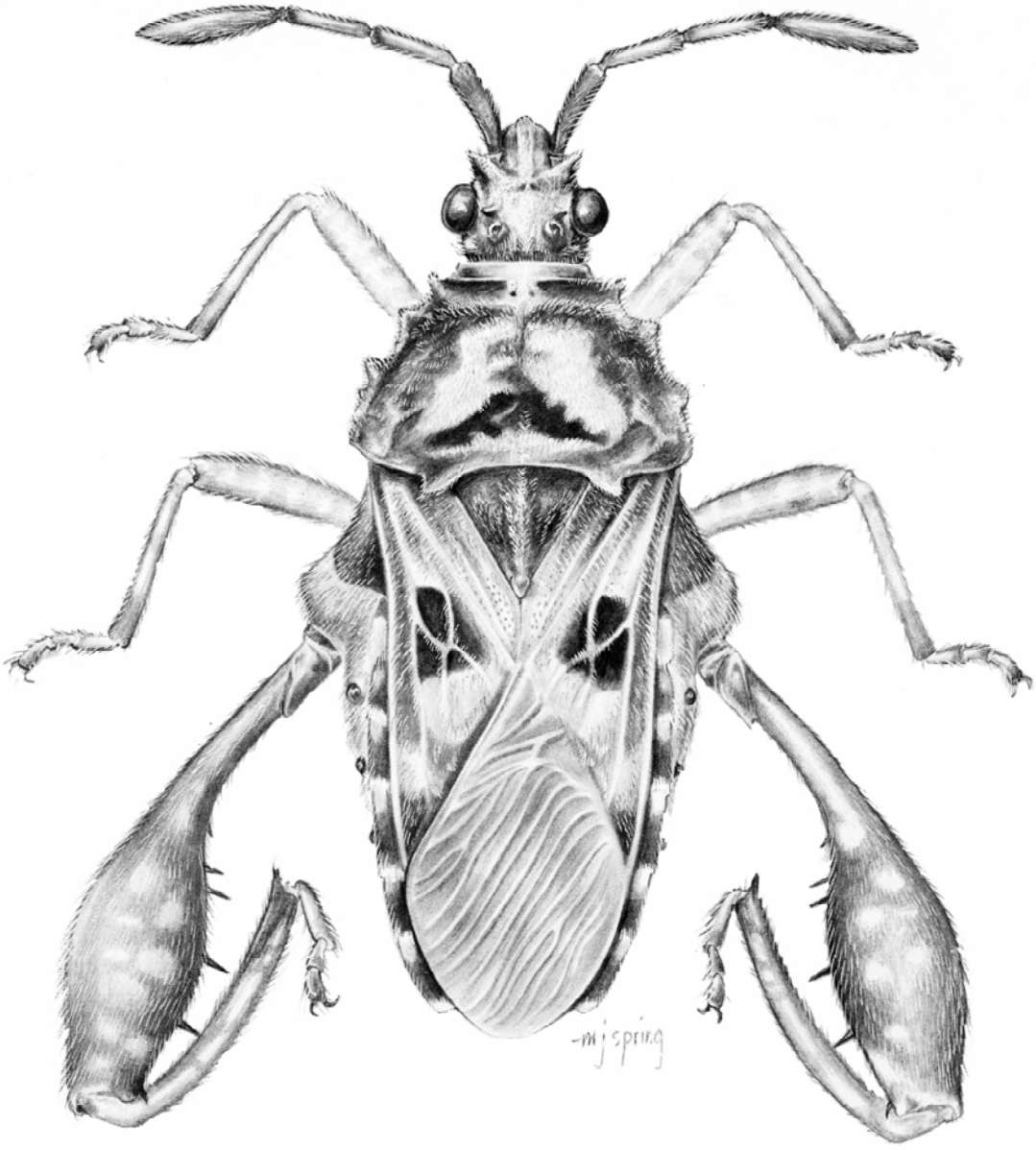


Fig. 1. *Merocoris typhaeus.*

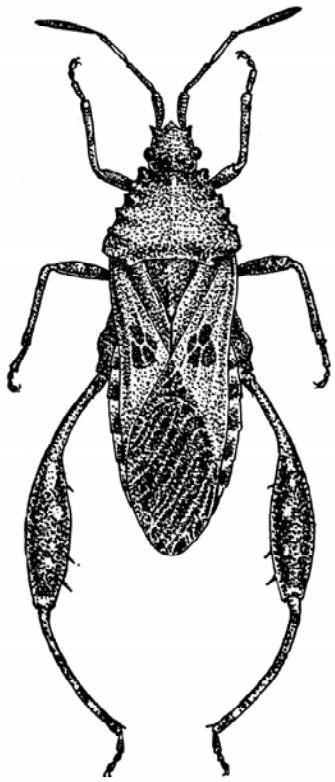


Fig. 2. *Merocoris distinctus.*

Weems, Jr., (FSCA); same, 25-III-57, F. W. Mead, (FSCACC); 2-VI-55, R. A. Morse, (RMB); HIGHLANDS CO.: Highlands Hammock St. Pk., 7-VI-69, Slater Schuh, Harrington, (JAS); Archbold Biological Station, 14-III-73, R. C. Miller, (ABS); HILLSBOROUGH CO.: Port Tampa, 17-VI-61, J. W. Patton, (FSCACC); INDIAN RIVER CO.: Vero Beach, 21-VII-39, P. Oman; Indian River Dist. VII-1896; PASCO CO.: Trilby, 10-XI, G. Green, POLK CO.: Lakeland, 8-V-12, (NMNH); TAYLOR CO.: 20 mi. E. Steinhatchee, 22-VII-66, R. E. Woodruff, (FSCA); VOLUSIA CO.: Oak Hill, 29-XI-79, J. N. Pott, (FSCACC).

COREINAE Stal

This subfamily includes the great majority of species of North American Coreidae and is recognized mostly by negative characters not possessed by the other two subfamilies. Upper surface generally not thickly set with small setae bearing granules. First segment of antennae rarely shorter than head. Hind coxae usually widely separated. Distal ends of hind tibiae not possessing a projecting spine. Posterior femora, although frequently curved and in some cases flattened, not generally strongly clavate with proximal half very slender, and the distal half strongly thickened and club shaped. Head generally much narrower and shorter than pronotum, and bucculae reaching well behind insertion of antennae.

For the most part these are relatively large species, only rarely being less than 10 mm in length with some reaching 30 mm or more. The tribal classification of this enormous subfamily varies according to different authors, but most authors recognize nine tribes in North America; all are represented in Florida.

KEY TO FLORIDA TRIBES OF COREINAE

1. Posterior tibiae dilated on one or both sides to form thin, leaf-like (foliaceous) plates 2

1′. Posterior tibiae simple, subcylindrical, terete, or if somewhat flattened, not expanded as leaf-like dilations 3

2. Tylus compressed, projecting upward between antenniferous tubercles in the form of a triangular spine . . . . . Acanthocephalini, p. 8

2′. Tylus either porrect or deflexed before distal end of juga but never projecting upward in the form of a triangular spine . . . . . Anisoscelini, p. 14

3. Rostrum relatively elongate, extending posteriorly to posterior coxae 4

3′. Rostrum relatively short, at most extending posteriorly to middle coxae 5

4. Antennal segments 2 and 3 3-sided (triquetrous) . . . . . Chelinidini, p. 48

4′. Antennal segments 2 and 3 cylindrical (terete), never distinctly 3-sided . . . . . Leptoscelini, p. 29

5. Posterior femora armed below with

numerous teeth, strongly incrassate in males; anterior portion of lateral pronotal margins toothed or crenulate 6

5′. Posterior femora with at most 2 or 3 small spines below, frequently mutic, not strongly incrassate in males; anterior portion of lateral margins of pronotum either armed with distinct teeth or unarmed 7

6. A distinct spine present on each antenniferous tubercle; metathoracic scent gland auricle with a single disc; ocellar tubercle large . . . . . Acanthocerini, p. 31

6′. Antenniferous tubercles lacking a distinct spine; metathoracic scent gland auricle terminating in a pair of divergent discs; ocellar tubercle small . . . . . Nematopini, p. 36

7. Neither juga nor tylus strongly deflexed, head not appearing incised anteriorly; antenniferous tubercles not prominently produced . . . . . Coreini, p. 50

7′. Head appearing incised anteriorly with juga and tylus strongly abruptly deflexed 8

8. Third antennal segment flattened and rounded into a leaf-like plate distally; antenniferous tubercles bearing a distinct spine . . . . . Chariesterini, p. 46

8′. Third antennal segment cylindrical, not dilated distally; antenniferous tubercles lacking a distinct spine . . . . . Corecorini, p. 40

ACANTHOCEPHALINI Stal 1870, p. 149

Generally large species. Head subquadrate, declivent, not produced anterior to bases of antennae, tylus compressed, extending upward as a triangular projection or ridge. Posterior femora of males greatly enlarged; all femora of both sexes spinose ventrally. Posterior tibiae expanded and flattened in both sexes.

This tribe is confined to the Western Hemisphere where approximately 9 genera are recognized of which only one occurs north of Mexico.

ACANTHOCEPHALA Laporte, 1832

Type Species: *Lygaeus compressus* (Fabricius) 1803 = *Cimex latipes* (Drury) 1782. By original designation.

Diagnosis: Head short, terminating in an upward bent spine. Antennae long slender terete, first segment elongate but stouter than remainder and longer than length of head. Anterior pronotal lobe small, posterior lobe large, expanded to humeral angles, strongly declivent. Hind femora swollen, armed below with sharp spines, much more incrassate in males than females. Posterior tibiae with foliaceous dilations, those on the outer surface widest and longest.

A Neotropical genus, widely distributed through Central and South America. Five species occur north of Mexico of which 4 are present in Florida.

KEY TO FLORIDA SPECIES OF *ACANTHOCEPHALA*

1. Pronotal humeral angles broadly expanded (foliaceous) extending laterally far beyond maximum lateral abdominal margins . . . . . *declivis*, p. 10

1′. Pronotal humeri, at most, moderately expanded, extending laterally, at most, only slightly beyond lateral abdominal margin 2

2. All antennal segments uniformly reddish brown, 4th segment not conspicuously paler than preceding . . . . *femorata*, p. 11

2′. Fourth antennal segment yellowish or reddish, always conspicuously paler than preceding segments 3

3. Dilation of posterior tibiae narrowing distally, but reaching or almost reaching distal end; pronotum granulated and at most weakly tuberculate (see *confraterna* discussion) . . . . . *confraterna*, p. 9

3′. Posterior tibial dilation occupying only proximal ⅔; pronotum with small but distinctly differentiated tubercles present . . . . . *terminalis*, p. 13

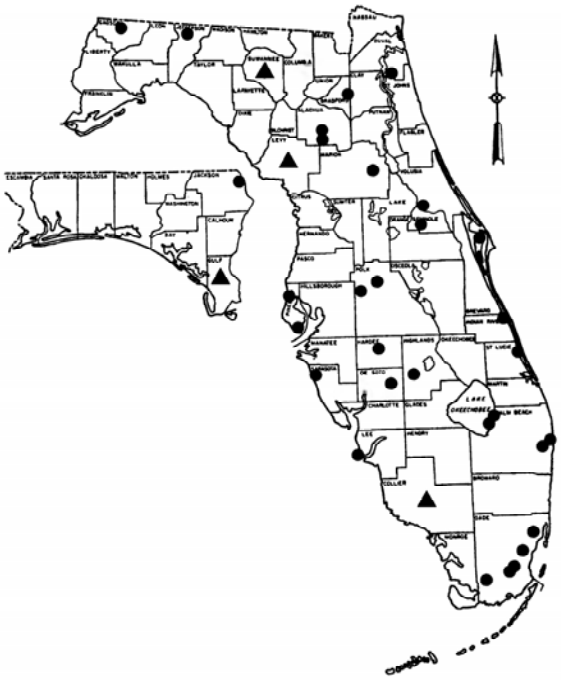
ACANTHOCEPHALA CONFRATERNA
(Uhler)
(map II)

Metopodius confraterna Uhler 1871, p. 99.
Acanthocephala confraterna Van Duzee 1916, p. 10.

Diagnosis: Elongate oval, dark brown, Body narrower in appearance than *femorata* or *terminalis*. Abdominal connexivum not evident, or only slightly so, when viewed dorsally, whereas in *terminalis* and *femorata* the connexivum posterior to the claval commissure extends laterally beyond the wing, giving the sides a sinuate appearance. Pronotum granulated, at times weakly tuberculate. The tuberculate appearance is similar to that of *terminalis*, but the narrow abdomen of *confraterna* separates the two.

Biology: Nothing is known of the biology, but collecting records indicate it has been taken on *Magnolia* sp., *Cirsium* sp. and *Clerodendrum* sp. Collected from March through December in Florida.

Distribution: A southeastern species known only from Georgia, Alabama, Texas, and Florida.



Map II. Distribution of *Acanthocephala confraterna*.

Florida Distribution: Reported by Barber (1914) from Biscayne Bay, Pablo Beach, Lakeland, Marco, La Grange, Silver Springs, Daytona, Lake City and Enterprise. Occurs throughout the state. ALACHUA CO.: Gainesville, 17-IV-59, H. V. Weems, Jr.; same, 9-III-21, H. E. Bratley, (FSCA); same, 28-IX-75, S. A. Alfieri, (FSCACC); same, 10-VII-69, E. Mercer; same, 22-V-69, L. O'Berry; same, 4-VIII-62, C. I. Ayres; same, 27-IX-39; 23-III-59, H. V. Weems, Jr.; same, 24-VI-54, H. A. Denmark; same, 25-V-54, F. W. Mead; 28-IV-23; Hainesworth, 14-XI-58, W. P. Hunter, (FSCA); Micanopy, 13-IV-24, E. G. Holt, (NMNH); BRADFORD CO.: Starke, 8-XII-75, C. Liberman, (FSCA); BREVARD CO.: Merritt Is., 12-III-56; same, 1-V-75, B. Stanley, (FSCA); COLLIER CO.: 18-III-51, E. L. & N. J. Sleeper, (NMNH); DADE CO.: Homestead, 24-V-63, C. J. Fay; same, 13-X-59, C. F. Dowling & J. H. Knowles; S. Miami, 21-X-58, R. W. Swanson, (FSCA); TREC, Homestead, VIII-1984, H. Glenn, (RMB); Miami, 2-VI-28, (NMNH); same, 12-X-53, O. D. Link; Everglades National Park, 6-V-58, H. V. Weems, Jr.; Goulds, 21-VIII-79, J. Diesler, (FSCA); DESOTO CO.: Joshua Creek, 18-IX-63, R. H. Rhodes, (FSCACC); DUVAL CO.: Mandarin, 11-V-72, W. B. Wikel, (FSCACC); GADSDEN CO.: Quincy, 19-V-09, W. A. Hooker, (NMNH); GULF CO.: 25-V-54, F. W. Mead, (FSCA); HARDEE CO.: Wauchula 17-I-64, R. H. Rhodes, (FSCACC); HIGHLANDS CO.: Archbold Biological Station, 30-V-67, (FSCACC); same, 25-V-83, 6-VI-84, M. Deyrup; same, 30-III-59, 22-VI-65, R. Archbold; same, 21-III-83, A. Schreffler, (ABS); INDIAN RIVER CO.: 21-III-54, F. W. Mead, (FSCA); 25-III-57, R. L. Blickle; same, 28-III-57; same, 12-IV-57; same, 3-VI-57; Sebastian, 21-III-72, W.B.C., (UNH); JACKSON CO.: 43 mi. N. Butler, 2-VI-55, R. F. Hussey, (FSCA); JEFFERSON CO.: Monticello, 28-X-69, J. T. Raese; same 16-IX-69; same, 9-XI-69, W. H. Whitcomb; same, 4-XI-69; LEE CO.: Sanibel, 12-VI-75; LEON CO.: Tallahassee, 11-XII-62, R. H. Miller, (FSCACC); LEVY CO.: 30-VI-56, H. V. Weems, Jr.; same, 6-IV-59, F. W. Mead, (FSCA); MARION CO.: Juniper Springs, 12-24-V-54, L. H. Krombein, (NMNH); PALM BEACH CO.: Lake Worth, 28-II-38, R. Hoag, (JAS); same, 11-I-29; same, 13-I-29; Pahokee, 13-IV-44; Canal Point, 1-XII-27, (NMNH); Hypoluxo, 30-IV-68, R. A. Long & W. E. Wyles; PINELLAS CO.: Dunedin, 14-V-59, O. L. Cartwright; same, 18-III-27, W.S.B., (NMNH); Gulfport, 1916, (UNH); POLK CO.: Lake Alfred, 26-VII-60, P. Pettigrew; Lakeland, 29-IV-57, R. R. Snell, (FSCACC); SARASOTA CO.: Sarasota,

21-VI-71, S. V. Hyatt, (FSCA); same, 14-VI-66, (FSCACC); SEMINOLE CO.: Casselberry, 6-IV-59, C. O. Youtsey, (FSCACC); SUWANNEE CO.: 29-VI-54, F. W. Mead; ST. LUCIE CO.: St. Lucie, 29-VI-55, G. W. Campbell, (FSCACC); VOLUSIA CO.: Enterprise, ?-IV-1887, (NMNH).

ACANTHOCEPHALA DECLIVIS (Say)
(map III)

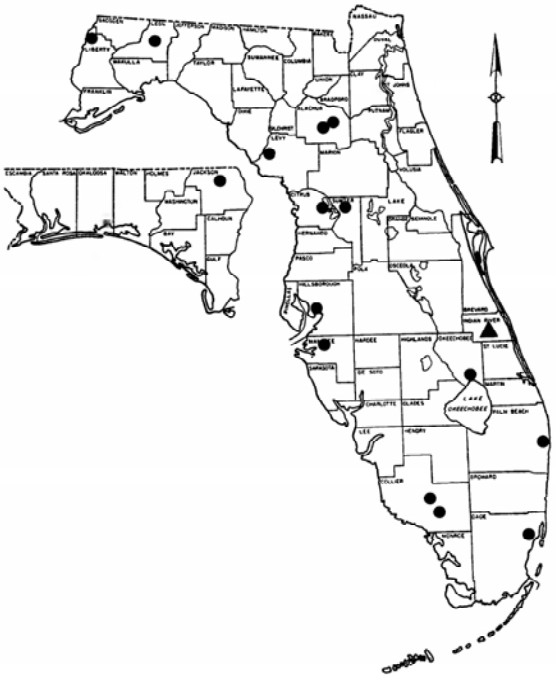
Rhinuchus declivis Say 1832, p. 10. (Leconte edit. p. 327) in V.D. 1917 as "Complete Writings".
? *Diactor alatus* Burmeister 1835, p. 334.
? *Metopodius thoracicus* Dallas 1852, p. 428.
Acanthocephala declivis Stal 1870, p. 150.

Diagnosis: Large, robust, chocolate brown with humeral angles of pronotum extremely strongly and broadly expanded laterally, usually upcurved, coarsely dentate. Anterior pronotal lobe usually with 2 small shining blunt projections along midline. Antennae with 1st 3 segments dark chocolate brown, 4th segment strongly contrasting pale orange yellow; hind tibiae with outer foliaceous dilation strongly notched in middle, very broad on distal half, the breadth only slightly narrowing until before apex of tibiae, then curving in at right angles to shaft of tibiae. Pronotal surface with scattered small tubercles present; area around scent gland auricle usually contrastingly red brown.

This species is similar to *A. femorata*, but readily separable, in addition to the color of the 4th antennal segment, by the extremely broadly expanded humeral angles as noted in the preceding key. Specimens are variable in the degree to which these humeral angles project outward, sometimes only slightly above the surface of the pronotum or sometimes curved upward in a strongly elevated arc.

Biology: Little seems to be known of the biology of this large species. Mitchell (unpub.) has taken adult aggregations on *Celtis laevigata* Willd., *Baccharis neglecta* Britt., and *Fraxinus texensis* (Gray) Sarg. Blatchley (1926) reported specimens on the foliage of red bay, *Persea borbonia* L. Spreng. Schaefer and Mitchell (1983) cited an unpublished record of T. P. Friedlander on *Celtis*. Arnaud (1978) reported it as being parasitized by *Trichopoda pennipes* (Fabricius).

Distribution: Occurs from Raleigh, North Carolina through the southeastern states westward to Louisiana, Texas, Arizona, and southward into Central America.



Map III. Distribution of *Acanthocephala declivis*.

Florida Distribution: Barber (1914) reported it from Chokoloskee and Blatchley (1926) reported it from Utopia, Lake Okeechobee and Dunedin. It probably occurs throughout the state but appears to be scarce and local. ALACHUA CO.: Gainesville, 15-VII-57, E. W. Holder; same 27-VI-74, F. W. Mead; same 6-V-54; same 25-IV-55, C. N. Patton; same, 18-I-73, C. Fink, (FSCA); same, 4-I-74, KWK, (RMB); same, 27-VI-79, D. Culbert; same, 27-IV-71, C. Bird; same, 14-IV-60, R. P. Esser, (FSCACC); same, 12-VI-54, H. V. Weems, Jr., (RMB); same, 26-I-76, 25-I-76, 7-III-76, P. Choate, (UNH); same, 20-IV-59, R. A. Morse; same, 3-V-53, H. A. Denmark; Paynes Prairie, 7-XII-24, T. H. Hubbell, (FSCA); Fairbanks, 12-V-75, E. Collins, (RMB); COLLIER CO.: Ochopee, 14-VI-79, C. Stieger & R. Larkin; Big Cypress, 24-IV-46, P. M. Miller; CITRUS CO.: Inverness, 21-IV-72, K. C. Lawry, (FSCA); DADE CO.: Miami, 11-V-17, (NMNH); HILLSBOROUGH CO.: Tampa, 4-VI-75, E. R. Simmons, (FSCACC); IN-

DIAN RIVER CO.: 21-VIII-53, G. W. Dekle; JACKSON CO.: Florida Caverns St. Pk., 1-XII-57, F. W. Mead; same, 7-XII-57, H. V. Weems, Jr.; Marianna, 23-IV-39, A. N. Tissot; (FSCA); LEON CO.: Tallahassee, 25-VII-59, J. Glover, (FSCACC); LEVY CO.: Manatee Spgs. St. Pk., 5-VI-63, C. E. Zeiger; LIBERTY CO.: Torreya St. Pk., 17-V-63, B. Weems, (RMB); MANATEE CO.: Parrish, 25-VII-62, (FSCACC); OKEECHOBEE CO.: Okeechobee, n. of, 4-VI-56, F. W. Mead, (FSCACC); PALM BEACH CO.: Lake Worth, 17-I-24, (NMNH); SUMPTER CO.: Wildwood, 14-VIII-80, R. Driggers, (FSCA).

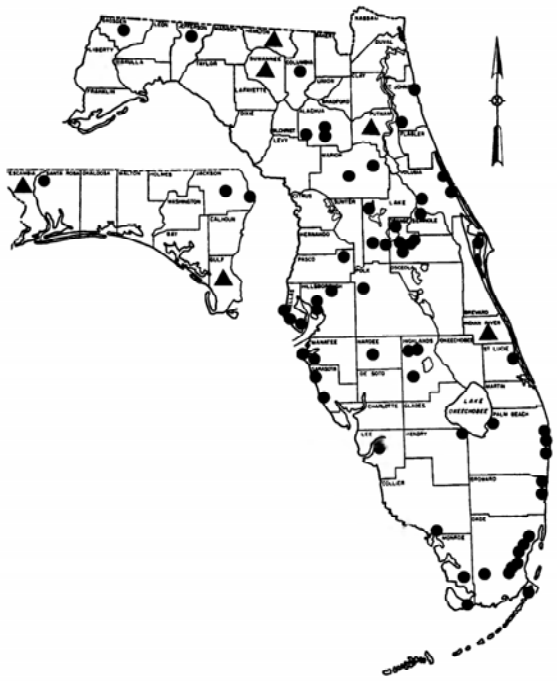
ACANTHOCEPHALA FEMORATA
(Fabricius)
(fig. 3, map IV)

Cimex femorata Fabricius 1775, p. 708.
Rhinuchus nasulus Say 1832, p. 10. (Leconte ed. p. 327) in V.D. 1917 as "Complete Writings".
Metapodius bispinus Westwood 1842, p. 15.
Metapodius obscurus Westwood 1842, p. 15.
Acanthocephala femorata Stal 1870, p. 150.

Diagnosis: Dark brown to almost black. Pronotum with numerous tubercles. All femora rather stout, hind ones of male extremely so, curved and armed below with 2 rows of sharp tubercles or spines. Tibial dilations extend almost to the distal end of segment. This is one of the largest of North American hemipterans (25-28).

Biology: Despite being a common, large, and conspicuous species, relatively little is known of the biology. We have examined specimens collected on *Abelmoschus* (as *Hibiscus*) *esculentus* (L.) Moench and *Erigeron quercifolius* Lam. Mitchell (unpub.) has taken adults and nymphs on *Verbascum thapsus* L. and *Ambrosia trifida* L. and adult aggregations on *Chenopodium album* L., *Ratibida columnifera* (as *columnaris*) (Nutt.) Woot. & Standl., *Fraxinus texensis* (Gray) Sarg., *Cirsium texanum* Buckl., and *Baccharis neglecta* Britt. Schaefer and Mitchell (1983) reported it from *Xanthium* and *Parthenium*. Mitchell (1980b) found that males defend flower heads of *Helianthus annuus* L. (also a host plant previously cited by Adams and Gaines, 1950) and fight one another by use of the huge posterior femora. Arnaud (1978) reported it as being parasitized by *Trichopoda pennipes* and *T. lanipes* (Fabricius).

Distribution: Ranges from North Carolina through Florida west to Oklahoma, Texas, and Mexico.



Map IV. Distribution of *Acanthocephala femorata*.

Florida Distribution: Reported by Barber (1914) from Ft. Myers, Lakeland, Miami, Key Largo, Sanford, St. Petersburg, Everglade, Chokoloskee, Punta Gorda, Biscayne Bay, Bellair, Atlantic Beach, Lake City, St. Augustine, Jacksonville, Pablo Beach and Enterprise, and by Blatchley (1926) from Ormond, Sarasota, Royal Palm Park and Dunedin. A common species in Florida, collected throughout the State. ALACHUA CO.: Gainesville, 17-III-48, R. Capelouto; same, 19-IV-47, 12-IV-47, 18-III-47, 4-X-46, H. V. Weems, Jr.; same, 17-IV-69, 27-IV-70, F. W. Mead; same, 20-I-72, E. Mercer; same, 25-II-56, J. B. Morrison; same, 6-V-34, 6-IV-34, 14-IV-54, 11-X-40, student collections; same 15-I-25, T. H. Hubbell; same, 9-VII-59, L. Berner; same 6-III-37, G. Swank; same 21-III-37, C. F. Lauffer; same, 12-IV-40, G. E. Ritchey; same, 16-IV-37, J. H. Wilkins; same, 20-XI-29, M.

Howell; same, 20-VI-28; same, 2-I-30, H. E. Bratley; same, 5-X-25, A. N. Tissot; same, 20-I-72, E. Mercer; same, 28-X-71, G. McIlveen, (FSCA); same, 7-IV-65, same, NW of, 11-XII-63, F. W. Mead, (FSCACC); same, 20-XI-28, same, M. C. Hall, (NMNH); same, 14-II-56, H. V. Weems, Jr.; 3-III-55, R. A. Morse; same, 3-IV-55, H. A. Denmark; same, 27-X-51, student collection; Poe Spring, 3-IV-55, R. F. Hussey; same, 17-V-52, 3-XII-51, 18-X-51, student collection; 3 mi. N. Newberry, 22-IV-48, E. D. McRae; Paradise, 19-III-48, D. J. Downes, (FSCA); 31-III-29, 25-III-23; Archer, 7-V-74, B. Wojcik; Newberry, 12-IV-79, N. Rodgers; BREVARD CO.: Merritt Island, 11-V-75, B. Stanley, (FSCACC); BROWARD CO.: Ft. Lauderdale, VI-22, D. M. Batta, (FSCA); same, 27-VIII-80, K. Tyson; Deerfield, 24, 26, 29-II-44, H. C. Secrest, (FSCACC); COLLIER CO.: Chokoloskee, 8-IV-12, (NMNH); COLUMBIA CO.: Lake City, (FSCA); DADE CO.: Richmond, X-70; Everglades Nat. Pk., 29-I-59, H. A. Denmark; Homestead, 30-V-79, P. Chobrda; same, 5-V-57, H. V. Weems, Jr., (FSCA); same, 9-VII-69, 11-VII-69, 12-IX-68, 20-X-58, 20-VI-59, R. M. Baranowski, (RMB); Naranja, 21-V-79, P. Chobrda, (FSCA); Miami, 21-I-60, R. W. Swanson & P. E. Briggs; same, 1-VI-58, R. W. Swanson; same, III; same, 27-XII-18; same, 10-VIII-18; Homestead, 16-IV-59, R. W. Swanson; same, 19-IV-57; same, 2-VII, R. W. Swanson & L. J. Daigle; same, 17-III-46, C. O. Esselbaugh, (JAS); Kendall, 31-I-44, W. R. May; S. Miami, 24-I-44, W. R. May, (FSCACC); same, 2-VI-28, H. Wolfe, (NMNH); ESCAMBIA CO.: 5-VIII-55, F. W. Mead; GADSDEN CO.: 14-VI-54, F. W. Mead; Quincy, 13-VII-54, F. W. Mead, (FSCA); same 31-VIII-56, (FSCACC); GULF CO.: 10-VII-54; HAMILTON CO.: 30-VII-54, F. W. Mead; HARDEE CO.: Ona, 23-IX-69, R. H. Rhodes; HENDRY CO.: Clewiston, 29-XII-50, F. W. Mead; HIGHLANDS CO.: Archbold Biol. Sta., 2-XII-61; same, 20-III-55, R. A. Morse, (FSCA); same, 30-III-59, R. Archbold, (ABS); Highlands Hammock St. Pk., 24-III-57, H. V. Weems, Jr., Sebring, 8-III-58, H. V. Weems, Jr., same, 20-III-55, F. W. Mead, (FSCA); same, 20-VIII-63, B. H. Strickland, (FSCACC); Childs Station, 5 mi. SSW Lake Placid, 2-VIII-62, T. Pliske, (ABS); HILLSBOROUGH CO.: Tampa, 17-VIII-77, K. C. Lawry; same, 8-I-60, C. W. Aoff; same, 20-V-70, E. R. Simmons; same, 29-VIII-66, T. J. Faberoso; same, 9-III-61, J. W. Patton; Branchton, 30-VI-60, L. B. Hill & E. W. Miller, (FSCACC); Sulfur Springs, 31-I-26, I. J. Milne, (UNH); INDIAN RIVER CO.: 16-III-54, F. W. Mead, (FSCA); same, 10-II-57, 15-VII-57, R. L. Blickle, (UNH); JACKSON CO.: Marianna, 3-VIII-54, F. W. Mead; 14-VII-54, F. W. Mead; 10-VI-53, T. H. Hubbell; Swinging Bridge, 12-VI-53, T. H. Hubbell, (FSCA); Chattahoochee, 1-VIII-56, F. W. Mead; JEFFERSON CO.: Monticello, 21-VII-54, F. W. Mead, (FSCA); LAKE CO.: Leesburg, 16-III-33, C. C. Goff, (FSCA); Groveland, 13-IV-60, W. P. Henderson; Killarney, 14-IV-44, H. C. Secrest, (FSCACC); LEE CO.: Ft. Myers, 26-I-44, C. S. Tuthill; same 20-III-12, 7-IV-12, (FSCACC); MANATEE CO.: Palmetto, 24-X-60, D. C. Chancey; same, 8-II-44, H. C. Secrest; Oneco, 25-IV-60, D. C. Chancey; Terra Ceia, 21-II-44, H. C. Secrest, (FSCACC); MARION CO.: Ocala Nat. Forest, 8-IV-56, R. A. Morse, (FSCA); Ocala, 8-X-62, R. Parker; MARTIN CO.: Stuart, 4-IV-78, G. W. Campbell; (FSCACC); MONROE CO.: N. Key Largo, 4-VII-69, R. M. Baranowski; Everglades National Park, Flamingo Prairie, 27-I-70, R. M. Baranowski, (RMB); Key Largo, same, III-1898, C. L. Pollard; Everglades, 7-IV-12, W. T. Davis, (NMNH); Everglades Nat. Pk., 26-XI-61, J. A. Slater, T. Woodward, M. Sweet; same, Snake Bight Trail, 20-VI-69, R. M. Baranowski, J. A. Slater, T. Schuh, J. Harrington, (JAS); ORANGE CO.: Orlando, 21-II-25; Winter Park, 7-XI-29, H T. Fernald, (FSCA); Windemere, 24-III-78, F. L. Ware; Winter Garden, 27-IV-44, H. C. Secrest; Zellwood, 22-III-44, 24-III-44; same, (FSCACC); Orlando, 2-IV-24, 24-III-27, 20-IV-?, 7-III-28, 5-VII-29, W. A. Biers, (NMNH); PALM BEACH CO.: Delray Beach, 14-VI-76, K. Stolley; Delray, 14-II-79, J. S. Bennett; (FSCA); W. Palm Beach, 2-V-60, R. A. Long; Pahokee, 26-I-44; (FSCACC); Lake Worth, 10-I-24, 15-I-24, 17-I-24; Palm Beach, J. W. Green, (NMNH); PASCO CO.: Dade City, 30-III-60, J. C. Sellars; PINELLAS CO.: Largo, 17-IV-71, K. Hickman & G. T. Williams, (FSCA); same, 11-VI-63, C. E. Bingaman, (FSCACC); Gulfport, 1916, (UNH); St. Petersburg, (NMNH); POLK CO.: Lakeland, 28-VI-61, J. Haywood; same, 13-VII-60, B. E. Tyner; (FSCACC); same 9-XI-11, W. T. Davis, (NMNH); PUTNAM CO.: 5-III-50, student collection; ST. JOHNS CO.: St. Augustine, W. J. Gerhard, (FSCA); Hastings, III-27, VII-27, J. L. Scribner; same 16-III-27, M. D. Leonard; St. Augustine, 8-XI-11, (NMNH); ST. LUCIE CO.: N. of Ft. Pierce, 30-X-57, G. W. Campbell, (FSCACC); 1-IX-55, G. W. Campbell, (FSCA); SANTA ROSA CO.: 11-VIII-55, F. W. Mead, (FSCA); Brownsville, 10-X-63, R. H. Rhodes, (FSCACC); SARASOTA CO.: Sarasota, 8-XI-63, C. L. Yax; S. Venice, 23-III-66, S. V. Hiatt, (FSCACC); Sarasota,

20-I-27, WSB, (NMNH); SEMINOLE CO.: Sanford, 20-IV-60, G. W. Desin; same, 9-IV-58, C. O. Youtsey, (FSCACC); same, 5-V-08, 6-V-08, Van Duzee; Sanford, 2-IV-27, WSB; same, 8-III-27, F. M. Uhler, (NMNH); SUWANNEE CO.: 28-VII-54, F. W. Mead, (FSCA); VOLUSIA CO.: New Smyrna, 31-VIII-71, G. W. Rosen; Port Orange, 16-III-61, E. B. Smith, (FSCACC); Enterprise, IV-1887, (NMNH).

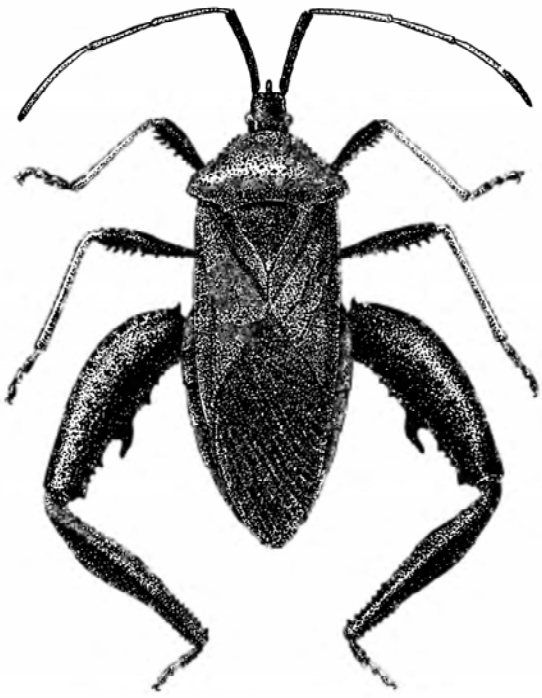


Fig. 3. *Acanthocephala femorata.*

ACANTHOCEPHALA TERMINALIS
(Dallas)
(fig. 4)

Metapodius terminalis Dallas 1852, p. 431.
Acanthocephala terminalis Stal 1870, p. 151.

Diagnosis: Almost uniformly dark chocolate brown or reddish brown, tibiae frequently pale yellow. First 3 antennal segments also reddish brown, but 4th a strongly contrasting pale yellow orange, or sometimes nearly white. Humeral angles of pronotum obtusely rounded with tubercles poorly developed or absent; dorsal surface of pronotal disc usually prominently tuberculate. Outer dilation of hind tibiae well developed, but strongly tapered on distal ⅓ so that this area does not appear to have an outer dilation.

This species is much smaller than either *declivis* or *femorata*, and the hind femora of the males are less strongly incrassate. It is very closely related to *confraterna*, and individuals of the 2 species are very difficult to separate in areas where the ranges overlap (see *confraterna* discussion).

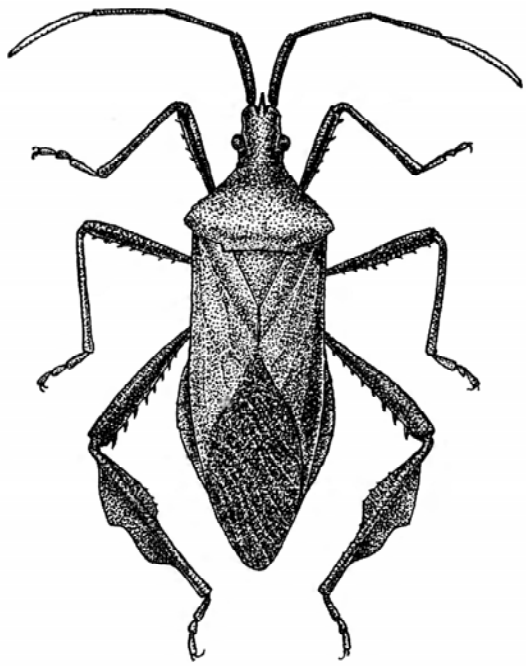


Fig. 4. *Acanthocephala terminalis.*

Biology: A common species in the northern states found on many trees and shrubs along woodland margins as well as in weedy fields. Yonke and Medler (1969a, c) described all of the immature stages and studied the biology in Wisconsin where there is one generation a year with adults overwintering. Adults and nymphs were taken on *Rhus typhina* L., *Vitis riparia* Michx., *Physocarpus opulifolius* (L.) Maxim., *Fraxinus* sp., *Rubus (Eubatus)* sp., *Tilia americana* L., *Desmodium glutinosum* (as *acuminatum*) (Muhl. ex Wild.) Wood, and *Ulmus rubra* Muhl., and definite feeding observed on the first 3 species. Yonke and Medler (1969d) described the egg and 5 nymphal instars and illustrated the latter. Hussey (1922) found nymphs in Michigan abundant on *Fraxinus*

americana L. and described the 1st, 2nd, 3rd, and 5th instars. Mitchell (unpub.) reported adult aggregations on *Celtis laevigata* Willd. and *Baccharis neglecta* Britt. Blatchley (1926) mentioned goldenrod, boneset, and Joe-Pye weed. Drew and Schaefer (1962) listed it on *Carya* sp. Arnaud (1978) reported it being parasitized by *Trichopoda plumipes* and *Trichopoda* sp.

Distribution: The known distribution is more northern than that of other members of the genus and extends over most of the United States from New England south perhaps to Florida and west at least to Texas and Colorado.

Florida Distribution: Although Uhler (1886) and Van Duzee (1917) reported *terminalis* from "Florida", we have not seen specimens from the state.

ANISOCELINI Amyot and Serville 1843, p. 217.

Medium sized, elongate. Head non-declivent, produced in front of head much beyond bases of antennae; tylus not compressed nor curved upward as a spine. Pronotum strongly declivent, humeri produced laterally and acutely to obtusely angled. Posterior femora straight, only slightly thicker than other femora. Posterior tibiae widely dilated (foliaceus).

The tribe is confined almost entirely to the Western Hemisphere (see discussion under *Leptoglossus gonagra*) and is chiefly Neotropical. Three genera occur north of Mexico, and all are represented in Florida.

KEY TO GENERA OF ANISOCELINI

1. Antennal segments 2 and 3 dilated and flattened on both sides ..... *Chondrocera*, p. 14

1′. Antennal segments 2 and 3 cylindrical (terete) 2

2. Length of antennal segment 1 nearly equal to distance from anterior margin of eye to end of tylus ..... *Narnia*, p. 27

2′. Length of antennal segment 1 greater than distance from posterior margin of eye to end of tylus ..... *Leptoglossus*, p. 16

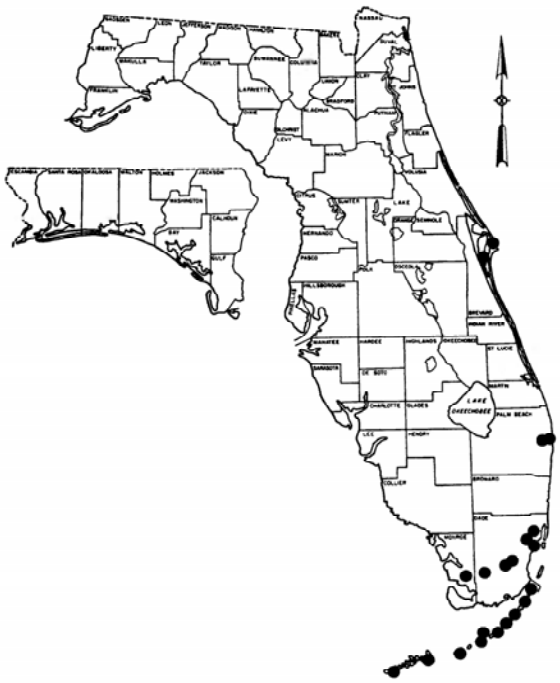
CHONDROCERA Laporte, 1832

Type Species: *Chondrocera laticornis* Laporte 1832, p. 45. Fixed by original designation.

Diagnosis: Resembles *Leptoglossus* in having strongly expanded and flattened posterior tibiae and a nondeclivent head that extends forward beyond the bases of the antennae. Readily distinguished by the prominently expanded and flattened first 3 antennal segments. A single species is known.

CHONDROCERA LATICORNIS Laporte (fig. 5, map V)

Chondrocera laticornis Laporte 1832, p. 45.
Petalotoma unicolor Guerin 1857, p. 389.



Map V. Distribution of *Chondrocera laticornis*.

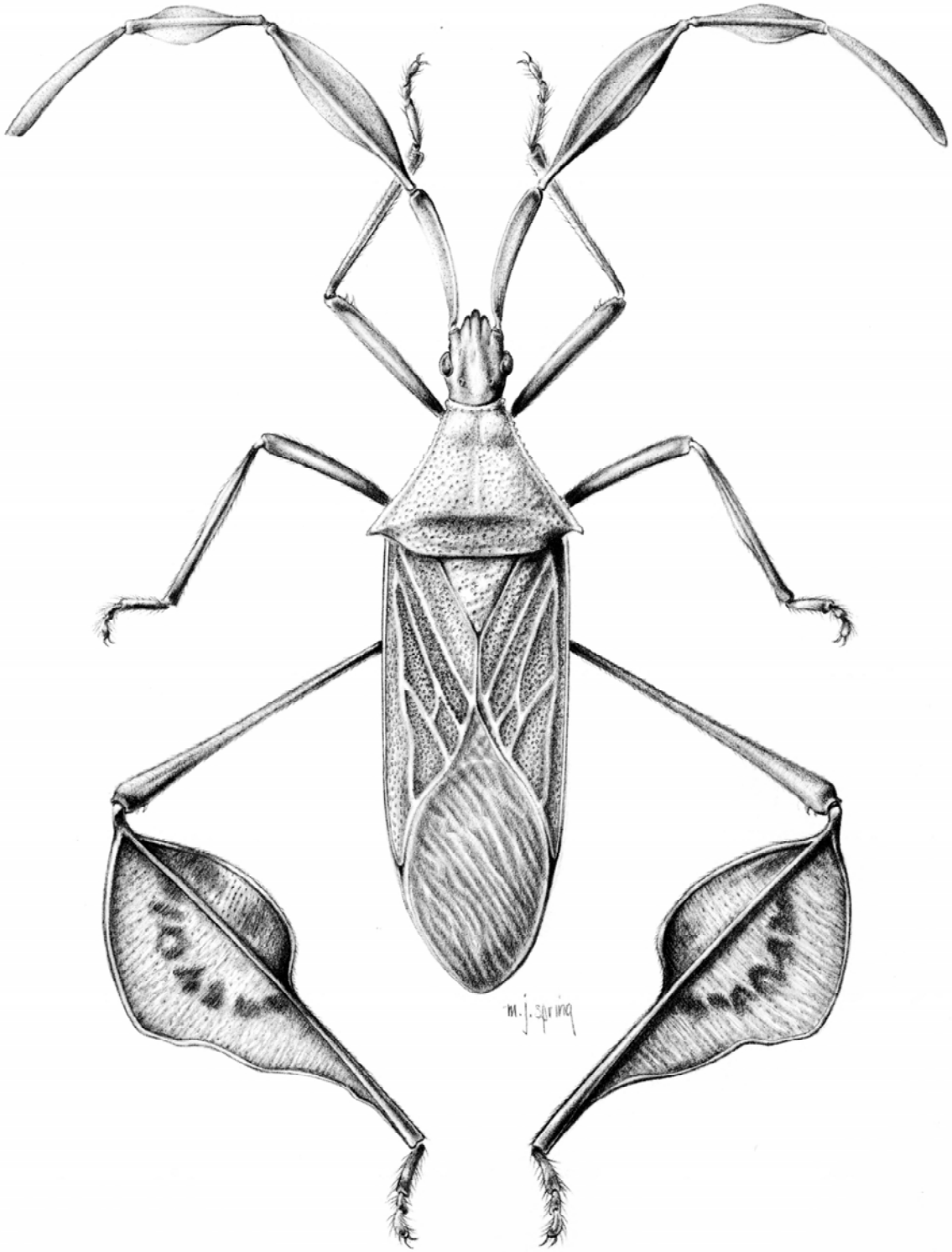


Fig. 5. *Chondrocera laticornis.*

Diagnosis: Head, pronotum, legs, and ventral surface tan to yellowish. Hemelytra reddish brown. Antennae and tarsi dull reddish. Lateral pronotal margins finely crenulate, humeral angles acute. Hind tibiae greatly enlarged, flattened, and leaf-like. Moderately large (16-18) with parallel-sided body.

Biology: Barber and Bruner (1947) reported that in Cuba it breeds on *Turnera ulmifolia* Sesse' & Moc. and that it feeds on the fruits of *Passiflora* sp. Breeding populations have been observed and collected in Florida on many occasions on both native and cultivated species of *Passiflora*, which are apparently the only host plants.

Distribution: Known only from the West Indies and Florida.

Florida Distribution: Reported by Barber (1914) from Palm Beach, Georgianna, Key Largo, and Lignumvitae Key. In Florida it is almost entirely restricted to the extreme southern counties, although there are a few coastal records as far north as Brevard Co. BREVARD CO.: Merritt Island, E. of Titusville, 7-X-45, A. B. Klots, (AMNH); Georgianna, Whittfield, (NMNH), (UK); DADE CO.: Matheson Hammock. 21-V-58, R. F. Hussey; Homestead, 21-V-54, G. W. Dekle; same 22-XI-36; same, 2-X-79, P. Chobrda, (FSCA); same, 6-X-61, R. M. Baranowski; same, 16-VIII-67, J. Bacheler, (RMB); Miami, 8-IV-54, O. D. Link, (FSCA); same, 20-VIII-67, B. Knight; same 2-XI-60, R. W. Swanson; S. Miami, 20-XI-60, R. W. Swanson, (FSCA); Everglades Nat. Pk. 30-XII-53, H. V. Weems, Jr.; Naranja, 30-VII-67, R. M. Baranowski, (JAS); same, 30-VII-67, 18-V-68, 30-VII-68, R. M. Baranowski; Fuch's Hammock, 7-I-79, L. A. Stange, (RMB); MONROE CO.: Key Largo, 3-I-57, 27-III-57, H. V. Weems, Jr., same, 14-II-64, F. W. Mead, (FSCA); same 14-II-64, H. S. Creamer; same, 26-II-56, H. V. Weems, Jr., (FSCACC); same, 26-III-54, K. V. Krombein; same, III-1898, G. N. Collins; same 5-III, H. Barber, (NMNH); same, 7-V-57, F. W. Mead; same, C. B. Weems, (RMB); N. Key Largo, 4-VIII-77, 20-IX-69, R. M. Baranowski, (JAS); same, 29-VI-69, R. M. Baranowski, (RMB); Windley Key, 23-II-29, Siepmann; Matecumbe, 31-XI; (UK); Tavernier, 4-XII-12, F. Knab, (NMNH); Lignum Vitae Key, II-07, V-09, (AMNH); Everglades Nat. Pk., 29-I-59, H. A. Denmark; Stock Island, 3-VI-64, H. V. Weems, Jr.; Long Key, 28-III-57, H. V. Weems, Jr.; Plantation Key, 19-X-54, 27-XI-55, H. V. Weems, Jr.; Key Vaca, 28-XII-55, H. V. Weems, Jr., (FSCA); PALM BEACH CO.: Palm Beach, I-1914; same 18-VII-39, P. W. Oman, (NMNH); W. Palm Beach, 5-III-62, C. F. Dowling & R. A. Long, (FSCACC).

LEPTOGLOSSUS Guerin, 1831

Type Species: *Leptoglossus dilaticollis* Guerin 1831. Monobasic.

Diagnosis: Medium to large, elongate species. Head porrect, longer than wide, shorter than length of pronotum, prolonged anterior to antenniferous tubercles. Tylus slightly exceeding juga. Pronotum subhexagonal with anterior lobe depressed below the strongly declivent posterior lobe; humeral angles usually expanded into acute points or rounded flange-like obtuse projections. Posterior pronotal margin concave. First antennal segment thickest, curved, usually subequal to or longer than head, at least longer than anteocular distance; second segment longer than third, fourth terete and equal to or longer than third segment. Femora armed below with two rows of distally directed teeth, tuberculate laterally and above. Hind femora swollen, usually thicker in males. Hind tibiae dilated, frequently strongly so and leaf-like; outer dilation variable in size and shape, usually wider than interocular distance.

Distribution: *Leptoglossus* is primarily a Neotropical genus. Twenty-six of the 38 known species are found in, or are restricted to, South America. There are several species in North and Central America and the Caribbean, all clearly related to South American groups within the genus. *Leptoglossus* extends northward almost throughout the United States, but the number of species declines drastically when one moves northward from the southeastern portion of the country.

A single species, known previously in the literature as *australis* (Fabricius), occurs in the Eastern Hemisphere. This species is extremely widely distributed throughout the tropical portions of Africa, the Orient, the Australasian, and Pacific Islands. We believe that it is synonymous with *gonagra*. Allen (1969) pointed out that the genitalia of the two species are identical and that most of the variation found in "*australis*" can be found also in *gonagra*. *L. gonagra* is primarily a pest of cultivated garden crops in the Eastern Hemisphere and possibly has been introduced several times. A situation such as this would produce precisely the situa-

tion that we find, in that populations in different parts of the range would be rather different in appearance from those in other parts. This would result from a restricted gene pool being introduced into one area, and in addition to this, genetic drift would come into play quickly in these isolated populations. It seems highly unlikely that a species such as *gonagra*, which is a pest in the Western Hemisphere, would be specifically distinct from a congener in the Eastern Hemisphere from which it is essentially indistinguishable.

Allen (1969) while noting the similarity, retained *australis* as distinct. However, it is interesting that specimens in the authors collections labeled by Allen as *australis* from Natal (S. Africa) are actually from Natal, Brazil.

Biology: For a genus whose members are morphologically so similar, the feeding habits are remarkedly diverse. Some of the species appear to be quite host specific on one or on a limited number of plants. Others are extremely general, feeding on an enormous variety of both wild and cultivated plants. Some species tend to be pests of garden, fruit, and vegetable crops, while others feed upon such dissimilar hosts as the seeds of coniferous trees where they may become very serious pests.

KEY TO FLORIDA SPECIES OF *LEPTOGLOSSUS*

1. Pronotum with distinct yellow or yellow-orange markings (never with entire dorsal surface dark) 2

1′. Pronotum without brightly contrasting yellow or yellow-orange markings present 4

2. Second and 3rd antennal segments uniformly dark . . . . . *ashmeadi*, p. 17

2′. Second and 3rd antennal segments entirely pale or with pale markings 3

3. Pronotum with a narrow arcuate yellow fascia on disc . . . . . *gonagra*, p. 21

3′. Pronotum with yellow areas in the form of distinctly separated oval spots or larger quadrate spots partially fused medially . . . . . *balteatus*, p. 18

4. Head uniformly reddish brown; lateral margins of pronotum serrate or dentate, lacking a transverse fascia . . . . . *fulvicornis*, p. 20

4′. Head black with a reddish longitudinal stripe; lateral margins of pronotum, immediately anterior to humeral angles, usually smooth, not dentate, but if so hemelytra with an even, pale, transverse fascia 5

5. Dilations of tibiae lacking deep scalloped emarginations along outer edge . . . . . *corculus*, p. 19

5′. Tibial dilations broad, scalloped with at least 1 deep emargination 6

6. First antennal segment unicolorous; transverse hemelytral fascia reduced to a short oblique mark on median vein . . . . . *oppositus*, p. 22

6′. First antennal segment bicolorous; transverse hemelytral fascia not reduced 7

7. Transverse hemelytral fascia straight . . . . . *phyllopus*, p. 23

7′. Transverse hemelytral fascia wavy . . . . . *concolor*, p. 18

LEPTOGLOSSUS ASHMEADI Heidemann (map VI)

Leptoglossus ashmeadi Heidemann 1909, p. 237.

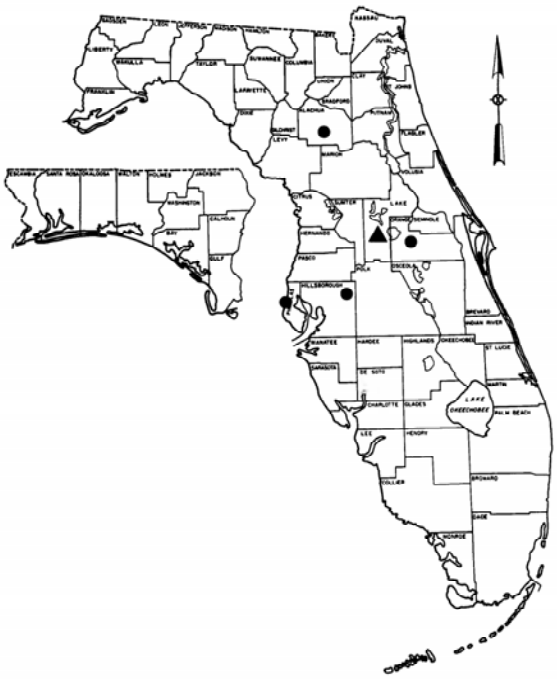
Diagnosis: Pronotum with broad orange-yellow margins, at times so extensive that the greater part of the pronotum is yellow, leaving the calli dark and a dark brown patch on the posterior pronotal lobe. The broad, complete, transverse hemelytral fascia, anterior ½ of each connexival segment, and the venter are also yellow-orange with the remainder of the body and appendages contrastingly black. Pronotal humeral angles acutely pointed. Hind tibial dilations broad and conspicuously scalloped.

This brightly colored handsome species is quite distinctive as no other *Leptoglossus* in Florida has such extensive orange-yellow pronotal markings.

Biology: As far as is known this species only breeds on the mistletoe, *Phoradendron tomen-*

tosum (DC.) Engelm. ex Gray. Blatchley (1926) reported taking adults and nymphs on this plant and Allen (1969) reported Mississippi specimens from the same host (as *flavescens*).

Distribution: Known only from Alabama, Mississippi, and Florida.



Map VI. Distribution of *Leptoglossus ashmeadi*.

Florida Distribution: Originally described from St. Nicholas and reported from Green Springs by Van Duzee (1909), from Dunedin by Blatchley (1926) and from Seven Oaks and Orlando by Allen (1969). Only a few records, almost all from the central part of the state. ALACHUA CO.: Gainesville, 25-XI-47, A. N. Tissot; same, 21-XII-55, M. J. Westfall, Jr., HILLSBOROUGH CO.: Plant City, 11-V-47, G. W. Dekle; LAKE CO.: 22-III-62, Felshaw; ORANGE CO.: Aug.-Sept. 36, O. D. Link, (FSCA); Orlando, 26-XII-08, A. W. Morrill, (NMNH); same, 29-IV, D. M. Delong, (UK); PINELLAS CO.: Dunedin, 1-IV-21, W.S.B., (NMNH).

LEPTOGLOSSUS BALTEATUS (Linnaeus)

Cimex balteatus Linnaeus 1771, p. 534.
Cimex auctus Fabricius 1781, p. 351.
Anisoscelis fasciatus Herrich-Schaeffer 1851, p. 277.
Anisoscelis thoracicus Guerin 1857, p. 386
Theognis schaefferi Mayr 1866, p. 102.
Anisoscelis selecta Walker 1871, p. 127.
Leptoglossus balteatus Stal 1870, p. 161.

Diagnosis: Bright reddish brown, a pair of large yellow spots on disc of pronotum, sometimes extensive and coalescing mesally; at other times discrete and well separated. Posterior margin of pronotum usually narrowly yellow. Hemelytra with complete, non-zigzagged pale transverse fascia. Second and 3rd antennal segments pale yellow mesally becoming reddish brown at proximal and distal ends. First antennal segment uniformly dark red brown, lacking black longitudinal striping. Hind tibiae with outer dilation broad, deeply scalloped, edges of scallops with sharp black-tipped spines.

Resembles *phyllopus* in that both have a complete, straight, pale transverse hemelytral fascia, but *balteatus* is readily recognizable by the prominent oval spots on the pronotal disc. Occasional specimens of *phyllopus* may show pale pronotal spots, but when present, these appear diffuse with poorly defined margins. The posterior tibial dilation in *balteatus* occupies 63-70% of the tibial length whereas in *phyllopus* it occupies 76-87%.

Biology: Barber and Bruner (1947) and Mead (1971a) reported it breeding on *Psidium guajava* L. and *Luffa* sp. Allen (1969) stated that *balteatus* breeds on a number of cultivated plants in the tropics including cotton, tomato, various legumes, oranges, cow peas, etc.

Distribution: Known only from the Greater Antilles, the Bahamas, St. Thomas, and Florida.

Florida Distribution: Barber (1914a) listed it from Florida without definite locality, and Blatchley (1926) reported a specimen in the United States National Museum from "Florida". We have not seen any specimens from Florida.

LEPTOGLOSSUS CONCOLOR (Walker) (map VII)

Anisoscelis concolor Walker 1871, p.128.
Leptoglossus concolor Distant 1881, p. 124.

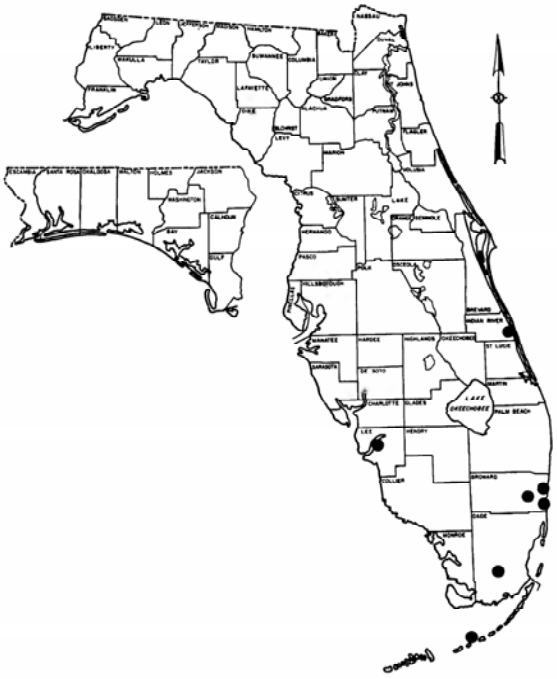
Diagnosis: Dark red with suffused black markings laterally on pronotum, clavus, and corium. Hemelytra with a complete and conspicuous zigzag white transverse fascia. Humeral angles obtuse, smooth, or at most very finely dentate laterally anterior to humeral angles, but obtusely dentate posteriorly. Head prominently striped with alternating black and reddish brown. Hind tibial dilations conspicuous, the outer dilation very broad with deep wide scalloping. First antennal segment striped with red and black, succeeding segments nearly uniformly reddish brown, the 4th segment often pale.

Hussey (1956) reported *Leptoglossus stigma* (Herbst) from a single female taken on lychee at the plant introduction station near South Miami, June 7, 1956. We have examined this specimen and believe it to represent a female of *L. concolor*. The data on the specimen is not precisely as given by Hussey in his description, but rather says "Dade County, Florida" and "taken on *Litchi chinensis* Sonner". Mead (1971a) noted that the specimen was collected in approximately 20 sweeps of *Litchi* foliage by D. DeLeon and F. W. Mead. He further stated that Allen had seen a photograph of this specimen but could not confirm its identification and indicated that female specimens of *stigma* and *concolor* are very difficult to separate. He suggested that several published host records of *stigma* for the Greater Antilles presumably pertain to *concolor*. We believe that this specimen represents *concolor* and that *stigma* should be eliminated from the Florida and United States lists.

Biology: Little is known of the biology. Mead (1971a) reported a specimen taken at Vero Beach on *Comptonia* sp. and (1974) an infestation on orange trees in Broward Co. We have examined 2 females, one from Broward Co., Dania, 24-VII-75, taken on *Coccolobis uvifera* (L.) L. and one at Davie on citrus. We have collected breeding populations on crabwood (*Gymnanthes lucida* Sw.), snowberry (*Chiococca alba* (L.) A. S. Hitch.), and guava (*Psidium guajava* L.).

Distribution: Distributed widely in Mexico, Central America, throughout the Greater Antilles, and Florida.

Florida Distribution: Apparently uncommon. BROWARD CO.: Davie, 20-IX-74, 2-X-74, R. L. Chavez; same, 24-VII-75, D. C. Clinton; Ft. Lauderdale, 29-XII-78, R. Gaskalla, (FSCA); Dania, 24-VII-75, D. C. Clinton; DADE CO.: AREC, Homestead, 1-XII-74, J. A. Slater; 3-VI-56, F. W. Mead & D. DeLeon; TREC, Homestead, 7-XII-1983, H. Glenn, (RMB); INDIAN RIVER CO.: Vero Beach, 7-I-54, Burnett, Campbell, & Jones; LEE CO.: Ft. Myers, 20-II-75, S. L. Kitto, (FSCA); MONROE CO.: Lignum Vitae Key, 13-XI-79; 30-VII-80, R. W. Baranowski; same, 1-VII-80, P. Veno, (RMB).



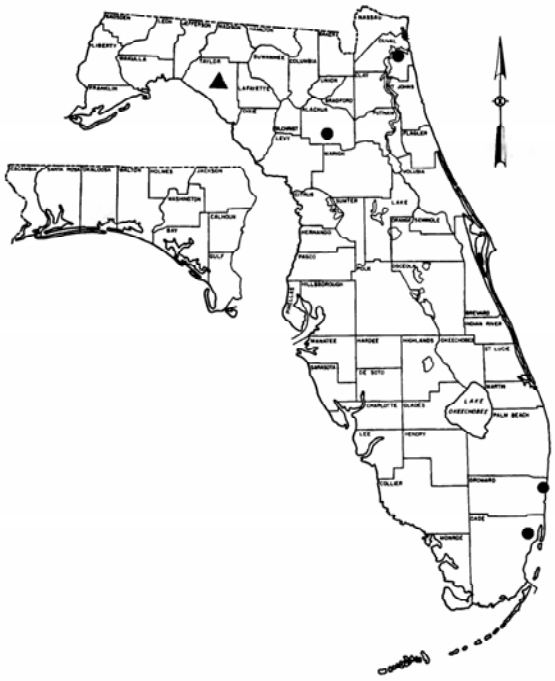
Map VII. Distribution of *Leptoglossus concolor*.

LEPTOGLOSSUS CORCULUS (Say)
(map VIII)

Anisoscelis corculus Say 1832, p. 12. Leconte Rep. 1859, p. 326.
Theognis excellens Mayr 1865, p. 434.
Leptoglossus corculus Stal 1870, p. 165.

Diagnosis: Ground color varies from light to dark brown with pronotum prominently mottled with small black spots. Transverse hemelytral fascia pale yellow, irregular and confined to veins, sometimes reduced or completely absent. Pronotal margins entire. Hind tibial dilations lack conspicuous scallops.

Biology: DeBarr (1967, 1970) attributed heavy seed loss of *Pinus elliottii* Engelm. and *P. palustris* P. Mill. in northern Florida to *L. corculus* feeding. Eggs are deposited in a row along a pine needle. First instars apparently feed on the needles. Second instar nymphs are most commonly found on the conelets in natural field populations. DeBarr and Ebel (1974) discussed conelet abortion and seed damage to *P. echinata* P. Mill. and *P. taeda* L. resulting from feeding by this species. In their experimental studies feeding by nymphs caused 60-100% of the conelets to abort. DeBarr and Kormanik (1975) discussed the anatomical basis for conelet abortion of *P. echinata* P. Mill. following feeding by *L. corculus* nymphs. The second instar also is figured in this paper. DeBarr (1967) also mentioned *Pinus virginiana* Mill., *P. strobus* L., and *P. pungens* Lamb. as hosts. Mead (1971a) reported a Miami specimen on *Artocarpus integrifolia* L. Yoshimoto (1977) reported the encyrtid wasp, *Oencyrtus leptoglossi* Yoshimoto as parasitizing the eggs of *L. corculus*.



Map VIII. Distribution of *Leptoglossus corculus*.

Distribution: Essentially eastern United States, being found from New York south into Florida, west to Missouri, and southwest to Texas. Published records include New Mexico, Arizona, Colorado, and California (Van Duzee 1917, Blatchley 1926), but Allen (1969) had not seen a specimen from farther west than Texas and speculated that the western records were of *L. occidentalis* Heidemann.

Florida Distribution: Originally described from "St. Johns River" and reported by Barber (1914) from Ft. Myers and Miami. Appears to be most common in the north, but occasional specimens have been collected in the southern part of the state. ALACHUA CO.: Gainesville, 24-VIII-58, J. Whitmore; same, 15-16-VIII-69, 22-V-71, F. W. Mead; same 31-I-73, G. W. Dekle; same VII-55, (FSCA); same 20-23-VII-73, 11-VII-73, F. W. Mead, (FSCACC); same, W. E. Pennington, (NMNH); same, Doyle Conner Bldg., 18-VII-70, 29-VII-70, F. W. Mead; same, Pine Hills Estate, 12-VII-69, 16-VII-69, 17-VII-69, H. V. Weems, Jr., (RMB); BROWARD CO.: Pompano Beach, 5-XII-59; DADE CO.: Miami, 23-II-58, C. F. Dowling, (FSCA); DUVAL CO.: Jacksonville, 22-V-80, J. Garbark, (FSCACC); same, 2-XII-73, S. L. Zieger, (RMB); Santa Rosa, 17-VII-55, F. W. Mead, (RMB); TAYLOR CO.: XI-58, L. A. Hetrick, (FSCA).

LEPTOGLOSSUS FULVICORNIS
(Westwood)
(map IX)

Anisoscelis fulvicornis Westwood 1842, p. 17.
Leptoglossus magnoliae Heidemann 1910, p. 191.
Leptoglossus fulvicornis Stal 1870, p. 161.

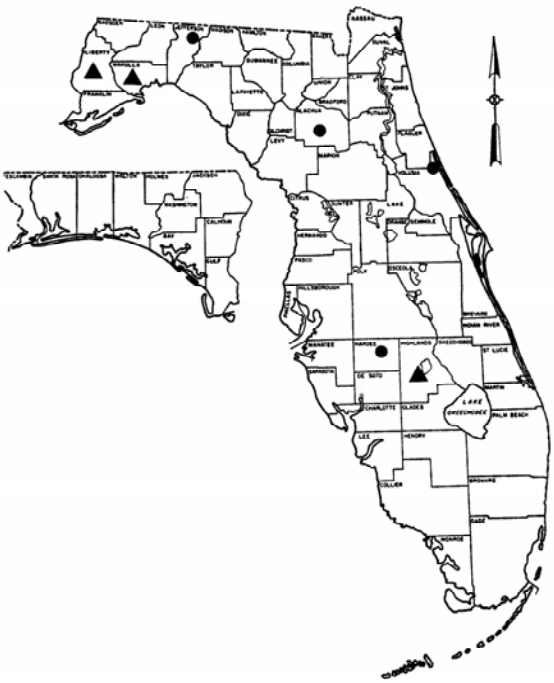
Diagnosis: Hemelytra completely lacking a transverse fascia. Humeral area of pronotum strongly expanded and flared outward and upward, bearing coarse obtuse teeth anterior and posterior to humeral angles. Head nearly uniformly brown, lacking alternating dark and light stripes. Tibial dilations relatively slender; outer dilation with shallow scalloping.

This species can be mistaken easily for *oppositus* because of the absence of a transverse hemelytral fascia, but is readily recognizable by the flaring, dentate pronotal margins, uniformly brown head, and much less deeply scalloped outer hind tibial dilation.

Biology: Heidemann (1910) writing of this species under the name *magnoliae*, a junior synonym, reported breeding on the leaves and fruits of several species of magnolia and that

considerable injury to the fruit occurred. He gave descriptive notes and figures of the nymphs and stated that eggs were laid in long "strings" on the undersides of magnolia leaves. Mitchell (unpub.) found breeding populations on *Magnolia grandiflora* L. in Texas.

Distribution: Reported from as far north as Massachusetts and New York in the east and south into Florida and west to Texas. It is a rare species, and the northern records need verification.



Map IX. Distribution of *Leptoglossus fulvicornis*.

Florida Distribution: Blatchley (1926) reported it from Dunedin and (1928) from Gainesville. Primarily northern. ALACHUA CO.: Gainesville, 18-XII-57, 7-VII-57, 5-X-54, R. F. Hussey; same, 6-XII-36, K. Wherley, (FSCA); same, 2-IX-73, F. W. Mead, (RMB); HARDEE CO.: Zolfo Springs, 23-IX-63, R. H. Rhodes, (FSCA); HIGHLANDS CO.: 5-II-56, H. V. Weems, Jr., (RMB); JACKSON CO.: 29-X-69, J. T. Raese, (FSCA); Fla. Cav. St. Pk., 7-XII-57, F. W. Mead, (RMB); JEFFERSON CO.: Monticello, 24-X-69, J. T. Raese, (FSCA); LIBERTY CO.: 27-III-54, R. F. Hussey; VOLUSIA CO.: Ormond Beach, 15-III-63, J. N. Pott; WAKULLA CO.: 16-VII-54, F. W. Mead, (FSCA); E. Fla. (labeled *L. magnoliae* n. sp.), Ashmead, (NMNH).

LEPTOGLOSSUS GONAGRA (Fabricius)
(map X)

Cimex gonagra Fabricius 1775, p. 708.
Cimex australis Fabricius 1775, p. 708. NEW SYNONYMY.
Cimex grallator Herbst 1784, p. 259.
Anisoscelis antica Herrich-Schaeffer 1836, p. 92.
Anisoscelis praecipua Walker 1871, p. 128.
Leptoglossus gonagra Stal 1868, p. 51.

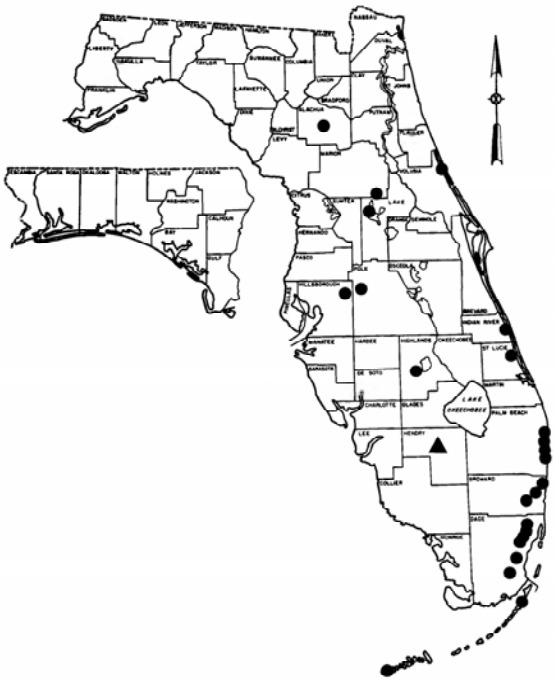
Diagnosis: Bright reddish brown with a lunate yellow vitta extending transversely across anterior portion of hind lobe of pronotum. Sharp dentate spines present on lateral pronotal margins anterior and posterior to acutely spinose humeral angles. Transverse hemelytral fascia reduced to 2 small pale yellow spots similarly placed as those of *oppositus*. Antennae variegated, chiefly bright orange yellow with proximal and distal ends of 2nd and 3rd segments black to dark chocolate brown, basal ⅓ of 4th segment dark with distal portion pale yellow to white, 1st segment with alternating red and black stripes. Hind femora also with prominent alternating red and black stripes. Tibial dilations moderate in width, outer dilation shallowly but broadly scalloped.

Biology: Barber and Bruner (1947) reported it breeding in abundance on *Luffa cylindrica* (L.) Roemer and feeding on *Ternstromia* (as *Taonabo*) *parviflora* Krug & Urb. in Cuba. Mead (1971a) stated that it is often called the "citron bug" of Florida because of its frequent presence on citron melons growing in citrus groves or in old watermelon fields. When these food sources are gone, *gonagra* often will attack and damage early varieties of citrus, including tangerines and oranges. Mead also indicated a number of cucurbits such as squash, pumpkins, and watermelons as food plants as well as wild balsam apple (*Momordica charantia* L.), *Solanum* sp., Brazilian pepper (*Schinus terebinthefolia* Raddi), guava, and *Passiflora* sp. Allen (1969) also indicated that *gonagra* attacks a number of cultivated plants in the Neotropics. Mitchell (unpub.) found adult aggregations on *Citrullus lanatus* (as *vulgaris*) (Thunb.) Matsumara & Naki. Hussey (1952) recorded *gonagra* on foliage and berries of *S. terebinthefolia*. Amaral and Storti (1976) reported *gonagra* as attacking: Cucurbitaceae: *Cucurbita pepo* L., *Sechium edule* (Jacq.) Sw., *Momordica charantia* L., *Citrullus lanatus* Matsumara & Naki (as *vulgaris*), *Cucumis sativus* L.; Myr-

taceae: *Psidium grandiflorum* Aubl., *P. guajava* L.; Compositae: *Helianthus annuus* L.; Anacardiaceae: *Mangifera indica* L.; Cariaceae: *Carica papaya* L.; Capparidaceae: *Cleome spinosa* Jacq.; Bixaceae: *Bixa orellana* L.; Passifloraceae: *Passiflora* sp; Punicaceae: *Punica granatum* L.; Rutaceae: *Citrus* sp; Typhaceae: *Typha domingensis* Pers. Mitchell (unpub.) collected it on *Helianthus annuus* L. and on *Sicyos* sp. and found it feeding and breeding on watermelon.

As mentioned in the generic discussion, we believe that Eastern Hemisphere specimens of "*australis*" are synonymous with *gonagra*.

Allen (1969) discussed the variability at length. Since *gonagra* and *australis* were described on the same page by Fabricius, we are exercising the right of first revisor in selecting *gonagra* as the appropriate name. The Eastern Hemisphere populations have a rather extensive literature indicating the species injures many vegetable and other cultivated plants almost throughout the tropics of the Old World.



Map X. Distribution of *Leptoglossus gonagra*.

Distribution: Known from the United States only in the southern states from Florida to Texas. Occurs almost throughout the Neotropical Region including the West Indies where it is widespread. In the Eastern Hemisphere, almost throughout the tropics and subtropics including many Pacific islands (see Allen 1969).

Florida Distribution: Reported by Barber (1914) from Daytona and Cutler, and by Hussey (1952) from Lakeland. Recorded as far north as Alachua Co., but it is common only in the southern part of the state. ALACHUA CO.: Gainesville, 15-X-39, J. R. Watson; BROWARD CO.: Davie, 20-IX-74, R. L. Chavez; Pompano Beach, 28-VIII-75, K. L. Tyson; same, 3-X-79, C. Culbreth; Ft. Lauderdale, 9-XI-78, F. Garry; same, 17-I-78, S. C. Poling, (FSCA); same, 9-XI-78, R. P. Gary; same, 8-XI-73, B. D. Perkins; same, 29-IX-65, D. C. Clinton; Pompano Beach, 28-VII-75, C. F. Dowling & K. L. Tyson; Davie, 28-IV-78, D. Martinelli, (FSCACC); DADE CO.: Homestead, 3-IX-68, R. M. Baranowski; TREC, Homestead, 10-X-1983, 14-X-1983, 16-XII-1983, H. Glenn; (RMB); same, 1-XII-74, 6-XII-74, 15-XII-74, J. A. Slater, (JAS); Miami, 20-VII-62, R. M. Baranowski, (RMB); same, 4-VI-80, C. Stieger; same, C. Mosier; same, IX-X-49, O. D. Link; same, 12-IX-38, J. S. Haeger; same, 14-VI-55, F. G. Butcher; S. Miami, 12-VII-57, C. F. Dowling; Hialeah, 28-IX-67, W. T. Rowan; Coral Gables, 26-XI-36; N. Miami, 26-XI-78, M. Sugley; same, XII-62, Moore, (FSCA); Miami, 15-IX-80, L. W. Howerton; S. Miami, 12-VII-57, R. W. Swanson & C. F. Dowling, (FSCACC); Cutler, 5-V-08, Russell, (NMNH); HENDRY CO.: 1950; HIGHLANDS CO.: Archbold Biological Station, Lake Placid, 28-XI-83, M. Deyrup; same, 8 mi. S., M. Deyrup, (ABS); HILLSBOROUGH CO.: Plant City, 14-X-57, V. E. Lowe; Seffner, 10-X-50; INDIAN RIVER CO.: Vero Beach, 18-XI-39, J. R. Watson, (FSCA); Gifford, 12-V-55, H. C. Burnett; LAKE CO.: Leesburg, 25-VII-46; MARION CO.: Weirsdale, 17-X-46, (FSCACC); MONROE CO.: Key Largo, 26-X-77, R. E. Woodruff, (FSCA); Key West, 8-VII-23, (NMNH); PALM BEACH CO.: Delray Beach, 14-II-79, J. E. Bennett & C. F. Dowling, (FSCACC); same, 26-IX-77, 14-II-79, J. C. Bennett; Boynton, 18-V-25, H. M. Betts, (FSCA); same, 17-XII-28; Lake Worth 10-I-24, 15-I-29; Palm Beach, 13-III-80, W. T. Rowan, (NMNH); POLK CO.: Lakeland, 8-XII-49, R. F. Hussey; ST. LUCIE CO.: Ft. Pierce, 30-X-57, (FSCA); VOLUSIA CO.: Daytona, 11-XI-11, (NMNH).

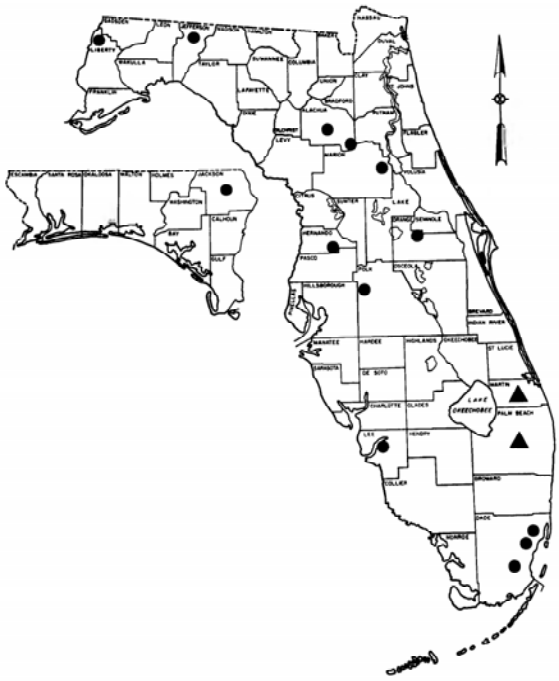
LEPTOGLOSSUS OPPOSITUS (Say)
(map XI)

Anisoscelis oppositus Say 1832, p. 12.

(Leconte edit. p. 327) in V. D. 1917 as "Complete Writings".
Anisoscelis tibialis Herrich-Schaeffer 1842, p. 12.
Leptoglossus oppositus Stal 1870, p. 163.

Diagnosis: Nearly uniformly bright or dark reddish brown. Whitish yellow transverse hemelytral fascia reduced to a spot or dash on medial vein anterior to origin of cross vein. Lateral pronotal margins non-serrate, humeral angles obtuse with outer hind tibial dilations deeply scalloped.

Biology: The biology has been summarized by Chittenden (1902) who called it the "northern leaf-footed plant bug". He described all 5 nymphal instars. It feeds on a wide variety of crops including peaches, apricots, tomatoes, melons, squash, cucumbers, and cotton. The eggs are deposited in single rows on the stems of host plants. Blatchley (1926) stated that Garman had taken nymphs on *Yucca filamentosa* L. Mitchell (unpub.) reported breeding on *Campsis radicans* (L.) Seem. ex Bureau, *Helianthus annus* L., *Morus rubra* L., *Catalpa* sp., aggregations on *Lycopersicon esculentum* P. Mill., and occasional feeding on *Carya illinoensis* (Wang.) K. Koch. Arnaud (1978) reported it being parasitized by *Trichopoda pennipes*.



Map XI. Distribution of *Leptoglossus oppositus*.

Distribution: Widely distributed from New York into Florida, west to Iowa and Wisconsin, southwest to Arizona, Texas, and into Mexico.

Florida Distribution: Reported by Barber (1914) from Lake Worth, by Blatchley (1926) from Dunedin and Ft. Myers, and by Mead (1971a) from Florida Cavern State Park, Jackson County and Hernando, DeSoto, Liberty, Alachua, Marion, Pinellas, Lee, Collier, and Dade counties. Appears to occur throughout the state, but it is generally uncommon. ALACHUA CO.: 23-VII-56, F. W. Mead; Devil's Millhopper, 8-XII-61, F. W. Mead; Gainesville, 13-IX-61, 21-VI-65, F. W. Mead; same 23-III-78, R. E. Woodruff; same, 20-II-48, W. L. Jennings, (FSCA); same, 20-V-76, (UNH); same, 19-VII-72, J. B. Heppner, (RMB); same, 21-VII-65, M. Morrison; same, C. Garcia; same, 5-VIII-61, J. W. Platt; Hawthorne, 23-VII-56, F. W. Mead, (FSCACC); DADE CO.: Miami, 8-III-34, W. L. Nanney; Princeton, 28-X-39, (FSCA); Miami, 13-VII-59, C. F. Dowling; S. Miami, 20-VI-59, R. W. Swanson, (FSCACC); Miami, 13-XI-18, (NMNH); HERNANDO CO.: Spring Lake, 10-VI-70; K. C. Lowery; JACKSON CO.: Fla. Cav. St. Pk., 1-XII-57, H. V. Weems, Jr.; same, 7-XII-57, F. W. Mead, (FSCA); JEFFERSON CO.: Monticello, 29-I-14, H. B. Scammell; (NMNH); LEE CO.: Ft. Myers, 29-VI-79, P. Gambill, (FSCA); LIBERTY CO.: Torreya St. Pk., 4-VII-65, H. V. Weems, Jr., (RMB); MARION CO.: Ocala Nat. Forest, 3-XII-61, F. W. Mead, (FSCACC); MARTIN CO.: V-VI-36, O. D. Link; ORANGE CO.: Winter Park, 21-VIII-44, 22-VIII-45, H. T. Fernald; PALM BEACH CO.: X-XI-36, O. D. Link, (FSCA); POLK CO.: Lakeland, 8-XI-11, W. T. Davis; Citrus City, 6 mi. N Paradise Key, 23-II, Schwartz & Barber, (NMNH).

LEPTOGLOSSUS PHYLLOPUS
(Linnaeus)
(fig. 6, map XII)

Cimex phyllopus Linnaeus 1767, p. 731.
Anisoscelis albicinctus Say 1831, p. 326.
Anisoscelis fraterna Westwood 1842, p. 16.
Anisoscelis confusa Dallas 1852, p. 453.
Leptoglossus phyllopus Stal 1870, p. 161.

Diagnosis: Dark chocolate brown. Occasionally with yellowish spots on pronotal disc. Lateral

pronotal margins variable, either dentate or smooth anterior to humeral angles, usually dentate behind angles. Hind tibiae broadly dilated, outer dilation usually with 2 deep scallops.

This species resembles *oppositus* in size and general habitus, but it is easily recognizable by the presence of a complete straight whitish-yellow fascia extending completely across the hemelytra.

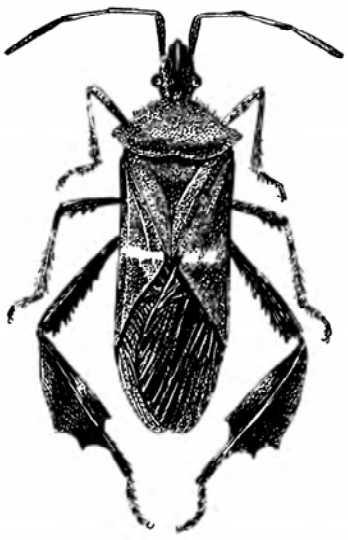
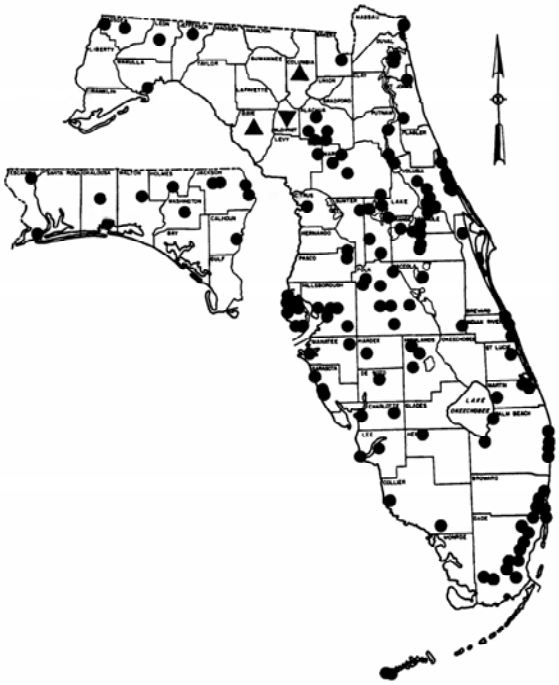


Fig. 6. *Leptoglossus phyllopus.*

Biology: Feeds on a wide variety of plants and has been reported as a pest of a number of cultivated crops. It has been reported as feeding on citrus (Ebling 1959), peaches (Snapp 1948), potato, tomato, sunflower, bean, cowpea, eggplant, bell pepper, okra, cucurbits, grain sorghum, blueberry, blackberry, plum, peach, lychee, pomegranate, loquat, pear, apple, persimmon, oat, and to a lesser extent rye, barley, wheat, and soybean (Mead 1971b). Blatchley (1926) listed it as common on yellow-flowered thistle, *Cirsium horridulum* Michx. Hussey (1952) reported collecting it on *Schinus terebinthefolia* but stated it is not a preferred host. Wiseman and McMillan (1971) noted nymphs and adults damaging late sorghum in south Georgia. Injury is accomplished not only by feeding, but by large quantities of feces which are deposited and create a favorable habitat for microorganisms in the developing seed heads. Mitchell (unpub.) reported definite breeding on *Yucca* sp., *Abelmoschus* (as *Hibiscus*) *esculentus* (L.) Moench, *Gaura parviflora* Dougl., *Callicarpa americana* L., *Lycopersicon esculentum* P. Mill., *Solanum elaeagnifolium* Cav., *Agalinis* sp., *Verbascum thapsus* L., *Campsis radicans* (L.) Seem. ex Bureau, *Cephalanthus occidentalis* L., *Baccharis neglecta* Britt., *Cirsium texanum* Buckl., *Helianthus annuus* L., *Heterotheca latifolia* Buckl., *Solidago altissima* L., *Amphiachyris dracunculoides* (DC.) Nutt., *Rhus* sp., *Datura* sp., *Achillea millefolium* L., *Aster* sp., and *Gutierrezia texana* (DC.) Torr. & Gray. She also reported aggregations on *Zea mays* L., *Chenopodium album* L., *Solanum dimidiatum* Raf., *S. tuberosum* L., *Cirsium horridulum* Michx., and *Sonchus asper* (L.) Hill. Frost (1979) reported it from December to March on *Sambucus simpsonii* Rehd. in Florida.

Arnaud (1978) reported it being parasitized by *Trichopoda pennipes* (F.), *T. plumipes* (F.) and a species in the *T. pennipes* complex.

Distribution: A common species in the southeast, ranging as far north as New York, west to Iowa and Kansas, and southwest to Texas and Baja California. It extends southward at least to Costa Rica, but it has not been reported from the West Indies.



Map XII. Distribution of *Leptoglossus phyllopus.*

Florida Distribution: Hussey (1952) reported it from Lakeland, and Barber (1914) and Blatch-

ley (1926) reported it at all of their collecting stations. One of the most common coreids in Florida. Distributed throughout the state. ALACHUA CO.: Gainesville, 1-V-37, K. Wheeler; same, 12-IV-40, J. R. Watson; same, 24-XI-58; same, 29-IX-36, P. T. Rieherd; same, 1-III-37, C. H. Lauffer; same, 25-X-58, 25-III-47, 13-X-47, 5-XI-46, 13-III-47, 6-V-55, 7-X-47, 22-IV-68, H. V. Weems, Jr.; same, III-56, F. W. Mead; same, 11-III-67, D. Mays; same, 20-IV-68, R. E. Woodruff; same, 19-VII-64, R. E. White; same 13-XI-37, 7-XII-32, 7-X-47; same, 15-I-25, T. H. Hubbell; same 25-II-56, 1-VII-55, J. B. Morrison; same, 25-X-47, R. Capelouto; same, 1-VII-54, R. F. Hussey, (FSCA); same, 26-IX-2-X-14; same 11-IV-35; same, 27-III-57, Forster & Gertsch, (AMNH); same, 4-V-79, 28-IV-79, C. Garcia; same, 5-IV-78, 19-III-77, 2-IV-71, 14-III-70, 17-VIII-70, 17-IV-69, 17-IV-67, 19-IV-67, 5-IV-67, 2-V-66, 20-IV-65, 28-IV-65, 31-III-64, 23-VIII-58, 30-IV-58, 24-IV-58, 6-III-56, 23-IV-57, 11-IV-57, 8-IV-57, 15-III-57, 25-IV-56, F. W. Mead; same 16-IV-76, C. B. Lieberman; same 13-X-74, J. B. Randall; same, 20-I-72; same 27-X-70, P. Bannister; same, 27-IV-63, 8-VIII-57, R. P. Esser; same, 10-VII-69, E. Mercer, (FSCACC); same, W. E. Pennington; Micanopy, 13-IV-24, E. G. Holt, (NMNH); same, 28-III-40, J. R. Watson; same, 14-III-54, 24-III-59, 15-XI-53, 3-IV-54, H. V. Weems, Jr.; same, 3-V-63, H. A. Denmark; same, X-60, C. Cabler; same, 29-XI-51, 12-X-51, student collection; same, II-51, W. C. Sloan, (FSCA); Newberry, 19-XI-11, (AMNH); Archer, 1-IV-80, C. Riherd; Hague, 2-VII-58, W. P. Hunter, (FSCACC); BAKER CO.: Glen St. Mary, 27-VIII-54; same, 3-IV-64, H. V. Weems, Jr., (FSCA); same, 28-IV-59, E. W. Holder, (FSCACC); same 27-XI-53, R. F. Hussey, (FSCA); BREVARD CO.: Titusville, 8-XI-11, (AMNH); BROWARD CO.: Hollywood, 27-XI-40, 1-XII-54, O. D. Link, (FSCA); Ft. Lauderdale, 24-VII-80, K. Tyson; same, 19-IV-79, R. Berry, (FSCACC); same, 6-VII-33, M. Bates; Hallandale, 16-VIII-39, H. Ruckes, (AMNH); Davie, 14-II-75, R. L. Chavez; CALHOUN CO.: Scotts Ferry, 19-IV-69, (FSCACC); CHARLOTTE CO.: Punta Gorda, 13-XI-11, 17-XI-11, (AMNH); same, 20-V-80, A. Gambel & W. T. Walsh, (FSCACC); same, 16-XI-11, W. T. Davis; Burmont, 9-IV-37, J. G. Franclemont, (NMNH); CITRUS CO.: Crystal River, 20-XII-79, R. Phillips, (FSCACC); 2-V-12, W. T. Davis, (NMNH); COLLIER CO.: 27-IV-12, H. G. Barber, (NMNH); Naples, 19-I-46, 1, 2-II-46, II-46, R. Rounds; Allen River to Deep Lake, 14-IV-12; Everglade, 6-IV-12, 7-IV-12, 11-IV-12, 19-XI-11, (AMNH); COLUMBIA CO.: 21-XI-53, R. F. Hussey, (FSCA); DADE CO.: Everglades Nat. Pk., 29-I-59, H. A. Denmark; Miami, XI-36; same, 22-X-54, H. A. Denmark; same, 9-IX-34, F. N. Young; same, 18-XII-48, O. D. Link, (FSCA); same, 7-II-80, C. Steiger; same, 10-VIII-79, S. Yocum & J. Deisler; same, 7-II-75, C. B. Lieberman; same, 20-VII-61, R. W. Swanson; same, 23-III-60, J. R. McFarland; same, 29-X-57, G. C. Butler, (FSCACC); same, A. E. Wight; same, 5-XI-11, (AMNH); same, 12-XI-32, C. F. Bainwater; same, II-09, (NMNH); Miami Springs, 13-II-80, L. Howerton & W. Brewton; N. Miami, 22-IV-77, J. DeBaby; same, 5-III-76, D. Phelps, (FSCACC); Coral Gables, 5-XII-17, (FSCA); same, 5-III-27, (NMNH); S. Miami, 23-II-46, T. Bayer; Cutler, 2-III-46, H. Montgomery; Redlands, 16-III-46, H. Montgomery; S. Allapattah, 29-IV-38, Pollett; Homestead, 27-II-56, R. A. Morse; (FSCA); same, 22-XI-74, J. A. Slater, (JAS); same, 17-XII-56, 27-X-56, 28-II-57, 15-VI-69, 31-X-69, R. M. Baranowski, (RMB); same, 29-I-59, 27-V-58, R. W. Swanson; same, 31-V-63, C. J. Fay; N. Miami Beach, 11-I-63, D. DeHaven, (FSCACC); 3 mi. S. Florida City, 1-IV-57, Forster & Gertsch, (AMNH); Royal Palm Park, 23-VII-27, M. Leonard; Tims Hammock, 24-II-19, H. S. Barber, (NMNH); DESOTO CO.: Arcadia, 26-I-70, 15-VII-63, R. H. Rhodes, (FSCACC); DIXIE CO.: 6-VII-54, F. W. Mead, (FSCA); DUVAL CO.: Jacksonville, 19-VIII-54, F. W. Mead, (FSCA); same, 3-XI-11, 5-XI-11, 7-V-22, IV, Allen, (AMNH); same, 11-VII-80, J. Garbark, (FSCACC); same, 11-XI, (NMNH); S. Jacksonville, 6-III-21, Allen, (AMNH); same, 27-XI-60, F. W. Mead, (FSCA); ESCAMBIA CO.: 20-VII-56, F. W. Mead, (FSCA); Pensacola, 19-IV-56, R. W. Halberton, (FSCACC); same, 11-14-X-14, (AMNH); nr. Century, 21-VII-55, F. W. Mead, (FSCACC); GADSDEN CO.: Quincy, 13-V-64, F. W. Mead, (FSCA); same, 5-15-VII-40, H. Ruckes, (AMNH); Oak Grove, 17-I-64, R. H. Rhodes, (FSCACC); GILCRIST CO.: 6-VII-54, F. W. Mead, (FSCA); HAMILTON CO.: 30-VII-54, F. W. Mead, (FSCA); HARDEE CO.: nr. Ona, 31-III-38, W. J. Gertsch, (AMNH); HENDRY CO.: LaBelle, 27-IV-12, 28-IV-12, (AMNH); HIGHLANDS CO.: Sebring, H. V. Weems, Jr., (FSCA); same 24-III-38, F. Lutz, (AMNH); same, 20-III-55, R. A. Morse; Highlands Hammock St. Pk., 15-IV-68, H. V. Weems, Jr., (FSCA); Archbold Biol. Sta. 14-IV-63, J. G. & B. L. Rosen; same, 26-I-43, 5-II-43, M. Cazier, (AMNH); same, 27-XII-58, S. W. Frost; same, 11-XI-62, R. Archbold; same, Lake Placid, 27-XI-83, M. Deyrup; same, 8 mi. S, 29-VIII-82, 6-X-82, M.

Deyrup, (ABS); HILLSBOROUGH CO.: Tampa, II-27, (AMNH); same, 30-VII-70, 10-XI-69, T. Faberoso; same 20-V-70, E. R. Simmons; Picnic, 20-VII-73, K. C. Laurie & A. L. Baker; Valrico, 8-XI-71, E. R. Simmons; Brandon, 8-XII-66, T. Faberoso; Riverview, 7-I-66, T. Faberoso; HOLMES CO.: Bonifay, 13-IV-68, E. T. Boggs; same, 20-IV-67, I. C. Whitehead, (FSCACC); INDIAN RIVER CO.: Wabasso, IV, G. Nelson; Sebastian, III, IV, G. Nelson, (AMNH); same, 21-III-72, W.B.C. (UNH); Vero Beach, 1-VI-67, F. S. Saba, (FSCACC); Indian River District; VI-1896; (NMNH); JACKSON CO.: 5-VIII-54, F. W. Mead; Fla. Cav. St. Pk., 9-VII-54, F. W. Mead; 4 mi N Butler, 2-VI-55, R. F. Hussey, (FSCA); Greenwood, 12-IV-67, D. R. Scott; same, 31-VII-63, 10-VII-63, E. L. Tipton; Sneads, 19-VII-63, A. R. Gary, (FSCACC); JEFFERSON CO.: Monticello, 4-8-X-14, (AMNH); same, 7-X-69, 3-XI-69, J. T. Raese; Quincy, 13-IV-64, 31-VII-56, 30-IV-56, F. W. Mead, (FSCACC); LAKE CO.: Wiersdale, 17-X-46; 12-VIII-58, A. L. Bentley; Leesburg, 23-IX-61, 7-V-61, C. H. Curran, (FSCA); same, 1907, Morton, (JAS); same, 1-11-III-54, M. Statham; same, 1-XI-53, 20-VII-60, 18-VI-61, 20-VI-60, 18-VII-61, 10-IX-61, C. H. Curran, (AMNH); same, 3-V-63, C. L. Felshaw; same, 10-XI-60, M. G. Howard & H. F. Haas; Mascotte, 21-X-71, A. L. Bentley, (FSCACC); same, 11-IX-39, Oman, (NMNH); Grand Island, 20-III-65, A. L. Bentley; Clairmont, 22-V-63, D. L. Brown; Eustis, 4-V-61, C. L. Felshaw, (FSCACC); LEE CO.: Sanibel Is., 9-VI-69, Slater, Schuh, Harrington, (JAS); Ft. Myers, 13-XI-11, 19-XI-11, 12-XI-11, 2-IV-12, 22-IV-12, 25-IV-12, 23-IV-12, (AMNH); same, 26-I-44; 10-XI, (NMNH); same, 11-VI-75, V. W. Yingst; Naples, 25-VI-79, K. Delate; same, 4-II-75, S. L. Kitto, (FSCACC); LEON CO.: Tallahassee, 8-VIII-03, (AMNH); same, 28-VI-78, 2-VI-77, M. A. Altieri; same, XI-68, F. Kellog, (FSCACC); LEVY CO.: 4-VII-57, 6-V-55, F. W. Mead; 10-IX-55, R. A. Morse; 5-VI-55, H. A. Denmark; 1-XI-51, N. Anderson; Bronson, 2-X-68, H. V. Weems, Jr., (FSCA); Williston, 11-X-57, J. C. Denmark, (FSCACC); LIBERTY CO.: 20-IX-54, R. F. Hussey, (FSCA); MANATEE CO.: Bradenton, 20-IV-72, S. Schrieber, (FSCACC); same, 30-I-23, F. M. Craighead; Duette, 9-XII-60, D. C. Chancy, (FSCACC); MARION CO.: Ocala, 9-V-40; same, 7-XII-57; same, 7-XII-56, 27-III-54, H. B. Wesson, (FSCA); Largo, 20-IV-78, K. Wells; Lowell, 12-XI-63, T. R. Adkins; same, 23-IV-57, W. P. Hunter; Fellowship, 22-V-56, J. Condo, (FSCACC); MARTIN CO.: 4-XI-54, F. W. Mead, (FSCA); Port Sewall, 1-II-41, L. J. Sanford; same, 21-XII-38, L. C. & L. J. Sanford, (AMNH); Stuart, 4-IV-78, E. W. Campbell; Indiantown, 20-IV-62, E. W. Campbell, (FSCACC); MONROE CO.: N. Key Largo, 6-II-70, R. M. Baranowski, (RMB); Stock Island, 12-VII-57, W. W. Warner; Key West, 4-VII-71, W. Pierce, (FSCA); same, 9-VII-71, T. H. Cartwright, (FSCACC); NASSAU CO.: N. Amelia City, 8-XII-62, W. Ivie, (AMNH); 17-IV-74, H. Belcher, (FSCACC); OKALOOSA, CO.: 31-VII-55, F. W. Mead; 29-III-78, A. Semago, (FSCA); Valparaiso, VI-43, G. A. Edwards; Crestview, 15, 16-X-14, (AMNH); ORANGE CO.: Winter Park, 21-XI-39, H. T. Fernald, (FSCA); same, 1-12-VIII-39, H. Ruckes; same, 6-IV, E. M. Davis; same, 9-IV, C. H. Paige, (AMNH); Orlando, 7-III-28, 18-IV-21, 21-IV-31, (FSCA); same, 12-I-10, (NMNH); same, 2-VI-61, J. R. Woodley; Apopka, 4-IV-80, D. Remington; same, 21-II-65, H. van Pelt; same, 14-XII-59, J. R. Woodley; Pine Castle, 8-IX-59, J. Fulford; Maitland, 10-II-71, W. S. Deott, (FSCACC); OSCEOLA CO.: 5 mi. W. Yeehaw Jct., 6-VI-69, Slater, Schuh, Harrington, (JAS); Kissimmee, 18-IX-63, R. A. Vild, (FSCACC); PALM BEACH CO.: South Bay, 28-III-12, 1-V-12, 2-V-12, (AMNH); Delray Beach, 29-V-80, D. Clinton & D. Sanders, (FSCACC); Palm Beach, H. G. Dyar; Canal Point, 1-XII-27, (NMNH); Lake Worth, 17-I-24, col. of S. W. Bromley; same, 19-I-24, 6-XI-26; Boynton, 26-I-09, Russell; same, 31-XII-28, (NMNH); PASCO CO.: Dade City, 28-VIII-63, J. C. Sellars & C. B. Williams; same, 29-III-60, J. C. Sellars; same, 10-X-61, J. C. Sellars, same, 22-IV-64, G. Barber & C. Williams; Lacoochee, 12-VII-69, L. O'Berry, (FSCACC); PINELLAS CO.: Safety Harbor, 13-IV-65, F. W. Mead, (FSCA); Clearwater, 15-23-VII-40, H. Ruckes, (AMNH); Seminole; 12-IV-78, D. R. McNeil; Dellwood, 13-IV-67, D. R. Scott, (FSCACC); St. Petersburg; Dunedin; 7-X-38, P. Oman; same, 17-III-27, W.S.B.: (NMNH); Gulfport, 1916; (UNH); POLK CO.: Lakeland, 14-IV-49, Hussey; Griffen, 20-XII-54; W. B. Tappan, (FSCA); same, 7-XI-11, 5-XI-12, (AMNH); same, 7-XI-11, W. T. Davis; same, 22-VIII-23; same, 27-III-23, E. M. Craighead, (NMNH); Ft. Meade, 22-VII-66, H. G. Schmidt; Bartow, 8-XII-61, 21-II-62, R. A. Vild; Alturas, 6-XII-63, R. A. Vild; E. Lake Wales, 30-VII-63, R. A. Vild; Laughman, 23-V-62, K. Hickman; Auburndale, 26-IV-61, J. Hayward & P. Pettigrew, (FSCACC); PUTNAM CO.: 7-XI-54, G. B. Merrill, (FSCA); Crescent City, 21-IV-08, 24-IV-08, Van Duzee; Palatka; Georgetown, C. T. Brues, (AMNH); SARASOTA CO.: 26-I-55, F. W. Mead, (FSCA); Sarasota, II-11, Blatchley,

(AMNH); Venice, 24-VIII-60, E. L. Yax; Nokomis, 13-X-58, W. Miller & L. B. Hill, (FSCACC); SEMINOLE CO.: Sanford; same, 28-IV-08, 26-IV-08, 3-V-08, 5-V-08, 6-V-08, Van Duzee, (AMNH); same, 14-VIII-58, 8-IV-58, C. O. Youtsey, (FSCACC); same 18-III-27, M. Leonard, (NMNH); Longwood, 12-III-37, (AMNH); SUMPTER CO.: Fruitland Pk., 20-VI-69, A. L. Bentley, (FSCACC); ST. JOHNS CO.: 17-VII-54, F. W. Mead, (FSCA); Ponte Vedra Beach, 7-III-45, 8-III-45, 9-III-45, 10-III-45, 12-III-45, 14-III-45, 15-III-45, 19-III-45, L. Lacey, (AMNH); Hastings, 10-III-27, M. Leonard; same, VII-27, Scribner, (NMNH); VOLUSIA CO.: 25-VII-54, 17-XI-56, H. A. Denmark, (FSCA); Ormond, 19-III-15, same, (AMNH); Daytona Beach, 3-XII-77, J. W. Bennett; Edgewater, 28-II-39, C. A. Frost; Enterprise, IV-1887; Lake Helen, 3-VII-07; Daytona, 10-XI-11, G. Engelhardt, (NMNH); Port Orange, 16-III-61, L. W. Holly & E. B. Smith; New Smyrna, 15-VIII-60, E. B. Smith; New Smyrna Beach, 5-VIII-59, E. B. Smith; Osteen, 18-V-59, L. W. Holly & E. B. Smith; DeLand, 1-IX-58, C. R. Roberts; Debary, 19-V-80, C. Roberts, (FSCACC); ST. LUCIE CO.: Ft. Pierce, 1-V-63, N. C. Hayslip, (FSCACC); WAKULLA CO.: Shell Point Beach, 3-VI-69, Slater, Schuh, Harrington, (JAS); St. Marks, 16-XI-69, F. W. Mead; WALTON CO.: 8-VII-53, 28-V-47; (FSCA); DeFuniak Spgs., 17-19-X-14, (AMNH); same, 18-VI-69, J. Kimper; WASHINGTON CO.: Vernon 20-IV-67, I. C. Whitehead, (FSCACC); UNKNOWN COUNTY: Everglades, 11-IV-12, col. of H. G. Barber, (NMNH); same, 6-I-78, P. LaScala, (UNH); Everglades Nat. Pk., 26-XI-61, Slater, Woodward, Sweet, (JAS); Paradise Key, 29-XII, Fairchild; (AMNH).

NARNIA Stal, 1862

Type Species: *Narnia femorata* Stal 1862, p. 296. Monobasic.

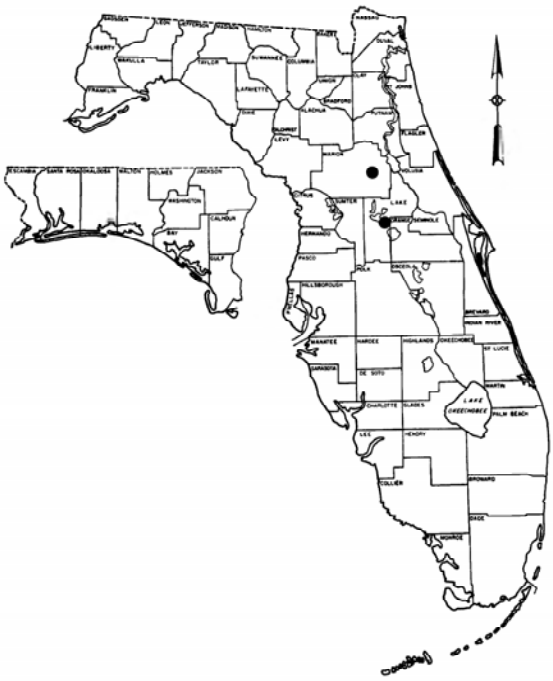
Diagnosis: Very closely related to *Leptoglossus*. Elongate, with subhexagonal pronotum. Head and pronotum subequal in length. Basal segment of antennae about equal to the anteocular portion of the head. Fourth segment of rostrum at least 2.5 times the length of the third. Posterior femora somewhat swollen.

According to Mann (1969) the several species are primarily prickly pear fruit feeders, but will also feed on the joints. They have been recorded from both *Platyopuntia* and *Cylindropuntia* spp.

NARNIA FEMORATA Stal
(fig. 7, map XIII)

Narnia femorata Stal 1862, p. 296.
Narnia pallidicornis Stal 1870, p. 166.

Diagnosis: Elongate, uniformly brown, occasionally with a pale transverse fascia across hemelytra. Hind femora moderately swollen, bearing spines on the ventral surface and smaller spines or tubercles on other surfaces. Tibiae somewhat dilated, the flattened portion extending over proximal two thirds of the segment.



Map XIII. Distribution of *Narnia femorata*.

Biology: As early as 1912, Hunter, Pratt, and Mitchell reported it as breeding on *Opuntia* sp. and other cacti. According to Mann (1969), adults and nymphs feed primarily on fruit of prickly pear cactus (both *Platyopuntia* and *Cylindropuntia* spp., the former being favored. They have also been observed feeding on the joints. Mitchell (unpub.) listed *Opuntia lindheimeri* Engelm. as a breeding host. Apparently the feeding causes little damage in the field or caged in the laboratory. Eggs are deposited in rows along the spines. There are 2 generations per year in the Southwest. Overwintering adults oviposit in March and April,

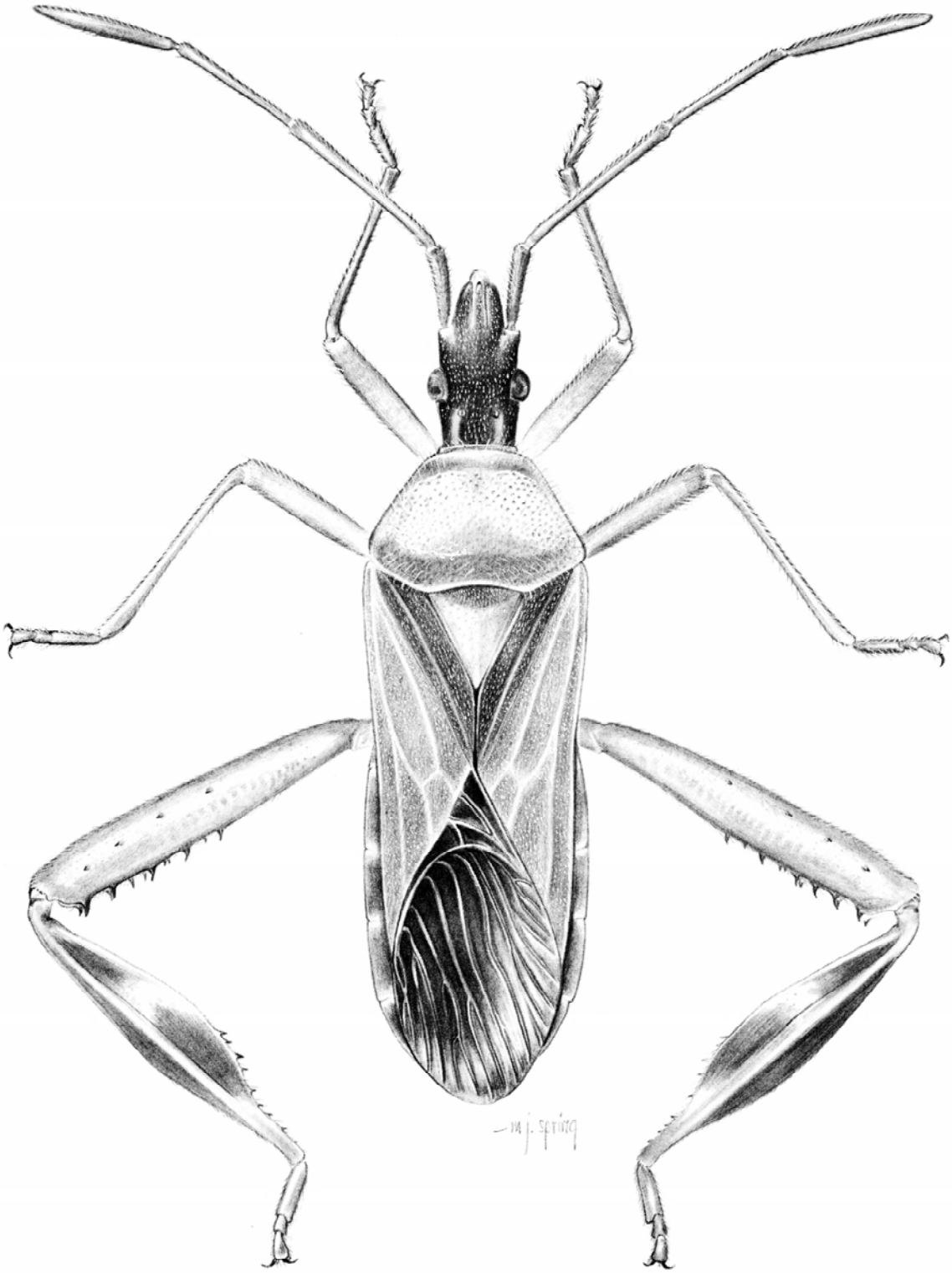


Fig. 7. *Narnia femorata.*

and the first generation reaches maturity in May and June. Hunter, Pratt, and Mitchell (1912) described the 5 nymphal instars.

According to Arnaud (1978) it is parasitized by *Trichopoda pennipes. Gryon* (as *Hadronotus*) *atriscapus* Gahan, an egg parasite, also was recorded by Gahan (1927) in Texas.

Distribution: Essentially southwestern, known from New Mexico, California, Arizona, Texas, Florida, and south in Central America to Costa Rica.

Florida Distribution: One specimen was collected in Florida, presumably an introduction on nursery stock. LAKE CO.: Astatula, 23-VII-63, Holly, (FSCA); MARION CO.: Recently 1 adult and 1 5th instar nymph were collected on *Opuntia humifusa* (Raf.) Raf. on Rt. 40, 12 mi. E. of Lynne, 24-IV-84, T. J. Henry and A. G. Wheeler, Jr., indicating that the species is established.

LEPTOSCELINI Stal 1867, p. 545.

Medium sized, elongate; head porrect and produced forward between bases of antennae. Labium extending beyond hind coxae. Femora armed beneath, but spines on middle and fore femora very small. Tibiae simple, terete, lacking foliaceous dilations.

A small Neotropical group of 4 genera, only 1 occurring north of Mexico.

PHTHIA Stal, 1862

Type Species: *Cimex lunatus* (Fabricius). Fixed by subsequent designation.

Diagnosis: Medium sized species with width across eyes exceeding width across anterior margin of pronotum. First antennal segment slightly more thickened than succeeding and only slightly curving. Head nondeclivent. Pronotum markedly declivent, antero-lateral angles with a distinct tooth. Hemelytra with lateral margins straight, covering most of abdominal connexivum. Fore and middle femora slender; hind femora moderately incrassate, armed below; hind tibiae not dilated.

The members of this genus are distributed widely in the Neotropics. One species reaches the southern United States.

PHTHIA PICTA (Drury)
(fig. 8, map XIV)

Cimex picta Drury 1770, p. 107.
Cimex ciliatus Fabricius 1775, p. 706.
Cimex leprosus Fabricius 1775, p. 719.
Cimex candelabrum Goeze 1778, p. 254.
Cimex crenulatus Fabricius 1781, p. 353.
Lygaeus dispar Fabricius 1803, p. 214.
Anisoscelis divisus Herrich-Schaeffer 1844, p. 9.
Anisoscelis pulverulentus Herrich-Schaeffer 1844, p. 9.
Leptoscelis obscura Dallas 1852, p. 458.
Anisoscelis annulipes Guerin 1857, p. 388.
Phthia picta Stal 1862, p. 296.

Diagnosis: Moderate sized (14-16) with nearly parallel sides. Body usually black or bluish black with an orange stripe behind each eye. Anterior and lateral margins of pronotum orange. Color extremely variable, orange markings frequently more extensive, sometimes predominating (see McAtee 1919) so that the black coloration is reduced to a series of spots. Lateral pronotal margins conspicuously spinose (occasionally reduced).

Biology: Commonly breeds on *Solanum nigrum* L. and almost seems restricted to this host even when related species of *Solanum* are present. Wilson (1923) reported serious injury by adults and nymphs to tomatoes in the Virgin Islands and noted egg deposition on *Datura metel* L. and stated that kingbirds destroy both adults and nymphs. Riley and Howard (1893) reported damage to tomatoes. Blatchley (1926) reported it on *Solanum* and (1928) the presence of adults and nymphs on squash vines. Barber and Bruner (1947) reported it breeding on tomatoes and that it also has been taken on squash and cow peas. Amaral (unpub.) reported it attacking the following plants: SOLANACEAE: *Lycopersicon esculentum* P. Mill., *Solanum sisymbrifolium* Lam., *S. chacoense* Bitter., *S. tuberosum* L., *S. melongena* L., *S. gracile* Herter, *S. pseudocapsicum* L. *Salpichroa origanifolia* (Lam.) Baill., *Cestrum pargui* L'Her., *Capsicum annuum* L., *Datura ferox* L., *D. stramonium* L., *Nicotiana tabacum* L.; CUCURBITACEAE: *Cucurbita pepo* L., *C.*

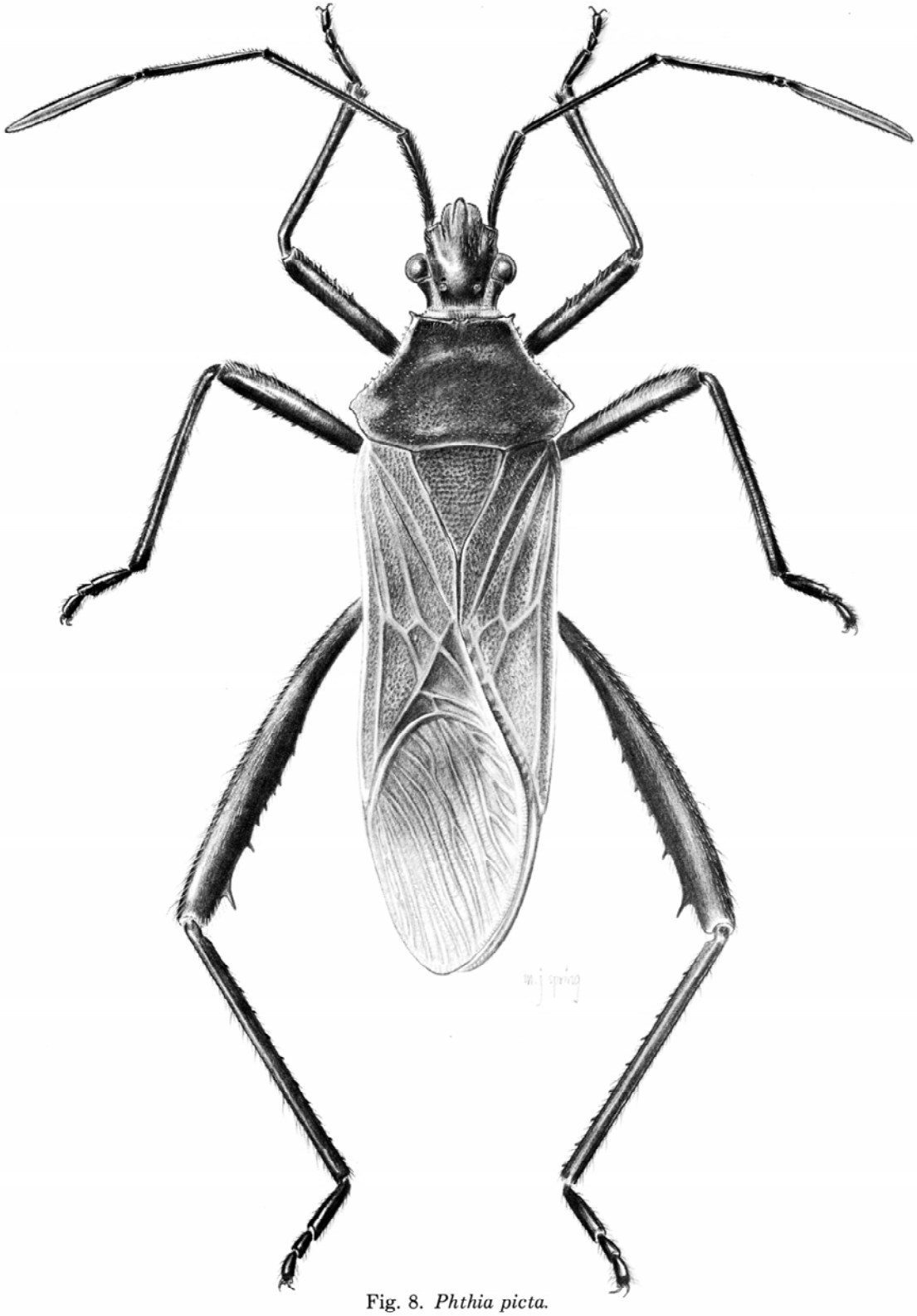
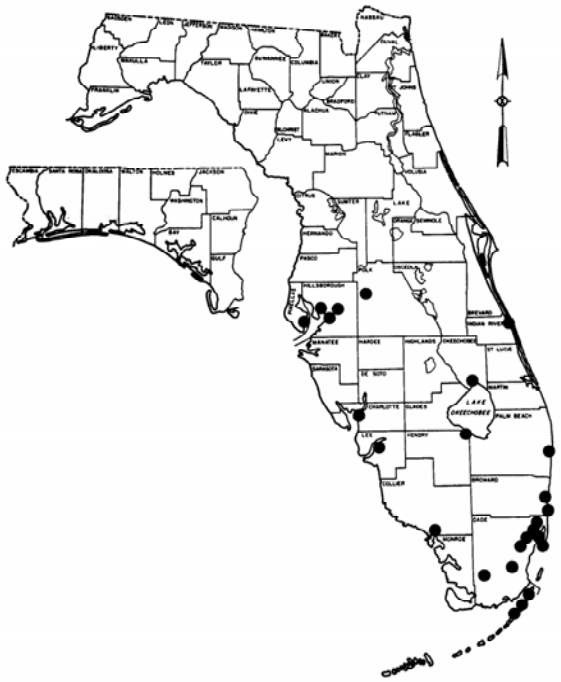


Fig. 8. *Phthia picta.*

moschata (Duchesne) Duchesne ex Poir., *C. maxima* Duchesne, *Cucumis melo* L., *Citrullus lanatus* (as *vulgaris*) Matsumara & Nakai, *Momordica charantia* L., *Sechium edule* (Jacq.) Sw.; LEGUMINOSAE: *Pisum sativum* L., *Phaseolus vulgaris* L., *Trifolium repens* L., *Vicia faba* L., *Vigna unguiculata* (as *sinensis*) (L.) Walp; CARYOPHYLLACEAE: *Stellaria media* (L.) Vill.; *PEDALIACEAE: Sesamum indicum* L.; COMPOSITAE: *Helianthus annuus* L.; CONVOLVULACEAE: *Ipomoea batatas* (L.) Lam., *I. cairica* (L.) Sweet; MALVACEAE: *Gossypium hirsutum* L., *Sida rhombifolia* L.; GRAMINEAE: *Oryza sativa* L.; PASSIFLORACEAE: *Passiflora coerula* Masters; PUNICACEAE: *Punica granatum* L.

Distribution: Ranges nearly throughout the Neotropical Region and also reported from California, Texas and Florida.



Map XIV. Distribution of *Phthia picta*.

Florida Distribution: Reported by Barber (1914) from Punta Gorda, Big Pine Key, Biscayne Bay, and Miami, and by Blatchely (1926) from Dunedin, Gainesville, and Ft. Lauderdale. Essentially southern but extends northward along the coasts. BROWARD CO.: Ft. Lauderdale, VI-21, O. M. Bates, (FSCA); Hallandale, 30-VII-?-VIII-40, H. Ruckes; CHARLOTTE CO.: Punta Gorda, 15-XI-11, (AMNH); COLLIER CO.: Royal Palm Park, 23-I-29; same, 23-I-32, A. L. Melander, (UK); same, 12-18-IV-23; Everglade, 20-VI-29, (AMNH); DADE CO.: Miami, 27-IV-44, 25-IV-44, 24-IV-44; same, 19-XI-11, G. P. Englehardt, (NMNH); same, 5-IV-11, W. T. Bather, (AMNH); same, 5-XI-57, C. F. Dowling; Coconut Grove, 26-IV-46; Redlands, 14-II-46, N. Mason, (FSCA); Biscayne Bay, Slosson, (AMNH); N. Miami, 20-V-76, D. Phelps, (FSCACC); Coral Gables, 5-III-27, S. Miami, 17-III-44, (NMNH); HENDRY CO.: Clewiston, 15-X-49, 25-XI-49; HILLSBOROUGH CO.: Brandon, 16-X-65, J. W. Patton; Tampa, 16-V-65, J. W. Patton; Riverview, 6-VII-76, F. J. Moore, (FSCA); INDIAN RIVER CO.: Sebastian, XI, G. Nelson, (AMNH); LEE CO.: Ft. Myers, 30-V-80, K. Delate; MONROE CO.: 26-X-77, R. E. Woodruff; Key Largo, 26-X-77, R. E. Woodruff, (FSCACC); Tavernier, 12-IV-44; (NMNH); N. Key Largo, 14-III-77, R. M. Baranowski, (JAS); same, 14-III-77, 20-XII-77, 18-III-83, R. M. Baranowski, (RMB); OKEECHOBEE CO.: Okeechobee, 23-30-VII-40, H. Ruckes, (AMNH); PALM BEACH CO.: Boynton, 17-III-44; PINELLAS CO.: St. Petersburg, 14-VI-38; POLK CO.: Lakeland, 19-IV-45, (NMNH).

ACANTHOCERINI Bergroth 1913, p. 144.

Diagnosis: Head quadrate, prominent postocular tubercles present with ocelli on distinct tubercles. Antenniferous tubercles armed with a prominent spine. Fourth antennal segment relatively short, robust. Femora at least moderately incrassate, usually armed below subdistally on ventral surface. Posterior femora markedly incrassate, especially in males.

This is a Western Hemisphere tribe consisting of 13 genera, one of which reaches the United States.

Schaefer and O'Shea (1979) stated that members of this tribe feed chiefly on species of Leguminosae.

KEY TO GENERA OF ACANTHOCERINI

1. Humeral angles of pronotum rounded, non-spinose . . . . . *Euthochtha*, p. 32

1'. Humeral angles of pronotum, produced into an elongate acute spine .... *Acanthocerus*, p. 32

ACANTHOCERUS Palisot de Beauvois, 1805

Type Species: *Acanthocerus crucifer* Palisot de Beauvois. Monobasic.

Diagnosis: Head with tylus strongly declivent, not projecting forward of bases of antennae. Pronotum strongly declivent, lateral margins coarsely toothed, humeral angles acutely produced laterad into an elongate spine. Abdomen with connexivum projecting conspicuously beyond hemelytra. Labium short, barely reaching mesosternum. All femora armed below distally. Hind femora strongly incrassate, especially in males. Antennae slender with only short inconspicuous hairs present.

Two species are known, both of which are West Indian.

ACANTHOCERUS LOBATUS (Burmeister) (fig. 9)

Crinocerus lobatus Burmeister 1835, p. 318.
Acanthocerus lobatus Distant 1900, p. 375.

Diagnosis: Robust, moderate sized (13-15). General coloration reddish brown. Scutellum black with a median and two lateral stripes contrastingly yellow. Apical corial margin yellowish, strongly contrasting with black membrane. Abdominal connexivum yellow, posterior one-half partly or entirely reddish brown. Posterior lobe of metapleuron calloused with yellowish in females. In males this area produced backward into a prominent spatulate projection.

Biology: Barber and Bruner (1947) stated that *lobatus* is common in Cuba on woody plants that occur up to 3,000 ft. elevation. They listed as definite hosts *Byrsonima spicata* Ndz. (as *Banisteria laurifolia*) and *Myroxylon balsamum* Harms. and state that it is commonly seen on *Tournefortia hirsutissima* L. and *Eupatorium* sp.

Distribution: Described from Cuba and subsequently reported in error from St. Vincent and Grenada. O'Shea (1975) stated that Barber (1914a) reported it from "Southern Florida". However, this is incorrect as there is no mention of the species in Barber's Florida paper. Barber, in another paper (1914b), did report it from New Mexico and said that he had carefully compared this material with Cuban specimens. O'Shea credited this New Mexican record to Van Duzee (1917) and Torre-Bueno (1941) and said the record seems questionable. Both of these authors were, however, merely following Barber.

Thus, despite O'Shea's comment, we have been unable to find a published Florida record. However, there is, in the Torre-Bueno collection (University of Kansas), a series of 11 specimens labeled "Fla.", so the species appears to have at least once been established in Florida. The possibility of label error exists, but the Kansas coreid collection contains a number of other southern Florida coreids with identical labels. Label error thus seems unlikely.

EUTHOCHTHA Mayr, 1865

Type Species: *Coreus galeator* (Fabricius). Monobasic.

Diagnosis: Head with tylus strongly declivent, not projecting forward of bases of antennae. Antenniferous tubercles with a strongly projecting blunt spine laterad. Eyes set well away from antero-lateral pronotal angles, area of head immediately behind eye tuberculate. Pronotum strongly declivent, lateral margins toothed, antero-lateral angles produced into a short tooth. Humeri rounded, crenulate. Body robust, abdomen elliptical, usually with connexivum projecting conspicuously laterad of lateral margins of hemelytra. All femora prominently armed below, hind femora curved, tuberculate above. Tibiae straight with small spines on inner margin, nondilated. Antennae slender with only short inconspicuous hairs present.

EUTHOCHTHA GALEATOR (Fabricius) (fig. 10, map XV)

Coreus galeator Fabricius 1803, p. 191.
Crinocerus tibialis Herrich-Schaeffer 1842, p. 21.
Euthochtha galeator Mayr 1865, p. 431.

Diagnosis: Robust, moderate size (15-17). Dull reddish brown to dull yellowish with numerous dark punctures over pronotum and hemelytra. Connexivum usually marked with pale and dark alternating patches.

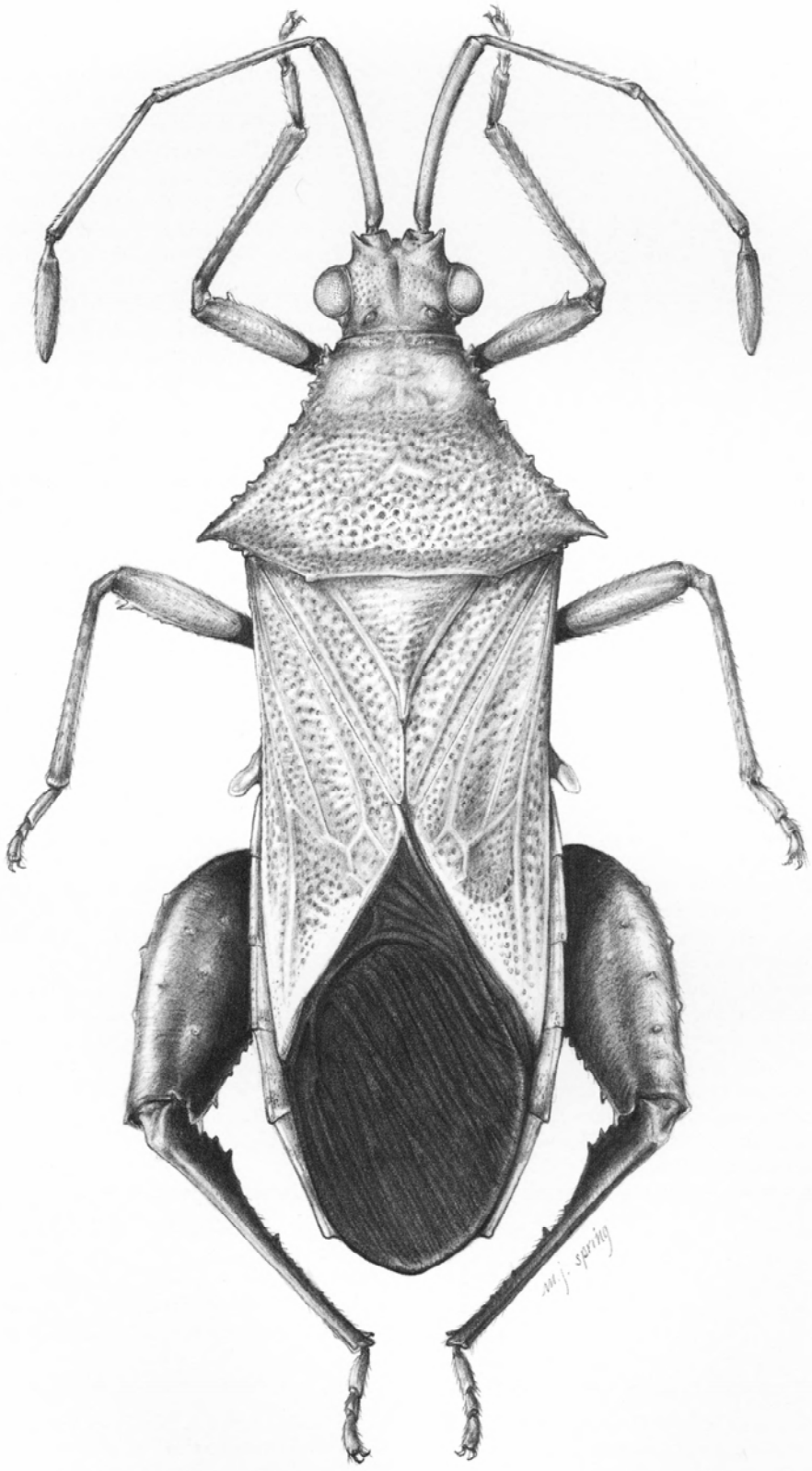


Fig. 9. *Acanthocerus lobatus.*

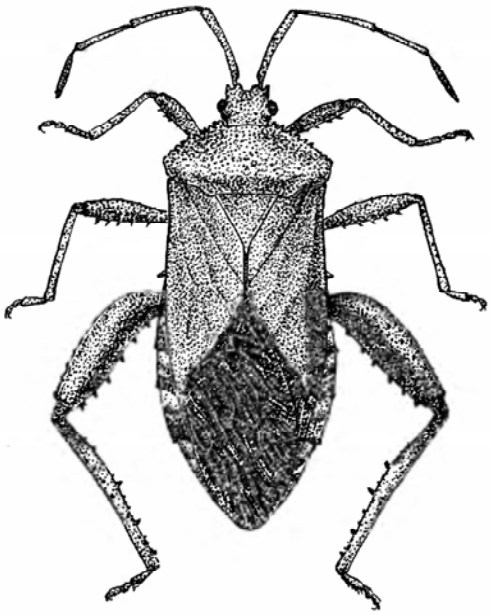
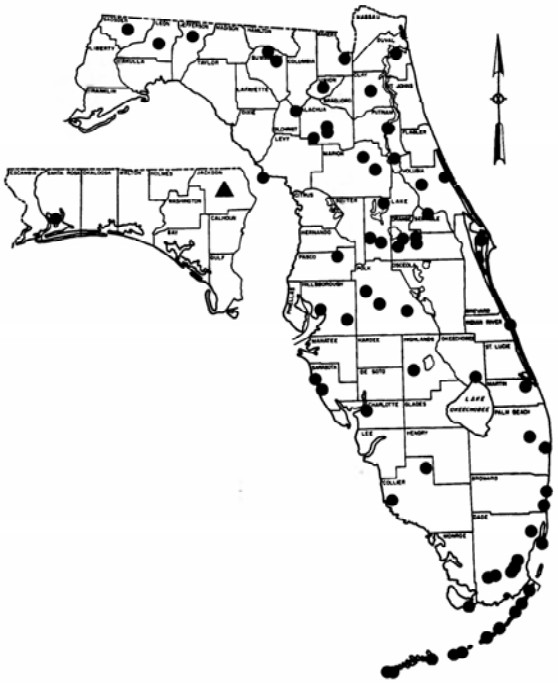


Fig. 10. *Euthochtha galeator.*

Biology: Feeds on a variety of plants. Yonke and Medler (1969a) took adults in Wisconsin on *Agrimonia gryposepala* Wallr., *Achillea millifolium* L., *Aster pilosus* Willd., *Monarda fistulosa* L., *Desmodium glutinosum* (as *acuminatus*) (Muhl. ex Willd.) Wood, and *Quercus ellipsoidalis* E. J. Hill, the first of these apparently being preferred. Nymphs and adults also were collected on *Amphicarpaea bracteata* (L.) Fern., *Aureolaris glandiflora* var. *pulchra* (Benth.) Pennell, *Carya* sp., and *Ulmus rubra* Muhl., eggs and first instar nymphs on *Aster ericoides* L., and eggs on *Urtica dioica* L., *Prunus americana* Marsh., and *Rhus glabra* L. Hussey (1922) reported collecting specimens on ragweed. Froeschner (1942) reported adults and nymphs breeding on *Monarda* sp. in Missouri. Torre-Bueno (1908) reported it occurring on bush beans and described the 5th instar nymph. Yonke and Medler (1969b) described and illustrated all of the immature stages. Mead (1981) reported various sized nymphs and adults feeding on and damaging roses. Hubbard (1885) reported it destructive on oranges. Ebling (1959) reported it responsible for defoliation of potted lychee plants. Griffiths and Thompson (1957) stated it caused wilting and dieback of tender young citrus twigs. Collecting records in Florida are on *Solanum* sp., *Bidens* sp., *Flaveria linearis* Lag., and *Lyonia marianna* Parks. There is one generation a year in the north with adults overwintering. Mitchell (unpub.) reported breeding populations on *Gaura parviflora* Dougl., *Ambrosia trifida* L., *Cirsium texanum* Buckl. and *Heterotheca latifolia* Buckl. She also reported adult aggregations on *Baccharis neglecta* Britt. and *Ratibida columnifera* (as *columnaris*) (Nutt.) Woot. & Standl. and adult feeding on *Rudbeckia hirta* L., *Solidago altissima* L., and *Conyza canadensis* (L.) Cronq. Mitchell (1980b) has observed males on flower heads of *Cirsium texanum* Buckl. fighting with their hind legs presumably as territorial defense similar to that observed in *Acanthocephala femorata.*

Eggs are parasitized by the hymenopteran *Ooencyrtus anasae* (Ashmead), *O. clisiocampae* (Ashmead), and *Anastatus pearsalli* (Ashmead), and adults are reported by Arnaud (1978) to be parasitized by *Trichopoda pennipes.* Death feigning and nymphal aggregating occurs.

Distribution: Occurs from New England west to Iowa and south to Texas and Florida.



Map XV. Distribution of *Euthochtha galeator.*

Florida Distribution: Reported by Barber (1914) from Jacksonville, Biscayne Bay, Key Largo, Miami, Everglade, Lakeland, Ft. Myers, Marco, La Grange, Key West, Big Pine Key, Marathon,

Leon Co., Indian River District, and Chokoloskee. Common, widely distributed throughout the state. ALACHUA CO.: Gainesville, 30-III-39, A. N. Tissot; same, 11-VIII-41; same, 6-III-37, S. Swank; same 6-IX-80, F.W. Mead; same, 6-XI-32, G. B. Merrill; same, 15-IV-36, 27-III-24, T. H. Hubbell; same, 11-VIII-55, C. N. Patton; same 18-III-48, H. V. Weems, Jr.; same, (FSCA); same, 20-IX-2-X-14 (AMNH); same, 13-VIII-80, D. Wojcik; same 11-V-80, F. W. Mead; same 8-X-79, J. C. Traitor; same 11-VI-79, 7-VII-79, F. W. Mead; same, 7-VIII-66, 28-VII-66, 12-VII-66, L. O'Berry; same, 4-IV-63, R. P. Esser, (FSCACC); same, 7-VII-55, 14-III-54, H. V. Weems, Jr.; San Felasco Hammock, 9-VI-77, 2-VI-77, H. V. Weems, Jr. & G. B. Fairchild; same, 11-X-35, student col.; Paradise, 19-III-48, T. J. Downes, same 6-III-46, student col., (FSCA); Archer, 7-VIII-79, C. Riherd & H. Collins; High Springs, 4-IV-76, C. V. Lieberman, (FSCACC); BAKER CO.: MacClenny, 26-XI-58, E. W. Holder, (FSCACC); BREVARD CO.: Merritt Island, 7-13-VIII-40, H. Ruckes, (AMNH); BROWARD CO.: Ft. Lauderdale, VI-22, S. M. Bates; same, 15-V-48; same, 24-VII-27, G. B. Merrill, (FSCA); same, 23-VIII-32, D. M. Bates, (AMNH); Hallandale, 16-VIII-39, H. Ruckes, (AMNH); CLAY CO.: Penney Farms, 26-VI-40, (FSCA); CHARLOTTE CO.: Punta Gorda, VIII-61, W. T. Walsh & H. Collins, (FSCACC); COLLIER CO.: Naples, 18-III-75, V. W. Yingst, (FSCA); same 18-III-75, V. W. Yingst & S. L. Kittle, (FSCACC); same, 29-XI-55, H. A. Denmark; same, 6-IV-59, H. V. Weems, Jr., (FSCA); Immokalee, 1-V-75, V. W. Yingst & S. L. Kittle, (FSCACC); DADE CO.: Miami, 19-VI-80, P. Larkins; same, 10-V-32, L. S. Light, (FSCA); same, 5-XI-11, II-09, (AMNH); same,19-VI-80, A. P. Larkins; same, 2-XI-72, 19-X-55, L. Daigle; same, 30-X-62, J. N. Todd, (FSCACC); same, 19-XI-11; same, 18-XI-11, G. P. Englehardt, (NMNH); Key Biscayne, 23-VIII-60, C. F. Dowling; Everglades Nat. Pk. 20-X-54, H. V. Weems, Jr.; Fuchs Hammock, 2-XI-79, H. V. Weems, Jr., (FSCA); Royal Palm St. Pk., 25-III-37, Mrs. F. E. Lutz; Biscayne Bay, (AMNH); Goulds, 16-X-75, P. Stansbery; 11-XII-56, R. W. Swanson, (FSCACC); Homestead, 15-X-58, 9-VII-69, 25-X-69, R. M. Baranowski; Naranja, 23-V-62, R. M. Baranowski, (RMB); DUVAL CO.: Jacksonville, Allen, (AMNH); GADSDEN CO.: 12-VII-54, F. W. Mead, (FSCA); Quincy, 5-15-VII-40, H. Ruckes, (AMNH); HIGHLAND CO.: Archbold Biol. Sta., 23-25-XI-79, 25-VI-79, T. A. Webber & H. V. Weems, Jr.; same, 30-IX-79, K. W. Harris & H. V. Weems, Jr.; (FSCA); same, 15-31-VII-48, A. B. Klots, (AMNH); same, Lake Placid, 15-VI-83, 3-V-83, M. Deyrup; same, 30-III-59, R. Archbold; same, 8 mi. S., 9-X-82, M. Deyrup, (ABS); HILLSBOROUGH CO.: Tampa, III-18, (AMNH); Lutz, 6-IX-61, R. E. Stokes, (FSCACC); N. of Picnic, 8-IX-38, P. Oman, (NMNH); INDIAN RIVER CO.: Indian River, (AMNH); JACKSON CO.: 3-VIII-53, H. B. Wesson, (FSCA); JEFFERSON CO.: Monticello, 4-8-X-14, (AMNH); same, 29-IV-57, R. H. Miller, (FSCACC); same, 21-VII-54, F. W. Mead; LAKE CO.: Groveland, 26-VIII-60, W. P. Henderson, (FSCA); Grand Island, 5-V-61, A. L. Bentley; Clermont, 14-VIII-58, A. L. Bentley, (FSCACC); LEON CO.: Tallahassee, 8-VIII-03, (AMNH); same, 14-VI-77, M. Altieri, (FSCACC); LEVY CO.: Cedar Key, 27-VII-25; 13-VII-54, 22-VI-57, H. V. Weems, Jr.; MARION CO.: Ocala Nat. For., nr. Hopkins Prairie, 11-18-V-79, G. B. Fairchild, (FSCA); Ft. McCoy, 19-VII-64, R. E. Vild; MARTIN CO.: Stuart, 25-VII-77, E. W. Campbell, (FSCACC); MONROE CO.: Key Vaca, 28-XII-55, H. V. Weems, Jr.; Big Pine Key, 28-III-57, H. V. Weems, Jr.; same, 23-VI-71, 30-VII-71, W. Pierce; Key Largo, 27-III-57, 2-V-57, 11-IV-59, H. V. Weems, Jr., (FSCA); same, 11-VI-69, 9-VI-69, Slater, Schuh, Harrington, (JAS); same, 6-XI-11; Flamingo, 13-IV-23, (AMNH); Stock Island, 27-XII-54, H. V. Weems, Jr.; Long Key, IV-55, H. A. Denmark; same, 28-III-57, H. V. Weems, Jr.; Upper Matecumbe, 27-XI-55, H. V. Weems, Jr.; Key West, 12-VI-53, O. D. Link, (FSCA); same, (AMNH); same, 29-III-61, C. A. Bennett, (FSCACC); No Name Key, 21-I-72, 29-II-72, W. Pierce, (FSCA); same, 9-VII-71, W. Pierce; Tavernier, 8-VIII-58, C. F. Dowling & R. W. Swanson, (FSCACC); N. Key Largo, 21-VII-67, 29-VI-69, 4-VII-69, 6-XI-79; R. M. Baranowski; same, 14-V-81, P. Veno; (RMB); OKEECHOBEE CO.: Okeechobee, 23-30-VII-40, H. Ruckes, (AMNH); ORANGE CO.: Windermere, 3-VI-48, O. D. Link; same, 25-VIII-56, H. A. Denmark; Winter Park, 19-XI-41, 28-IV-42, H. T. Fernald, (FSCA); same, 14-VI, E. M. Davis; Fairvilla, 14-23-VIII-40, H. Ruckes, (AMNH); Orlando, 23-III-28, 26-IV-31, 15-III-27, 9-IV-31, 19-XI-31, (FSCA); same, IV, Paige, (AMNH); same, 15-III-08, 14-X-08, 6-IV-06, Russell; same, 20-V-29, C. Nelson, (NMNH); PALM BEACH CO.: Boynton, 18-IV-25, H. N. Betts; Loxahatchee, 29-30-X-34, T. H. Hubbell, (FSCA); PASCO CO.: Jessamine, 17-IV-17, (AMNH); Blanton, 21-XI-63, L. B. Hill & C. B. Williams, (FSCA); POLK CO.: 22-VI-57, 28-IV-55, H. A. Denmark; Lakeland, 28-III-12, (AMNH); Bartow, 4-VII-72, T. Neal & J. Purdy; Babson Park, 21-IV-64, R. E. Vild, (FSCACC); PUTNAM CO.: Crescent City, 24-IV-08, Van Duzee; Palatka, (AMNH);

SANTA ROSA CO.: Avalon, 25-II-48, O. D. Link; SARASOTA CO.: Nokomis, 11-I-53, G. C. Groff, (FSCA); same, 13-X-58, D. E. Stokes; Sarasota, 22-VIII-74, H. J. Von Doch; same, 4-VIII-62, B. Hoffman, (FSCACC); SEMINOLE CO.: Sanford; same, 26-IV-08, 28-IV-08, Van Duzee, (AMNH); SUWANNEE CO.: Suwannee, 12-V-78, C. Lieberman; 30-VII-54, F. W. Mead, (FSCA); Live Oak, 10-VIII-03, (AMNH); UNION CO.: Lake Butler, 4-IV-31, (FSCA); VOLUSIA CO.: Port Orange, 16-III-61, E. B. Smith; Deland, 19-VIII-58, L. W. Holly & C. R. Roberts, (FSCACC); UNKNOWN COUNTY: Wahneta, 28-VIII-67, H. G. Schmidt, (FSCACC); Everglade, 5-IV-12, 7-IV-12, St. Johns River, (AMNH); Everglades; 5-IV-12, coll. of W. T. Davis, (NMNH); Pleasant Grove, 7-VII-57, C. W. Hale & D. Stokes, (FSCACC).

NEMATOPINI
Amyot & Serville 1843, p. 191.

Large to very large species. Head subquadrate. Femora at least slightly incrassate, posterior femora markedly incrassate, especially in males. Anterior femora armed distally on ventral surface with 2 spines. Abdominal venter unarmed.

A Western Hemisphere tribe consisting of 16 genera, 3 of which reach the United States and 2 occur in Florida.

Schaefer and O'Shea (1979) commented that species of Leguminosae frequently are preferred hosts.

KEY TO GENERA OF NEMATOPINI

1. Mesosternum anteriorly behind anterior coxae with a distinct longitudinal groove or sulcus; margins elevated . . . . . *Mozena*, p. 36

1'. Mesosternum behind anterior coxae not, or at most very shallowly and indistinctly, grooved or sulcate, margins not elevated . . . . . *Piezogaster*, p. 38

MOZENA Amyot and Serville, 1843

Type Species: *Mozena spinifrons* Amyot and Serville 1843, p. 192. Monobasic.

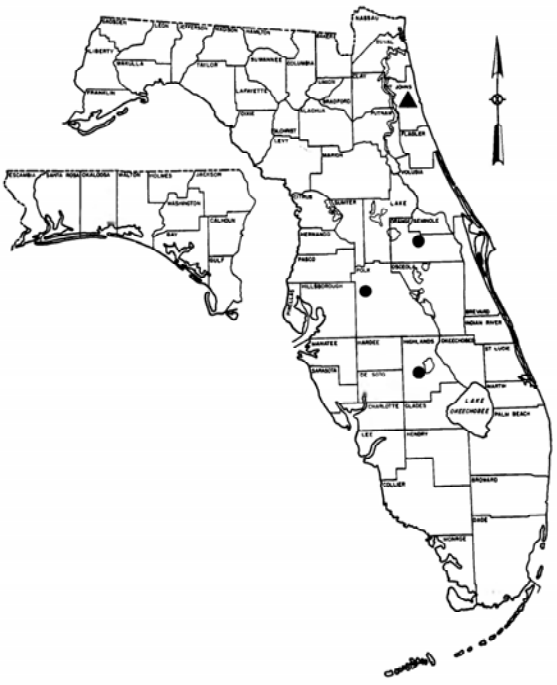
Diagnosis: Large, elongate to elongate oval. Head subquadrate. Labium short, stout, apex fitting into a sulcate tubercle on anterior margin of mesosternum. Pronotum strongly declivent, lateral margins nodulose, humeri produced laterally. Femora armed at least distally with spines on ventral surface. Posterior femora swollen.

McCullough (1974) stated that the mesquite tree (*Prosopis* sp.) is host to at least 2 species, *lunata* Burmeister and *obtusa* Uhler, both often found on the same tree at the same time.

Twenty three species are known, with the majority found in Central America and Mexico and 1 species known from Colombia, 1 from Cuba, and 8 occurring north of Mexico.

MOZENA OBESA Montandon
(fig. 11, map XVI)

Mozena obesa Montandon 1899, p.190.



Map XVI. Distribution of *Mozena obesa*.

Diagnosis: Large, uniformly brown to dark reddish brown. Membrane chocolate brown. Scutellum transversely rugose, coarsely punctate, yellowish. Connexivum broadly exposed, reflexed, with each segment marked with alternating brown and yellow. Antennae reddish

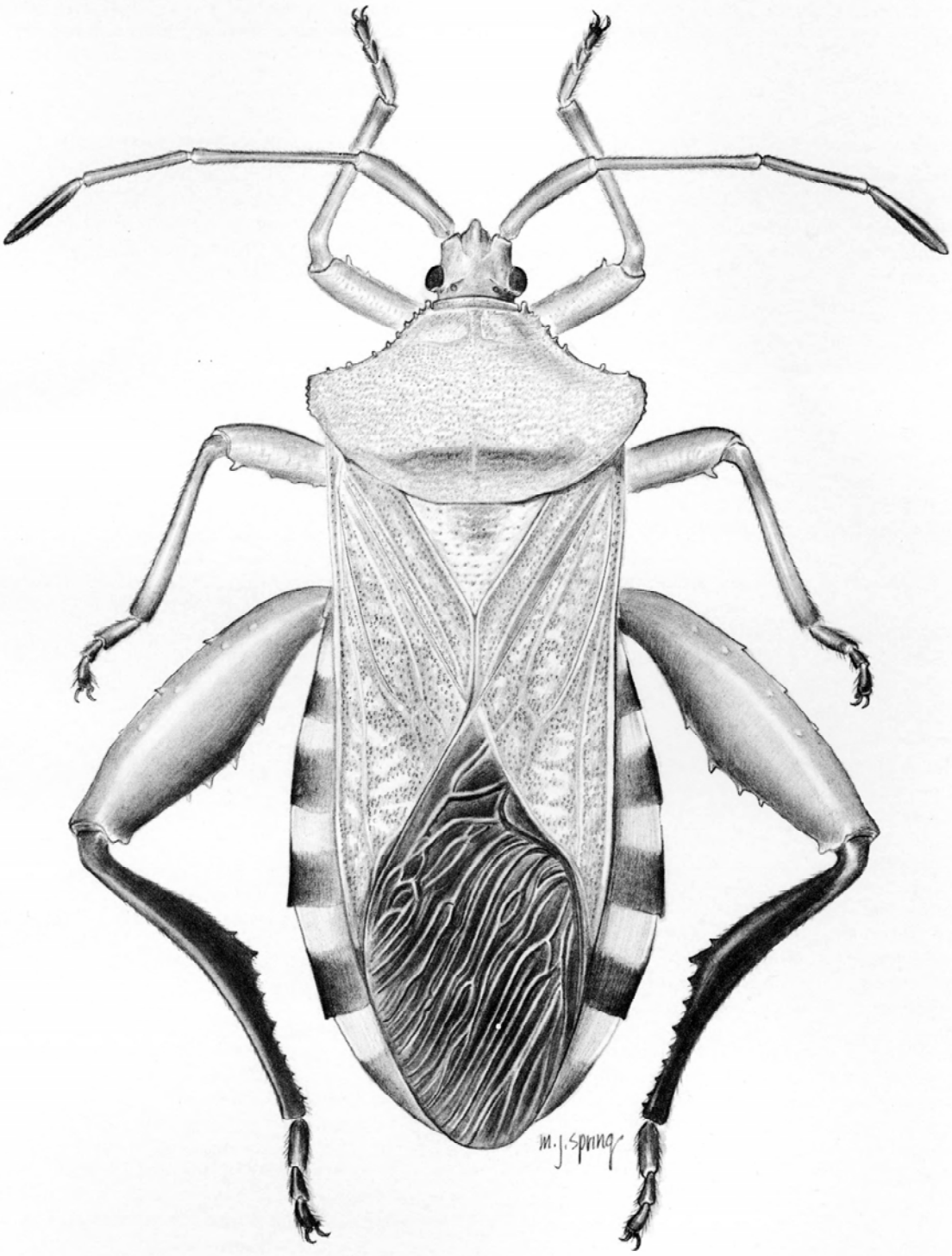


Fig. 11. *Mozena obesa.*

brown with distal half to two-thirds of segment four darker. Legs similar in color to body.

Biology: Froeschner (1942) reported taking adults and nymphs commonly on *Schrankia uncinata* Willd., and Schaefer and O'Shea (1979) stated that this is the only known host plant. However, Mitchell (unpub) reported collecting adults and nymphs on *Prosopis glandulosa* Torr. (as *juliflora*).

Distribution: Known from South Carolina west to Oklahoma, Kansas, and Nebraska, south to Florida.

Florida Distribution: Described from Florida without definite locality, reported by Barber (1914) from Jacksonville and Enterprise and by Blatchley (1926) from Lakeland. Uncommon, not known from the southern part of the state. HIGHLANDS CO.: Archbold Biological Station, 28-VI-63, 23-VIII-59, T. Pliske, (ABS); ORANGE CO.: Orlando, 4-IX-04, F. W. Walker, (UM); POLK CO.: Lakeland, 25-X-25, I. J. Milne collection, (UNH); ST. JOHNS CO.: IV, (FSCA).

PIEZOGASTER Amyot & Serville, 1843

Type Species: *Piezogaster albonotatus* Amyot & Serville 1843, p.197. Monobasic.

Diagnosis: Medium to large species. Head relatively triangular, postocular tubercles distinct, not forming a smooth curve with eye. Antenniferous tubercles lacking an outward directed spine. Pronotum variable, but humeral angles obtuse in North American species. All femora armed below, at least distally, with conspicuous spines. Posterior femora markedly incrassate in males, less so in females. Posterior tibiae rounded or slightly flattened in females; curved and flattened, but not dilated in males.

All previous American literature treated this genus under the name *Archimerus* Stal. O'Shea (1975) showed this name to be a replacement name of Burmeister and not validly used in the sense used by Stal so that the North American species pertain to the genus *Piezogaster*. Twenty-four species are recognized, all occurring in the Neotropical Region except for the two and questionably three that are found north of Mexico.

KEY TO FLORIDA SPECIES OF *PIEZOGASTER*

1. Antennae relatively slender, more than ½ length of body. Anterolateral angles of abdominal connexival segments 2 & 3 with a small pale spot present . . . . . *ashmeadi*, p. 39

1'. Antennae relatively stout, not more than ½ as long as body. Abdominal connexival segments either conspicuously alternated with yellow and fuscus or nearly unicolorous reddish brown 2

2. Femora bearing numerous black erect bristly hairs. Connexivum alternated with yellow and fuscous . . . . *alternatus*, p. 38

2'. Femora lacking erect bristly black hairs, hairs pale and semidecumbent. Connexivum uniformly reddish brown or suffused with black, but never with alternating pale and dark markings . . . . *calcarator*, p. 39

PIEZOGASTER ALTERNATUS (Say)
(fig. 12, map XVII)

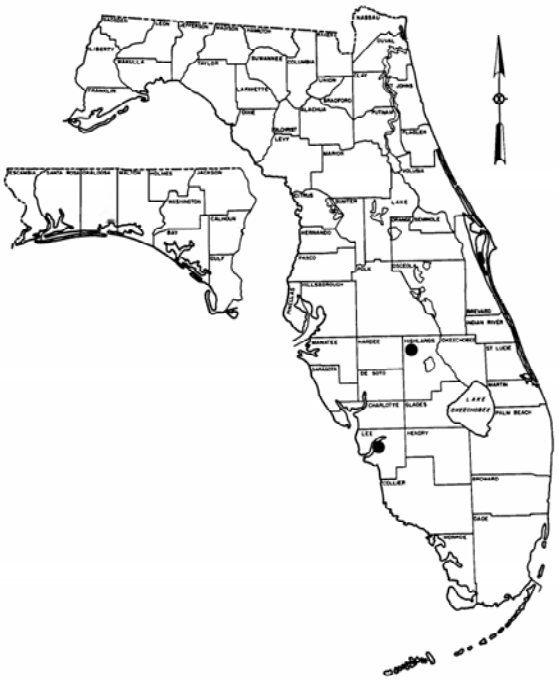
Coreus alternatus Say 1825, p. 317. (Leconte edit. p. 327) in V.D. 1917 as "Complete Writings".
Archimerus squalus Burmeister 1835, p. 321.
?Archimerus rubiginosus Herrich-Schaeffer 1843, p. 52.
Archimerus muticus Herrich-Schaeffer 1843, p. 52.
Piezogaster albonotatus Amyot & Serville 1843, p. 197.

Diagnosis: A robust species, of moderately large size (16-21); generally light brown with membrane somewhat darker. Connexivum marked with alternating yellow and brown. Femora with numerous erect dark bristle-like hairs. Hind femora of males strongly incrassate, those of females markedly less so.

Biology: Yonke and Medler (1969a) reported this species develops in Wisconsin chiefly on *Desmodium glutinosum* (as *acuminatum*) (Muhl. ex Willd.) Wood. The first four instars feed only on this plant whereas the fifth instar nymphs and adults feed on a variety of unrelated plants. Numerous adults were found copulating on *Ambrosia trifida* L., *Solidago gigantea* Ait., and *S. altissima* L., with feeding occurring on the latter. Adults were taken on *Aster sagittifolius* Wedemeyer ex Willd., *Erigeron annuus* (L.) Pers., *Symplocarpus foetidus* (L.) Nutt., and *Robinia pseudoacacia* L. Fifth instar nymphs occurred on *Ambrosia*

artemisiifolia L., *A. trifida* L., *Cryptotaenia canadensis* (L.) D.C., *Desmodium canadense* (D.) D.C., and *Eupatorium rugosum* Houtt. Morrill (1910) reported it from golden rod. Adults exhibit death feigning when disturbed, dropping from the plants and remaining motionless in the litter for as long as five minutes. Two Hymenoptera, *Ooencyrtus clisiocampae* and *Anastatus pearsalli*, parasitize the eggs, and both Yonke and Medler (1969a) and Patton (1958) reported adults and nymphs parasitized by *Trichopoda pennipes*. Yonke and Medler (1969c) described and illustrated the egg and nymphal instars. They reported a single generation per year with adults overwintering. Arnaud (1978) reported it as being parasitized by *Trichopoda lanipes* and *pennipes*.

Distribution: Ranges from New Jersey south into Florida and west to Wisconsin, Colorado, and Oklahoma.



Map XVII. Distribution of *Piezogaster alternatus*.

Florida Distribution: Reported by Blatchley (1926) from Royal Palm Park. Uncommon. HIGHLANDS CO.: Highlands Hammock St. Pk., 24-III-57, H. V. Weems, Jr.; LEE CO.: Ft. Myers, 20-IX-76, C. Olson, (FSCA); same, 8-II-44, C. S. Tuthill, (FSCACC).

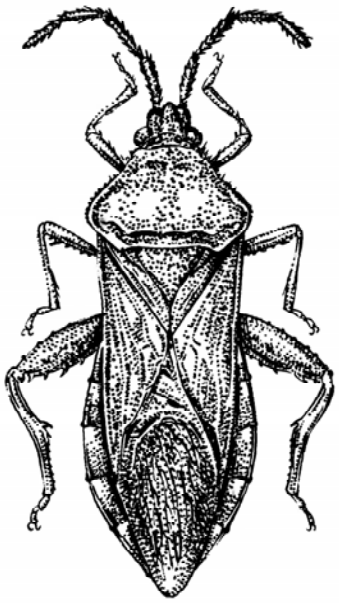


Fig. 12. *Piezogaster alternatus*.

PIEZOGASTER ASHMEADI Montandon
New Combination

Archimerus ashmeadi Montandon 1899, p. 194.

A questionably distinct species. It was differentiated by the characters given in the preceding key, but apparently it has not been recognized since the original description when it was described from "Florida" without definite location.

PIEZOGASTER CALCARATOR
(Fabricius)
New Combination
(map XVIII)

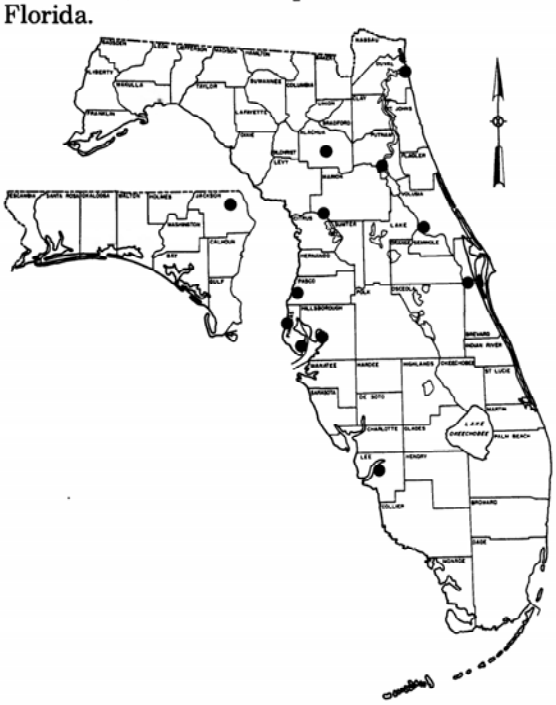
Coreus calcarator Fabricius 1803, p. 192.

Diagnosis: Large, robust, very similar in most respects to *alternatus*, but tending to be slightly lighter in color and lacks the alternating color markings on the connexivum and the black bristly femoral spines.

Biology: Blatchley (1926) noted adult hibernation and its occurrence on the flowers of *Asimina parviflora* (Michx.) Dunal. Drake (1920) reported parasitization by *Trichopoda pennipes.*

Distribution: Originally described from

"Carolina", but all subsequent records are from Florida.



Map XVIII. Distribution of *Piezogaster calcarator*.

Florida Distribution: Reported by Van Duzee (1909) from Crescent City, Tampa, Ft. Myers, and Estero, by Barber (1914) from Lakeland, Biscayne Bay, Charlotte Harbor, Sanford, and Pablo Beach, and by Blatchley (1926) from Dunedin. Appears to be generally distributed throughout the state. ALACHUA CO.: Gainesville. 17-IV-58, L. C. Kuitert, (FSCA); same, 19-X-36, student coll., (RMB); BREVARD CO.: Rockledge, 29-III-28, (FSCA); DUVAL CO.: (NMNH); St. Johns Bluff, 16-VII-57, F. W. Mead, (RMB); HILLSBOROUGH CO.: Tampa, 8-IV-48, D. J. Downes, (FSCA); JACKSON CO.: Greenwood, 3-VIII-55, H. B. Wesson, (FSCACC); LEE CO.: Ft. Myers, 20-III-12, 21-III-12, (NMNH); MARION CO.: Dunellon, 10-VIII-68, C. F. Zeiger, (RMB); PASCO CO.: New Port Richey, 7-X-38, P. Oman; Trilby, 12-IX; PINELLAS CO.: Dunedin, 17-III-27, Blatchley; St. Petersburg, (NMNH); PUTNAM CO.: Welaka, 16-VII-40, J. J. Friauf, (RMB); VOLUSIA CO.: Sanford, 11-VII-51, Price, Beamer, Wood, (UK).

CORECORINI Van Duzee 1916, p. 12.

Diagnosis: Large, broadly oval, head quadrate, wider than long. Antenniferous tubercles prominent and lacking spines at the sides. Labium short, extending posteriorly only slightly beyond fore coxae. Abdomen usually very broad with connexivum widely exposed and somewhat reflexed to give dorsal surface of abdomen a concave appearance. Legs short, slender, all femora and tibiae unarmed.

Five genera are known, all from the Western Hemisphere, of which two occur north of Mexico.

KEY TO FLORIDA GENERA OF CORECORINI

1. Veins of membrane distinctly and irregularly anastomosing. Pronotal humeri projected upward. Fourth antennal segment not longer than 3rd . . . . *Corecoris*, p. 40

1'. Veins of membrane sometimes forked, but not with numerous anastomosing veins. Pronotal humeri not prominently produced upward. Fourth antennal segment longer than 3rd . . . . . *Sephina*, p. 44

CORECORIS Hahn, 1833

Type Species: *Corecoris cinnamomeus* Hahn 1833, fig. 124. Monobasic.

Diagnosis: Large (17-24), broad, ovoid species with numerous anastomosing veins in the membrane of the fore wing. Antennae short. Lateral pronotal margins not toothed nor serrate. Humeri prominent, rounded and tilted somewhat upward. Femora unarmed.

The genus is chiefly Neotropical. Two species occur north of Mexico, both occurring in the southeastern states.

KEY TO FLORIDA SPECIES OF *CORECORIS*

1. Pronotum with a pair of black longitudinal lines . . . . . *fuscus*, p. 41

1'. Pronotum without black longitudinal lines . . . . . *diffusus*, p. 41

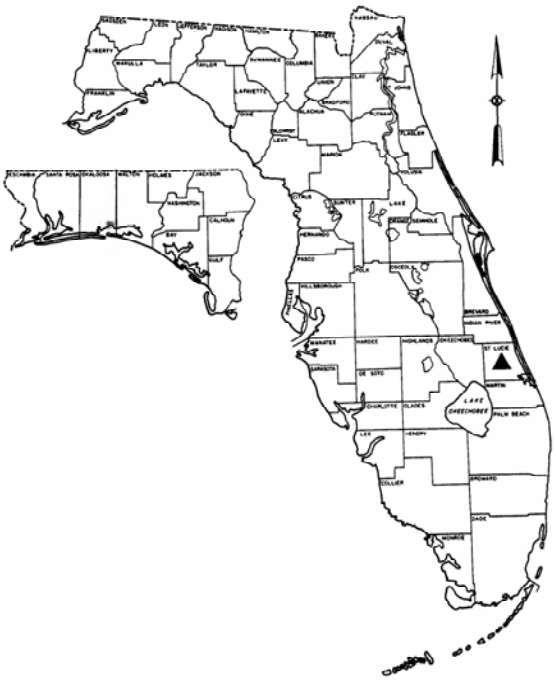
CORECORIS DIFFUSUS (Say)
(map XIX)

Coreus diffusus Say 1832, p. 11.
Corecoris diffusus Van Duzee 1916, p. 12.

Diagnosis: A slightly smaller (17-20) species than *fuscus*, lacking the black longitudinal pronotal stripes and alternating black and orange areas on the connexivum, although small black spots may be present.

Biology: Unknown.

Distribution: From North Carolina to Texas, New Mexico, and Florida.



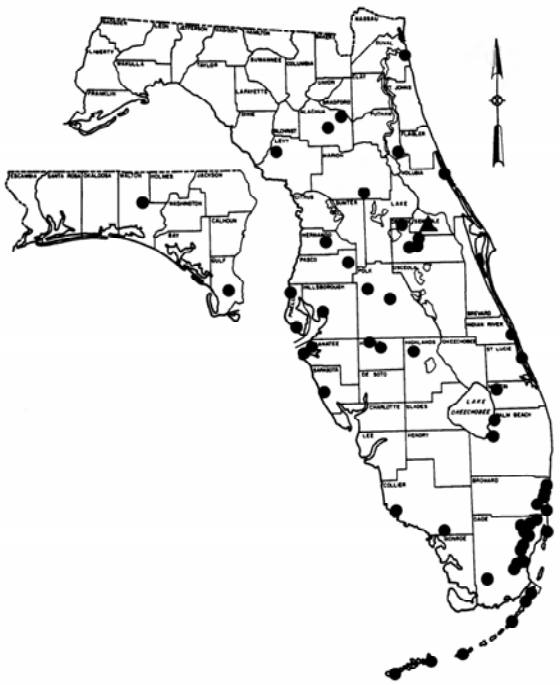
Map XIX. Distribution of *Corecoris diffusus*.

Florida Distribution: Previously reported by Van Duzee (1917) and by Uhler (1886) as *Spartocera cinnamomea* without definite station and by Riley (1892) from Waldo, Florida. ST. JOHNS CO.: Anastasia St. Pk., 12-III-77, L. R. Davis, (UNH); ST. LUCIE CO.: 1-VIII-58, E. W. Campbell, (FSCA).

CORECORIS FUSCUS (Thunberg)
(fig. 13, map XX)

Cimex fuscus Thunberg 1783, p. 44.
Reduvius moestus Fabricius 1794, p. 198.
Coreus confluentus Say 1832, p. 11.
Spartocerus geniculatus Burmeister 1835, p. 342.
Spartocerus serrulatus Herrich-Schaeffer 1842, p. 12.
Spartocerus lateritus Westwood 1842, p. 7.
Spartocerus affinis Westwood 1842, p. 7.
Corecoris fuscus Van Duzee 1916, p. 12.

Diagnosis: A large (20-24) robust, bright orange to yellow insect having a pair of longitudinal black lines on the posterior lobe of the pronotum, one on either side midway between meson and lateral margin that converge on meson just behind calli. Anterior area of pronotum black, extending posteriorly along entire lateral margins of anterior pronotal lobe. Connexiva black laterally on anterior half. Antennae completely black, legs chiefly so, but with coxae, trochanters, proximal and distal ends of femora, and proximal ends of tibiae contrastingly orange or yellow.



Map XX. Distribution of *Corecoris fuscus*.

Biology: Breeds on *Solanum americanum* P. Mill. Early instar nymphs tend to be gregarious. It also has been taken in cultivated fields, orange groves, and gardens and has been col-

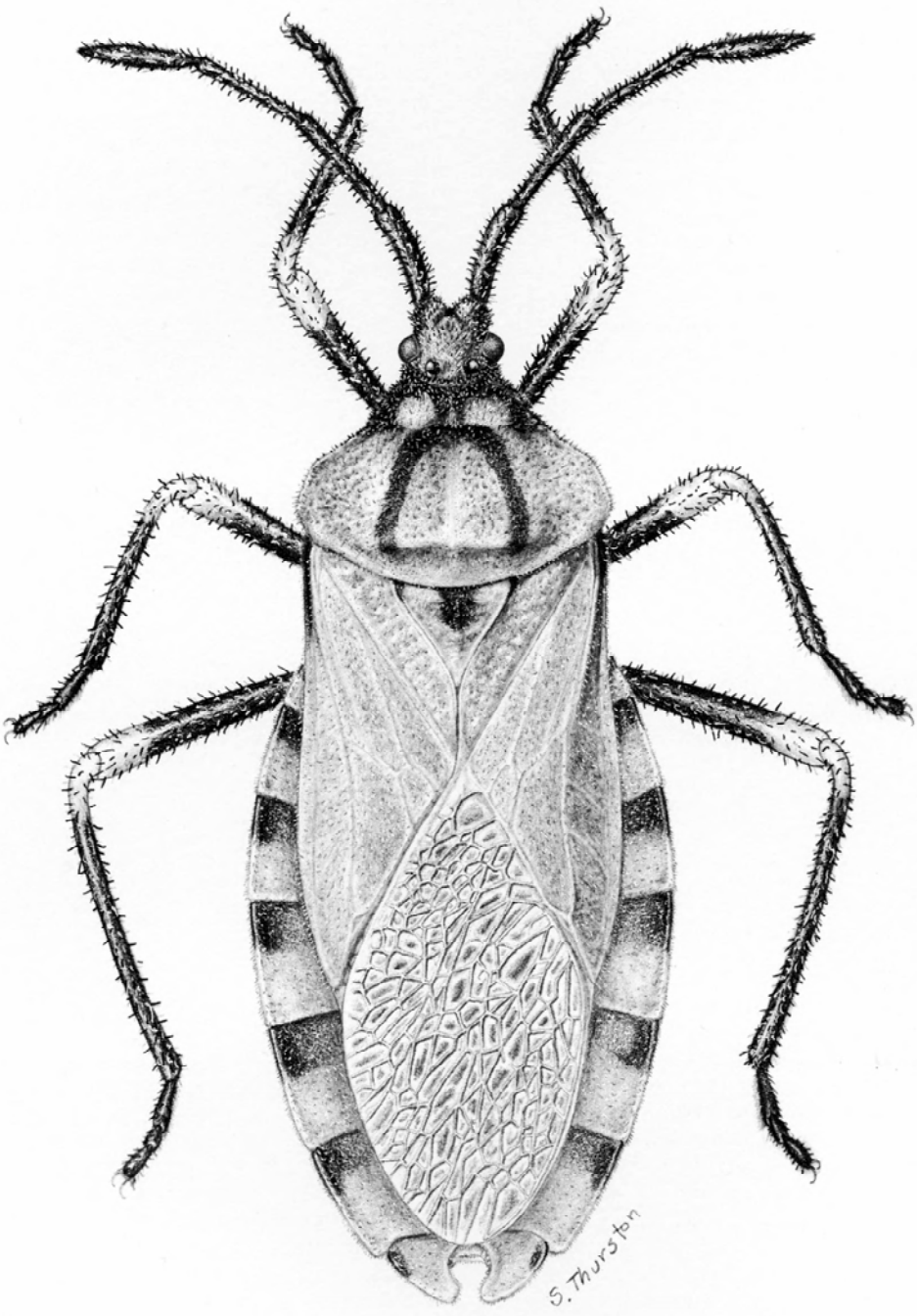


Fig. 13. *Corecoris fuscus*.

lected feeding on *Physalis* sp. Barber and Bruner (1947) reported it breeding on *Solanum nigrum* L. Schaefer and Mitchell (1983) cited a record from Basso et al. (1974) on *Solanum* sp. Drake (1920) reported nymphs of this species, under the name *confluenta*, parasitized by *Sarcophaga sternodontis* Townsend at Homestead.

Distribution: Known from Mexico, southwestern United States, and Florida.

Florida Distribution: Reported by Van Duzee (1909) as *Spartocera confluenta* (Say), a synonym, from Crescent City and Clearwater, by Barber (1914) under the same name from Biscayne Bay, Charlotte Harbor, Key Largo, Miami, Lake Okeechobee, Everglade, Lee County, Lake City, Lake Worth and Chokoloskee and by Blatchley (1926) from Dunedin, Gulfport, Ft. Myers and Sarasota. Barber (1914) believes Uhler's (1886) record of *C. diffusus* from "Florida" should be referred here. Primarily throughout the southern part of the state, but occasional records as far north as Walton Co. ALACHUA CO.: Gainesville, 22-X-37, E. D. Morse; same 4-II-27, H. Sterling; same, 20-X-25, A. N. Tissot; same, 8-III-37, G. Swank; same, XII-68, XI-52, L. A. Hetrick; same, IX-48, E. Dickson, (FSCA); Waldo, 23-XI-1889, (NMNH); BROWARD CO.: Ft. Lauderdale, VII-22, D. M. Bates; same, 7-VI-78, K. L. Tyson; Davie, 7-VII-77, R. Schimmel, (FSCA); same 1-V-78, R. Gaskalla, (FSCACC); Dania, 17-I-78, (FSCA); Pompano, 2-III-45, L. V. France; Oakland Park, 27-IV-64, G. McLean; COLLIER CO.: Naples, 28-VI-78, 10-V-77, R. E. Driggers; same, 10-X-77, W. T. Walsh, (FSCACC); Chokoloskee, (UK); DADE CO.: Miami. 1-VI-78, D. C. Phelps; same, 16-IV-35, P. Heinrich; same, 9-III-58, C. F. Dowling; same, 21-VIII-80, C. Steiger, (FSCA); same, 3-V-77, H. Glenn; same, 6-IV-77, D. Culbert; same, 28-V-70, 27-VIII-69, W. S. Brewton; same, 20-IV-67, L. P. Meyer; same 16-I-59, L. J. Daigle; same, 10-I-56, C. F. Dowling; same, 26-VII-78, D. Phelps; same, 7-VI-78, R. E. Driggers, (FSCACC); same 31-V-10, 3-V-10, E. R. Sasser; same, 29-IV-28, F. Muser, (NMNH); Homestead, 20-IV-59, R. M. Baranowski, (RMB); same, 30-VI-80, same, 8-VI-61, J. H. Knowles; G. Webster; Coral Gables, 17-V-46; Naranja, 10-VI-54, O. D. Link; Miami Beach, 6-X-80, W. James; Opalocka, 25-III-75, D. Steger; N. Miami, 27-VII-71, J. R. Halsted; W. Miami, 14-VI-60, R. W. Swanson; Hialeah, 10-VII-80, Pena (FSCACC); Allapattah, 30-IX-18; S. Miami, 19-V-28; Paradise Key, C. A. Mosier; Larkin, 20-VII-18, (NMNH); Royal Palm Park, 21-VII-48, L. D. Beamer, (UK); DUVAL CO.: Mayport, 2-VII-73, G. Foster; GULF CO.: White City, 19-VI-80, E. Gambill; HARDEE CO.: Wachulla, 16-VI-18, B. E. Melendy, (FSCA); Ft. Green, 30-V-62, R. H. Rhodes; HERNANDO CO.: Brooksville, 30-III-62, C. E. Harper, (FSCACC); HIGHLANDS CO.: Highlands Hammock St. Pk., 14-III-77, H. V. Weems, Jr., (FSCA); HILLSBOROUGH CO.: Tampa, 3-X-73, E. R. Simmons; same 30-IX-69, A. Krause; same, 22-III-61, J. W. Patton, (FSCACC); same, 10-II-27, C. O. Bare, (NMNH); INDIAN RIVER CO.: Vero Beach, 23-VI-67, P. Araoz, (FSCACC); same, IV-41, J. R. Malloch, (NMNH); same, 31-V-57, L. R. Blickle, (UNH); LEVY CO.: IX-51, L. A. Hetrick, (FSCA); Chiefland, 26-V-76, W. Littleton, (FSCACC); MANATEE CO.: Bradenton, 8-XII-69, J. R. McFarland, (FSCA); same, 21-VI-63, D. C. Chancy; Palmetto, 24-V-44, 18-II-44, H. C. Secrest, (FSCACC); same, 18-I-44, 24-V-44, (NMNH); MARION CO.: Weirsdale, 14-VII-25, (FSCA); MARTIN CO.: Bluefield, 6-V-80, Campbell; MONROE CO.: N. Key Largo, 6-IX-68, 19-XII-69, 14-I-77, 19-XII-77, 20-XII-77, R. M. Baranowski, (RMB); same, 14-I-77, 20-IX-69, R. M. Baranowski, (JAS); Key Vaca, 4-IV-57, C. F. Dowling; Stock Island, 1-VII-57, W. B. Warner, (FSCA); Tavernier, 12-IV-44, C. S. Tuthill; Key Largo, 24-II-60, H. Creamer, (FSCACC); same, III-1898, 9-III, G. N. Collins; Big Pine Key, 6-III, H. Barber, (NMNH); Vaca Key, 29-III-57, C. F. Dowling & G. W. Dekle, (FSCACC); ORANGE CO.: Winter Park, 29-V-44, 17-V-42, 2-X-40, 5-VIII-40, H. T. Fernald, (FSCA); Plymouth, 7-IX-77, D. A. Graddy; Orlando, 27-IX-61, J. R. Woodley; same, 3-VIII-07, 1-VIII-07, 23-VIII-07, 11-VII-08, 5-VII-07, Russell, (NMNH); Gotha, F. Rauterberg; same, F. R., (UK); PALM BEACH CO.: Belle Glade, 18-VII-39, P. Oman; Pahokee, 25-IV-19, (NMNH); PASCO CO.: Dade City, 29-IX-59, J. C. Sellars; PINELLAS CO.: Tarpon Springs, 4-X-76, K. C. Lawrey, (FSCACC); Gulfport, 1919, (UNH); POLK CO.: Winter Haven, 27-XII-66, W. A. Wyles; Lakeland, 3-V-57, R. R. Snell, (FSCACC); PUTNAM CO.: Lake Como, VII-21, (NMNH); SARASOTA CO.: Sarasota, 8-VI-55, E. G. Kelsheimer, (FSCA); SEMINOLE CO.: 10-VIII-29, H. Clark, (NMNH); ST. LUCIE CO.: Ft. Pierce, 12-IX-55, E. Campbell, (FSCACC); VOLUSIA CO.: 18-VII-58, C. O. Youtsey, (FSCA); Daytona Beach, 10-IX-45, G. T. Riegel, (NMNH); Pierson, 18-VII-58, C. O. Youtsey, C. R. Roberts; WALTON CO.: Iona, 24-X-75, S. Kitto, (FSCACC); UNKNOWN COUNTY: nr. Sharkeys P. O., (FSCA).

SEPHINA Amyot & Serville, 1843

Type Species: *Lygaeus pustulata* Fabricius 1803, p. 205. Monobasic.

Diagnosis: Robust, ovoid, moderate sized. Head very short, tylus declivent, not projecting forward of antenniferous tubercles, the latter prominent, elevated above head surface and directed forward. Eyes small, projecting, globose, set well away from antero-lateral pronotal angles. Pronotum with distinct ring-like punctate collar; ellipsoidal in shape; calli depressed; convexly swollen immediately behind calli. Lateral pronotal margins nearly straight, humeral angles acute but not spinose. Lateral and posterior pronotal margins smooth. Antennae slender, terete. Legs not incrassate, unarmed or weakly armed below. Tibiae lacking flattened dilations. Veins of membrane forked but not conspicuously anastomosing.

SEPHINA GUNDLACHI (Guerin)
(cover, fig. 14, map XXI)

Coreus gundlachi Guerin 1857, p. 377.
Sephina gundlachi Stal 1870, p. 177.
Sephina grayi Van Duzee 1909b, p. 232. NEW SYNONYMY.

Diagnosis: Moderate sized (16-18); striking black and yellow color. Head, antennae, legs, scutellum, area of calli, and a very large ovoid spot mesally on posterior pronotal lobe all black. Remainder of body mostly yellow, but connexivum with alternating yellow and black patches. Van Duzee (1909b) described *Sephina grayi* as a new species from Florida which he differentiated from *gundlachi* by the lack of the dark spot in the central area of the corium and the nearly flat scutellum. We have examined 165 specimens from Sanibel Island and 17 from various localities from Miami north to Gainesville. The Sanibel population shows very little variation, none having black corial markings, except for a faint darkening along the margin adjacent to the membrane in some specimens; 10 specimens had a large black area covering most of the pronotal disc that on some specimens reached the posterior edge of the pronotum; 9 specimens showed a faint trace along the midline of the pronotum and 14 had a small but distinct black mark on the midline that varied from elongate to round to semi-circular. The corium of the 17 specimens from other areas was either unmarked or the black marking was present and varied from large and triangular to faint and elongate. The black area along the membrane varied from being faint and narrow to large, triangular. Pronotal markings varied from specimens having most of the disc black and humeral angles black to only a large black area in the middle of the disc to a faint central mark to no mark. Included in this material were 4 specimens collected by Dr. H. V. Weems, Jr. in Highlands Hammock State Park, 28-VII-49, on *Hamelia patens*. In this series 1 specimen had an elongate black spot on the corium and the apex black. The pronotum had a large black spot and the humeral angles were black. A 2nd specimen had the apex of the corium darkened, but no spot and only a faint small dark area along the midline of the pronotum. The 3rd specimen had a large dark spot on the pronotum but no corial marks and the 4th had a large dark spot on the pronotal disc with dark humeral angles but no dark markings on the corium. In the Sanibel material, as well as in the other material, there is variation in the scutellum from a very distinct ridge being present to a scutellum that is nearly flat. We have examined the male genitalia of 4 specimens, one from Sanibel without pronotal or corial spots, one from "S. Fla." having a dark pronotal area but no corial spot, one from Highlands Hammock having both pronotal and corial black spots and one from "Paradise Key" having both. We could find no structural differences. We believe that a single species is represented and thus synonymize *grayi* with *gundlachi*.

In the American Museum of Natural History are two specimens without a central black corial spot that appear to be the type series of *Sephina grayi* Van Duzee. One is a female bearing a small uncolored printed label saying "type" and a second handwritten label reading "Florida alcoholic". The second specimen is a male bearing three labels as follows: (1) a small uncolored printed label saying "Cotype"; (2) an inked label saying "*Sephina grayi* V. D.", and (3) a small red label saying "Cotype". Van Duzee (1909b) did not designate a holotype. Accordingly we take this opportunity to designate the female specimen noted above as lectotype of *Sephina grayi* Van Duzee. An appropriate label has been placed on this specimen and a paratype label on the male noted above.

Biology: We believe this species is confined to the climbing milkweed, *Cynanchum scoparium* Nutt. as a breeding host. Blatchley (1926, 1928) reported nymphs and adults of both *gundlachi* and *grayi* from this host (as *Metastelma scoparium*) and suggested that the 2 are only color variations of one another. We have exam-

Fig. 14. *Sephina gundlachi*.

ined specimens reported as being taken on *Hamelia repens* Jacq. and on *Citrus aurantium* L. The climbing milkweed typically grows over other plants, and it seems probable that these specimens were actually on milkweed. Of particular interest is the observation that this species deposits its eggs on the leaves of the plant that the milkweed climbs on, rather than on the milkweed itself.

Distribution: West Indies and Florida.

Map XXI. Distribution of *Sephina gundlachi*.

Florida Distribution: Reported as *S. grayi* by Barber (1914) from Miami and Georgianna and by Blatchley (1926) from Dunedin and as *S. gundlachi* by Blatchley (1928) from Paradise Key and Gulfport and by Banks (1910) without definite locality. ALACHUA CO.: Gainesville, 2-IX-54, (FSCA); BREVARD CO.: Georgianna, 17-VII-02, Wiltfeld; DADE CO.: Paradise Key, 19-III, H. G. Barber; Miami, 22-IX-13, W. T. Davis, (NMNH); HIGHLANDS CO.: 28-VII-49, H. V. Weems, Jr.; Highlands Hammock State Park, 15-IV-68, H. V. Weems, Jr.; Parker Is., rt 29, 1.9 mi N. rt 70, 7-VI-66, R. G. Beard, (ABS); LEE CO.: Sanibel Island, 19-VII-80, 2-X-82, 9-X-82, 1-II-83, 24-IV-83, R. M. Baranowski, (RMB); PALM BEACH CO.: Palm Beach, 12-X-35, (FSCA); PINELLAS CO.: Dunedin, 19-III-25, Blatchley, (NMNH); same, 17-III-27, W.S.B. coll., (NMNH); VOLUSIA CO.: Deland, 18-V-62, C. R. Roberts, (FSCA); UNKNOWN COUNTY: "Florida" labeled type; "Florida" labeled cotype, (AMNH); "S. Fla.", P. R. Uhler; "Fla.", (NMNH).

CHARIESTERINI Stal 1867, p. 546.

Slender, elongate. Head short, quadrate, with antenniferous tubercles spined above. Third antennal segment widely dilated and flattened, leaf-like. Pronotal humeri spinose. All femora armed below with a short spine near distal end. Tibiae terete.

Three genera are known, all occurring in the Neotropical Region with one in the United States.

CHARIESTERUS Laporte, 1832

Type Species: *Chariesterus gracilis* Laporte 1832, p. 44. = *Pendulinus armatus* Thunberg 1835. Fixed by original designation.

Diagnosis: Slender, elongate, rather small (11-13) species. Head subquadrate, deeply cleft medially with a visible pit in front of each ocellus. Antenniferous tubercles prominent with a sharp acute forward projecting spine. Antennal segment one, three-sided; two, rounded or only slightly three-sided; third segment on distal ⅔ to ½ strongly dilated and flattened. Pronotum with prominent spinose humeri and lacking an anterior collar. Hemelytral membrane fuscous to bronze-black, veins more or less parallel, sometimes anastomosing. Meso- and metasterna deeply sulcate.

This genus (Ruckes, 1955) contains 11 described species and occurs throughout the United States, south through the West Indies, the Bahamas, Central America, and well into tropical South America.

CHARIESTERUS ANTENNATOR (Fabricius) (fig. 15, map XXII)

Coreus antennator Fabricius 1803, p. 198.
Gonocerus dubius Say 1832, p. 10. (Leconte edit. p. 327) in V. D. 1917 as "Complete Writings".
Chariesterus antennator Blanchard 1840, p. 120.

Diagnosis: Small, very slender, gray or reddish brown. Surface covered with a thick coating of

grayish or brownish flattened scale-like (tomentose) hairs. Readily recognizable by the strongly flattened dilated third antennal segment which is usually black and contrasting with the reddish brown of the other segments. Head with conspicuous black spines before ocelli and behind eyes. Three-sided antennal segments bearing numerous black spines. Femora armed below distally with a single prominent small black spine.

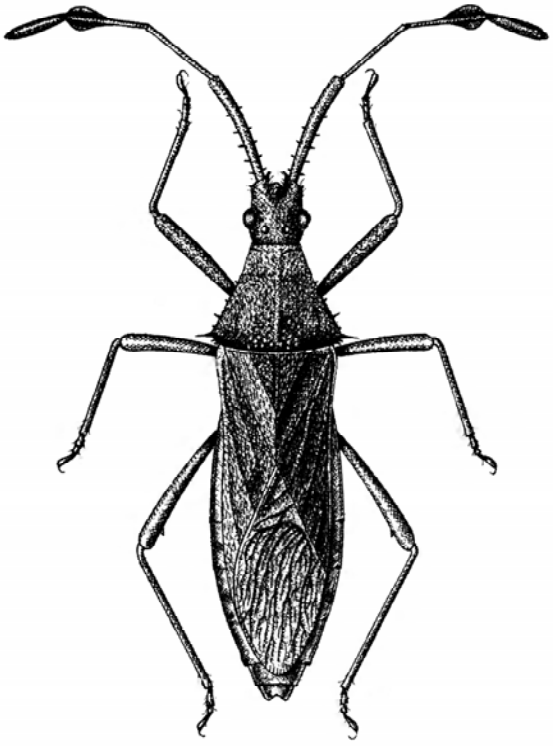
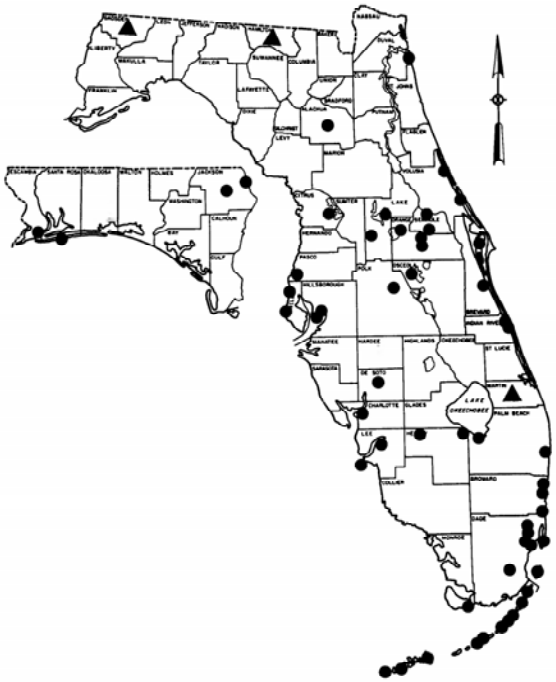


Fig. 15. *Chariesterus antennator.*

Biology: Frequently found in open fields. Hussey (1922) found it to be a characteristic species of the Michigan dunes where it was restricted to a single food plant, *Euphorbia corollata* L., upon which nymphs and adults fed and adults oviposited. Blatchley (1926) stated that it occurs on Jersey tea, *Ceanothus americanus* Torr. & Gray, *Euphorbia* sp., *Asclepias* sp., grasses, dwarf willows, bushes of various sorts, and goldenrod. Hart (1907) supported the record of Hussey as finding it to have as its principal host plant, flowering spurge, *Euphorbia corollata* L. Ashmead (1895), calling it the "flat horned coreid", listed it as common on cotton. Hoffman (1975) listed it also as taken on *Euphorbia corollata* L., *Ceanothus* sp., *Apocynum* sp., *Plantago* sp., *Rhus* sp., and *Castanea pumila* (L.) P. Mill.

Kurczewski (1967) reported it as being found as prey in the cells of the sphecid wasp, *Solierella inermis* (Cresson).

Distribution: Widespread almost throughout the United States east of the Rocky Mountains, but relatively uncommon in the northern states of New England, Wisconsin, Minnesota, etc.



Map XXII. Distribution of *Chariesterus antennator.*

Florida Distribution: Reported by Van Duzee (1909) from Estero, by Barber (1914) from Key Largo, Punta Gorda, Charlotte Harbor, Lake Worth, Biscayne Bay, Atlantic Beach, Lakeland, Miami, Big Pine Key and Indian River District and by Blatchley (1926) from Dunedin, Caxambus and Cape Sable. Throughout the State. ALACHUA CO.: Gainesville, 11-VI-54, G. B. Merrill; same, 26-VIII-55, R. A. Morse; same, 8-V-55, H. V. Weems, Jr., (FSCA); BREVARD CO.: Melbourne, 26-III-80, F. Smith, (FSCACC); Merritt Island, 7-13-VII-40, H. Ruckes, (AMNH); BROWARD CO.: Dania, 17-XI-54, O. D. Link, (FSCA); N. Lauderdale, 29-V-80, K. Tyson; Pompano Beach, 3-X-79, C. Culbreth & D. Clinton, (FSCACC); CHARLOTTE CO.: Punta Gorda, 17-XI-11, (AMNH);

CITRUS CO.: Inverness, 8-VII-80, Siedenburg, (FSCACC); DADE CO.: Miami, 11-21-IV-23, (AMNH); same, 11-V-32, O. D. Link; same, 21-VIII-46, (FSCA); same, 6-VI-78, D. Martinelli, (FSCACC); same, 17-X-61, J. N. Todd; same, 4-IV-11, (NMNH); Homestead, 20-VIII-59, 25-X-61, 26-X-61, R. M. Baranowski, (RMB); same, 8-XII-74, J. A. Slater, (JAS); same, 5-IV-45, L. V. France, (FSCACC); same, 18-IV-23; Biscayne Bay, Slosson, (AMNH); Hialeah, 20-VII-27, G. B. Merrill; Coral Gables, 13-VIII-46, L. V. Isham; Coconut Grove, 3-IV-44, C. S. Tuthill; same, 12-I-38, 10-III-25, (FSCA); Elliot Key, 14-VI-58, G. W. Butler & R. W. Swanson, (FSCACC); DESOTO CO.: Arcadia, 10-XI, (NMNH); DUVAL CO.: Atlantic Beach, (AMNH); ESCAMBIA CO.: Pensacola, 11-14-X-14, (AMNH); GADSDEN CO.: 26-VIII-55, 1-VIII-56, F. W. Mead; HAMILTON CO.: 29-VII-54, H. B. Wesson; HENDRY CO.: Clewiston, 18-X-54; same, 8-X-54, H. A. Denmark, (FSCA); La Belle, 16-VII-39, P. Oman, (NMNH); HIGHLANDS CO.: Archbold Biological Station, Lake Placid, 6-XII-82, M. Deyrup, (ABS); HILLSBOROUGH CO.: Tampa, 8-IV-48, D. J. Downes, (FSCA); same, 24-IV-44, (NMNH); same, 26-V-44, 24-V-44, C. S. Tuthill; same, 20-XI-62, J. W. Patton; Port Tampa, 2-VII-63, J. W. Patton, (FSCACC); INDIAN RIVER CO.: Sebastian, IV,XI, G. Nelson; Wabasso, G. Nelson, (AMNH); 19-III-57, R. L. Blickle, (UNH); JACKSON CO.: 4.3 mi N. Butler, 2-VI-56, R. F. Hussey; Marianna, 22-IV-38, A. N. Tissot, (FSCA); LAKE CO.: Tavares, 18-IX-61, J. R. Hay, (FSCACC); Mascotte, 11-IX-38, P. Oman, (NMNH); LEE CO.: Sanibel Island, 18-VI-57, R. L. Blickle, (UNH); Ft. Myers, 16-II-44, C. S. Tuthill, (FSCACC); MARTIN CO.: 3-XI-54, H. V. Weems, Jr., (FSCA); MONROE CO.: Everglades Nat. Pk., Flamingo Prairie, 26-IX-69, R. M. Baranowski; same, 5-XII-74, J. A. Slater, (JAS); N. Key Largo, 29-VI-69, 4-VII-69, R. M. Baranowski, (RMB); Matecumbe Key, 9-IV-28; Upper Matecumbe Key, 30-VI, M. Bates; same, III, Brooks, (AMNH); same, 30-XII-45, C. O. Esselbaugh, (JAS); Lower Matecumbe Key, 30-VI, M. Bates; Key Largo, (AMNH); same, 26-II-56, 27-III-57, H. V. Weems, Jr., same, 23-VII-53, G. W. Dekle; same, 21-IX-56, H. A. Denmark; same, 27-II-56, R. A. Morse; same, 13-V-58, C. F. Dowling, (FSCA); same, 16-II-46, C. O. Esselbaugh, (JAS); Big Pine Key, 8-VIII-71, W. H. Pierce; same, 19-XI-57, C. F. Dowling, R. W. Swanson, (FSCACC); same, X-1913, (NMNH); same, 13-XII-57, H. V. Weems, Jr.; Plantation Key, X-54, H. A. Denmark; Key West, 14-IV-55, H. V. Weems, Jr.; same, 17-V-28, S. D. Kerr, (FSCA); Islamorada, 28-XII-61, J. H. Knowles; Flamingo, 30-V-58, C. F. Dowling & R. W. Swanson; Boca Chica, 13-VI-71, W. H. Pierce, (FSCACC); ORANGE CO.: Winter Park, 1-12-VIII-39, H. Ruckes; same, 7-IV-37, F. E. Lutz, (AMNH); same, 4-XII-31, (FSCA); Orlando, 20-IX-61, J. R. Woodley; same, 10-VIII-07, Russell, (NMNH); Apopka, 18-X-72, G. T. Smith; OSCEOLA CO.: Kissimmee, 31-VII-78, Pope & Stone, (FSCACC); PALM BEACH CO.: Belle Glade, 18-VII-39, (NMNH); Delray Beach, 18-VII-78, J. E. Bennett & W. C. Churchill, (FSCACC); 23-VII-53, H. V. Weems, Jr., (FSCA); PASCO CO.: Elfers, 14-VII-39, P. Oman; PINELLAS CO.: Clearwater, 7-XI-38, P. Oman; Dunedin, 7-X-38, Andre, (NMNH); POLK CO.: Winter Haven, 26-IX-40, H. T. Fernald; 24-V-55, R. A. Morse, (FSCA); SANTA ROSA CO.: Santa Rosa Island, 15-VI-44, H. C. Secrest, (FSCACC); SEMINOLE CO.: nr. Wagner, 10-IV-41, H. T. Fernald, (FSCA); Sanford, 12-VIII-60, B. Talmadge, (FSCA); ST. LUCIE CO.: Ft. Pierce Inlet, 15-V-83, M. Deyrup; VOLUSIA CO.: Daytona Beach, 30-VI-58, L. W. Holley; Daytona, 19-XI-42, H. V. Weems, Jr.; same, 10-VIII-56, 24-VII-54, H. A. Denmark, (FSCA); same, 21-VII-71, T. L. Kipp & J. N. Pott; Pierson, 25-VII-58, C. R. Roberts, (FSCACC); New Smyrna, III-38, Mrs. C. F. Frost, (NMNH); UNKNOWN COUNTY: Lake Okeechobee, 29-II-38, Gertsch, (AMNH).

CHELINIDINI Uhler 1863, p. 365.

Body oblong, oval. Head porrect, juga with subconical rather subacute apices with tylus deflexed between them. Pronotal humeri rounded, not prominent; lateral margins of pronotum slightly explanate. Femora with a double row of spines on distal half; hind femora somewhat swollen. Second and third antennal segments and tibiae three-sided.

A single genus is known, confined in distribution to the southern United States and Mexico.

CHELINIDEA Uhler, 1863

Type Species: *Chelinidea vittiger* Uhler 1863, p. 366. Monobasic.

Diagnosis: Moderate sized with body short, broad, oblong-oval. Antennal segments 1, 2, and

3 flattened, three-sided. Head porrect, juga produced as conical subacute processes. Pronotum broadly rounded, margins entire, slightly explanate; posterior margin not emarginate. Femora spinose distally below.

The genus, recently reviewed by Herring (1980), contains 5 species, 1 known only from Mexico, 3 occur in Mexico and the southwestern states, one of which ranges into northern South America. The range of 1 coincides with the distribution of prickly pear cactus in the United States and Mexico. Several of the species were introduced into Australia in an attempt to control prickly pear cactus.

CHELINIDEA VITTIGER Uhler (fig. 16, map XXIII)

Chelinidea vittiger Uhler 1863, p. 366.

Diagnosis: A short, stout species (13-15), chiefly yellow orange to dull orange in color. Head, except for an orange medium stripe, legs and antennae, brown. Hemelytra varying from uniform brown to brown with distinct orange or yellow veins and lateral margins. Posterior margin of pronotum may or may not be brown. Post ocular spine reduced to a small tubercle or absent. Body densely punctate. Eastern populations belong to the subspecies *aequoris* McAtee.

Biology: Hamlin (1924) reported its native host to be the prickly pear cactus, *Opuntia humifusa* (as *O. lata*) (Raf.) Raf. It also has been found on *O. stricta* (Haw.) Haw. (reported as *O. dilleni*) and has been reared successfully on *O. austrina* Small and *O. pusilla* (Haw.) Haw. (reported as *O. drummondii*). In Texas it was found to live upon *O. lindheimeri* Engelm. and *O. ficus-indica* (L.) P. Mill. (as *O. engelmanni*) and upon *O. inermis* DC, *O. stricta* (Haw.) Haw., and *O. ficus-indica* (as *megacantha*) in Australia. The Texan and Australian species of *Opuntia* were not as good hosts as the Florida species. Mitchell (unpub) also reported *O. humifusa* (Raf.) Raf. (as *compressa*) as a breeding host in Texas. Adults hibernate on the underside of the cactus joints from about December through February, appearing on the surface of the plants to feed during warm periods. The adults emerge from hibernation in north Florida during February. Oviposition begins in March, and four generations develop annually in the Gainesville area.

The nymphs were first described by Hunter, Pratt, and Mitchell (1912) and more fully by Hamlin (1924). Mead and Herring (1974) provided a short review of the Florida subspecies and a photograph showing an adult and a nymph on *Opuntia*. Arnaud (1978) reported it being parasitized by *Trichopoda pennipes*.

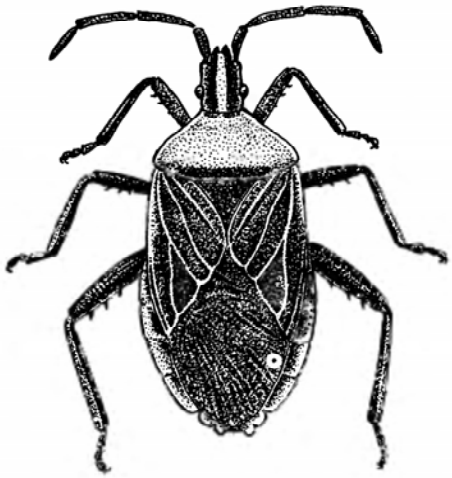
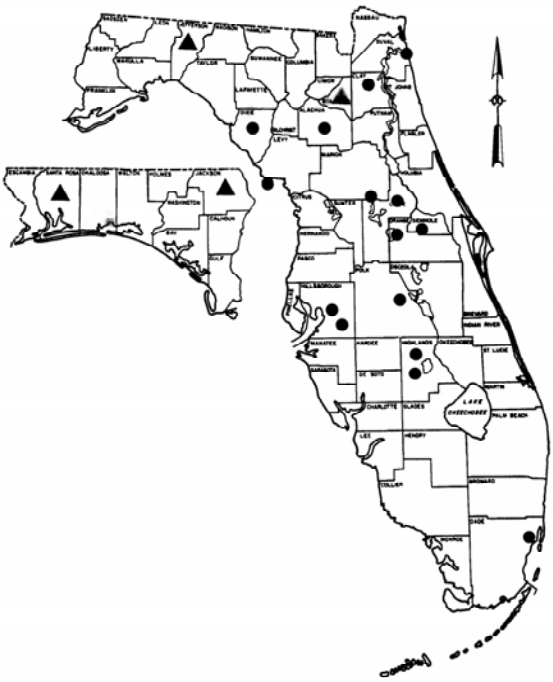


Fig. 16. *Chelinidea vittiger*.

Distribution: Widely distributed in the Western States. It also has been reported from Virginia, North Carolina, Georgia, Alabama, Tennessee, and Florida.



Map XXIII. Distribution of *Chelinidea vittiger*.

Florida Distribution: Hussey (1952) reported it from Rock Bluff, Liberty County and Alachua County. More common in the central and northern counties. ALACHUA CO.: Gainesville, 15-VII-59, P. Weems; same, 8-II-49, G. W. Dekle; same, IX-55, X-62, L. A. Hetrick; same 18-IV-38, K. Wheeler; same 14-VII-37, 30-IV-37, 17-V-37, 4-VIII-37, A. N. Tissot; same, 24-IV-75; same, 29-X-36, (FSCA); same, 27-VI-79, D. Culbert; same, 3-X-75, C. B. Lieberman; same, 24-IV-75, K. R. Langdon, (FSCACC); same, 2-VII-56, F. W. Mead; same, 14-VII-61, J. Q. Platt, (RMB); same, 26-IV-48, R. Capelouto; same, 27-VI-79, H. W. Collins; same, 12-VII-55, H. A. Denmark; same, 4-IV-58, R. P. Esser; BRADFORD CO.: 2-V-59, H. V. Weems, Jr., (FSCA); same, 1-V-59, 2-V-59, H. V. Weems, Jr., (RMB); CLAY CO.: Penney Farms, 13-VII-36, K. Wheeler, (FSCA); Camp Crystal, 6-V-67, H. V. Weems, Jr.; same, 14-V-60, H. V. Weems, Jr., (RMB); DADE CO.: Miami, E. Mortenson, (NMNH); DIXIE CO.: Cross City, 24-IV-38, A. N. Tissot; (FSCA); DUVAL CO.: Ft. George, 18-II-67, C. E. Zeiger, (RMB); HIGHLANDS CO.: 23-IV-62; Sebring, 10-VI-60, L. J. Bottimer; same, 24-XII-60, H. V. Weems, Jr., (FSCA); same, 10-VI-60, 23-XII-61, 14-IV-66, H. V. Weems, Jr.; Archbold Biol. Sta., 27-III-63, H. V. Weems, Jr., (RMB); same, Lake Placid, 11-XI-82, M. Deyrup, (ABS); HILLSBOROUGH CO.: Brandon, 15-VIII-80, E. R. Simmons; same, 8-IV-64, J. W. Patton; Picnic, 7-X-65, B. Damel & A. Baker; JACKSON CO.: 1-X-68, W. H. Whitcomb, (FSCACC); JEFFERSON CO.: 2-V-57, R. H. Miller, (RMB); Cody, 2-V-57, R. H. Miller, LAKE CO.: Paisley, 26-IV-65, A. L. Bentley; LEVY CO.: Cedar Key, 11-VIII-74, F. N. Young; MARION CO.: Weirsdale, 2-V-78, F. J. McHenry; ORANGE CO.: Apopka, 13-VIII-71, P. Gibson; POLK CO.: E. Lake Wales, 9-IV-59, W. P. Henderson; SANTA ROSA CO.: 2-VIII-55, F. W. Mead; SEMINOLE CO.: Fern Park, 24-VIII-62, C. O. Youtsey, (FSCACC).

COREINI Stal 1867, p. 547.

Relatively small to moderate sized. Body elongate to oblong-oval. Head porrect, subquadrate, or subtriangular, produced slightly to considerably forward in front of bases of antennae. Pronotum somewhat hexagonal, margins usually simple, non-spinose. Femora usually unarmed or with one or two small spines. Tibiae simple, cylindrical.

A large tribe represented in all major zoogeographic regions of the world, containing about 30 genera, seven of which occur in Florida.

KEY TO FLORIDA GENERA OF COREINI

1. Posterior femora armed below with one or more spines 2
1'. Posterior femora mutic 4
2. Body length less than 10 mm; humeri produced into long, sharp, outwardly directed spines . . . . . *Zicca*, p. 67
2'. Body length generally 14 mm or more; humeri not acutely spined 3
3. Head lacking spines or tubercles either behind bases of antennae or laterally . . . . . *Namacus*, p. 63
3'. Head with prominent spine behind antennae (not laterad of antenniferous tubercle) . . . . . *Anasa*, p. 51
4. Tylus elevated and compressed above juga to form carina between antennal bases; veins of membrane numerous, irregularly anastomosing, or almost reticulated . . 5
4'. Veins of membrane less numerous, simple or at most slightly branched or furcate; tylus not compressed and elevated above juga (tylus somewhat elevated in *Catorhintha divergens*) 6
5. Second and 3rd antennal segments compressed . . . . . *Sethenira*, p. 65
5'. Second and 3rd antennal segments cylindrical . . . . . *Althos*, p. 51
6. Labium very short, scarcely extending posteriorly beyond fore coxae . . . . . *Cimolus*, p. 61
6'. Labium attaining or extending beyond middle of mesosternum (labium on some specimens of *Catorhintha divergens* does not reach mesocoxae) 7
7. A shelf-like plate present beneath antenniferous tubercle extending over lower rim of antennal articulation orifice . . . . . *Catorhintha*, p. 56
7'. Head below antenniferous tubercle lacking a raised shelf-like plate . . . *Anasa*, p. 51

ALTHOS Kirkaldy, 1904

Type Species: *Margus pectoralis* Dallas 1852. By subsequent designation.

Diagnosis: Relatively small (9-11) with numerous anastomosing veins in the membrane. Tylus elevated and compressed. Pronotum nearly flat, antero-lateral angles sharply carinate, acutely produced anteriorly into a short tooth. Legs slender, all femora unarmed.

Essentially a Neotropical genus containing approximately 13 species of which 3 occur in the United States. Two of these are western, the third occurring in Florida. Much of the literature concerning the North American species is under the name of *Margus* Dallas.

ALTHOS OBSCURATOR (Fabricius)
(fig. 17, map XXIV)

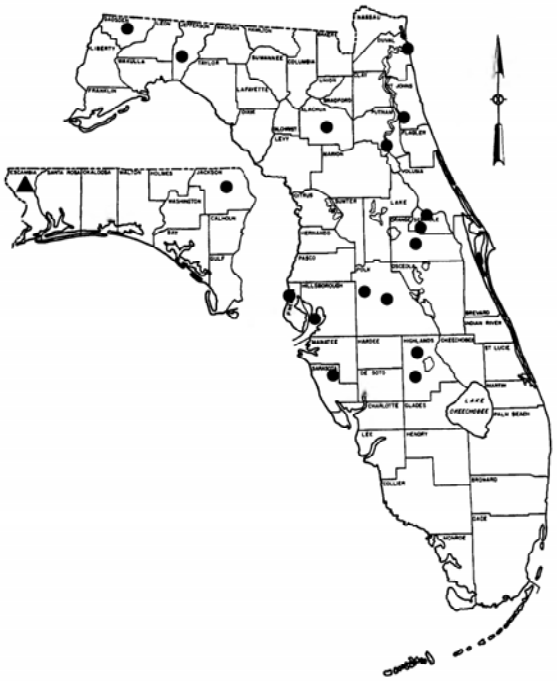
Coreus obscurator Fabricius 1803, p. 200.
Margus impudens Stal 1860, p. 37.
Althos obscurator Van Duzee 1909, p. 160.

Diagnosis: Small (9-11); grayish yellow to pale brown with numerous dark punctures. Antenniferous tubercles with outer side of distal ends acutely produced. Antennae with basal segment stout, curved. Granulose connexivum alternating yellowish and black. Legs pale brown.

Biology: Blatchley (1902) reported specimens on flowers of thistle and *Senecio* sp. Van Duzee (1909a) took it on sedges and grasses in marshy meadows. Blatchley (1926) noted its occurrence in old fields and open pine woodlands and that it comes to light.

Distribution: Widely distributed in the Neotropical and known in this country only from Florida and South Carolina (Sherman, 1948).

Florida Distribution: Reported by Blatchley (1902) as *Margus inornatus* Stal from Ormond, by Van Duzee (1909) from Sanford, Crescent City and St. Petersburg, by Barber (1914) in the genus *Margus* from Lakeland and South Jacksonville and by Blatchley (1926) from Moore Haven, Sarasota and Dunedin. ALACHUA CO.: Gainesville, 4-IX-55, R. A. Morse; same, 25-VI-39, J. R. Watson, (FSCA); same, 14-VIII-76, G. B. Edwards; same, 4-IV-72, F. W. Mead, (FSCACC); same, 15-IX-18, J. R. Watson, (NMNH); same, 29-III-58, R. E. Woodruff; same 13-IX-61, 4-IV-72, F. W. Mead, (RMB); same, 20-IX-55, F. W. Mead; same, 6-V-34, student coll.; same, 14-II-49, F. N. Young; DUVAL CO.: St. John's Bluff, 11-IX-56, F. W. Mead; ESCAMBIA CO.: 5-VIII-55, F. W. Mead, (FSCA); GADSDEN CO.: Quincy, 1-IX-21, G. L. Garrison, (NMNH); HIGHLANDS CO.: Archbold Biol. Sta., 22-II-59, S. W. Frost, (RMB); Parker Island, Lake Placid, 29-III-67, M. Deyrup, (ABS); Sebring, 8-III-58, H. V. Weems, Jr., (FSCA); HILLSBOROUGH CO.: Port Tampa, 17-VI-61, J. W. Patton, (FSCACC); JACKSON CO.: Fla. Cav. St. Pk., 13-IV-60, H. V. Weems, Jr.; JEFFERSON CO.: Aucilla Wild. Mgt. Area, 14 mi. S. Wacissa, 16-III-74, J. B. Heppner, (RMB); ORANGE CO.: Orlando, 10-V-09, Russell; same 30-III-08; PINELLAS CO.: Dunedin, 6-III-27, W. S. Blatchley; POLK CO.: Lakeland, 7-V-12, 8-V-12, W. T. Davis, (NMNH); same, 19-IV-49, R. F. Hussey, (FSCA); Winter Haven, 4-II-48, O. D. Link, (RMB); PUTNAM CO.: Pomona Park, 21-V-72, D. H. Habeck; SARASOTA CO.: Lake Myakka, 4-VI-39, J. R. Watson, (FSCA); SEMINOLE CO.: Fern Park 7-IV-59, C. O. Youtsey, (FSCACC); Sanford, 1925, E. Ball; same, 22-VII-39, P. W. Oman; same, 8-V-08, 28-IV-08, Van Duzee; ST. JOHNS CO.: Hastings, 27-VII, J. L. Scribner, (NMNH).



Map XXIV. Distribution of *Althos obscurator*.

ANASA Amyot and Serville, 1843

Type Species: *Anasa cornuta* Amyot and Serville 1843. Monobasic.

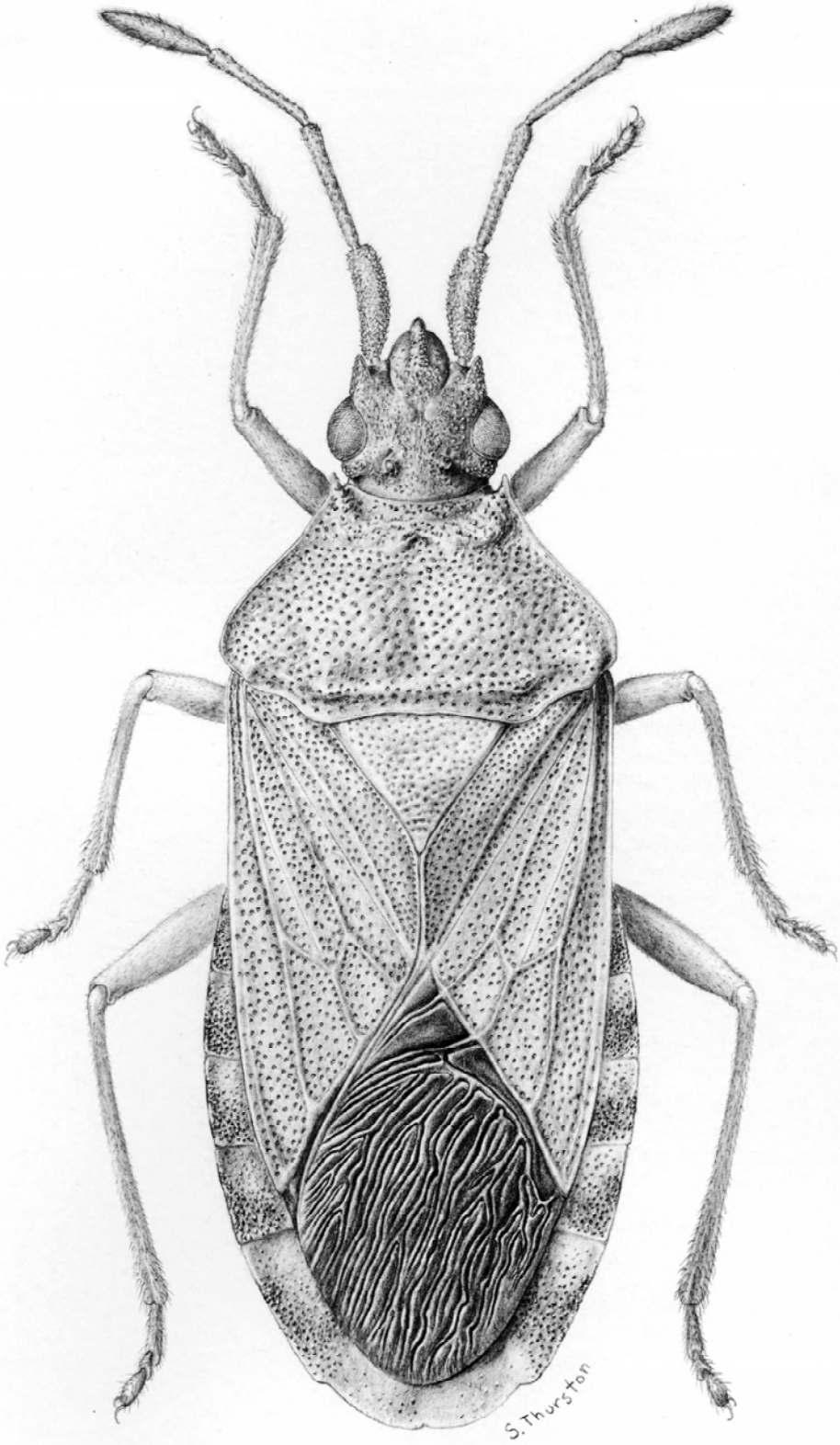


Fig. 17. *Althos obscurator.*

Diagnosis: Medium size, robust, elongate oval. Head subquadrate, not strongly declivent, projecting noticeably beyond bases of antennae, calloused and swollen laterally behind eyes. Labium extending to or beyond middle coxae. Pronotum strongly declivent, anterolateral margins finely serrate or nodulose, markedly narrowing anteriorly; humeri obtuse. Connexivum usually widely exposed. Femora slender, unarmed or with one or two small spines distally on ventral surface.

Distribution: A large genus of over 50 species, chiefly Central and South American in distribution. Seven species occur north of Mexico, one into Canada, and four in Florida.

KEY TO FLORIDA SPECIES OF *ANASA*

1. Head spines present or absent, but if present short, not reaching bases of antennae; humeral angles of pronotum not reflexed 2

1'. Head spines arising behind base of antenniferous tubercles and extending dorsolaterad to reach beyond bases of antennae; humeral angles of pronotum produced and reflexed upward 3

2. Fourth antennal segment yellowish or orange, at least distally. A short stout spine present dorsally on head posterior to each antenniferous tubercle. Scutellum lacking black punctures along median line (body distinctly more slender than *tristis*) ..... *andresii*, p. 53

2'. Fourth antennal segment chiefly black. No spine on head posterior to antenniferous tubercle. Scutellum without a pale midline ..... *tristis*, p. 55

3. First antennal segment unicolorous ..... *scorbutica*, p. 54

3'. First antennal segment with large black or dark brown spots ..... *armigera*, p. 54

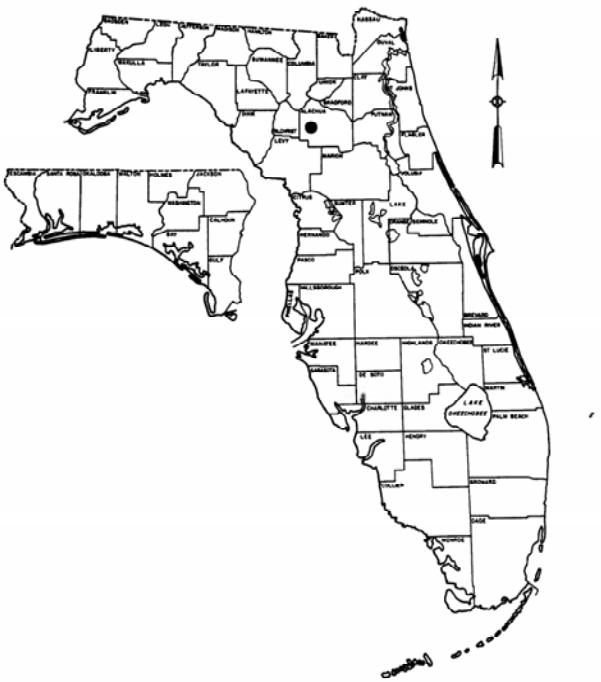
ANASA ANDRESII (Guerin)
(map XXV)

Coreus andresii Guerin 1857, p. 383.
Anasa lugens Stal 1862, p. 301.
Anasa andresii Stal 1865, p. 186.

Diagnosis: Relatively elongate and parallel sided, moderate in size (13-15). Dull yellowish brown or greenish brown with numerous black punctures over entire dorsal surface, these being most dense on posterior pronotal lobe. Fourth antennal segment chiefly orange or yellow, especially distally, contrasting with dark chocolate brown to black of preceding segments. Membrane brown; connexivum with alternating dark brown and yellow patches, but with central portion of brown area suffused with yellow. Legs yellowish with black dots. Head spines above bases of antenniferous tubercles short and stout.

Very similar in appearance to the ubiquitous *A. tristis*, but a more slender species. The forward projection of the antero-lateral pronotal angles with a tooth in *tristis* traditionally used in many keys is of questionable value.

Biology: Barber and Bruner (1947) stated that it is a pest on squash and also has been taken on tomato in Cuba. Jones (1916) reported it as a pest of cucurbits in Louisiana and described the nymphs and life cycle. We have collecting records from cotton and corn.



Map XXV. Distribution of *Anasa andresii*.

Distribution: Widespread in the Neotropical Region. In the United States reported from

Louisiana, Texas, New Mexico, California, and Florida.

Florida Distribution: Reported by Uhler (1875) from southern Florida without definite locality. Only known from 2 specimens. "E. Fla." Ashmead, (NMNH); ALACHUA CO.: Newberry, 14-V-75, R. Beuttell, (FSCA).

ANASA ARMIGERA (Say)
(map XXVI)

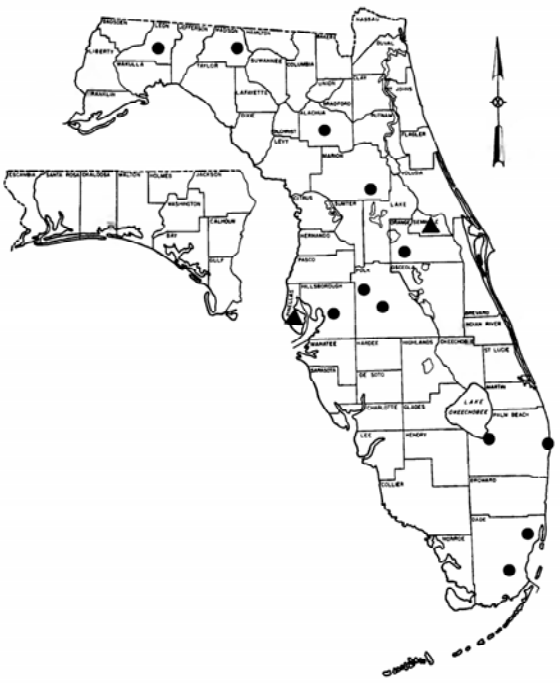
Coreus armigera Say 1825, p. 319.
Anasa terminalis Dallas 1852, p. 506.
Anasa armigera Stal 1868, p. 57.

Diagnosis: Dark to yellowish brown with numerous dark punctures over the surface. Membrane uniformly dark brown. Connexivum dark brown with anterior border of each segment and a small dot on middle of lateral edge yellow. Legs yellow with numerous conspicuous black dots. Fourth antennal segment orange or yellow. Pronotum strongly declivent.

Biology: Blatchley (1926) reported *armigera* on *Sicyos angulatus* L. in company with *A. repetita* Heidemann. Hoffman (1975) reported *Sicyos angulatus* L. as the native host and also commented on occasional damage to cultivated cucurbits. Chittenden (1898) discussed the life history, described the 5 nymphal instars, and also reported it as occasionally injurious to cultivated cucurbits. It apparently has 1 generation a year, at least in the North. Arnaud (1978) reported it as being parasitized by *Trichopoda pennipes*.

Distribution: Ranges from New England south into Florida and Texas and west to Iowa and Kansas.

Florida Distribution: Reported by Blatchley (1926) from Dunedin, Lake Okeechobee, Royal Palm Park and Cape Sable. ALACHUA CO.: Gainesville, 23-VIII-61, G. Q. Platt; same, 31-V-60, B. Platt; same 18-VIII-58, (RMB); same, 18-X-47, H. V. Weems, Jr.; same, 11-VIII-55, R. A. Morse; same, 11-VII-59, F. W. Mead; same, 15-VI-57, R. F. Hussey, (FSCA); same, 22-V-79, M. A. Altieri; same 4-VI-74, D. Mays, (FSCACC); same, 22-XI-22, (RMB); DADE CO.: Homestead, 8-XII-74, J. A. Slater, (JAS); Miami, 20-IV-44, C. S. Tuthill; HILLSBOROUGH CO.: Brandon, 6-IX-64, 6-X-65, J. W. Patton, (FSCACC); LEON CO.: Tallahassee, 6-VII-78, M. A. Altieri, (FSCACC); MADISON CO.: Madison, 12-V-54, H. Van Pelt, (FSCA); MARION CO.: E. Lake Weir, 23-VI-60, T. R. Adkins; (FSCACC); ORANGE CO.: Windemere, 3-V-48, O. D. Link, (FSCA); PALM BEACH CO.: Lake Worth, IV-45, G. M. Anderson; Belle Glade, 20-V-44, H. C. Secrest, (FSCACC); PINELLAS CO.: 18-IV-58, C. E. Bingaman, (FSCA), (RMB); POLK CO.: Lakeland, 22-XI-54, W. B. Tappan, (FSCA); Bartow, 28-V-63, R. E. Vild; SEMINOLE CO.: 18-IV-58, C. E. Bingaman, (FSCACC).



Map XXVI. Distribution of *Anasa armigera*.

ANASA SCORBUTICA (Fabricius)
(map XXVII)

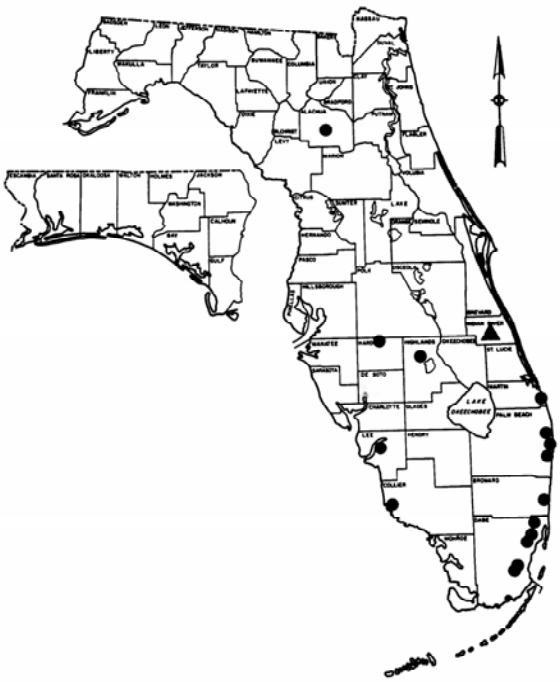
Cimex scorbutica Fabricius 1775, p. 706.
Acanthocerus nebulosa Palisot Beauvois 1805, p. 205.
Anasa moesta Dallas 1852, p. 505.
Anasa spiniceps Stal 1862, p. 300.
Anasa scorbutica Stal 1868, p. 56.

Diagnosis: Moderate sized (12-14), stout bodied. Dull yellow to dark red-brown with numerous dark punctures over the dorsal surface. Membrane uniformly dark brown. Legs yellowish with brown spots especially conspicuous on femora, the distal halves of which are infuscated with brown. Antennae nearly uniformly yellow-

ish, unspotted. Head with elongate outwardly curving spines behind bases of antenniferous tubercles. Head laterally strongly tuberculate, swollen behind eyes. Pronotum strongly declivent, bearing numerous upstanding setigerous hairs that contrast strongly with pale yellow semi-decumbent hairs of hemelytra. All femora armed below distally with a sharp spine.

Biology: Barber and Bruner (1947) stated that it breeds on squash and *Luffa cylindrica* (L.) Roemer and has been taken on tomato in Cuba. At Homestead we have taken adults and nymphs on *Momordica charantia* (L.), wild balsam apple.

Distribution: West Indies, Mexico, southwestern states, and Florida.



Map XXVII. Distribution of *Anasa scorbutica*.

Florida Distribution: Reported by Barber (1914) from Biscayne Bay. More common in southern counties. ALACHUA CO.: Gainesville, 30-VIII-60, T. R. Adkins; BROWARD CO.: Ft. Lauderdale, 8-XI-73, B. D. Perkins, (FSCACC); COLLIER CO.: Naples, 28-VI-79, K. Delate; DADE CO.: Miami, 14-X-57, J. C. Butler; same, 27-II-58, 12-XII-56, C. F. Dowling; same, 4-VIII-33, F. N. Young; same 12-VIII-48, O. D. Link; same, 9-III-79, P. Chobrda, (FSCA); same, 30-X-63, J. F. Richter; same, 22-X-61, B. K. Dozier, (RMB); same 30-X-63, J. F. Richter; same, 24-IX-58, L. J. Daigle; same, 27-II-58, L. J. Daigle & C. F. Dowling; same 23-V-44, C. S. Tuthill, (FSCACC); same, 23-III-44, (NMNH); Homestead, 23-II-46, 19-I-46, C. O. Esselbaugh, (JAS); same, 16-X-61, D. O. Wolfenbarger; same, 8-IV-57, R. M. Baranowski; same, 4-IV-58, C. F. Dowling; same, 14-IV-58, R. W. Swanson & C. F. Dowling; same, 5-XI-58, R. W. Swanson; same, 12-VII-62, S. Goldweber; same, 12-V-76, V. Waddill; same 30-VI-80, G. Webster, (FSCACC); same, 16-X-61, D. O. Wolfenbarger; same, 11-II-48, O. D. Link; same, 9-III-49, Calkins & Link; same, 10-I-38, J. S. Haeger, (FSCA); Coral Gables, 12-XII-56, C. F. Dowling; N. Miami, XII-62, Moore, (FSCACC); 26000 SW 197 Av., 3-I-80, R. M. Baranowski; Ross & Castellow Hammock, 12-IV-66, H. V. Weems, Jr., (RMB); HARDEE CO.: Bowling Green, 14-X-77, J. T. Felty, (FSCACC); HIGHLANDS CO.: Sebring, 1-IX-57, 7-VIII-49, H. V. Weems, Jr., (FSCA); INDIAN RIVER CO.: 19-III-57, R. L. Blickle, (UNH); LEE CO.: Ft. Myers, 26-III-75, V. W. Yingst, (FSCA); same, 22-XI-74, J. Crane, (RMB); same, 8-X-75, 26-III-75, V. W. Yingst; same, 22-XI-74, J. Crane; MARTIN CO.: Hobe Sound, 13-IV-74, T. Fair; PALM BEACH CO.: Lake Worth, 6-VI-78, J. E. Bennett, (FSCACC); same, 7-VIII-78, 4-VI-78, J. E. Bennett, (FSCA); same, 19-IV-45, (NMNH); Boynton, 7-II-51, G. C. Costner, (FSCA); W. Palm Beach, 15-III-75, P. Duplease, (UNH).

ANASA TRISTIS (DeGeer)
(fig. 18, map XXVIII)

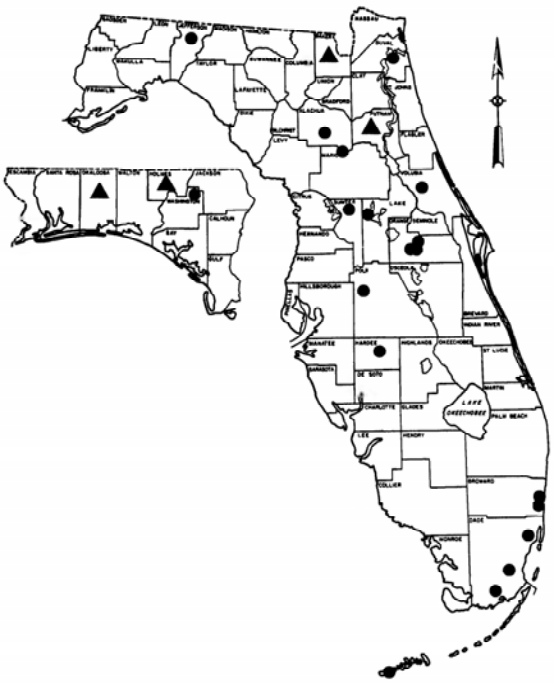
Cimex tristis DeGeer 1773, p. 340.
Cimex moestus Gmelin 1778, p. 2168.
Coreus rugator Fabricius 1803, p. 192.
Coreus ordinatus Say 1825, p. 318.
Oriterus destructor Hahn 1831, p. 8.
Anasa tristis Stal 1868, p. 56.

Diagnosis: Robust, oblong-oval, ranging from dull yellow to dark brown; densely covered with dark punctures. The presence of small irregular yellow areas frequently gives it a mottled appearance. Head brownish with a narrow pale yellow median line and a shorter yellow stripe on each side. Lateral margins of pronotum and tip of scutellum yellow. Membrane brown to black. Legs yellow, densely covered with dark on dorsal surface, less so on ventral surface.

Biology: Commonly known as the Squash Bug, it was one of the first insects to be described

from North America. It has been recorded from several kinds of plants but is especially injurious to squash and melons. Chittenden (1899, 1908) figured all stages, discussed its damage and reported *Trichopoda pennipes* as a parasite of the adult and *Hadronotus anasa* Ashmead, *Ooencyrtus anasae* Ashmead, and *Eupelmus reduvii* Howard as egg parasites. Arnaud (1978) also reported it as being parasitized by *T. pennipes*.

Distribution: Throughout the United States and southern Canada south into Mexico and Brazil.



Map XXVIII. Distribution of *Anasa tristis*.

Florida Distribution: Reported by Barber (1914) from Lake Okeechobee, Everglade, Jacksonville, Lee Co., Big Pine Key, Miami and Silver Springs and by Blatchley (1926) from Dunedin. ALACHUA CO.: Gainesville, 21-VII-36, 6-X-37, A. N. Tissot; same, 18-X-47, H. V. Weems, Jr., (FSCA); same, 29-IV-63, R. P. Esser; nr. Gainesville, 14-V-57, R. P. Esser; BAKER CO.: 23-VIII-55, H. B. Wesson, (FSCACC); BROWARD CO.: Hollywood, 6-IX-36; Ft. Lauderdale, VI-22, D. M. Bates, (FSCA); DADE CO.: Miami, 23-IV-44, 24-IV-44, C. S. Tuthill; same, 7-X-80, G. Webster, (FSCACC); Univ. of Fla., AREC, 1-IX-77, R. M. Baranowski, (RMB); Paradise Key, 8-III-19, H. G. Barber (NMNH); DUVAL CO.: Jacksonville, 29-IV-19, H. A. Daniels, (NMNH); HARDEE CO.: Wauchula, 16-VII-18, B. E. Melendy, (FSCA); HOLMES CO.: 24-V-56, J. C. Russell, (FSCACC); JEFFERSON CO.: Monticello, 6-VII-37, A. N. Tissot, (FSCA); same, 29-I-40, H. B. Scammell; LAKE CO.: Leesburg, 2-IV-54, J. M. Crall, (FSCACC); same, 25-VII-46, (FSCA); MARION CO.: Orange Lake, 7-V-45, (FSCA); MONROE CO.: Stock Island, 10-IV-44, C. S. Tuthill, (FSCACC); OKALOOSA CO.: 13-VIII-55, H. B. Wesson; ORANGE CO.: Winter Park, 4-X-43, H. T. Fernald, (FSCA); Orlovista, 1-IV-44, H. C. Secrest, (FSCACC); Orlando, 14-V-07, 17-VI-07, (NMNH); POLK CO.: Lakeland, 22-XII-52, R. F. Hussey, (FSCA); PUTNAM CO.: 5-IX-60, F. W. Mead, (RMB); SUMTER CO.: Wildwood, 18-IV-52, W. Hunter; (FSCA); VOLUSIA CO.: Deland, 9-IX-58, C. R. Roberts, (FSCA); WASHINGTON CO.: Chipley, 25-VI-56, A. L. Baker, (FSCA).

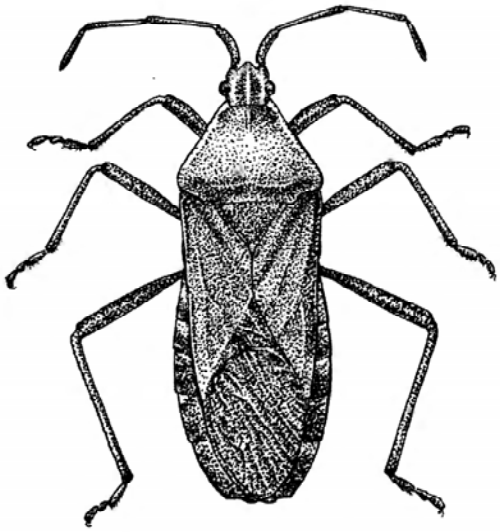


Fig. 18. *Anasa tristis*.

CATORHINTHA Stal, 1859

Type Species: *Lygaeus guttula* Fabricius 1794, p. 162. Fixed by subsequent designation.

Diagnosis: Small to moderate sized (8-12), oblong elongate. Dull grayish brown to yellowish. Head broad, somewhat flattened. Antenniferous tubercles usually small, with or without a prominent spine. First antennal segment slightly thickened, slightly curved, one-half or

more length of head. Humeri obtusely rounded, not prominent. Connexivum narrowly exposed.

Nearctic and Neotropical. Eight species are known, four occurring north of Mexico with three in Florida.

KEY TO FLORIDA SPECIES OF *CATORHINTHA*

1. Antenniferous tubercle not spinose nor with conical tubercles, at most with an indication of a small tubercle ..... *divergens*, p. 57

1'. Antenniferous tubercle produced into an anterolaterally directed spine or conical tubercle 2

2. Legs having numerous black spots ..... *guttula*, p. 57

2'. Legs without numerous black spots ..... *viridipes*, p. 59

CATORHINTHA DIVERGENS Barber
(fig. 19, map XXIX)

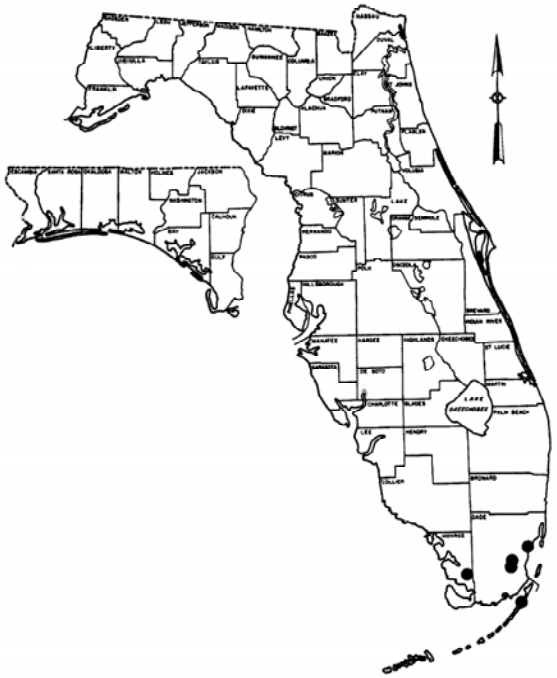
Catorhintha divergens Barber 1926, p. 214.

Diagnosis: Medium sized (12), elongate, almost uniformly pale yellow or greenish yellow. Corium irregularly suffused with dull reddish. Antennae yellowish-brown, segment one with two black longitudinal stripes, segment four reddish, distal half often lighter than proximal half. Legs uniformly yellow. Antenniferous tubercles with spines present. Abdominal dorsum with two broad vivid red stripes.

Biology: Barber and Bruner (1947) reported it from guava in Cuba (probably a sitting record). We have examined adults collected on *Coccoloba diversifolia* Jacq. At times it is relatively common in blacklight catches from hammocks in southern Florida.

Distribution: Mexico, Cuba and Florida.

Florida Distribution: The holotype was described from Paradise Key. Restricted to the extreme southern part of the State. DADE CO.: Matheson Hammock, 26-XI-55, H. A. Denmark; same, 31-X-57, F. W. Mead; Homestead, 12-VI-62, C. F. Dowling, (FSCA); Newton Road, Orchid Jungle, 1-X-69, R. M. Baranowski, (JAS); same, 17-VI-69, 1-VII-69, 9-VII-69, 1-VIII-69, 29-VIII-69, 5-IX-69, 11-IX-69, 23-IX-69, 30-IX-69, 1-X-69, 7-X-69, 9-X-69, 14-X-69, R. M. Baranowski; Ross & Castellow Hammock, 2-VII-69, 9-VII-69, 5-IX-69, 11-IX-69, 23-IX-69, 30-IX-69, 1-X-69, 2-X-69, 7-X-69, 9-X-69, 10-X-69, 16-X-69, 20-X-69, 22-X-69, R. M. Baranowski; Homestead, 1962, C. F. Dowling; Naranja, 21-VI-54, O. D. Link; MONROE CO.: Key Largo, 2-V-57, F. W. Mead; Everglades Nat. Pk., 5-IV-58, H. V. Weems, Jr., (RMB).



Map XXIX. Distribution of *Catorhintha divergens*.

CATORHINTHA GUTTULA (Fabricius)
(map XXX)

Lygaeus guttula Fabricius 1794, p. 162.
Gonocerus dorsiger Westwood 1842, p. 25.
Catorhintha guttula Stal 1859, p. 471.

Diagnosis: Elongate oblong, small (8-9), grayish yellow with numerous dark punctures on dorsal surface. Antennae largely black with area between second and third segments and distal ends of third and fourth yellow. Abdominal connexivum alternating yellow and black. Dorsum of abdomen black except for area around scent

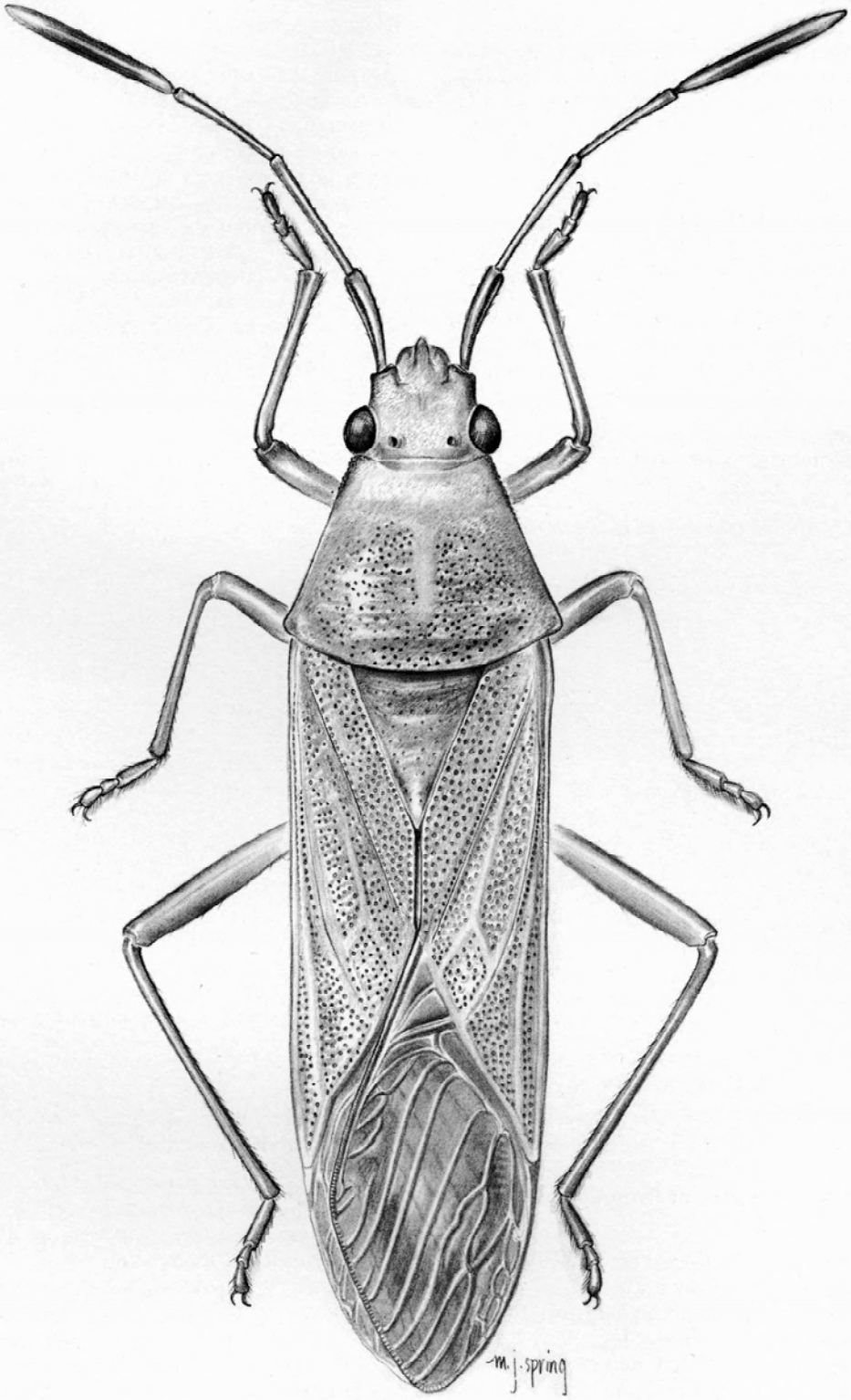
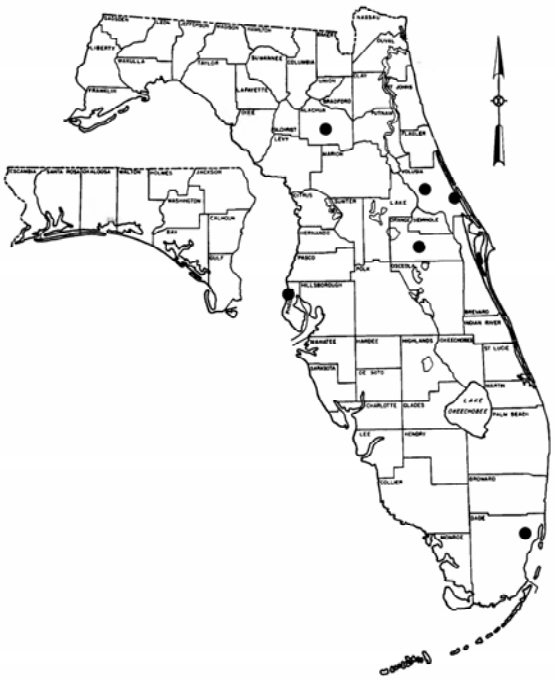


Fig. 19. *Catorhintha divergens.*

gland openings. Legs yellow with black spots. Inner surface of proximal half of femora of males flattened and covered with long hairs, the same area in females flattened but only a few short hairs present. This structure is apparently unique to this species and may be a mating adaptation.

Biology: Blatchley (1926) reported it "especially" on the flowers and foliage of *Lyonia* (as *Xolisma*) *ferruginea* (Walt.) Nutt. Mitchell (unpub.) reported breeding populations on *Boerhaavia diffusa* L. (as *B. coccinea*) and adults on *Heterotheca* sp., *Cirsium* sp., and *Ludwigia* sp. Barber and Bruner (1947) reported specimens on *Urena sinuata* L. and *Mirabilis jalapa* L. in Cuba.

Distribution: West Indies, Colorado, Texas, Arizona, North Carolina, and Florida.



Map XXX. Distribution of *Catorhintha guttula.*

Florida Distribution: Reported by Van Duzee (1909) from Crescent City and Seven Oaks, by Barber (1914) from Biscayne Bay, Miami and Jacksonville and by Blatchley (1926) from Dunedin. ALACHUA CO.: Gainesville, 7-VI-26, G. B. Merrill; same, 30-IV-79, M. Altieri; same, 28-VII-33, (FSCA); DADE CO.: Miami, 8-IV-19, (NMNH); ORANGE CO.: Orlando, 30-IV-26; PINELLAS CO.: Dunedin, 1-IV-22, W. S. Blatchley, (NMNH); VOLUSIA CO.: Deland, 13-XII-71, C. R. Roberts, (FSCA); Edgewater, 18-II-39, C. A. Frost, (NMNH).

Catorhintha mendica Stal was listed by Barber (1914) as occurring in Florida, based on material collected by Mrs. A. Slosson at Biscayne Bay and by W. T. Davis at Miami. Fracker (1923) also stated that this species occurs in Florida, but very likely this was based on Barber's records. Balduf (1942, 1957) showed conclusively that *mendica* is a western species that has been extending its range northeastward in historical times following its only host plant, *Mirabilis nyctaginea* (Michx.) MacM. It certainly is not a member of the Florida fauna. We suggest that the Barber and Fracker references are based on mistaken identifications of *guttula*. However, as pointed out by Hoffman (1975) the host plant and the insect are steadily expanding their ranges, and he cited a record for Virginia.

CATORHINTHA VIRIDIPES Blatchley
(fig. 20, map XXXI)

Catorhintha borinquensis viridipes Blatchley 1926, p. 247.

Diagnosis: Moderate sized (10-12), elongate, dull yellow to dark reddish brown. Head dull yellow with numerous black punctures coalescing to form two irregular stripes. First antennal segment, distal ends of segments two and three, middle of segment four black, the remainder of antennae yellow. Antenniferous tubercles produced into sharp prominent black spines. Pleurites and mediolateral area of each ventral abdominal segment with a prominent black spot. (The original description indicates that the legs are dull yellow except for the distal third of the femora and the entire tibiae bluish green). One specimen examined from Key West has the legs entirely yellow except for a small brownish area of the distal end of the femora.

Biology: Eggs are deposited in clusters in the flowers of *Pisonia rotundata* Griseb. Nymphs remain feeding on the flowering parts until they molt to adults. We have only collected them on this plant during the spring months when it is in flower. The habitat during other times of the year is unknown.

The type was beaten from fallen leaves of royal palm on Paradise Key (Everglades National Park). Blatchley (1926) described *viridipes* as a subspecies of the Puerto Rican

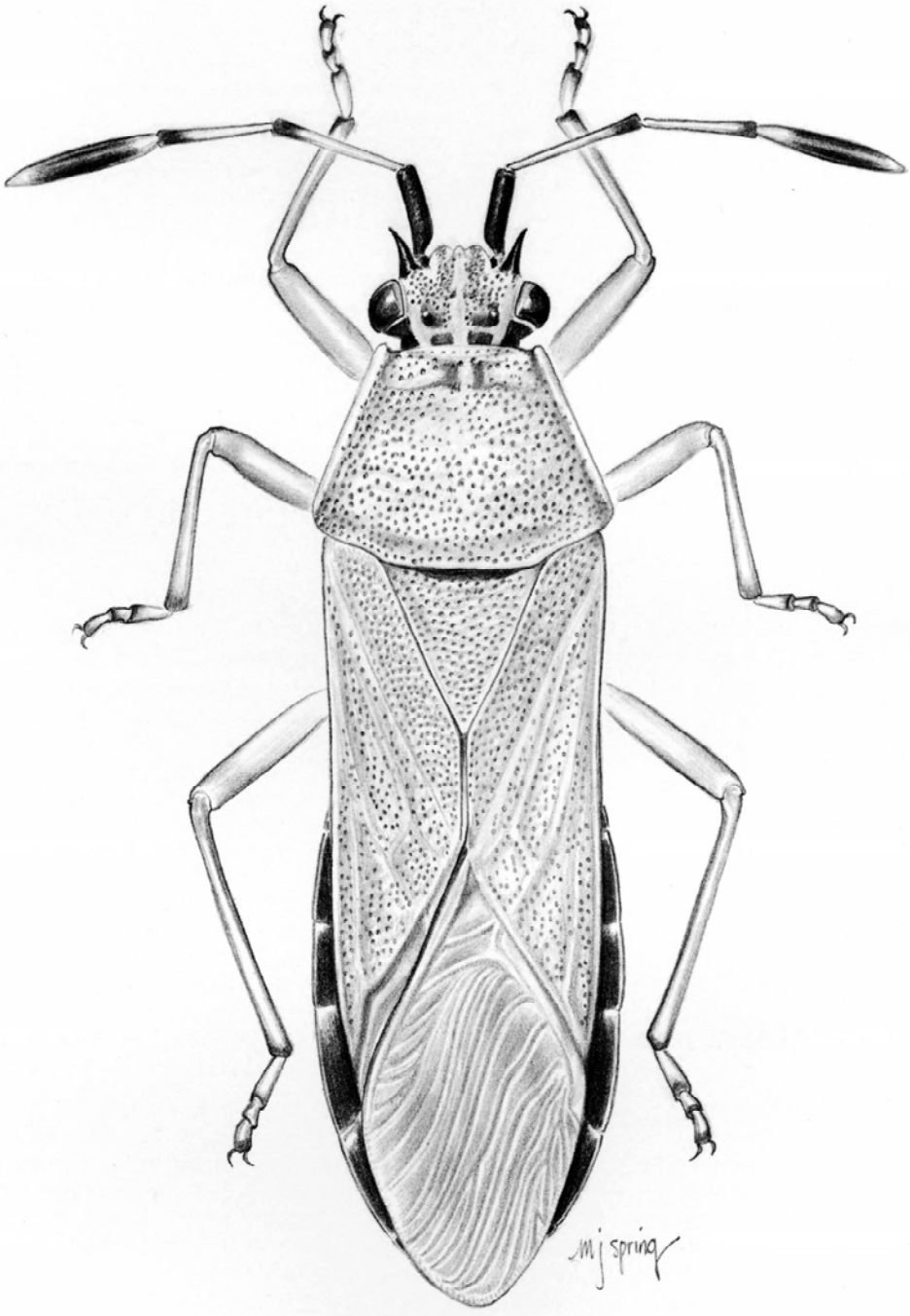
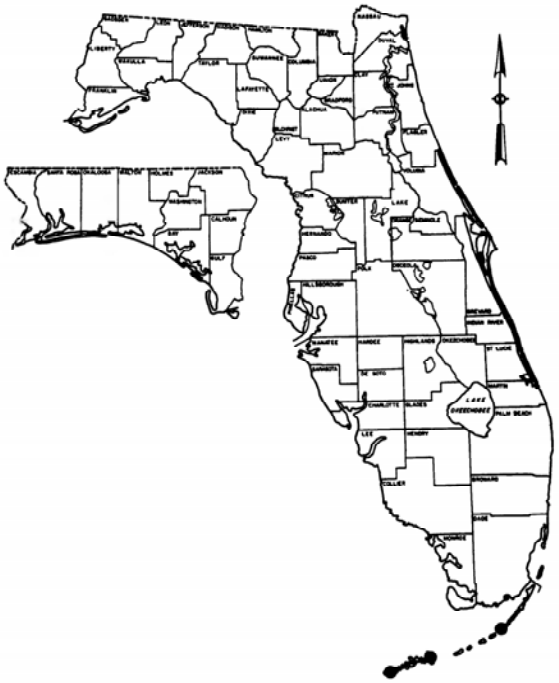


Fig. 20. *Catorhintha viridipes.*

borinquensis. Torre-Bueno (1941) treated it as a species. We have compared Florida material with *borinquensis* and believe it to be a distinct species, thus we follow Torre-Bueno in his designation.

Distribution: Endemic to Florida.



Map XXXI. Distribution of *Catorhintha viridipes*.

Florida Distribution: MONROE CO.: Key West, 18-VII-62, F. A. Buchanan, (FSCACC); Upper Matecumbe Key, 1 mi. SW Islamorada, 18-VI-1974, J. B. Heppner, (FSCA); Big Pine Key, 12-III-1984, 17-III-1984, R. M. Baranowski, (RMB).

CIMOLUS Stal, 1862

Type Species: *Cimolus vitticeps* Stal 1862, p. 302. Monobasic.

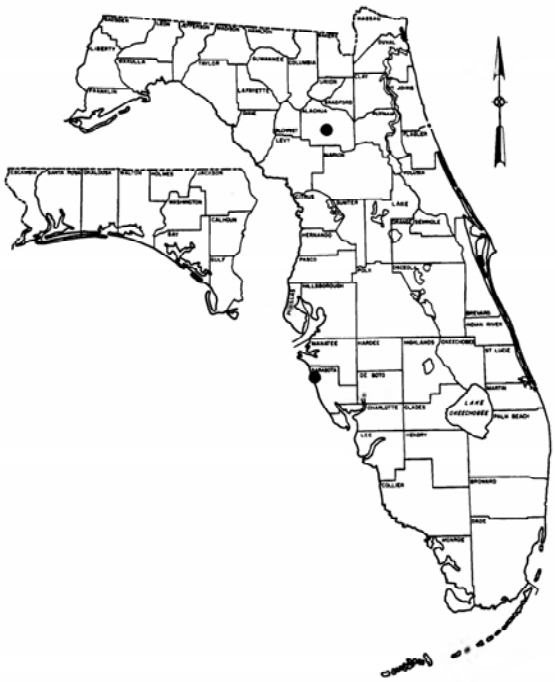
Diagnosis: Body robust, ovoid. Head strongly declivent anteriorly, not extending appreciably forward of antenniferous tubercles. A small spine present dorsally on head behind base of each antenniferous tubercle. Head produced laterally behind eye. Pronotum strongly declivent, collar distinct, lateral margins irregularly and obscurely crenulate and serrate. Abdominal connexivum broad, ovoid-elliptical. Labium short, barely reaching posterior margin of fore coxae. Legs at most slightly enlarged with no more than a few scattered spines or tubercles ventrally on femora.

Distribution: Two species are known, one occurring from Panama into Mexico, the other ranging from Texas, and South Carolina into Florida.

CIMOLUS OBSCURUS Stal
(fig. 21, map XXXII)

Cimolus obscurus Stal 1870, p. 189.

Diagnosis: Medium sized (13-18), body yellow brown to dark brown, dorsum covered with coarse black punctures (very similar in size, shape, and color to *Anasa tristis*). Antennae dark brown, first segment with irregular light spots. Pronotum subtrapezoidal, antero-lateral angles ending in a short blunt spine, humeral angles broadly rounded. Connexivum widely exposed. Legs same as body color, but heavily mottled with darker brown to black.



Map XXXII. Distribution of *Cimolus obscurus*.

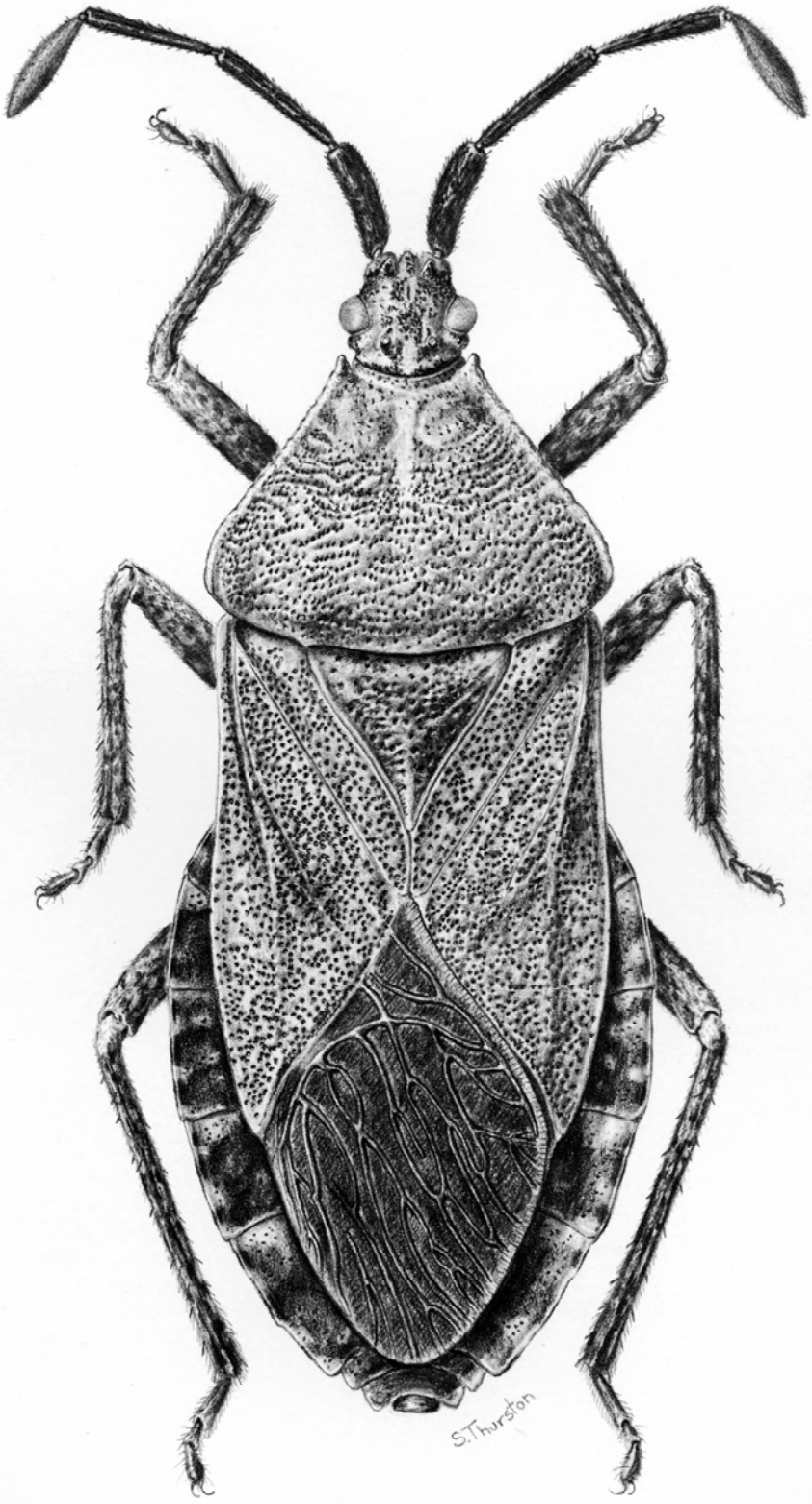


Fig. 21. *Cimolus obscurus.*

Biology: Jones (1924) reported that in Louisiana the only known host is the creeping cucumber, *Melothria pendula* L. He examined other wild and cultivated cucurbits, but never found *C. obscurus* on them. Eggs are deposited in clusters of 7-23 on the underside of the leaves and hatch in about 10 days. The adult stage is reached in about 4 weeks under summer conditions. The adults overwinter and have been noted in the field from April through November. The 5 nymphal instars are also described.

Distribution: Texas, Louisiana, South Carolina into Florida.

Florida Distribution: ALACHUA CO.: Gainesville, 24-V-25, IV-25, (RMB); same, 11-X-36; Newnan's Lake, 22-II-25, T. H. Hubbell; Ag. Expt. Sta., 9-III-26, H. E. Bratley, (FSCA); SARASOTA CO.: Sarasota, 3-XI-55, C. J. Bickner, (RMB).

NAMACUS Amyot and Serville, 1843

Type Species: *Namacus transvirgatus* Amyot and Serville 1843, p. 243. Monobasic.

Diagnosis: Elongate, relatively slender, nearly parallel-sided. Eyes large, occupying most of the lateral surface of the head. Head slightly swollen behind eyes. Ocelli large. First antennal segment elongate, curved, slightly thickened, and greatly exceeding apex of tylus. Tylus compressed, elevated above juga. Pronotum not strongly declivent, lateral margins evenly narrowing anteriorly, entire, humeral angles rounded. Mesosternum deeply sulcate. Labium reaching middle coxae. Front wing membrane venation simple or slightly branched. All femora slender, spined below distally; hind femora slightly enlarged.

Distribution: Three species are known, two Neotropical and one occurring in Florida.

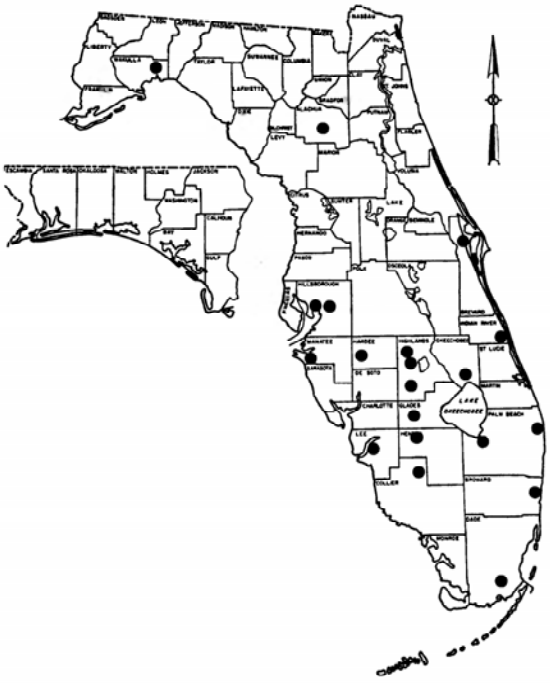
NAMACUS ANNULICORNIS Stal
(fig. 22, map XXXIII)

Namacus annulicornis Stal 1870, p.186.

Diagnosis: Moderately large (13-15), elongate, slender, parallel-sided; dull red with numerous conspicuous dark punctures. Hemelytra of some specimens light brown or dull yellow with a (sometimes obscure) dark fascia. Ventral surface and legs reddish. Antennae dark chocolate brown with a strikingly contrasting pale annulus at proximal ends of segments two and three (sometimes obsolete on segment two). All tibiae grooved along entire dorsal surface.

Biology: The only known host is *Thalia geniculata* L. Eggs are deposited end to end along the flower stems. Nymphs feed on the flowering parts. In the laboratory they are not able to survive without the flowers.

Distribution: Mexico and Florida.



Map XXXIII. Distribution of *Namacus annulicornis*.

Florida Distribution: Reported by Barber (1914) from Ft. Myers and Enterprise and by Blatchley from Ft. Myers, Enterprise and St. Petersburg. ALACHUA CO.: 27-VIII-54, H. V. Weems, Jr., (FSCA); 28-VI-60, J. W. Perry; Gainesville, 15-VIII-60, G. Q. Plah, (RMB); BREVARD CO.: Indian River City, 14-VI-32, (FSCA); BROWARD CO: Pompano, 18-IV-58, C. F. Dowling & R. W. Swanson; COLLIER CO.: V-52; Immokalee, 21-IX-56, H. V. Weems, Jr.; same, 2-XII-55, H. A. Denmark, (FSCA); DADE CO.: Homestead, 28-IX-68, R. M. Baranowski, (RMB); GLADES CO.: SW of Palmdale, 19-IX-80, D. Habeck; HARDEE CO.: Ona, 17-XI-67, R. H. Rhodes; HENDRY CO.: Labelle, 20-VII-60, W. W. Smith & C. F. Dowling; HILLSBOROUGH CO.: Brandon, 18-VI-62, J. W. Patton,

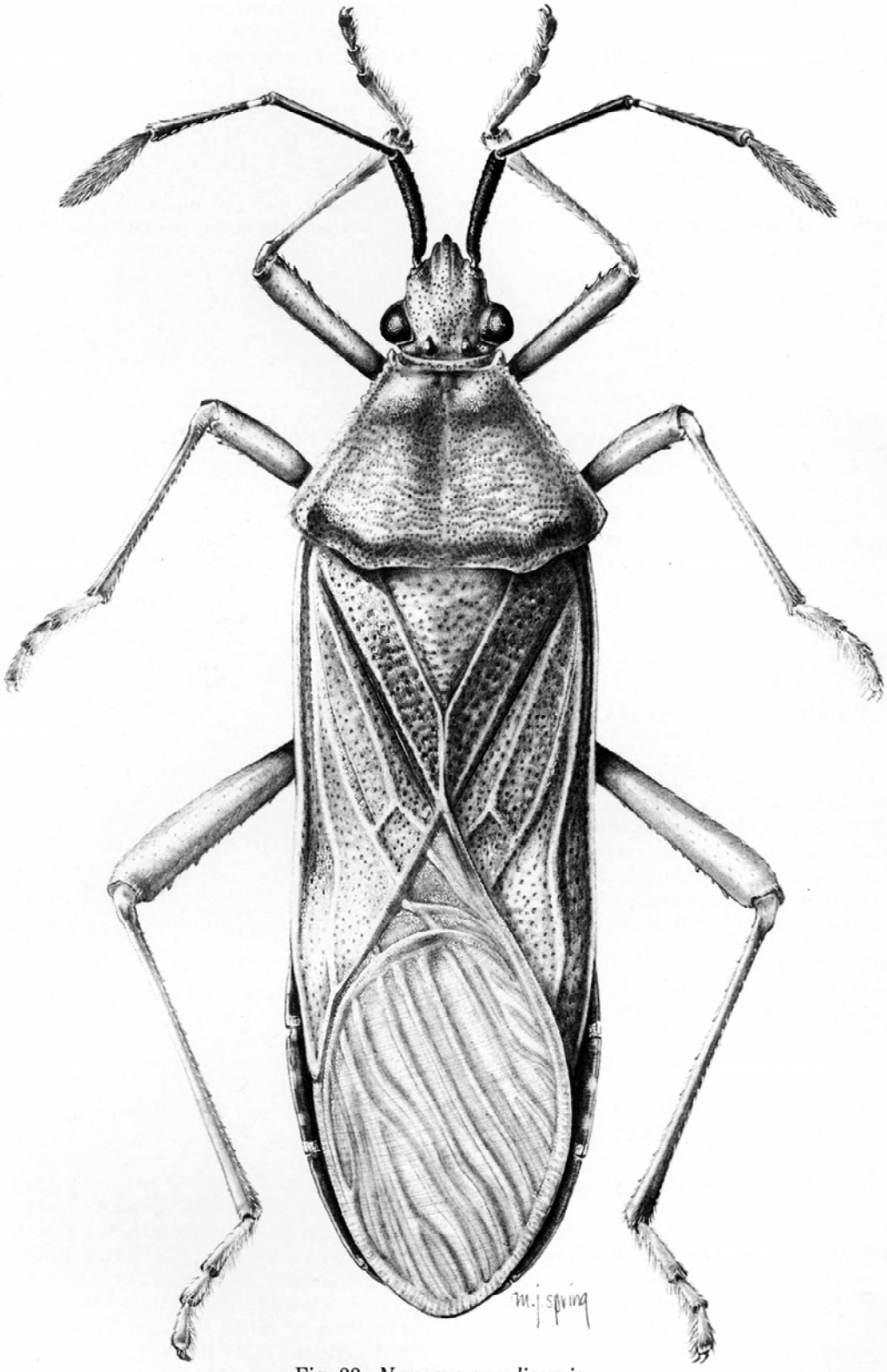


Fig. 22. *Namacus annulicornis.*

(FSCACC); Tampa, 1-X-83, J. E. Eger, (RMB); HIGHLANDS CO.: Archbold Biological Station, L. Placid, 29-IX-84, M. Deyrup; same, 27-VI-67, F. W. Mead, (RMB); same, [8 mi. S.] 30-IX-82, 3-IX-82, M. Deyrup; same, 14-VI-82, 28-V-82, W. C. Packer, (ABS); Highlands Hammock St. Pk., 11-VII-64, C. E. Stegmaier (RMB); same, 11-VII-64, C. E. Stegmaier, (FSCACC); Lake Placid, 13-VII-48, H. W. Crowder; same, 13-VII-48, R. H. Beamer; same, 13-VII-48, B. T. McDermott; Sebring, 20-VI-51, Price, Wood, Beamer, (UK); INDIAN RIVER CO.: Vero Beach, 12-VII-67, R. A. Morse, (FSCACC); same, 12-VII-67, F. S. Saba, (RMB); LEE CO.: Ft. Myers, 21-VI-51, Wood, Price, Beamer, (UK); LEVY CO.: 19-IX-59, H. V. Weems, Jr., (RMB); MANATEE CO.: Oneco, 19-VI-28, G. B. Merrill, (FSCA); OKEECHOBEE CO.: N. of Okeechobee, 31-X-58, (FSCACC); PALM BEACH CO.: Lake Park, 23-X-78, J. E. Bennett & D. C. Clinton; Belle Glade area, 25-V-72, C. E. Nelson; Belle Glade, 5-XI-54, H. V. Weems, Jr.; 12-V-58, H. A. Denmark, (FSCA); WAKULLA CO.: Wakulla, 17-XI-57, R. H. Rhodes, (FSCACC).

SETHENIRA Spinola, 1837

Type Species: *Sethenira testacea* Spinola 1837, p. 198. Monobasic.

Diagnosis: Moderately large, yellowish brown. Head nondeclivent, tylus compressed, elevated above juga. First antennal segment thickened, curved, oval to 3-sided in cross-section; second and third segments flattened, not dilated, fourth rounded. Humeral angles broadly produced laterally and toothed. Femora unarmed.

Distribution: A small genus, but represented throughout the Neotropics. Only one species occurs in the United States where it is known only from Florida.

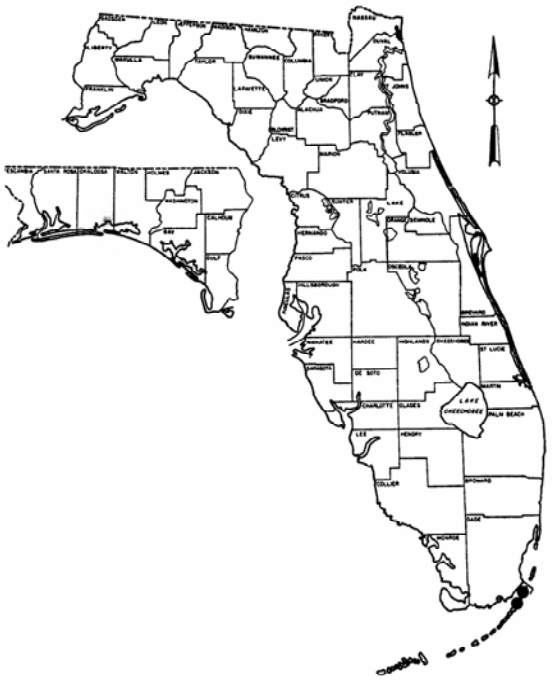
SETHENIRA FERRUGINEA Stal
(fig. 23, map XXXIV)

Sethenira ferruginea Stal 1870, p. 182.

Diagnosis: Moderately large (15-20), uniformly reddish or yellowish to dark brown. Antennae with first segment concolorous with body, second and third segments chocolate brown to nearly black; terminal half of fourth segment light yellow. Lateral pronotal margins deeply concave. Anterolateral margins of pronotum tuberculate or irregular. Humeral angles produced laterally, posterolateral margin scalloped. Labium reaching to or beyond middle coxae. Connexivum moderately to broadly exposed. Femora not swollen, tibiae with irregular black markings.

The only known host is crabwood, *Gymnanthes lucida* Sw. Eggs are deposited in late spring after the plants flower. Feeding by the nymphs appears to be confined largely to the developing seeds. There is only one generation a year.

Distribution: Recorded from Cuba and Florida. We also have examined specimens from Mexico and Paraguay in the JAS collection that appear to be conspecific.



Map XXXIV. Distribution of *Sethenira ferruginea*.

Florida Distribution: Known only from the Florida Keys. MONROE CO.: Key Largo, 3-VI-55, 13-VI-55, W. W. Warner; same, 27-III-57, 2-V-57, H. V. Weems, Jr., (FSCA); same, 27-III-57, H. V. Weems, Jr., (JAS); same, 29-V-27, John D.; same, 6-VI-60, 7-VI-60, H. V. Weems, Jr.; N. Key Largo, 4-VII-77, 16-VI-74, R. M. Baranowski, (RMB); same, 16-VI-74, 14-VI-74, 4-VII-77, R. M. Baranowski, (NMNH); same, 1-I-69, R. M.

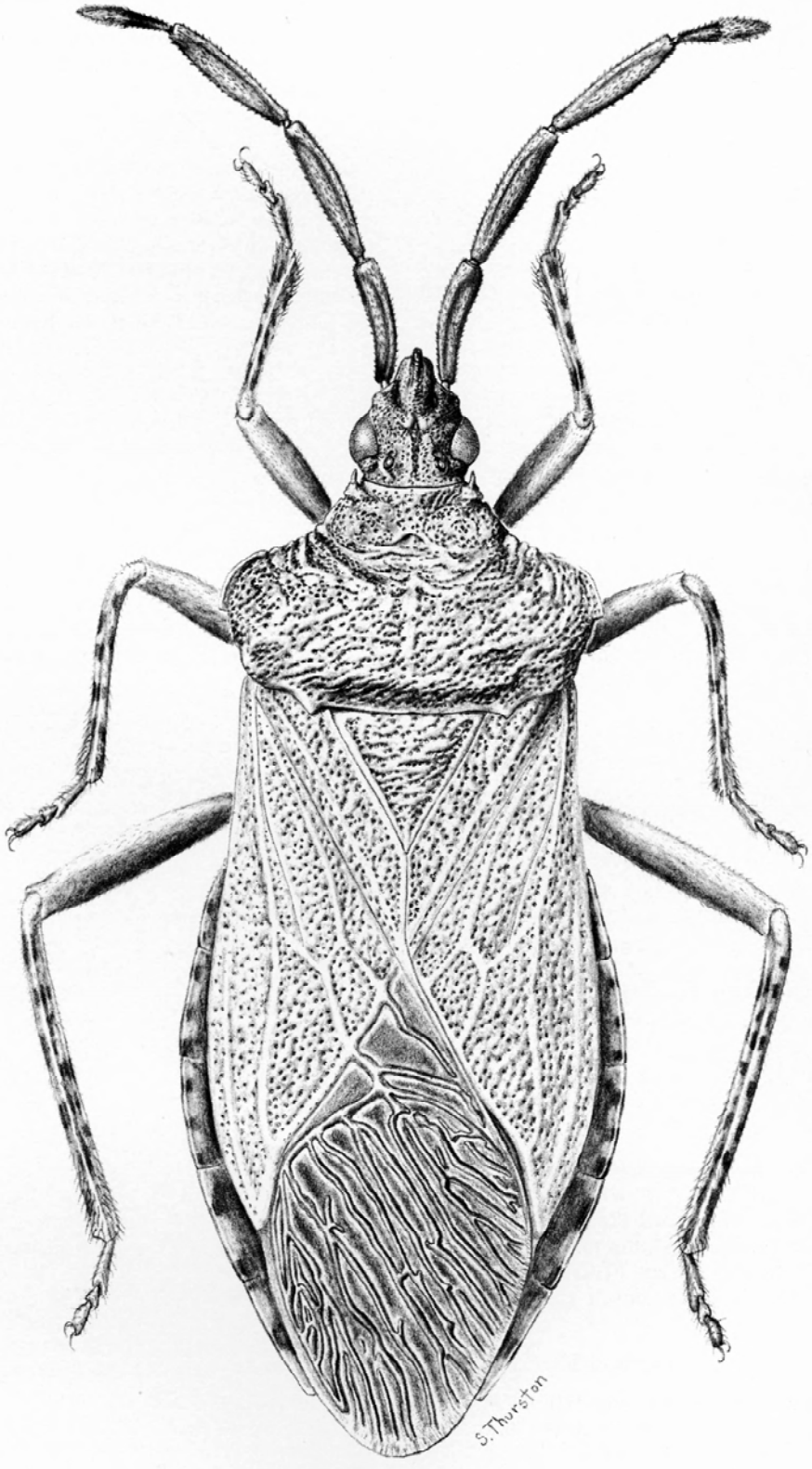


Fig. 23. *Sethenira ferruginea.*

Baranowski, J. A. Slater; same, 4-V-77, 21-VII-67, 16-VI-74, R. M. Baranowski, (JAS).

ZICCA Amyot and Serville, 1843

Type Species: *Zicca nassulata* Amyot and Serville 1843 = *Cimex nigropunctatus* DeGeer 1773. Monobasic.

Diagnosis: Small (10), body stout. Antenniferous tubercles with a short spine. Tylus projecting well forward of bases of antennae, not compressed. Eyes large, globular. Pronotum strongly declivent, antero-lateral margins with a few coarse blunt teeth or elongate tubercles; humeral angles spinose. Posterior femora clavate, swollen, and bearing ventral spines on distal half.

Distribution: Primarily Neotropical, containing about 13 species, most of which are confined to South America.

ZICCA TAENIOLA (Dallas)
(fig. 24, map XXXV)

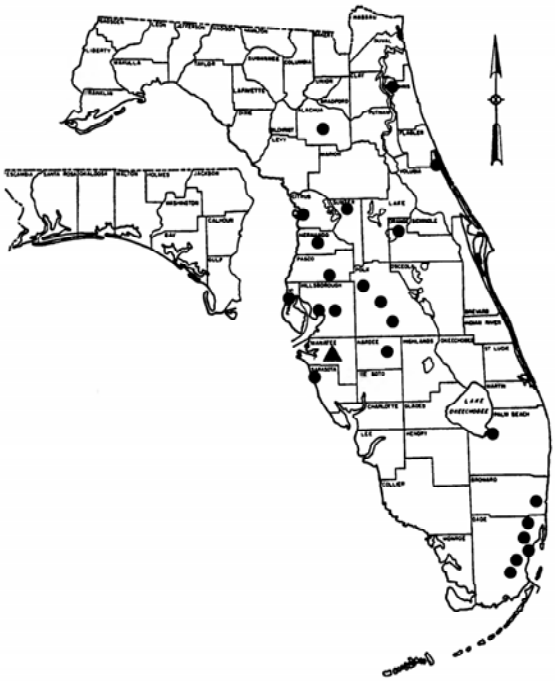
Clavigralla taeniola Dallas 1852, p. 514.
Gonocerus obsoletus Herrich-Schaeffer 1842, p. 10.
Coreus delicatus Guerin 1857, p. 384.
Zicca taeniola Stal 1862, p. 299.

Diagnosis: Uniformly brown or yellowish brown with membrane somewhat darker. A small white spot present in the center of the corium. Antero-lateral margins of pronotum with a series of large white teeth. Two small white teeth or tubercles present on disc of anterior lobe of pronotum. Ventral abdominal segments with a row of black dots on each side. Legs yellowish with black dots. Coxae with two black spots on outer sides.

Biology: Breeds on *Amaranthus* sp. Eggs are deposited singly on the seed heads. Early instars tend to remain on the seed heads, but later instars and adults also are found on the foliage. A large series in the FSCA was collected in Homestead on *Phytolacca americana* L., pokeweed.

Distribution: West Indies and Florida.

Florida Distribution: Hussey (1956) first recorded it as occurring in the United States from specimens collected in Dade Co. (Miami, 1954, Matheson Hammock, 1954, and Homestead, 1956). We have seen specimens collected at Lake Worth, 4-VI-49, indicating an even wider and earlier establishment, thus the "N. Amer." record in the Van Duzee 1917 catalog Hussey referred to as doubtful, may well have been correct. ALACHUA CO.: Gainesville, 18-X-72, J. Brown, (FSCA); same, 5-III-56, F. W. Mead, (FSCACC); BROWARD CO.: Davie, 25-X-78, R. Garry, (FSCA); same, 11-XII-78, D. C. Clinton, (FSCACC); CITRUS CO.: Homosassa, 2-XII-65, T. Faberoso, (FSCACC); DADE CO.: Homestead, 16-X-69, 12-V-69, 31-X-69, 20-X-69, 18-XI-69, 11-VII-69, R. M. Baranowski; same, 1-III-56, H. V. Weems, Jr., (RMB); same, 31-X-69, 20-X-69, X-69, R. M. Baranowski; same, 22-XI-74, 8-XII-74, J. A. Slater, (JAS); same, 1-III-56, H. V. Weems, Jr.; same, 6-III-61, J. H. Knowles; Matheson Hammock, 22-X-54, H. V. Weems, Jr.; Perrine, 31-I-61, R. W. Swanson; Miami, 15-II-56, C. F. Dowling; same, 30-IV-54, O. D. Link, (FSCA); N. Miami, 10-II-61, D. A. Palmer, (FSCACC); HARDEE CO.: Zolfo, 21-I-65, R. H. Rhodes, (FSCACC); HERNANDO CO.: Brooksville, 6-IX-79, R. Phillips, (FSCA); HILLSBOROUGH CO.: Tampa, 27-IX-66, T. Faberoso; Brandon, 3-IX-66, J. W. Patton; LEE



Map XXXV. Distribution of *Zicca taeniola*.

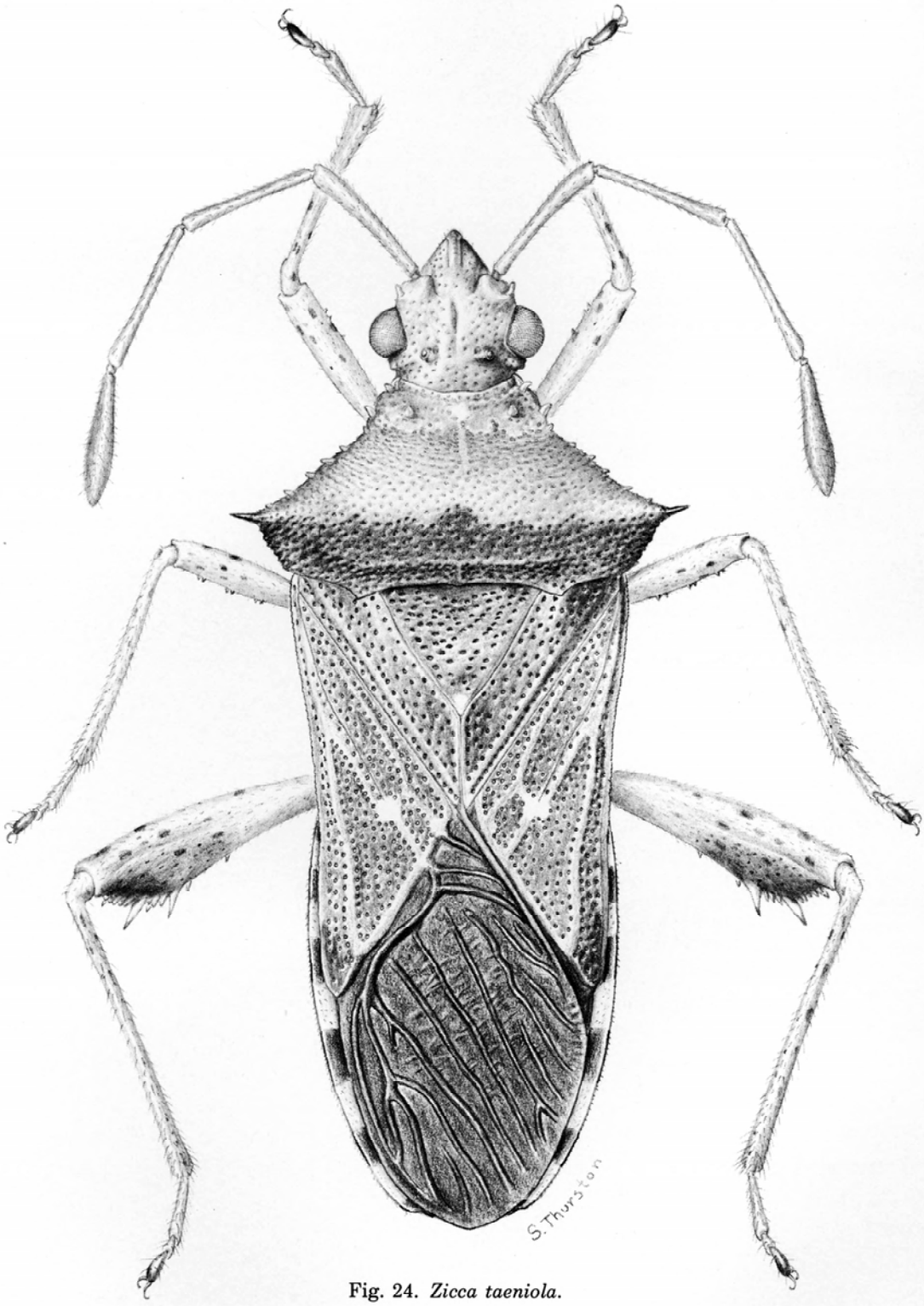


Fig. 24. *Zicca taeniola*.

CO.: Ft. Myers, 27-II-75, S. L. Kitto; ORANGE CO.: Apopka, 18-X-77, J. Pott; MANATEE CO.: 15-IX-61, D. C. Chancy, (FSCACC); PALM BEACH CO.: Belle Glade, 3-I-72, G. W. Genung, (FSCA); PASCO CO.: Zephyrhills, 9-XI-65, C. V. Williams; Zephyr, 21-X-63, E. R. Simmons; PINELLAS CO.: Dunedin, 14-VIII-63, W. C. Carroll, (FSCACC); POLK CO.: Ft. Meade, 28-VIII-62, R. E. Vild, (RMB); Lakeland, 9-XII-60, J. H. Maynard & C. W. Smith; Bartow, 5-X-61, R. E. Vild; ST. JOHNS CO.: Switzerland, 19-IV-79, R. Hill, (FSCA); SARASOTA CO.: Sarasota, 8-VII-63, J. T. Holden, (FSCA); Sarasota Bee Ridge Rd. orange grove, 19-VII-66, R. Allen, (JAS); SUMTER CO.: Wildwood, 26-X-71, T. L. Kipp & L. W. Holly, (FSCA); VOLUSIA CO.: Ormond Beach, 9-XI-77, J. N. Pott, Samsula, 21-IX-79, J. N. Pott; (FSCA).

PSEUDOPHLOEINAE Stal

Small, generally dull colored. Head produced anteriorly in front of bases of antennae. Pronotum declivent. Pronotum, scutellum, and hemelytra roughly granulate with each granule bearing a small adpressed seta. Scent gland auricle with margins reduced. Fore wing membrane with a curved vein remote from margin and having numerous small veins arising from it anastomosing anteriorly and becoming forked near apex.

A widespread but small group containing about 20 genera of which two occur in the United States and Florida.

KEY TO FLORIDA GENERA OF PSEUDOPHLOEINAE

1. Humeri rounded, unarmed ..... *Ceraleptus*, p. 69

1'. Humeri with an acute spine present ... *Coriomeris*, p. 70

CERALEPTUS Costa, 1847

Type Species: *Coreus gracilicornis* Herrich-Schaeffer, Faun. Germ. p. 135. By "subsequent designation".

Diagnosis: Moderate sized. Dull brownish or grayish yellow. Humeral pronotal angles rounded. Antenniferous tubercles armed with a small blunt spine. Antennae short and stout. Posterior femora subclavate, armed with several small spines below near distal ends.

Distribution: A Holarctic genus containing four North American species (Froeschner, 1963). Three species are western or southwestern, the other, widely distributed in the southern states.

CERALEPTUS AMERICANUS Stal
(fig. 25, map XXXVI)

Ceraleptus americanus Stal 1870, p. 219.

Diagnosis: Small (10-13), dull yellowish with numerous dark punctures scattered over the body. Head brown with a medium yellow stripe. Obscure yellowish markings present on membrane of front wing.

Froeschner (1963) separated *americanus* from related species by the evenly rounded humeral angles, lack of explanate lateral pronotal margins, the latter "rounding smoothly into the propleura". This latter is somewhat misleading as in at least some Florida specimens the lateral pronotal margins anteriorly are dentate and tuberculate.

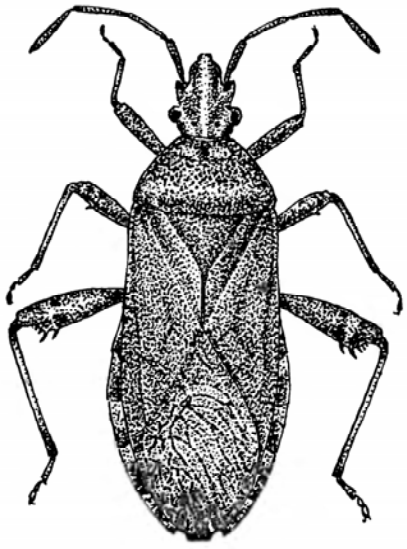
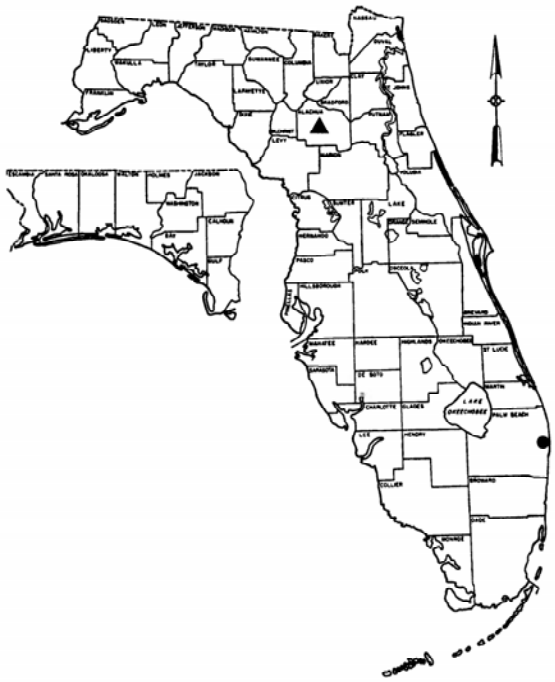


Fig. 25. *Ceraleptus americanus*.

Biology: Little is known, but it appears to chiefly inhabit dry sandy areas. Froeschner (1963) believes it overwinters as an adult and reported a collecting record on eggplant.

Distribution: The range is poorly understood but is chiefly southern from Texas into Florida, although there are records from New York, Indiana, Missouri, North Carolina, and Washington, D.C.



Map XXXVI. Distribution of *Ceraleptus americanus.*

Florida Distribution: Reported by Barber (1914) from Lake Worth and by Blatchley (1926) from Dunedin. ALACHUA CO.: 12-V-55, R. A. Morse, (FSCA); PALM BEACH CO.: Lake Worth, (AMNH).

CORIOMERIS Westwood, 1842

Type Species: *Cimex denticulatus* Scopoli 1763. Fixed by subsequent designation.

Diagnosis: Small, clothed with dense woolly pubescence. Head subquadrate. First antennal segment hairy and granulate, second antennal segment distinctly shorter than third. Pronotum narrowed anteriorly, strongly declivent. Posterior femora armed below distally with a curved spine and several small teeth. Metacoxae widely separated.

Distribution: A Holarctic genus, four species occurring in North America.

CORIOMERIS HUMILIS (Uhler)
(fig. 26)

Dasycoris humilis Uhler 1871, p. 403.
Coriomeris humilis Van Duzee 1916, p. 14.

Diagnosis: Small (8-9), grayish or brown with dorsal surface hirsute and granulose. Eyes small, set at middle of lateral surface of head. Lateral pronotal margins bearing a series of white tubercles, each terminating in a sharp spine. Femora slender, hind femora below armed distally with three or four conspicuous sharp spines. Connexivum marked with alternating brown and yellow patches, Veins of membrane anastomosing. Antennae large, hirsute, appearing "spiny".

Biology: Unknown. It appears to inhabit dry areas. Hussey (1922) reported taking a specimen on willow in a Michigan gravel pit.

Distribution: The status of this species as a member of the Florida fauna is uncertain. Torre-Bueno (1921) reported it from St. Petersburg, but he does not include Florida in his 1941 "Synopsis". There do not appear to be any other records from the southeastern states. The distribution is chiefly west of the Mississippi, but it does occur in the north (Michigan) and east (Connecticut). In view of the "western element" in Florida, Torre-Bueno's record cannot be totally disregarded, however its occurrence in Florida is improbable. Dolling and Yonke (1976) attempted to find the specimen and failed. They consider *humilis* to have an essentially "Boreo-Montane" distribution.

Fig. 26. *Coriomeris humilis*

LIST OF ASSOCIATED PLANTS

ABELMOSCHUS ESCULENTUS (L.) Moench
Acanthocephala femorata (F.)
Leptoglossus phyllopus (L.)
ACHILLEA MILLEFOLIUM L.
Euthochtha galeator (F.)
Leptoglossus phyllopus (L.)
AGALINIS SP.
Leptoglossus phyllopus (L.)
AGRIMONIA GRYPSOSEPALA WALLR.
Euthochtha galeator (F.)
AMARANTHUS SP.
Zicca taeniola (Dallas)
AMBROSIA ARTEMISIIFOLIA L.
Piezogaster alternatus (Say)
AMBROSIA TRIFIDA L.
Piezogaster alternatus (Say)
Acanthocephala femorata (F.)
Euthochtha galeator (F.)
AMPHIACHYRIS DRACONCULOIDES (DC.) Nutt.
Leptoglossus phyllopus (L.)
AMPHICARPA BRACTEATA (L) Fern.
Euthochtha galeator (F.)
APOCYNUM SP.
Chariesterus antennator (F.)
APPLE
Leptoglossus phyllopus (L.)
APRICOT
Leptoglossus oppositus (Say)
ARTOCARPUS INTEGRIFOLIA L.
Leptoglossus corculus (Say)
ASCLEPIAS SP.
Chariesterus antennator (F.)
ASIMINA PARVIFLORA (Michx.) Dunal.
Piezogaster ashmeadi Montandon
ASTER SP.
Leptoglossus phyllopus (L.)
ASTER ERICOIDES L.
Euthochtha galeator (F.)
ASTER PILOSUS Willd.
Euthochtha galeator (F.)
ASTER SAGITTIFOLIUS Wedemeyer ex Willd.
Piezogaster alternatus (Say)
AUREOLARIS GRANDIFLORA var *PULCHRA* (Benth.) Pennell
Euthochtha galeator (F.)
BACCHARIS SP.
Merocoris sp.
BACCHARIS NEGLECTA Britt.
Acanthocephala declivis (Say)
Acanthocephala femorata (F.)
Acanthocephala terminalis (Dallas)
Euthochtha galeator (F.)
Leptoglossus phyllopus (L.)
BALSAM APPLE
Anasa scorbutica (F.)
Leptoglossus gonagra (F.)
BARLEY
Leptoglossus phyllopus (L.)
BEAN
Leptoglossus phyllopus (L.)
BELL PEPPER
Leptoglossus phyllopus (L.)
BLACKBERRY
Leptoglossus phyllopus (L.)
BLUEBERRY
Leptoglossus phyllopus (L.)
BIDENS SP.
Euthochtha galeator (F.)
BIXA ORELLANA L.
Leptoglossus gonagra (F.)
BOERHAAVIA DIFFUSA L.
Catorhintha guttula (F.)
BONESET
Acanthocephala terminalis (Dallas)
BRAZILIAN PEPPER
Leptoglossus gonagra (F.)
BUSH BEANS
Euthochtha galeator (F.)
BYRSONIMA SPICATA Ndz.
Acanthocerus lobatus (Burmeister)
CACTUS
Narnia femorata Stal
CALLICARPA AMERICANA L.
Leptoglossus phyllopus (L.)
CAMPSIS RADICANS (L.) Seem. ex Bureau
Leptoglossus oppositus (Say)
Leptoglossus phyllopus (L.)
CAPSICUM ANNUUM L.
Phthia picta (Drury)
CARICA PAPAYA L.
Leptoglossus gonagra (F.)
CARYA SP.
Acanthocephala terminalis (Dallas)
Euthochtha galeator (F.)
CARYA ILLINOENSIS (Wang.) K. Koch.
Leptoglossus oppositus (Say)
CASTANEA PUMILA (L.) P. Mill
Chariesterus antennator (F.)
CATALPA SP.
Leptoglossus oppositus (Say)
CEANOTHUS SP.
Chariesterus antennator (F.)
CEANOTHUS AMERICANUS Torr. & Gray
Chariesterus antennator (F.)
CELTIS SP.
Acanthocephala declivis (Say)
CELTIS LAEVIGATA Willd.
Acanthocephala declivis (Say)
Acanthocephala terminalis (Dallas)
CEPHALANTHUS OCCIDENTALIS L.
Leptoglossus phyllopus (L.)
CHENOPODIUM ALBUM L.
Acanthocephala femorata (F.)
Leptoglossus phyllopus (L.)
CHIOCOCCA ALBA (L.) A. S. Hitchc.
Leptoglossus concolor (Walker)
CESTRUM PARQUI L'HER.
Phthia picta (Drury)
CIRSIUM SP.
Acanthocephala confraterna (Uhler)
Catorhintha guttula (F.)

CIRSIUM HORRIDULUM Michx.
Leptoglossus phyllopus (L.)
CIRSIUM TEXANUM Buckl.
Leptoglossus phyllopus (L.)
Acanthocephala femorata (F.)
Euthochtha galeator (F.)
CITRON MELON
Leptoglossus gonagra (F.)
CITRULLUS LANATUS Matsomara & Naki
Leptoglossus gonagra (F.)
Phthia picta (Drury)
CITRUS
Leptoglossus phyllopus (L.)
Leptoglossus concolor (Walker)
Leptoglossus gonagra (F.)
CITRUS AURANTIUM L.
Sephina gundlachi (Guerin)
CLEOME SPINOSA Jacq.
Leptoglossus gonagra (F.)
COCCOLOBIS UVIFERA (L.) L.
Leptoglossus concolor (Walker)
COCOLOBA DIVERSIFOLIA Jacq.
Catorhintha divergens Barber
COMPTONIA SP.
Leptoglossus concolor (Walker)
CONYZA CANADENSIS (L.) Cronq.
Euthochtha galeator (F.)
COTTON
Anasa andresii (Guerin)
Chariesterus antennator (F.)
Leptoglossus balteatus (L.)
Leptoglossus oppositus (Say)
COW PEA
Leptoglossus balteatus (L.)
Leptoglossus phyllopus (L.)
Phthia picta (Drury)
CORN
Anasa andresii (Guerin)
CRABWOOD
Leptoglossus concolor (Walker)
Sethenira ferruginea Stal
CRYPTOTAENIA CANADENSIS (L.) D. C.
Piezogaster alternatus (Say)
CUCUMIS SATIVUS L.
Leptoglossus gonagra (F.)
CUCUMBER
Leptoglossus oppositus (Say)
CUCURBIT
Anasa andresii (Guerin)
Anasa armigera (Say)
Leptoglossus gonagra (F.)
Leptoglossus phyllopus (L.)
CUCUMIS MELO L.
Phthia picta (Drury)
CUCURBITA MAXIMA Duchense
Phthia picta (Drury)
CUCURBITA MOSCHATA (Duchense)
Duchense ex. Poir.
Phthia picta (Drury)
CUCURBITA PEPO L.
Phthia picta (Drury)
Leptoglossus gonagra (F.)
CYLINDROPUNTIA SP.
Narnia sp.
Narnia femorata Stal
CYNANCHUM SCOPARIUM Nutt.
Sephina gundlachi (Guerin)
DATURA SP
Leptoglossus phyllopus (L.)
DATURA FEROX L.
Phthia picta (Drury)
DATURA METEL L.
Phthia picta (Drury)
DATURA STRAMONIUM L.
Phthia picta (Drury)
DESMODIUM CANADENSIS (D.) D. C.
Piezogaster alternatus (Say)
DESMODIUM GLUTINOSUM (Muhl. ex. Wild.)
Acanthocephala terminalis (Dallas)
Piezogaster alternatus (Say)
Euthochtha galeator (F.)
EGG PLANT
Ceraleptus americanus Stal
Leptoglossus phyllopus (L.)
ERIGERON ANNUUS (L.) Pers.
Piezogaster alternatus (Say)
ERIGERON QUERCIFOLIUS Lam.
Acanthocephala femorata (F.)
EUPATORIUM SP.
Acanthocerus lobatus (Burmeister)
EUPATORIUM RUGOSUS Houtl.
Piezogaster alternatus (Say)
EUPHORBIA SP.
Chariesterus antennator (F.)
EUPHORBIA COROLLATA L.
Chariesterus antennator (F.)
FLAVERIA LINEARIS Lag.
Euthochtha galeator (F.)
FRAXINUS SP.
Acanthocephala terminalis (Dallas)
FRAXINUS AMERICANA L.
Acanthocephala terminalis (Dallas)
FRAXINUS TEXENSIS (Gray) Sarg.
Acanthocephala declivis (Say)
Acanthocephala femorata (F.)
GAURA PARVIFLORA Dougl.
Leptoglossus phyllopus (L.)
Euthochtha galeator (F.)
GOLDENROD
Acanthocephala terminalis (Dallas)
Chariesterus antennator (F.)
Piezogaster alternatus (Say)
GOSSYPIUM HIRSUTUM L.
Phthia picta (Drury)
GRASSES
Chariesterus antennator (F.)
GUAVA
Catorhintha divergens Barber
Leptoglossus concolor (Walker)
Leptoglossus gonagra (F.)
GUTIERREZIA TEXANA (D. C.) Torr. & Gray
Leptoglossus phyllopus (L.)
GYMNANTHES LUCIDA Sw.
Leptoglossus concolor (Walker)
Sethenira ferruginea Stal
HAMELIA REPENS Jacq.
Sephina gundlachi (Guerin)

HELIANTHUS ANNUUS L.
Acanthocephala femorata (F.)
Leptoglossus gonagra (F.)
Leptoglossus oppositus (Say)
Leptoglossus phyllopus (L.)
Phthia picta (Drury)
HETEROTHECA SP.
Catorhintha guttula (F.)
HETEROTHECA LATIFOLIA Buckl.
Euthochtha galeator (F.)
Leptoglossus phyllopus (L.)
IPOMOEA BATATAS (L.) Lam.
Phthia picta (Drury)
IPOMOEA CAIRICA (L.) Sweet
Phthia picta (Drury)
JERSEY TEA
Chariesterus antennator (F.)
JOE-PYE WEED
Acanthocephala terminalis (Dallas)
LOQUAT
Leptoglossus phyllopus (L.)
LEGUME
Leptoglossus balteatus (L.)
LITCHI CHINENSIS Sonner.
Leptoglossus concolor (Walker)
LUDWIGIA SP.
Catorhintha guttula (F.)
LUFFA SP.
Leptoglossus balteatus (L.)
LUFFA CYLINDRICA (L.) Roemer
Anasa scorbutica (F.)
Leptoglossus gonagra (F.)
LYCHEE
Leptoglossus phyllopus (L.)
LYCOPERSICON ESCULENTUM P. Mill.
Leptoglossus oppositus (Say)
Leptoglossus phyllopus (L.)
Phthia picta (Drury)
LYONIA FERRUGINEA (Walt.) Nutt.
Catorhintha guttula (F.)
LYONIA MARIANNA Parks
Euthochtha galeator (F.)
MAGNOLIA
Leptoglossus fulvicornis (Westwood)
MAGNOLIA SP.
Acanthocephala confraterna (Uhler)
MAGNOLIA GRANDIFLORA L.
Leptoglossus fulvicornis (Westwood)
MANGIFERA INDICA L.
Leptoglossus gonagra (F.)
MELON
Leptoglossus oppositus (Say)
MELOTHRIA PENDULA L.
Cimolus obscurus Stal
MESQUITE
Mozena sp.
MIRABILIS NYCTAGINEA (Michx.) MacM.
Catorhintha mendica Stal
MIRABILIS JALAPA L.
Catorhintha guttula (F.)
MISTLETOE
Leptoglossus ashmeadi Heidemann
MOMORDICA CHARANTIA L.
Anasa scorbutica (F.)
Leptoglossus gonagra (F.)
Phthia picta (Drury)
MONARDA SP.
Euthochtha galeator (F.)
MONARDA FISTULOSA L.
Euthochtha galeator (F.)
MORUS RUBRA L.
Leptoglossus oppositus (Say)
MYROXYLON BALSAMUM Harms.
Acanthocerus lobatus (Burmeister)
NICOTIANA TABACUM (L.)
Phthia picta (Drury)
OAT
Leptoglossus phyllopus (L.)
OKRA
Leptoglossus phyllopus (L.)
OPUNTIA SP.
Narnia femorata Stal
OPUNTIA AUSTRINA Small
Chelinidea vittiger Uhler
OPUNTIA HUMIFUSA (Raf.) Raf.
Narnia femorata Stal
Chelinidea vittiger Uhler
OPUNTIA INDICA (L.) P. Mill.
Chelinidea vittiger Uhler
OPUNTIA INERMIS DC
Chelinidea vittiger Uhler
OPUNTIA LINDHEIMERI Engelm.
Chelinidea vittiger Uhler
Narnia femorata Stal
OPUNTIA PUSILLA (Haw.) Haw.
Chelinidea vittiger Uhler
OPUNTIA STRICTA (Haw.) Haw.
Chelinidea vittiger Uhler
ORANGES
Leptoglossus balteatus (L.)
Leptoglossus gonagra (F.)
ORYZA SATIVA (L.)
Phthia picta (Drury)
PARTHENIUM SP.
Acanthocephala femorata (F.)
PASSIFLORA SP.
Chondrocera laticornis Laporte
Leptoglossus gonagra (F.)
PASSIFLORA CAERULEA Masters
Phthia picta (Drury)
PERSEA BORBONIA (L.) Spreng.
Acanthocephala declivis (Say)
PEACH
Leptoglossus phyllopus (L.)
Leptoglossus oppositus (Say)
PEAR
Leptoglossus phyllopus (L.)
PERSIMMON
Leptoglossus phyllopus (L.)
PHASEOLUS VULGARIS L.
Phthia picta (Drury)
PHORADENDRON TOMENTOSUM (DC) Engelm. ex Gray
Leptoglossus ashmeadi Heidemann
PHYSALIS SP.
Corecoris fuscus (Thunberg)

PHYSOCARPUS OPULIFOLIUS (L.) Maxim.
Acanthocephala terminalis (Dallas)
PHYTOLACCA AMERICANA L.
Zicca taeniola (Dallas)
PINUS SP.
Leptoglossus corculus (Say)
PINUS ECHINATA P. Mill.
Leptoglossus corculus (Say)
PINUS ELIOTTII Engelm.
Leptoglossus corculus (Say)
PINUS PALUSTRIS P. Mill.
Leptoglossus corculus (Say)
PINUS PUNGENS Lamb.
Leptoglossus corculus (Say)
PINUS STROBUS L.
Leptoglossus corculus (Say)
PINUS TAEDA L.
Leptoglossus corculus (Say)
PINUS VIRGINICA Mill.
Leptoglossus corculus (Say)
PISONIA ROTUNDATA Griseb.
Catorhintha viridipes Blatchley
PISUM SATIVUM L.
Phthia picta (Drury)
PLANTAGO SP.
Chariesterus antennator (F.)
PLATYOPUNTIA SP.
Narnia sp.
Narnia femorata Stal
PLUM
Leptoglossus phyllopus (L.)
POKEWEED
Zicca taeniola (Dallas)
POLYGALA SP.
Merocoris sp.
POLYGALA LUTEA L.
Merocoris typhaeus Dallas
POMEGRANATE
Leptoglossus phyllopus (L.)
POTATO
Leptoglossus phyllopus (L.)
PRICKLY PEAR CACTUS
Chelinidea sp.
PRUNUS AMERICANA Marsh.
Euthochtha galeator (F.)
PROSOPIS SP.
Mozena sp.
PROSOPIS GLANDULOSA Torr.
Mozena obesa Montandon
PSIDIUM GUAJAVA L.
Leptoglossus balteatus (L.)
Leptoglossus concolor (Walker)
Leptoglossus gonagra (F.)
PSIDIUM GRANDIFLORUM Aubl.
Leptoglossus gonagra (F.)
PUMPKIN
Leptoglossus gonagra (F.)
PUNICA GRANATUM L.
Leptoglossus gonagra (F.)
Phthia picta (Drury)
QUERCUS ELLIPSOIDALIS E. J. Hill
Euthochtha galeator (F.)
RAGWEED
Euthochtha galeator (F.)
RATIBIDA COLUMNIFERA (Nutt.) Woot. & Standl.
Acanthocephala femorata (F.)
Euthochtha galeator (F.)
RED BAY
Acanthocephala declivis (Say)
RHUS SP.
Chariesterus antennator (F.)
Leptoglossus phyllopus (L.)
RHUS GLABRA L.
Euthochtha galeator (F.)
RHUS TYPHINA L.
Acanthocephala terminalis (Dallas)
ROBINIA PSEUDOACACIA L.
Piezogaster alternatus (Say)
ROSE
Euthochtha galeator (F.)
ROYAL PALM
Catorhintha viridipes Blatchley
RUBUS SP.
Acanthocephala terminalis (Dallas)
RUDBECKIA HIRTA L.
Euthochtha galeator (F.)
RYE
Leptoglossus phyllopus (L.)
SALPICHROA ORIGANIFOLIA (Lam.) Baill.
Phthia picta (Drury)
SAMBUCUS SIMPSONII Rehd.
Leptoglossus phyllopus (L.)
SARCOSTOMA CLAUSUM (Jacq.) R. & S.
SCHINUS TEREBINTHEFOLIA Raddi
Leptoglossus gonagra (F.)
Leptoglossus phyllopus (L.)
SCHRANKIA UNCINATA Willd.
Mozena obesa Montandon
SECHIUM EDULE (Jacq.) Sw.
Leptoglossus gonagra (F.)
Phthia picta (Drury)
SENECIO SP.
Althos obscurator (F.)
SESAMUM INDICUM L.
Phthia picta (Drury)
SICYOS SP.
Leptoglossus gonagra (F.)
SICYOS ANGULATUS L.
Anasa armigera (Say)
SIDA RHOMBIFOLIA L.
Phthia picta (Drury)
SOLANUM SP.
Euthochtha galeator (F.)
Phthia picta (Drury)
Leptoglossus gonagra (F.)
SOLANUM AMERICANUM P. Mill.
Corecoris fuscus (Thunberg)
SOLANUM CHACOENSE Bitter.
Phthia picta (Drury)
SOLANUM DIMIDIATUM Raf.
Leptoglossus phyllopus (L.)
SOLANUM ELAEAGNIFOLIUM Cav.
Leptoglossus phyllopus (L.)
SOLANUM GRACILE Herter
Phthia picta (Drury)

SOLANUM MELONGENA L.
Phthia picta (Drury)
SOLANUM NIGRUM L.
Corecoris fuscus (Thunberg)
Phthia picta (Drury)
SOLANUM PSEUDOCAPSICUM L.
Phthia picta (Drury)
SOLANUM SISYMBRIOFOLIUM Lam.
Phthia picta (Drury)
SOLANUM TUBEROSUM L.
Leptoglossus phyllopus (L.)
Phthia picta (Drury)
SOLIDAGO SP.
Merocoris sp.
SOLIDAGO ALTISSIMA L.
Euthochtha galeator (F.)
Leptoglossus phyllopus (L.)
Piezogaster alternatus (Say)
SOLIDAGO GIGANTEA Ait.
Piezogaster alternatus (Say)
SONCHUS ASPER (L.) Hill.
Leptoglossus phyllopus (L.)
SORGHUM
Leptoglossus phyllopus (L.)
SOYBEAN
Leptoglossus phyllopus (L.)
SQUASH
Leptoglossus gonagra (F.)
Leptoglossus oppositus (Say)
Phthia picta (Drury)
SNOWBERRY
Leptoglossus concolor (Walker)
SPURGE
Chariesterus antennator (F.)
STELLARIA MEDIA (L.) Vill.
Phthia picta (Drury)
SUNFLOWER
Leptoglossus phyllopus (L.)
SYMPLOCARPUS FOETIDUS (L.) Nutt.
Piezogaster alternatus (Say)
TANGERINE
Leptoglossus gonagra (F.)
TERNSTROMIA PARVIFLORA Krug & Urb.
Leptoglossus gonagra (F.)
THALIA GENICULATA L.
Namacus annulicornis Stal
THISTLE
Althos obscurator (F.)
Leptoglossus phyllopus (L.)
TILIA AMERICANA L.
Acanthocephala terminalis (Dallas)
TOMATO
Leptoglossus balteatus (L.)
Leptoglossus oppositus (Say)
Leptoglossus phyllopus (L.)
Phthia picta (Drury)
TOURNEFORTIA HIRSUTISSIMA L.
Acanthocerus lobatus (Burmeister)
TRIFOLIUM REPENS L.
Phthia picta (Drury)
TUNG
Acanthocephala confraterna (Uhler)
TURNERA ULMIFOLIA Sesse & Moc.
Chondrocerus laticornis Laporte
TYPHA DOMINGENSIS Pers.
Leptoglossus gonagra (F.)
ULMUS RUBRA Muhl.
Acanthocephala terminalis (Dallas)
Euthochtha galeator (F.)
URENA SINUATA L.
Catorhintha guttula (F.)
URTICA DIOCA L.
Euthochtha galeator (F.)
VERBASCUM THAPSUS L.
Acanthocephala femorata (F.)
Leptoglossus phyllopus (L.)
VICIA FABA L.
Phthia picta (Drury)
VIGNA UNQUICULATA (L.) Walp.
Phthia picta (Drury)
VITIS RIPARIA Michx.
Acanthocephala terminalis (Dallas)
WATERMELON
Leptoglossus gonagra (F.)
WHEAT
Leptoglossus phyllopus (L.)
WILLOW
Coriomeris humilis (Uhler)
Chariesterus antennator (F.)
XANTHIUM SP.
Acanthocephala femorata (F.)
YUCCA SP.
Leptoglossus phyllopus (L.)
YUCCA FILAMENTOSA L.
Leptoglossus oppositus (Say)
ZEA MAYS L.
Leptoglossus phyllopus (L.)

LITERATURE CITED

Adams, A. L., and J. C. Gaines. 1950. Sunflower insect control. J. Econ. Ent. 43:181-4.

Allen, R. C. 1969. A revision of the genus *Leptoglossus* Guerin (Hemiptera: Coreidae). Ent. Americana 45:35-140.

Amaral, F. B. F., & A. Storti F. 1976. Estudos biologicos sombre *Leptoglossus gonagra* (Fabricius, 1775) (Hemiptera, Coreidae) em laboratoria. Anais Soc. Ent. 5:130-137.

Amyot, C. J. B., and J. G. A. Serville. 1843. Histoire naturelle des insectes. Hemiptera. Paris. lxvi + 675 + 6 p.

Arnaud, P. H. 1978. A host-parasite catalog of North American Tachinidae (Diptera). United States Dept. Agr. Misc. Publ. 1319, 860 p.

Ashmead, W. H. 1895. Notes on cotton insects found in Mississippi. Insect Life 7:320-326.

Balduf, W. V. 1942. Bionomics of *Catorhintha mendica* Stal (Coreidae: Hemiptera). Bull. Brooklyn Ent. Soc. 37:158-166.

_____. 1957. The spread of *Catorhintha mendica* Stal (Coreidae: Hemiptera). Proc. Ent. Soc. Washington 59:176-185.

Banks, N. 1910. Catalogue of the Nearctic Hemiptera-Heteroptera. Philadelphia. American Ent. Soc. 103 + viii p.

Barber, H. G. 1914a. Insects of Florida. II. Hemiptera. Bull. American Mus. Nat. Hist. 33:495-535.

_____. 1914b. New Hemiptera-Heteroptera with comments upon the distribution of certain known forms. J. New York Ent. Soc. 22:164-171.

_____. 1926. Notes on the Coreidae in the collection of the U. S. National Museum with description of a new *Catorhintha* (Hemiptera-Heteroptera). J. New York Ent. Soc. 34:209-216.

Barber, H. G., and S. C. Bruner. 1947. The Coreidae of Cuba and the Isle of Pines with the description of a new species (Hemiptera-Heteroptera). Mem. Soc. Cubana Hist. Nat. 19(1):17-88.

Blanchard, E. 1840. Histoire Naturelle des Insectes. Hemiptera 3:85-218. Paris.

Blatchley, W. S. 1902. A list of the Hemiptera-Heteroptera taken in the vicinity of Ormond, Fla., in March and April, 1899. A nature wooing. Indianapolis (p. 224-226).

_____. 1926. Heteroptera or true bugs of eastern North America, with special reference to the faunas of Indiana and Florida. Nature Publ. Co. Indianapolis, Indiana, 1116 p.

_____. 1928. Notes on the Heteroptera of eastern North America with descriptions of new species. I. J. New York Ent. Soc. 36:1-23.

_____. 1938. Collecting beetles in Florida. Ward's Ent. Bull. 6:243-244.

Burmeister, H. C. C. 1835. Handbuch der Entomologie. Berlin. Hemiptera, Rhynchota 2:ii + 400 p.

Chittenden, F. H. 1898. A new squash bug. Canadian Ent. 30:239-240.

_____. 1899. The common squash bug (*Anasa tristis* DeG.). Circ. United States Dept. Agr. Div. Ent. (2), 39:1-5, fig. 1-3.

_____. 1902. Some insects injurious to vegetable crops. Bull. United States Bur. Ent. (ns.) 33:1-117.

_____. 1908. The common squashbug, (*Anasa tristis* DeG.). Circ. United States Dept. Agr. Div. Ent. 39, Second Revision: 1-5.

_____. 1925. Note on the behavior of *Leptoglossus oppositus* Say. Bull. Brooklyn Ent. Soc. 20:148-149.

_____. 1927. The Florida potato plant-bug. Quart. Bull. Florida St. Plant Board 11:116-118.

Costa, A. 1847. Cimicum Regni Neapolitani centuria atti. Inst. Sci. Nat. Napoli 7:1-41.

Dallas, W. S. 1852. List of the specimens of hemipterous insects in the collection of the British Museum 2:369-592.

DeBarr, G. L. 1967. Two new sucking insect pests in southern pine seed beds. United States Dept. Agr. Forest Serv. Res. Note SE-78, 3 p.

_____. 1970. Characteristics and radiograph detection of seed bug damage to slash pine seed. Florida Ent. 53:109-117.

DeBarr, G. L., and B. H. Ebel. 1974. Conelet abortion and seed damage of short leaf and loblolly pines by a seedbug, *Leptoglossus corculus*. Forest Sci. 20:165-170.

DeBarr, G. L., and P. P. Kormanik. 1975. Anatomical basis for conelet abortion on *Pinus echinata* following feeding by *Leptoglossus corculus*. Canadian Ent. 107:81-86.

DeGeer, C. 1773. Memoires pour servir a l'histoire des insectes. 3: Hemiptera. Stockholm. 696 p.

Distant, W. L. 1881. Insecta. Rhynchota. Hemiptera-Heteroptera. Vol. I. *in* Biologia Centrali Americana. London. xx + 462 p.

_____. 1900. Rhynchota Notes VIII. Fam. Coreidae. Ann. Mag. Nat. Hist. Ser. 7: 6:1-375.

Dolling, W. R., and T. R. Yonke. 1976. The genus *Coriomeris* in North America. Ann. Ent. Soc. America 69:1147-1152.

Drake, C. J. 1920. The southern green stink bug in Florida. Quart. Bull. St. Plant Board Florida 4:41-94, fig. 6-38.

Drew, W. A., and K. Schaefer. 1962. The Coreidae of Oklahoma (Hemiptera). Proc. Oklahoma Acad. Sci. 43:112-22.

Drury, D. 1770. Illustrations of natural history, wherein are exhibited upwards of two hundred and forty figures of exotic insects, etc. London. vol. I. xxx + 130 p.

Ebeling, W. 1959. Subtropical Fruit Pests. Univ. California Div. Agr. Sci. 436 p.

Engelhardt, G. P. 1912. A hemipteron on carrion. J. New York Ent. Soc. 20:294.

Fabricius, J. C. 1775. Systema entomologiae, sistens insectorum classes, ordines, genera, species, adiectis, synonymis, locis, descriptionibus, observationibus. Flensburg & Lipsiae. 832 p.

_____. 1781. Species insectorum exhibentes eorum differentias specificas, synonyma auctorum, loca natalia, metamorphosis adjectiv observationibus descriptionibus. vol. 2:1-517 Hamburgi & Kiel (Kilonii).

_____. 1794. Entomologia systematica emendata et aucta. Secundum classes, ordines, genera, species, adjectis, synonimis, locis observationibus. vol. 4:1-472 Hafniae.

_____. 1798. Entomologia systematica. Supplementum. Hafniae. ii + 527 p.

_____. 1803. Systema Rhyngotorum secundum ordines, genera, species, adiectis, synonymis, locis, observationibus, descriptionibus. Brunsvigae. Hafniae. ix + 1-314 p.

Fracker, S. B. 1923. A Review of the North American Coreini (Heteroptera). Ann. Ent. Soc. America 16:165-173.

Froeschner, R. C. 1942. Contributions to a synopsis of the Hemiptera of Missouri. II. Coreidae, Aradidae, Neididae. American Midl. Nat. 27:591-609.

_____. 1963. The genus *Ceraleptus* Costa in the Western Hemisphere. (Hemiptera: Coreidae). J. Kansas Ent. Soc. 36:109-113.

Frost, S. W. 1975. Third supplement to insects taken in light traps at the Archbold Biological Station, Highlands Co., Fla. Florida Ent. 58:35-42.

_____. 1979. A preliminary study of North American insects associated with elderberry blossoms. Florida Ent. 62:341-355.

Gahan, A. B. 1927. Miscellaneous descriptions of new parasitic Hymenoptera with some synonymical notes. Proc. United States Natl. Mus. 71:(4):1-39.

Gmelin, J. F. 1789. Caroli a Linne systema naturae. Edition 13. Hemiptera Tome 1:1517-2224 (2041-2224).

Goeze, J. A. E. 1778. Entomologische beitrage zu der ritter Linne zwolften ausgabe der natursystems. 2:i-lxxii, 1-352, Hemiptera. Leipzig.

Gray Herbarium Index. 1968. Vol. 1-10. Harvard Univ. G. K. Hall & Co. Boston, Massachusetts.

Griffiths, J. T., and W. L. Thompson. 1957. Insects and mites found on Florida citrus. Univ. Florida Agric. Expt. Sta. Bull. 591:1-86.

Guerin-Meneville, F. E. 1831. Insects *in* Duperrys voyage autour du monde sur la Coquille. Plates X-XII. Paris.

_____. 1857. Animaux articules a pieds articules. *in* Sagra, Histoire physique, politique et naturelle du l'Ile de Cuba. Vol. VII Hemiptera. Paris.

Hahn, C. W. 1831. Die Wanzenartigen insecten. vol. I. Nurnberg. (orig. not seen). p. 1-36.

_____. 1833. Die Wanzenartigen insecten. vol. II. Nurnberg. (orig. not seen). p. 1-32.

Hamlin, J. D. 1924. A review of the genus *Chelinidea* (Hemiptera-Heteroptera) with biological data. Ann. Ent. Soc. America 17:193-208.

Hart, C. A. 1907. On the biology of the sand areas of Illinois. Part III. Zoological studies in the sand regions of the Illinois and Mississippi River Valleys. Bull. Illinois St. Lab. Nat. Hist. 7:195-267.

Heidemann, O. 1909. New species of Tingitidae and description of a new *Leptoglossus* (Hemiptera-Heteroptera). Bull. Buffalo Soc. Nat. Sci. 9:231-238, 6 fig.

_____. 1910. New species of *Leptoglossus* from North America (Hemiptera-Coreidae). Proc. Ent. Soc. Washington 12:191-197, pl. 7-8.

Herbst, J. F. W. 1784. Geminnutzige naturgeschichte des Thierreichs 6:278. Berlin and Stralsund.

Herrich-Schaeffer, G. A. W. 1842-1851. Die Wanzenartigen insecten. vol. VI, XI (1842), VII (1844), (1851).

Herring, J. L. 1980. A review of the cactus bugs of the genus *Chelinidea* with the description of a new species (Hemiptera: Coreidae). Proc. Ent. Soc. Washington 82:237-251.

Hoffman, R. L. 1975. The insects of Virginia. no. 9. Squash, broad-headed and scentless plant bugs of Virginia (Hemiptera: Coreoidea: Coreidae, Alydidae, Rhopalidae). Virginia Polytech. Inst. Res. Div. Bull. 105:i-iv, 1-52 p.

Hubbard, H. G. 1885. Insects affecting the orange. United States Dept. Agric., Div. Ent., 48th Congress, 2nd Session, House of Representatives, Misc. Doc. No. 40, United States Gov't Printing Office, Washington, D.C., 227 p.

Hunter, W. D., E. C. Pratt, and J. D. Mitchell. 1912 (1913). The principal cactus insects of the United States. Bull. United States Dept. Agr. Div. Ent. (N.S.) 113:1-71, 8 pl., 8 fig.

Hussey, R. F. 1922. Hemiptera from Berrien County, Michigan. Occas. Papers Mus. Zool. Univ. Michigan 118:1-39 p.

_____. 1952. Food plants and new records for some Hemiptera in Florida. Florida Ent. 35:117-118.

_____. 1956. Additions to the United States List of Hemiptera. Florida Ent. 39:88.

Jones, T. H. 1916. Notes on *Anasa andresii* Guer. an enemy of cucurbits. J. Econ. Ent. 9:431-434.

_____. 1924. The life history and stages of *Cimolus obscurus* Stal (Hemiptera). Proc. Ent. Soc. Washington 26:197-205, pl. 9-10.

Kartesz, J. T., & R. Kartesz. 1980. A synonymized checklist of the vascular plants of the United States, Canada and Greenland. Vol. II, the biota of North America. Chapel Hill: Univ. North Carolina Press, 500 p.

Kirkaldy, G. W. 1900. Bibliographical and nomenclatorial notes on the Rhynchota. No. 1. Entomologist 33:238-243.

Kurzewski, F. E. 1967. A note on the nesting behavior of *Solierella* sp? *inermis* (Hymenoptera: Sphecidae, Larrinae). J. Kansas Ent. Soc. 40:203-208.

Laporte, F. L. 1832. Essai d'une classification systematique de l'ordre des Hemipteres (Hemipteres- Heteropteres Latr.). Mag. Zool. I. Nos. 52-55, suppl., 88 p., pl. 51-55.

Linnaeus, C. 1767. Systema Naturae. 12th edit. Holmiae: *Laurentii Salvii*. 1: (2): 533-1327.

_____. 1771. Mantissa plantarum altera generum editionis II. Holmiae: *Laurentii Salvii*. p. 143-587.

Mann, J. 1969. Cactus feeding insects and mites. United States Natl. Mus. Bull. 256:1-158.

Mayr, G. L. 1865. Diagnosen neuer Hemipteren II. Verh. zool.-bot. ges. Wien 15:429-446.

_____. 1866a. Diagnosen neuer Hemipteren III. Verh. zool.-bot. ges. Wien 16:361-366.

_____. 1866b. Hemiptera *In*: Reise der Osterreicheschen Fregatte Novara um die Erde in den Jahren 1857, 1858, 1859. Zool. Theil. 2. abt. 1. Wien: Karl Gerholdi Sohn 204 p.

McAtee, W. L. 1919. Notes on Nearctic Heteroptera. Bull. Brooklyn Ent. Soc. 14:8-16.
McCollough, T. 1974. Chemical analysis of the defensive scent fluid produced by *Mozena lunata* (Hemiptera: Coreidae). Ann. Ent. Soc. America 67:298.
Mead, F. M. 1971a. Annotated key to leaf footed bugs (*Leptoglossus* spp.) in Florida (Hemiptera: Coreidae). Florida Dept. Agr. and Consumer Serv., Div. Pl. Ind. Ent. 113:1-4.
_____. 1971b. Leaf footed bug, *Leptoglossus phyllopus* (Linnaeus) (Hemiptera: Coreidae). Florida Dept. Agr. and Consumer Serv., Div. Pl. Ind. Ent. Circ. 107:1-2.
_____. 1974. (edit.) Triology Tech. Rept. Florida. Dept. Agr. and Consumer Serv., Div. Pl. Ind. 13(10)1-6 (p.1).
_____. 1981. The coreid bug, *Euthochtha galeator* (Fabricius) in Florida (Hemiptera: Coreidae). Florida Dept. Agr. and Consumer Serv., Div. Pl. Ind. Circ. 222:1-4.
_____. and J. L. Herring. 1974. A cactus bug, *Chelinidea vittiger aequoris* McAtee in Florida (Hemiptera: Coreidae). Fla. Dept. and Consumer Serv., Div. Pl. Ind. Ent. Circ. 149:1-2.
Mitchell, P. L. 1980a. Host plant utilization by leaf footed bugs: an investigation of generalist feeding strategy. Ph.D. Dissertation. U. Texas, Austin. 226 p.
_____. 1980b. Combat and territorial defense of *Acanthocephala femorata* (Hemiptera: Coreidae). Ann. Ent. Soc. America 73:404-408.
Montandon, A. L. 1899. Hemiptera Heteroptera. Fam. Coreidae. Notes and descriptions de trois nouvelles especes Americaines. Bull. Soc. Sci. Bucarest, 8:190-195.
Morrill, A. W. 1910. Plant bugs injurious to cotton bolls. Bull. United States Dept. Agr., Bur. Ent., 86:1-110.
O'Shea, R. 1975. A generic revision of the Mictinae (Heteroptera: Coreidae: Coreinae). Ph.D. Dissertation. U. of Connecticut. 232 p.
Palisot de Beauvois, A. M. F. J. 1805. Insectes Recueillis en Afrique et en Amerique, dans les Royaumes d'Oware et de Benin, a Saint Dominique et dans les Etats Unis pendant les annees 1781-1797. Paris. 267 p.
Parshley, H. M. 1914. List of the Hemiptera-Heteroptera of Maine. Psyche 21:139-149.
Patton, C. N. 1958. A catalogue of the Larvaevoridae of Florida. Fla. Ent. 41:29-39, 77-89.
Perty, M. 1830. Delectus animalium articulatorum, quae in itinere per Brasilian annis, 1817-1820, jussu et auspiciis Maximiliani Josephi Bavariae regis augustissimi peracto, Collegerunt Dr. J. B. de Spix et Dr. C. F. Ph. de Martius. Monachii. 4 + 44 = 222 p., 40 pl.
Riley, C. V. 1892. New injurious insects of a year. Insect Life 5:16-19.
Riley, C. V., and L. O. Howard. 1893. A new enemy of the tomato. Insect Life 5(4):282.
Rosen, D. E. 1978. Vicariant patterns and historical explanation in biogeography. Syst. Zool. 27: 159-188.
Ruckes, H. 1955. The genus *Chariesterus* de LaPorte (Heteroptera, Coreidae). American Mus. Novitates. 1721:1-16.
Say, T. 1825. Descriptions of new hemipterous insects collected in the expedition to the Rocky Mountains, performed by order Mr. Calhoun, Secretary of War, under command of Major Long. J. Acad. Nat. Sci. Philadelphia. 4:307-345.
_____. 1831. Descriptions of new species of Heteropterous Hemiptera of North America. New Harmony, Indiana. 39 p. (Fitch reprint pp. 755-812).
_____. 1832. New species of North American insects found by Joseph Barabino, chiefly in Louisiana. New Harmony, Indiana, 16 pp.
Schaefer, C. W., and P. L. Mitchell. 1983. Food plants of the Coreoidea (Hemiptera: Heteroptera). Ann. Ent. Soc. America 76:591-615.
Schaefer, C. W., and R. O'Shea. 1979. Host plants of three coreine tribes (Hemiptera: Heteroptera: Coreidae). Ann. Ent. Soc. America 72:519-523.
Scopoli, J. A. 1763. Entomologie Carniolica exhibens insecta Carnioliae indigena et distributa in ordines, genera, species, varietates. Methodo Linneana. Vindobonae, xxxvi + 420 p.
Sherman, F. 1948. Coreidae of South Carolina in comparison with North Carolina. Ent. News 48:15-17.
Snapp, O. I. 1948. Control of sucking bugs that cause deformed peaches. J. Econ. Ent. 41:555-557.
Stal, C. 1859. Till Kannedomen om Coreida. Ofvers. VetenskAkad. Forh. 16:449-475.
_____. 1860. Bidrag till Rio Janeiro — Traktens hemipter-fauna. Svenska Vet. Akad. Handl. 2:1-84.
_____. 1862. Hemiptera Mexicana enumeravit speciesque novas descripsit. Stettin Ent. Zeit. 23:289-325.
_____. 1865. Hemiptera nova vel minus cognita. Ann. Soc. Ent. France. (4):5:163-188.
_____. 1867. Bidrag till Hemipterernas Systematik. Ofv. Svenska Vet.-Akad. Forh. 24:543-551.
_____. 1868. Hemiptera Fabriciana. Fabricianska Hemipterarter, efter de i Kopenhamn och Kiel forvarde typexemplaren granskade och beskrifne. 2. Svenska vet. Akad. Handl. 7:1-148.
_____. 1870. Enumeratio Hemipterorum. Svenska Vet. Akad. Handl. 9(1):1-232.
Thunberg, C. P. 1783. Dissertatio entomologica novas insectorum species sistens. Upsala. pt. 2:29-52.
Torre-Bueno, J. R. 1908. Notes on Heteroptera. Canadian Ent. 40:165-167.
_____. 1921. New records of Florida bugs. Bull. Brooklyn Ent. Soc. 16:61.
_____. 1930. On the Hemiptera collected by George P. Engelhardt in the South and West. Bull. Brooklyn Ent. Soc. 25:107-108.
_____. 1933. On Floridian Heteroptera, with new state records from the Keys. Bull. Brooklyn Ent. Soc. 28:28-31.

_____. 1941. A synopsis of the Hemiptera-Heteroptera of America north of Mexico. Part II. Ent. Americana, n.s., 21:41-122.

Uhler, P. R. 1863. Hemipterological contributions. No. 2. Trans. Ent. Soc. America 2:361-366.

_____. 1871 (1872). Notices of the Hemiptera of the Western Territories of the United States chiefly from the surveys of Dr. F. V. Hayden. *In* Hayden, Prelim. Rpt. United States Geol. Surv. Montana, p. 392-432. Washington.

_____. 1875. Report upon the collections of Hemiptera made in portions of Nevada, Utah, California, Colorado, New Mexico, and Arizona, during the years 1871, 1873, and 1874. Ann. Rept. Geogr. Expl. West 100th Meridian. 5:827-842.

_____. 1876. List of Hemiptera of the region west of the Mississippi river, including those collected during the Hayden explorations of 1873. Bull. United States Geol. Geogr. Surv. Terr. 1(5): 269-361. (also separate pagination 1-95), pl. 19-21.

_____. 1878. Notices of Some Heteroptera in the collection of Dr. T. W. Harris. Proc. Boston Soc. Nat. Hist. 14:93-109.

_____. 1886. Checklist of the Hemiptera Heteroptera of North America. Brooklyn Ent. Soc. New York. p. 1-34.

Van Duzee, E. P. 1909a. Observations on some Hemiptera taken in Florida in the spring of 1908. Bull. Buffalo Soc. Nat. Sci. 9:149-230.

_____. 1909b. North American Heteroptera. Ent. News. 20:231-234.

_____. 1916. Checklist of the Hemiptera (excepting the Aphididae, Aleurodidae and Coccidae) of America, North of Mexico. New York. (New York Ent. Soc.) xi + 111 p.

_____. 1917. Catalogue of the Hemiptera of America North of Mexico excepting the Aphididae, Coccidae and Aleurodidae. Tech. Bull. California Agr. Exp. Sta. Ent. 2:i-xiv, 1-902.

Walker, F. 1871. Catalogue of the specimens of Hemiptera Heteroptera in the collection of the British Museum. London. p. 1-211.

Westwood, J. O. 1842. *In* Hope, F. W. A catalogue of Hemiptera in the collection of the Rev. F. W. Hope, M.A., with short Latin diagnoses of the new species. Part II. London. 46 p.

Wilson, C. E. 1923. Truck crop insect pests in the Virgin Islands and methods of combating them. Virgin Islands Agr. Expt. Sta. Bull. 4:1-35.

Wiseman, B. R., and W. W. McMillan. 1971. Damage to sorghum in South Georgia by Hemiptera. J. Georgia Ent. Soc. 6(4):237-242.

Yonke, T. R., and J. R. Medler. 1969a. Biology of the Coreidae of Wisconsin. Wisconsin Acad. Arts & Letters 57:163-188.

_____. 1969b. Description of immature stages of Coreidae. 1. *Euthochtha galeator*. Ann. Ent. Soc. America 62:469-473.

_____. 1969c. Description of immature stages of Coreidae. 2. *Acanthocephala terminalis*. Ann. Ent. Soc. America 62:474-476.

_____. 1969d. Description of immature stages of Coreidae. 3. *Archimerus alternatus*. Ann. Ent. Soc. America 62:477-480.

Yoshimoto, C. M. 1977. A new species. *Ooencyrtus leptoglossi* (Hymenoptera: Chalcidoidea: Encyrtidae) reared from eggs of *Leptoglossus corculus* (Hemiptera: Coreidae). Canadian Ent. 109:1009-1012.

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