

REVISION OF THE PLANT BUG
GENUS *RHINACLOA* REUTER
WITH A PHYLOGENETIC ANALYSIS
(HEMIPTERA: MIRIDAE)

RANDALL T. SCHUH AND MICHAEL D. SCHWARTZ

BULLETIN
OF THE
AMERICAN MUSEUM OF NATURAL HISTORY
VOLUME 179 : ARTICLE 4 NEW YORK : 1985

REVISION OF THE PLANT BUG
GENUS *RHINACLOA* REUTER
WITH A PHYLOGENETIC ANALYSIS
(HEMIPTERA: MIRIDAE)

RANDALL T. SCHUH

*Curator, Department of Entomology,
American Museum of Natural History,
Adjunct Professor, Department of Biology,
City College, City University of New York*

MICHAEL D. SCHWARTZ

*Curatorial Assistant, Department of Entomology,
American Museum of Natural History*

This article completes Volume 179.

BULLETIN OF THE AMERICAN MUSEUM OF NATURAL HISTORY

Volume 179, article 4, pages 379–470, figures 1–258, tables 1–4

Issued June 7, 1985

Price: \$6.50 a copy

CONTENTS

Abstract	382
Introduction	382
Acknowledgments	386
Museum Abbreviations	386
Systematics	387
<i>Rhinacloa</i> Reuter	387
Checklist of Names Proposed or Used in <i>Rhinacloa</i> Reuter	388
Key to <i>Rhinacloa</i> species	389
<i>Basalis</i> Species Group	392
<i>Rhinacloa antennalis</i> (Reuter)	392
<i>Rhinacloa apicalis</i> (Reuter)	394
<i>Rhinacloa basalis</i> (Reuter), New Combination	395
<i>Rhinacloa bellissima</i> Carvalho and Gomes	397
<i>Rhinacloa carvalhoi</i> , New Species	397
<i>Rhinacloa chapini</i> , New Species	398
<i>Rhinacloa clavicornis</i> (Reuter)	399
<i>Rhinacloa fernandoana</i> , New Species	402
<i>Rhinacloa luridipennis</i> (Reuter)	402
<i>Rhinacloa maiuscula</i> Carvalho	404
<i>Rhinacloa mysteriosus</i> , New Species	404
<i>Rhinacloa nigripes</i> Maldonado	405
<i>Rhinacloa schaffneri</i> , New Species	406
<i>Pallidipes</i> Species Group	407
<i>Rhinacloa pallidipennis</i> , New Species	407
<i>Rhinacloa pallidipes</i> Maldonado	407
<i>Forticornis</i> Species Group	410
<i>Rhinacloa aricana</i> Carvalho	410
<i>Rhinacloa azapa</i> , New Species	411
<i>Rhinacloa betanzos</i> , New Species	412
<i>Rhinacloa cajamarca</i> , New Species	412
<i>Rhinacloa callicrates</i> Herring	413
<i>Rhinacloa cardini</i> (Barber and Bruner), New Combination	414
<i>Rhinacloa crassitoma</i> Carvalho	416
<i>Rhinacloa forticornis</i> Reuter	417
<i>Rhinacloa incaicus</i> (Carvalho and Gomes), New Combination	418
<i>Rhinacloa insularis</i> (Barber), New Combination	419
<i>Rhinacloa juli</i> , New Species	420
<i>Rhinacloa longirostris</i> (Carvalho), New Combination	421
<i>Rhinacloa manleyi</i> , New Species	421
<i>Rhinacloa mella</i> (Van Duzee), New Combination	422
<i>Rhinacloa mesoamericana</i> , New Species	423
<i>Rhinacloa nigripennis</i> , New Species	424
<i>Rhinacloa penai</i> , New Species	424
<i>Rhinacloa peruana</i> , New Species	425
<i>Rhinacloa puertoricensis</i> , New Species	426
<i>Rhinacloa rubescens</i> Carvalho	427

Rhinacloa rubroornata, New Species 428

Rhinacloa usingeri (Carvalho), New Combination..... 428

Taxa Used for Outgroup Comparison 429

Misplaced Species 430

Species *Incertae Sedis*..... 431

Phylogenetic Analysis 453

Distributional Discussion 460

Literature Cited 469

ABSTRACT

The genus *Rhinacloa* Reuter is revised. Thirty seven species are included, 17 of which are described as new. *Campylomma cardini* Barber and Bruner, *Europiella mella* Van Duzee, *Psallus incaicus* Carvalho and Gomes, *Psallus insularis* Carvalho, *Psallus longirostris* Carvalho, *Psallus usingeri* Carvalho and *Sthenarus basalis* Reuter are transferred to *Rhinacloa*. The following new synonymies are created: *Rhinacloa antennalis* (Reuter) = *Rhinacloa melanotelus* Reuter; *Rhinacloa clavicornis* (Reuter) = *Rhinacloa subpallicornis* Knight and *Rhinacloa lepagei* Carvalho; *Rhinacloa forticornis* Reuter = *Psallus minutulus* Reuter and *Rhinacloa incerta* Reuter; *Rhinacloa basalis* (Reuter), new combination = *Rhinacloa pallida* Reuter, *Rhinacloa pusillus* (Knight), and *Rhinacloa castanea* Carvalho; *Rhinacloa pallidipes* Maldonado = *Lepidopsallus riocensis* Carvalho and *Rhinacloa punctipes* Maldonado. *Demarata mirifica* Distant is treated as a species *incertae sedis*.

Rhinacloa araguaiana Carvalho is transferred to *Paramixia* Reuter (Pilophorini). *Lygus ordinatus* Distant is placed in *Ellenia* Reuter (Phylini). Illustrations are presented for the antennae and male genitalic structures of most known *Rhinacloa* species; scanning electron micrographs are presented for the pretarsus and scale-like setae of many species. A key to separate the included species is included. A phylogenetic analysis of the species is presented, using *Campylomma verbasci* Meyer-Dür, *Microphylidea prosopidis* Knight, and *Nigirmiris pallipes* Carvalho and Schaffner for outgroup comparison. Distributional maps are provided for all species, indicating a range for *Rhinacloa* from the southwestern United States, the Caribbean including the Florida Keys (with three widely distributed species occurring in Florida), the Galapagos Islands, and south to northern Argentina and central Chile. *Rhinacloa forticornis* is introduced into Hawaii.

INTRODUCTION

While collecting in the American southwest in 1978, R. T. Schuh and T. J. Henry found several taxa which seemed at least superficially related to species placed in *Campylomma* Reuter. Attempts by Schuh to identify that material were not particularly successful and led to the current revision, in which we provide a revised diagnosis for the genus *Rhinacloa* Reuter, detailed structural comparisons with what we believe to be closely related taxa, a key to all currently included species, descriptions or redescrptions and diagnoses of all species, phylogenetic analysis and a distributional summary.

The present paper is designed to help identify species and to understand their relationships. Species descriptions are organized according to species groups which correspond closely to the groupings indicated by our phylogenetic analysis: the *basalis* species group, the *pallidipes* species group, and the *forticornis* species group, appear in that order in the text, with species organized alphabetically within each group. Dorsal view photographs are near each description. Illustrations of morphological details are grouped together

at the end of the descriptions and to aid comparison are organized by type of structure and roughly by order of the species in the text.

Much of the groundwork for this project had been laid before we began our effort. J. C. Schaffner had collected extensively in Mexico and put together excellent series of several species that appeared to belong to *Rhinacloa*. In cooperation with J. C. M. Carvalho, Schaffner had borrowed Reuter types from several European museums in preparation for describing material in his collections. Through the generous cooperation of Drs. Schaffner and Carvalho we have been able to examine all the material in their possession as well as their notes derived from examination of type specimens. We have also benefited greatly by being able to study substantial collections from the Canadian National Collection made in Mexico primarily by Dr. L. A. Kelton, in addition to the large and diverse collections of the United States National Museum. We have attempted personally to extract additional specimens from as many other collections as possible without engaging in extended travel. We found

hundreds of unidentified specimens simply filed under Miridae. We also found many misidentified specimens, not only at the species level, but also placed in other genera, primarily *Paramixia* Reuter.

When Reuter (1876) described *Rhinacloa*, with a single included species from Texas, he stated of its relationships "Prope *Atractotomum* [sic] Fieb. locandum." Reuter (1905) described three species, *antennalis*, *apicalis*, and *clavicornis* in *Sthenarus*, but later (Reuter, 1909) transferred them to *Rhinacloa*. Reuter (1909) made it clear that he thought the closest relatives of *Rhinacloa* were members of the Old World genus *Campylomma*. He noted that the two groups could be recognized by the strongly transverse head, the large eyes occupying the entire side of the head and the head forming a very short clypeus. Reuter also stated that *Rhinocloa* could be distinguished from *Campylomma* by (1) the inner margin of the large granular eyes which is almost parallel in *Rhinacloa* but is emarginate near the middle in *Campylomma*; (2) the antennae which are equally short, segment two as long as the width of the head or slightly shorter, in the males thickened beginning at the base, more or less rod-shaped and thicker than segment one, in the females segment two is distinctly clavate; (3) the metafemora are not so strongly thickened as in *Campylomma*, and are either black, brown, or pale and without the large black spots which are so characteristic of *Campylomma*; and (4) the tibiae usually lack the black spots at the bases of the spines.

Carvalho (1948) diagnosed *Rhinacloa* as having (among other things) scale-like pubescence, a transverse, vertical, weakly produced head with very large eyes occupying nearly its entire sides (at least in the males), the inner margin of the eyes nearly straight and the antennae inserted near the inner margin, antennal segment one short, segment two large, the labium not surpassing the posterior coxae (except in some females), the hemelytra the length of the abdomen, the cuneus short, the cuneal fracture deep, and the tibiae with some black spines.

Carvalho (1948) compared *Rhinacloa* to *Atractotomus* Fieber and *Lepidopsallus* Knight from which he said it could be dif-

ferentiated by the scale-like setae covering the entire body, including the head and pronotum, the less strongly enlarged antennae, and the different male genitalia.

Carvalho (1955) in his world keys to the genera of Miridae diagnosed *Rhinacloa* on the presence of scale-like setae, the distance between the bucculae and the eyes not greater than the width of antennal segment one, and the length of antennal segment two not greater than the width of the head. He distinguished *Rhinacloa* from *Campylomma* on the type of setae, *Campylomma* lacking scale-like setae, and from *Lepidopsallus* and *Atractotomus* on the structure of the head, with the distance between the bucculae and the eyes greater than the thickness of antennal segment one. Carvalho and Gagné (1968) in their treatment of the Miridae from the Galapagos Islands diagnosed *Rhinacloa* as having scale-like setae, the second antennal segment equal to or shorter than the width of the head, the head not produced in front of the antennal bases, and the female with an incrassate second antennal segment. They distinguished *Rhinacloa* from *Campylomma* by the latter having only a single type of pubescence without scale-like hairs and translucent rather than opaque hemelytra, and from *Psallus* which has antennal segment two longer than the width of the head and the head produced in front of the antennal bases, but possessing in common the scale-like setae.

Knight (1968) distinguished *Campylomma* from *Rhinacloa* principally by virtue of the former having only a single type of pubescence and the latter having simple as well as scale-like setae.

None of these diagnoses is workable because none lists a single feature or combination of features unique to *Rhinacloa*. Because these diagnoses were meant to be used in a regional context this has not been a serious problem. However, none of them will function over the entire morphological and geographic range of the group. Possibly the most serious problem is that many of the species placed in *Rhinacloa* and related genera do not fit the diagnoses of the groups to which they have been assigned.

Schuh (1984) has already discussed some of the problems encountered in preparing a

diagnosis for *Campylomma*. Much of that discussion is pertinent to the problems encountered in *Rhinacloa*. This may in fact be because, as was pointed out by Reuter long ago, *Campylomma* and *Rhinacloa* are related and therefore show variation in many of the same characters, such as the length and structure of antennal segment two, length of the labium, and coloration and structure of the metafemora. We discuss below the characters used to diagnose *Rhinacloa*. Some show no variation within the genus and are discussed only for purposes of preparing a diagnosis for *Rhinacloa* and identifying its near relatives. Others do vary within *Rhinacloa* and are discussed further in other parts of the paper.

Metafemoral spicules: A complete row of metafemoral spicules occurs in the Phylinae only in *Campylomma* and *Rhinacloa* (see fig. 36). Some members of other subfamilies have a complete row of spicules on the dorsal distal surface of the metafemur, whereas some Nearctic Phylini have a partial row of spicules on the metafemur. Most of the latter will probably end up being placed in *Lepidopsallus* or *Atractotomus*. Whether the spicule row is a synapomorphy for *Rhinacloa* and *Campylomma* was not resolved by our phylogenetic analysis. The resolution of the question lies beyond the scope of this project and will have to wait more detailed study of relationships within the Phylini.

Scale-like setae: Scale-like setae have been used to diagnose several generic level taxa of phyline Miridae, but no information has been available on the detailed structure of those setae. Schuh (1984) showed that SEM examination of setae reveals structural details that can be helpful in recognizing groups within the Miridae, as for example in the Pilophorini and *Lasiolabops* Poppius. The same appears to be true in the complex of genera associated with *Rhinacloa*, based on our current examination. We have studied specimens of many species for which sufficient material was available for SEM mounting, as well as the following taxa: *Atractotomus magnicornis* (Fallen), *Atractotomus purshiae* Knight, *Campylomma verbasci* (Meyer-Dür), *Europiella stigmata* (Uhler), *Lepidopsallus californicus* Knight, *Lepidopsallus rubidus* (Uhler), *Microphylidea proso-*

pidis Knight, *Psallus ancorifer* (Fieber) and *Pseudoatomoscelis seriatus* (Reuter).

Sericeous setae in taxa we examined can be divided into two basic types: those that are swollen mesially, somewhat flattened and apically acuminate, and those that are strongly flattened, broadened apically, and truly scale-like. These characteristics are sometimes detectable with a dissecting microscope.

Of those taxa we examined the first setal type occurs in *Atractotomus magnicornis* (fig. 51), *Campylomma verbasci* (fig. 57), *Europiella stigmata* (fig. 52), *Psallus ancorifer* (fig. 53), and *Pseudoatomoscelis seriatus* (fig. 54). The second type occurs in all remaining taxa we examined (figs. 55, 56, 58–82). Not all of these setae are necessarily identical, but nonetheless, our observations have several implications. First, they suggest that the previous diagnosis of *Campylomma* as having only a single setal type is incorrect (see Schuh, 1984). Second they suggest that the diagnosis of *Atractotomus* on the basis of a terete second antennal segment may be in doubt (an idea already discussed by Schuh [1984] with respect to the placement of *Atractotomus* [= *Campylomma*] *collinus* Van Duzee and *Atractotomus* [= *Druthmarus*] *coxalis* Reuter). Third, they suggest that on the basis of setal type alone, not all species now placed in *Atractotomus* form a monophyletic group with *magnicornis*. And fourth, they suggest that the sericeous flattened setae found in at least some European *Psallus* species are substantially different than those of some New World taxa which have been placed in that genus.

The truly scale-like setae are of three types, which have the following distribution: (1) those with distinctly raised, more or less parallel ridges, which sometimes ramify near the apex (found in most *Rhinacloa* species [figs. 59–67, 70–72, 75–80, 82] and *Lepidopsallus rubidus* [fig. 56]); (2) those in which the ridges are nearly parallel, but faint or totally obliterated, especially near the midline of the seta and apically (found in *Rhinacloa callicrates* [fig. 73], *R. cardini* [fig. 74], *R. puertoricensis* [fig. 81], and *Microphylidea prosopidis* [fig. 58]); and (3) those in which the ridges form an anastomose-like pattern (found in *Lepi-*

dopsallus californicus [fig. 55] *Atractotomus purshiae*). These observations suggest that the presence of scale-like setae alone may define a more inclusive group than *Rhinacloa*, and that species such as *Atractotomus purshiae* have been placed in that genus solely on the basis of antennal type with the squamose setae being disregarded, whereas *Lepidopsallus californicus* with identical setae, was placed in its genus solely on the basis of its setal type.

The distribution of scale-like setae in species we place in *Rhinacloa* shows substantial variation. Most members of the *Rhinacloa forticornis* species group and *pallidipes* species group have the scale-like setae covering the entire body (figs. 14–25, 27–34), with the conspicuous exception of *manleyi*, in which they are present only on the propleuron (fig. 26). Most members of the *basalis* species group have the scale-like setae concentrated on the hemelytra and propleuron with only a very few occurring on the pronotum and scutellum (figs. 1–13).

Eyes size, emargination, and distance between eyes and bucculae: Large eyes which occupy nearly the entire height of the head (fig. 138) and narrow bucculae of a width less than the diameter of antennal segment one (figs. 133, 137) occur in most species we place in *Rhinacloa* as well as some *Campylomma* species. In some cases the genae are nearly obsolete. These characteristics appear to be strongly correlated. They also occur in a very similar form in another tribe, the Leucophoropterini, as can be seen in many species which Carvalho and Gross (1983) and Schuh (1984) placed in the genus *Sejanus* Distant. As discussed below, we do not believe the relative width of the genae can be used as a basis for excluding species from *Rhinacloa*.

The anterior margin of the eyes is strongly emarginate in most *Rhinacloa* males as it is in *Campylomma* males. This attribute is not a group-defining character, and its presumed existence may be based on original observation of a mixture of males and females, since indeed the anterior margin of the eyes of females of *Campylomma* and *Rhinacloa* is much less strongly emarginate than the males.

Antennal structure and length: Antennal

structure is variable in the Phylinae, running the gamut from the simple type found in species such as *Psallus ancorifer* with little or no sexual dimorphism to novelties such as the antennae of *Beamerella personatus* Knight. The antennae of the species we place in *Rhinacloa* show conspicuous variation only in segment two. This ranges from simple in both males and females, to slightly enlarged and cylindrical in males, to terete (such as *aricana*; fig. 113) or weakly to rather strongly clavate (such as *clavicornis*; fig. 107) in females. The antennae of the males of many *Campylomma* and *Sejanus* species are similar to those of many *Rhinacloa* species. Sexual dimorphism in the first two genera does not include the terete and distinctly clavate forms in the females, as found in *Rhinacloa*, however.

Antennal length is variable and in our view cannot be used as diagnostic at the generic level for *Rhinacloa*. The same applies to *Campylomma* as shown by Schuh (1984). Nonetheless, the length of antennal segment two in relation to the width of the head does seem to be useful in identifying one group of species within the *forticornis* species group.

Metafemoral size, shape, and color: *Rhinacloa* species vary in metafemoral size and spotting as do *Campylomma* species. Most species have at least weakly enlarged metafemora, but the degree of enlargement is highly variable within the group. Most species with black femora show no apparent spotting; light-colored species may or may not have spots, contrary to Reuter's diagnosis. Coloration and spotting of the legs is not correlated with most morphological characters. It seems clear that intensity of pigmentation of the legs, or the body as a whole for that matter, cannot be used as a generic character. Schuh (1984) has already pointed out the problems with diagnosing *Campylomma* species on the basis of color. However, our analysis suggests that patterns of antennal coloration may be of value in recognizing natural groups of species.

Labial length: The length of the labium varies greatly in those species we place in *Rhinacloa*. Only one group of species seems clearly defined by labial length (the *cardini* group with its very short labium). Some

species, such as *longirostris* have a very long labium extending well past the apices of the metacoxae.

Pretarsus: Most characters previously thought to be diagnostic of *Rhinacloa* are not reliable under closer scrutiny. The structure of the pretarsus, which has not been used previously in defining the group, appears, upon the basis of our examination, to define not only the genus *Rhinacloa*, but also to demonstrate variation which allows for the recognition of groups of species within the genus. The basally broad claws appear to be diagnostic for *Rhinacloa* at least within the context of that group of taxa which we have examined in detail (compare figs. 39–50 with basally narrow claws in figures 37, 38). The large pulvilli, covering nearly the entire ventral surface of the claw, appear to be unique to what we call the *forticornis* species group (figures 45–50).

ACKNOWLEDGMENTS

We have received assistance with this project in three areas. For the loan of specimens we are particularly grateful to Drs. Joseph C. Schaffner, Texas A&M University, College Station, José C. M. Carvalho, Museu Nacional de Historia Natural, Rio de Janeiro, Mr. Thomas J. Henry, Systematic Entomology Laboratory, USDA, % National Museum of Natural History, Washington, D.C., and Dr. Leonard A. Kelton, Agriculture Canada, Ottawa. Additional specimens were received from Mr. William R. Dolling, British Museum (Natural History), London; Drs. Jenaro Maldonado C., Escuela de Medicina, Ponce, Puerto Rico; Paul H. Arnaud, Jr., California Academy of Sciences, San Francisco, John D. Pinto, University of California, Riverside; Quentin D. Wheeler, James Liebherr, and Mr. E. Richard Hoebeke, Cornell University, Ithaca, New York; Drs. Wilford J. Hanson, Utah State University, Logan; Peter D. Ashlock and Messr. Alex Slater, University of Kansas, Lawrence; Julian Donahue, Los Angeles County Natural History Museum; Drs. John A. Chemsak, California Insect Survey, University of California, Berkeley; Floyd Werner, University of Arizona, Tucson; Alan Hardy, California Department of Food and

Agriculture, Sacramento; Mr. Robert O. Schuster, University of California, Davis; Drs. Frank Mead, Florida State Collection of Arthropods, Gainesville; James A. Slater, University of Connecticut, Storrs; Nils Möller Andersen and the late S. L. Tuxen, University Zoological Museum, Copenhagen; A. Kaltenbach, Naturhistorisches Museum, Vienna; Per Lindskog, Swedish Museum of Natural History, Stockholm; Antti Jansson, University Zoological Museum, Helsinki; I. M. Kerzhner, Zoological Institute, Leningrad; and R. H. Cobben, Agricultural University, Wageningen, the Netherlands.

For assistance with the phylogenetic analysis we are indebted to Dr. Charles Mitter, Director, Maryland Center for Systematic Entomology, University of Maryland, College Park, for providing access to the Center's PHYSYS® installation. We also thank Drs. J. S. Farris, M. F. Mickevich, Michael Schauff, Douglass Miller, and Mr. T. J. Henry for assistance and use of facilities, and some fine local hospitality.

For assistance with illustration we thank Ms. Kathleen Schmidt, Scientific Assistant, Department of Entomology, American Museum of Natural History, who prepared the original antennal illustrations, inked all line drawings, and did the final figure layouts. Ms. Joan Whelan, Interdepartmental Laboratory, American Museum of Natural History, assisted with the preparation of the scanning electron micrographs.

We thank Drs. J. C. M. Carvalho, J. C. Schaffner, Gary M. Stonedahl, J. S. Farris, Lee Herman, and Mr. T. J. Henry for reading and commenting on the manuscript.

Support for field work and technical assistance was received from NSF Grant DEB 81-13401.

MUSEUM ABBREVIATIONS

AMNH, American Museum of Natural History, New York
BM, British Museum (Natural History), London
CAFA, California Department of Food and Agriculture, Sacramento
CAS, California Academy of Sciences, San Francisco
CNC, Canadian National Collection of Insects, Agriculture Canada, Ottawa

COP, Zoological Museum, Copenhagen
 CU, Department of Entomology, Cornell University, Ithaca
 FSCA, Florida State Collection of Arthropods, Gainesville
 HM, University Zoological Museum, Helsinki
 JCMC, José C. M. Carvalho, Rio de Janeiro
 JM, Jenaro Maldonado C., Ponce, Puerto Rico
 KU, Snow Entomological Museum, University of Kansas, Lawrence
 LACM, Los Angeles County Museum of Natural History
 MNRJ, Museu Nacional de Historia Natural, Rio de Janeiro
 TAM, Department of Entomology, Texas A&M University, College Station

UAZ, Department of Entomology, University of Arizona, Tucson
 UCB, California Insect Survey, University of California, Berkeley
 UCD, Department of Entomology, University of California, Davis
 UCR, Department of Entomology, University of California, Riverside
 USNM, National Museum of Natural History, Smithsonian Institution, Washington, D. C.
 USU, Department of Entomology, Utah State University, Logan
 WAG, Agricultural University, Wageningen, the Netherlands
 ZIL, Zoological Institute, Leningrad

SYSTEMATICS

Rhinacloa Reuter

Rhinacloa Reuter, 1876, p. 88; Carvalho, 1952a, pp. 65, 102; 1958, p. 138; Maldonado, 1969, p. 79.

Plesiodemidea Reuter, 1908, p. 177.

Orizaba Reuter, 1908, p. 176.

DIAGNOSIS: Recognized by the distinctive sericeous, appressed, scale-like setae, the row of spicules dorsally on the distal half of the metafemur, and the basally broad claws with the pulvilli either flaplike or covering nearly the entire ventral claw surface.

DESCRIPTION: Male. Macropterous, small; coloration variable, often dark, sometimes body and appendages completely white or yellow, metafemora occasionally with dark spots.

Body, including thorax laterally and abdomen, usually covered with flattened, subappressed, scale-like, sericeous or golden, shining setae, sometimes restricted on dorsum primarily to corium and clavus along claval suture or absent; membrane sometimes with some scale-like setae; antennae usually with short neat vestiture, sometimes with longer somewhat shaggy setae.

Body usually compact, sometimes elongate, hemelytra usually more or less parallel-sided; head usually concave behind, conforming to and obscuring anterior margin of the pronotum, with posterolateral margins of

eyes contiguous with anterolateral angles of pronotum, in species with head weakly concave behind, posterolateral angles of eyes distinctly removed from pronotum; antennal segment one short, segment two cylindrical or weakly clavate, diameter about equal to or slightly less than diameter of segment one, segments three and four of much smaller diameter than segment two; eyes usually large, head usually projecting only slightly beyond anterior margin of eyes in dorsal view, eyes usually occupying at least three fourths of height of head in lateral view, often occupying nearly entire height of head; antennae inserted just above ventral margin of eyes, fossae contiguous with eyes; labium reaching from apex of procoxae to well onto abdomen; metafemora usually enlarged and broadly rounded on dorsal surface, distodorsal surface with an uninterrupted row of tiny, black, closely spaced spicules (as also found in *Campylomma*); claws relatively broad basally, varying from smoothly curving on dorsal surface, with flaplike pulvilli to nearly straight on dorsal surface and sharply bent apically with the pulvilli covering nearly the entire ventral surface of the claw; parempodia setiform.

MALE GENITALIA: Vesica elongate, usually sigmoid, occasionally J-shaped, rather slender, with or without a secondary gonopore, sometimes ornamented apically and/or me-

sially with tiny spicules; phallotheca L-shaped, rather broad apically; left paramere usually boat-shaped, sometimes weakly splayed-out and flattened and with several heavy setae on dorsal margin of posterior process.

FEMALE: Macropterous. Similar to male, often more strongly ovoid; coloration of antennae often different than in male; eyes somewhat smaller; antennal segment two usually narrowed proximally, sometimes weakly to strongly clavate, and less commonly terete.

TYPE SPECIES: *Rhinacloa forticornis* Reuter.

DISTRIBUTION: New World, ranging from north central Florida and the southwestern United States, through the Greater Antilles, south to Central Chile and northern Argentina. Introduced into Hawaii.

DISCUSSION: See Introduction and Discussion under *luridipennis*.

BIOLOGICAL DISCUSSION: Many species of phyline Miridae for which life history information is available are known to be host specific. Such a statement could probably be generalized at about the 80–90 percent level for the Nearctic and Palearctic species. It appears not to be true of many *Rhinacloa* species, however, based on available information. The

same may hold true for *Campylomma* species in the Indo-Pacific region based on the data recently assembled by Schuh (1984). Some European species of *Campylomma* appear to be host specific, whereas others do not (Wagner, 1975). *Campylomma verbasici* in North America can commonly be found on *Verbascum*, but obviously breeds on other plants as indicated by McMullen and Jorge (1970). MacPhee (1976) recorded *C. verbasici* as a pest of apples in Canada. We have recorded host records from label data wherever they were available, but they are so meager as to not be worth summarizing here. Available data suggest that *Rhinacloa callicrates* feeds on *Cercidium* spp. and that *Rhinacloa rubroornata* possibly restricts its development to *Suriana maritima*. The most numerous species in North American collections, *Rhinacloa forticornis*, appears to feed on a wide variety of plants, at least in the American Southwest and Mexico (Knight, 1927). Berry (1951), Wille (1952), and Herrera (1965) considered *Rhinacloa* spp. to be important predators of cotton pests, whereas Ingram (1980) considered *Rhinacloa forticornis* to be a pest of cotton. The widespread species, *Rhinacloa basalis*, can often be collected on ruderal vegetation such as *Amaranthus dubius* in the Neotropics.

CHECKLIST OF NAMES PROPOSED OR USED IN *RHINACLOA* REUTER

antennalis Reuter 1905 (*Sthenarus*)
apicalis Reuter, 1905 (*Sthenarus*)
araguaiana Carvalho, 1948 (*Rhinacloa*), see *Paramixia* Reuter
aricana Carvalho, 1948 (*Rhinacloa*)
azapa, New Species
basalis Reuter, 1907 (*Sthenarus*)
bellissima Carvalho and Gomes, 1970
betanzos, New Species
cajamarca, New Species
callicrates Herring, 1971 (*Rhinacloa*)
cardini Barber and Bruner, 1946 (*Campylomma*)
carmelitana Carvalho, 1948 (*Rhinacloa*), see *Paramixia* Reuter
carvalhoi, New Species
castanea Carvalho, 1948 (*Rhinacloa*), see *basalis* (Reuter)

chapini, New Species
citri Ashmead, 1909 (*Rhinacloa*), see *Halticus* Hahn
clavicornis Reuter, 1905 (*Sthenarus*)
crassitoma Carvalho, 1984
fernandoana, New Species
forticornis Reuter, 1876 (*Rhinacloa*)
fusciceps Reuter, 1908 (*Plesiodemidea*), see *luridipennis* (Reuter)
incerta Reuter, 1908 (*Rhinacloa*), see *forticornis* Reuter
incaicus Carvalho and Gomes, 1968 (*Psallus*)
insularis Barber, 1925 (*Psallus*)
juli, New Species
lepagei Carvalho, 1954 (*Rhinacloa*), see *clavicornis* (Reuter)
longirostris Carvalho, 1968
luridipennis Reuter, 1908 (*Orizaba*)

maiuscula Carvalho, 1948
manleyi, New Species
melanotelus Reuter, 1908 (*Rhinacloa*), see
antennalis (Reuter)
mella Van Duzee, 1937 (*Europiella*)
mesoamericana, New Species
minutulus Reuter, 1908 (*Psallus*), see *forti-*
cornis Reuter
mysteriosus, New Species
nigripennis, New Species
nigripes Maldonado, 1969
pallida Reuter, 1908 (*Rhinacloa*), see *basalis*
 (Reuter)
pallidipennis, New Species
pallidipes Maldonado, 1969

penai, New Species
peruana, New Species
puertoricensis, New Species
punctipes Maldonado, 1969 (*Rhinacloa*), see
pallidipes Maldonado
pusillus Knight, 1926 (*Lepidopsallus*), see
basalis (Reuter)
riodocensis Carvalho, 1980 (*Lepidopsallus*),
 see *pallidipes* Maldonado
rubescens Carvalho, 1968
rubroornata, New Species
schaffneri, New Species
subpallicornis Knight, 1925 (*Rhinacloa*), see
clavicornis Reuter
usingeri Carvalho, 1968 (*Psallus*)

KEY TO *RHINACLOA* SPECIES

1. Labium short, reaching only to apex of pro-
 coxae; general coloration light, yellow, yel-
 low green or yellow orange, rarely infuscate,
 sometimes with a few black spots on femora
 2
 Labium much longer, reaching at least to mid-
 point of mesocoxae and often much farther;
 coloration of body and/or appendages at
 least in part dark; if body light antennal
 segments one and two black, at least in males
 5
2. Posterolateral margin of eyes slightly re-
 moved from anterior margin of pronotum
 (head not obscuring anterior pronotal mar-
 gin in dorsal view; fig. 20), eyes weakly pro-
 jecting laterally; frons slightly produced an-
 teriorly in dorsal view; lateral margin of
 pronotum and hemelytra with a row of
 heavy black setae; male genitalia as in fig-
 ures 167, 168, 208, 209, 240; Caribbean,
 Central America, Northeast of Brazil
 *cardini*
 Posterior margin of head and eyes closely con-
 forming to anterior margin of pronotum
 (head obscuring anterior pronotal margin
 in dorsal view; figs. 19, 28, 32), eyes not
 appearing to project laterally; frons forming
 a smooth curve with anterior margin of eyes
 in dorsal view; lateral margin of pronotum
 and hemelytra without a row of heavy black
 setae; male genitalia as in figures 166, 178,
 181, 207, 219, 222, 239, 245 3
3. Small, length apex tylus-cuneal fracture 1.40–
 1.70 4
 Larger, length apex tylus-cuneal fracture 1.80–
 2.40; male genitalia as in figures 166, 207,
 239; northern Mexico, southern Arizona .
 *callicrates*
4. Metatibia with distinct black spots at bases of
 spines; vesica of male diagnostic as in fig-
 ures 181, 222, 245; Jamaica, Hispaniola,
 Puerto Rico, Antigua and the Netherlands
 Antilles *puertoricensis*
 Metatibia without distinct black spots at bases
 of spines; vesica of male diagnostic as in
 figures 178, 219; tropical Central America
 *mesoamericana*
5. Propleura with an elongate, intense, velvety-
 black or shining-black patch without flat-
 tened setae just behind eye (figs. 68, 69) or
 in *crassitoma* a glabrous area on propleuron
 behind eye; body generally and densely cov-
 ered with scale-like setae; antennal seg-
 ments one and two black in males, segment
 two black at least proximally and distally
 in females (figs. 109, 110, 118); vesica of
 male with secondary gonopore, or without
 gonopore in *crassitoma* 6
 Propleura without an elongate intense vel-
 vety-black patch just behind eyes; vesica
 variable 8
6. Vesica of male without secondary gonopore;
 male genitalia as in figures 169, 210; anten-
 nal segment two of female strongly terete
 (fig. 118); northern Argentina, southern
 Brazil, coastal Peru *crassitoma*
 Vesica of male with secondary gonopore; an-
 tennal segment two of female cylindrical .
 7
7. Metatibia with sharply delimited black
 patches surrounding the bases of spines;

¹ All measurements in the Key and the Descriptions are in millimeters.

- male genitalia as in figures 158, 199, 234; antennal segment two in females entirely black (fig. 109); widely distributed *pallidipes*
- Metatibia without sharply delimited black patches surrounding the bases of spines; male genitalia as in figures 159, 200, 235; antennal segment two in females light mesially (fig. 110); Mexico *pallidipennis*
8. Membrane with scale-like setae, often especially abundant along posterior margin of cells (fig. 6); antennal segment two light proximally and dark distally; male genitalia with secondary gonopore, genitalia as in figures 147, 149, 156, 157, 189, 191, 197, 198, 229, 232, 233 9
- Membrane without scale-like setae; coloration of antennal segment two variable; male genitalia variable, but not as above .. 12
9. Antennal segment one pale; shining setae on dorsum, including membrane, golden; common setae on dorsum very long, brown, suberect; dorsum highly polished, shining, castaneous and yellow; male genitalia as in figures 147, 189; Dominica, Guadeloupe *bellissima*
- Antennal segment one dark; shining setae on dorsum sericeous; common setae short, reclining; dorsum at most weakly shining .. 10
10. Antennal segment two of males with many erect setae of length nearly equal to diameter of segment; male genitalia as in figures 157, 198, 233; Mexico *luridipennis*
- Antennal segment two of males with at most a few erect setae 11
11. Large species, length apex tylus-cuneal fracture (2.30–2.50) body and appendages generally castaneous; male genitalia as in figures 149, 191, 229; males elongate, female ovoid and robust; Colombia *chapini*
- Smaller species, length apex tylus-cuneal fracture (1.50–1.80); male genitalia as in figures 156, 197, 232; males and females similar in size and shape; widely distributed *clavicornis*
12. Antennal segment one black or very dark .. 13
- Antennal segment one pale on distal two thirds, occasionally dark at extreme base 28
13. Antennal segment two in males pale, at least on extreme proximal portion, remainder black; in female segment two pale on proximal one half, incrassate distally (fig. 105); moderately large black species; male genitalia as in figures 152, 194; Mexico *mysteriosus*
- Antennal segment two in males entirely black, in females shape variable, sometimes light mesially (fig. 114); body size and coloration variable 14
14. General coloration, including legs pale, nearly white; antennal segment two in female light mesially; male genitalia as in figures 164, 205, 237; Chile *azapa*
- General coloration not white or nearly so, sometimes light brown, at least pronotum and scutellum often much darker 15
15. Length of antennal segment two in males greater than width of head across eyes; vesica of males without secondary gonopore 21
- Length of antennal segment two in males less than width of head across eyes 16
16. All tibiae castaneous, more or less unicolorous with remainder of body and appendages 17
- Pro- and mesotibiae light in color, usually with distinctly contrasting dark bases of tibial spines 18
17. All femora uniformly castaneous; male genitalia as in figures 160, 201; Mexico *nigripennis*
- All femora not uniformly castaneous, with apices lightly colored; male genitalia as in figures 161, 202; Puerto Rico. . . *nigripes*
18. Hemelytra, including cuneus, pale, head; pronotum, and most of scutellum much darker; male genitalia as in figures 179, 220, 243; Chile *penai*
- Coloration variable, but if hemelytra generally light, cuneus always darker and at least weakly contrasting; head, pronotum, and scutellum always dark, usually not noticeably contrasting with hemelytra 19
19. Small species, length apex tylus-cuneal fracture in males 1.40–1.80; males with procoxae dark and profemora light, profemora dark in females; antennal segment two in females incrassate distally; vesica of male without secondary gonopore; male genitalia as in figures 170, 211, 241; southwestern United States to northern South America, Lesser Antilles *forticornis*
- Larger species, length apex tylus-cuneal fracture in males 1.85–2.20; antennal segment two in females terete as in figures 89, 112, 113 20
20. Coloration of dorsum castaneous; proximal half of metatibia castaneous; vesica of male with secondary gonopore; male genitalia as in figures 162, 203; Hispaniola *schaffneri*
- Coloration of dorsum not uniformly castaneous, cuneus usually reddish; vesica of male without secondary gonopore; male genitalia

- as in figures 163, 204, 236; Central Colombia to Central Chile *aricana*
21. Dorsum without flattened sericeous setae, highly polished and shining; cuneus red; male genitalia as in figures 176, 217; tropical Central America, Mato Grosso, Brazil *manleyi*
Dorsum always generally covered with sericeous, scale-like setae, smooth, varying from slightly shining to rather highly polished; coloration of cuneus variable 22
22. Dorsum and venter strongly and uniformly suffused with carmine red; males with eyes large in lateral and dorsal view; ratio of height head–height eye 1:0.87; ratio of width head interocular space 1:0.34; Galapagos Islands *rubescens*
Coloration of dorsum not as above; eyes in males smaller, ratio width head–interocular space 1:0.45–1:0.53 to 1:0.70–1:0.74 . 23
23. Head, pronotum, and scutellum almost entirely brown black or black, body surface dull; females much more robust and strongly ovoid in shape than males 24
Body not so dull, dorsum varying from weakly shining to moderately strongly polished; females sometimes more strongly ovoid and robust than males 26
24. Most of hemelytra and legs deep red; head, pronotum, and scutellum black; male genitalia as in figures 174, 215, 242; southern Peruvian Andes *juli*
Hemelytra and legs medium to light brown; head, pronotum, and scutellum brown black 25
25. Male genitalia as in figures 165, 206, 238; Bolivia *betanzos*
Male genitalia as in figures 172, 213; Ecuador *incaicus*
26. Cuneus brown, unicolorous with remainder of hemelytra; male genitalia as in figures 180, 221, 224; Peruvian Andes . *peruana*
Cuneus red, unicolorous or not with most of remainder of hemelytra, 27
27. Cuneus unicolorous with most of remainder of hemelytra; females much more strongly ovoid and robust in appearance than males; male genitalia as in figures 247, 248; Northern Peruvian Andes *cajamarca*
Cuneus not unicolorous with remainder of hemelytra; males and females of similar body proportions; male genitalia as in figures 177, 218; Galapagos Islands *mella*
28. Head, pronotum, scutellum, and venter castaneous to nearly black; hemelytra at least partly unicolorous with above areas; vesica of male with secondary gonopore 29
Coloration of head, pronotum, scutellum, and venter variable, but never uniformly castaneous to nearly black; coloration of hemelytra variable; vesica of male with or without secondary gonopore 30
29. Antennal segment one dark at base (fig. 104); all femora yellow; male genitalia as in figures 151, 193, 230; Central Colombia to Southern Brazil *maiuscula*
Antennal segment one uniformly yellow; all femora castaneous, sometimes light distally; metatibiae castaneous proximally; male genitalia as in figures 145, 187, 227; tropical Central and South America .. *antennalis*
30. Rostrum long reaching to middle of abdomen; male genitalia as in figures 175, 216; Galapagos Islands *longirostris*
Rostrum not as long, reaching at most to apices of metacoxae 31
31. Mesal portion of head, pronotum, scutellum, and clavus with a continuous brown stripe (fig. 34); pronotal surface flattened; posterolateral margin of eyes removed from anterior margin of pronotum; male genitalia as in figures 183, 224; Galapagos Islands *usingeri*
Dorsum without brown stripe; pronotal surface convex 32
32. Both clypeus and frons usually light in color 33
Clypeus and/or frons usually dark in color or infusate 35
33. Female with antennal segment two dark proximally and distally, pale mesially (fig. 106); vesica of male with secondary gonopore; males with length of antennal segment two less than width of head across eyes; male genitalia as in figures 154, 195, 231; widespread *basalis*
Female with antennal segment two uniformly light colored, at least on proximal half ... 34
34. Males with length of antennal segment two greater than width of head across eyes; vesica of male without secondary gonopore; male genitalia as in figures 173, 214; Galapagos Islands *insularis*
Males with length of antennal segment two less than width of head across eyes; vesica of male with secondary gonopore; male genitalia as in figures 150, 192; Isla Fernando da Noronha *fernandoana*
35. Clypeus pale, frons dark, neither region with reddish suffusion; vesica of male with secondary gonopore; male genitalia as in figures 148, 190; Rio de Janeiro . *carvalhoi*
Clypeus and frons usually dark or with reddish suffusion 36
36. Pronotum and femora orange brown; head

and hemelytra usually very dark brown; vesica of male with secondary gonopore; male genitalia as in figures 146, 188, 228; Brazil, Venezuela, Panama *apicalis*

Dorsum usually strongly suffused with carmine red; vesica of male without secondary gonopore; male genitalia as in figures 182, 223, 246; Florida Keys *rubroornata*

BASALIS SPECIES GROUP

Rhinacloa antennalis (Reuter)

Figures 1, 39, 59, 83, 98, 145, 227, 253

Sthenarus antennalis Reuter, 1905, p. 37.

Rhinacloa antennalis: Reuter, 1909, p. 82; Carvalho, 1958, p. 138.

Rhinacloa melanotelus Reuter, 1908, p. 178; Carvalho, 1958, p. 139. NEW SYNONYMY.

DIAGNOSIS: Recognized by the relatively large size, nearly black general coloration, antennae with only distal half of segment two black, the dark coxae, femora and proximal portion of the metatibiae, the male genitalia of the *basalis* type with a sigmoid vesica, a distinct secondary gonopore, some subapical spicules, and the left paramere slightly splayed-out.

DESCRIPTION: Male. Relatively large, elongate oval, length apex tylus–cuneal fracture 1.59–1.73, width pronotum 0.82–0.94; general coloration deep castaneous to nearly black; antennae yellow white, except distal half of segment two castaneous; femora castaneous except extreme distal portion of profemora; tibiae and tarsi yellow white, except proximal four fifths of metatibiae castaneous.

Body distinctly shining, generally covered with dark, reclining, sericeous setae; hemelytra densely along claval suture and ventrolaterally on thorax and abdomen with sericeous, subappressed, scale-like setae; membrane without scale-like setae.

Eyes large, ratio of width head–width vertex 1:0.39, eyes occupying nearly entire height of head in lateral view; antennal segment two length 0.54–0.63, nearly cylindrical, diameter visibly greater than that of segment one, length less than width of head; labium just reaching apex of metacoxae; claws smoothly curving, pulvilli flaplike, occupying slightly more than half of ventral claw surface.

MALE GENITALIA: Figures 145, 187, 227. Vesica sigmoid, secondary gonopore well developed, a few small spicules near apex of vesica; secondary gonopore splayed-out with

several heavy setae on dorsal margin of posterior process; *basalis* type.

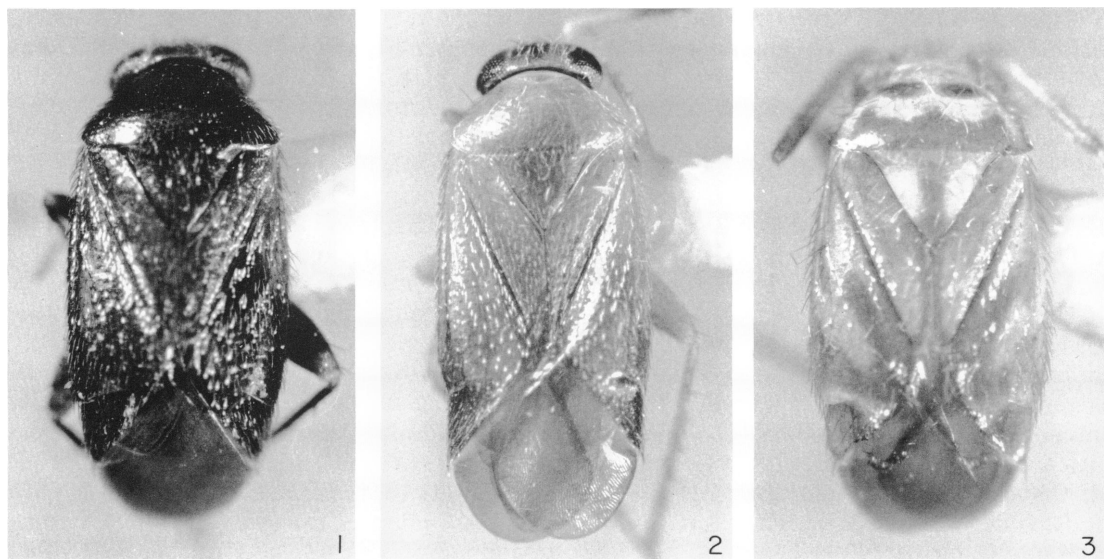
FEMALE: More broadly ovoid than male, eyes relatively smaller, antennal segment two conspicuously clavate.

DISTRIBUTION: Northern Argentina, southern Brazil and western Amazon Basin, Bolivia, tropical northern South America including Trinidad, and tropical Central America and Mexico.

DISCUSSION: *Rhinacloa antennalis* was originally described by Reuter (1905) in the genus *Sthenarus* on the basis of a single male specimen from Venezuela. Reuter (1909) later transferred this and several other species to the genus *Rhinacloa*. Our comparison of the holotype male of *antennalis* in the University Zoological Museum, Copenhagen, with notes and photographs made by J. C. Schaffner of the type of *Rhinacloa melanotelus* Reuter from Orizaba, Mexico, deposited in the Naturhistorisches Museum in Vienna, indicates that the two species are synonymous, *antennalis* being the senior synonym.

SPECIMENS EXAMINED: ARGENTINA. **Misiones:** Loreto, March 10, 25, 1930, Ogloblin (ZIL), 2♀♀. BOLIVIA. **Santa Cruz:** Buenavista, 450 ft., April 21, 1926, June 10–15, 1926, Steinbach (ZIL), 2♀♀. BRAZIL. **Bahia:** Encruzilhada, Divisa, 960 m, Alvarenga (JCMC), 1♂; km 965 Rio–Bahia, Encruzilhada, Motel de Divisa, 960 m, November 1972, Seabra and Roppa (JCMC), ten specimens. **Mato Grosso:** SINOP, 12°31'S, 55°37'W, October 1974, M. Alvarenga (AMNH), 1♀; Rio Teles Pires, SINOP, September 1974, Alvarenga and Roppa (JCMC), 1♂, 4♀♀; Tres Lagoas, December 6–10, 1919, E. C. Harris (CU), 1♂, 3♀♀. **Minas Gerais:** Barbacena, February 1962, M. Alvarenga (JCMC), 2♂♂; Belo Horizonte, November 1–6, 1919 (CU), 2♂♂; Pedra Azul, 900 m, November 1972, M. Alvarenga (AMNH), 1♀; Carmo do Rio Claro, Carvalho (JCMC), 6♂♂,

- 2♀♀; Carmo do Rio Claro, January 1978, J. C. M. Carvalho and J. C. Schaffner (TAM), 1♂, 4♀♀; Ouro Preto, April 1954, N. L. H. Krauss (USNM), 2♀♀. **São Paulo:** Campinas, February 16, April 20, 1936, E. J. Hambleton (USNM), 1♂, 1♀; S. J. Barreiro, S. Bocaina, 1650 m, January 1969, M. Alvarenga (JCMC), 2♂♂; Piracicaba, March 25, 1966, C. A. Triplehorn, black light (AMNH), 1♂; Campinas, February 16, 1937, H. F. G. Sauer (JCMC), 1♂; Campinas, January 1936, April 20, 1936, E. J. Hambleton (USNM), 2♂♂. **Rio de Janeiro:** km 47 Estrada Rio-São Paulo, August 1945, Wygodzinsky (JCMC), 1♂; Represa Rio Grande, August 1972, M. Alvarenga (AMNH), 2♀♀; Represa Rio Grande, F. M. Oliveira (JCMC), 2♂♂, 2♀♀; Paqueta Islands, June 1954, N. L. H. Krauss (USNM), 1♀. **Santa Caterina:** Nova Teutonia, 27°11'S, 52°23'W, F. Plaumann (JCMC), 4♂♂, 2♀♀; Nova Teutonia, 27°11'S, 52°23'W, 300–500 m, April 1971, F. Plaumann (CNC), 3♀♀; Nova Teutonia, 27°11'S, 52°23'W, April 1945, F. Plaumann (USNM), 1♀. **BOLIVIA. La Paz:** Chulumani, October 2, 1972, G. E. Bohart (USU), 1♂; Las Yungas, 9200 ft., September 30, 1972, G. E. Bohart (USU), 1♂, 2♀♀. **COLOMBIA. Cundinamarca:** Alban, September 10, 1965, J. A. Ramos (JM), 1♀; El Triunfo, December 11, 1965, J. A. Ramos (JM), 8♀♀; 9 km S of Fusugasuga, November 11, 1965, J. A. Ramos (JM), 3♂♂, 1♀; San Antonio de Tena, October 9, 1965, J. A. Ramos (JM), 3♂♂, 1♀; Chipaque, November 27, 1965, J. A. Ramos (JM), 1♂; Melgar, November 11, 1965, J. A. Ramos (JM), 2♀♀. **COSTA RICA.** Pablo Schild (USNM), 1♂. **HONDURAS.** Tegucigalpa, F. J. Dyer (USNM), 5♂♂; Zamorano, November 1959, N. L. H. Krauss (USNM), 1♂. **MEXICO. Chiapas:** 5 mi. NNW of Tuxtla Gutierrez, July 22, 1951, A. A. Alcorn (KU), 1♂; Comitán, July 20, 1969, L. A. Kelton (CNC), 1♂, 1♀; Teopisca, June 20, 1965, Schaffner et al. (AMNH, TAM), 1♂, 1♀; 14 mi. W of Comitán, July 15, 1969, L. A. Kelton (CNC), 3♀♀; San Cristobal, August 14, 1969, L. A. Kelton (CNC), 1♀; 3 mi. SE La Trinitaria, June 18–19, 1965, Schaffner et al. (TAM), 1♀; 1 mi. W of Comitán, 5100 ft., June 20, 1965, Schaffner et al. (TAM), 2♀♀; 1 mi. S of Rayón, 4200 ft., June 16, 1965, Schaffner et al. (TAM), 1♂; 0.5 mi. N of Ocozocoautla, July 8, 1971, Schaffner et al. (TAM), 2♂♂; 50 mi. S of Pichucalco, September 13, 1974, W. Hanson and G. Bohart (USU), 1♂. **Jalisco:** Nevado de Colima Road, 2.3 mi. W of highway junct. near Atenquique, April 20–21, 1977, 5000 ft., Schaffner et al. (TAM), 1♀. **Oaxaca:** Oaxaca, 8.3 mi. SE of El Camaron, July 24, 1974, Schaffner et al. (AMNH), 1♂; 65 mi. SE of Oaxaca, August 15, 1972, G. F. and S. Hevel (USNM), 1♂. **Puebla:** 6 mi. SW of Tehuacan, July 8–10, 1973, Schaffner and Mastro (TAM), 1♀. **Querétaro:** 14 mi. E of Landa de Matamoros, July 23–24, 1970, Schaffner et al. (AMNH, TAM), 1♂, 3♀♀. **San Luis Potosí:** Tamazunchale, Quinta Chilla, December 20, 1948, E. S. Ross (CAS), 1♂. **Vera Cruz:** Jalapa, November 15, 1963, July 13, 1965, N. L. H. Krauss (USNM), 3♂♂, 7♀♀; Jalapa, Crawford (HM), 1♂; Orizaba, Mann (AMNH), 1♂, 1♀; Orizaba, September 4, 1974, G. Bohart and W. Hanson (USU), 1♀; Orizaba, Crawford (HM), 1♂; 6.9 mi. N of Fortín, August 6, 1976, Schaffner et al. (TAM), 1♀; 5 mi. N of Huatusco, June 29, 1971, Schaffner et al. (TAM), 1♀. **NICARAGUA.** Santa Maria de Ostuma, November 1959, N. L. H. Krauss (USNM), 1♂. **PANAMA.** Canal Zone, Fortuna, H. Wolda (JM), 4♂♂. **PARAGUAY.** Horqueta, 45 mi. E, Paraguay River, May 12–19, 1933, A. Schulze (USNM), 6♀♀; Villa Rica, March, F. Shade (AMNH), 1♂; Gran Chaco, 59°40'S, 22°23'W, 230 km W of Paraguay River, August 13, 1933, A. Schulze (USNM), 1♂. **PERU. Junín:** between San Ramon de Pangoa and Boca de Kiatari, 40–55 km SE of Satipo, 750 m, March 4–13, 1972, R. T. and J. C. Schuh, sweeping roadside vegetation (AMNH), 2♂♂, 2♀♀; San Ramon de Pangoa, 40 km SE Satipo, 750 m, February 29, 1972, R. T. and J. C. Schuh (AMNH), 1♂, 1♀; La Merced, Rio Chanchamayo, June 17, 1920 (CU), 1♂. **TRINIDAD.** Asa Wright Nature Center, January 15, 1981, G. E. Bohart (USU), 1♀; Arima Valley, 800–1200 ft., February 10–22, 1964, J. G. Rozen and P. Wygodzinsky (AMNH), 2♂♂; Port of Spain, Dept. of Agric. grounds, November 23, 1918, H. Morrison (USNM), 2♂♂, 2♀♀. **VENEZUELA. Aragua:** Rancho Grande, 20 km NW of Maracay, 1100 m, July 23, 1976, M. H. Sweet, at light (TAM), 1♂; Rancho Grande, July 5, 1968, J. Maldonado (JM), 1♂. **Merida:** 10 km W of Merida, 2100 m, February 11, 1968, P. and B. Wygodzinsky



FIGS. 1-3 1. *Rhinacloa antennalis*, ♂, Mexico, Queretaro, 14 mi. E of Landa de Matamoros. 2. *Rhinacloa apicalis*, ♂, Brazil, Santa Catarina, Nova Teutonia. 3. *Rhinacloa bellissima*, ♂, Dominica, Antrim.

(AMNH), 1♀. **Sucre:** Mariquitar, June 29, 1968, J. Maldonado (JM), 1♂; Cariaco, June 27, 1968, J. Maldonado (JM), 1♂.

Rhinacloa apicalis (Reuter)

Figures 2, 60, 99, 146, 188, 228, 252

Sthenarus apicalis Reuter, 1905, p. 36.

Rhinacloa apicalis: Reuter, 1909, p. 82; Carvalho, 1958, p. 138.

DIAGNOSIS: Recognized by the generally orange-brown pronotum and legs in contrast to the darker coloration of the head, scutellum, and posterior portion of the hemelytra, coloration of the antennae, and structure of the male genitalia which are of the *basalis* type.

DESCRIPTION: Male. Moderate-sized, elongate ovoid, length apex tylus-cuneal fracture 1.58-1.90, width pronotum 0.85-0.96; pronotum, thorax laterally and ventrally, basal portion of hemelytra, and all legs light to medium orange brown; head, scutellum, remainder of hemelytra, and abdomen dark brown; antennae generally light yellow, distal two fifths of segment two dark brown, segment four generally infusate; labial segments

two, three, and four yellow; black tibial spines without black bases.

Body surface smooth and weakly shining; body generally covered with medium brown, reclining, common setae; clavus and corium narrowly along claval suture, corium sparsely, and abdomen lateroventrally with sericeous, subappressed, scale-like setae; membrane without scale-like setae.

Eyes large, ratio of width head-width vertex 1:0.37, eyes occupying nearly entire height of head in lateral view; antennal segment two length 0.63-0.68, nearly cylindrical, maximum diameter slightly greater than that of segment one, length less than width of head; labium just surpassing apex of mesocoxae; hemelytra weakly convex laterally; claws rather strongly curved, pulvilli flaplike, occupying about half of ventral claw surface.

MALE GENITALIA: Figures 146, 188, 228. Vesica sigmoid, secondary gonopore well developed, apex of vesica with a very few spicules; left paramere weakly splayed-out with several heavy setae on dorsal margin of posterior process; *basalis* type.

FEMALE: Body more broadly ovoid than in male, eyes relatively smaller, antennal segment two weakly clavate.

DISTRIBUTION: Tropical America, from southern Brazil to Costa Rica.

DISCUSSION: Reuter (1905) described *Rhinacloa apicalis* in the genus *Sthenarus* on the basis of a single female specimen from Caracas, Venezuela. Reuter later (1909) transferred it to the genus *Rhinacloa*. We have established the identity of this species examination of the holotype female which is deposited in the University Zoological Museum, Copenhagen.

SPECIMENS EXAMINED: **BRAZIL.** **Amapá:** Serra do Navio, 1°0'N, 51°3'W, May 6–7, 1973, R. T. Schuh (AMNH), 1♀. **Mato Grosso:** SINOP, 12°31'S, 55°37'W, October 1974, M. Alvarenga (AMNH), 1♀; Rio Teles Pires, Mt. Brasil, SINOP, September 1974, Alvarenga and Roppa (JCMC), 1♀. **Pará:** Tukurui, January 1979, Alvarenga (JCMC), ten specimens. **Minas Gerais:** Carmo do Rio Claro, January 1978, Carvalho and Schaffner (TAM), 1♀. **Santa Caterina:** Nova Teutonia, 27°11'S, 52°23'W, 300–500 m, F. Plaumann (CNC), 1♂, 5♀♀; Nova Teutonia, 27°11'S, 52°23'W, October 1970, F. Plaumann (AMNH, TAM), 4♂♂, 3♀♀; Nova Teutonia, 27°11'S, 52°23'W, March 30, 1931, F. Plaumann (JCMC), 1♀. **COSTA RICA.** **Cartago:** Turrialba, IICA Res. Sta., July 3–8, 1981, W. R. Dolling (BM), 1♀; Cartago, November 1954, N. L. H. Krauss (BM), 1♂. **PANAMA.** La Jolla, April 1952, F. S. Blanton (USNM), 1♀; Canal Zone, Barro Colorado Island, Griswold (AMNH), 1♀; Canal Zone, Camaron, Ft. Kobbe, June 23, 1952, F. S. Blanton (USNM), 1♀; Las Cumbres, 09°06'N, 79°32'W, April 16, 1974, H. Wolda, light trap (AMNH), 1♂, 1♀. **TRINIDAD.** Simla, July 1–15, 1962, J. Maldonado (JM), 1♀; Simla, Arima Valley, February 3–4, 1965, J. A. Slater and N. T. Davis (AMNH), 3♂♂, 2♀♀; Arima Valley, 800–1200 ft., February 10–22, 1964, Rozen and Wygodzinsky (AMNH), 2♂♂, 1♀. **VENEZUELA.** **Aragua:** Rancho Grande, July 5, 1968, J. Maldonado (JM), 1♀.

Rhinacloa basalis (Reuter),
new combination

Figures 12, 40, 63, 86, 106,
153, 154, 195, 231, 252

Sthenarus basalis Reuter, 1907, p. 26; Carvalho, 1958, p. 144.

Rhinacloa pallida Reuter, 1908, p. 178; Carvalho, 1958, p. 139; Maldonado, 1969, p. 82. **NEW SYNONYMY.**

Lepidopsallus pusillus Knight, 1926, p. 227; Maldonado, 1969, p. 85. **NEW SYNONYMY.**

Rhinacloa castanea Carvalho, 1948, p. 10; 1958, p. 138. **NEW SYNONYMY.**

Rhinacloa pusilla: Carvalho, 1955, p. 226; 1958, p. 139.

DIAGNOSIS: Recognized by the generally pale brown, but variable coloration, the sexual dimorphism in the coloration of antennal segment two, and the structure of the male genitalia with the developed secondary gonopore, the spicules apically on the vesica, and the splayed-out left paramere.

DESCRIPTION: Male. Small, elongate, nearly parallel-sided, length apex tylus–cuneal fracture 1.47–1.83, width pronotum 0.76–0.92; dorsal surface usually light brown, scutellum often slightly darker, head, pronotum, and scutellum often dark brown to nearly black in populations from Greater Antilles; hemelytra (including membrane) light brown; appendages (including labium) yellowish, except distal one third of antennal segment two castaneous; thorax and abdomen ventrally brown; metathoracic scent-gland evaporatory area appearing pruinose.

Dorsum polished and weakly shining; body covered with pale, reclining, common setae, hemelytra with some sericeous, subappressed, scale-like setae concentrated along the claval suture, with at most a few such setae on pronotum and scutellum; membrane without scale-like setae.

Eyes large, ratio of width head–width vertex 1:0.37, occupying four fifths of height of head in lateral view; antennal segment two length 0.56–0.76, cylindrical, of diameter equal to that of segment one, length less than width of head; labium not quite reaching apex of metacoxae; claws curved on dorsal surface, pulvilli flaplike, covering about half of ventral claw surface.

MALE GENITALIA: Figures 153, 154, 195, 231. Vesica sigmoid, secondary gonopore developed, apex of vesica with a few spicules; left paramere splayed-out with several heavy setae on dorsal margin of posterior process; *basalis* type.

FEMALE: Ovoid, pattern of coloration similar to male but often much darker; eyes

smaller than in male; antennal segment two castaneous on distal one fourth and usually on proximal one fifth, sometimes almost totally dark.

DISTRIBUTION: Widely distributed, ranging from northern Argentina to central Mexico, the West Indies, and Florida.

DISCUSSION: Reuter (1907) described *Sthenarus basalis* on the basis of a single female from Mandeville, Jamaica. Comparison of the holotype in the Helsinki Museum with notes and photographs of the holotype of *Rhinacloa pallida* Reuter made by J. C. Schaffner (a male from Orizaba, Mexico, deposited in the Naturhistorisches Museum, Vienna), the holotype of *Lepidopsallus pusillus* Knight (deposited in the National Museum of Natural History, Washington, D.C.), and the holotype of *Rhinacloa castanea* Carvalho (deposited in the Museu Nacional de Historia Natural, Rio de Janeiro) indicate that all four nominal taxa are synonymous. *Sthenarus basalis* is therefore transferred to *Rhinacloa* and treated as the senior synonym of the remaining three species.

This widely distributed species shows substantial variation in pigmentation over its entire range. Most notable are collections from Hispaniola in which the posterior half of the pronotum is very dark brown, in striking contrast with the anterior half, and from Jamaica in which nearly the entire pronotum is dark brown to almost black; at most other localities the head and pronotum are generally pale, although the scutellum is quite often dark brown. Other characteristics, including the structure of the male genitalia and the coloration of antennal segment two in the females suggest that the specimens here referred to *basalis* belong to a single rather variable species. In some instances, including the holotype of *basalis*, antennal segment two is light basally in the female. Examination of large numbers of specimens indicates that this is simply individual variation.

SPECIMENS EXAMINED: ARGENTINA. Chaco: Resistencia. Tucumán: Tucumán. BAHAMAS. Nassau: New Providencia. BELIZE. Corozal Prov.: 5 mi. S of Santa Elena. Prov. ?: Belmopan. BOLIVIA. Santa Cruz: Santa Cruz. BRAZIL. Distrito Federal: Brasília. Minas Gerais: Carmo do Rio Claro; Pirapara; Belo Horizonte. Rio de Janeiro: km

47 Estrada Rio-São Paulo; Petropolis; Riachuelo, at light. São Paulo: Piracicaba; Santos. Santa Catarina: Nova Teutonia, 27°11'S, 52°23'W (including holotype ♂ in MNRJ). COLOMBIA. Bolivar: Cartagena. Cundinamarca: Anapoima. COSTA RICA. Cartago: Turrialba; Cartago. CUBA. Herradura; Soledad; Trinidad Mountains, Buenos Aires; Trinidad Mountains, Mina Carlota; Havana; Caymas. DOMINICA. Antrim, 1000 ft.; Roseau; Laudet; Soufriere; Clarke Hall; Pont Casse. DOMINICAN REP. Puerto Plata Prov.: Sosna. Samara Prov.: Samara. Santiago Prov.: Pedro Garcia. La Vega Prov.: La Guardarragua, 2000 m; 2 mi. N of Valle Nuevo. Prov. ?: Constanza, ex weed; Santo Domingo; 8 mi. up Macoris River. EL SALVADOR. Santa Tecla; San Salvador. GRENADA. Mt. Gay Est., leeward side; Balthazar, windward side. GUATEMALA. Peten, Santa Elena, 120–160 m; Guatemala City, 1500–1600 m; Escuintla; Lago Amatitlan. HONDURAS. Tegucigalpa; Coyoles; Roatan Island; Aguan Valley, 10 mi. E of Olanchito; Pena Blanco, Lago Yojoa. JAMAICA. Harwar Gap, 4000 ft.; St. Catherine's Parish, Linstead; Moneague; Blue Mountains, 4500 ft.. MEXICO. Chiapas: Palenque; 29 mi. SW of Cintalapa; 9 mi. N of Ocozocoautla; 12 mi. N of Ocozocoautla. Hidalgo: 18 km E of Santa Ana. Nayarit: Rio de las Canyas, 8 mi. NW of Acaponeta; 24 mi. SE of Tepic; 8 mi. NW of Acaponeta. Mexico: N slope Popocatepetl, 13000 ft.. Puebla: 5 mi. E of Huauchinango. Queretaro: 14 mi. E of Landa de Matamoros. San Luis Potosí: Tamazunchale; Xilitla; 1 km E of Xolol. Sinaloa: E of Mazatlan; Mazatlan. Tabasco: 17 mi. S of Villa Hermosa. Vera Cruz: Orizaba; 5 mi. W of Palma Sola; Allende; Jalapa; Tampico; Cordoba; Catemaco; 8 mi. NE of Catemaco; 30 mi. S of Acayucan; 3 mi. N of Fortin; 2 mi. E of Tula. NETHERLANDS ANTILLES. Curaçao (WAG), four specimens. St. Gustatin (WAG), six specimens. NIGARAGUA. Managua. PANAMA. Dolega; Darien Province, Garachine; Canal Zone, Barro Colorado; Chiriqui; Pearl Island, San Jose. PUERTO RICO. San Juan; Lajas; Cajuas; Mariacao; Naguabo; Rincon; Mayaguez; Coamo Springs; Rio Piedras; nr. Isabela, Punta Rosario. PERU. Huanuco: Tingo Maria. Junin: 40–55 km SE of Satipo, between

San Ramon de Pangoa and Boca de Kiatari, 750 m; 40 km SE of Satipo, San Ramon de Pangoa, ex *Amaranthus dubius*; approx. 55 km SE of Satipo, San Emiliano de Cachin-gareni, 1000 m; La Merced, Rio Chancha-mayo. **Loreto:** Pucallpa, 150 m; 34 km NW of Pucallpa, km 3 on Tournavista Road, 300 m. **Madre de Dios:** Puerto Maldonado. **Dept. ?:** Hacienda San Juan. **ST. LUCIA.** Castries, 1–210 m. **ST. VINCENT.** Kingstown. **SUR-INAM.** Paramaribo. **TRINIDAD.** Curepe; La Brea. **USA. Florida:** *Alachua Co.:* Gainesville (holotype ♂ of *pusillus*, USNM); Newberry. *Broward Co.:* Deerfield. *Charlotte Co.:* Punta Gorda. *Collier Co.:* Naples. *Dade Co.:* Miami; Homestead; Coconut Grove, Key Largo. *Glades Co.:* 3 mi. S of Moore Haven. *Hendry Co.:* Clewiston. *Highlands Co.:* Lake Placid. *Hillsborough Co.:* Tampa; Plant City. *Lee Co.:* Ft. Myers. *Monroe Co.:* Everglades Nat. Park, Rt. 27 nr. Visitor Center; Flamingo. *Orange Co.:* Winter Park. *Palm Beach Co.:* 3 mi. N of Palm Beach Gardens; Belle Glade. *Pinellas Co.:* Dunedin. *Polk Co.:* Bartow. *Putman Co.:* Crescent City. *Sarasota Co.:* Myakka River State Park. *Seminole Co.:* Sandford. **Georgia:** Okefenoke Swamp. **VE-NUZUELA.** **Aragua:** Maracay. **Carabobo:** Saiman Mocho; Chirgua. **Cojedes:** Tinaco. **Merida:** Merida. **Yaracuy:** Salom. **Sucre:** El Rincon. **Zuila:** Paraguaicoa. **State ?:** El Valle.

Rhinacloa bellissima Carvalho and Gomes
Figures 3, 100, 147, 189, 251

Rhinacloa bellissima Carvalho and Gomes, 1970,
p. 596.

DIAGNOSIS: Recognized by the distinctive coloration, the golden scale-like setae which also occur on the membrane, the very long, suberect, brown, common setae on the dorsum, and the male genitalia of the type found also in *clavicornis*.

DESCRIPTION: Male. Moderate sized, elongate ovoid, length apex tylus–cuneal fracture 1.61–1.68, width pronotum 0.88; general coloration light yellow brown, with castaneous markings as follows: calli, lateral and posterior margins of pronotum irregularly, midline of scutellum broadly, most of anterior two thirds of clavus, most of endocorium, corium adjacent to cuneus, and most of cuneus; posterior one third of corial margin and cuneal

margin reddish; distal half of antennal segment two and segments three and four dark; metafemora with black bases of spines on dorsal margin; long black tibial spines with very heavy dark bases.

Dorsum highly polished, shining, covered with very long, suberect, brown common setae, venter of abdomen with short, pale, reclining, common setae; dorsum with golden, shining, subappressed, scale-like setae in a neat row on corium and clavus adjacent to claval suture, along posterior margin of cuneus, and on membrane; membrane without scale-like setae.

Eyes large, ratio of width head–width vertex 1:0.41; eyes occupying nearly entire height of head in lateral view; frons projecting slightly beyond anterior margin of eyes in dorsal view, clypeus not visible; antennal segment two length 0.70–0.72, cylindrical, diameter slightly greater than that of segment one, length greater than width of head; labium reaching to apex of metacoxae; lateral corial margins distinctly convex; claws rather strongly curved on dorsal surface, pulvilli flaplike, occupying about two thirds of ventral claw surface.

MALE GENITALIA: Figures 147, 189. Vesica similar in form to *clavicornis* and *lividicornis*; left clasper splayed-out with several heavy setae on dorsal margin of posterior process.

FEMALE: Body much more robust than in male, membrane strongly declivent, cuneal incisure deep; eyes relatively smaller than in male; antennal segment two weakly clavate.

DISTRIBUTION: Lesser Antilles: Dominica and Guadeloupe.

SPECIMENS EXAMINED: DOMINICA. Antrim, 1000 ft., March 10–15, 1956, J. F. G. Clarke (AMNH, USNM), 4♂♂, 5♀♀. GUADELOUPE. Duclos, June 25, 1971, L. Gruner, light trap (AMNH), 1♀; Guadeloupe (HM), 1♀ (holotype).

Rhinacloa carvalhoi, new species

Figures 4, 101, 148, 190, 253

DIAGNOSIS: Recognized by the generally castaneous coloration of the body, including the head above the eyes and the abdominal venter, the pale yellow white appendages as well the head below the antennal fossae, the labium and the coxae generally with the distal

one fourth of antennal segment two castaneous, and the *basalis* type of genitalia.

DESCRIPTION: Male. Moderate sized, elongate, length apex tylus–cuneal fracture 1.65–1.75, width pronotum 0.85–0.90; general coloration of body castaneous, thoracic venter somewhat lighter than remainder; head below antennal fossae, antennae, except distal one fourth of segment two, head below antennal fossae, and labium pale yellow white; black tibial spines without black bases; membrane weakly smoky.

Dorsum weakly rugulose and weakly shining, generally covered with reclining, brown, simple setae; clavus and corium along claval suture and costal margin of anterior two thirds of corium and pro- and mesothorax laterally with sericeous, subappressed, scale-like setae; membrane without scale-like setae.

Eyes moderately large, ratio of width head–width vertex 1:0.40, eyes occupying entire height of head in lateral view; antennal segment two length 0.60, more or less cylindrical, greatest diameter mesially, slightly greater than that of segment one; labium reaching apex of mesocoxae; hemelytra weakly convex laterally; claws broadened basally and strongly curved on dorsal surface, pulvilli flaplike, occupying about half of ventral claw surface.

MALE GENITALIA: Figures 148, 190. Vesica rather broad, sigmoid, with several spicules distad of relatively small secondary gonopore and a few spicules mesially on shaft; left paramere somewhat flattened and splayed-out, with several heavy setae on dorsal margin of posterior process; *basalis* type.

FEMALE: Not positively identified.

ETYMOLOGY: Named for J. C. M. Carvalho.

DISTRIBUTION: Known only from Rio de Janeiro, Brazil.

HOLOTYPE ♂: BRAZIL. **Distrito Federal:** Corcovado, June 1946, Carvalho collector; deposited in the Museu Nacional de Historia Natural, Rio de Janeiro.

PARATYPES: Same data as holotype (MNRJ, JCMC, AMNH), 6♂♂, 2♀♀.

***Rhinacloa chapini*, new species**

Figures 5, 102, 149, 191, 229, 253

DIAGNOSIS: Recognized by the rather uniform castaneous coloration, the scale-like setae on the membrane, the distinct sexual di-

morphism, and the structure of the male genitalia similar to that found in *mysteriosus*, *nigripes*, and *maiuscula*.

DESCRIPTION: Male. Relatively large, body elongate, length apex tylus–cuneal fracture 2.33–2.48, width pronotum 1.02–1.16; general coloration castaneous; proximal half of antennal segment two, proximal one third of antennal segment three, distal one fifth of all femora, and all tibiae and tarsal segments one and two yellow white, all tarsal segments three infusate.

Body surface smooth and shining, covering with reclining, pale brown, simple setae and sericeous, subappressed, scale-like setae; membrane with scale-like setae.

Eyes large, ratio of width head–width vertex 1:0.45, occupying slightly more than three fourths of height of head in lateral view; antennal segment two length 0.80–0.92, increasing slightly in diameter distally; labium not quite reaching apex of metacoxae; hemelytra very long, very weakly convex laterally, broadest just anterior to cuneal fracture; claws smoothly curved on dorsal surface, pulvilli flaplike and occupying about half of ventral claw surface.

MALE GENITALIA: Figures 149, 191, 229. Vesica sigmoid with a weakly developed but visible secondary gonopore, with a few spicules on shaft distad and proximad of gonopore, apically with a slender spine; left paramere weakly splayed-out with several heavy setae on dorsal margin of posterior process; *basalis* type.

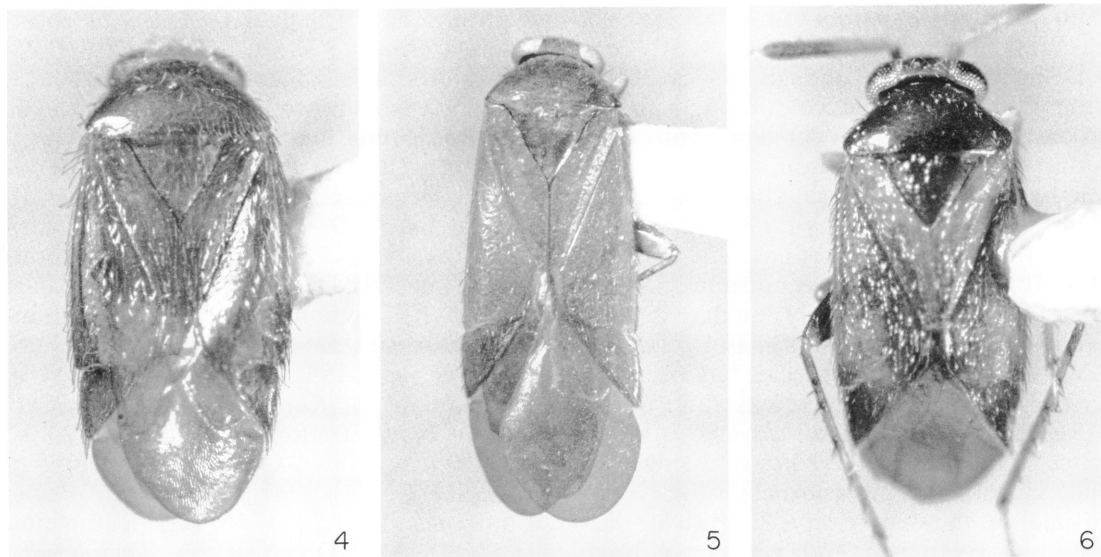
FEMALE: Much shorter and more ovoid than male; antennal segment one white, antennal segment two weakly clavate.

ETYMOLOGY: Named for E. A. Chapin, the collector of most known specimens.

DISTRIBUTION: Central Andes of Colombia.

HOLOTYPE ♂: COLOMBIA. **Cundinamarca:** Boy Sagamosa, May 29, 1946, E. A. Chapin; deposited in the National Museum of Natural History, Washington, D.C.

PARATYPES: COLOMBIA. **Cundinamarca:** Bogota, February 15–21, 1942, E. A. Chapin (AMNH, USNM), 4♂♂, 4♀♀; Guasca, May 21, 1946, E. A. Chapin (USNM), 1♂; El Colegio, June 6, 1946, E. A. Chapin (USNM), 1♀; Boy Sogamoso, May 29, 1946, E. A. Chapin (USNM), 1♀.



FIGS. 4–6 4. *Rhinacloa carvalhoi*, ♂, Brazil, Rio de Janeiro, Corcovado. 5. *Rhinacloa chapini*, ♂, holotype. 6. *Rhinacloa clavicornis*, ♂, Brazil, Santa Catarina, Nova Teutonia.

Rhinacloa clavicornis (Reuter)

Figures 6, 41, 64, 65, 107,
156, 197, 232, 249

Sthenarus clavicornis Reuter, 1905, p. 38.

Rhinacloa clavicornis: Reuter, 1909, p. 82; Carvalho, 1958, p. 139.

Rhinacloa subpallicornis Knight, 1925, p. 1; Carvalho, 1948, p. 7; 1958, p. 139; Maldonado, 1969, p. 85. NEW SYNONYMY.

Rhinacloa lepagei Carvalho, 1954, p. 115; 1958, p. 139. NEW SYNONYMY.

DIAGNOSIS: Recognized by the generally dark but variable coloration, relatively small size, presence of scale-like setae on the membrane, dark antennal segment one with segment two light proximally and dark distally, clavate antennal segment two in the females, and the structure of the male genitalia with the vesica similar to that of *bellissima* and *luridipennis*.

DESCRIPTION: Male. Small to medium sized, elongate, more or less parallel-sided, length apex tylus–cuneal fracture 1.50–1.78, width pronotum 0.60–0.87; general coloration castaneous, corium and clavus somewhat lighter than remainder; antennal segment one and distal half of segment two and most of segments three and four castaneous, remainder yellow, most of labium yellow, profemora on

distal one fifth, and most of tibiae and tarsi yellow; black tibial spines with black bases; posterior margin of metathoracic scent-gland evaporatory area ivory.

Body surface dull, covered with reclining, brown, common setae, and sericeous, subapressed, scale-like setae; membrane with scale-like setae.

Eyes large, ratio of width head–width vertex 1:0.38, eyes very large, height of eye nearly equal to height of head in lateral view; antennal segment two length 0.53–0.68, nearly cylindrical, diameter slightly greater than that of segment one, length less than width of head; labium just reaching apex of mesocoxae; claws curving on dorsal surface, pulvilli flaplike, occupying about two thirds of ventral claw surface.

MALE GENITALIA: Figures 156, 197, 232. Vesica sinuous, apex deflexed, secondary gonopore developed, subapical; left paramere splayed-out with several heavy setae on dorsal margin of posterior process; genitalia similar in form to those of *bellissima* and *luridipennis*.

FEMALE: Body ovoid, eyes smaller than in male, head rounded in dorsal view; antennal segment two conspicuously clavate.

DISTRIBUTION: New World tropics, ranging

from northern Argentina to tropical Mexico, the West Indies, and Florida.

DISCUSSION: Even though *clavicornis* is somewhat variable in coloration, e.g., the procoxae may be light or dark apparently even within the same population, it is rather distinctive because of the scale-like setae on the membrane (in common with *bellissima* and *chapini*) and the dark first antennal segment in combination with the second antennal segment being light proximally and dark distally (which also occurs in *chapini* and *mysteriosus*). Nonetheless, this species has been described what appear to be at least three times.

Reuter (1905) described *clavicornis* in the genus *Sthenarus* on the basis of a single female specimen from Venezuela, which is deposited in the University Zoological Museum, Copenhagen and which we have examined. Reuter later (1909) transferred *clavicornis* to *Rhinacloa*.

Examination of the holotype of *Rhinacloa subpallicornis* Knight indicates that it is conspecific with *clavicornis* Reuter.

Rhinacloa lepagei Carvalho (1954) possesses antennal and other coloration consistent with that of *clavicornis*, as confirmed by examination of a paratype and the original description. Carvalho (1954) diagnosed *lepagei* as being very close to *subpallicornis*. On these bases we are treating *lepagei* as conspecific with *clavicornis*.

SPECIMENS EXAMINED: ARGENTINA. **Misiones:** March 25, 1930, December 10, 1930, Ogloblin (ZIL), 1♂, 1♀. **BAHAMAS.** **Nassau:** July 1956, N. L. H. Krauss (AMNH), 1♀. **Cat Island:** Arthurs Town, July 29, 1935, W. J. Clench (AMNH), 1♀. **Andros Island:** Little Golding Cay, July 5, 1924 (AMNH), 1♀; Mangrove Cay, May–June 1917, W. M. Mann (AMNH), 3♀♀. **BERMUDA.** December 9, 1951, W. and E. Mason (CNC), 1♂, 1♀; Paget, 0–50 m, August 23, 1971, N. L. H. Krauss (USNM), 4♂♂, 3♀♀. **BRAZIL.** **Bahia:** Joacema, Senhor do Bonfim, May 1974, J. C. M. Carvalho, caatinga (JCMC), five specimens. **Goia:** Rio Verde, Carvalho (JCMC), three specimens. **Mato Grosso:** Corumba, Staudinger and Bang-Haas (ZIL), 4♂♂, 4♀♀; Hiway 163, km 500–600, SINOP, 12°31'S, 55°37'W, 350 m, September 1974, Alvarenga and Roppa (JCMC), one specimen. **Minas Gerais:** Carmo do Rio Claro, January 1978,

Carvalho and Schaffner (JCMC), 21 specimens; Carmo do Rio Claro, January 1978, Carvalho and Schaffner (AMNH, TAM), 7♀♀; Lassance, November 1919 (CU), 2♂♂. **Rio de Janeiro:** Rio de Janeiro, January 1947, Wygodzinsky (JCMC), one specimen; Rio de Janeiro, December 1970, J. Maldonado (JM), 1♂; Itatiaia, 1100 m, January 8, 1950, Daley and Travasso (JCMC), one specimen. **Roraima:** 22 km NNW of Boa Vista, 140 m, August 1, 1973, R. T. Schuh (AMNH), 8♂♂, 3♀♀. **Santa Catarina:** Nova Teutonia, 27°11'S, 52°23'W, April 1945, F. Plaumann (USNM), 1♂ (paratype of *Rhinacloa maiuscula* Carvalho); Nova Teutonia, 27°11'S, 52°23'W, 300–500 m, March–October, F. Plaumann (AMNH, CNC, TAM), 4♂♂, 7♀♀. **São Paulo:** Campinas, April 20, 1936, E. J. Hambleton (USNM), 1♀. **COSTA RICA.** **Guanacaste:** Cometac, 8 km NW of Bagaces, October 15, 1971, P. Opler (UCB), 1♂. **CUBA.** Santa Clara Province, Soledad, 1939, C. T. Parson (AMNH), 1♂; Havana, Baker and Banks (AMNH, USNM), 1♂, 2♀♀. **DOMINICA.** Clarke Hall, January 21–23, 1965, W. W. Wirth, malaise trap (USNM), 1♂. **DOMINICAN REPUBLIC.** Sabaneta, Santa Rodriguez, July 24, 1978 (CU), 1♀. **ECUADOR.** Guayas, Playas, February 26, 1973, M. and N. Deyrup (AMNH), 1♀. **EL SALVADOR.** Volcan de Conchagua, June 1958, L. J. Bottimer (USNM), 1♀. **GUATEMALA.** Guatemala City, March 1945, J. H. Hughes (USNM), 1♂; Cacao, Trece Aguas, March 30, Schwarz and Barber (USNM), 1♀. **GUYANA.** New River, 750 ft., May 1938, C. A. Hudson (BM), 1♀. **HONDURAS.** Tegucigalpa, February 1918, F. J. Dyer (USNM), 5♂♂, 2♀♀; Coyoles, June 20, 1977, G. V. Manley (TAM), 1♂, 1♀. **JAMAICA.** Goat Island, April 23, 1941, Chapin (USNM), 7♂♂, 14♀♀; St. Thomas, July 1961, J. Maldonado (JM), 1♂; Kingston, Tip Top Hotel on Ruthven Road, May 7, 1969, R. E. Woodruff, blacklight trap (FSCA), 3♂♂, 1♀. **MEXICO.** **Islas de Revillagigedo:** Socorro Island, Grayson Cove, May 4, 1925, H. H. Kiefer (CAS), 4♂♂, 8♀♀; Socorro Island, 2000 ft., May 9, 1925, H. H. Kiefer (CAS), 4♂♂, 6♀♀; Socorro Island, Braithwaite Bay, May 7, 1925, H. H. Kiefer (CAS), 10♂♂, 10♀♀. **Campeche:** 31.5 mi. N of Hopelchen, August 1, 1980, Schaffner et al. (TAM), 5♀♀. **Chiapas:** 22 mi. W of Ocozocoautla, June 25,

- 1965, Schaffner et al. (TAM), 2♂♂; Cintalapa, July 28, 1969, L. A. Kelton (CNC), 1♀; 29 mi. SW of Cintalapa, July 7, 1971, Schaffner et al., at light (TAM), 1♀; El Sumidero, September 14, 1974, Hanson and Bohart (USU), 1♀. **Durango**: 3 mi. E. of Paraiso, September 22, 1950, 6775 ft., R. F. Smith (UCB), 1♀. **Guerrero**: 20 mi. E of Acapulco, July 10, 1974, Schaffner et al. (TAM), 1♀. **Jalisco**: 16 km N of Autlan, July 31–August 2, 1978, Schaffner and Plitt (TAM), 1♀. **Michoacan**: 30 mi. S of Nueva Italia, August 8, 1978, Schaffner and Plitt (TAM), 1♂. **Nayarit**: 15 mi. N of Tepic, April 27, 1961, Howden and Martin (CNC), 3♀♀; Rio de las Canyas, 8 mi. NW of Aca-poneta, November 25, 1948, E. S. Ross (CAS), 1♀. **Oaxaca**: 14 mi. W of Miltepec, July 7, 1971, Schaffner et al. (TAM), 2♂♂, 2♀♀; 12 mi. W of Tehuantepec, July 11, 1971, Schaffner et al., at light (TAM), 1♂; 11.3 mi. SE of Totlapan, July 21, 1974, Schaffner et al. (TAM), 1♂; 1 mi. SE of Rio Hondo, July 22, 1974, Schaffner et al. (TAM), 1♀; 8.3 mi. SE of El Cameron, July 24, 1974, Schaffner et al. (TAM), 1♀. **Puebla**: 20 mi. NE of Villa A. Camacho, December 28, 1963, 700 ft., C. W. O'Brien, under bark (AMNH), 1♂. **Quintana Roo**: Isla Mujeres, January 25, 1981, G. Bohart (USU), 1♂, 4♀♀; Cozumel, San Miguel, January 29, 1981, G. Bohart (USU), 2♀♀; Cozumel, Espiritu Santo Bay, April 5, 1960, J. F. G. Clarke (USNM), 1♂; Cozumel, July 1959, N. L. H. Krauss (USNM), 2♂♂. **San Luis Potosi**: 3 mi. W of Xilitla, July 22, 1970, Schaffner et al., at light (TAM), 2♀♀; 1 mi. E of El Naranjo, August 7, 1967, Burke and Hafernik (TAM), 1♀. **Sinaloa**: Mazatlan, August 6, 1964, L. A. Kelton (CNC), 1♀; 5 mi. N of Mazatlan, August 1, 1972, Chemsak, ex *Buddleia wrightii* (UCB), 1♀; 20 mi. W of Rosario, January 30, 1964, R. van den Bosch, ex *Zea mays* (UCR), 1♀. **Tabasco**: 10 mi. E of Cardenas, June 12, 1965, Schaffner et al. (TAM), 1♀. **Tamaulipas**: 6.5 mi. S of Ciudad Victoria, October 12, 1973, Gaumer and Clark (TAM), 1♂; 8 mi. W of El Limon, July 20, 1970, Schaffner et al. (TAM), 2♂♂, 1♀; 6 mi. N of Ciudad Victoria, November 17, 1948, E. S. Ross (CAS), 1♀; 19 mi. S of Ciudad Victoria, November 17, 1948, E. S. Ross (CAS), 1♀. **Vera Cruz**: 36 mi. S of Acayucan, July 5, 1971, Schaffner et al., at light (TAM), 1♂; 5 mi. W of Palma Sola, July 28, 1974, Schaffner et al. (TAM), 1♀; 9 mi. N of Tempoal, June 6, 1965, Schaffner et al. (TAM), 1♂; Allende, July 1944, M. Guerra (AMNH), 2♂♂; 4 mi. NE of Minatitlan, June 11, 1965, Schaffner et al., at light (TAM), 2♂♂, 2♀♀. **Yucatan**: 4.7 mi. NE of Hochtun, July 31, 1980, Schaffner et al. (TAM), 1♂; Tixkokob, July 5, 1952, Pallister (AMNH), 2♀♀; Merida, July 29–31, 1964, P. J. Spangler (USNM), 1♀.
- NETHERLANDS ANTILLES. Curaçao** (WAG), one specimen. **NICARAGUA**. Corinto, January 26, 1930, T. O. Zschokke (CAS), 1♀. **PANAMA**. La Jolla, April 14, 1952, F. S. Blanton (USNM), 1♂; La Jolla, April 4 1952, F. S. Blanton (USNM), 1♂; Darien, Garachine, February 1953, F. S. Blanton (USNM), 1♀; Nata, September 1946, N. L. H. Krauss (USNM), 1♂; Tocumen, March 25, 1952, F. S. Blanton (USNM), 1♂; Canal Zone, August 1, 1952, F. S. Blanton (USNM), 1♀; Canal Zone, Ancon, W. H. W. Komb (USNM), 2♂♂, 1♀; Canal Zone, Barro Colorado, April 1973, D. Engleman (JM), 3♂♂, 1♀; Canal Zone, Mojiga Swp., November 26, 1951, F. S. Blanton (USNM), 1♂. **PARAGUAY**. Horqueta, January 27, 1934, A. Schulze (JCMC), one specimen; Gran Chaco, 260 km W of Paraguay River, 59°40'W, 22°23'N, July 13, 1935, A. Schulze (USNM), 1♂, 1♀. **PUERTO RICO**. San German, April 16, 1930 (CU), 1♀; Lajas, May 1954, J. Maldonado (JM), 1♂. **PERU. La Libertad**: Chanchan Ruins, 3 km N of Trujillo, April 12, 1972, R. T. Schuh (AMNH), 7♂♂, 16♀♀. **Lambayeque**: 10 km S of Chiclayo, March 21, 1951, Ross and Michelbacher, ex alfalfa (JCMC), four specimens. **Lima**: Canete, May–June 1941, C. P. Clausen (JCMC), 1♀; Canete, February–June 1941, Clausen and Hambleton, on cotton (USNM), 9♂♂, 9♀♀. **Loreto**: Lago Yarinacocha, 10 km NW of Pucallpa, 150 m, December 10, 1971, R. T. Schuh, at light (AMNH), 2♂♂, 1♀; 34 km W of Pucallpa, km 3 on Tournavista Road, 300 m, December 17, 1971, R. T. Schuh, at light (AMNH), 1♂, 1♀. **Piura**: Piura, Barry (JCMC), six specimens. **TRINIDAD**. St. Augustine, May 25, 1959, F. D. Bennet (CNC), 1♂; St. Augustine, June 12, 1973, Slater et al., at light (AMNH), 1♂; Arima Valley, 800–1200 ft., February, Rozen and Wygodzinsky (AMNH), 3♂♂. **URUGUAY**. Montevideo, January 1, 1953, C. M. Biezanko (BM), 1♀. **USA. Florida. Ala-**

chua Co.: Gainesville, Doyle Conner Building, December 30, 1974, F. W. Mead, black light (FSCA), 1♀. *Broward Co.*: 2 mi. S junct. of 280–27, April 28, 1982, T. J. Henry and A. G. Wheeler (USNM), 1♂, 5♀♀. *Dade Co.*: Everglades Nat. Park, Mahogany Hammock, December 3, 1961, Munroe et al. (CNC), 1♂, 1♀; Coconut Grove, March, G. Fairchild (KU), 7♂♂, 4♀♀; Miami, October 6, 1932, C. F. Rainwater, on cotton (USNM), 1♂; Homestead, April 21, 1943, G. D. Riehle (USNM), 1♂; Biscayne Bay, A. T. Slosson (USNM), 1♂ (paratype of *Rhinacloa subpallicornis* Knight); Biscayne Bay, A. T. Slosson (AMNH), 4♂♂; Big Pine Key, April 24–26, 1961, L. A. Kelton (CNC), 1♂. *Hendry Co.*: Clewiston, April 30, 1961, L. A. Kelton (CNC), 1♀. *Highlands Co.*: Sebring, August–December, C. T. Parsons (AMNH), 10♂♂, 5♀♀; Sebring, August 6, C. T. Parsons (USNM), 1♂. *Hillsborough Co.*: Plant City, August 15, 1930, J. O. Nottingham (KU), 1♀. *Levy Co.*: Yankeetown, July 31, 1930, P. W. Oman (KU), 1♀. *Luce Co.*: Ft. Pierce, August 7, 1930, P. W. Oman (KU), 1♂, 5♀♀. *Monroe Co.*: Cape Sable, Middle Cape, December 18, 1949, G. S. Walley (CNC), 1♀; Flamingo, April 24, 1961, L. A. Kelton (CNC), 1♀. *Monroe Co. ?*: Key Vaca, December 28, 1955, H. V. Weems (FSCA), 1♂. *Palm Beach Co.*: Palm Beach, July 18, 1939, P. B. Lawson (KU), 1♂. *Pinellas Co.*: Dunedin, April 22, 1927 (USNM), 1♀; Dunedin, March 18, 1924, W. S. Blatchley (USNM), 1♂. *Seminole Co.*: Sanford, August 22, 1933, C. O. Bare (KU), 1♂. *County ?*: Princeton, April 4, 1952, G. S. Walley (CNC), 1♀. VENEZUELA. *Aragua*: Rancho Grande, July 5, 1968, J. Maldonado (JM), 1♀; Rancho Grande, 20 km NW of Maracay, 1100 m, July 20–30, 1976, M. H. Sweet, at light (AMNH, TAM), 2♂♂, 2♀♀. *Carabobo*: Pateremo Beach, July 11, 1968, J. Maldonado (JM), 1♂. *Cojedes*: Tinaco, July 11, 1968, J. Maldonado (JM), 1♀. *Falcon*: Coro, 30 m, July 21, 1976, M. H. Sweet (TAM), 1♂, 1♀.

***Rhinacloa fernandoana*, new species**

Figures 7, 103, 150, 192, 252

DIAGNOSIS: Recognized by the generally yellow-orange or orange-brown coloration, including all appendages, the scale-like setae on the dorsum restricted to the corium and

clavus, and the structure of the male genitalia.

DESCRIPTION: Male. Short, relatively broad, length apex tylus–cuneal fracture 1.60–1.65, width pronotum 0.83–0.86; general coloration yellow orange to orange brown, including all appendages; femora without black spots; black tibial spines with only very slightly expanded black bases.

Dorsum smooth, moderately shiny, covered with reclining pale common setae and clavus and corium along claval suture with scattered, sericeous, subappressed scale-like setae; membrane without scale-like setae.

Eyes large, ratio of width head–width vertex 1:0.35, eyes occupying entire height of head; antennal segment two length 0.68–0.71, increasing slightly in diameter distally, greatest diameter slightly greater than that of segment one; labium reaching to apex of metacoxae; claws broad basally, broadly rounded on dorsal surface, pulvilli flaplike, occupying about two thirds of ventral claw surface.

MALE GENITALIA: Figures 150, 192. Vesica sigmoid, with distinct secondary gonopore, apically with some vaguely spiculate elaborations, mesially without spicules; left paramere slightly flattened and splayed-out, with several heavy setae on dorsal margin of posterior process; *basalis* type.

FEMALE: Coloration and vestiture similar to male; eyes smaller, vertex broader, body more distinctly ovoid than in male, antennal segment two distinctly clavate.

ETYMOLOGY: Named for its occurrence on Fernando de Naronha.

DISTRIBUTION: Known only from the type locality, Isla Fernando de Naronha.

HOLOTYPE ♂: BRAZIL. Isla Fernando de Naronha, August 1973, E. Ropa, deposited in the Museu Nacional de Historia Natural, Rio de Janeiro.

PARATYPES: 9♂♂, 18♀♀. Same data as holotype (AMNH, JCMC, MNRJ).

***Rhinacloa luridipennis* (Reuter)**

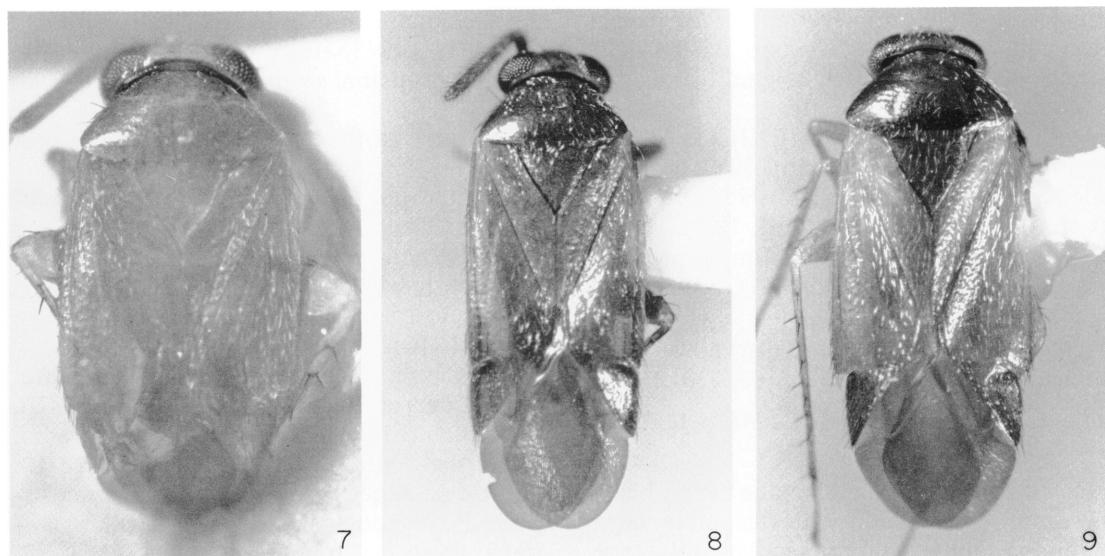
Figures 8, 42, 66, 108, 159, 198, 233, 251

Orizaba luridipennis Reuter, 1908, p. 177

Plesiodemidea fusciceps Reuter, 1908, p. 177.

Rhinacloa fusciceps: Carvalho, 1952a, p. 65.

Rhinacloa luridipennis: Carvalho, 1952a, p. 102; 1954, p. 425; 1958, p. 139.



FIGS. 7–9 7. *Rhinacloa fernandoana*, ♂, holotype. 8. *Rhinacloa luridipennis*, ♂, Mexico, San Luis Potosí, 3 mi. E of Terrazas. 9. *Rhinacloa maiuscula*, ♂, Brazil, Santa Catarina, Nova Teutonia.

DIAGNOSIS: Recognized by the elongate, parallel-sided body form, the dark-colored antennae with rather long erect setae, the scale-like setae on the membrane, and the structure of the male genitalia.

DESCRIPTION: Male. Relatively small, elongate, parallel-sided, length apex tylus–cuneal fracture 1.69–2.00, width pronotum 0.80–0.92; general coloration castaneous or very dark brown, hemelytra sometimes light brown; antennal segment three, extreme distal portion of profemora, and all tibiae and tarsi yellow; labium dark; posterior margin of metathoracic scent-gland evaporatory area lighter than remainder of thoracic pleuron.

Body surface smooth and weakly shining, covered with reclining light brown simple common setae and sericeous, subappressed, scale-like setae; antennal segment two length 0.58–0.66, with erect black vestiture of length nearly equal to diameter of segment; membrane with scale-like setae.

Eyes large in dorsal view, ratio width of head–width vertex 1:0.35, occupying slightly less than height of head in lateral view; labium just surpassing apex of mesocoxae; hemelytra elongate, parallel-sided; claws curved on dorsal surface, pulvilli flaplike and covering about half of ventral claw surface.

MALE GENITALIA: Figures 159, 198, 233. Vesica with secondary gonopore developed, apex decurved; left paramere splayed-out with several heavy setae on dorsal margin of posterior process; genitalia similar to those of *bellissima* and *clavicornis*.

FEMALE: Distinctly ovoid in shape, eyes smaller than in male, antennal segment two very weakly clavate, light mesially, dark proximally and distally.

DISTRIBUTION: Central Mexico.

DISCUSSION: Reuter (1908) originally described *luridipennis* in the genus *Orizaba* on the basis of a single male specimen from Orizaba, Mexico. Carvalho (1952) synonymized *Orizaba* with *Rhinacloa*. Reuter (1908) described a species *Plesiodemidea fusciceps* on the basis of a single female specimen from Cuernavaca, Mexico; the type is in the Naturhistorisches Museum, Vienna. Carvalho (1952a, p. 65) synonymized *Plesiodemidea* with *Rhinacloa*. Carvalho (1954) synonymized *fusciceps* with *Rhinacloa luridipennis* (Reuter), suggesting that *fusciceps* was the female of the latter. Based on Reuter's original description and notes and photographs made by J. C. Schaffner of the type specimens, we judge that *fusciceps* is actually conspecific with *luridipennis*, and follow Carvalho's treatment

of *Orizaba* Reuter and *Plesiodemidea* Reuter as synonyms of *Rhinacloa* on the basis of current placement of their originally included species.

SPECIMENS EXAMINED: MEXICO. **Jalisco:** Puente Barranquitas, 18 mi. NW of Magdalena, 3000 ft., October 10, 1975, J. A. Powell and J. A. Chemsak (UCB), 1♀. **San Luis Potosi:** 3 mi. E of Terrazas, March 15, 1977, Schaffner et al. (AMNH, TAM), 23♂♂, 23♀♀.

Rhinacloa maiuscula Carvalho

Figures 9, 61, 84, 104, 151, 193, 230, 253

Rhinacloa maiuscula Carvalho, 1948, p. 11; 1958, p. 139.

DIAGNOSIS: Recognized by the nearly black dorsum in conjunction with the yellow femora and the male genitalia similar to the type found in *chapini*, *nigripes*, and *mysteriosus*.

DESCRIPTION: Male. Large, elongate, nearly parallel-sided, length apex tylus-cuneal fracture 1.81–2.07, with pronotum 0.92–1.07; body and hemelytra generally dark brown to castaneous, hemelytra yellow brown antero-laterally; coxae dark, distal half of antennal segment two castaneous; remainder of appendages yellow; membrane infumate.

Body surface smooth and shining, covered with pale, shining, reclining setae of somewhat shaggy appearance; clavus with a single row, endocorium generally, thorax lateroventrally, and abdomen sparsely with sericeous, subappressed, scale-like setae; membrane without scale-like setae.

Head broad, eyes large, ratio width head-width vertex 1:0.36, eyes occupying nearly entire height of head in lateral view; antennal segment two length 0.70–0.86, nearly cylindrical, diameter slightly greater than that of segment one, length greater than width of head; labium just reaching apex of mesocoxae; claws curving on dorsal surface, pulvilli flaplike, occupying about half of ventral claw surface.

MALE GENITALIA: Figures 151, 193, 230. Vesica sigmoid, secondary gonopore developed, apical portion of vesica with numerous small spicules and also spicules mesially on shaft; left paramere splayed-out with several heavy setae on dorsal margin of posterior process; *basalis* type.

FEMALE: Broadly ovoid, eyes relatively

smaller than in male, head broadly rounded in dorsal view; pattern of coloration similar to male; antennal segment two distinctly clavate.

DISTRIBUTION: Venezuela to southern Brazil.

DISCUSSION: The group of specimens studied by Carvalho (1948) when he described *maiuscula* contained at least one specimen of *clavicornis* which was labeled as a paratype and deposited in the National Museum of Natural History, Washington, D.C.

SPECIMENS EXAMINED: BOLIVIA. **Santa Cruz:** Buenavista, 450 ft., April 15–21, 1926, Steinbach (ZIL), 1♂. BRAZIL. **Mato Grosso:** Corumba, Staudinger and Bang-Haas (ZIL), 1♂. **Rio de Janeiro:** Teresopolis, Fazenda Alpina, P. Wygodzinsky (JCMC), 1♀; Alto Itatiaia, Serro do Itatiaia, February 21, 1922, E. F. Holt (USNM), 1♀. **Santa Catarina:** Nova Teutonia, 27°11'S, 52°23'W, 300–500 m, April–November, F. Plaumann (AMNH, CNC, JCMC, MNRJ, TAM), 27♂♂, 21♀♀ (including holotype male and two paratypes). **São Paulo:** S. J. Barreiro, S. Bocaina, 1650 m, January 1969, Alvarenga (JCMC), 2♀♀; Campo do Jordao, 1600 m, March 1945, P. Wygodzinsky (JCMC), 1♀; Litreaira [?], June 6, 1945, O. Monte (JCMC), 1♂. COLOMBIA. **Cundinamarca:** Finca San Pablo, 8 km N of Alban, 1800 m, August 1–12, 1967, P. and B. Wygodzinsky (AMNH), 1♂; San Antonia de Tena, October 9, 1965, J. A. Ramos (JM), 3♂♂, 2♀♀. ECUADOR. Quito, September 1962, J. C. M. Carvalho (JCMC), 2♀♀. Canar-Zhud, 9000 ft., June 21, 1981, G. V. Manley (TAM), 2♀♀. PARAGUAY. Caa Guazu District, Estancia Primeira, December 23, 1931, R. F. Hussey (JCMC), 1♀. PERU. **Cajamarca:** 1 mi. SW of Cajamarca, 8000 ft., August 26, 1971, P. S. and H. L. Broomfield (BM), 1♂. VENEZUELA. **Lara:** Yacambu Nat. Park, 13 km SE of Sanare, 4800 ft., March 4–7, 1978, J. B. Heppner, at light in cloud forest (USNM), 4♂♂, 1♀.

Rhinacloa mysteriosus, new species

Figures 10, 62, 85, 105, 152, 194, 253

DIAGNOSIS: Recognized by the relatively large size, dark coloration, the antennae with the first segment and distal half of segment two black and the genitalia most similar to

the type found in *chapini*, *nigripes*, and *maiuscula*.

DESCRIPTION: Male. Relatively large, elongate ovoid, length apex tylus–cuneal fracture 1.79–2.10, width pronotum 0.98–1.10; general coloration black, bases of corium and clavus along claval suture somewhat lighter; basal one third of antennal segment one, antennal segments three and four, extreme distal portion of all femora, pro- and mesotibiae, distal half of metatibiae, all tarsi, and segments two, three, and four of labium yellow.

Pronotum and scutellum smooth and weakly shining, hemelytra dull; body covered with reclining, light brown, common setae and sericeous, subappressed, scale-like setae; membrane without scale-like setae.

Eyes large, ratio of width head–width vertex 1:0.39, eyes occupying four fifths of height of head in lateral view; antennal segment two length 0.71–0.81, thickened, nearly cylindrical, diameter somewhat greater than that of segment one, length greater than width of head; labium not quite reaching apex of metacoxae; hemelytra weakly convex laterally; claws rather strongly curved, pulvilli flaplike, occupying about half of ventral claw surface.

MALE GENITALIA: Figures 152, 194. Vesica sigmoid, secondary gonopore developed but small, vesica with some small spicules on shaft, especially at apex; left paramere weakly splayed-out with several heavy setae on dorsal margin of posterior process; *basalis* type.

FEMALE: Similar to male, more broadly ovoid, eyes relatively smaller; antennal segment two conspicuously clavate.

ETYMOLOGY: Named for the difficulty we had in distinguishing this species from other large black congeners.

DISTRIBUTION: Tropical Mexico, Central America, and southern Brazil.

HOLOTYPE ♂: MEXICO. **Michoacan:** Pta. Garnica, 8.VIII.1969, L. A. Kelton; deposited in the Canadian National Collection of Insects, Ottawa.

PARATYPES: BRAZIL. **Minas Gerais:** Barbacena, February 1962, Alvarenga (JCMC), 1♀; Carmo do Rio Claro, January 1978, Carvalho and Schaffner (JCMC), 1♀. COSTA RICA. Pablo Schild (USNM), 1♀. MEXICO. **Chiapas:** 14 km NW of Comitán, 5500 ft., August 15, 1967, H. R. Burke and J. Hafernik (TAM), 1♀. **Durango:** 9 mi. W of La Ciudad,

9000 ft., June 16, 1964, L. A. Kelton (AMNH, CNC), 3♀♀; 24 mi. W of La Ciudad, 7000 ft., June–July 1964, L. A. Kelton (AMNH, CNC), 2♂♂, 4♀♀. **Michoacan:** Punta Garnica, 9270 ft., August 8, 1969, L. A. Kelton (CNC), 1♂, 1♀. **Vera Cruz:** Jalapa, December, 1954, N. L. H. Krauss (USNM), 1♂. PANAMA. Porto Bello, January 1971, J. Maldonado (JM), 1♂.

Rhinacloa nigripes Maldonado

Figures 11, 161, 202, 253

Rhinacloa nigripes Maldonado, 1969, p. 81.

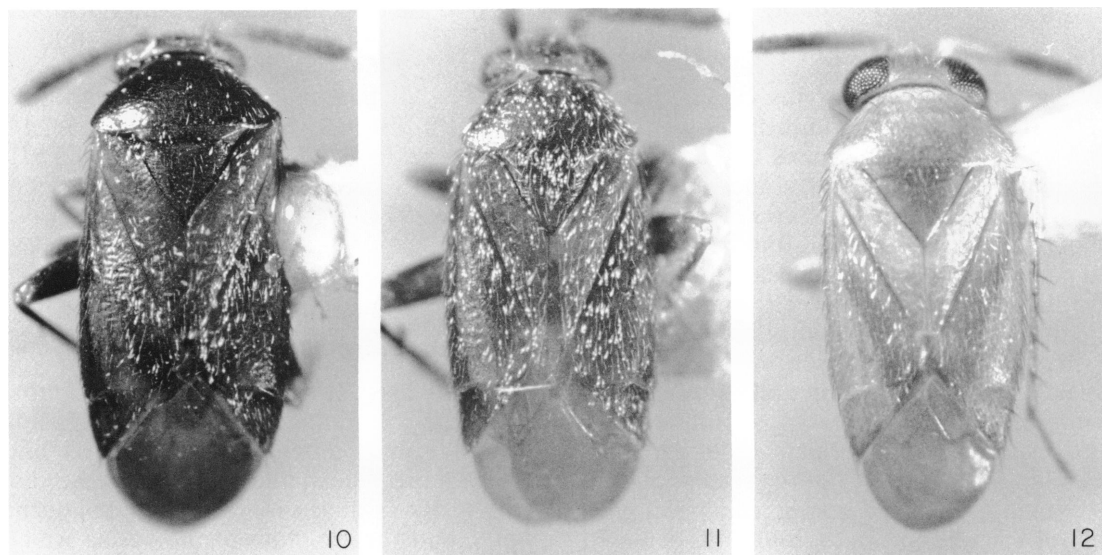
DIAGNOSIS: Recognized by the almost completely castaneous coloration, including all tibiae, with antennal segment three and the labium yellow, the scale-like setae distributed over the entire dorsal surface of the body, and the structure of the vesica which resembles that of *chapini*, *mysteriosus*, and *maiuscula*.

DESCRIPTION: Male. Small, elongate ovoid, length apex tylus–cuneal fracture 1.65, width pronotum 0.79; general coloration castaneous, antennal segment four, labium and bucculae yellow; all femora at tibiofemoral articulation and all tarsi yellow brown.

Dorsum smooth, very weakly shining; body generally covered with reclining, brown, common setae, and sericeous, subappressed, scale-like setae; membrane without scale-like setae.

Eyes moderately large, ratio width head–width vertex 1:0.48, eyes occupying about half of height of head in lateral view (in part a product of the anteriorly produced head); head distinctly produced anterior to eyes (as in *Paramixia*), tylus visible in dorsal view; antennal segment two length 0.63, cylindrical, diameter slightly greater than than of segment one, length greater than width of head; labium just surpassing apex of metacoxae; claws rounded on dorsal surface, pulvilli flaplike, covering about half of ventral claw surface.

MALE GENITALIA: Figures 161, 202. Vesica with developed secondary gonopore, sinuous, of type found in *chapini*, *mysteriosus*, and *maiuscula*, with distinctive structure of straps and spicules mesially on shaft; left paramere splayed-out with several heavy setae on dorsal margin of posterior process; *basalis* type.



FIGS. 10–12 10. *Rhinacloa mysteriosus*, ♂, holotype. 11. *Rhinacloa nigripes*, ♂, holotype. 12. *Rhinacloa basalis*, ♂, Mexico, Vera Cruz, 8 mi. NE of Catemaco.

FEMALE: Unknown.

DISTRIBUTION: Puerto Rico.

SPECIMEN EXAMINED: PUERTO RICO. Maricao, July 1960, J. Maldonado, at light (USNM), 1♂ (holotype).

***Rhinacloa schaffneri*, new species**

Figures 13, 112, 162, 203, 252

DIAGNOSIS: Recognized by the castaneous coloration of the dorsum, the female with a terete second antennal segment, and the male genitalia of the *basalis* type.

DESCRIPTION: Male. Relatively large, weakly ovoid, length apex tylus–cuneal fracture 1.85–2.18, width pronotum 0.92–1.11; general coloration castaneous, antennal segments three and four, proximal two thirds of labium, profemora distally, and pro- and mesotibiae yellow; black tibial spines without black bases.

Dorsum weakly rugulose, weakly shining, covered with reclining, brown, common setae and sericeous, subappressed, scale-like setae; membrane without scale-like setae.

Eyes large, rounded anteriorly in dorsal view, ratio of width head–width vertex 1:0.36, occupying four fifths of height of head in lateral view; antennal segment two length 0.65–

0.74, very weakly terete, greatest diameter slightly greater than that of segment one, length less than width of head; labium reaching to apex of mesocoxae; claws rounded on dorsal surface, pulvilli large, flaplike, covering nearly two thirds of ventral claw surface.

MALE GENITALIA: Figures 162, 203. Vesica sigmoid, secondary gonopore distinctly developed, subapical, apex of vesica with a few spicules; left paramere splayed-out with several heavy setae on dorsal margin of posterior process; *basalis* type.

FEMALE: More distinctly ovoid than male, eyes relatively smaller, antennal segment two terete.

ETYMOLOGY: Named for J. C. Schaffner, the collector of most known specimens.

DISTRIBUTION: Hispaniola.

HOLOTYPE ♂: DOMINICAN REPUBLIC.

La Vega Prov.: 2 mi. north Valle Nuevo, August 4, 1967, J. C. Schaffner; deposited in the American Museum of Natural History, New York.

PARATYPES: DOMINICAN REP. **Espaillet Prov.:** 6 mi. N of San Victor, August 22, 1967, J. C. Schaffner (TAM), 1♀. **La Vega Prov.:** 2 mi. N of Valle Nuevo, August 4, 1967, J. C. Schaffner (AMNH, TAM), 3♂♂, 3♀♀. **Constanza,** August 3, 1967, J. C. Schaffner (TAM),

1♂. Valle Nuevo, 2200 m, December 28, 1955, J. Maldonado (USNM), 1♀. **San Cristobal Prov.**: August 27, 1967, L. H. Rolston (TAM),

1♀. HAITI. Mt. La Hotte, Desbarriere, 4000 ft., October 12–14, 1934, Darlington (AMNH), 1♀.

PALLIDIPES SPECIES GROUP

Rhinacloa pallidipennis, new species

Figures 14, 110, 159, 200, 235, 254

DIAGNOSIS: Recognized by the black velvety patch on the propleuron, the black tibial spines without black bases, and the vesica in the male forming a single coil; distinguished from *pallidipes* by the coloration of the tibiae and the structure of the male genitalia.

DESCRIPTION: Male. Small, robust, nearly parallel-sided, length apex tylus–cuneal fracture 1.75–2.04, width pronotum 0.84–0.99; general coloration castaneous; propleuron just behind eye with an intense velvety black patch strongly contrasting with the remainder of the propleuron; all antennal segments very dark; bucculae, buccal cavity, prosternum, procoxae, and metathoracic scent-gland evaporatory area ivory; all legs, including coxae distally, yellow; exocorium adjacent to cuneal fracture red; black tibial spines without black bases.

Body surface smooth and somewhat shining, generally covered with reclining brown common setae and numerous appressed, sericeous, scale-like setae; membrane without scale-like setae.

Eyes moderately large, ratio of width head–width vertex 1:0.40, eyes occupying entire height of head in lateral view; antennal segment two length 0.62–0.73, increasing slightly in diameter distally to about diameter of segment one, length greater than width of head; labium not quite reaching apices of mesocoxae; claws rather strongly bent at about midpoint, pulvilli flaplike, covering slightly more than half of ventral claw surface.

MALE GENITALIA: Figures 159, 200, 235. Vesica forming a single coil, secondary gonopore developed, subapical; left paramere not splayed-out.

FEMALE: More robust than male, coloration of dorsum somewhat lighter, antennal segment two yellow mesially, femora distally and tibiae weakly to strongly infuscate; antennal segment two weakly clavate.

ETYMOLOGY: Named for its similarity to *pallidipes*.

DISTRIBUTION: Tropical Mexico and Venezuela.

HOLOTYPE ♂: MEXICO. **Chiapas:** 15 mi. W. of San Cristobal, July 10, 1971, Hart, Murray, Schaffner; deposited in the American Museum of Natural History, New York.

PARATYPES: MEXICO. **Chiapas:** Teopisca, July 31, 1969, L. A. Kelton (AMNH, CNC), 3♂♂, 3♀♀; Tuxtla Gutierrez, August 1, 1969, L. A. Kelton (CNC), 2♂♂; Tuxtla Gutierrez, August 1959, N. L. H. Krauss (USNM), 2♀♀. **Jalisco:** 18 mi. NW of Guadalajara, April 30, 1961, Howden and Martin, pine-oak area (CNC), 1♀; Nevado de Colima road, 2.3 mi. W of hiway junct., near Atenquique, 5000 ft., April 20–21, 1977, Schaffner et al. (TAM) 1♂; 7.8 mi. SE of El Molino, 4900 ft., April 19, 1977, Schaffner et al. (TAM), 1♀. **Michoacan:** 10.6 mi. S of Uruapan, August 8, 1978, Schaffner and Plitt (TAM), 1♂, 1♀. **Nuevo Leon:** 18 mi. SW of Linares, July 3, 1974, Schaffner et al. (AMNH, TAM), 1♂, 1♀. **Oaxaca:** Gualetao, August 18, 1969, L. A. Kelton (CNC), 1♂. **Puebla:** 6 mi. SW of Tehuacan, August 9, 1980, Schaffner et al. (AMNH, TAM), 2♂♂, 4♀♀. **Queretaro:** 14 mi. E of Landa de Matamoros, July 23, 1970, Schaffner et al., at light (TAM), 2♂♂, 1♀. **San Luis Potosi:** 10 mi. S of Rio Verde, July 28, 1970, Schaffner et al. (TAM), 1♂; 32 mi. E of San Luis Potosi, July 26, 1970, Schaffner et al. (TAM), 1♀. **VENEZUELA.** **Aragua:** Maracay, July 10, 1968, J. Maldonado (JM), 1♀.

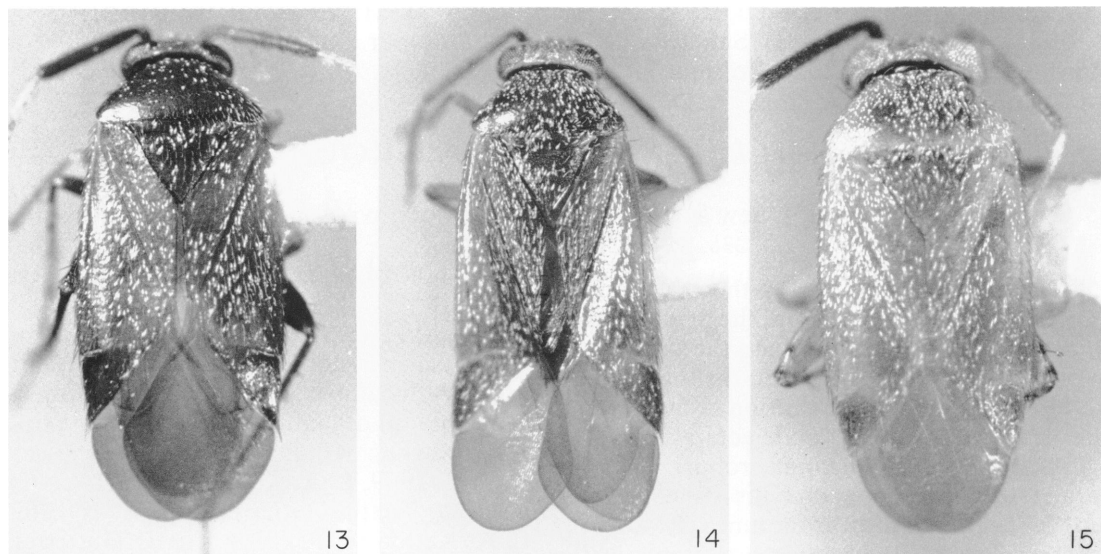
Rhinacloa pallidipes Maldonado

Figures 15, 43, 68–70, 88, 109, 158, 199, 234, 254

Rhinacloa pallidipes Maldonado, 1969, p. 83; Henry, 1984, p. 519.

Rhinacloa punctipes Maldonado, 1969, p. 84. **NEW SYNONYMY.**

Lepidopsallus riocensis Carvalho, 1980, p. 302. **NEW SYNONYMY.**



FIGS. 13–15 13. *Rhinacloa schaffneri*, ♂, holotype. 14. *Rhinacloa pallidipennis*, ♂, holotype. 15. *Rhinacloa pallidipes*, ♂, Mexico, Guerrero, 3.7 mi. E of Marquelia.

DIAGNOSIS: Recognized by the black velvety patch on the propleuron, the tibial spines with distinct black bases, and the sigmoid nature of the vesica in the male; distinguished from *pallidipennis* by the differences in tibial coloration and the structure of the vesica.

DESCRIPTION: Male. Small, robust, nearly parallel-sided, length apex tylus–cuneal fracture 1.52–1.81, width pronotum 0.77–0.94; general coloration light yellow brown, sometimes largely infuscate to very dark; pronotum laterally just behind eyes with an intense velvety black patch strongly contrasting with remainder of propleuron; antennal segments one and two black; metafemora with some black spots along dorsal surface and at bases of trichobothria and spines, black tibial spines with distinct black bases; membrane infuscate.

Body smooth, dull, generally covered with reclining, yellow-brown, common setae and densely with sericeous, subappressed, scale-like setae; membrane without scale-like setae.

Eyes large, ratio width head–width vertex 1:0.39; eyes occupying more than four fifths of height of head in lateral view; antennal segment two length 0.68–0.74, cylindrical, of

diameter about equal to that of segment one, length greater than width of head; labium reaching to about midpoint of mesocoxae; claws rather strongly bent at about midpoint, pulvilli flaplike, covering about half of ventral claw surface.

MALE GENITALIA: Figures 158, 199, 234. Vesica long, slender, sigmoid, secondary gonopore developed, subapical, vesica with a short, blunt spine apically; left paramere not splayed-out.

FEMALE: Somewhat more robust than male, ovoid, eyes smaller, head rounded as viewed from above; antennal segment two black, very weakly clavate.

DISTRIBUTION: Widely distributed, ranging from northern Argentina to central Mexico, the Greater Antilles, and Florida.

DISCUSSION: Comparison of the holotype of *Rhinacloa punctipes* Maldonado and paratypes of *Lepidopsallus riococensis* Carvalho with the holotype of *Rhinacloa pallidipes* Maldonado indicates that these three nominal taxa simply represent a range of size and color variation which we believe should be treated as a single species; *pallidipes* Maldonado is the senior synonym. Henry (1984) in recording *pallidipes* from Florida noted that

it was almost certainly the senior synonym of *punctipes*, and our action therefore represents a formalization of Henry's suggestion.

SPECIMENS EXAMINED: ANTIGUA. July 1963, J. Maldonado (USNM), 1♂. ARGENTINA. **La Rioja:** 34 km N of Famatina, 2030 m, December 31, 1981, R. T. Schuh and B. M. Massie (AMNH), 3♀♀. BAHAMAS. **Nassau:** June 1956, N. L. H. Krauss (AMNH), 1♂, 1♀. **Watling Island:** February (AMNH), 1♀. BRAZIL. **Amapá:** Estirão do Equador, October 1979, M. Alvarenga (JCMC), 1♀. **Mato Grosso:** Corumba, December 14–23, 1919 (CU), 1♀. **Minas Gerais:** Pirapora, November 11–13, 1919 (CU), 2♀♀; Belo Horizonte, November 1–6, 1919 (CU), 1♀; Parque Rio Doce, Cel. Fabriciano, M. Alvarenga (JCMC), 1♂, 4♀♀ (paratypes of *Lepidopsallus riocercensis* Carvalho). **Pará:** 8 km E of Belém, Ananindeua, July 20, 1973, R. T. Schuh, at light (AMNH), 1♂; Belém, November 15, 1973, R. T. Schuh, at light (AMNH), 1♀. **Per-nambuco:** Casa Nova, May 1974, Carvalho (JCMC), 1♂, 3♀♀. **Rio de Janeiro:** Madureira, Carvalho (JCMC), 1♀; Itatiaia, 100 m, January 8, 1950, Daley and Travassos (JCMC), 1♂; km 47 Estrada Rio–São Paulo, February 1945, P. Wygodzinsky (JCMC), 1♀. BOLIVIA. **La Paz:** Chulumani, October 2, 1972, G. E. Bohart (USU), 1♀. COLOMBIA. **Cundinamarca:** Melgar, November 11, 1965, J. A. Ramos (JM), 1♀; Guagabeta, June 29, 1965, J. A. Ramos (JM), 1♀; El Triunfo, December 11, 1965, J. A. Ramos (JM), 1♀. COSTA RICA. **Cartago:** Turrialba, IICA Res. Station, July 3–8, 1981, W. R. Dolling (BM), 1♀. **Guanacaste:** Rio Ahogados, 10 mi. NW of Liberia, July 25, 1965, P. J. Spangler, black light (USNM), 1♂, 1♀. CUBA. Soledad, 1939, C. T. Parsons (AMNH), 1♀. DOMINICA. Grande Savane, March 21, 1964, D. F. Bray, at light (USNM), 1♀; Roseau, June 23, 1971, Slater et al., black light (AMNH), 1♀; Antrim, 1000 ft., March 11–15, 1956, J. F. G. Clarke (USNM), 8♀♀; Clarke Hall, June 22, 1964, O. S. Flint (USNM), 2♂♂, 1♀; Clarke Hall, January 21, 1965, W. W. Wirth (USNM), 1♂. DOMINICAN REP. Santo Domingo, October 4, 1967, L. H. Rolston (TAM), 1♀; Santo Domingo, August 1967, J. C. Schaffner, at light (AMNH, TAM), 4♂♂, 10♀♀. **Samana Prov.:** Samana, August 15, 1967, J. C. Schaff-

ner, at light (TAM), 1♀. **Santiago Prov.:** Santiago, August 10, 1967, J. C. Schaffner, at light (TAM), 3♂♂, 1♀. HONDURAS. Aguan Valley, 10 mi. W of Alanchito, May 24, 1977, G. V. Manley (TAM), 4♀♀; Coyoles, December 20, 1976, G. V. Manley (TAM), 1♀. JAMAICA. Spanishtown, December 12, 1967, N. L. H. Krauss (USNM), 1♀; Try. Duncans, August 6, 1966, H. F. Howden (CNC), 1♂, 4♀♀; Fort Simonds, July 12, 1942, C. B. Philip (KU), 1♀; Kingston, Tip Top Hotel on Ruthven Road, May 7, 1969, R. E. Woodruff, black light trap (FSCA), 24 specimens. MEXICO. **Chiapas:** Teopisca, July 31, 1969, L. A. Kelton (CNC), 1♂; Tuxtla Gutierrez, July 1, 1969, L. A. Kelton (CNC), 2♂♂; 31 mi. SE of Comitán, June 18, 1965, Schaffner et al., at light (AMNH, TAM), 4♂♂, 2♀♀; La Trinitaria, June 17, 1965, Schaffner et al. (TAM), 2♀♀; Ocozacoautla, August 2, 1969, L. A. Kelton (CNC), 1♀. **Colima:** Manzanillo, September 1965, N. L. H. Krauss (USNM), 1♂. **Guerrero:** 17 mi. E of Acapulco, July 9–10, 1974, J. C. Schaffner (AMNH), 1♀. **Jalisco:** 16 mi. N of Autlan, July 31–August 2, 1978, Schaffner and Plitt (TAM), 1♀; Barra de Navidad, September 1965, N. L. H. Krauss (USNM), 1♂, 1♀. **Morelos:** Cuernavaca, September 1965, November 1966, N. L. H. Krauss (USNM), 1♂, 1♀. **Oaxaca:** 13 km W of Tehuantepec, 100 ft., August 11, 1967, H. R. Burke and J. Hafernik (TAM), 1♂; 3 mi. NE of Putla, August 2, 1976, Schaffner et al., at light (TAM), 2♂♂; 8 mi. N of La Ventosa, July 22, 1973, Schaffner and Matro, at light (TAM), 3♂♂; 14 mi. W of Miltepec, July 7, 1971, Schaffner et al. (TAM), 1♂, 6♀♀; 11.6 mi. W of Jalapa de Marques, July 12, 1971, Schaffner et al., at light (TAM), 1♀. **Puebla:** 4 mi. W of Acatepec, July 26, 1973, Schaffner and Mastro (TAM), 1♀; 5.1 mi. SW of Tehuacan, July 27, 1974, Schaffner et al. (TAM), 1♀; 5 mi. SW of Zapotitlan, July 8, 1973, Schaffner et al. (TAM), 1♀. **Queretaro:** 14 mi. E of Landa de Matamoros, July 23, 1970, Schaffner et al., at light (AMNH, TAM), 13♂♂, 6♀♀. **Quintana Roo:** Cozumel Island, San Miguel, July 1959, N. L. H. Krauss (USNM), 1♀. **San Luis Potosi:** 10 mi. S of Rio Verde, July 28, 1970, Schaffner et al. (TAM), 1♀; Palitla, July 21, 1970, Schaffner et al., at light (TAM), 2♂♂. **Sinaloa:** Mazatlan, August 18, 1964, H. R. Burke and

J. Apperson, near beach (TAM), 1♀. **Tamaulipas**: 8 mi. W of El Limon, July 20, 1970, Schaffner et al., at light (TAM), 1♂; 6 mi. N of Ciudad Victoria, November 17, 1948, E. S. Ross (CAS), 1♂. **Vera Cruz**: 4 mi. NE of Minatitlan, June 11, 1965, Schaffner et al., at light (TAM), 1♀. **State ?**: 7.8 mi. SE of El Molino, April 19, 1977, 4900 ft., Schaffner et al. (TAM), 1♀. **NETHERLANDS ANTILLES**. **Bonaire** (WAG), 16 specimens. **Curaçao** (WAG), 19 specimens. **Saba** (WAG), one specimen. **NICARAGUA**. Escuela Agrícola Calrea, July 1971, J. Maldonado (JM), 1♀; Managua, Bolona, July 1971, J. Maldonado (USNM), 3♂♂, 5♀♀. **PANAMA**. Chiriqui, Renacimiento, Santa Clara, 4000 ft., May 28–29, 1976, Engleman and Thurman, at light (AMNH), 1♀; Tocumen, March 25, 1952, F. S. Blanton (USNM), 1♂. **PERU**. **Piura**: Piura, May 5, 1941, E. J. Hambleton, on cotton (USNM), 1♀. **Lima**: km 46 on Carretera Central E of Lima, November 14, 1971, R. T. and J. C. Schuh (AMNH), 1♂. **Loreto**: 34 km W of Pucallpa, km 3 on Tournavista Road, 300 m, December 31, 1971, R. T. and J. C. Schuh, at light (AMNH), 1♂. **PUERTO RICO**. Isla Maguey, Parguera, December 20, 1962, P. J. Spangler (USNM), 1♂, 2♀♀; Cayey, September–November 1960, M. Santiago (USNM), 1♀; Tallaboa near Ponce, July 23,

1914 (JM), 1♀; Maricao, July 1960, J. Maldonado, at light (USNM), 1♂ (holotype); Lajas, May 1–20, 1954, J. Maldonado, grandul (USNM), 1♀ (holotype of *R. punctipes* Maldonado). **TRINIDAD**. St. Augustine, May 29, 1959, F. D. Bennett (CNC), 1♂; Port of Spain, June 9, 1953, F. S. Blanton (USNM), 1♂; St. Augustine, June 12, 1973, Slater et al. (AMNH), 2♀♀. **USA**. **Florida**: **Broward Co.**: Hollywood, October 27, 1983, L. J. Dingle, ex *Schinus terebinthifolius* (USNM), 1♀. **Dade Co.**: Homestead, April 22–28, 1961, L. A. Kelton (CNC), 2♂♂, 2♀♀; Miami, Coconut Grove, July 6, 1943, W. W. Wirth (JCMC), 1♀; Goulds, May 2, 1963, R. E. Brown, ex *Mangifera indica* (FSCA), 1♂. **County ?**: Kendall, April 28, 1961, L. A. Kelton (CNC), 1♂. **URUGUAY**. Montevideo, July 30, 1944, Berry (USNM), 1♂. **VENEZUELA**. **Aragua**: Rancho Grande, July 5, 1968, J. Maldonado (JM), 1♂, 2♀♀; Rancho Grande, 20 mi. NW of Maracay, 1100 m, July 23–30, 1976, M. H. Sweet, at light (AMNH, TAM), 5♂♂, 5♀♀. **Sucre**: Las Vegas, July 1, 1968, J. Maldonado (JM), 1♂, 3♀♀. **State ?**: Mt. Duida, January 27, 1929 (JCMC), 1♀. **IVIC**, Altos de Pipe, July 2, 1968, J. Maldonado (JM), 1♂, 1♀. **VIRGIN ISLANDS**. **St. Croix**: Spring Gut, June 14, 1917, H. Morrison (USNM), 1♀.

FORTICORNIS SPECIES GROUP

Rhinacloa aricana Carvalho

Figures 16, 71, 89, 113, 163, 204, 236, 258

Rhinacloa aricana Carvalho, 1948, p. 9; 1958, p. 138.

DIAGNOSIS: Recognized by the *forticornis*-like appearance and coloration in the males, but with the females having a distinctive tertete second antennal segment, found otherwise only in *crassitoma* and *scaffneri*.

DESCRIPTION: Male. Medium sized, moderately elongate, length apex tylus-cuneal fracture 1.68–2.08, width pronotum 0.85–1.01; head, pronotum, scutellum, thoracic pleuron and venter, slightly polished, weakly shining, deep castaneous; posterior margin of metathoracic scent-gland evaporatory area light; hemelytra, including membrane dirty

yellow brown; cuneus red; coxae dark basally; coxae distally and all trochanters, femora, and tibiae light yellow brown; tarsi and antennal segments three and four infuscate; black tibial spines with small black bases.

Body weakly shining, generally covered with reclining, dark-brown common setae and sericeous, subappressed, scale-like setae; membrane without scale-like setae.

Eyes relatively large, ratio width head-width vertex 1:0.41; antennal segment two length 0.60–0.80, cylindrical, elongate, relatively slender, length greater than width of the head; labium reaching to between meso- and metacoxae; claws nearly straight on dorsal surface, elongate, pulvilli covering most of ventral claw surface.

MALE GENITALIA: Figures 163, 204, 236.

Vesica sigmoid, relative short apically, not strongly attenuated, no secondary gonopore; left paramere not splayed-out; *forticornis* type.

FEMALE: Shorter, more strongly ovoid than male, antennal segment two shorter than in male, weakly to strongly terete; coxae and femora usually strongly infusate and very dark, hemelytra usually darker than in male.

DISTRIBUTION: Andean South America, from central Chile to central Colombia.

SPECIMENS EXAMINED: **ARGENTINA. Catamarca:** Andalgalá, October 25–November 4, 1972, G. E. Bohart, ex *Prosopis alba* (USU), 3♂♂; Belén, November 1, 1972, G. E. Bohart (USU), 1♂. **La Rioja:** Carrizal, November 1, 1972, G. E. Bohart, ex *Prosopis alba* (USU), 1♂. **Mendoza:** Potrerillos, 4000 ft., March 16–20, 1920, R. G. Harris (CU), 1♂. **CHILE. Arica:** Azapa, November 9, 1955, L. E. Peña (CNC), 13♀♀. **Atacama:** 15 km SE of Caldera, October 9, 1971, Rozen and Peña (AMNH), 1♂; La Junta, October 15, 1969, Rozen and Peña (AMNH), 1♀. **Coquimbo:** Frae Jorge Nat. Park, 250–600 m, November 3–5, 1981, R. T. Schuh and N. I. Platnick (AMNH), 1♂, 1♀; 5 km S of Illapel, 530 m, November 6, 1981, R. T. Schuh and N. I. Platnick, ex *Acacia* sp. (AMNH), 3♂♂, 7♀♀. **Iquique:** Mamina, September 1951, L. E. Peña (KU), 1♂; Mamina, 1952, Kuschel (USNM), 1♂. **Prov. ?:** Chinina, Camino Tolabre, October 1955, L. E. Peña (CNC), 1♂, 1♀. **COLOMBIA. Cundinamarca:** Quetame, October 12, 1965, J. A. Ramos (JM), 1♂. **ECUADOR. Mitad del Mundo, San Antonio, 10 km N of Quito, March 14, 1973, M. and N. Deyrup (AMNH), 8♂♂, 9♀♀; Pichincha, Cutuglahua Parish, September 1963, Saulo Soria, on potato foliage (USNM), 7♂♂, 1♀; Canar, W of Cerro Naupan NW of Canar, 2800–3200 m, December 10, 1970, L. Peña (AMNH), 1♂. **ECUADOR. Loja, September 1907, Ohaus S. (HM), 1♂. PERU. Amazonas:** Tingo, 38 km S of Chacapoyas, 1300–1800 m, July 10, 1972, R. T. and J. C. Schuh, sweeping natural vegetation (AMNH), 1♀; 20 km E of Chachapoyas, 1800 m, July 11, 1972, R. T. and J. C. Schuh (AMNH), 1♀; Tingo, August, Cockerell (AMNH), 1♂. **Arequipa:** Arequipa, April 14, 1978, J. Smilanick (UCD), 1♂; Arequipa, 2500 m, July 30–August 1, 1971, C. and M. Vardy (BM), 1♀; Yura, 28 km N of Arequipa, 2500 m, January 23–24, 1972, R. T. and J. C. Schuh, sweeping**

natural vegetation (AMNH), 47♂♂, 40♀♀. **Cajamarca:** 1 mi. SW of Cajamarca, 8000 ft., August 28–29, 1971, P. S. and H. L. Broomfield (BM), 2♀♀. **Cuzco:** Macchu Picchu, 2300 m, 1972, P. Wygodzinsky, at light (AMNH), 1♀. **Huanuco:** Huanuco, 6500 ft., January 28, 1947, J. C. Pallister (AMNH), 2♂♂, 1♀. **Junin:** Huacapistana, Rio Tarma, June 12, 1920 (CU), 1♂, 1♀. **Lima:** La Molina, December 20, 1953, W. Ebeling (LACM), 1♂. Canete, February 12, 1941, E. J. Hambleton, on cotton (USNM), 4♂♂, 5♀♀. Rio Chillon, 2200 ft., June 26, 1955, C. D. Michener (KU), 1♀; km 46 of Carretera Central E of Lima, November 14, 1971, R. T. and J. C. Schuh (AMNH), 1♀; near Huarara, January 22, 1964, WHC, on cultivated cotton (USNM), 1♂; Pachacamac, July 22, 1968, C. W. and L. O'Brien, at light (UCB), 1♂; Matucana, May 26–27, 1920 (CU), 4♂♂, 4♀♀. **Piura:** Huancabamba, August 11, 1945, P. A. Berry (USNM), 8♂♂, 5♀♀ (two paratypes). **Dept. ?:** Valle de Huacho, January 1939, J. E. Wille (USNM), 1♀.

***Rhinacloa azapa*, new species**

Figures 17, 72, 90, 114, 164, 205, 237, 258

DIAGNOSIS: Recognized by the nearly white general coloration with strongly contrasting black first and second antennal segments, in conjunction with the *forticornis* type vesica without a developed secondary gonopore which is most similar in structure to *betanzos*.

DESCRIPTION: Male. Relatively broad bodied, length apex tylus–cuneal fracture 1.89–1.96, width pronotum 0.96–0.97; general coloration yellow white; antennal segments one and two black, segments three and four weakly infusate; metafemora with dark spots at bases of spines and trichobothria; black tibial spines with black bases; membrane weakly infusate posteriorly.

Dorsum with scattered, reclining pale brown simple setae and sericeous, subappressed scale-like setae; membrane without scale-like setae.

Body weakly ovoid in outline, hemelytra slightly convex laterally; eyes only moderately large, ratio width head–width vertex 1: 0.73, eyes occupying about three fourths of height of head in lateral view; antennal segment two length 0.77–0.84, long, length

greater than width of head, cylindrical, diameter about equal to that of segment one, slightly greater than that of segments three and four; labium reaching to posterior margin of abdominal sternite four; claws nearly straight on dorsal surface, sharply bent apically, pulvilli occupying most of ventral claw surface.

MALE GENITALIA: Figures 164, 205, 237. Vesica sigmoid, apical portion straight and relatively short, no secondary gonopore; left paramere not splayed-out; *forticornis* type.

FEMALE: Similar to male, body slightly more stout and ovoid, eyes relatively smaller, the frons more strongly bulging in dorsal view, and the second antennal segment weakly clavate and light colored except proximally and distally.

ETYMOLOGY: Named for the type locality.

DISTRIBUTION: Known only from the type locality in extreme northern Chile.

HOLOTYPE ♂: CHILE. **Arica:** Azapa, November 9, 1955, L. E. Peña; deposited in the Canadian National Insect Collection.

PARATYPES: Same data as holotype, 26♂♂, 10♀♀ (AMNH, CNC).

***Rhinacloa betanzos*, new species**

Figures 18, 115, 165, 206, 238, 258

DIAGNOSIS: Similar in appearance to *juli* and *peruana*, with the body surface dull, the second antennal segment in the males black, or nearly so, and longer than the width of the head, and by the *forticornis* type male genitalia; distinguished by the castaneous head, pronotum, and scutellum.

DESCRIPTION: Male. Moderate sized, elongate, length apex tylus-cuneal fracture 2.11–2.15, width pronotum 1.00–1.03; head, pronotum, scutellum, thoracic venter and pleuron, and antennae castaneous; venter of abdomen dark laterally, much lighter mesially; hemelytra, including membrane medium yellow brown; coxae dark, remainder of legs yellow brown, femora with dark spotting; black tibial spines with black bases; all tarsal segments three castaneous.

Body surface dull, covered with pale, reclining, common setae and sericeous, subappressed, scale-like setae; membrane without scale-like setae.

Eyes relatively small, ratio of width head-width vertex 1:0.50, occupying less than three fourths of height of head in lateral view; antennal segment two length 0.89–0.97, cylindrical, of diameter equal to that of segment one, length greater than the width of the head; labium reaching to apex of mesocoxae; hemelytra long, weakly convex laterally; claws straight on dorsal surface, sharply bent apically, pulvilli covering entire ventral claw surface.

MALE GENITALIA: Figures 165, 206, 238. Vesica sigmoid, apical portion nearly straight and relatively short, no secondary gonopore; left paramere not splayed-out; *forticornis* type, most similar to *azapa*.

FEMALE: Body shorter and much more broadly ovoid, eyes relatively smaller, and antennal segment two relatively shorter than in male.

ETYMOLOGY: Named for the type locality.

DISTRIBUTION: Known only from the type locality in the highlands of south central Bolivia.

HOLOTYPE ♂: BOLIVIA. **Potosí:** Betanzos, 45 km NE of Potosí, 4000 m, September 24, 1972, R. T. and J. C. Schuh; deposited in the American Museum of Natural History, New York.

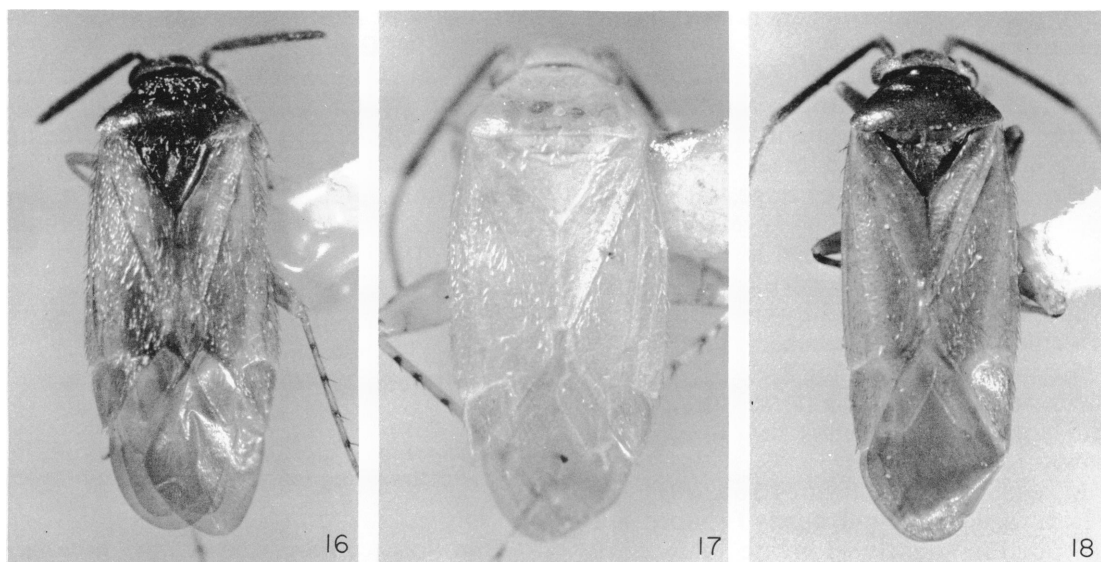
PARATYPES: Same data as holotype, 13♂♂, 49♀♀ (AMNH).

***Rhinacloa cajamarca*, new species**

Figures 247, 248, 258

DIAGNOSIS: Distinguished by the black second antennal segment longer than the width of the head across the eyes, the distinctly polished and shining dorsum, the reddish coloration of the cuneus and usually the corium and clavus, the distinct sexual dimorphism, and the structure of the male genitalia, which are of the *forticornis* type.

DESCRIPTION: Male. Elongate, hemelytra nearly parallel-sided, length apex tylus-cuneal fracture 2.21–3.31, width pronotum 0.99–1.63, head pronotum and most of scutellum castaneous, most of corium, clavus, and cuneus carmine red, membrane smoky with pale veins; femora mostly pale; tibiae and tarsi pale; tibial spines black with small black bases.



FIGS. 16–18 16. *Rhinacloa aricana*, ♂, Peru, Arequipa, Yura, 28 km N of Arequipa. 17. *Rhinacloa azapa*, ♂, holotype. 18. *Rhinacloa betanzos*, ♂, holotype.

Dorsum smooth, polished, and rather strongly shining, covered with reclining, generally pale common setae and sericeous, subappressed, scale-like setae; membrane without scale-like setae.

Eyes of moderate size, frons weakly bulging in dorsal view, ratio width head–width vertex 1:0.40, eyes occupying about two thirds of height of head in lateral view; antennal segment two length 0.93–1.02, cylindrical, diameter about equal to that of segment one, length about one and a half times width of head; labium reaching to apex of mesocoxae; clavus nearly straight on dorsal surface, strongly bent apically, pulvilli covering nearly entire ventral claw surface.

MALE GENITALIA: Figures 247, 248. Vesica more or less J-shaped, moderately elongate and nearly straight apically, no secondary gonopore; left paramere not splayed-out; *forticornis* type.

FEMALE: Coloration similar to male, antennal segment two sometimes light proximally; body much shorter and more strongly ovoid and robust, eyes smaller, and antennal segment two relatively shorter than in male; antennal segment two not cylindrical, but narrowed proximally.

ETYMOLOGY: Named for the Peruvian province of Cajamarca.

DISTRIBUTION: Northern Peruvian Andes.

HOLOTYPE ♂: PERU. **Cajamarca:** 1 mi. SW of Cajamarca, 8000 ft., August 26, 1971, P. S. and H. L. Broomfield, shrubs on hillside of fertile valley in Andes; deposited in the British Museum (Natural History), London.

PARATYPES: Same data as holotype, 10♂♂, 23♀♀ (AMNH, BM).

Rhinacloa callicrates Herring

Figures 19, 45, 73, 91, 116, 166, 207, 239, 256

Rhinacloa callicrates Herring, 1971, p. 449.

DIAGNOSIS: Recognized by its entirely pale yellow-green coloration, the short labium reaching only to the apex of the procoxae, the head concave behind and conforming to and obscuring the anterior margin of the pronotum, the much larger size than found in the similar appearing species *mesoamerica* and *puertoricensis*, and the structure of the male genitalia, of the *forticornis* type and similar to that of *puertoricensis*.

DESCRIPTION: Male. Elongate oval, length apex tylus–cuneal fracture 1.83–2.37, width

pronotum 0.92–1.10; general coloration greenish yellow.

Body surface moderately shining, covered with reclining, dark, simple, setae and sericeous, subappressed, scale-like setae; membrane without scale-like setae.

Head very broad, eyes large, ratio width head–width vertex 1:0.43, eyes occupying nearly entire height of head in lateral view; antennal segment two length 0.61–0.73, stout, cylindrical, diameter slightly greater than that of segment one, length less than width of head; labium not quite reaching apex of procoxae; claws weakly curving on dorsal surface, pulvilli large, occupying entire ventral surface of claw.

MALE GENITALIA: Figures 166, 207, 239. Vesica vaguely sigmoid, nearly J-shaped, apical portion greatly elongate and nearly straight, similar in form to *puertoricensis* and *penai*; left paramere not splayed-out; *forticornis* type.

FEMALE: Slightly more ovoid in outline than male, eyes slightly smaller, antennal segment one weakly clavate.

DISTRIBUTION: Extreme southwestern United States and northwestern Mexico.

SPECIMENS EXAMINED: MEXICO. **Baja California Norte:** 12 mi. SE of El Rosario, June 10, 1978, J. D. Pinto, at light (UCR), 2♂♂, 10♀♀; Arroyo about 13 mi. N of San Ignacio, April 2, 1961, A. G. Smith (CAS), 1♂. **Sinaloa:** 34 mi. N of Los Mochis, August 27, 1963, Parker and Stange (UCD), 1♂. **Sonora:** Alamos, August 28, 1971, W. J. Hanson (USU), 1♂, 1♀. Hermosillo, August 16, 1957, Chemsak and Renells (UCB), 1♂. **USA. Arizona. Pima Co.:** Tucson, 2400 ft., October 8, 1934, Torre-Bueno (KU), 2♂♂. Tucson, September 3–4, 1956, F. G. Werner (UAZ), 2♂♂, 1♀; 15 mi. NW of Nogales, Pena Blanca Lake, May 26, 1961, Howden and Martin (CNC), 1♀. **Maricopa Co.:** 10 mi. W of Scottsdale, June 2, 1962, R. F. Sternitsky (CNC), 4♀♀; Gila Bend, 260 m, May 7–8, 1978, R. T. Schuh, at light (AMNH), 6♂♂, 1♀; Phoenix, May 20, 1971, T. Halstead (CAS, USNM), 4♂♂, 2♀♀ (paratypes); Phoenix, May 28, 1970, T. F. Halstead, ex *Cercidium* (CAFA), 4♂♂, 2♀♀; Hassayampa, May 1, 1972, Torchio, Parker and Bohart (USU), 3♂♂, 1♀. **Pima Co.:** 26.7 mi. N of Sasabe, July 28, 1977, J. D. Pinto, ex *Cercidium* (UCR), 2♂♂, 4♀♀. **California.**

Riverside Co.: Deep Canyon, May 2–September 4, 1963, E. I. Schlinger (UCR), 9♂♂, 2♀♀; 3.6 mi. S of Palm Desert, P. L. Boyd Desert Research Center, Coyote Creek, April 27–May 17, 1974, Silva, Tucker and Dickson (UCR), 2♂♂, 1♀. **San Bernardino Co.:** 15 mi. W of Baker, May 6, 1977, L. E. Guenther (UCD), 1♀. **San Diego Co.:** Borrego Springs, June 11, 1965, J. L. Bath, at light (UCR), 1♀.

Rhinacloa cardini (Barber and Bruner),
new combination

Figures 20, 46, 74, 92, 117, 168,
209, 240, 256

Campylomma cardini Barber and Bruner, 1946,
p. 58; Carvalho, 1958, p. 25; Maldonado, 1969,
p. 75.

DIAGNOSIS: Recognized by the generally pale greenish yellow coloration, the distinct black spotting on the metafemora, the row of heavy black setae laterally on the pronotum and hemelytra, the head weakly concave behind with the posterior margin of the eyes not conforming to the anterior margin of the pronotum, and the structure of the male genitalia.

DESCRIPTION: Male. Small, weakly ovoid in outline, length apex tylus–cuneal fracture 1.66–1.92, width pronotum 0.83–0.93; general coloration greenish yellow; metafemora with some dark spots at bases of spines and trichobothria; black tibial spines without black bases.

Body surface smooth and shining, covered with pale, short, reclining, common setae and sericeous, subappressed, scale-like setae; lateral margin of pronotum and hemelytra with a row of heavy black setae; membrane without scale-like setae.

Head very broad, four fifths of width of pronotum; ratio of width head–width vertex 1:0.45, eyes occupying about three fourths of height of head in lateral view, antennal segment two length 0.67–0.74, greater than width of head; labium just reaching to apex of procoxae; claws more or less straight on dorsal surface, sharply bent apically, pulvilli covering most of ventral claw surface.

MALE GENITALIA: Figures 168, 209, 240. Vesica long, flat, curving broadly basally, J-shaped, no secondary gonopore; left paramere not splayed-out; *forticornis* type.

FEMALE: Slightly more convex laterally than male, eyes slightly smaller.

DISTRIBUTION: Central Mexico and the West Indies south to Colombia and Venezuela; one record from the Northeast of Brazil (see Discussion).

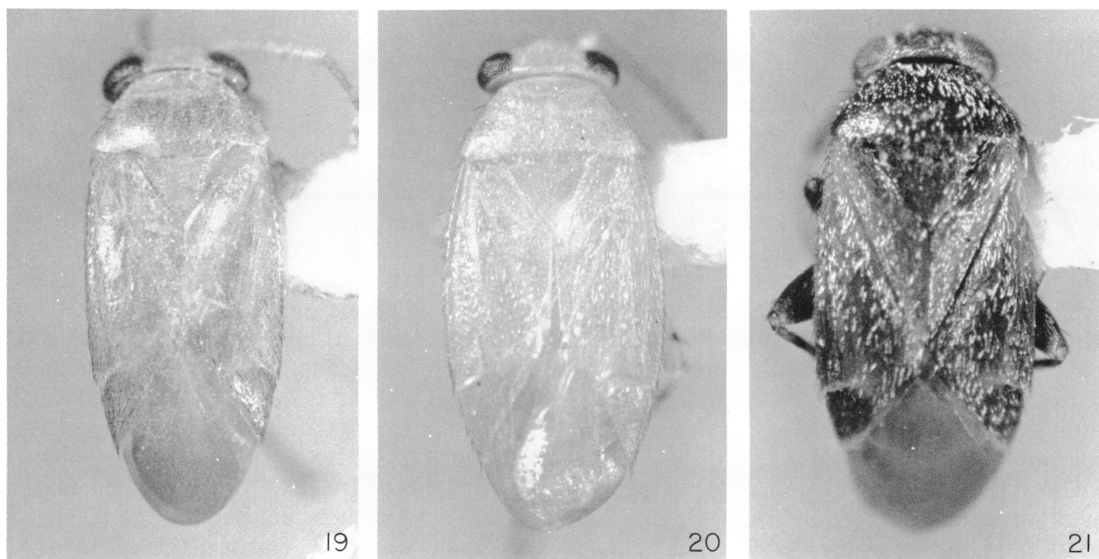
DISCUSSION: Originally described in *Campylomma*, *cardini* clearly belongs to *Rhinacloa* on the basis of the structure of the male genitalia and the type of pubescence.

Some specimens of *cardini* from southern Mexico and Costa Rica are much darker than Caribbean populations and other Central American populations. Nonetheless, they show no structural differences from the light-colored specimens.

Courtesy of J. C. M. Carvalho we examined two specimens from Brazil, Bahia, Encruzilhada, which show very close affinities with *cardini*, on the basis of coloration, heavy setae laterally on the pronotum, and male genitalia, and we have treated them as conspecific. Nonetheless, as can be seen by comparing figures 167 and 168 there are substantial differences in the structure of the vesica in the Caribbean and Brazilian populations of what we refer to as *cardini*. Additional specimens, which would allow further study of variation, might indicate that two species are involved.

SPECIMENS EXAMINED: BRAZIL. Bahia: Encruzilhada, Divisa, 960 m, Alvarenga (JCMC), 1♂, 1♀. COLOMBIA. Tol. Amero, January 26–30, 1977, Peyton and Suarez (USNM), 1♂. COSTA RICA. Cartago: Turrialba, IICA Res. Sta., July 3–8, 1981, W. R. Dolling (BM), 5♂♂. Guanacaste: 10 mi. NW of Liberia, Rio Ahogados, July 25, 1965, P. J. Spangler, black light (USNM), 12♂♂, 25♀♀. CUBA. Ferhald (USNM), 3♂♂, 5♀♀; Soledad nr. Cienfuegos, August 6–20, N. A. Weber (AMNH), 2♂♂, 2♀♀; Habana, Santiago de las Vegas, July 4, 1945, S. C. Bruner (USNM), 5♂♂, 5♀♀ (paratypes). DOMINICA. Roseau, June 23, 1971, Slater et al., blacklight trap (AMNH), 8♂♂, 10♀♀. DOMINICAN REPUBLIC. Santo Domingo, August 2–12, 1967, J. C. Schaffner, at light (TAM), 26♂♂, 64♀♀. San Cristobal Prov.: 3 mi. W of Haina, August 17, 1967, J. C. Schaffner (AMNH), 1♂. EL SALVADOR. Lake Ilanpango, August 2, 1965, P. J. Spangler (USNM), 1♂; Rio Majagual near La Libertad, July 1, 1966, Flint

and Ortiz (USNM), 1♂. GRENADA. St. Andrews Parish, Lake Grand Etang, June 17, 1973, Baranowski et al. (AMNH), 1♂. JAMAICA. Kingston, Tip Top Hotel on Ruthven Road, May 7, 1969, R. E. Woodruff, blacklight trap (FSCA), 125 specimens; Manchester Parish, Mandeville, June 29, 1971, Slater et al., black light (AMNH), 3♂♂, 2♀♀; St. Andrew Parish, Irishtown, July 6, 1971, Slater et al., black light (AMNH), 3♂♂, 1♀; St. Catherine Parish, Linstead, July 3–4, 1971, Slater et al., black light (AMNH), 3♂♂, 2♀♀; Try., Duncans, August 21, 1966, Howden and Becker (CNC), 1♂, 7♀♀. HONDURAS. 5 mi. E of Choluteca, July 28, 1965, P. J. Spangler (USNM), 1♀. MEXICO. Chiapas: Uxmal, January 21, 1981, G. E. Bohart (USU), 3♂♂; Palenque, September 10, 1974, G. Bohart and W. Hanson (USU), 2♂♂, 1♀; 29 mi. SW of Cintalapa, July 7, 1971, Schaffner et al., at light (AMNH), 1♀. Colima: Manzanillo, July 21, 1956, R. E. Beer (KU), 1♂. Oaxaca: 12 mi. W of Tehuantepec, July 11, 1971, Schaffner et al., at light (TAM), 1♂; 6 mi. W of Tehuantepec, July 6, 1971, Schaffner et al., at light (TAM), 1♂; 8 mi. W of La Ventosa, July 22, 1973, Schaffner and Mastro, at light (TAM), 1♂; 5 mi. S of Candelaria Loxicha, July 18–19, 1974, Schaffner et al. (TAM), 2♂♂, 4♀♀. Tamaulipas: 8 mi. W of Limon, July 20, 1970, Schaffner et al., at light (AMNH, TAM), 3♂♂, 4♀♀. Vera Cruz: 36 mi. S of Acayucan, July 5, 1971, Schaffner et al., at light (TAM), 1♀. Sinaloa: 27 mi. E of Villa Union, July 26, 1964, H. F. Howden (CNC), 1♂; 10 mi. S of Mazatlan, July 3, 1965, Chemsak and Linsley (UCB), 1♀. NICARAGUA. Leon, 16.3 mi. SE of Leon, June 18, 1972, R. R. and M. E. Murray, at light (TAM), 1♂. PANAMA. Tocumen, March 25, 1952, F. S. Blanton (USNM), 2♀♀; Porto Chitre, October 24, 1952, F. S. Blanton (USNM), 1♀; Maden Dam, April 28, 1952, F. S. Blanton (USNM), 1♂; Las Cumbres, 09°06'N, 79°32'W, April 11, 1974, H. Wolda (AMNH), 1♂, 2♀♀; Canal Zone, Coco Solo Hospital, May 21, 1976, D. Engleman, light trap (AMNH), 1♂. PUERTO RICO. Guayanilla, September–November 1969, E. Murphy (USNM), 2♂♂, 1♀; Salinas, June 5, 1961, J. Maldonado (AMNH), 1♂; Isla Maguey, Parguera, December 20, 1962, P. and P. Spangler (USNM), 7♂♂, 6♀♀; Mayaguez, December 1964, R. Jorge (USNM),



FIGS. 19–21 19. *Rhinacloa callicrates*, ♂, USA, Arizona, Maricopa Co., Gila Bend. 20. *Rhinacloa cardini*, ♂, Dominican Republic, San Cristobal Prov., 3 mi. W of Haina. 21. *Rhinacloa forticornis*, ♂, USA, New Mexico, 4.8 mi. SW of Rodeo.

3♂♂, 5♀♀. VENEZUELA. **Barinas:** Rio Caparo Res. Sta., 32 km E of El Canton, February 3–5, 1978, J. B. Heppner, at light (USNM), 1♂.

Rhinacloa crassitoma (Carvalho)

Figures 118, 169, 210, 257A

Rhinacloa crassitoma Carvalho, 1984, p. 178.

DIAGNOSIS: Recognized by the *forticornis*-like appearance with its compact body form, the dorsum densely covered with appressed, flattened, sericeous setae, the pronotum with a glabrous black area just behind the eyes, the terete antennal segment two in the females, and the structure of the male genitalia.

DESCRIPTION: Male. Small, ovoid, length apex tylus–cuneal fracture 1.68, width pronotum 0.90; general coloration dark brown to castaneous, including antennal segments one and two and all femora; antennal segment three and four and all tibiae and tarsi yellow white; black tibial spines with weak to strong black bases; metathoracic scent gland evaporatory area ivory.

Dorsum smooth, dull; body covered with reclining dark brown, simple setae, and densely covered with subappressed, sericeous

scale-like setae; membrane without scale-like setae.

Eyes large, ratio of width head–width vertex 1:0.47; eyes occupying slightly less than height of head; antennal segment two length 0.58, nearly cylindrical, diameter about equal to that of segment one; labium reaching to apex of metacoxae; claws elongate, sharply bent apically, puvilli covering most of ventral claw surface.

MALE GENITALIA: Figures 169, 210. Vesica sigmoid, without secondary gonopore, apex moderately long and weakly curving; left paramere not splayed-out, posterior process without heavy setae on dorsal margin; *forticornis* type.

FEMALE: Coloration and vestiture as in male; body more broadly ovoid than in male; antennal segment two distinctly terete.

DISTRIBUTION: Coastal Peru, northern Argentina, southern Brazil, and northeast of Brazil.

DISCUSSION: All characters of *crassitoma* fall well within the *forticornis* group. The males and females of *crassitoma* are substantially similar in shape, whereas in *aricana*, which also has a terete second antennal segment in the female, the males have distinctly

longer hemelytra than the females. This form of sexual dimorphism is common to all species closely related to *aricana* with the exception of *azapa*.

SPECIMENS EXAMINED: ARGENTINA. **Tucumán:** Tucumán, February 1949, P. Wygodzinsky (AMNH, JCMC), 1♂. BRAZIL. **Bahia:** Encruzilhada, Divisa, 960 m, Alvargenga (JCMC), 1♀. **Rio de Janeiro:** Itatiaia, 1100 m, January 8, 1950, Daley and Travassos (AMNH, JCMC), 2♀♀. PERU. **Lima:** Lima, January 20, 1964, Raven (JCMC), 1♂.

Rhinacloa forticornis Reuter

Figures 21, 36, 47, 75, 93, 119, 137–140,
170, 211, 241, 255

Rhinacloa forticornis Reuter, 1876, p. 89; Knight, 1927, p. 36; 1968, p. 35; Maldonado, 1969, p. 80.

Psallus minutulus Reuter, 1908, p. 175; Carvalho, 1958, p. 125. NEW SYNONYMY.

Rhinacloa incerta Reuter, 1908, p. 178; Carvalho, 1958, p. 139; Maldonado, 1969, p. 79. NEW SYNONYMY.

DIAGNOSIS: Recognized by its small size, generally dark coloration, including antennal segments one and two in both sexes, and the structure of the male genitalia; the profemora are usually yellowish in males and black in females, with meso- and metafemora usually dark in both sexes.

DESCRIPTION: Male. Small, more or less parallel-sided, length apex tylus–cuneal fracture 1.40–1.77, width pronotum 0.74–0.94; coloration generally castaneous, base of corium and clavus often light brown or yellowish, cuneus laterally and adjacent corium often reddish; antennal segments one and two black, segments three and four mostly contrasting yellow; posterior margin of metathoracic scent-gland evaporatory area ivory; all coxae nearly black, all trochanters contrasting yellow, profemora usually conspicuously light and yellowish, meso- and metafemora infuscate to black; tibiae generally light, black tibial spines with black bases.

Body generally and densely covered with reclining, dark, simple setae and white, appressed, scale-like setae; membrane without scale-like setae.

Head broad, ratio width head–width vertex

1:0.41, eyes occupying four fifths of height of head in lateral view; antennal segment two length 0.52–0.66, less than width of head, cylindrical; labium reaching to between meso- and metacoxae; claws relatively short on dorsal surface, sharply bent apically, straight, pulvilli covering nearly entire ventral claw surface.

MALE GENITALIA: Figures 170, 211, 241. Vesica sigmoid, long, slender, attenuated and curving apically, no secondary gonopore; left paramere not splayed-out; *forticornis* type.

FEMALE: More ovoid in outline than male, somewhat larger, eyes somewhat smaller; antennal segment two shorter than in males and very weakly clavate; profemora usually strongly infuscate.

DISTRIBUTION: From southcentral and southwestern United States to northernmost South America, and scattered localities in the West Indies. See Discussion concerning collections from Peru and Brazil.

DISCUSSION: Reuter (1908) described *Psallus minutulus* from a single female specimen from Cuernavaca, Mexico (deposited in the Naturhistorisches Museum, Vienna). Comparison of the holotype of *Rhinacloa forticornis* in the Swedish Museum of Natural History in Stockholm with notes and photographs of the type of *minutulus* made by J. C. Schaffner clearly indicates that *minutulus* is synonymous with *forticornis*. Later in the same paper Reuter (1908) described *Rhinacloa incerta* from specimens collected in Orizaba, Mexico. A careful reading of Reuter's description indicates that *incerta* is also conspecific with *forticornis*. Maldonado (1969) treated *incerta* as very close to *forticornis*. The type of *incerta* could not be found in the Naturhistorisches Museum, Vienna.

Collections of *Rhinacloa* from North America and Mexico are often overwhelmed by specimens of *forticornis*. One might be inclined, therefore, to think of it as a widely distributed species. In fact the distribution of this conspicuously polyphagous and possibly omnivorous species is quite restricted, as can be seen in figure 253. The only outlying populations are two from cultivated cotton in coastal Peru (Lima Department, Canete; Piura Department, Sullana), and one from the northeast of Brazil. The specimens from the former pair of localities appear to be typical

of *forticornis* over most of its range. The specimens from Brazil, Bahia, Encruzilhada, which were loaned to us through the courtesy of J. C. M. Carvalho, are distinctive, however. They are similar to *forticornis* from Mexico and the American southwest in size, sexual dimorphism, and the form of the male genitalia (compare figs. 170 and 171), as well as the fact that the cuneus is distinctly reddish. They are distinctly lighter in coloration, however, with the femora being light with dark spots, even in the females, and antennal segment one is usually weakly brown, whereas segment two is light on the proximal two thirds and dark distally.

We have refrained from describing this Bahian material as new because it comprises specimens from only a single locality. It seems clear that the specimens are closely related to *forticornis* and probably *penai* and might in the future merit treatment as distinct species.

SPECIMENS EXAMINED: We examined several thousand specimens the distribution of which is summarized in the following localities (see also fig. 253). **ANTIGUA. BELIZE.** **BRAZIL.** Bahia: Encruzilhada, Divisa, 960 m, Alvarenga (JCMC), 21 specimens. **DOMINICA. COLOMBIA:** Bolivar. **EL SALVADOR. GRENADA. HONDURAS. JAMAICA. MEXICO:** Baja California Norte; Baja California Sur; Chiapas; Chihuahua; Coahuila; Durango; Guanajuato; Guerrero; Hidalgo; Jalisco; Mexico; Michoacan; Morelos; Nayarit; Nuevo Leon; Puebla; Queretaro; San Luis Potosi; Sinaloa; Sonora; Tamaulipas; Vera Cruz; Zacatecas. **NETHERLANDS ANTILLES.** Aruba; Bonaire; Curaçao; Saba; St. Gustatino; St. Martin. **NICARAGUA. PANAMA. PUERTO RICO. PERU:** Lima; Piura. **ST. LUCIA. ST. THOMAS. TRINIDAD. USA.** Arizona: Apache Co.; Cochise Co.; Coconino Co.; Gila Co.; Graham Co.; Mohave Co.; Navajo Co.; Pima Co.; Pinal Co.; Santa Cruz Co.; Yavapai Co.; Yuma Co. **California:** Imperial Co.; Inyo Co.; Kern Co.; Los Angeles Co.; Mariposa Co.; Orange Co.; Riverside Co.; Santa Barbara Co.; San Bernardino Co.; San Diego Co.; Ventura Co. **Colorado:** Montezuma Co. **Kansas:** Douglas Co.; Hamilton Co.; Kearny Co.; Sumner Co. **Nevada:** Clark Co.;

Lander Co.; Lincoln Co.; Nye Co.; White Pine Co. **New Mexico:** Bernalillo Co.; Chaves Co.; Dona Ana Co.; Eddy Co.; Grant Co.; Hidalgo Co.; Lea Co.; Lincoln Co.; McKinley Co.; Otero Co.; Socorro Co.; Torrance Co.; Valencia Co. **Texas:** Bexar Co.; Bosque Co.; Brazos Co.; Brewster Co.; Cameron Co.; Culberson Co.; Ector Co.; Frio Co.; Gillespie Co.; Glasscock Co.; Jeff Davis Co.; Jim Wells Co.; Mills Co.; Pecos Co.; Presidio Co.; Randall Co.; San Patricio Co.; San Saba Co.; Upshur Co.; Uvalde Co.; Valverde Co.; Webb Co. **Utah:** Box Elder Co.; Iron Co.; Kane Co.; San Juan Co.; Washington Co. **VENEZUELA:** Aragua.

Rhinacloa incaicus (Carvalho and Gomes),
new combination

Figures 22, 172, 213, 258

Psallus incaicus Carvalho and Gomes, 1968, p. 533.

DIAGNOSIS: Recognized by the elongate body form in the male, the relatively small, weakly exerted eyes, leaving the genae rather broadly exposed, and the male genitalia of the *forticornis* type.

DESCRIPTION: Male. Elongate, more or less parallel-sided, length apex tylus-cuneal fracture 2.20, width pronotum 0.98; head and thorax, including venter, antennae, coxae and meso- and metafemora generally castaneous; remainder of body and appendages much lighter, tan or dirty yellow; black tibial spines with conspicuous black bases.

Dorsum weakly rugulose, dull to weakly shining, covered with short, reclining, brown, simple setae and subappressed, sericeous, scale-like setae; membrane without scale-like setae.

Eyes relatively small, ratio of width head-width vertex 1:0.48, eyes occupying about three fourths of height of head, genae relatively broad, width nearly equal to diameter of antennal segment one; eyes weakly exerted, head not distinctly concave behind, posterior margin of head not closely conforming to anterior pronotal margin; antennal segment two length 0.79, nearly cylindrical, increasing slightly in diameter distally, greatest diameter slightly less than that of segment one; labium reaching to metacoxae (per Car-

valho and Gomes, 1968); lateral corial margins nearly straight; claws elongate, not distinctly broadened basally, nearly straight on dorsal surface, sharply bent apically, puvilli covering most of ventral claw surface.

MALE GENITALIA: Figures 172, 213. Vesica sigmoid, without secondary gonopore, apex relatively short and nearly straight; left paramere not splayed-out and without heavy setae on posterodorsal margin; *forticornis* type.

FEMALE: Similar in coloration and vestiture to male, more broadly ovoid as illustrated by Carvalho and Gomes (1968).

DISTRIBUTION: Known only from the type locality, Quito, Ecuador.

DISCUSSION: Carvalho and Gomes (1968) described *incaicus* as a *Psallus* species. Even though the general appearance is somewhat divergent from that found in many *Rhinacloa* species, the presence of scale-like setae, the row of metafemoral spicules, and the structure of the claws and male genitalia militate for placement in *Rhinacloa*.

SPECIMEN EXAMINED: ECUADOR. Quito, November 1962, J. C. M. Carvalho (AMNH), 1♂ (paratype).

Rhinacloa insularis (Barber),
new combination

Figures 23, 121, 173, 214. 257B

Psallus insularis Barber, 1925, p. 250; Carvalho, 1958, p. 122; Carvalho and Gagné, 1968, p. 163.

DIAGNOSIS: Recognized by the yellow coloration, including antennal segments one and two, with some occasional reddish infusion on the pronotum and femora, and the labium reaching to the apex of the mesocoxae; distinguished from *longirostris* by its much shorter labium and the head which does not project anterior to the eyes in dorsal view.

DESCRIPTION: Male. Moderate sized, length apex tylus-cuneal fracture 1.61–1.85, width pronotum 0.82–0.92; general coloration, including antennae and legs, yellow; pronotum and distal half of metafemora sometimes infused with red; black tibial spines with indistinct small black bases; metafemora sometimes with dark spotting.

Dorsum smooth, dull, generally covered with brown, reclining, common setae and se-

riceous, subappressed, scale-like setae; abdominal venter with only reclining, pale, common setae; membrane without scale-like setae.

Eyes large, ratio width head-width vertex 1:0.44; eyes occupying about three fourths of height of head in lateral view; frons not projecting beyond anterior margin of eyes in dorsal view; antennal segment two length 0.76–0.91, cylindrical, diameter about equal to that of segment one, length greater than width of head; labium reaching to apex of mesocoxae; claws relatively straight on dorsal surface, sharply bent apically, pulvilli covering most of ventral claw surface.

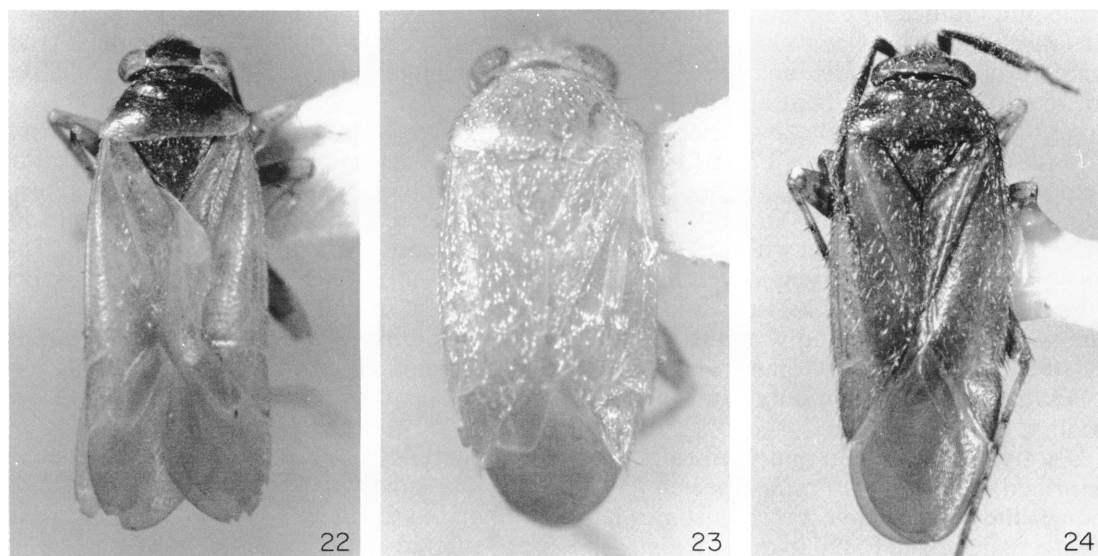
MALE GENITALIA: Figures 173, 214. Vesica sigmoid, moderately long and attenuated apically, not secondary gonopore; left paramere not splayed-out; *forticornis* type, most similar to *mella*.

FEMALE: Similar to male, body more robust, ovoid, eyes relatively smaller, antennal segment two very weakly clavate.

DISTRIBUTION: Galapagos Islands.

DISCUSSION: This species was described in *Psallus* by Barber (1925) and retained in that genus by Carvalho and Gagné (1968) because the second antennal segment is longer than the width of the head. We are moving *insularis* to *Rhinacloa* on the basis of its vestiture, row of spicules on the metafemur, antennal dimorphism, and male genitalic structure.

SPECIMENS EXAMINED: GALAPAGOS ISLANDS. **Darwin:** January 29, 1964, D. Q. Cavagnaro (CAS), 7♂♂, 3♀♀. **Fernandina:** Punta Espinosa, January 29, 1964, R. L. Usinger (CAS), 1♂; W side, 100 ft., February 5, 1964, D. Q. Cavagnaro (CAS), 1♀. **Floreana:** Black Beach, February 17, 1964, R. L. Usinger (CAS), 1♂, 21♀♀; February 18, 1964, R. L. Usinger (CAS), 1♂, 4♀♀; Wittmer's Farm, February 15, 1964, R. L. Usinger (CAS), 2♂♂, 7♀♀. **Pinta:** S Coast, May 25, 1964, D. Q. Cavagnaro (CAS), 1♂. **Santa Cruz:** E slope, 160 m, April 16, 1964, D. Q. Cavagnaro (AMNH, CAS), 3♂♂, 6♀♀; Horneman Farm, 220 m, March 18, 1964, D. Q. Cavagnaro (AMNH, CAS), 4♂♂; Table Mountain, 440 m, April 16, 1964, D. Q. Cavagnaro (CAS), 1♂; Academy Bay, Darwin Research Station, January–February 1964, D. Q. Cavagnaro and R.O. Schuster (AMNH, CAS), 6♂♂, 7♀♀.



FIGS. 22–24 22. *Rhinacloa incaicus*, ♂, Ecuador, Quito. 23. *Rhinacloa insularis*, ♂, Galapagos Islands, Isla Santa Cruz, Horneman Farm. 24. *Rhinacloa juli*, ♂, holotype.

***Rhinacloa juli*, new species**

Figures 24, 48, 76, 122, 174, 215, 242, 258

DIAGNOSIS: Similar in appearance to *be-tanzos* and *peruana* with the dull body surface, the second antennal segment in the males uniformly dark and longer than the width of the head and with *forticornis* type male genitalia; distinguished by the black head, pronotum, and scutellum, with the contrasting deep red hemelytra.

DESCRIPTION: Male. Elongate, length apex tylus–cuneal fracture 1.89–2.11, width pronotum 0.92–0.98; head, pronotum, scutellum, antennae, and thorax laterally and ventrally black; hemelytra deep brown red in distinct contrast to body anteriorly; all coxae very dark, nearly black; all trochanters, femora, and abdomen nearly black or heavily infuscate; tibiae and tarsi dirty yellow-brown; membrane yellow-brown.

Body surface dull, generally covered with reclining, black, common setae and sericeous, subappressed, scale-like setae; membrane without scale-like setae.

Vertex relatively broad, eyes relatively small, ratio width head–width vertex 1:0.53; antennal segment two length 0.80–0.85, longer than width of head; hemelytra elongate; labium reaching to between meso- and me-

tacoxae; claws nearly straight on dorsal surface, sharply bent apically, pulvilli large, covering most of ventral claw surface.

MALE GENITALIA: Figures 174, 215, 242. Vesica elongate and recurved apically, no secondary gonopore; left paramere not splayed-out; *forticornis* type.

FEMALE: Much shorter and more robust than male, eyes relatively smaller; second antennal segment very weakly clavate.

ETYMOLOGY: Named for the type locality.

DISTRIBUTION: Highlands of southern Peru, Bolivia, and northern Argentina.

HOLOTYPE ♂: PERU. **Puno:** Juli, 3835 m, January 31, 1972, R. T. and J. C. Schuh, ex *Hypericum* sp.; deposited in the American Museum of Natural History, New York.

PARATYPES: BOLIVIA. **La Paz:** Tiahuanaco Ruins W of La Paz, 4000 m, January 29, 1972, R. T. and J. C. Schuh (AMNH), 1♂, 6♀♀. PERU. **Puno:** Juli, 3835 m, January 31, 1972, R. T. and J. C. Schuh, ex *Hypericum* sp. (AMNH), 19♂♂, 82♀♀.

ADDITIONAL SPECIMENS: ARGENTINA. **Tucumán:** 26 km SE of Amaicha del Valle, 2800 m, January 2, 1982, R. T. Schuh and B. M. Massie (AMNH), 1♂. **Jujuy:** La Quisca, February 17, 1951, Ross and Michelbacher (JCMC), 2♂♂. BOLIVIA. **La Paz:** La Paz, Estr.

de Quitina, September 30, 1972, G. Bohart (USU), 1♀. PERU. Cuzco: 8 mi. S of Cuzco, 3500 m., August 6, 1971, C. and M. Vardy (BM), 2♂♂, 5♀♀. Dept. ?: La Huerta, 3800 m, October 24–28, 1972 (CNC), 3♂♂, 4♀♀.

Rhinacloa longirostris (Carvalho),
new combination

Figures 25, 123, 175, 216, 257B

Psallus longirostris Carvalho, 1968 (in Carvalho and Gagné), p. 158.

DIAGNOSIS: Recognized by the rostrum reaching well past the midpoint of the abdomen, the head distinctly produced in front of the eyes, the yellow white coloration, including antennal segments one and two, the black tibial spines without black bases, and the male genitalia of the *forticornis* type.

DESCRIPTION: Male. Moderately large, elongate ovoid, length apex tylus–cuneal fracture 1.97–2.09, width pronotum 0.87–0.98; general coloration yellow-white, including all appendages; tibiae with black spines without black bases.

Dorsum smooth, weakly shining, covered with reclining brown common setae, and numerous, generally distributed, subappressed, golden, shining, scale-like setae; abdomen with only pale, reclining, common setae; membrane without scale-like setae.

Eyes moderately large, ratio width head–width vertex 1:0.45; eyes occupying about two thirds of height of head in lateral view; head distinctly projecting in front of eyes in dorsal view, weakly angulate, tylus barely visible from above; antennal segment two length 0.88–0.98, cylindrical, diameter about equal to that of segment one, length greater than width of head; labium very long, apex just reaching anterior margin of genital capsule; claws relatively straight on dorsal surface, strongly bent apically, pulvilli occupying most of ventral claw surface.

MALE GENITALIA: Figures 275, 216. Vesica sigmoid, elongate apically, no secondary gonopore; left clasper not splayed-out; *forticornis* type, most similar to *usingeri* and *rubescens*.

FEMALE: More robust than male, body distinctly ovoid in outline, eyes relatively smaller than in male; head conspicuously projecting anterior to eyes in dorsal view by a

distance equal to approximately half the length of an eye as measured from above; antennal segment two distinctly narrowed proximally; labium reaching slightly posterior to base of ovipositor.

DISTRIBUTION: Galapagos Islands.

DISCUSSION: Carvalho (in Carvalho and Gagné [1968]) described *longirostris* in the genus *Psallus* based on the length of antennal segment two as being greater than the width of the head. Our observations suggest that this character conflicts with others used to place species in the genus *Rhinacloa*, including type of pubescence, the row of spicules on the metafemur, and the male genitalia. We are therefore moving *longirostris* to *Rhinacloa*.

SPECIMENS EXAMINED: GALAPAGOS ISLANDS. **Floreana:** Black Beach, February 14, 1964, R. L. Usinger, ex *Scalesia affinis* (CAS), 1♀. **Isabella:** Tagus Cove, January 30, 1964, R. L. Usinger, ex *Scalesia gummifera* (CAS), 1♀. **Pinzon:** Upper Caldera Valley area, February 7, 1964, D. Q. Cavagnero (AMNH, CAS), 21♂♂, 11♀♀; Summit and Upper Caldera areas, February 7, 1964, D. Q. Cavagnero (CAS), 1♂, 3♀♀ (paratypes). **San Cristobal:** Wreck Bay, February 24, 1964, R. L. Usinger, lowland dry forest (CAS), 1♂, 1♀. **Santa Cruz:** Academy Bay, Darwin Research Station, January 25, 1964, D. Q. Cavagnero and R. O. Schuster (CAS), 3♂♂, 2♀♀ (paratypes).

Rhinacloa manleyi, new species

Figures 26, 77, 78, 94, 124, 176, 217, 257A

DIAGNOSIS: Recognized by the orangish coloration, the long, slender black second antennal segment, the dorsum devoid of scale-like setae, and the structure of the male genitalia.

DESCRIPTION: Male. Small, elongate, more or less parallel-sided, length apex tylus–cuneal fracture 1.65–2.00, width pronotum 0.82–0.92; basic coloration of dorsum orange yellow; scutellum and clavus adjacent to scutellum and along commissure orange brown; cuneus, face between eyes and antennal fossae, and thorax laterally red; membrane infusate; antennae castaneous; ventral surface of head, including bucculae, most of labium, all legs (including coxae), posterior margin of metathoracic scent-gland evaporatory area,

and abdomen yellow-white; metafemora with some dark spots; black tibial spines with distinct black bases.

Body surface smooth and rather strongly shining, generally covered only with pale, shining, reclining common setae; thorax lateroventrally with some sericeous, subappressed, scale-like setae; membrane without scale-like setae.

Eyes large, ratio of width head-width vertex 1:0.36, eyes occupying four fifths of height of head in lateral view; antennal segment two length 0.75–0.97, nearly cylindrical, maximum diameter about equal to that of segment one, length greater than width of head; labium reaching to posterior margin of metatrochanters; claws weakly curving on dorsal surface, rather strongly bent apically, pulvilli occupying about two thirds of ventral claw surface.

MALE GENITALIA: Figures 176, 217. Vesica sigmoid, apical half greatly elongate and slender, no secondary gonopore; left paramere not splayed-out; *forticornis* type.

FEMALE: More strongly ovate and stout bodied than male, dorsum, abdomen, and appendages more strongly reddish than in male; antennal segment one more slender than in male and very weakly clavate.

ETYMOLOGY: Named for Gary V. Manley, the collector of many known specimens.

DISTRIBUTION: Extreme southwest Texas, tropical Mexico, Honduras, and Mato Grosso, Brazil (see Discussion).

DISCUSSION: The single female specimen from Brazil, Mato Grosso, is similar to *manleyi* in coloration and in the absence of scale-like setae on the dorsum. Because we had available only female specimens we have chosen not to distinguish it from *manleyi*, even though the distribution is grossly disjunct.

HOLOTYPE ♂: MEXICO. **Tamaulipas:** 8 mi. W of El Limon, July 20, 1970, taken at light, Murray, Phelps, Hart, Schaffner; deposited in the American Museum of Natural History, New York.

PARATYPES: HONDURAS. Aguan Valley, 10 mi. W of Olanchito, May 24, 1977, G. V. Manley (AMNH, TAM), 4♂♂, 4♀♀. MEXICO. **Chiapas:** Palenque, September 10, 1974, G. Bohart and W. Hanson (USU), 1♂. **San Luis Potosí:** 2 mi. SE of Pedro Montoya, July 27–

28, 1970, Schaffner et al. (AMNH, TAM), 4♀♀; 3 mi. W of Tamuin, August 24, 1974, W. E. Clark (TAM), 3♂♂, 2♀♀. **Tamaulipas:** 8 mi. W of El Limon, July 29, 1970, Schaffner et al. (TAM). **Vera Cruz:** Tuxpam, June 6, 1965, Schaffner et al., at light (TAM), 1♀.

ADDITIONAL SPECIMENS: BRAZIL. **Mato Grosso:** Rio Teles Pires, Mt. Brazil, SINOP, September 1974, Alvarenga and Roppa (JCMC), 1♀. COSTA RICA. **Guanacaste:** 10 mi. NW of Liberia, July 25, 1965, P. J. Spangler (USNM), 1♀. MEXICO. **Vera Cruz:** 44 mi. W of Tampico, August 22, 1967, G. F. Hevel (USNM), 1♂. PANAMA. 1 km E of Bejuco, July 17, 1976, W. E. Clark (USNM), 1♀. USA. **Texas:** *Cameron Co.:* Brownsville, June 11, 1971, W. E. Clark (TAM), 1♂; Brownsville, S Texas Garden, November 29, 1910, December 18, 1911, (USNM), 3♀♀.

Rhinacloa mella (Van Duzee),
new combination

Figures 27, 125, 133–136, 177, 218, 257B

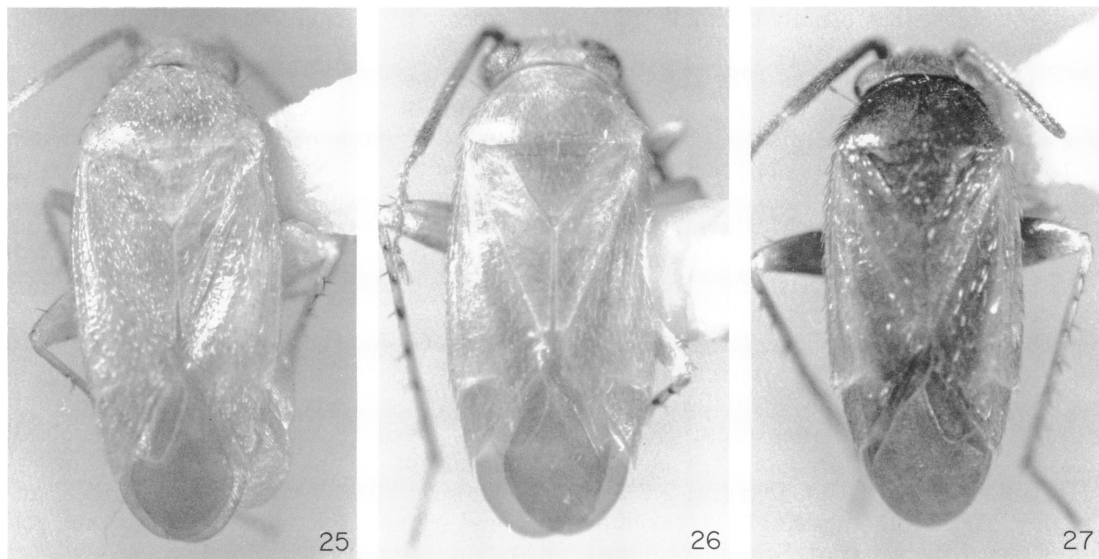
Europiella mella Van Duzee, 1937, p. 117 Carvalho, 1958, p. 46.

Psallus mella Carvalho and Gagné, 1968, p. 159.

DIAGNOSIS: Recognized by the dark coloration of most of the body, the antennae uniformly dark in the males with segment one and two much lighter in the females, and the form of the male genitalia which are of the *forticornis* type; among species recorded from the Galapagos *mella* is the darkest.

DESCRIPTION: Male. Small, length apex tylus–cuneal fracture 1.52–1.84, width pronotum 0.71–0.85; general coloration deep brown, hemelytra often somewhat lighter, cuneus usually distinctly reddish; antennae nearly black; coxae and femora variable, ranging from nearly yellow to almost completely dark brown or castaneous, pro- and mesofemora usually lighter than metafemora; labium pale, abdomen broadly yellowish along midline; tibiae and tarsi yellowish; black tibial spines with small black bases on metafemora only.

Dorsum smooth, polished, rather strongly shining; body generally covered with brown, reclining, common setae; hemelytra and thorax lateroventrally with some sericeous, subappressed, scale-like setae; membrane without scale-like setae.



FIGS. 25–27 25. *Rhinacloa longirostris*, ♂, Galapagos Islands, Isla Pinzon, Upper Caldera Valley area. 26. *Rhinacloa manleyi*, ♂, holotype. 27. *Rhinacloa mella*, ♂, Galapagos Islands, Isla Fernandina, W side, 1100 feet.

Eyes only moderately large, ratio width head–width vertex 1:0.48, eyes occupying somewhat less than three fourths of height of head in lateral view, genae and bucculae exposed ventrally; frons rounded, distinctly projecting anterior to margin of eyes in dorsal view; antennal segment two length 0.57–0.89, cylindrical, diameter slightly greater than that of segment one, length greater than width of head; head only weakly concave behind, not strongly conforming to or completely obscuring anterior margin of pronotum; labium just reaching apex of mesocoxae; claws weakly curving on dorsal surface, rather sharply bent apically, pulvilli occupying about two thirds of ventral claw surface.

MALE GENITALIA: Figures 177, 218. Vesica sigmoid, moderately elongate and strongly attenuated apically, no secondary gonopore; left paramere not splayed-out; *forticornis* type, most similar to *insularis*.

FEMALE: More robust than male, body ovoid, eyes smaller than in male, antennal segment two distinctly narrowed proximally, antennal coloration much lighter than in male.

DISTRIBUTION: Galapagos Islands.

DISCUSSION: Originally described in *Europiella* by Van Duzee (1937), *mella* was transferred to *Psallus* by Carvalho and Gagné

(1968), on the basis of its having scale-like setae and the second antennal segment longer than the width of the head. We are transferring *mella* to *Rhinacloa* because of the structure of the scale-like setae, the row of spicules on the metafemora, and the structure of the male genitalia.

SPECIMENS EXAMINED: GALAPAGOS ISLANDS. **Fernandina:** W side, 1100 ft., February 5, 1964, D. Q. Cavagnero (AMNH, CAS), 31♂♂, 3♀♀. **Indefatigable:** Conway Bay, March 16–22, 1935, Templeton-Crocker (CAS), 1♂ (holotype), 3♀♀. **Santa Cruz:** Table Mountains, 440 m, April 16, 1964, D. Q. Cavagnero (AMNH, CAS), 25♂♂, 36♀♀; grassland, 750 m, April 19, 1964, D. Q. Cavagnero (CAS), 8♂♂, 3♀♀; Horneman Farm, 220 m, March–April 1984, D. Q. Cavagnero (AMNH, CAS), 4♂♂, 1♀.

Rhinacloa mesoamericana, new species

Figures 28, 126, 178, 219, 256

DIAGNOSIS: Very similar in general appearance to *puertoricensis*; distinguished by the darker spotting on the tibiae and the form of the male genitalia which is similar to that found in *cardini*.

DESCRIPTION: Male. See *puertoricensis*;

bases of tibial spines usually distinctly dark in contrast to *puertoricensis*.

MALE GENITALIA: Figures 178, 219. Similar in form to *cardini*.

FEMALE: See *puertoricensis*.

ETYMOLOGY: Named for its occurrence in Central America.

DISTRIBUTION: Tropical Mexico and Central America.

DISCUSSION: On the basis of external appearance *mesoamericana* is almost indistinguishable from *puertoricensis*. The male genitalia, however, suggest a close relationship to *cardini*, whereas the male genitalia of *puertoricensis* are very similar to those of *calli-crates*.

HOLOTYPE ♂: MEXICO. **Oaxaca**: 2.7 mi. NW of El Cameron, July 13, 1971, taken at light, Clark, Murray, Hart, Schaffner; deposited in the American Museum of Natural History, New York.

PARATYPES: MEXICO. **Oaxaca**: 8 mi. N of La Ventosa, Schaffner and Mastro, at light (TAM), 1♂; 2.7 mi. NW of El Camaron, July 13, 1971, July 24, 1973, Schaffner et al. (TAM), 1♂. NICARAGUA. Leon, 16.3 mi. SE of Leon, June 18, 1972, R. R. and M. E. Murray, at light (AMNH, TAM), 4♂♂, 4♀♀; Masachapa, September 1953, N. L. H. Krauss, ex *Prosopis* sp. (AMNH, USNM), 17♂♂, 19♀♀. PANAMA. Barro Colorado Island, April 1973, D. Engleman (JM), 1♂; Puerto Chitre, October 24, 1952, F. S. Blanton (USNM), 4♂♂, 5♀♀.

***Rhinacloa nigripennis*, new species**

Figures 29, 87, 111, 160, 201, 255

DIAGNOSIS: Distinguished by its rather small size, deep castaneous coloration, and the structure of the male genitalia, which do not closely resemble those of any other known species.

DESCRIPTION: Male. Small, elongate, parallel-sided, length apex tylus–cuneal fracture 1.46–1.74, width pronotum 0.81–0.91; coloration castaneous.

Body surface shining, covered with reclining, dark brown, common setae and sericeous, subappressed, scale-like setae; antennal segment two length 0.53–0.56, with some suberect pubescence of length about equal to

diameter of segment, but unlike condition found in *luridipennis*; membrane without scale-like setae.

Head broad, short, width about three fourths of width of pronotum, ratio width head–width vertex 1:0.46; eyes occupying about three fourths of height of head in lateral view; labium reaching to apex of mesocoxae; claws with rounded dorsal surface, pulvilli large, covering nearly entire ventral claw surface.

MALE GENITALIA: Figures 160, 201. Vesica sigmoid, apex strongly attenuated distad of well developed secondary gonopore, no apical or mesial spicules; left paramere not splayed-out.

FEMALE: Stout bodied, broadly ovoid; antennal segment two very weakly clavate, yellow on proximal half.

ETYMOLOGY: Named for the totally dark-colored legs.

DISTRIBUTION: Central Mexico.

HOLOTYPE ♂: MEXICO. **San Luis Potosí**: Matehuala, 7.IX.1969, L.A. Kelton; deposited in the Canadian National Collection of Insects, Ottawa.

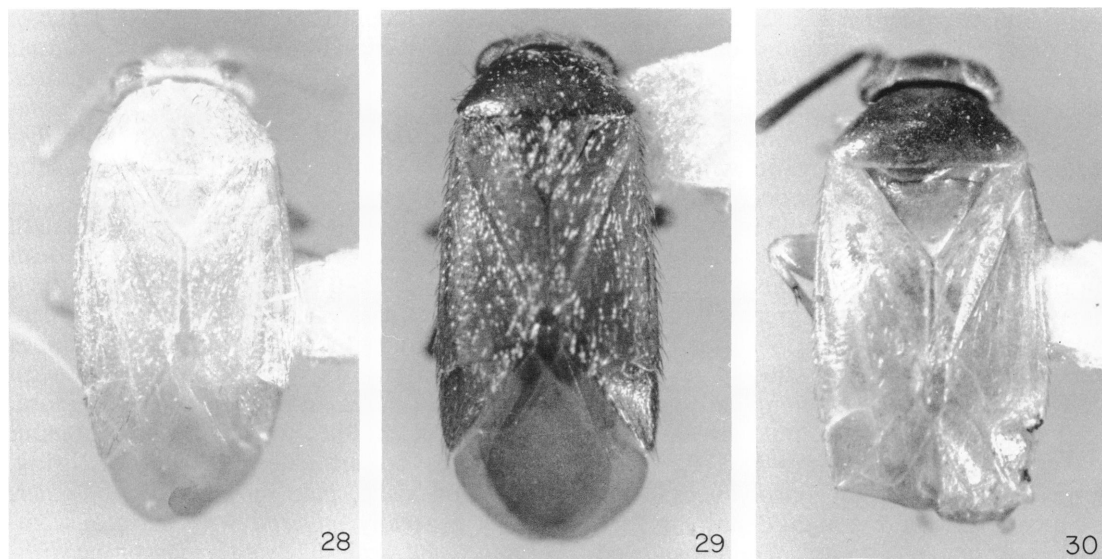
PARATYPES: MEXICO. **Durango**: 5 mi. W of Durango, 6500 ft., July 29, 1964, L. A. Kelton (AMNH, CNC), 1♂, 7♀♀. **Nuevo Leon**: 9 mi. W of Iturbide, July 3, 1974, Schaffner et al. (TAM), 1♀. **San Luis Potosí**: Matehuala, October 7, 1969, L. A. Kelton (AMNH, CNC), 11♂♂, 28♀♀. **Zacatecas**: Tropic of Cancer marker on Hiway 54, 1950 m, July 4, 1984, Carroll, Schaffner, Friedlander, (AMNH, TAM), 53♂♂, 24♀♀.

***Rhinacloa penai*, new species**

Figures 30, 49, 79, 128, 179, 220, 242, 255

DIAGNOSIS: Recognized by the yellowish coloration, the weakly shining body surface, and as a member of the *forticornis* group by the structure of the male genitalia.

DESCRIPTION: Male. Small, elongate ovoid, length apex tylus–cuneal fracture 1.65–1.81, width pronotum 0.86–0.96; head and entire thorax dark brown; antennal segments one and two castaneous; remainder of body and appendages yellow; metafemora with some very faint brown spots; black tibial spines with dark bases on meso- and metafemora.



FIGS. 28–30 28. *Rhinacloa mesoamericana*, ♂, Nicaragua, Masachapa. 29. *Rhinacloa nigripennis*, ♂, Mexico, San Luis Potosí, Matehuala. 30. *Rhinacloa penai*, ♂, Chile, Iquique, 20 km S of Pintados.

Body surface smooth, dull, covered with reclining, pale, common setae and sericeous, subappressed, scale-like setae; membrane without scale-like setae.

Head broad, eyes large, ratio of width head-width vertex 1:0.39; height of eye equal to four fifths of height of head in lateral view; antennal segment two length 0.63–0.72, cylindrical, of diameter slightly greater than that of segment one, length less than width of head; labium reaching to about midpoint of mesocoxae; claws nearly straight on dorsal surface, sharply bent apically, pulvilli covering most of ventral claw surface.

MALE GENITALIA: Figures 179, 220, 242. Vesica sigmoid, nearly J-shaped, distal half greatly elongated, apex curving, no secondary gonopore; left paramere not splayed-out; *forticornis* group.

FEMALE: Similar to male, body somewhat more strongly ovoid, antennal segment two very weakly clavate and light-colored mesially.

ETYMOLOGY: Named for the collector of most known specimens, L. E. Peña.

DISTRIBUTION: Coastal Peru, northern Chile, and the northeast of Brazil.

HOLOTYPE ♂: [CHILE. Iquique]: 20 km S

of Pintados, XI-55, Peña; deposited in the Canadian National Collection of Insects, Ottawa.

PARATYPES: CHILE. Iquique: 20 km S of Pintados, November 1955, L. E. Peña (AMNH, CNC), 10♂♂, 31♀♀.

ADDITIONAL SPECIMENS: BRAZIL. Ceará: Crato, May 1971, J. C. M. Carvalho (JCMC), 20 specimens. PERU. Piura: Chira, November 12, 1943, J. Lamas (USNM), 1♂.

***Rhinacloa peruana*, new species**

Figures 31, 50, 80, 127, 180, 221, 244, 258

DIAGNOSIS: Distinguished from *betanzos* and *juli* by the brownish coloration, the weakly shining dorsal surface, and the structure of the male genitalia, which are of the *forticornis* type.

DESCRIPTION: Male. Elongate, hemelytra weakly convex laterally, length apex tylus-cuneal fracture 1.37–2.21, width pronotum 0.85–1.00; general coloration yellow brown, head, pronotum mesially, scutellum, and thorax lateroventrally darker brown; all antennal segments black; metafemora with some dark suffusion and some dark spots at bases of spines and trichobothria; black tibial spines with heavy black bases.

Dorsum smooth, weakly shining, covered with pale, reclining, common setae, and sericeous, subappressed, scale-like setae; membrane without scale-like setae.

Eyes relatively small, frons weakly projecting anterior to eyes, ratio width head-width vertex 1:0.45, eyes occupying about three fourths of height of head in lateral view; antennal segment two length 0.80–1.06, cylindrical, slender, diameter about two thirds that of segment one, length greater than width of head; labium reaching to about apex of metacoxae; claws nearly straight on dorsal surface, rather strongly bent apically, pulvilli covering nearly entire ventral claw surface.

MALE GENITALIA: Figures 180, 221, 244. Vesica sigmoid, rather sharply bent, moderately elongate and straight distally, no secondary gonopore; left paramere not splayed-out; *forticornis* type.

FEMALE: Similar to male, elongate, antennal segment two light mesially.

ETYMOLOGY: Named for its occurrence in Peru.

DISTRIBUTION: Central Peru south to central Chile.

HOLOTYPE ♂: CHILE. **Coquimbo Prov.:** El Tofo, 700 m, Nov. 2, 1981, R. T. Schuh and N. I. Platnick, ex *Ophryosporos triangularis* Meyen (Asteraceae); deposited in the American Museum of Natural History, New York.

PARATYPES: CHILE. **Coquimbo:** El Tofo, 700 m, November 2, 1981, R. T. Schuh and N. I. Platnick, ex *Ophryosporos triangularis* (Asteraceae) (AMNH), 1♀. **PERU. Arequipa:** Yura, 28 km N of Arequipa, 2500 m, January 23–24, 1972, R. T. and J. C. Schuh, sweeping natural vegetation (AMNH), 17♂♂, 17♀♀. **Lima:** km 46 Carretera Central E of Lima, November 14, 1971, R. T. and J. C. Schuh (AMNH), 1♂; Chancay, 40 mi. N of Lima, July 29, 1971, P. S. and H. L. Broomfield, irrigated coastal oasis (BM), 1♀; Huacho, November 4, 1909, R. Paessler (JCMC), 1♂. **Pasco:** Huancabamba, August 11, 1945, P. A. Bray (USNM), 1♂. **COUNTRY ? CBB,** Ayopaya, Morochita, 3094 m, April 19, 1980, O. Bacon and D. Foster (AMNH), 2♂♂, 1♀.

***Rhinacloa puertoricensis*, new species**

Figures 32, 129, 181, 222, 245, 256

DIAGNOSIS: Recognized by its small size, yellowish coloration, short labium, and the

head which conforms closely to the shape of the anterior margin of the pronotum; similar in appearance and coloration to *callicrates*, but much smaller and similar in size to *mesoamericana*, but with different genitalia; distinguished from *cardini* by the shape of the head and smaller size.

DESCRIPTION: Male. Small, ovoid, length apex tylus–cuneal fracture 1.40–1.56, width pronotum 0.75–0.81; general coloration yellow, sometimes tinged with orange or green; metafemora with faint dark bases of spines and trichobothria; dark tibial spines with some dark bases on meso- and metafemora.

Dorsum smooth, weakly shining; dorsum generally covered with brown, reclining, common setae, pale on abdominal venter, body generally covered with sericeous, subappressed, scale-like setae; membrane without scale-like setae.

Eyes moderately large, ratio width head-width vertex 1:0.47, eyes occupying four fifths of height of head in lateral view; frons only very slightly projecting beyond anterior margin of eyes in dorsal view and tylus not visible from above; antennal segment two length 0.50–0.54, cylindrical, diameter slightly less than that of segment one, length less than width of head; labium very slightly surpassing apex of procoxae; hemelytra short, lateral corial margin very weakly convex; claws nearly straight on dorsal surface, sharply bent apically, pulvilli covering most of ventral claw surface.

MALE GENITALIA: Figures 181, 222, 245. Vesica sigmoid, distal half elongate, slender and nearly straight, very similar in form to *callicrates*; left paramere not splayed-out; *forticornis* type.

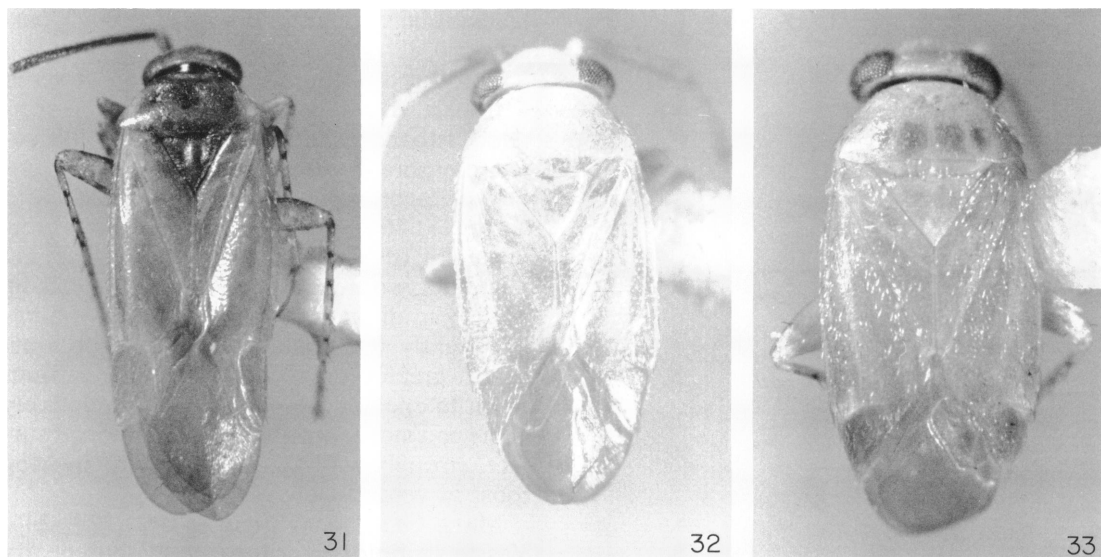
FEMALE: Similar to male, body more strongly ovoid, eyes relatively smaller, antennal segment two somewhat narrowed proximally.

ETYMOLOGY: Named for its occurrence in Puerto Rico.

DISTRIBUTION: West Indies, including Jamaica, Hispaniola, Puerto Rico, Antigua, and the Netherlands Antilles.

HOLOTYPE ♂: PUERTO RICO. Isla Maguay, Parguera, XII-20-62, Paul and Phyllis Spangler; deposited in the National Museum of Natural History, Washington, D.C.

PARATYPES: ANTIGUA. St. Johns, 1–150 m, July 1976, N.L.H. Krauss (AMNH), 3♀♀.



FIGS. 31–33 31. *Rhinacloa peruana*, ♂, Peru, Arequipa, Yura, 28 km N of Arequipa. 32. *Rhinacloa puertoricensis*, ♂, holotype. 33. *Rhinacloa rubroonata*, ♂, holotype.

DOMINICAN REP. **Santiago Prov.:** Santiago, August 10, 1967, J. C. Schaffner, black light (TAM), 2♂♂. JAMAICA. King, Palisadoes, August 25, 1966, Howden and Becker (CNC), 2♂♂; Tip Top Hotel on Ruthven Road, May 7, 1969, R. E. Woodruff, black light trap (FSCA), 1♂, 2♀♀. PUERTO RICO. Isla Maguëy, Parguera, December 19–20, 1962, P. and P. Spangler (AMNH, USNM), 74♂♂, 11♀♀; Isla Maguëy, May 1962, H. Mayorga, at light (USNM), 2♂♂; Mayaguez, December 1964, R. Jorge (USNM), 1♀; Luquillo Forest, El Yunque, 2100 ft., January 1, 1963, P. and P. Spangler, at light (USNM), 1♂.

ADDITIONAL SPECIMENS: NETHERLANDS ANTILLES. Aruba (WAG), 22 specimens. Bonaire (WAG), 156 specimens. Curaçao (WAG), 43 specimens.

Rhinacloa rubescens Carvalho

Figures 130, 257B

Rhinacloa rubescens Carvalho, 1968 (in Carvalho and Gagné), p. 165.

DIAGNOSIS: Recognized by its small size, the very large eyes in the male occupying nearly the entire side of the head, and the generally carmine red coloration.

DESCRIPTION: Male. Small, ovoid, relatively broad-bodied, length apex tylus–cuneal

fracture 1.65, width pronotum 0.90; general coloration carmine red.

Dorsum smooth, slightly shining, generally covered with dark, reclining common setae and sericeous, subappressed, scale-like setae; membrane without scale-like setae.

Head distinctly transverse, eyes very large, slightly projecting beyond anterior margin of frons in dorsal view, ratio of width head–width vertex 1:0.34; height of eyes in lateral view nearly equal to height of head; head strongly concave behind, conforming to and obscuring anterior margin of pronotum; antennal segment two cylindrical length 0.77, diameter about equal to that of segment one, length greater than width of head; labium reaching to apex of mesocoxae; claws nearly straight on dorsal surface, rather strongly bent near apex, pulvilli occupying most of ventral claw surface.

MALE GENITALIA: Vesica sigmoid, apex attenuated, similar in structure to *mella* and *insularis*; left paramere not splayed-out; *forticornis*-type.

FEMALE: Body more strongly ovoid than in male, eyes relatively smaller, antennal segment two very weakly clavate.

DISTRIBUTION: Galapagos Islands.

SPECIMENS EXAMINED: GALAPAGOS ISLANDS. Floreana: Black Beach, February 17,



FIG. 34 *Rhinacloa usingeri*, ♂, Galapagos Islands, Isla Santa Cruz, Bella Vista.

1964, R. L. Usinger, ex *Euphorbia* sp. (CAS), 1♂ (paratype), 1♀.

***Rhinacloa rubroornata*, new species**

Figures 33, 82, 131, 182, 223, 246, 257A

DIAGNOSIS: Recognized by the strongly reddish (carmine) coloration of the dorsum, the *forticornis* type male genitalia, and the second antennal segment dark only distally in the female.

DESCRIPTION: Male. Small, elongate, length apex tylus-cuneal fracture 1.62–1.79, width pronotum 0.84–0.88; background coloration of dorsum yellowish, heavily suffused with carmine red in many specimens; thorax and abdomen castaneous lateroventrally, yellow mesioventrally; labium and legs (including coxae) yellow white, except metafemora reddish on distal half; antennae yellow-white;

black tibial spines without distinct black bases.

Body surface smooth and shining, covered with pale, reclining common setae, and scattered, subappressed, sericeous, scale-like setae; membrane without scale-like setae.

Eyes large, ratio of width of head-width vertex 1:0.40; eyes occupying about four fifths of height of head in lateral view; antennal segment two length 0.64–0.68, increasing slightly in diameter distally, greatest diameter slightly less than that of segment one, length greater than width of head; labium reach to apex of mesocoxae; claws relatively short and stout, nearly straight on dorsal surface, strongly bent apically, pulvilli covering most of ventral claw surface.

MALE GENITALIA: Figures 182, 223, 246. Vesica sigmoid, elongate, slender, and nearly straight apically, no secondary gonopore; left paramere not splayed-out; *forticornis* type.

FEMALE: Broadly ovoid, more robust than male; body and appendages heavily suffused with red; eyes smaller than in male.

ETYMOLOGY: Named for its reddish coloration.

DISTRIBUTION: Florida Keys.

HOLOTYPE ♂: USA. **Florida.** Big Pine Key, 24-26-IV-61, L. A. Kelton; deposited in the Canadian National Collection of Insects, Ottawa.

PARATYPES: USA. **Florida.** *Monroe Co.:* Big Pine Key, April 24–26, 1961, L. A. Kelton (AMNH, CNC), 17♂♂, 27♀♀; Key Largo, April 26–27, 1961, L. A. Kelton (CNC), 1♂; Crawl Key, April 8, 1981, T. J. Henry and A. G. Wheeler, ex *Suriana maritima* (USNM), 2♂♂, 4♀♀. *Dry Tortugas:* Garden Key, May 9, 1961, July 9, 1963, Weems and Woodruff, some ex *Melanthera deltoidea* (FSCA), 4♂♂, 2♀♀; Bush Key, May 9–10, 1961, F. W. Mead, ex *Suriana maritima* (FSCA), 5♂♂, 4♀♀; Loggerhead Key, January 1962, May 1962, Denmark and Woodruff, ex *Suriana maritima* (FSCA), 2♂♂, 11♀♀.

***Rhinacloa usingeri* (Carvalho),
new combination**

Figures 34, 132, 183, 224, 257B

Psallus usingeri Carvalho, 1968 (in Carvalho and Gagné), p. 162.

DIAGNOSIS: Recognized by the moderately small size, elongate slender body, the gen-

erally light yellow coloration with a broad brown stripe down the midline of the dorsum, the head which is concave behind only mesially (and resembles somewhat the form found in *incaicus* [Carvalho and Gomes] and also *Tytthus* Fieber), and the male genitalia, which are of the *forticornis*-type.

DESCRIPTION: Male. Moderately small, elongate, more or less parallel-sided, length apex tylus-cuneal fracture 1.77–1.90, width pronotum 0.80–0.86; general coloration, including antennae and legs, light yellow, midline of dorsum with a broad brown stripe.

Dorsal surface somewhat roughened and granular, at most very weakly shining; body generally covered with pale, reclining, common setae; dorsum and thoracic pleura with some sericeous, subappressed, scale-like setae; membrane without scale-like setae.

Head more or less transverse in dorsal view, eyes moderately large, ratio width head-width vertex 1:0.48, frons not projecting beyond eyes in dorsal view; eyes occupying only about two thirds of height of head in lateral view and appearing somewhat globular; head concave behind only at midline of vertex, not conforming to or obscuring anterior pronotal margin, eyes slightly removed from anterior

pronotal margin in dorsal view and appearing somewhat bulging; antennal segment two length 0.92, cylindrical, diameter about equal to that of segment one, length greater than width of head; labium reaching to midpoint of mesocoxae; claws nearly straight on dorsal surface, sharply bent apically, pulvilli occupying about two thirds of ventral claw surface.

MALE GENITALIA: Figures 183, 224. Vesica sigmoid, weakly elongated and attenuated distally, similar to *longirostris*; left paramere not splayed-out; *forticornis* type.

FEMALE: Not examined.

DISTRIBUTION: Galapagos Islands.

DISCUSSION: This species was originally described in the genus *Psallus* by Carvalho because of antennal segment two being longer than the width of the head and the wide genae. Because these characteristics conflict with others used to place species in *Rhinacloa* and because of the *forticornis* type male genitalia we have moved *usingeri* to *Rhinacloa*.

SPECIMENS EXAMINED: GALAPAGOS ISLANDS. **Floreana:** February 18, 1964, R. L. Usinger (CAS), 1♀. **Santa Cruz:** Bella Vista, February 4, 1964, R. L. Usinger (CAS), 2♂♂ (including paratype), 1♀.

TAXA USED FOR OUTGROUP COMPARISON

Campylomma verbasci (Meyer-Dür)

Figures 37, 57, 95, 141, 184, 225

Campylomma verbasci Meyer-Dür, 1843, p. 70.

DIAGNOSIS: Recognized by the generally light coloration, antennal segment one with an irregular black band distally and segment two with a small black band proximally, the distinct black spotting on the metafemora, the sericeous, lanceolate setae intermixed with common setae, and the vesica with two blade-like spines apically.

DISCUSSION: *Campylomma verbasci* appears to be the only representative of the genus in the New World. This species has long been thought to be introduced (e.g., Knight, 1941), a view with which we concur. The structure of the male genitalia (figs. 141, 184, 225) agrees closely with many species known from elsewhere in the Eastern Hemisphere, as recently illustrated by Schuh (1984).

Microphylidea prosopidis Knight

Figures 35, 38, 58, 96, 142, 185, 226

Microphylidea prosopidis Knight, 1968, p. 29.

DIAGNOSIS: Recognized by the pale yellow green coloration, the black distal one fourth of antennal segment two, the irregular row of spicules on the dorsal surface of the metafemur, and the structure of the male genitalia.

DESCRIPTION: Male. Relatively large, elongate ovoid, length apex tylus-cuneal fracture 2.27–2.37, width pronotum 1.08–1.09; general coloration pale yellow green; distal one fourth of antennal segment two black.

Dorsum smooth, weakly shining; body covered with white, weakly shining, reclining, common setae and sericeous, subappressed scale-like setae; membrane without scale-like setae.

Eyes large, ratio width head-width vertex 1:0.37, frons bulging between eyes as viewed

from above, head broad relatively to width of pronotum; head not concave behind, not obscuring anterior margin of pronotum, posterior margin of eyes distinctly removed from anterior pronotal margin; eyes occupying greater than three fourths of height of head in lateral view; antennal segment two length 0.79–0.80, increasing slightly in diameter distally, greatest diameter slightly greater than diameter of segment one; claws long, weakly but smooth curved, pulvilli small, occupying about one third of ventral claw surface.

MALE GENITALIA: Figures 142, 185, 226. Vesica sigmoid, of nearly uniform width over entire length, secondary gonopore subapical, strongly developed; left paramere not splayed-out.

FEMALE: More robust than male, eyes relatively smaller, antennal segment two distinctly more strongly narrowed proximally than in male.

DISCUSSION: *Microphylidea* Knight contains at present only the species *prosopidis* Knight, the type of the genus, and *pallens* Knight. The former is known to be host specific on *Prosopis juliflora*. At present nothing is known of the habits of *pallens*. The male genitalia, the distinctive sexual dimorphism, head structure, and partial row of spicules on the metafemur all suggest that *prosopidis* may be closely related to a large group of *Lepidopsallus* species which feed on oaks in the American southwest.

Nigrimiris pallipes
Carvalho and Schaffner
Figures 94, 144, 186

Nigrimiris pallipes Carvalho and Schaffner, 1973, p. 21.

DIAGNOSIS: Recognized by the shining, almost black body with yellow legs, the single type of pubescence, and the form of the male genitalia.

DESCRIPTION: Male. Elongate, more or less parallel-sided, length apex tylus–cuneal fracture 1.96–2.05, width pronotum 1.01–1.07; dorsum, pleuron, and antennal segment two black; remaining antennal segments, head below antennal insertions, prosternum, posterior margin of eyes narrowly, and all legs, including coxae, yellow white.

Dorsum highly polished, shining; body covered with reclining, weakly shining, light brown, common setae, devoid of scale-like setae; antennal segments two, three, and four with rather numerous, scattered, erect setae of length slightly greater than diameter of segment.

Head transverse, frons weakly bulging as viewed from above, ratio of width of head–width vertex 1:0.54; eyes occupying about three fourths of height of head in lateral view; head concave behind, posterior margin of vertex sharply acuminate; antennal segment two length 0.99–1.03, cylindrical, diameter slightly less than that of segment one; labium not quite attaining apex of mesocoxae; claws elongate, smoothly curved, pulvilli flaplike, occupying about two thirds of ventral claw surface.

MALE GENITALIA: Figures 144, 186. Vesica S-shaped, more or less in one plane, secondary gonopore developed, subapical; left clasper not splayed-out, posterior process elongate and acuminate.

FEMALE: Body somewhat broader than in male, eyes relatively smaller, antennal segment two distinctly narrowed and light colored proximally.

DISCUSSION: *Nigrimiris* Carvalho and Schaffner is at present monotypic. The overall appearance, male genitalia, and partial row of spicules on the metafemur suggest that it may be related to species from Argentina (see fig. 143) and Mexico which are as yet undescribed.

MISPLACED SPECIES

Ellenia ordinata (Distant),
new combination

Lygus ordinatus Distant, 1893, p. 435.

DISCUSSION: Distant (1893) described *Ly-*

gus ordinatus from a single female specimen from Orizaba, Mexico. Carvalho (1952b) in a review of generic placements of Distant's "Biologia" species tentatively placed *ordinatus* in the genus *Orizaba* Reuter. In the

same year Carvalho (1952a, p. 102) synonymized *Orizaba* with *Rhinacloa*, and subsequently listed *ordinatus* Distant as a *Rhinacloa* species in his world catalog (Carvalho, 1958). Our examination of the type specimen of *Lygus ordinatus*, deposited in the British Museum (Natural History), indicates that it is a species of *Ellenia* similar in coloration and appearance to *obscuricornis* from the Eastern Hemisphere.

Paramixia araguaiana (Carvalho),
new combination

Rhinacloa araguaiana Carvalho, 1948, p. 11.

DISCUSSION: Carvalho (1948) described several new species in the genus *Rhinacloa*. He later (1955) transferred one of them, *carmelitana* to the genus *Orthotylellus* (= *Paramixia*), upon realizing that its similarity to *Rhinacloa* was only superficial. Our examination of Carvalho's (1948) paper and comments by Carvalho (1984:180) indicate that *araguaiana* is also a *Paramixia* species.

SPECIES INCERTAE SEDIS

Demarata mirifica Distant

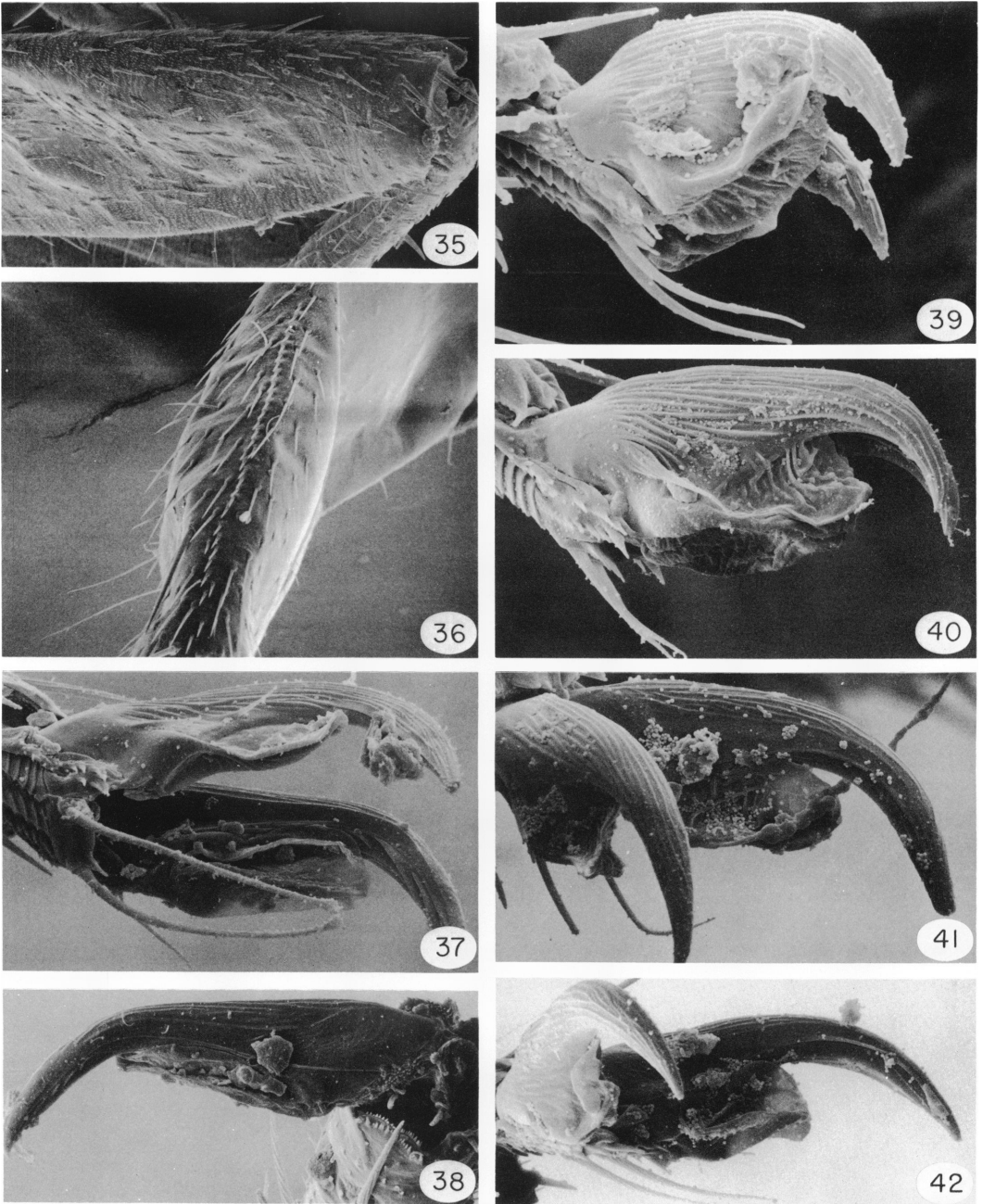
Demarata mirifica Distant, 1893, p. 451.

Ceratopsus mirificus Carvalho, 1958b, p. 47.

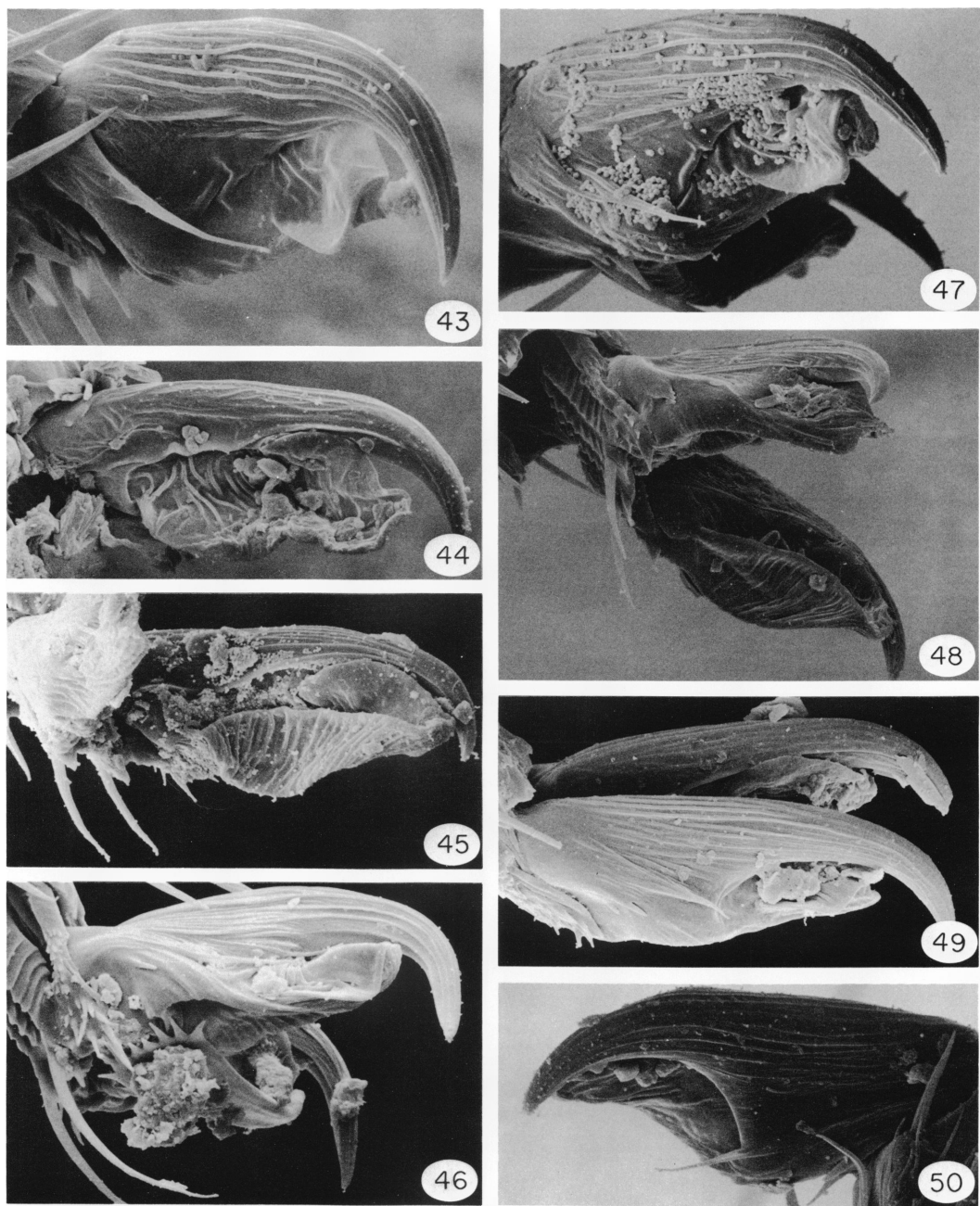
DISCUSSION: Distant (1893) described *Demarata mirifica* from Atoyac (Vera Cruz), Mexico on the basis of a single female specimen. Carvalho (1952a) in his generic catalog synonymized *Demarata* with *Ceratopsus* Reuter, thus creating the new combination *Ceratopsus mirificus*. Our examination of the holotype of *mirificus*, deposited in the British Museum (Natural History), indicates that it is almost certainly a phylina, and thus incorrectly placed in *Ceratopsus*, and that Reuter's (1908) supposition that his species

Rhinacloa basalis was perhaps identical with *Demarata mirifica* is also incorrect, because *mirifica* has no scale-like setae and lacks the row of spicules on the metafemur. We consider the placement of this species to be equivocal, because no characters indicating definitively the subfamilial or generic placement are evident in the only known specimen.

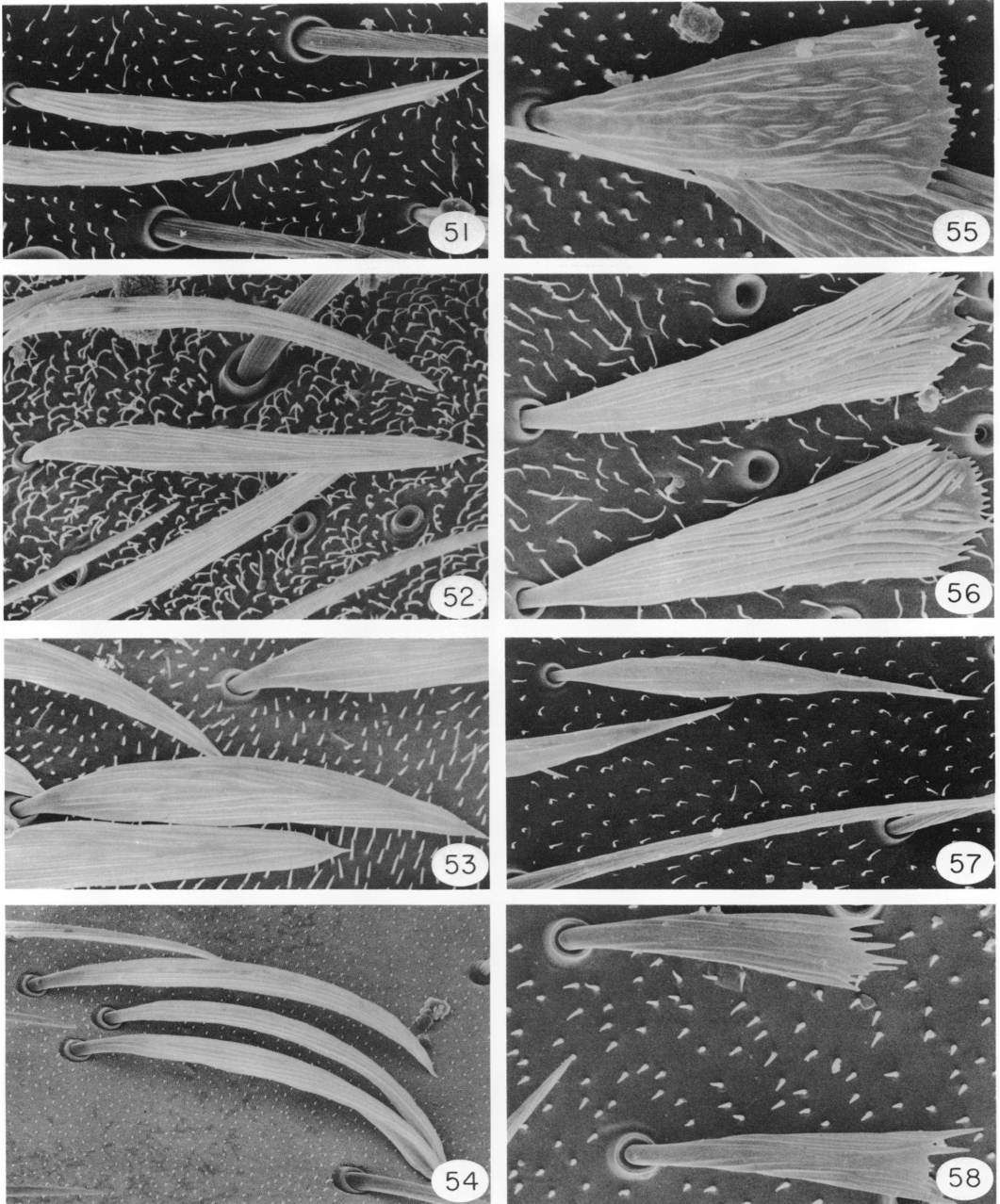
The type species of *Demarata*, *villosa* Distant, is indeed a species of *Ceratopsus*. This leaves *mirifica* in limbo as far as generic placement is concerned. We see no point in trying to rectify this situation at present since insufficient material is available to clarify the position of *mirifica*.



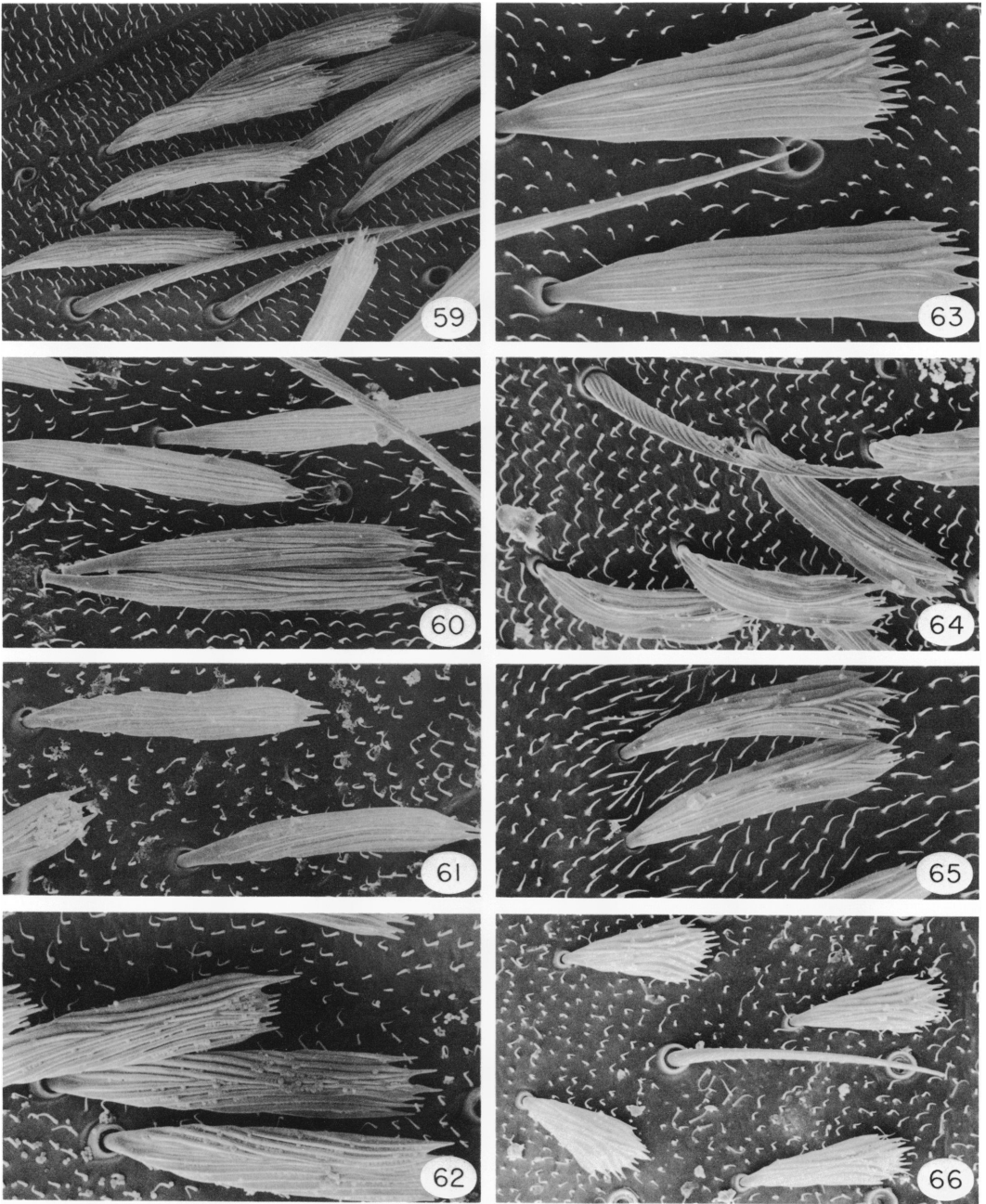
FIGS. 35–42 Femoral and pretarsal structures. 35. *Microphylidea prosopidis* Knight, dorsal distal surface of metafemur, showing scattered spicules. 36. *Rhinacloa forticornis*, dorsal distal surface of metafemur, showing regular row of spicules. 37. *Campylomma verbasici*, pretarsus. 38. *Microphylidea prosopidis*, pretarsus. 39. *Rhinacloa antennalis*, pretarsus. 40. *Rhinacloa basalis*, pretarsus. 41. *Rhinacloa clavicornis*, pretarsus. 42. *Rhinacloa luridipennis*, pretarsus.



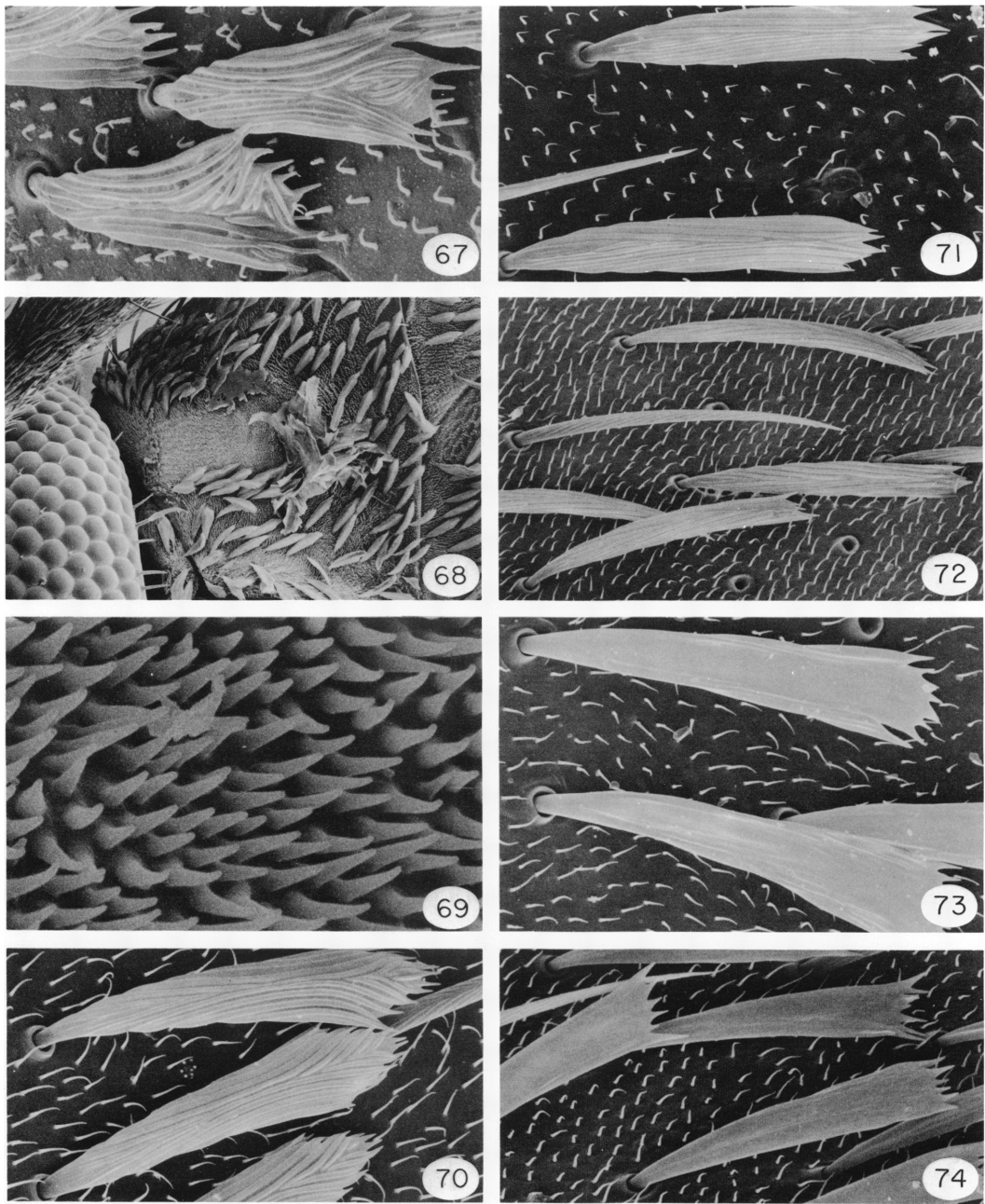
FIGS. 43–50 Pretarsal structures. 43. *Rhinacloa pallidipes*. 44. *Rhinacloa nigripennis*. 45. *Rhinacloa callicrates*. 46. *Rhinacloa cardini*. 47. *Rhinacloa forticornis*. 48. *Rhinacloa juli*. 49. *Rhinacloa penai*. 50. *Rhinacloa peruana*.



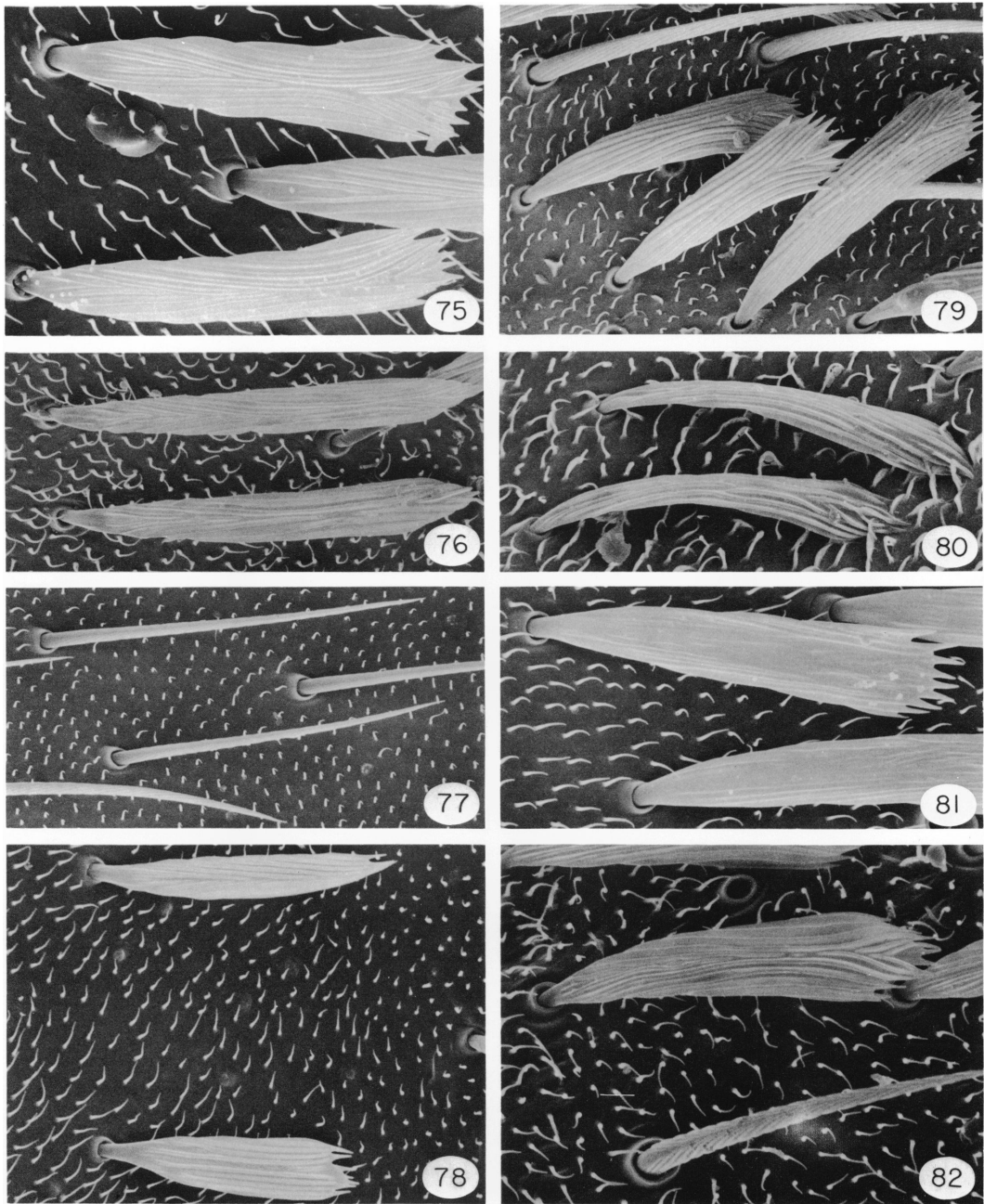
FIGS. 51–58 Sericeous setae. 51. *Atractotomus magnicornis* Fallen. 52. *Europiella stigmosa* (Uhler). 53. *Psallus ancorifer* (Fieber). 54. *Pseudatomoscelis seriatus* (Reuter). 55. *Lepidopsallus californicus* Knight. 56. *Lepidopsallus rubidus* (Uhler). 57. *Campylomma verbasce*. 58. *Microphylidea prosopidis*.



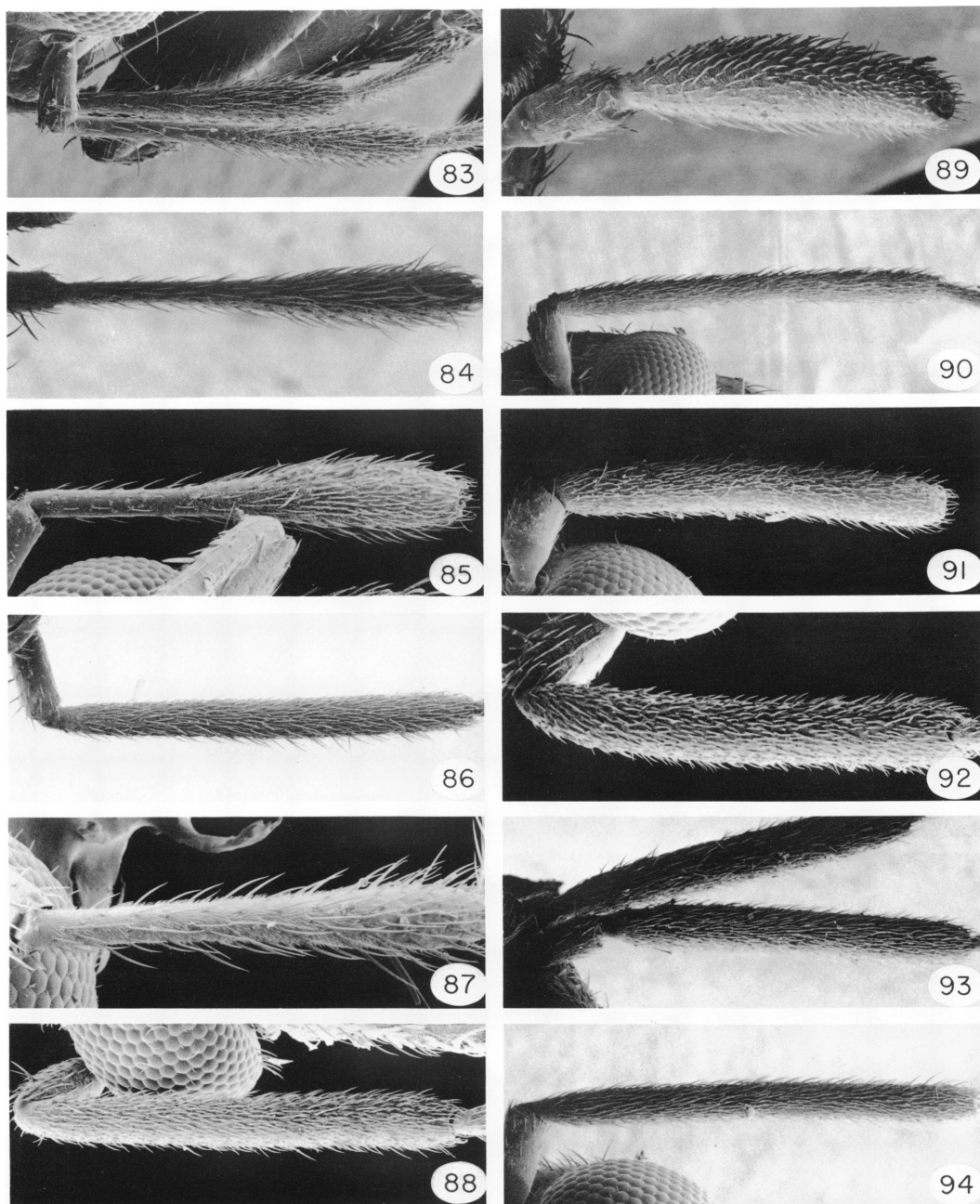
FIGS. 59–66 Sericeous setae. 59. *Rhinacloa antennalis*. 60. *Rhinacloa apicalis*. 61. *Rhinacloa maiuscula*. 62. *Rhinacloa mysteriosus*. 63. *Rhinacloa basalis*. 64. *Rhinacloa clavicornis*, corium. 65. *Rhinacloa clavicornis*, vein of membrane. 66. *Rhinacloa luridipennis*.



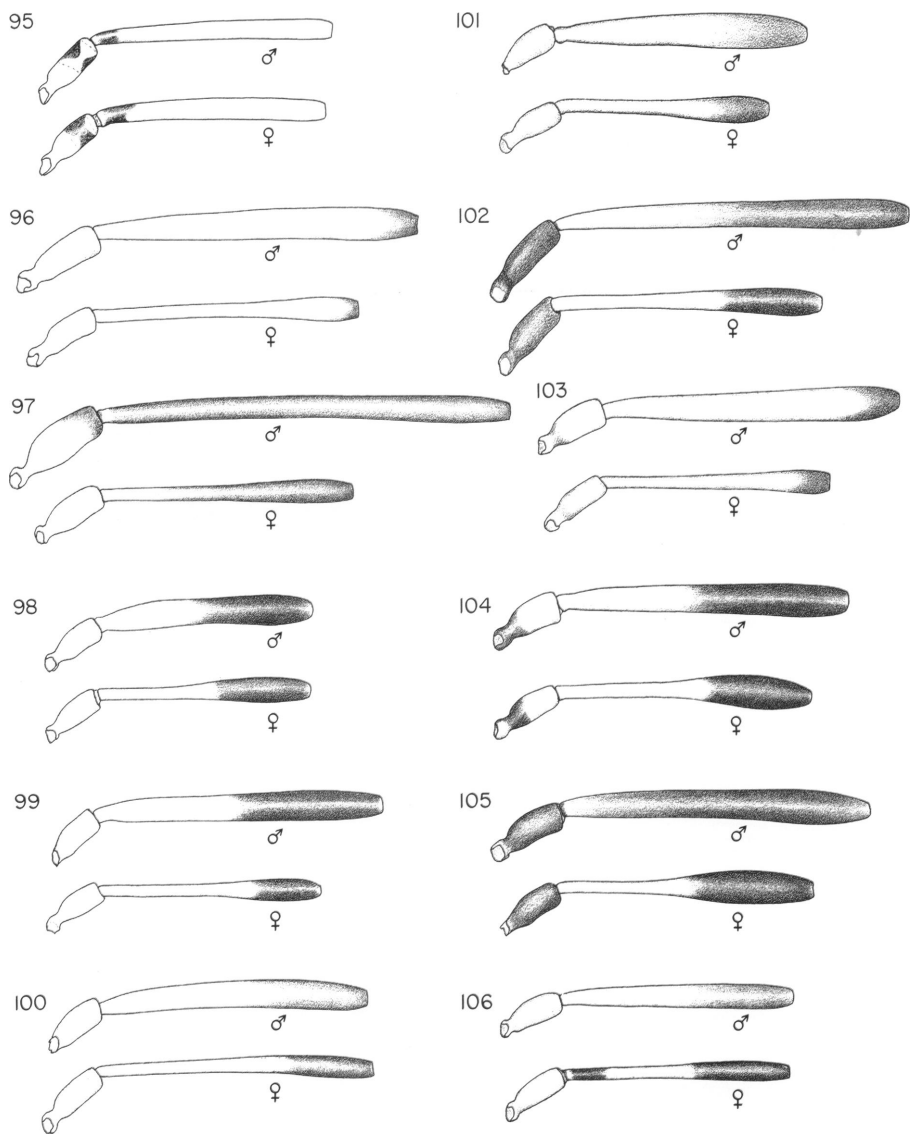
FIGS. 67–74 Sericeous setae. 67. *Rhinacloa nigripennis*. 68. *Rhinacloa pallidipes*, general view of prothoracic pleuron. 69. *Rhinacloa pallidipes*, detail of velvety black patch on prothoracic pleuron. 70. *Rhinacloa pallidipes*. 71. *Rhinacloa aricana*. 72. *Rhinacloa azapa*. 73. *Rhinacloa callicrates*. 74. *Rhinacloa cardini*.



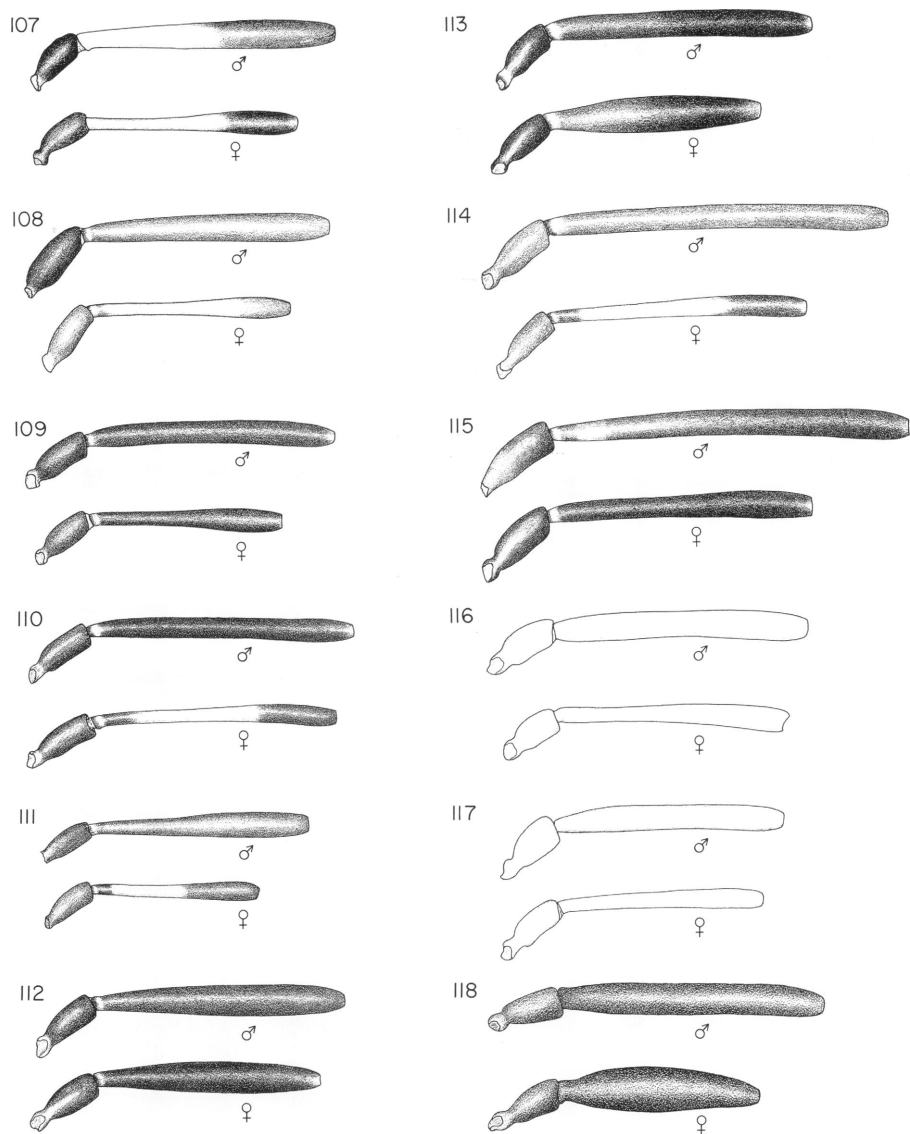
FIGS. 75–82 Sericeous setae. 75. *Rhinacloa forticornis*. 76. *Rhinacloa juli*. 77. *Rhinacloa manleyi*, hemelytron. 78. *Rhinacloa penai*. 79 *Rhinacloa manleyi*, propleuron. 80. *Rhinacloa peruana*. 81. *Rhinacloa puertoricensis*. 82. *Rhinacloa rubroornata*.



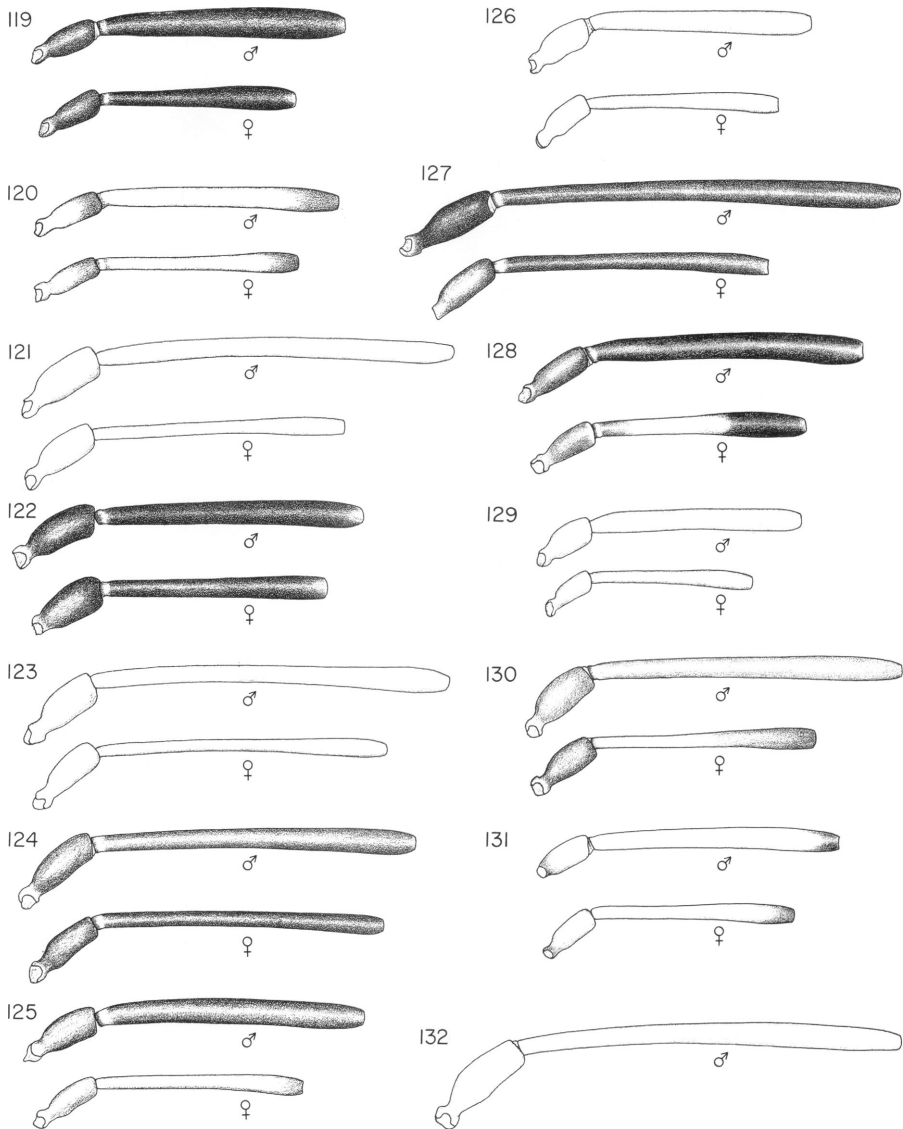
FIGS. 83–94 Antennae. 83. *Rhinacloa antennalis*, ♂. 84. *Rhinacloa maiuscula*, ♀. 85. *Rhinacloa mysteriosus*, ♀. 86. *Rhinacloa basalis*, ♂. 87. *Rhinacloa nigripennis*, ♀. 88. *Rhinacloa pallidipes*, ♂. 89. *Rhinacloa aricana*, ♀. 90. *Rhinacloa azapa*, ♂. 94. *Rhinacloa callicrates*, ♂. 92. *Rhinacloa cardini*, ♂. 93. *Rhinacloa forticornis*, ♂. 91. *Rhinacloa manleyi*, ♂.



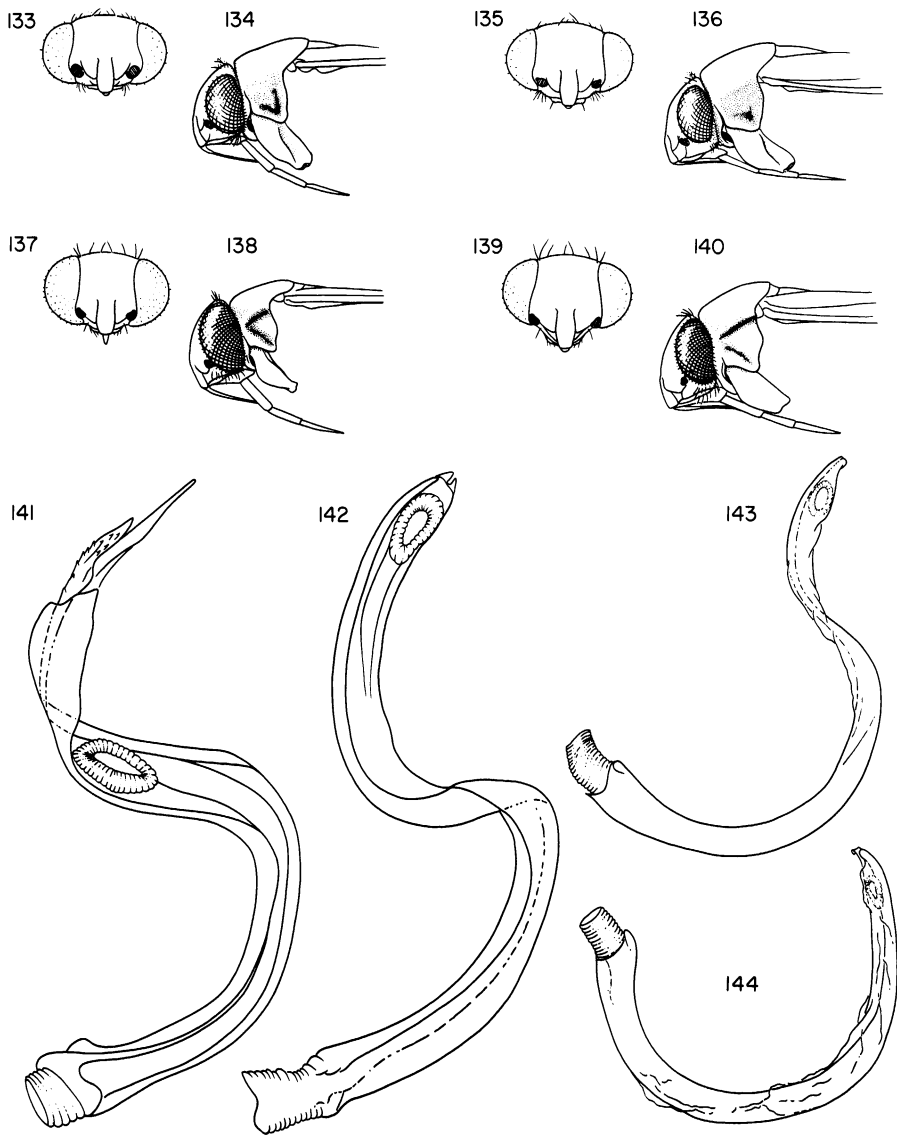
FIGS. 95–106 Antennae. 95. *Campylomma verbasci*. 96. *Microphylidea prosopidis*. 97. *Nigrimiris pallipes* Carvalho and Schaffner. 98. *Rhinacloa antennalis*. 99. *Rhinacloa apicalis*. 100. *Rhinacloa belisima*. 101. *Rhinacloa carvalhoi*. 102. *Rhinacloa chapini*. 103. *Rhinacloa fernandoana*. 104. *Rhinacloa maiuscula*. 105. *Rhinacloa mysteriosus*. 106. *Rhinacloa basalis*.



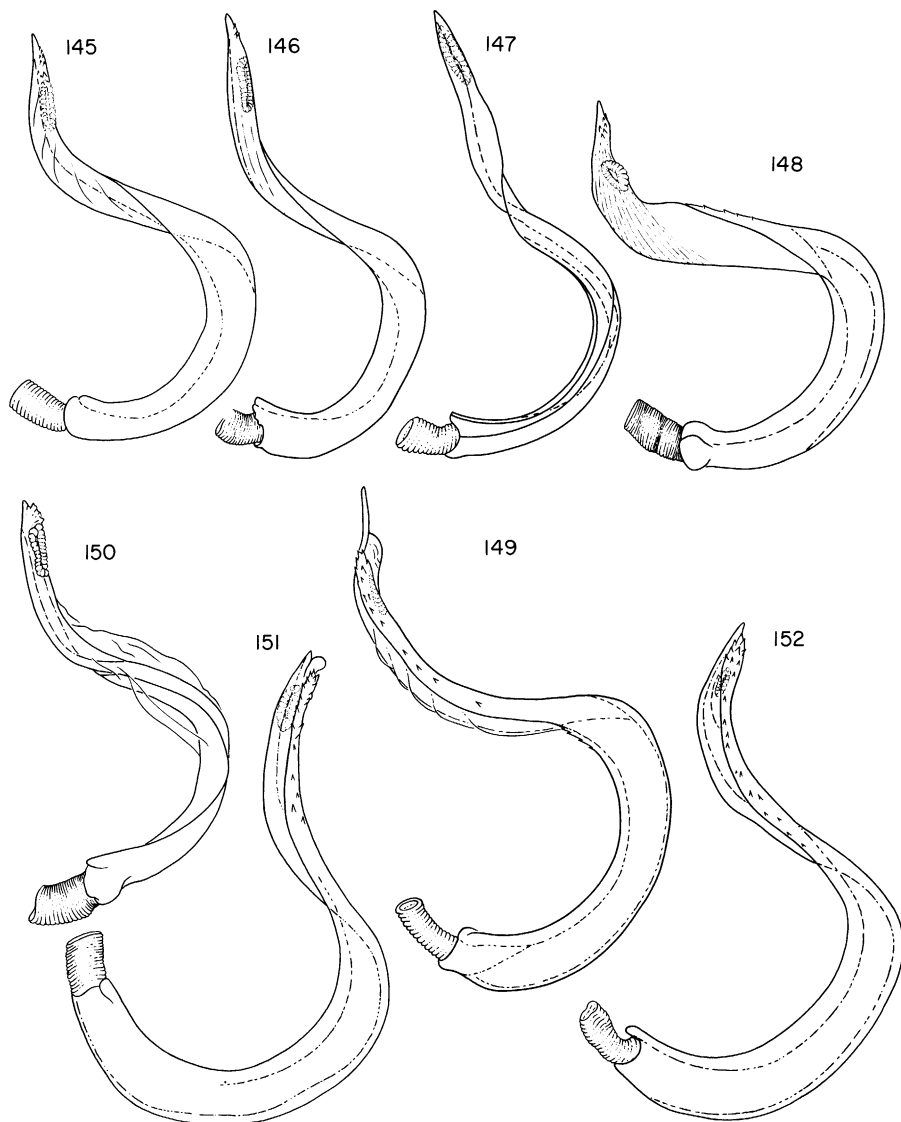
FIGS. 107-118 Antennae. 107. *Rhinacloa clavicornis*. 108. *Rhinacloa luridipennis*. 109. *Rhinacloa pallidipes*. 110. *Rhinacloa pallidipennis*. 111. *Rhinacloa nigripennis*. 112. *Rhinacloa schaffneri*. 113. *Rhinacloa aricana*. 114. *Rhinacloa azapa*. 115. *Rhinacloa betanzos*. 116. *Rhinacloa callicrates*. 117. *Rhinacloa cardini*. 118. *Rhinacloa crassitoma*.



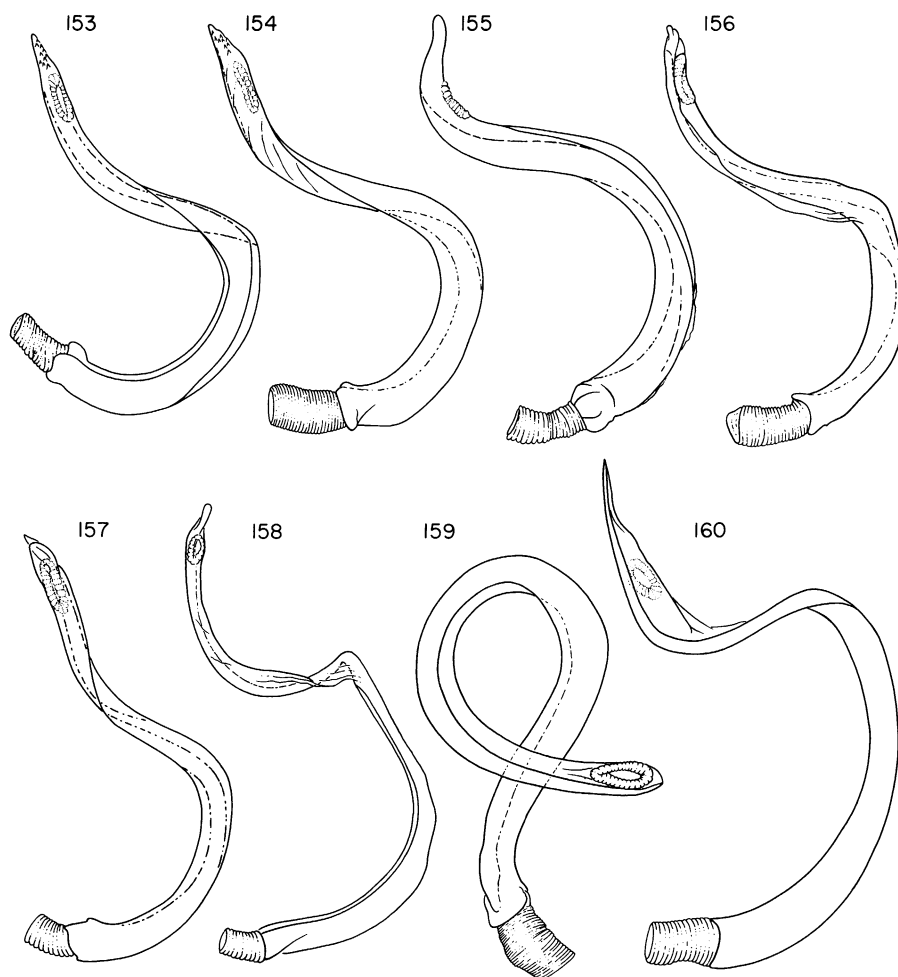
FIGS. 119–132 Antennae. 119. *Rhinacloa forticornis*. 120. *Rhinacloa* nr. *forticornis*, from Brazil, Bahia, Encruzilhada. 121. *Rhinacloa insularis*. 122. *Rhinacloa juli*. 123. *Rhinacloa longirostris*. 124. *Rhinacloa manleyi*. 125. *Rhinacloa mella*. 126. *Rhinacloa mesoamericana*. 127. *Rhinacloa peruana*. 128. *Rhinacloa penai*. 129. *Rhinacloa puertoricensis*. 130. *Rhinacloa rubescens*. 131. *Rhinacloa rubroornata*. 132. *Rhinacloa usingeri*.



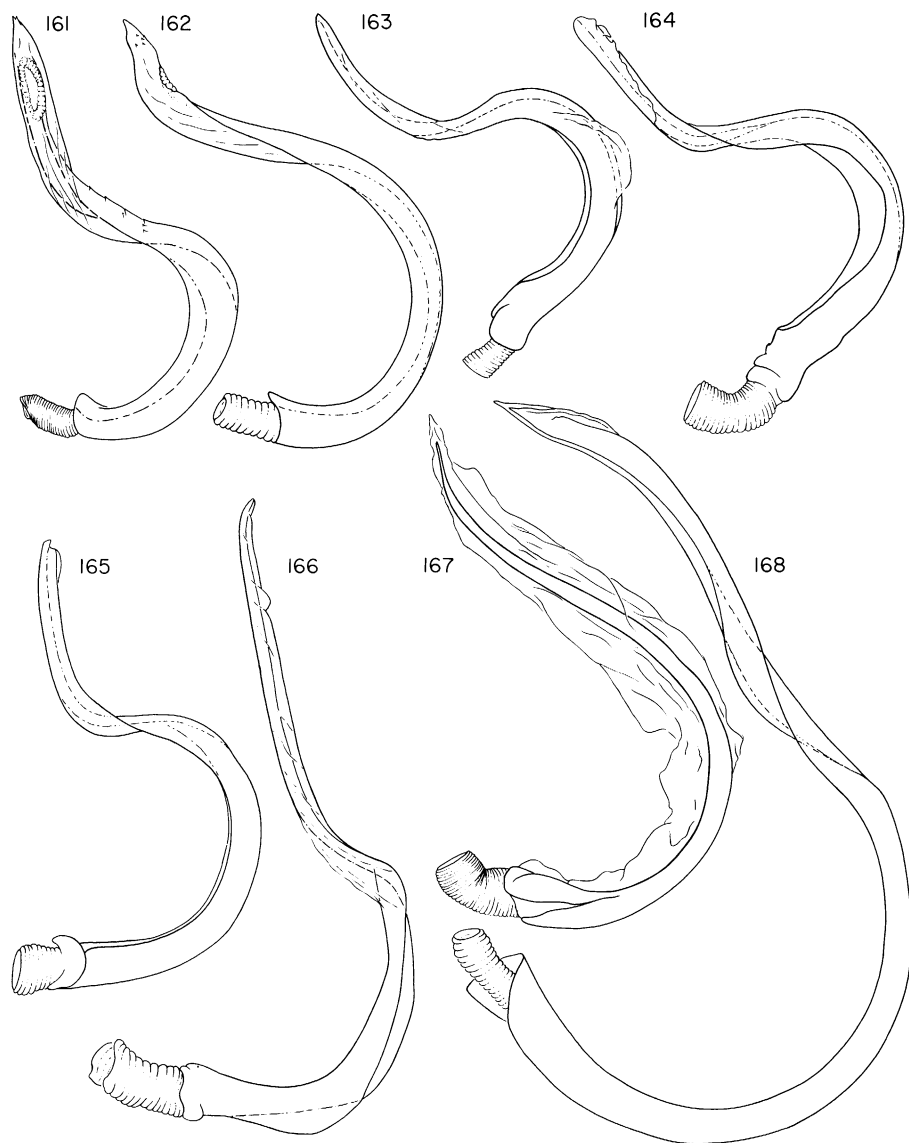
FIGS. 133-144 Head structure. 133-136. *Rhinacloa mella*. 133. Front view, ♂. 134. Lateral view, ♂. 135. Front view, ♀. 136. Lateral view, ♀. 137. Front view, ♂. 138. Lateral view, ♂. 139. Front view, ♀. 140. Lateral view, ♀. Vesicae. 141. *Campylomma verbasci*. 142. *Microphylidea prosopidis*. 143. Species from Argentina near *Nigrimiris pallipes*. 144. *Nigrimiris pallipes*.



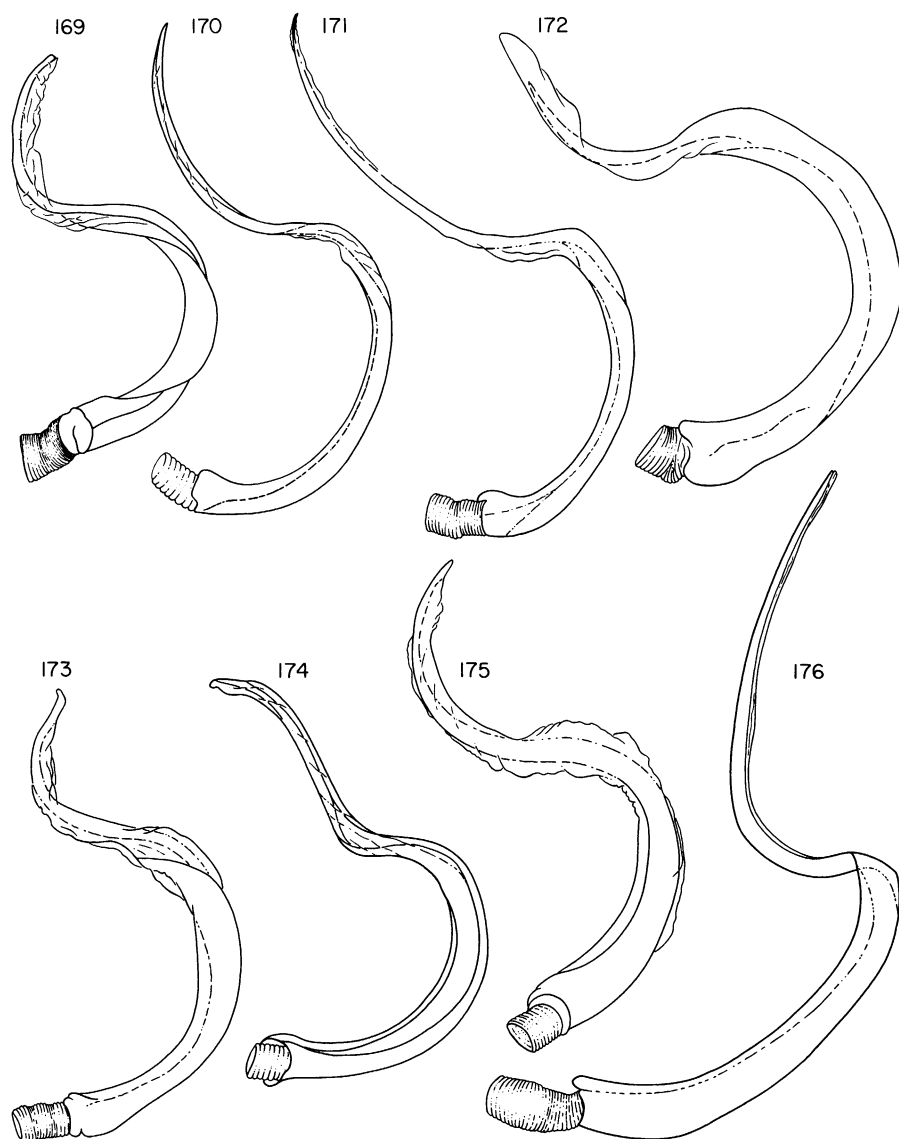
FIGS. 145–152 Vesicae. 145. *Rhinacloa antennalis*. 146. *Rhinacloa apicalis*. 147. *Rhinacloa bellisima*. 148. *Rhinacloa carvalhoi*. 149. *Rhinacloa chapini*. 150. *Rhinacloa fernandoana*. 151. *Rhinacloa maiuscula*. 152. *Rhinacloa mysteriosus*.



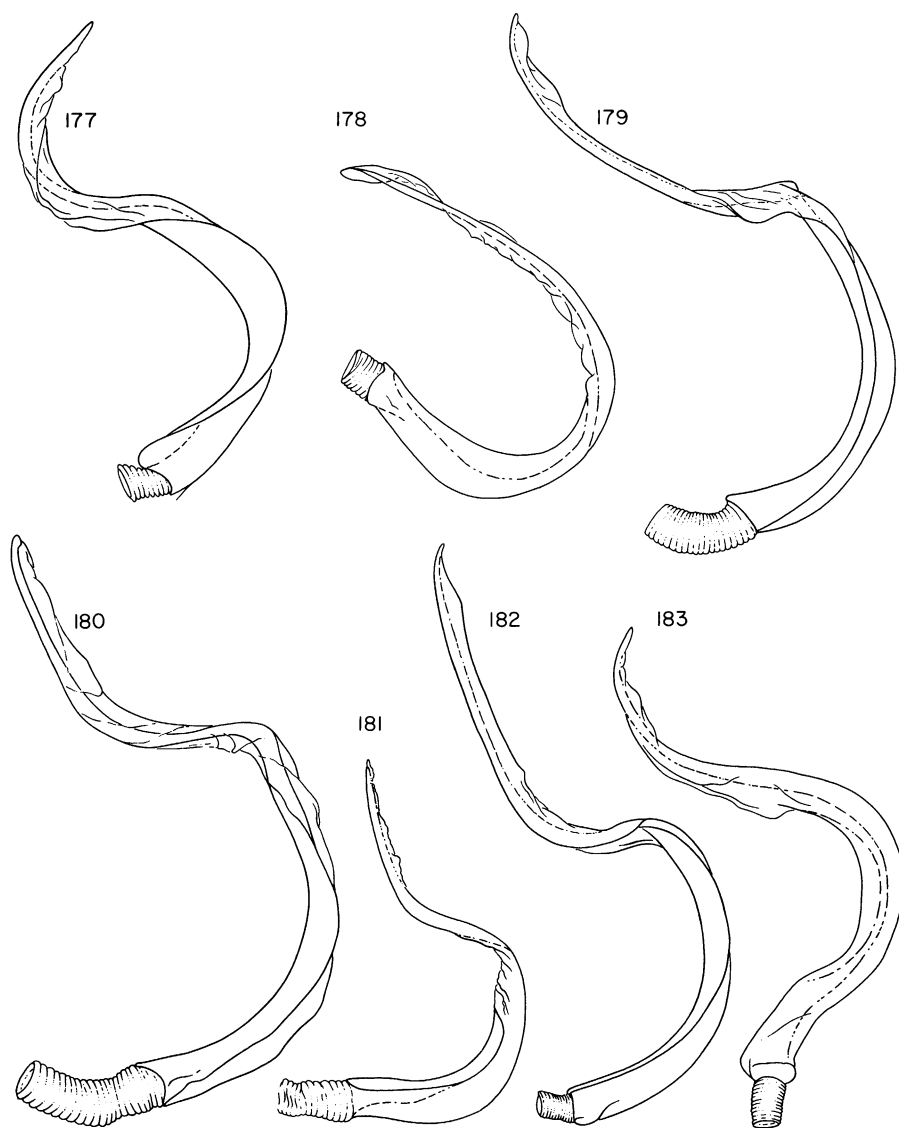
FIGS. 153–160 Vesicae. 153. *Rhinacloa basalis*. 154. *Rhinacloa basalis*. 155. *Rhinacloa* prob. n. sp. near *basalis* from Brazil, Pará, Jacarecanga (JCMC). 156. *Rhinacloa clavicornis*. 157. *Rhinacloa luridipennis*. 158. *Rhinacloa pallidipes*. 159. *Rhinacloa pallidipennis*. 160. *Rhinacloa nigripennis*.



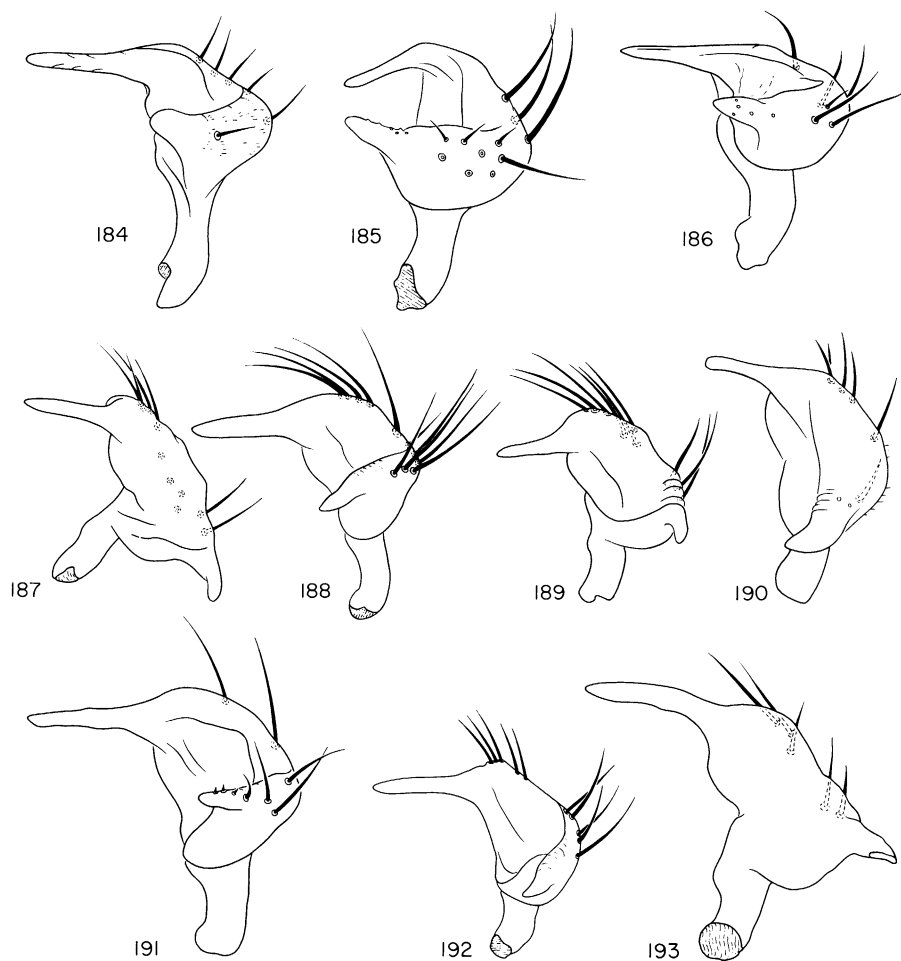
FIGS. 161–168 Vesicae. 161. *Rhinacloa nigripes*. 162. *Rhinacloa schaffneri*. 163. *Rhinacloa aricana*. 164. *Rhinacloa azapa*. 165. *Rhinacloa betanzos*. 166. *Rhinacloa callicrates*. 167. *Rhinacloa cardini*, Brazil, Bahia, Encruzilhada. 168. *Rhinacloa cardini*.



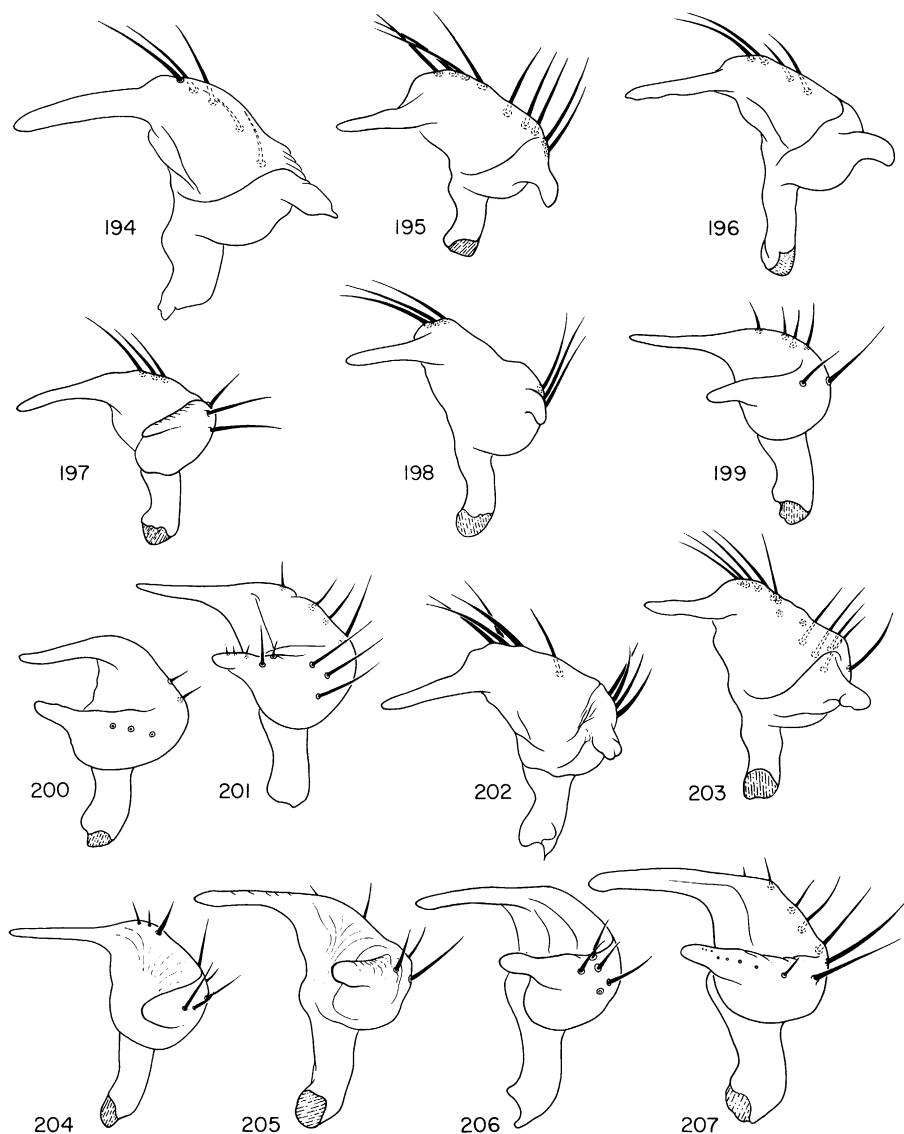
FIGS. 169-176 Vesicae. 169. *Rhinacloa carssitonus*. 170. *Rhinacloa forticornis*. 171. *Rhinacloa* nr. *forticornis*, Brazil, Bahia, Encruzilhada. 172. *Rhinacloa incaicus*. 173. *Rhinacloa insularis*. 174. *Rhinacloa juli*. 175. *Rhinacloa longirostris*. 176. *Rhinacloa manleyi*.



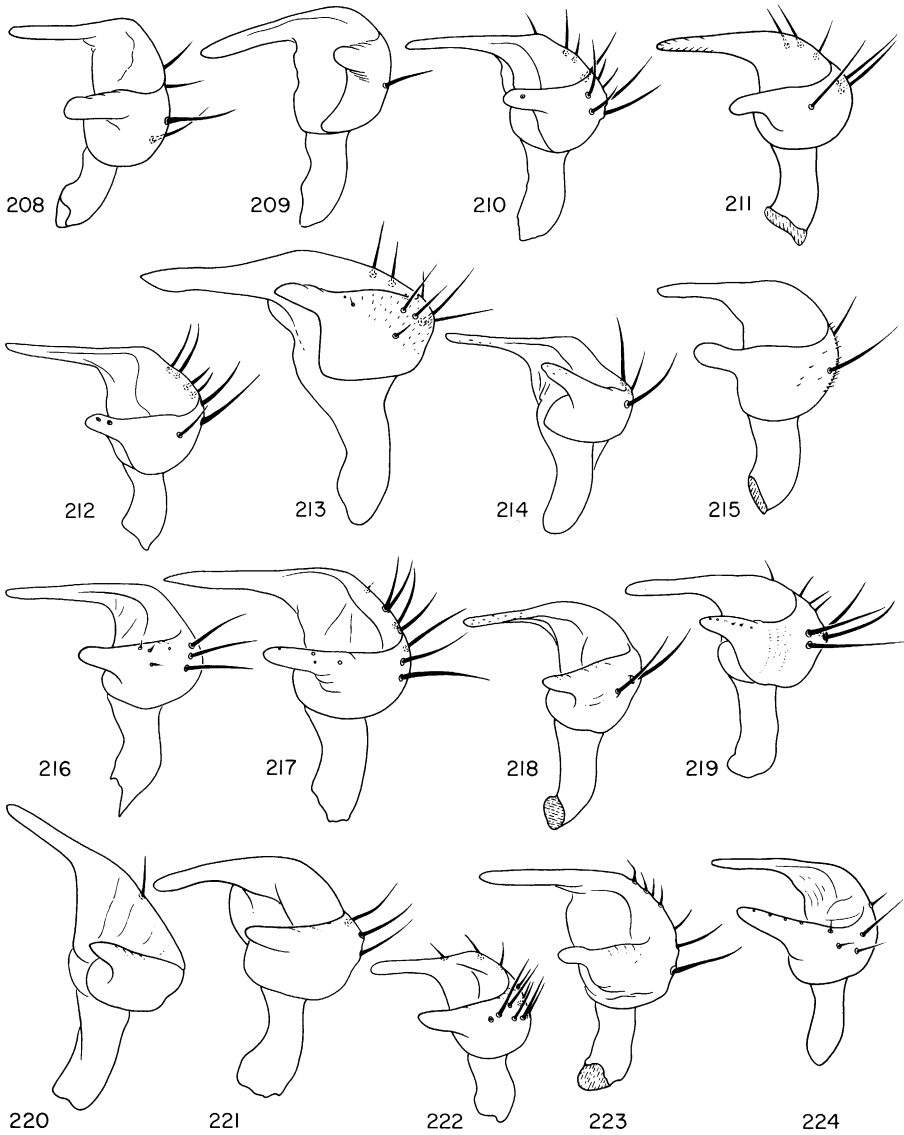
FIGS. 177–183 Vesicae. 177. *Rhinacloa mella*. 178. *Rhinacloa mesoamericana*. 179. *Rhinacloa penai*. 180. *Rhinacloa peruana*. 181. *Rhinacloa puertoricensis*. 182. *Rhinacloa rubroornata*. 183. *Rhinacloa usingeri*.



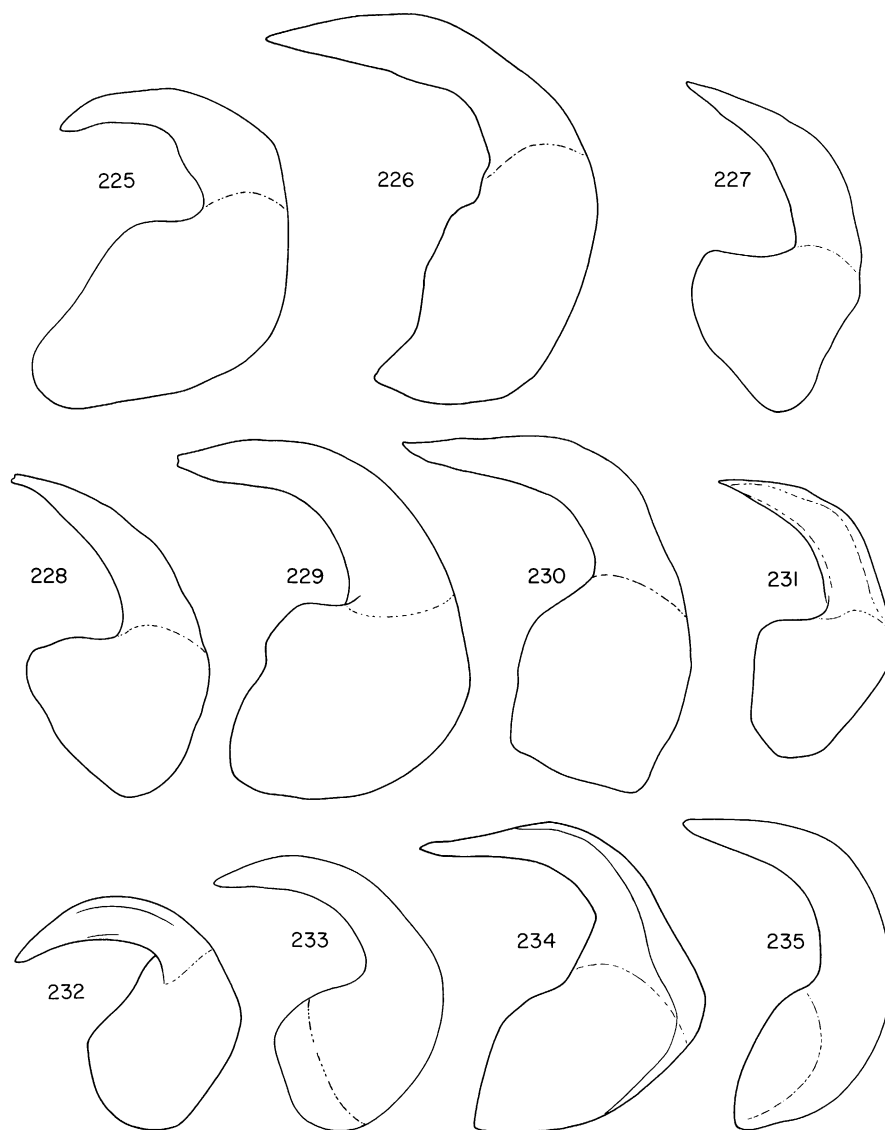
FIGS. 184–193 Left parameres. 184. *Campylomma verbasci*. 185. *Microphylidea prosopidis*. 186. *Nigrimiris pallipes*. 187. *Rhinacloa antennalis*. 188. *Rhinacloa apicalis*. 189. *Rhinacloa bellissima*. 190. *Rhinacloa carvalhoi*. 191. *Rhinacloa chapini*. 192. *Rhinacloa fernandoana*. 193. *Rhinacloa maiuscula*.



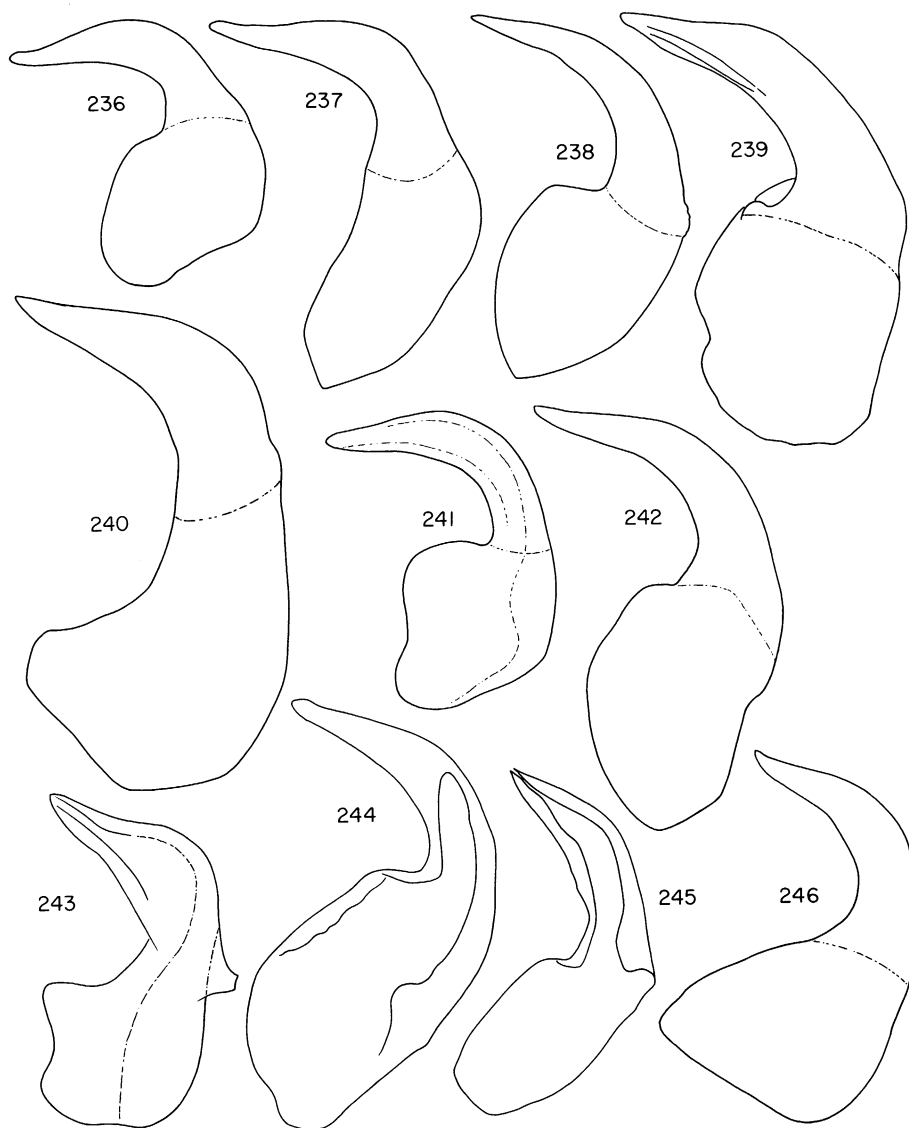
FIGS. 194–207 Left parameres. 194. *Rhinacloa mysteriosus*. 195. *Rhinacloa basalis*. 196. *Rhinacloa* prob. n. sp. near *basalis* from Brazil, Pará, Jacarecanga (JCMC). 197. *Rhinacloa clavicornis*. 198. *Rhinacloa luridipennis*. 199. *Rhinacloa pallidipes*. 200. *Rhinacloa pallidipennis*. 201. *Rhinacloa nigripennis*. 202. *Rhinacloa nigripes*. 203. *Rhinacloa schaffneri*. 204. *Rhinacloa aricana*. 205. *Rhinacloa azapa*. 206. *Rhinacloa betanzos*. 207. *Rhinacloa callicrates*.



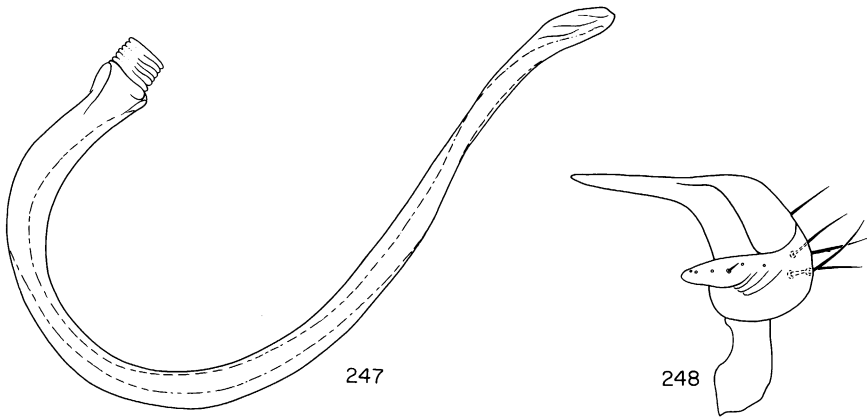
FIGS. 208-224 Left Parameres. 208. *Rhinacloa cardini*. 209. *Rhinacloa cardini*, Brazil, Bahia, Encruzilhada. 210. *Rhinacloa carssitomus*. 211. *Rhinacloa forticornis*. 212. *Rhinacloa* nr. *forticornis*, Brazil, Bahia, Encruzilhada. 213. *Rhinacloa incaicus*. 214. *Rhinacloa insularis*. 215. *Rhinacloa juli*. 216. *Rhinacloa longirostris*. 217. *Rhinacloa manleyi*. 218. *Rhinacloa mella*. 219. *Rhinacloa mesoamericana*. 220. *Rhinacloa penai*. 221. *Rhinacloa peruana*. 222. *Rhinacloa puertoricensis*. 223. *Rhinacloa rubroornata*. 224. *Rhinacloa usingeri*.



FIGS. 225–235 Phallothecae. 225. *Campylomma verbasci*. 226. *Microphylidea prosopidis*. 227. *Rhinacloa antennalis*. 228. *Rhinacloa apicalis*. 229. *Rhinacloa chapini*. 230. *Rhinacloa maiuscula*. 231. *Rhinacloa basalis*. 232. *Rhinacloa clavicornis*. 233. *Rhinacloa luridipennis*. 234. *Rhinacloa pallidipes*. 235. *Rhinacloa pallidipennis*.



FIGS. 236–246 Phallothecae. 236. *Rhinacloa aricana*. 237. *Rhinacloa azapa*. 238. *Rhinacloa betanzos*. 239. *Rhinacloa callicrates*. 240. *Rhinacloa cardini*. 241. *Rhinacloa forticornis*. 242. *Rhinacloa juli*. 243. *Rhinacloa penai*. 244. *Rhinacloa peruana*. 245. *Rhinacloa puertoricensis*. 246. *Rhinacloa rubroornata*.



FIGS. 247–248 *Rhinacloa cajamarca*. 247. Vesica. 248. Left paramere.

PHYLOGENETIC ANALYSIS

In a continuing effort to elucidate the interrelationships of the Phylinae, we have prepared the following species-level phylogenetic analysis for *Rhinacloa*. The discussion of our phylogenetic work in effect picks up where our introductory discussion of generic-level group-diagnostic characters leaves off.

Because this is the first species-level phylogenetic work done in the Phylinae and some of the first in the Miridae, we have taken a somewhat experimental approach, not only with respect to the characters used, but also for the analysis of the data.

In our search for information that would group species of *Rhinacloa* we assembled a list of characteristics, including among others, coloration of antennae, setal structure, genitalic structure, and pretarsal structures. Also, remembering that *Rhinacloa* and associated genera, including *Psallus* and *Campylomma* have often been diagnosed on the basis of morphometric characteristics, we assembled a list of morphometric attributes, to see to what degree they were congruent with morphology. Our analysis was performed using PHYSYS®, a cladistic computer package which allowed us to determine easily not only the exact solution to a somewhat messy problem, but also what characters showed least homoplasy.

Our initial analysis included a list of 40 characteristics. Disregarding autapomorphies, which were subsequently eliminated, we found that several characters were inconsistent with groupings formed by nearly all others. Among these were two dealing with antennal coloration, and four with morphometrics. The latter group included the following: (1) the ratio of the height of the eye to the total height of the head; (2) the ratio of the width of the vertex to the total width of the head; (3) the ratio of the width of the head to the greatest width of the pronotum; and (4) the ratio of the length of antennal segment two in males and females.

Among these morphometric characters, the first was an attempt to reflect in the form of repeatable measurements the idea of the genae being of a width less than the diameter of antennal segment one, or greater, the characteristic used by Carvalho to differentiate *Psallus* and *Rhinacloa*. We have shown that this head measurement conflicts with groupings based on setal and male genitalic structure, a problem that confounds the formation of consistent groupings not only of *Rhinacloa* but also *Psallus*. The other three morphometric attributes were simply attempts to discover new character information, but all were extremely homoplasious and appeared on the

TABLE 1
30 Character Data Set.

SEXUAL DIMORPHISM

1. 0(1)—hemelytra in males not greatly elongate, not significantly surpassing apex of abdomen
- 1(6)—hemeleytra in males very long, substantially surpassing apex of abdomen

ANTENNAL COLORATION

2. 0(1)—segment 1 unicolorous
- 1(3)—segment 1 not unicolorous
3. 0(6)—segment 2 unicolorous in males
- 1(2)—segment 2 not unicolorous in males
4. 0(2)—segment 2 in males if unicolorous then white
- 1(1)—segment 2 in males black
5. 0(1)—segment 2 in males black proximally and white distally
- 1(1)—segment 2 in males white proximally and black distally
6. 0(3)—segment 2 white in females
- 1(1)—segment 2 black in females
7. 0(1)—segment 2 in females black proximally and white distally
- 1(2)—segment 2 in females white proximally and black distally
- 2(2)—segment 2 in females black proximally and distally and white mesially

BODY SURFACE

8. 0(5)—dull
- 1(1)—weakly to rather strongly shining
9. 0(1)—propleuron without an intense black patch behind eye
- 1(1)—propleuron with an intense black patch behind eye, contrasting in color and texture with the remainder of the propleuron

VESTITURE

10. 0(1)—membrane without scale-like setae
- 1(2)—membrane with scale-like setae
11. 0(1)—sericeous flattened setae acuminate apically
- 1(1)—sericeous flattened setae broad apically
12. 0(1)—apically broad sericeous setae ornamented apically
- 1(1)—apically broad sericeous setae largely devoid of ornament apically (as in *cardini*)
13. 0(1)—row of metafemoral spicules regular, uninterrupted, occupying distal one half of dorsal surface of femur
- 1(2)—metafemoral spicules few in number, occupying only extreme distal one fourth of femur, forming a short irregular row

CLAW STRUCTURE

14. 0(1)—claw elongate slender, not noticeably broadened basally
 - 1(1)—claws sometimes elongate, but always distinctly broadened basally
-

TABLE 1—Continued)

15. 0(1)—claws, if broadened basally, smoothly curving on dorsal surface
- 1(1)—claws, if broadened basally, rather sharply bent subapically
16. 0(1)—puvlivilli flaplike and covering about one half of ventral claw surface
- 1(1)—puvilli not so distinctly flaplike, covering from about two thirds to nearly entire ventral claw surface

HEAD STRUCTURE

17. 0(1)—head concave behind, obscuring anterior margin of pronotum, posterolateral angles of eyes contiguous with pronotum
- 1(4)—head not distinctly concave behind, not obscuring anterior margin of pronotum, posterolateral angles of eyes slightly removed from pronotum

ANTENNAL STRUCTURE

18. 0(2)—length of segment 2 equal to or less than width of head in the male
- 1(5)—length of segment 2 greater than width of head in the male
19. 0(1)—segment 2 in females not terete
- 1(3)—segment 2 in females at least weakly terete
20. 0(2)—segment 2 in females cylindrical or nearly so
- 1(2)—segment 2 conspicuously clavate in females

LABIUM

21. 0(1)—labium reaching at most to apex of procoxae
- 1(1)—labium surpassing procoxae but not surpassing apex of metacoxae
- 2(3)—labium surpassing apex of metacoxae

MALE GENITALIA

22. 0(1)—secondary gonopore present
 - 1(1)—secondary gonopore absent
 23. 0(3)—vesica without spicules at apex
 - 1(1)—vesica with spicules at apex
 24. 0(1)—vesica without spicules on central portion of shaft and structure of vesical straps not as below
 - 1(1)—vesica with spicules on central portion of shaft and with structure of vesical straps as in *apicalis*
 25. 0(1)—vesica without blade-like straps apically
 - 1(1)—vesica with two blade-like straps apically
 26. 0(1)—apex of vesica not deflexed
 - 1(1)—apex of vesica deflexed (as in *clavicornis*)
 27. 0(1)—when secondary gonopore absent basal one half of vesica of forticornis type (3 dimensional)
 - 1(1)—when secondary gonopore absent entire vesica in a single plane more or less J-shaped (as in *cardini*)
 28. 0(1)—when secondary gonopore absent apical one half of vesica straight with a recurved tip
-

TABLE 1—(Continued)

1(3)—when secondary gonopore absent apical one half of vesica straight
2(1)—when secondary gonopore absent apical one half of vesica moderately to strongly curving
29. 0(1)—when secondary gonopore absent, apical one half of vesica short
1(4)—when secondary gonopore absent apical one half of vesica moderately long
2(1)—when secondary gonopore absent apical one half of vesica very long
30. 0(1)—left paramere not splayed-out and without heavy setae on dorsal posterior margin
1(2)—left paramere at least moderately splayed-out and with several heavy setae on dorsal posterior margin

tree several times. We have therefore eliminated these four morphometric characters from our final analyses, as well as two characters dealing with antennal coloration and one with sexual dimorphism. We believe that the characters of greatest phylogenetic interest are those that form the same groupings. We further believe that meaningful work with morphometric data in *Rhinacloa* should be conducted under careful statistical control, something that was not possible in the present case where we had only one or a few specimens available in several cases (*incaicus*, *nigripes*, *rubescens*, and *usingeri*). The one thing that seems clear from our work is that even as ratios, morphometric data in *Rhinacloa*, and at least some related taxa, are almost certainly going to be limited in their use in forming species level groupings within genera. This is true of many of the characters used in our analysis of *Rhinacloa*, but we note that of all the attributes selected for their ability to distinguish taxa, the morphometric data showed the most homoplasy. Of the two characters showing most homoplasy in our data one is morphometric, comparing the length of antennal segment two to the width of the head, the other deals with degree of hemelytral development.

The phylogenetic results we present are derived from two different but very similar data sets. The differences in the two data sets exists

TABLE 2
25 Character Data Set.

SEXUAL DIMORPHISM	
1.	0(1)—hemelytra in males not greatly elongate, not significantly surpassing apex of abdomen
1(6)	—hemeleytra in males very long, substantially surpassing apex of abdomen
ANTENNAL COLORATION	
2.	0(1)—segment 1 unicolorous
1(1)	—segment 1 not unicolorous
3.	0(1)—segment 2 in males black proximally and white distally
1(4)	—segment 2 in males white proximally and black distally
2(2)	—segment 2 in males black
3(2)	—segment 2 in males white
BODY SURFACE	
4.	0(6)—dull
1(1)	—weakly to rather strongly shining
5.	0(1)—propleuron without an intense black patch behind eye
1(1)	—propleuron with an intense black patch behind eye, contrasting in color and texture with the remainder of the propleuron
VESTITURE	
6.	0(1)—membrane without scale-like setae
1(2)	—membrane with scale-like setae
7.	0(1)—sericeous flattened setae acuminate apically
1(1)	—sericeous flattened setae broad apically and ornamented
2(1)	—sericeous flattened setae broad apically and unornamented
8.	0(1)—row of metafemoral spicules regular, uninterrupted, occupying distal one half of dorsal surface of femur
1(2)	—metafemoral spicules few in number, occupying only extreme distal one fourth of femur, forming a short irregular row
CLAW STRUCTURE	
9.	0(1)—claw elongate slender, not noticeably broadened basally
1(1)	—claws sometimes elongate, but always distinctly broadened basally
10.	0(1)—claws, if broadened basally, smoothly curving on dorsal surface
1(1)	—claws, if broadened basally, rather sharply bent subapically
11.	0(1)—puvlivlli flaplike and covering about one half of ventral claw surface
1(1)	—pulvilli not so distinctly flaplike, covering from about two thirds to nearly entire ventral claw surface
HEAD STRUCTURE	
12.	0(1)—head concave behind, obscuring anterior mar-

TABLE 2—(Continued)

- gin of pronotum, posterolateral angles of eyes contiguous with pronotum
- 1(4)—head not distinctly concave behind, not obscuring anterior margin of pronotum, posterolateral angles of eyes slightly removed from pronotum

ANTENNAL STRUCTURE

13. 0(2)—length of segment 2 equal to or less than width of head in the male
- 1(5)—length of segment 2 greater than width of head in the male
14. 0(1)—segment 2 in females not terete
- 1(3)—segment 2 in females at least weakly terete
15. 0(2)—segment 2 in females cylindrical or nearly so
- 1(2)—segment 2 conspicuously clavate in females

LABIUM

16. 0(1)—labium reaching at most to apex of procoxae
- 1(1)—labium surpassing procoxae but not surpassing apex of metacoxae
- 2(3)—labium surpassing apex of metacoxae

MALE GENITALIA

17. 0(1)—secondary gonopore present
- 1(1)—secondary gonopore absent
18. 0(2)—vesica without spicules at apex
- 1(1)—vesica with spicules at apex
19. 0(1)—vesica without spicules on central portion of shaft and structure of vesical straps not as below
- 1(1)—vesica with spicules on central portion of shaft and with structure of vesical straps as in *apicalis*
20. 0(1)—vesica without blade-like straps apically
- 1(1)—vesica with two blade-like straps apically
21. 0(1)—apex of vesica not deflexed
- 1(1)—apex of vesica deflexed (as in *clavicornis*)
22. 0(1)—when secondary gonopore absent basal one half of vesica of forticornis type (3 dimensional)
- 1(1)—when secondary gonopore absent entire vesica in a single plane more or less J-shaped (as in *cardini*)
23. 0(1)—when secondary gonopore absent apical one half of vesica straight with a recurved tip
- 1(1)—when secondary gonopore absent apical one half of vesica straight
- 2(4)—when secondary gonopore absent apical one half of vesica moderately to strongly curving
24. 0(1)—when secondary gonopore absent, apical one half of vesica short
- 1(3)—when secondary gonopore absent apical one half of vesica moderately long
- 2(2)—when secondary gonopore absent apical one half of vesica very long

TABLE 2—(Continued)

25. 0(1)—left paramere not splayed-out and without heavy setae on dorsal posterior margin
- 1(1)—left paramere at least moderately splayed-out and with several heavy setae on dorsal posterior margin

in the recoding of characters dealing with antennal coloration and type of vestiture; coding for all other characters remains the same. Descriptions of the data are presented in tables 1 and 2; the number in parentheses after the character state indicates the number of origins on the cladograms. Character distributions are presented in tables 3 and 4; conditions represented as "8" in tables 3 and 4 represent "no codes."

Analysis of these data revealed that there was not a single minimal length solution for either matrix but rather multiple solutions. We have therefore presented the solutions for the two data sets analyzed in the form of Adams consensus trees (Adams, 1972) which represent the information in common for all minimum-length trees, although consensus trees are usually one or two steps longer for a given data set than is any one of the minimum-length trees.

The Adams consensus for the data sets in tables 1 and 3 are given in figure 249 and for tables 2 and 4 in figure 250. It is clear that the two results are very similar, recognizing most of the same monophyletic groups in common. We have designated components in the following discussion by lettering the nodes on the cladograms. The new species *cajamarca* does not appear in our analysis because we only received specimens of it after the remainder of the paper was finished. Its placement in the cladogram will obviously be at component N.

Component A. We have called this the *basalis* group, and recognized it for purposes of organizing the paper. The grouping was seldom recognized in this form in our phylogenetic analysis, a result that speaks clearly of the numerous character conflicts within the group as recognized in figure 250, where it is defined by the heavy setae on the dorsal

TABLE 3
30 Character Matrix Processed by PHYSYS®.

123456789012345678901234567890
0018181100100100000011010008881 <i>antennalis</i>
001818110010010000001010008881 <i>apicalis</i>
100181810010011101181100000100 <i>aricana</i>
000188210010011101002100000100 <i>azapa</i>
001818210010010000001010008881 <i>basalis</i>
001818110110010001001000018881 <i>bellissima</i>
100181800010011101001100000100 <i>betanzos</i>
000080810011011100000100000120 <i>callicrates</i>
000080810011011111000100001120 <i>cardini</i>
001818110010010000011011008881 <i>carvalhoi</i>
101818110110010001001001008881 <i>chapini</i>
001818110110010000011000018881 <i>clavicornis</i>
000181800010011100101100000210 <i>crassitoma</i>
000180810010010000001000008881 <i>fernandoana</i>
000181810010011100001100000220 <i>forticornis</i>
000181800010011111001100000100 <i>incaicus</i>
000080810010011101001100000210 <i>insularis</i>
100181800010011101001100000010 <i>juli</i>
000080810010011101002100000210 <i>longirostris</i>
000188110110010000001000018881 <i>luridipennis</i>
0118181100100100001011001008881 <i>maiuscula</i>
000181810010011101001100000120 <i>manleyi</i>
000188210010011101001100000220 <i>mella</i>
000080810011011100000100001110 <i>mesoamericana</i>
001818110010010001011001008881 <i>mysteriosus</i>
100188210010011100001000008880 <i>nigripennis</i>
000181810018010001002001008881 <i>nigripes</i>
000188211010010001001000008880 <i>pallidipennis</i>
000181801010010001001000008880 <i>pallidipes</i>
000188200010011100001100000120 <i>penai</i>
100181800010011101001100000110 <i>peruana</i>
000080810011011100000100000120 <i>puertoricensis</i>
000188810010011101001100000220 <i>rubescens</i>
001818110010011101001100000120 <i>rubroornata</i>
000181810010010000101010008881 <i>schaffneri</i>
100088800010011111881100000220 <i>usingeri</i>
011808010008000000001000108880 <i>Campylomma</i> <i>verbasci</i>
101818110010100010001000008880 <i>Microphylidea</i> <i>prosopidis</i>
010188110088100000001000008880 <i>Nigrimiris</i> <i>palipes</i>

margin of the posterior process of the left paramere.

Component B. Always defined by the apically deflexed vesica and the scales on the membrane, the latter character also occurring in *chapini*; in the 30 character analysis also defined by the splayed-out left paramere with heavy setae on the dorsal posterior margin.

TABLE 4
25 Character Matrix Processed by PHYSYS®.

1234567890123456789012345
00110010100000011010008881 <i>antennalis</i>
0011001010000001010008881 <i>apicalis</i>
1021001011101181100000100 <i>aricana</i>
0021001011101002100000100 <i>azapa</i>
0011001010000001010008881 <i>basalis</i>
0011011010001001000018881 <i>bellissima</i>
1020001011101001100000100 <i>betanzos</i>
0031002011100000100000120 <i>callicrates</i>
0031002011111000100001120 <i>cardini</i>
0011001010000011011008881 <i>carvalhoi</i>
1011011010001001001008881 <i>chapini</i>
0011011010000011000018881 <i>clavicornis</i>
0020001011100101100000210 <i>crassitoma</i>
0021001010000001000008881 <i>fernandoana</i>
0021001011100001100000220 <i>forticornis</i>
0020001011111001100000100 <i>incaicus</i>
0031001011101001100000210 <i>insularis</i>
1020001011101001100000010 <i>juli</i>
0031001011101002100000210 <i>longirostris</i>
0021011010000001000018881 <i>luridipennis</i>
0111001010001011001008881 <i>maiuscula</i>
0021001011101001100000120 <i>manleyi</i>
0021001011101001100000220 <i>mella</i>
0031002011100000100001110 <i>mesoamericana</i>
0011001010001011001008881 <i>mysteriosus</i>
1021001011100001000008880 <i>nigripennis</i>
0021001010001002001008881 <i>nigripes</i>
0021101010001001000008880 <i>pallidipennis</i>
0020101010001001000008880 <i>pallidipes</i>
0020001011100001100000120 <i>penai</i>
1020001011101001100000110 <i>peruana</i>
0031002011100000100000120 <i>puertoricensis</i>
0021001011101001100000220 <i>rubescens</i>
0011001011101001100000120 <i>rubroornata</i>
0021001010000101010008881 <i>schaffneri</i>
1030001011111881100000220 <i>usingeri</i>
0101000000000001000108880 <i>Campylomma</i> <i>verbasci</i>
1011001100010001000008880 <i>Microphylidea</i> <i>prosopidis</i>
0121008100000001000008880 <i>Nigrimiris</i> <i>pallipes</i>

Component C. Defined by the clavate second antennal segment in the females (see also component F).

Component D. Defined by the presence of spicules mesially on the vesical shaft.

Component E. Defined by two characters which are variable within *Rhinacloa*, the second antennal segment being longer than the width of the head and the vesica lacking spicules apically.

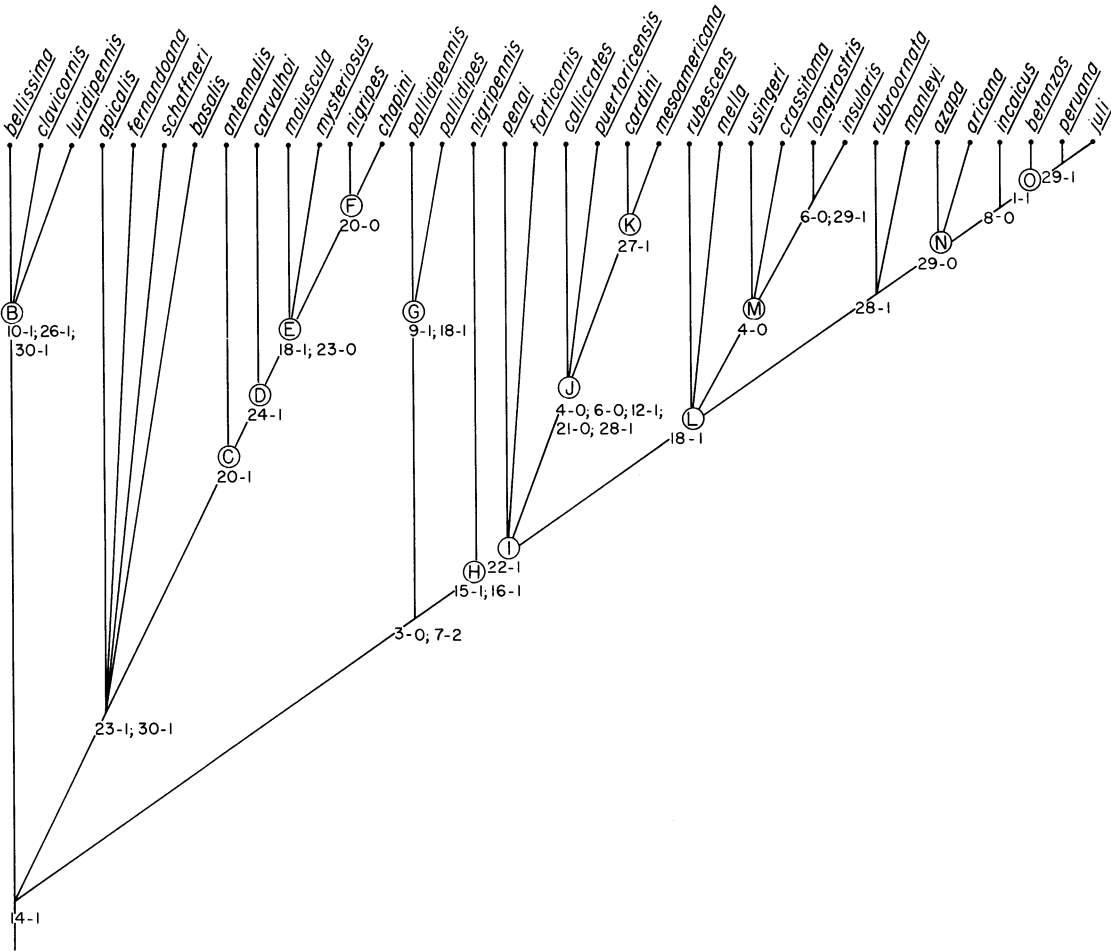


FIG. 249 Cladogram of *Rhinacloa* spp. based on analysis of 30-character data set. Numbers are characters followed by character states.

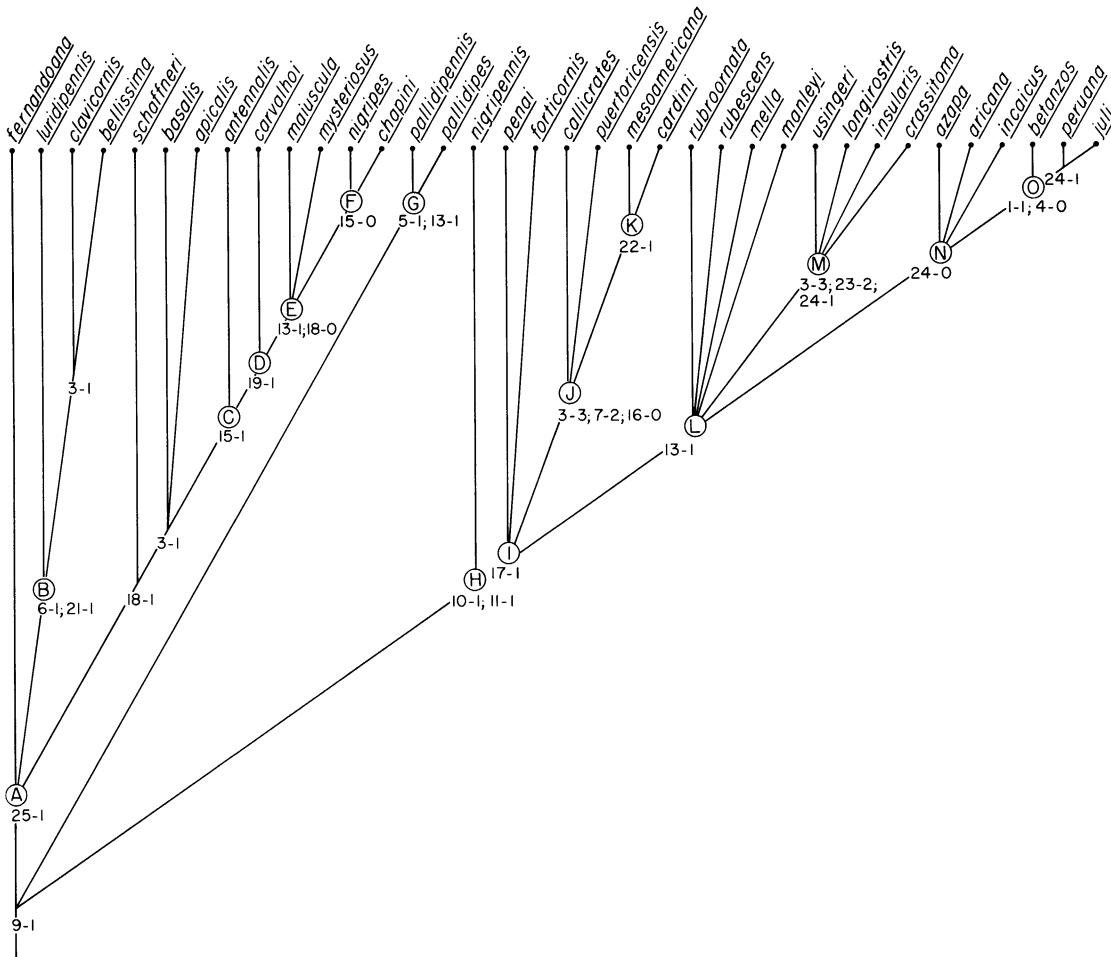


FIG. 250 Cladogram of *Rhinacloa* spp. based on analysis of 25-character data set. Key to corresponding characters in 30 character analysis (CA) and 25 (CA): 1 = 1; 2 = 2; 3 absent in 25 (CA); 4,5 = 3 (recoded); 6,7 absent in 25 (CA); 8 = 4; 9 = 5; 10 = 6; 11,12 = 7 (recoded); 13 = 8; 14 = 9; 15 = 10; 16 = 11; 17 = 12; 18 = 13; 19 = 14; 20 = 15; 21 = 16; 22 = 17; 23 = 18; 24 = 19; 25 = 20; 26 = 21; 27 = 22; 28 = 23; 29 = 24; 30 = 25.

Component F. Defined by the more or less cylindrical second antennal segment in the females.

Component G. The *pallidipes* group. Defined by the intense black patch on the propleuron and the somewhat variable attribute of antennal segment two being longer than the width of the head.

Component H. We refer to this as the *forticornis* group in the Systematics section of the paper. Defined by the more or less straight claws which are sharply bent apically and the large pulvilli covering most of the ventral claw surface.

Component I. Defined by the absence of the secondary gonopore.

Component J. Defined by the white antennae in the male, the unornamented scale-like setae, the short labrum reaching only to the apex of the procoxae, and the nearly straight apical section of the vesica; also defined in the 30 character analysis by the white second antennal segment in the female and the apical half of the vesica straight.

Component K. Defined by the distinctive shape of the vesica, found only in *cardini* and *mesoamericana*.

Component L. Defined by the variable character of the second antennal segment being longer than the width of the head.

Component M. Defined by the somewhat variable character of the second antennal segment being white in the male (a character which is reversed in *crassitoma*); also for the 30 character analysis by the moderately to strongly curving and moderately long apex of the vesica.

Component N. Defined by the short apex of the vesica.

Component O. Defined by the dull dorsal surface; also for the 25 character analysis by the elongate hemelytra in the males.

Those characters which show no homoplasy in 30 character analysis are 5, 9, 11, 12, 14, 15, 16, 22, 24, 25, 26, and 27.

Those characters which show no homoplasy in 25 character analysis are 5, 7, 9, 10, 11, 17, 19, 20, 21, 22, 25.

DISTRIBUTIONAL DISCUSSION

Distributions for the 37 species of *Rhinacloa* we recognize are presented in figures 251–258. To the degree possible this information is arranged so that monophyletic groups are placed on a single map.

One obvious attribute of the distributions is that many species are widespread. The species *basalis*, *clavicornis*, *forticornis*, and *pallidipes* all occur over the entire range of the genus, excluding the Galapagos Islands. Other species, such as *antennalis* and *mysteriosus*, occur widely in lowland tropical localities from Mexico to southern Brazil, but are absent in the West Indies.

Several areas of endemism seem to exist for *Rhinacloa*, each possessing a number of species. These areas include: Central Mexico, the Andes of Ecuador, Peru, Bolivia and northern Chile, and the Galapagos Islands.

Single species also appear to be endemic to the Sonoran Desert, Central America, Hispaniola, Puerto Rico, Dominica and Guadeloupe, the Florida Keys, Central Columbia, and southern Brazil.

The fauna of Florida (excluding the Keys) possesses only the two widespread species, *basalis* and *clavicornis*.

The fauna of the West Indies, particularly the Greater Antilles, shows some variation, notably on Jamaica and Hispaniola. Only very limited material was available from Cuba. It seems clear that additional collecting in the Antilles might yield interesting results. The same is true for South America. The Planalto and the Northeast of Brazil are very poorly collected areas, but obviously possess populations that vary from those found in other parts of the range of *Rhinacloa*.

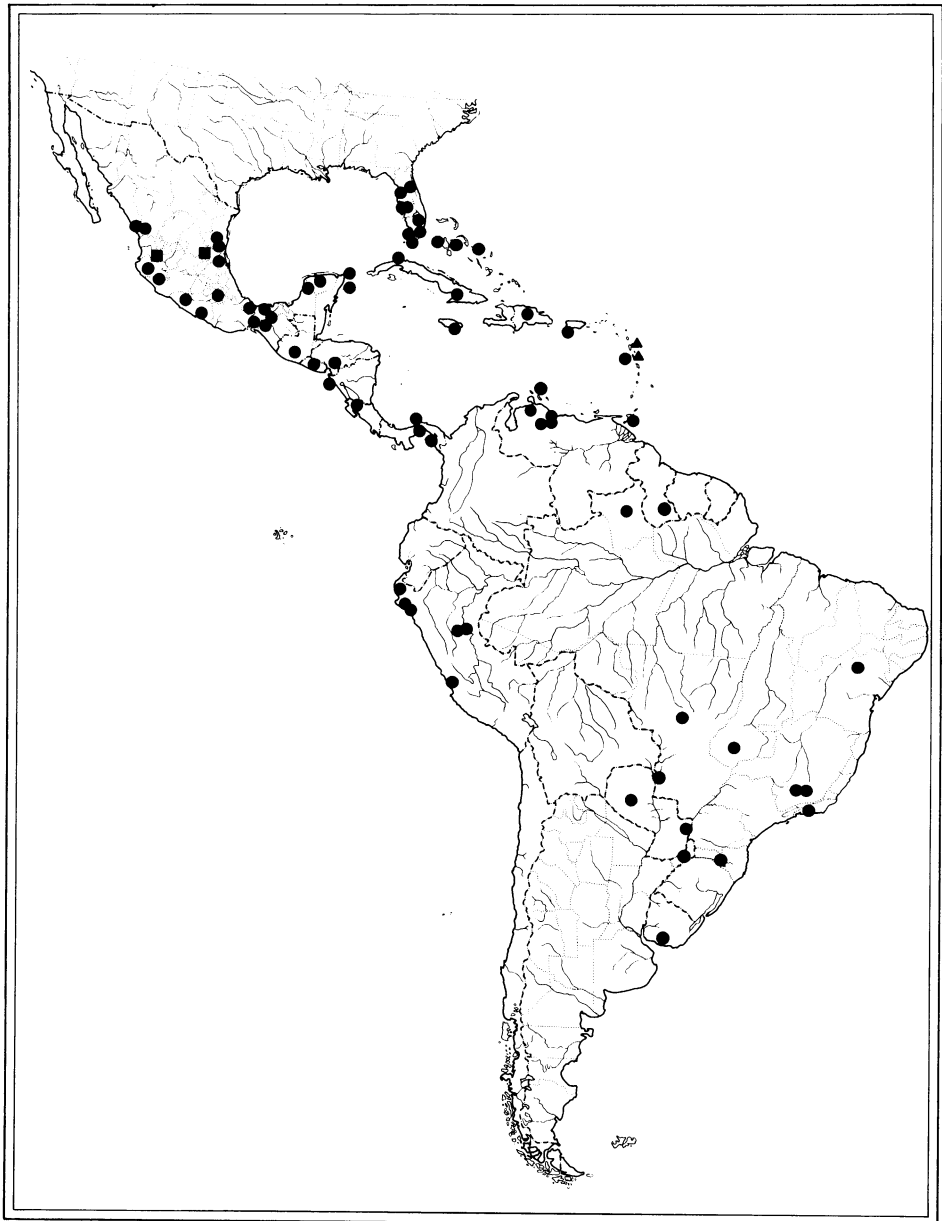


FIG. 251 Distribution of *Rhinacloa clavicornis* species group: ▲ *bellissima*; ● *clavicornis*; ■ *luridipennis*.

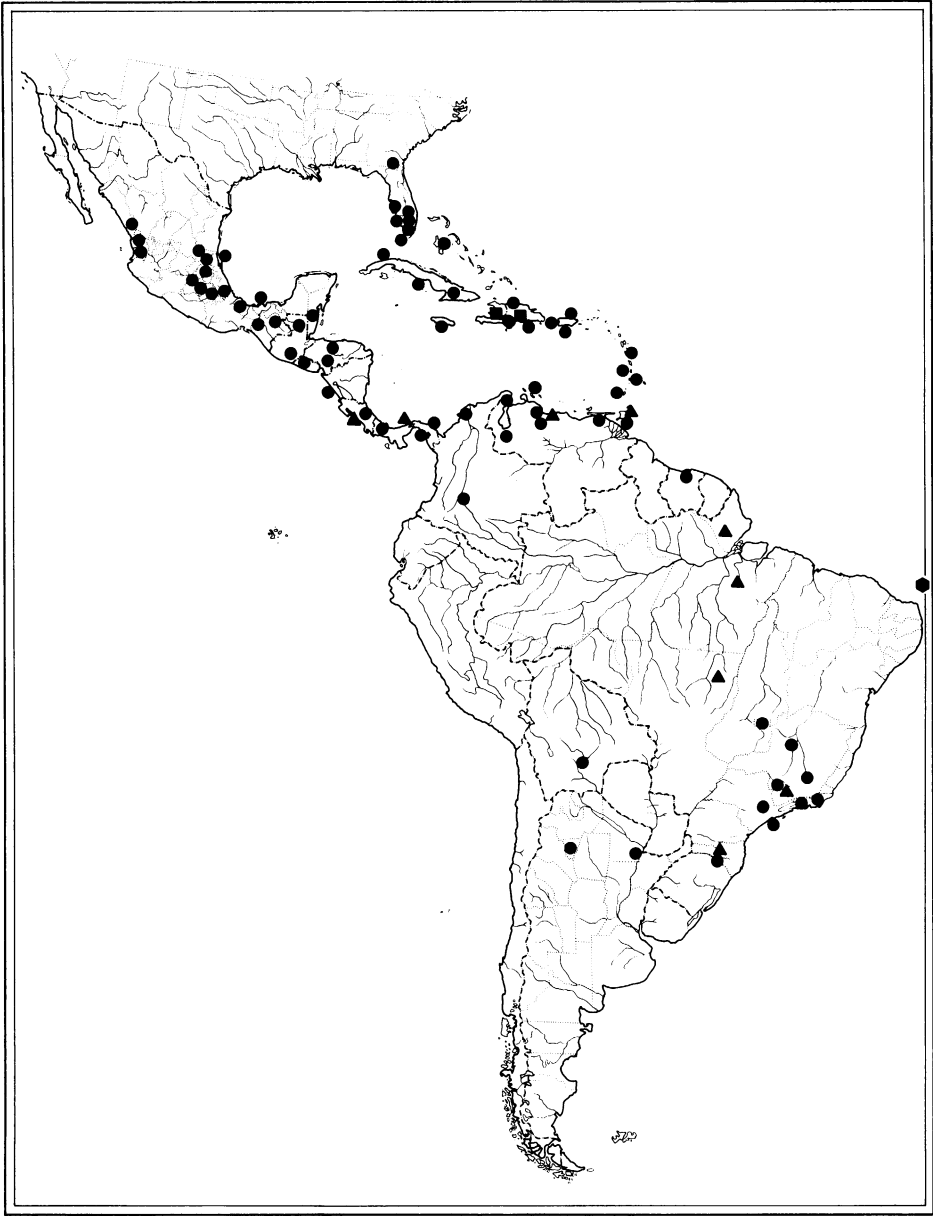


FIG. 252 Distribution of four *Rhinacloa* spp.: ▲ *apicalis*; ● *fernandoana*; ● *basalis*; ■ *schaffneri*.



FIG. 253 Distribution of *Rhinacloa antennalis* species group: ▼ *antennalis*; ▲ *chapini*; ◆ *carvalhoi*; ■ *maiuscula*; ● *mysteriosus*; ● *nigripes*.



FIG. 254 Distribution of *Rhinacloa pallidipes* species group: ▲ *pallidipennis*; ● *pallidipes*.



FIG. 255 Distribution of three *Rhinacloa* spp: ● *forticornis*; ▲ *nigripennis*; ■ *penai*.



FIG. 256 Distribution of *Rhinacloa cardini* species group: ● *callicrates*; ● *cardini*; ▲ *mesoamericana*; ■ *puertoricensis*.

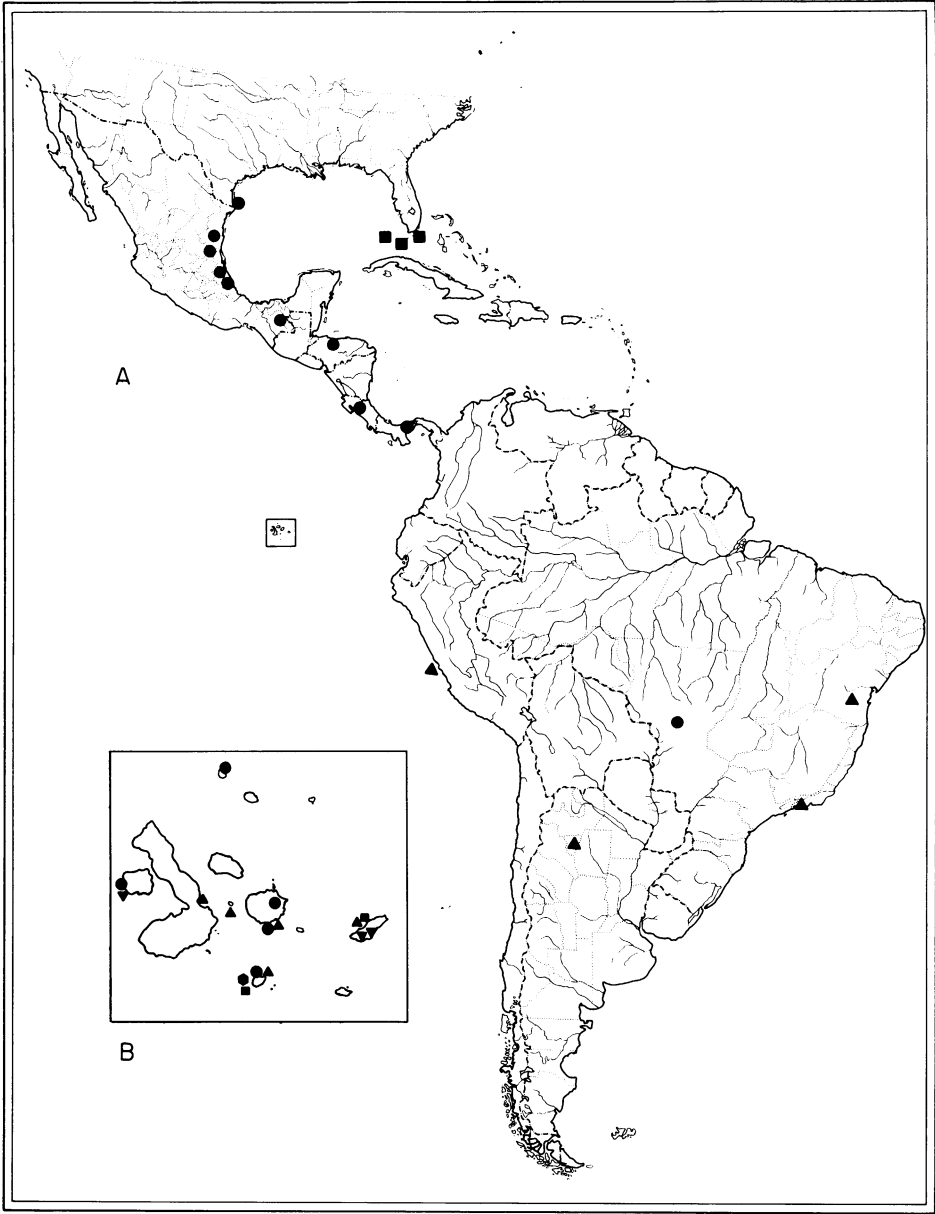


FIG. 257 Distribution of eight *Rhinacloa* species. A: ▲ *crassitoma*; ● *manleyi*; ■ *rubroornata*. B: ● *insularis*; ▲ *longirostris*; ▼ *mella*; ● *rubescens*; ■ *usingeri*.



FIG. 258 Distribution of *Rhinacloa aricana* species group: ● *aricana*; ● *azapa*; ▲ *betanzos*; ▼ *cajamarca*; ▼ *incaicus*; ■ *juli*; ◆ *peruana*.

LITERATURE CITED

- Adams, E. N.
1972. Consensus techniques and the comparison of taxonomic trees. *Syst. Zool.*, vol. 21, pp. 390–397.
- Ashmead, W. H.
1909. Hemipterological contributions. *Ent. Amer.*, vol. 3, pp. 155–156.
- Barber, H. G.
1925. Hemiptera-Heteroptera from the Williams Galapagos Expedition. *Zoologica*, vol. 5, no. 21, pp. 241–254.
- Barber, H. G., and S. C. Bruner
1946. Records and descriptions of miscellaneous Cuban Hemiptera. *Bull. Brooklyn Ent. Soc.*, vol. 41, no. 2, pp. 52–61, figs. 1–5.
- Berry, P. A.
1951. Biology and habits of cotton stainers (Hemiptera): *Dysdercus* spp.), their natural enemies in South America, and two parasitic flies imported into Puerto Rico. *Rev. Ent.*, vol. 22, no. 1, pp. 329–342.
- Carvalho, J. C. M.
1948. Mirídeos neotropicais, XXX: Gêneros *Ellenia* Reuter, *Eurychlopterella* Reuter, e *Rhinacloa* Reuter, com descrições de espécies novas (Hemiptera). *Bol. Mus. Nac.*, Rio de Janeiro, nova ser., *Zoologia* no. 85, 12 pp., figs. 1–17, 1 plate.
1952a. On the major classification of the Miridae (Hemiptera). (With keys to the subfamilies and tribes and a catalog of the world genera.) *An. Acad. Bras. Cienc.*, vol. 24, no. 1, pp. 31–110, figs. 1–40.
1952b. Neotropical Miridae, L: On the present generic assignment of the species in the *Biologia Centrali Americana*. *Bol. Mus. Nac.*, Rio de Janeiro, nova ser., *Zoologia*, no. 118, 17 pp.
1954. Neotropical Miridae, LXXVII: Miscellaneous Observations in some European museums (Hemiptera). *An. Acad. Bras. Cienc.*, vol. 26, nos. 3 and 4, pp. 423–427.
1955. *Analecta Miridologica*: Miscellaneous observations in some American museums and bibliography (Hemiptera). *Rev. Chilena Ent.*, vol. 4, pp. 221–227.
1958. Catalogue of the Miridae of the World. Part II. *Arq. Mus. Nac.*, Rio de Janeiro, vol. 45, pp. 1–216.
1980. Mirídeos neotropicais, CCXIX: Descrições de um gênero, sete espécies e uma ocorrência nova de mirídeos no Brasil (Hemiptera). *Rev. Brasil. Biol.*, vol. 40, no. 2, pp. 297–306, figs. 1–20.
1984. Mirídeos neotropicais, CCLII: Descrições de novos gênero e espécies da tribo Phylini Douglas & Scott (Hemiptera). *Bol. Mus. Paraense Emilio Goeldi, Ser. Zool.*, vol. 1, no. 2, pp. 143–206, 119 figs.
- Carvalho, J. C. M., and W. C. Gagné
1968. Miridae of the Galapagos Islands. *Proc. California Acad. Sci.*, fourth ser., vol. 36, no. 7, pp. 147–219, 56 figs.
- Carvalho, J. C. M., and I. P. Gomes
1968. Mirídeos neotropicais, CV: Descrição de sete espécies novas da Republica do Ecuador (Hemiptera). *An. Acad. Brasil. Cienc.*, vol. 40, no. 4, pp. 531–537, 21 figs.
1970. Mirídeos neotropicais, CXX: Descrição de um gênero e quatro espécies novas (Hemiptera). *Rev. Brasil. Biol.*, vol. 30, no. 4, pp. 595–599, 8 figs.
- Distant, W. L.
1893. Insecta. Rhynchota. Hemiptera-Heteroptera, vol. I. In *Biologica Centrali-Americana*, London, XX + pp. 492, 39 pls.
- Henry, T. J.
1984. New United States records for two Heteroptera: *Pellaea stictica* (Pentatomidae) and *Rhinacloa pallidipes* (Miridae). *Proc. Ent. Soc. Wash.*, vol. 86, no. 3, pp. 519–520.
- Herring, J. L.
1971. A new species of *Rhinacloa* from Palo Verde and Ocotillo in the Western U. S. *Proc. Ent. Soc. Washington*, vol. 73, no. 4, p. 449.
- Herrera, A. J. M.
1965. Investigacions sobre las chinches del género *Rhinacloa* (Hemiptera: Miridae) Controladores importantes del *Heliothis virescens* en el algodón. *Rev. Peruana Ent.*, vol. 8, pp. 44–60.
- Ingram, W. R.
1980. Preliminary indications of the status of *Rhinacloa forticornis* as a pest of sea island cotton in Barbados. *Tropical Pest Management*, vol. 26, no. 4, pp. 371–376, figs. 1–5.
- Knight, H. H.
1926. A new *Rhinacloa* and three new species of *Lepidopsallus* (Hemiptera, Miridae). *Bull. Brooklyn Ent. Soc.*, vol. 20, no. 5, pp. 225–228.
1927. Notes on the distribution and host plants

- of some North American Miridae. Canadian Ent. vol. 59, pp.34-44.
1941. The plant bugs, or Miridae, of Illinois. Bull. Illinois Nat. Hist. Survey, vol. 22, art. 1, 234 pp., figs. 1-181.
1968. Taxonomic review: Miridae of the Nevada test site and the western United States. Brigham Young Univ. Sci. Bull. Biol. Ser., vol. 9, no. 3, pp. 1-282, 318 figs.
- MacPhee, A. W.
1976. Predictions of destructive levels of the apple-stinging bugs *Atractotomus mali* and *Campylomma verbasci* (Hemiptera: Miridae). Can. Ent., vol. 108, pp. 423-426.
- McMullen, R. D. and C. Jorg
1970. The biology and influence of pesticides on *Campylomma verbasci* (Heteroptera: Miridae). Can. Ent., vol. 102, no. 11, pp. 1390-1394.
- Maldonado, C. J.
1969. The Miridae of Puerto Rico (Insecta, Hemiptera). University of Puerto Rico, Agricultural Experiment Station Technical Paper 45, 133 pp., 37 figs.
- Meyer-Dür, L. R.
1843. Verzeichnis der in der Schweiz einheimischen Rhynchoten (Hemiptera Linn.)-Erstes Heft, die Familie der Capsini, X + 11 + 116 + IV pp. 7 color pls., 34 figs.
- Reuter, O. M.
1876. Capsinae ex America boreali in Museo Holmiensi asservatae. Ofv. Kongl. Vet.-Akad. Forh., Stockholm, 1875, no. 9, pp. 59-92.
1905. Capsidae in Venezuela a D:o D:re Fr. Meinert collectae enumeratae novaeque species descriptae. Ofv. Finska Vet.-Soc. Forh., vol. 47, no. 19, 39 pp., 1 pl.
1907. Capsidae novae in insula Jamaica mense aprilis 1906 a D. E. P. Van Duzee collectae. Ofv. Finska Vet.-Soc. Forh. vol. 49, no. 5, 27 pp.
1908. Capsidae Mexicanae a Do. Bilimekl collectae in museo i.r. Vindobonensi asservatae. Ann. K. K. Naturhistorischen Hofmuseums, Wien, vol. 22, pp. 150-179.
1909. Bemerkungen über nearktische Capsiden nebst Beschreibung neuer Arten. Acta Soc. Sci. Fennicae, vol. 34, no. 2, 86 pp. + I-III.
- Schuh, R. T.
1984. Revision of the Phylinae (Hemiptera, Miridae) of the Indo-Pacific. Bull. Amer. Mus. Nat. Hist., vol. 177, art. 1, pp. 1-476, 1499 figs.
- Van Duzee, E. P.
1937. The Hemiptera of the Templeton Crocker expedition to Polynesia in 1934-1935. Proc. California Acad. Sci., vol. 22, no. 4, pp. 111-126.
- Wille, J. E.
1952. Entomologica Agrícola del Peru. Manual para entomólogos, ingenieros agrónomos, agricultores y estudiantes de agricultura. Ministerio de Agricultura. Lima, Peru, La Imprenta Americana.

BULLETIN OF THE AMERICAN MUSEUM OF NATURAL HISTORY



VOLUME 179
1985

PUBLISHED BY ORDER OF THE TRUSTEES
NEW YORK : 1985

Edited by
FLORENCE BRAUNER

CONTENTS OF VOLUME 179

- Article 1. Systematics and Phylogeny of *Hipparion*, *Neohipparion*, *Nannippus*, and *Cormohipparion* (Mammalia, Equidae) from the Miocene and Pliocene of the New World. By Bruce J. MacFadden. Pages 1–196, figures 1–151, tables 1–45. November 15, 1984 Price \$14.00
- Article 2. Allometric Trends and Locomotor Adaptations in the Bovidae. By Kathleen M. Scott. Pages 197–288, figures 1–16, tables 1–8. April 19, 1985 .. Price \$9.50
- Article 3. Brachiopods of the Onondaga Limestone in Central and Southeastern New York. By Howard R. Feldman. Pages 289–378, figures 1–61, tables 1–13. April 26, 1985 Price \$7.75
- Article 4. Revision of the Plant Bug Genus *Rhinacloa* Reuter with a Phylogenetic Analysis (Hemiptera: Miridae). By Randall T. Schuh and Michael D. Schwartz. Pages 379–470, figures 1–258, tables 1–4. June 7, 1985 Price \$6.50

