

REVISION OF THE TRIATOMINAE
(HEMIPTERA, REDUVIIDAE), AND THEIR
SIGNIFICANCE AS VECTORS OF CHAGAS'
DISEASE

HERMAN LENT AND PEDRO WYGODZINSKY

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C O N T E N T S

Abstract	127
Resumen	127
Introduction	128
Acknowledgments	129
Brief History and General Literature	130
Natural History	131
Habits and Habitats	131
Geographical Distribution	135
Role as Vectors of Chagas' Disease	135
Reproduction	137
Laboratory Rearing	138
Structure of Adults	139
Structure of Nymphs	162
Key to Genera of Triatominae, Based on First Instar Nymphs	167
Key to Genera of Triatominae, Based on Fifth Instar Nymphs	169
Structure of Eggs	171
Authors' Remarks	174
Systematics	175
Triatominae Jeannel	175
Relationships, Phylogeny, and Classification	176
Key to the Tribes and Genera	179
Triatomini Jeannel	180
<i>Triatoma</i> Laporte	181
<i>Eratyrus</i> Stål	346
<i>Linshcosteus</i> Distant	351
<i>Dipetalogaster</i> Usinger	360
<i>Panstrongylus</i> Berg	363
<i>Paratriatoma</i> Barber	401
Rhodniini Pinto	403
<i>Rhodnius</i> Stål	404
<i>Psammolestes</i> Bergroth	426
Cavernicolini Usinger	433
<i>Cavernicola</i> Barber	433
Bolboderini Usinger	437
<i>Bolbodera</i> Valdés	438
<i>Belminus</i> Stål	440
<i>Parabelminus</i> Lent	451
<i>Microtriatoma</i> Prosen and Martínez	456
Alberproseniini Martínez and Carcavallo	460
<i>Alberprosenia</i> Martínez and Carcavallo	460
Keys in Spanish	464
Keys in Portuguese	483
Literature Cited	499
Index of Scientific Names of Triatominae	516

ABSTRACT

The reduviid subfamily Triatominae contains numerous species which are actual or potential vectors of Chagas' disease, caused by *Trypanosoma cruzi*. All Triatominae require bloodmeals for their complete development. Most species feed on small terrestrial or arboreal mammals, especially didelphids, edentates, and rodents; others are associated with bats, and some are found with birds. Several triatomines have colonized human habitations, where they transmit Chagas' disease to man and his domestic animals. The epidemiologically most important species are the wide-ranging *Triatoma infestans*, *T. dimidiata*, and *Rhodnius prolixus*. The following are also active vectors of Chagas' disease, although more localized: *Triatoma barberi*, *brasiliensis*, *carrioni*, *guasayana*, *maculata*, *patagonica*, *pallidipennis*, *phylllosoma*, *pseudomaculata*, *rubrofasciata*, *sordida*, and *rubida*, *Panstrongylus chinai*, *megistus*, and *rufotuberculatus*, *Rhodnius ecuadoriensis*, and *pallescens*.

A survey of the external structures of the Triatominae and their terminology is presented to facilitate use of the keys and comprehension of the descriptions. The Triatominae share a derived character not found in other reduviids, viz., a membranous connection between the second and third rostral segments. This structure permits an extensive flexure of the third segment, in connection with the act of bloodsucking. The trichobothria of the second antennal segment of the adult are described for the first time; their number and arrangement are diagnostic on the tribal and in some cases generic level. Trichobothria were also discovered on the anterior femora of *Cavernicola pilosa*. Another previously unknown structure is the presence of a pair of flasklike invaginations on the terminal rostral segment of *Dipterogaster maximus*. The shape of the stridulatory sulcus of the prosternum is shown to be, in some cases, diagnostic on the generic level. Some Triatominae have adopted strategies that allow them to expand their abdomen for the ingestion of unusually large bloodmeals; three such strategies, involving membranization of part of the connexivum and correlated modifications of the lateral part of the abdomen, are described. The male genitalia of plesiomorphic triatomines are of simple structure, but derived forms are shown to have variously specialized phalli, involving modifications of the articulatory apparatus, the basal plate struts, and the dorsal phallosoma plate. First and fifth instar nymphs are studied morphologically, mainly on the generic

level. A newly discovered character of first instar nymphs is the absence or presence of a group of elongate sensory hairs on the metatarsus. Nymphs of all instars of *Microtriatoma* and *Parabelminus* have three pairs of spongy fossulae as do the adults, a condition unique in the subfamily.

The subfamily Triatominae is restricted to the Nearctic, Neotropical, and Oriental regions, entering the Australian region marginally. *Triatoma rubrofasciata* is tropicopolitan. There are 13 genera in the Western Hemisphere, with the center of diversity in South America. The Oriental region contains one endemic genus and an apparently monophyletic species group of *Triatoma*, a genus occupying the entire range of the subfamily.

The division of the Triatominae into five tribes is maintained. One tribe, the Triatomini, is paraphyletic; the Rhodniini, Cavernicolini, Bolboderini, and Alberproseniini are either monophyletic or monotypic. The five tribes, 14 genera, and 111 species are described or redescribed and illustrated and their synonyms given; host relations and epidemiological role are stated where known. Keys for tribal, generic, and specific identification of adults as well as for generic identification of first and fifth instar nymphs are given in English, and, where pertinent, in Spanish and/or Portuguese.

Six new species are described: *Triatoma guazu* (Paraguay); *Linscosteus chota* and *kali* (India), *Belminus herreri* (Panama), *Parabelminus yurupucu* (Brazil: Bahia), and *Microtriatoma borbai* (Brazil: Parana). Nine names are newly synonymized: *Triatoma ninoi* Carcavallo et al. with *T. eratyrusiformis* Del Ponte; *T. pessoi* Sherlock and Serafim and *T. bahiensis* Sherlock and Serafim, both with *T. lenti* Sherlock and Serafim; *T. novaeguineae* Miller with *T. leopoldi* (Schouteden); *T. pallidula* Miller with *T. migrans* Breddin; *T. phylllosoma usingeri* Mazzotti with *T. pallidipennis* (Stål); *T. bruchi* Mazza and Jörg with *T. rubrovaria* (Blanchard); *T. garciabesi* Carcavallo et al. with *T. sordida* (Stål); *Rhodnius amazonicus* Almeida et al. with *R. pictipes* Stål.

RESUMEN

La subfamilia Triatominae (Reduviidae) contiene numerosas especies que actúan como vectores actuales o potenciales de la enfermedad de Chagas, causada por *Trypanosoma cruzi*. Todas las especies de Triatominae requieren sangre de vertebrados para su desarrollo completo. La mayoría de las especies

se alimenta sobre mamíferos terrestres o arbóreos, especialmente didelfidos, edentados y roedores; otras se encuentran asociadas con murciélagos, y algunas con aves. Varias especies de Triatominae han colonizado habitaciones humanas, donde transmiten la enfermedad de Chagas al hombre y a sus animales domésticos. Las especies más importantes epidemiológicamente y que ocupan el área más amplia, son *Triatoma infestans*, *T. dimidiata* y *Rhodnius prolixus*. Las especies siguientes son también vectores activos de la enfermedad de Chagas, aunque de área más restricta: *T. barberi*, *brasiliensis*, *carrioni*, *guasayana*, *maculata*, *patagonica*, *pallidipennis*, *phyllosoma*, *pseudomaculata*, *rubrofasciata*, *sordida*, y *rubida*, *Panstrongylus chinai*, *megistus* y *rufotuberculatus*, *Rhodnius ecuadoriensis*, y *pallescens*.

Se presenta un estudio de las estructuras externas y de su terminología en las Triatominae, afín de facilitar la comprensión de las claves y descripciones. Las Triatominae tienen en común un carácter derivado que no se encuentra en otras Reduviidae, es decir, una conexión membranosa entre los segundo y tercero segmentos del rostro. Esta estructura permite una amplia flexión del tercer segmento rostral, en el acto de picar. Las tricobótrias del segundo segmento antenal del adulto se describen por primera vez. Su número y disposición son diagnósticos al nivel de la tribu y, en algunos casos, del género. Tricobótrias fueron descubiertas también en los fémures anteriores de *Cavernicola pilosa*. Otra estructura anteriormente desconocida es la presencia de un par de invaginaciones en forma de frasco, situadas en la punta del tercer segmento rostral de *Dipetalogaster maximus*. Se demuestra que la forma del sulco estridulatorio situado en el prosterno es, en algunos casos, característico al nivel genérico. Algunas Triatominae han adaptado estrategias que les permiten dilatar el abdomen de forma excepcional para ingerir cantidades muy grandes de sangre. Se describen las tres estrategias respectivas, todas involucrando membranización de parte del concoxivo y modificaciones correlacionadas de la porción lateral del abdomen. La genitalia del macho de Triatominae plesiomórficas es de estructura sencilla, pero formas derivadas tienen el falo de estructura especializada de diversas maneras, involucrando modificaciones del aparato articulatorio, del soporte

del falosoma, y de la placa dorsal del falosoma. Se estudia la morfología de las ninfas del primero y quinto estadio. Un carácter recién descubierto, en ninfas del primer estadio, es la ausencia o presencia de un grupo de pelos sensoriales largas y finas en el metatarso. Ninfas de todos los estadios de *Microtriatoma* y *Parabelminus* poseen, igual como los adultos, fósulas esponjosas en los tres pares de patas, condición que no se encuentra en otros miembros de la subfamilia.

El área de distribución de las Triatominae está limitada a las regiones Neártica, Neotropical y Oriental, alcanzando la región Australiana solo al margen. *Triatoma rubrofasciata* es especie tropicopolita. Hay 13 géneros en las Américas, con el centro de diversidad situado en la América del Sur. La región Oriental contiene un género endémico y un grupo de especies de *Triatoma* aparentemente monofilético. *Triatoma* ocupa el área de distribución total de la subfamilia.

Se mantiene la subdivisión de las Triatominae en cinco tribus. Una tribu, Triatomini, es polifilética; Rhodniini, Cavernicolini, Bolboderini y Alberproseniini son monofiléticos o monotípicos. Se describen o redescriven y ilustran los cinco tribus, 14 géneros y 11 especies, se indica su sinonimia, y se hacen constar sus hospederos y su papel epidemiológico. Se presentan claves para la identificación de tribus, géneros y especies, basadas sobre caracteres de adultos, así como claves para la identificación genérica de ninfas del primer y quinto estadio, en inglés y, cuando apropiado, también en castellano y/o portugués.

Se describen como nuevas para la ciencia *Triatoma guazu* (Paraguay); *Linchcosteus chota* y *kali* (India); *Belminus herreri* (Panamá); *Parabelminus yurupucu* (Brasil: Bahía), y *Microtriatoma borbai* (Brasil: Paraná). Nueve nombres se sinonimizan: *Triatoma ninoi* Carcavallo et al. con *T. eratyrusiformis* Del Ponte; *T. pessoai* Sherlock y Serafim y *T. bahiensis* Sherlock y Serafim, ambas con *T. lenti* Sherlock y Serafim; *T. novaeguineae* Miller con *T. leopoldi* (Schouteden); *T. pallidula* Miller con *T. migrans* Breddin; *T. phyllosoma usingeri* Mazzotti con *T. pallidipennis* Stål; *T. bruchi* Mazza y Jörg con *T. rubrovaria* (Blanchard); *T. garciaebesi* Carcavallo et al. con *T. sordida* (Stål); *Rhodnius amazonicus* Almeida et al. con *R. pictipes* Stål.

INTRODUCTION

In 1909, the Brazilian scientist Carlos Chagas discovered the first human cases of a

hitherto unknown trypanosomiasis, now widely known as Chagas' disease, American try-

panosomiasis, or trypanosomiasis cruzi. Chagas proved that the vector of the causal agent of the disease, the flagellate protozoan *Trypanosoma cruzi*, was an insect of the order Hemiptera, known in Brazil by the common name of "barbeiro," studied and determined at that time by Arthur Neiva as *Conorhinus megistus* (now *Panstrongylus megistus*). Thus, the medical importance of the hematophagous insects now contained in the subfamily Triatominae of the family Reduviidae was first securely established.

When Chagas discovered the disease, research on the vectors was restricted to those found in human habitations and associated peridomestic structures, as is still the case with most modern epidemiological studies of Chagas' disease. Soon, however, the first sylvatic reservoir of *Trypanosoma cruzi*, the armadillo, was discovered, and in its burrow another species of triatomine was found to exist, capable of becoming infected and transmitting the protozoan. Thus it began to become clear that Chagas' disease is a zoonosis, a parasitic disease of wild animals, among which it is transmitted by sylvatic species of triatomines, and that adaptation of some of the vectors to human habitations is secondary, as is the domestic cycle of the parasite. Some of the most important reservoirs are opossums (*Didelphis* spp.), which are sylvatic and peridomestic; the percentage of infected opossums is very high among wild-caught opossums, and the virulence of *Trypanosoma cruzi* in these animals tends to be low, with few pathological changes in the host. One of the hosts of *Trypanosoma cruzi* is man: according to the World Health Organization, 7,000,000 people in South America suffer from the disease, especially in those areas where the type of construction of rural and periurban housing favors colonization by triatomines. No curative treatment for Chagas' disease has been found; therefore, control of this disease depends on control of the vectors—the triatomines.

A very extensive literature exists on Chagas' disease, its causal agent, its vectors and their life history, physiology, and ecology. We are not concerned here with the first three aspects, which are covered by a great many research

papers, books, reviews, and bibliographies. It has been our aim, rather, to gather, analyze, and present the information on the general biology, external structure, systematics, and geographical distribution of all known species and higher taxa of the Triatominae, based upon the literature and our own research. The main purpose of this effort is to permit rapid and secure identification of any species of triatomine bugs by means of up-to-date keys, illustrations, and descriptions. We trust that those concerned with Chagas' disease and the control of its vectors will profit from our efforts, and we hope that our work will stimulate others to take up where we leave off.

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BRIEF HISTORY AND GENERAL LITERATURE

Fray Reginaldo de Lizarraga was the first to describe the aspect and habits of a triatomine, probably *Triatoma infestans*, as early as about 1590, in his report following an inspection tour of convents from Peru to Chile. Many other early travelers in South America made reference to these voracious hematophagous insects. However, the first triatomine bug to be formally made known to science was described in 1773 by DeGeer as *Cimex rubrofasciatus* "que se trouve aux Indes"; almost 60 years later this species was made the type of the genus *Triatoma* by Laporte (1832-1833).

The chronology of early triatomine systematics is summarized as follows: Latreille (1811) named two species which he called *Reduvius dimidiatus* and *Reduvius geniculatus*, both from Ecuador. Klug (1834) described the now infamous "vinchuca" from southern South America as *Reduvius infestans*. Burmeister (1835) was the first entomologist to call attention to the hematophagous habits of a triatomine species when he described *Conorhinus megistus*

from Brazil; in the same paper, Burmeister named another species, *Conorhinus phyllosoma* from Mexico. The first species reported from Uruguay was *Conorhinus rubrovarius*, published by Blanchard (1843). A few years later in 1848, Erichson described *Conorhinus maculatus* from the then British Guiana; that same year, Herrich-Schaeffer published a second Mexican species, *Conorhinus mexicanus*. The tenth valid species, and the first from the United States, was *Conorhinus sanguisugus* LeConte (1855).

Carl Stål added 15 valid species of triatomines between 1859 and 1872; he also revised the entire group as then known and established a basic classificatory system for the group. Following Stål, several authors, such as Walker, Berg, Uhler, Champion, Breddin, and Distant, produced further descriptions from 1873 to 1907. In 1907, the literature contained a total of 59 specific names in the Triatominae, representing what we now consider 33 valid species.

The more recent phase of research into the systematics of the Triatominae, beginning with Neiva's papers which started to appear in 1910, has added numerous species to produce a total of 112 valid species as listed in the present paper, including six described for the first time here.

There are a limited number of general, comprehensive papers on the systematics of the Triatominae, the most informative being the following: the monographs by Neiva (1914a), Pinto (1925a), and Del Ponte (1930), the synopses by Neiva and Lent (1936 and 1941), and the revisions of North and Central American species by Usinger (1944) and of the Argentinean species by Abalos and Wygodzinsky (1951). A considerable number of works with a primarily epidemiological or public health orientation have also contributed important data on the distribution of the various species although with emphasis on those found in human habitations; the most informative of such papers are those by Lent (1948b, 1962), Dias (1955), Romaña (1963), and Zeledón (1974a, 1974b).

Entomological information is also contained in studies on Chagas' disease, especially those on its epidemiology in various Western Hemisphere countries, the ecology of triatomine bugs, and the results of painstaking research on reservoirs of *Trypanosoma cruzi* and its sylvatic vectors. We recommend the following works to those who want to obtain information on the above subjects in addition to that offered in our contribution. These papers are arranged by country:

UNITED STATES: Wood, 1941; Usinger, 1944; Packchanian, 1949; Wood and Wood, 1961; Yaeger, 1961. MEXICO: Mazzotti and Dias, 1949; Biagi and Navarrete, 1961; Tay, 1969. GUATEMALA: Peñalver, 1953; León, J. R., 1959. BELIZE: Petana, 1969. HONDURAS: Ponce and Zeledón, 1973. EL SALVADOR: Cedillos, 1975. NICARAGUA: Arce Páiz, 1954. COSTA RICA: Zeledón, 1959. PANAMA: Pipkin, 1968. WEST INDIES: Fistein and Sutton, 1963. FRENCH GUIANA: Floch, 1947. VENEZUELA: Cova-Garcia and Suárez, 1959; Gamboa, 1966; Machado-Allison and Ramirez, 1967; Pifano, 1973. COLOMBIA: D'Alessandro, Barreto and Duarte, 1971; Marinkelle, 1972. PERU: Herrer, 1960; Cornejo Donayre, 1967. ECUADOR: León and León, 1953. BOLIVIA: Torrico, 1964. PARAGUAY: Gonzalez Romero and Aguero, 1967; Canese, 1973. CHILE: Gasic and Bertín, 1941; Neghme, Román and Sotomayor, 1949. ARGENTINA: Abalos and Wygodzinsky, 1951; Bejarano, 1964; Carcavallo and Martínez, 1968; Abalos, 1974. URUGUAY: Talice, Costa, Rial and Osimani, 1940. BRAZIL: Lucena, 1959b, Pessoa, 1959 and 1962; Correa, 1968; Albuquerque and Barretto, 1968a, 1968b; 1969a, 1969b; Barretto, 1963, 1964, 1967a, 1967b, 1967c, 1968a, 1968b, 1971; Barretto and Albuquerque, 1969; Barretto, Albuquerque and Funayama, 1969; Barretto and Carvalheiro, 1966, 1967, 1968a, 1968b; Barretto and Ferrioli, 1964; Barretto, Siqueira and Correa, 1963; Barretto, Siqueira, Ferrioli and Carvalheiro, 1968; Correa, Carvalheiro and Barretto, 1964.

NATURAL HISTORY

HABITS AND HABITATS

The main biological characteristic of the Triatominae is their obligate hematophagous condition. All triatomines need the blood of a vertebrate to complete their life cycle, although in some instances triatomine nymphs feed on other insects, in nature and in the laboratory; even cannibalism has been occasionally reported.

The primary habitat of triatomines is found in and close to shelter, burrows, and nests of

wild homiothermal animals, such as marsupials, edentates, rodents, carnivores, bats, and birds (fig. 1A). Triatomines are also found among rocks and in stone walls (fig. 2B), where they feed on small rodents and in some cases on iguanas and other lizards that share their habitat. In addition, the insects are found under fallen logs and in hollow trees, among exposed roots and under loose bark, in palm fronds (fig. 1B) and in epiphytic bromeliads (fig. 2A). Many triatomines have become per-

idomestic, occurring in stables and corrals, in rabbit and guinea pig houses, and in chicken and pigeon coops (fig. 2C). To the epidemiologist, the most important habitat of triatomines is the human habitation, especially the mud huts or adobe constructions so common all over Latin America (fig. 3).

Some triatomines have definite host preferences: *Cavernicola pilosa* is invariably associated with bats; all three species of *Psammolestes* are found only in birds' nests, as are *Triatoma platensis* and *T. delpontei*; *Panstrongylus geniculatus* shows a decided preference for armadillos' burrows; *Paratriatoma hirsuta* and several species of the *protracta* group of *Triatoma* prey exclusively on wood rats of the genus *Neotoma*. Finally, some species are now closely associated with man, al-

most to the exclusion of any other host; *Triatoma infestans* is the classic example of this group.

The habits of the various species of triatomines thus allow us to divide them roughly into sylvatic and domestic species, with an intermediate category of peridomestic species, which are occasionally attracted into houses by light but do not colonize in houses and which thus feed on man only occasionally.

In human habitations triatomines prefer dark and sheltered places such as cracks in the wall, furniture, trunks, suitcases, and boxes filled with old clothes or papers. They are found among curtains and clothes hanging from the walls, behind pictures or calendars, in various types of roofing materials, such as thatch, palm fronds, or even loose shingles, among mat-

tresses and in cots and beds of all kinds, in hammocks and cradles, and in woodpiles; in short, in all kinds of materials and structures. This is where domestic triatomines lurk and where they reproduce. The simple rural habitations with dirt or mud walls or built from bamboo or even low quality bricks, are where triatomines thrive. Wooden buildings may also be colonized by the insects, especially in areas of high infestation rates, but the number of specimens will be lower than in the above type

of buildings. Houses with smooth whitewashed walls devoid of cracks, covered by zinc or shingle roofs and built without straw or other vegetable matter, such as palm fronds, inhibit colonization by triatomines and are the best means of preventive control of triatomines and therefore of Chagas' disease.

Triatomines remain immobile during the day, emerging at night, to search for uncovered portions of sleeping persons, and for domestic animals (mainly dogs and cats). Domestic tri-

atomines will even bite in the daytime when the opportunity presents itself. Some sylvatic species, such as *Dipetalogaster maximus* and *Triatoma spinolai*, both of which live among stones and under rocks in semiarid areas, will attack men or birds (personal observ.) in broad daylight. A triatomine's bloodmeal lasts normally from 20 to 30 minutes; no pain is felt by the victim because of the anesthetizing action of the bug's saliva.

Triatomines may go without a bloodmeal for months at a time, and their activities are much reduced during the colder part of the year. These facts contribute to the difficulties in eradicating triatomines from habitations where hiding places, such as deep cracks in the walls, are sufficient protection from any insecticide. The insects can spend months without coming into contact with insecticides that have been

sprayed on the surface but have not penetrated into their hiding places.

Adult triatomines rarely fly, and domestic specimens generally will not leave a habitation if sufficient food sources are available. Winged specimens of some species, generally males, are attracted to artificial light and may enter habitations, although many individuals are carried by man into his domicile, as discussed below.

Triatomines are poor flyers; dispersal of domestic species is carried out by man himself not only by transporting the insect and its eggs with items of furniture, clothes, and household goods but also by introducing the insects, especially their eggs, with roofing material such as palm fronds and straw. Triatomines of various species have been intercepted in luggage of long-distance bus and airline passengers. Cer-

tain triatomines, such as some species of *Rhodnius*, breed in nests of large migratory birds (*Jabiru mycteria* [Licht.] and *Mycteria americana* L., Ciconiidae) and may lay their eggs on the birds' feathers where early instars of the bugs may also hide; birds can thus also probably serve as dispersal agents.

GEOGRAPHICAL DISTRIBUTION

Since a cladistic system of the Triatominae has not been worked out, a meaningful analysis of the historical biogeography of these bugs is impossible. However, a descriptive survey of the distribution of the group as a whole and of its components is useful.

There are two outstanding facts of triatomine distribution: first, the group is mainly tropical and subtropical, and second, it is restricted to the Western Hemisphere and the Oriental region, being completely absent from the Palearctic and Ethiopian regions (not taking into consideration *Triatoma rubrofasciata*, a tropicopolitan species dispersed by man) and entering the Australian region only marginally. The center of diversity of the subfamily is tropical and subtropical South America.

Representatives of the Triatomini (a paraphyletic group) occur over the entire range of the subfamily; details of their distribution are shown below. The remaining four tribes, apomorphic and monophyletic or monotypic, are all exclusively Neotropical. The Rhodniini, with two genera, occur from Central America to Argentina: *Rhodnius* prefers forested, mesic habitats, extends from Mexico to southern Brazil, and parasitizes a wide range of avian and mammalian hosts; *Psammolestes* prefers open, semiarid country, and is strictly South American, ranging from Venezuela to Central Argentina, and parasitizes birds. The Bolboderini range from the Caribbean to Central and South America, as far as southern Brazil; their main hosts are probably didelphids. The monotypic and monospecific Cavernicolini is associated with bats and only known from Panama and northern South America. The monotypic and monospecific Alberproseniini, with unknown food preferences, has only been reported from northern Venezuela.

To return to the Triatomini: although these insects are an overwhelming New World group, they do occur also in the Oriental region; the other tribes do not. There are two monophyletic groups of Triatomini in the Oriental region. The first is the *rubrofasciata* group of *Triatoma*, found with endemic species in southern China, in Malaya, Indonesia, New Guinea, and extreme northeastern Australia; only the synanthropic *T. rubrofasciata* is tropicopolitan. The second Oriental group is the genus *Linshcosteus*, with six closely related species all found in India. The feeding preferences of the Oriental *Triatoma* and of the species of *Linshcosteus* are poorly known.

All remaining Triatomini are inhabitants of the Western Hemisphere. The genus *Triatoma* is the most speciose and most wide-ranging, from the United States to Patagonia. Details of distributional patterns are given after the generic redescription of this genus. Among the smaller genera, *Dipetalogaster*, feeding on a variety of small vertebrates, is restricted to the extreme southern tip of semiarid Baja California Sur. The monotypic *Paratriatoma*, associated with woodrats, is limited to the southwestern USA and adjoining areas of Mexico. Farther south, *Eratyrus*, comprehending two closely related species, inhabits Central American and northern South American forested areas, and is associated with bats. *Panstrongylus*, the second largest genus of Triatomini, with 13 morphologically and biologically diverse species, extends from Central America to central Argentina. The ecological preferences of the species of *Panstrongylus* range from mesic forest habitats to semiarid shrub land.

ROLE AS VECTORS OF CHAGAS' DISEASE

Although a variety of arthropods have been experimentally infected with *Trypanosoma cruzi*, only triatomines are epizoologically and epidemiologically important in the transmission of Chagas' disease.

The bite of triatomines is generally painless, which explains why sleeping persons are unaware of the bugs' attack and thus can be bitten

by a large number of individuals. Consequently, there is a great chance of being infected with *Trypanosoma cruzi*, or, at least, of suffering a potentially important loss of blood over an extended period. Cases of hypersensitivity have been reported, with local swelling, pain, and other serious symptoms, but such cases are rare.

All six instars of triatomines are hematophagous; all species defecate shortly after their bloodmeal. The time span between the bloodmeal and the first subsequent defecation varies in different species; this is significant epidemiologically when we consider that the infective metacyclic forms (trypomastigotes) of *T. cruzi* occur only in the feces. In many insect vectors the parasite is transmitted with the saliva during the bite; this is true even for another species of *Trypanosoma* transmitted by a triatomine, *T. rangeli*, but not for *T. cruzi*, which is transmitted only through the feces. Trypanosomes penetrate into the host's tissues through skin abrasions, through the mucosa of the mouth, and, in humans, especially through the conjunctiva of the eyes. It is obvious that transmission of the parasite to the vertebrate cannot occur in this way when defecation takes place after the vector has left the host; hence the importance of the time span between feeding and the first subsequent defecation.

Infection with *T. cruzi* also occurs when the triatomine is eaten. There is evidence that this is the common way in which such animals as woodrats and opossums are infected. Obviously, this mode of transmission must be exceedingly rare in man and is without epidemiological importance.

All species of triatomines are potential vectors of *Trypanosoma cruzi*, but only in a few cases are all conditions fulfilled to transform a species from a potential into an actual and effective vector of Chagas' disease in humans, viz.,

- a. Adaptation to life in human habitations.
- b. High degree of anthropophily.
- c. Short span of time between bloodmeal and defecation.
- d. Wide geographical distribution.

There are actually only a few species which fulfill most or all of these conditions and which

are thus instrumental in maintaining Chagas' disease in humans.

The vector par excellence is the widely distributed *Triatoma infestans*, which occurs in Argentina, Chile, Uruguay, Paraguay, Brazil (from southern Brazil north to Pernambuco and northeastern Goias and to Mato Grosso), Bolivia, Peru, and Ecuador; the species is almost exclusively domestic.

In northern South America *T. infestans* is substituted epidemiologically by *Rhodnius prolixus* in the Guianas, Venezuela, and Colombia; its range extends into Central America and southern Mexico. *Triatoma dimidiata* is another important vector in Ecuador and Peru, as well as in several Central American countries and in the south of Mexico. The only known vector in Panama is *Rhodnius pallescens*. In Mexico, Chagas' disease is transmitted to humans, in addition to *Triatoma dimidiata*, mainly by *T. phyllosoma* and *T. pallidipennis*; less important vectors are *Triatoma barberi*, *T. rubida*, and *Rhodnius prolixus*.

In addition to the principal, wide-ranging vectors in South America, there are other species of considerable epidemiological importance, although they tend to be more localized: *Panstrongylus megistus*, *Triatoma sordida*, and *T. brasiliensis*, in Brazil; *Triatoma sordida*, *T. guasayana*, and *T. patagonica* in Argentina; *T. maculata* in Venezuela; *T. carrioni*, *Panstrongylus rufotuberculatus*, and *P. chinai* in Ecuador; *Panstrongylus herreri*, *P. chinai*, and *Rhodnius ecuadorensis* in Peru. All these species will colonize human habitations, although not necessarily over the entire range of the respective species.

Panstrongylus geniculatus, commonly encountered in armadillo burrows, is widely distributed over South America and has been reported from Central America north to Nicaragua. The species is frequently attracted by light to human habitations but has not yet been reported to colonize there. Like this species, others have been found in habitations or in peridomestic situations without colonizing; however, species of this group constitute potential vectors because most have been found to be naturally infected with *T. cruzi* or have been infected experimentally.

Most sylvatic species or populations of triatomines prey on mammals or birds; reptilians or amphibians are occasional hosts. The sylvatic species' contact with man or domestic animals is only potential, but one cannot ignore the possibility of a future occupation of peri-domestic or domestic niches by practically any sylvatic species. Even some species now colonizing human habitations did not do so within recent times (e.g., *Rhodnius neglectus*, *R. ecuadorensis*) and others are colonizing in houses locally now, while also maintaining sylvatic populations (e.g., *Panstrongylus megistus*, *Triatoma guasayana*, and others). New colonization is to be expected when new niches are made available (human habitations being built in formerly unsettled areas) or when niches have been emptied (such as by successful eradication programs not necessarily directed against triatomines; e.g., anti-malaria campaigns).

In the United States where the numerous species and subspecies of woodrats (*Neotoma* spp.) and the opossum (*Didelphis virginiana* Kerr), in addition to other minor hosts, are the main sylvatic reservoirs of *Trypanosoma cruzi*, there are no truly domestic species of triatomines. This is probably due to the types of construction of human habitations and better sanitation, which do not favor permanent colonization by the bugs. However, individuals of certain common and widespread species, such as *Triatoma sanguisuga*, *T. lecicularia*, and *T. protracta* are frequently found in human habitations, probably attracted by artificial light; bites by triatomines do occur, although not on the massive scale to be expected if the species had truly colonized human habitations.

REPRODUCTION

Prior to copulation, the male approaches the female until they stand parallel; he then proceeds to immobilize her with the three legs of one side of the body, assuming a dorsolateral position, and placing the apex of his abdomen below that of the female. The parameres of the male assist in the immobilization of the female preparatory to the introduction of the penis, which is preceded by a torsion of the male

genital capsule. Copulation lasts in most cases from 5 to 15 minutes.

Triatomines are oviparous. Egg laying begins from 10 to 30 days after copulation. Oviposition may continue for several months. The total number of eggs laid at one time or during the entire lifespan of the female varies with the species and with external factors, such as availability of food, temperature, and humidity. A single female can produce up to 1000 eggs in her lifetime, but a total of about 500 is more usual. Virgin females may also lay eggs but these will be few in number and, of course, infertile.

Eggs are either laid free or attached to the substrate, according to the species; this may vary even between closely related forms. For instance, *Triatoma infestans*, probably originally an inhabitant of rodent burrows, lays loose eggs, but the closely related *T. platensis* and *T. delpontei* which inhabit rather loosely constructed birds' nests, lay eggs glued to the substrate. Most eggs are laid singly, but in *Rhodnius* several eggs may be laid together in a regular pattern, and the female of *Psammolestes arthuri* (but not of the other species of *Psammolestes*) produces a subconical egg mass (fig. 282B) reminiscent of egg masses in the reduviid subfamilies Harpactorinae and Apiomerinae.

The freshly laid eggs are pearly white in most species, but grayish in some (e.g., *Rhodnius pictipes*). In many species, the original color is maintained through their entire development, but in others the eggs turn pink and finally reddish. In some species, the eyespots of the developing first instar nymph become visible through the egg chorion.

Hatching takes place within 10 to 30 days after oviposition. First instar nymphs are pinkish and soft-bodied; hardening takes place soon, and the little nymph is ready to feed 48 to 72 hours after hatching. There are five nymphal instars. At least one full bloodmeal is required for each molt, but more than one meal is commonly taken by instars II-V.

Most triatomines, even in tropical climates, have a comparatively long life cycle, on the average 300 days from egg to adult. Some species may take two years to complete their

cycle, e.g., *Panstrongylus megistus*, *Paratriatoma hirsuta*, *Triatoma recurva*, *Triatoma arthurneivai*, and some populations of *Triatoma eratyrusiformis*, where the last instar nymphs may enter into a lengthy diapause. Other triatomines (*Rhodnius* spp.) are able to develop to maturity in only 90-120 days. Data regarding developmental cycles observed in the laboratory are not strictly comparable, because of the multiple variables involved—temperature, relative humidity, host species, and feeding intervals, among others. For this reason, we refrain from a survey of such data.

LABORATORY REARING

Much information on the biology and on the value of certain systematic characters of triatomines has been obtained through rearing and observing these insects in the laboratory. It is not difficult to establish laboratory cultures which make it possible to study the bugs' behavior and development under varying conditions of temperature, relative humidity and illumination, their alimentary preferences, and the effects of the numbers of meals provided. Laboratory rearing is essential to examine some aspects of the chromatic variability of a species, and to study the genetics of intra- and inter-specific crosses. The ease with which most species can be reared and experiments carried out has resulted in considerable information not only on triatomines but on insect physiology generally (Wigglesworth, 1972). Triatomines have also provided test objects for new insecticides, including juvenile hormones and pheromones. Mass rearings are necessary when "clean" triatomines are required for xenodiagnostic¹ purposes.

More or less complex apparatus has been described to rear triatomines, but our experi-

¹Xenodiagnosis is a test for infection by *Trypanosoma cruzi*, having a non-infected vector obtain a bloodmeal from the suspected vertebrate host, followed by periodical examination of the triatomine's rectal contents; as *T. cruzi* multiplies in the alimentary tract of the bug, even a host's weak infection not observable from a blood smear or a thick drop will show up eventually as a much more visible infection in the triatomine.

ence suggests that very simple equipment is perfectly satisfactory.

Any large jar or other glass, metal, or plastic container topped by metal or plastic mesh can be used as a rearing vessel, as long as it is large enough to contain both the number of insects one intends to produce and the bird or small mammal introduced periodically to serve as a source of bloodmeals. The host, of course, has to be restrained. The interior of the container preferably should contain a wooden support or shelf on which the host can be placed, and which also provides shelter for the bugs. Sheets of filter paper folded bellows-like provide additional shelter for the bugs and at the same time absorb excess moisture generated by the bugs and in some cases also the feces and urine of the host. The wire mesh should have a gauge small enough to prevent eggs from being laid on its outside surface and to prevent small nymphs from escaping. Frequent cleaning of the rearing containers, preferably shortly after feeding, will help to make the culture a successful one.

High temperatures in the insectary or rearing room as well as frequent feeding, perhaps once a week, accelerate the developmental cycle which may become shorter than it is in nature. On the average, a temperature of 27° to 28° C. is optimal. Most species do not survive at temperatures above 37° C. or below 10° C. Different species have very different humidity requirements; there are species, such as *Panstrongylus geniculatus*, which require 100 percent humidity for a successful establishment of a laboratory culture, while 70 to 80 percent is ideal for many other species.

We have used living animals (chickens, other birds, mice, rats, guinea pigs, and rabbits), suitably immobilized, to feed our cultures. It is important that the host be placed in such a way that the bugs can reach it from below, which is the natural feeding position of triatomines (see fig. 4E). Specimens are fed every week or every other week, although especially the later nymphal instars and the adult can go without a meal for extended periods; as a matter of fact, adults survive longer when not fed than when fed.

STRUCTURE OF ADULTS

We have found it necessary to condense the wealth of available knowledge of triatomine structure into a selective survey of those features that we believe useful for identification and classification, the main purpose of our work. Furthermore, this information is restricted to data of the exoskeleton, because the importance of the soft anatomy of the Triatominae for their systematics has not yet been unequivocally demonstrated. The above restrictions are also reflected in our bibliographical references.

Ramírez Pérez (1969) published a detailed and abundantly illustrated survey of the external and internal anatomy of one triatomine species, *Rhodnius prolixus*, and should be consulted for details. An earlier but also useful study is that by Del Ponte (1920, 1921) on the external and internal structure of *Triatoma infestans*.

GENERALITIES: The general structure of the triatomine body is shown in the illustrations, and does not differ significantly from that of most other reduviids. Adult triatomines differ from nymphs in all cases by the presence of ocelli and of well-developed external genitalia, and in most cases by the possession of fully developed fore and hind wings. Females can be recognized by the pointed or truncate abdominal apex, which is rounded in males. Other than size, the only case of evident polymorphism is found in the Chilean *Triatoma spinolai*, where practically wingless males and females occur together with brachypterous and fully winged males (fig. 177).

SIZE: Females of triatomines are larger than males; however, in some samples, large males may be larger than unusually small females. The largest triatomine is *Dipetalogaster maximus*, the female of which may attain a length of 44 mm., a pronotal width of 9.5 mm., and an abdominal width of 15 mm. The smallest triatomine is *Alberprosenia goyovargasi*, with measurements of 5.0, 1.6, and 1.9 mm., respectively. Most frequently, however, measure-

ments of triatomines vary between 20 and 28, 5 and 6, and 8 and 10 mm., respectively. Size, although roughly diagnostic for each species, can vary considerably (up to 20% or more) over the geographical range of a given species. As laboratory rearing has shown, the amount of food available to the nymphs influences the size of the adult. Nonetheless, in laboratory cultures, specimens belonging to consecutive generations become in many cases progressively smaller even if abundant food is available; the reason for this is not known.

COLOR PATTERN: Most species of triatomines can be recognized with some experience by their color pattern, best observed in live or recently preserved specimens. In museum specimens of many species, the black or brown areas will frequently fade in a few years and acquire a reddish tinge; this fading is more pronounced in some species than in others.

The general body color of triatomines is black or piceous, with pattern elements from light yellow to light brown, orange, or various hues of red; light green color occurs in one exceptional case (*Panstrongylus rufotuberculatus*). Light pattern elements may be present in any area of the body or appendages; their color, intensity, and distribution are of considerable importance for systematic purposes. Geographical and individual variation of the color pattern are not uncommon, and have in many cases caused unnecessary descriptions of species or subspecies. One of the most striking cases of individual pattern variation has been demonstrated by Lent (1942) for the red and black pronotal pattern in *Triatoma rubrovaria* (Blanchard) (figs. 165A, C, D, F-J). Ryckman (1962) has illustrated beautifully the geographic color variation in *Triatoma protracta* Uhler, not only in adults, but also in fifth instar nymphs. *Panstrongylus geniculatus* is another species where striking pattern variants can be observed, especially on the pronotum and the abdominal venter (figs. 221D-G, I-L); these variants do not deserve nomenclatural recognition.

Eyes of triatomines are normally black, but mutations that cause the eyes to appear red or even white have been observed in *Triatoma*, *Panstrongylus*, *Rhodnius*, and *Psammolestes*.

INTEGUMENT: The cuticle of triatomines is either apparently smooth (e.g., *Cavernicola pilosa*), or rugose, granulose, or tuberculate (most other triatomines). The degree of development of granules on the head and pronotum provides a useful key character in some cases (e.g., to distinguish the conspicuously granulose *Triatoma rubrofasciata* from other, less granulose species). The microsculpture of the abdomen also furnishes good taxonomic characters (see under Abdomen).

The integument bears setae of varying number and length according to the species involved. The setae of triatomines are minutely spinulose in most cases (fig. 25B, F, I, J), but smooth in *Cavernicola* (fig. 25C, H, K). Setae are long and very numerous in such specialized forms as *Paratriatoma hirsuta* and *Cavernicola pilosa* (figs. 250A; 293B, C), but generally they are short and may become practically imperceptible, except on the antennae, rostrum, legs, and in some cases on the abdomen. As a rule, setae tend to be more easily seen against a background of a different color than their own. Length and number of setae may differ even in closely related species such as in *T. delpontei* and *T. platensis* (figs. 62C; 146D).

HEAD: The triatomine head (fig. 4A, C, E, I) is forwardly directed, freely movable, and has a distinct neck. In most triatomines, the head is subcylindrical and on an average three times longer than it is wide across the eyes. The head is widened only in a few genera (*Psammolestes*, some specimens of *Microtriatoma*, *Alberprosenia*), being about as long as it is wide across the eyes. The upper surface of the head is usually more or less flattened, but strongly convex in *Triatoma lecticularia* and especially *Paratriatoma hirsuta*.

For taxonomic purposes, the head is divided into anteocular and postocular regions (fig. 4C); the ratio of their length is used in descriptions. Anteriorly on the dorsal surface of the anteocular region there are three elongate sclerites invariably mentioned in our descriptions: the central sclerite is the clypeus (the term tylus

is frequently used by hemipterists for this structure), and the 1+1 sclerites on either side of the clypeus, the genae. Actually, the clypeus consists of two sclerites: a large posterior one, the postclypeus, and a small anterior one articulated flexibly to the postclypeus, the anteclypeus. For descriptive purposes, in this paper we refer to the postclypeus simply as clypeus; it is variously widened and more or less convex above; in many cases, its anterior border is somewhat emarginated. The anteclypeus is not rigidly connected to the other cephalic sclerites, and its position may thus appear variable in different species; we therefore have not considered the anteclypeus in our descriptions, although it is usually figured in the illustrations. The labrum is a narrow triangular sclerite inserted on the distal margin of the anteclypeus and covering the extreme base of the rostrum; its shape varies slightly in different genera. The genae are situated laterad of the clypeus, and frequently on a somewhat lower level; they may appear compressed laterally or dorsoventrally. The apex of the genae may be rounded or acute. The position of the apex of the genae in relation to that of the clypeus is of much interest to the taxonomist. Another pair of sclerites, the jugae, are modestly developed as compared to other reduviids; they are generally small, subtriangular plates situated at the base of each gena; their base may be delimited by a sulcus. The antenniferous tubercles are situated laterally somewhat below the level of the jugae. The apicoexternal area of these tubercles may extend into a conspicuous projection provided with distinct setiferous granules; this projection is especially well developed in the Bolboderini. The position of the antenniferous tubercles in relation to the anterior border of the eyes or the apex of the head furnishes important generic characters (e.g., very close to the eyes in *Panstrongylus* and *Alberprosenia* and very close to the apex of the head in *Rhodnius*).

The antennae (figs. 4A; 6-9) consist of four articles, the first short and not or only very slightly projecting beyond the apex of the head, and the second, third, and fourth much longer than the first, in most cases decreasing in length from the second to the fourth. The rela-

tive lengths of the articles are used as a taxonomic character. The articles are separated from each other by small nodules, not to be included in measurements for the calculation of antennal ratios. The first and second articles are

comparatively stout, and the third and fourth slender and filiform; the integument is smooth in the first and second, delicately annulate (figs. 6A, 7C) in the third and fourth segments. The setae of the first segment are short, slightly

curved, and irregularly scattered. The setae of the second segment (fig. 6) are numerous, frequently of more than one structural type and of varied lengths as compared to the diameter of the segment; in a few cases, we have found them to be of taxonomic value. In addition to the setae mentioned, the second segment, and only the second segment, bears in all Triatominae a certain number of trichobothria (fig. 7A, D-F). These specialized hairs occur in many, although not all, Reduviidae, but their possible usefulness in providing taxonomic characters had hitherto not been investigated. Trichobothria are long, slender hairs inserted in comparatively large, cuplike depressions, the bothria. The base of the depression shows lamellar structures, possibly acting as mechan-

ical reinforcements (fig. 7D, F). There is only one trichobothrium in the nymphal instars, situated subapically; the full number for each species is found only in the adult. The probable plesiomorphic distribution pattern, as judged by comparison with other reduviids, is found in the Triatomini (*Triatoma*, *Paratriatoma*, *Panstrongylus*, *Eratyrus*, *Dipetalogaster*, *Linchcosteus*), viz., one series of not fewer than four trichobothria arranged along the entire length of the article including the subapical portion (fig. 8), with a concentration of trichobothria on the basal area of the article. Each of the recognized other tribes shows a different derived pattern. In the Bolboderini, there is a trend toward a reduction in the number of trichobothria, from four in *Belminius* (fig. 9A) to only one in

Bolbodera (fig. 9L). Both genera of Rhodniini (fig. 9H-K) are characterized by the presence of two ancillary trichobothria adjacent to the basal trichobothrium of the main series. *Cavernicola*, the only genus of the Cavernicolini, is distinguished by the three invariably closely spaced subbasal and the two widely spaced submedian and subapical trichobothria (fig. 9F, G). *Alberprosenia* (fig. 320C) has two closely spaced

basal trichobothria, two median ones, and a subapical one longer than the remaining.

The color of the two basal antennal segments normally agrees with the prevalent dark body color, but the two distal articles are light colored.

In *Rhodnius*, the dorsum of the anteocular portion of the head shows a prominent percurrent median longitudinal ridge (figs. 5C, 251,

and others), found in other triatomines only in *Alberprosenia* (fig. 320A).

The eyes are separated dorsally by the vertex; the closest distance between the eyes dor-

sally is called the synthlipsis. Ventrally, the eyes are invariably closer than dorsally. The size of the eyes, be it in lateral view or expressed by the relative widths of the synthlipsis and the eyes as observed dorsally, is a character much used in triatomine systematics. These measurements tend to be rather constant in a given population, but may vary geographically within a species.

The interocular sulcus, a transverse depression connecting the posterior border of the eyes

across the vertex, prominent in most reduviids, is obsolescent in most Triatominae, and U-shaped when distinctive, such as in *Cavernicola* (fig. 293B).

The postocular region is invariably shorter than the anteocular, and distinctly separate from the neck. The two ocelli, situated dorsally on the postocular region, are invariably present in the adult, even in the micropterous forms of *Triatoma spinolai*. The ocelli are obsolescent in some species of *Belminus* as well as in *Caver-*

nicola pilosa. A reduction in the size of the ocelli has been observed in cave-dwelling specimens of *Triatoma dimidiata* as compared with those of surface-dwelling specimens of the same species (see fig. 64D, G). The ocelli are situated either directly at the level of the surface of the head (Bolboderini, *Cavernicola*) or on distinct elevations which may merge at their base (most Triatomini, most Rhodniini). The head of *Rhodnius* and *Psammolestes* bears laterally behind the eyes the postocular callosities, beset with numerous spiniferous tubercles (fig. 5A, B).

The under surface of the head from the insertion of the rostrum to its posterior border is called the gula. The insertion of the rostrum is marked laterally by a pair of, in most cases, not very conspicuous lamellae, the bucculae; these are best developed in some Bolboderini. The three-segmented rostrum, a somewhat dorsoventrally depressed cylinder, is closely adpressed to the gula when at rest, and is practically straight when seen from the side (fig. 4I), whereas it is curved in the great majority of entomophagous reduviids (figs. 4F; 33B). The median segment of the rostrum is generally

the longest, and the third the shortest; the relative measurements of the three rostral segments provide excellent generic and specific characters, as do the length and relative number of the hairs found on the various articles of the rostrum. Details of the chaetotaxy of the rostrum, especially of the apex of the third segment (figs. 10A, B, D, F, G) vary considerably among species and deserve detailed study. When the bug is feeding, the rostrum is forwardly directed (fig. 4E), with its longitudinal axis continuous with that of the head, but the distal article is flexed upward in relation to the second segment; this peculiar flexure during feeding is unique among reduviids and obviously correlated with the preferred position of attack when the triatomine feeds: at the sides of and partially below the host. This flexure is made possible by the ample membranous articulation between the second and third rostral segment (fig. 4I), not found in other reduviids (fig. 4F-H).

As in other Hemiptera, the rostrum of the Triatominae is the modified labium which forms a protective sheath for the stylets into which parts of the maxillae and the mandibles

have been transformed. The apically serrate mandibles serve to perforate the epidermis of the host, with the smooth lanceolate maxillary stylets penetrating the skin in search for blood vessels from which to take nourishment. Barth (1962) and Cobben (1978) have described and illustrated the structure of the mouth stylets of various triatomines and entomophagous reduviids. Because these structures are not being used for taxonomic purposes, no further details are provided here.

We have found that the third rostral segment in nymphs and adults of *Dipetalogaster maximus* shows near its apex a pair of small invaginated, flasklike ectodermal structures which open at their base to the outside (fig. 10C-E). The wall of these structures is rather thick, and their lumen shows irregular transverse septa, more pronounced near the base of the structures, which we hypothesize are sensory or glandular organs. We have examined all triatomine genera and found the rostral organs restricted to *Dipetalogaster*.

THORAX: The three thoracic divisions, prothorax, mesothorax, and metathorax, are of quite different structure and provide many useful taxonomic characters.

The prothorax is strongly developed dorsally, forming the pronotum (fig. 4A, B), a shieldlike sclerite covering most of the mesothorax from above. The pronotum is roughly trapezoidal, with the sides diverging posteriorly to a larger or lesser degree; in some cases they are almost straight (e.g., *Triatoma barberi* [fig. 40A]) but in most species they form an angle at the level of the transverse depression which divides the pronotum into a fore and hind lobe. The fore lobe is again subdivided by a longitudinal, in some cases incomplete, sulcus. An anterior transverse depression on the fore lobe separates the collar, a narrow transverse band ending on each side with a protuberance; these projections are referred to in the descriptions as anterolateral angles (or processes) of the pronotum. Their shape varies from short and blunt or rounded to conical and more or less pointed, and is species-specific although some variation may obtain. The disc of the fore lobe of the pronotum varies from smooth to granular; in many cases, smooth and granular sections oc-

cur side by side, forming a characteristic pattern. In addition to the granules, larger tubercles are found in many species, with one pair (the discal tubercles) situated on the disc

of the fore lobe of the pronotum, and another pair (the lateral tubercles) situated on or near to the lateral margin of the fore lobe of the pronotum. In some cases, the tubercles are weakly developed, and it may be difficult to decide if they are present or not. The hind lobe of the pronotum is transversally or irregularly rugose or wrinkled, and bears a pair of longitudinal submedian carinae of varied extension. The posterolateral areas of the pronotum are referred to as the humeri. The humeral angles are

generally rounded, explanate in some cases (*Triatoma flavigaster*, fig. 70A, B) or even pointed (e.g., *Triatoma mexicana* [figs. 113, 114A, C], some *T. eratyrusiformis* [figs. 67-69]). The humeri are more or less elevated; they bear a conspicuous suberect tubercle or spine in the species of *Eratyrus* (figs. 196, 197, 198A). The pronotum appears glabrous in many species, but it is covered in others by more or less conspicuous hairs or setae which may provide specific characters. The lateral portions of the

prothorax (fig. 11B) form the propleura; socket-like expansions, the acetabula, cover the insertions of the coxae of the fore legs; the color of the acetabula, as well as of those of the meso and metathorax, which may be different from that of the rest of the pleura, furnishes in some specific characters.

The ventral portion of the prothorax, the prosternum (fig. 11A), is comparatively small and pointed posteriorly. The central portion of the prosternum is occupied, as in other Reduviidae, by a stridulitrum, formed by a longitudinal field of minute transverse ridges, the stridulatory sulcus. The corresponding plectrum (or rasp) is the tip of the rostrum, which, when the bug stridulates, is moved back and forth over the stridulitrum. *Linshcosteus* and *Cavernicola* differ from the other Triatominae, and from most other Reduviidae, by the absence of a prosternal stridulitrum (fig. 15). In *Linshcosteus* (fig. 15A), there is a narrow longitudinal area of the prosternum devoid of setae, but no stridulitrum is perceptible. In *Cavernicola* the glabrous portion of the prosternum is more extensive, and irregularly reticulate microscopically (fig. 15B, C). The stridulitrum extends from the anterior border of the prosternum to the tip of its posterior projection (fig. 13); its shape varies in different genera (figs. 12, 13). The distance between the peaks of the transverse ridges of the stridulitrum varies in the few species examined for this character from about 7 μ (*Panstrongylus rufotuberculatus*) to 10 to 12 μ (*Psammolestes arthuri* and *Triatoma rubrofasciata*). The number of transverse ridges varies in the specimens examined from about 90 (*Psammolestes arthuri*) to about 140 (*Belminus peruvianus*) and up to 300 in *Panstrongylus*, according to Schofield (1977). We illustrate details of the stridulitrum for a few species of Triatominae (figs. 13, 14, 15); more comprehensive research is needed before the taxonomic usefulness of the microstructure of the stridulitrum can be evaluated. With low magnification (approx. $\times 40$) diffraction patterns on the stridulitrum appear in the SEM image (fig. 13B).

Schofield (*loc. cit.*) has analyzed the "song" of five species of triatomines but has not been able to point out the function of sound production in these bugs.

The posterior portion of the dorsal surface of the mesothorax, visible between the wing bases, is the scutellum (figs. 4A, B; 11B). This sclerite is triangular in all genera except in *Parabelminus* where it is trapezoidal (fig. 311E). The triangular scutellum bears a posterior process. The dorsal surface of the scutellum is rugose with its central area more or less depressed and bordered by two more or less well-developed, posteriorly convergent carinae. In some species (*Triatoma flava* [fig. 70B], *T. obscura*, *T. platensis* [fig. 145]) there are 1 + 1 conspicuous submedian, erect processes on the anterior margin of the scutellum which are in close contact with the hind border of the pronotum. In *Belminus* (fig. 304, 305E) 1 + 1 large setiferous subconical horizontal projections arise sub-basally from the sides of the scutellum. At the extreme basal angles of the scutellum of the Rhodniini 1 + 1 minute knoblike projections, almost covered by the hind border of the pronotum, can be observed. The posterior projection of the scutellum is in most cases cylindrical, elongate and sub-horizontal, with its apex pointed, rounded or even truncate, especially in lateral view. In rare cases (e.g., *Cavernicola pilosa* [fig. 292], *Triatoma spinolai* [figs. 177 A; 179A]) the apical process is reduced to a mere knoblike protuberance. In *Eratyrus* (figs. 197, 198A), the scutellar process is unusually long, obliquely upward directed and sharply pointed. In *Micro-triatoma* (fig. 318C), the scutellar process is flattened and in the shape of an inverted spoon.

The mesosternum (fig. 11A) is large and in many species bears mesially a knob or transverse ridge-shaped projection. The presence or absence and the shape of this projection furnish characters which we believe could profitably be explored taxonomically, especially on the species group level.

The dorsal portion of the metathorax is not perceptible in the triatomines. The metasternum (fig. 11A) is either smoothly contiguous with the mesosternum, or connected to the latter by a longitudinal ridge, or even separated from it by a transverse carina; this is another potential source for taxonomically useful characters.

The lateral portions of the thoracic segments, the pleura (fig. 11B), are of similar shape in all triatomines; however, their surface sculpture or their color does in some cases provide specific characters.

WINGS: Triatomines possess two pairs of wings. The forewings (fig. 11E), associated with the mesothorax, are referred to as hemelytra, an allusion to their being only partly elytrous with a membranous posterior portion. The hind wings (fig. 11C), appendages of the metathorax and covered in resting position by the hemelytra, are uniformly membranous. Most Triatominae have fully developed hemelytra and hind wings, viz., they are macropterous. In a few species, however, (e.g., *Triatoma phylllosoma*), both pairs of wings are strongly abbreviated (fig. 140, 141) and fall considerably short of the apex of the abdomen; these forms are referred to as brachypterous. In all females and some males of *Triatoma spinolai* the hemelytra and hind wings are reduced to tiny pads (figs. 177C); these micropterous specimens seem to be wingless unless exam-

ined with high magnification. Truly apterous triatomines are not known.

The hemelytra are divided into three distinct parts. These are the basal corium, separated by the claval suture from a narrow mesial portion, the clavus, and a large apical area, the membrane. The corium is more heavily sclerotized

than the rest of the hemelytron, triangular in shape, with several more or less distinct veins, and in some species beset with conspicuous setae that may vary in length considerably from one species to the other. The clavus is coriaceous on its basal and membranous on its apical portion. The membrane, more delicate in

structure than the corium, occupies the rest of the hemelytra. The membrane is invariably glabrous and more or less wrinkled. Pattern elements are in many cases conspicuous on the corium but rarely so on the membrane which is fumose in most species. In some species the membrane may show central cloudy spots darker than the remainder, or the veins may be conspicuously darkened or bordered with light color. In *Psammolestes*, *Rhodnius* and some species of *Panstrongylus* and *Triatoma* (e.g., *T. delpontei*, *T. platensis*, *T. venosa*) more complex membranal patterns obtain.

The veins and cells of the hemelytra and hind wings are used frequently in reduviid systematics, on the subfamilial and generic as well as on the specific level. In the Triatominae, considerable uniformity of fore and hind wing

venation obtains, and we therefore make little use of it in the systematic part of this paper. For completeness' sake and for eventual future use we illustrate the fore and hind wings (fig. 11C, E) with their venation, accompanied by the pertinent terminology. Our terminology follows that suggested by N. T. Davis (1961), which is slightly different from that used by Usinger (1944) and Abalos and Wygodzinsky (1951), whose *analis* is now interpreted as *postcubitus*.

In flight, the hemelytra and hind wings are firmly attached to each other by a coaptor, or wing coupling mechanism, similar to that found in most Hemiptera. Triatomine coaptors were described in detail by Galliard (1936) and in many taxonomic papers on Triatominae by Lent and Jurberg (1967, 1968, 1970). The number

and size of the elements making up the coaptor are of no interest for the classification of higher groups in the subfamily, and are of minor importance on the specific level; they will not be mentioned further in this paper.

LEGS: The legs of triatomines are of generalized structure, with all segments, coxa, trochanter, femur, tibia and tarsus, normally developed (fig. 11D). The legs vary from comparatively short and stout (e.g., *Bolboderini*, *Psammolestes*, species of the *protracta* group of *Triatoma*) to slender and elongate, as in *Rhodnius*, *Dipetalogaster*, *Linchcosteus*, *Eratyrus* and various species of *Triatoma*. The color of the legs generally agrees with the general body color, but in some cases spots or annuli produce characteristic patterns, providing excellent taxonomic characters. The structure of

the coxae and trochantera is simple. The femora may be cylindrical or variously thickened and even laterally compressed (e.g., *Psammolestes*). Their under surface may be smooth, or, more frequently, beset with a small number of denticles or setiferous processes; these are best developed on the fore and mid femora. The tibiae are longer and more slender than the femora; they are devoid of denticles or processes. In many species, the tibia bears apically a spongy fossula, also present in many other reduviids; this is a vesicular hemolymph-filled structure (fig. 17B) beset with a large number of adhesive glandular setae among which there are scattered short sensory pegs (fig. 17C). The distribution of the spongy fossulae is of taxonomic importance; they may occur only on the first, or on the first and

second pair of legs, or even on all three. In most species, spongy fossulae are only found in males; in others, they occur also in females or are even completely absent. Although normally

limited to adult bugs, spongy fossulae are present, to our surprise, and apparently fully functional, in all nymphal instars of *Parabelminus*, and in at least the fifth nymphal instar of *Mi-*

crotriatoma. Spongy fossulae have an adhesive function, allowing certain triatomines, such as *Rhodnius*, to climb smooth glass walls; they may also serve to improve the males' grasp of the females during copulation. We are at a loss to suggest the function of spongy fossulae in nymphs of *Parabelminus* and *Microtriatoma*; however, it should be kept in mind that the natural retreat of the species of this genus seems to be between leaves of arboricolous bromeliads, which have unusually smooth leaves; adhesive capabilities may be of value to all instars, not only the adults.

The tarsi of most adult Triatominae are three-segmented, with the first segment being the shortest, but the adults of *Microtriatoma* and *Parabelminus* and the nymphs of all species have only two tarsomeres (figs. 311C; 315F). The pretarsus bears two simple claws. There are no empodia or pulvilli, but two bristle-like parempodia are invariably present.

Leg setae are quite variable in number and length; they are generally most apparent on tibiae and tarsi. Unusually long leg setae are found in such species as *Paratriatoma hirsuta*,

Cavernicola pilosa, *Dipetalogaster maximus*, *Triatoma eratyrusiformis* and others. Closely related species may in some cases be distinguished, among other characters, by the length and number of the hairs on their legs; e.g., *Triatoma platensis* and *T. delpontei* (figs. 62C; 146D). *Cavernicola pilosa* is unique among triatomines in possessing trichobothria on the femora in adults and nymphs (figs. 26C; 293H, I). First instar nymphs of many species of *Triatoma* and those examined of *Panstrongylus*, *Dipetalogaster*, *Eratyrus* and *Linshcosteus* have specialized tarsal hairs, described in detail in the chapter on nymphs (p. 162). Small apically curved hairs are found on the under surface of the tarsi of adults (e.g., fig. 180B); their number varies in different species from generally one or two to up to 10, the higher numbers found in species inhabiting semiarid areas.

ABDOMEN (FIG. 18). The abdomen of the triatomines is roughly ovoid, and in females frequently pointed behind. The ventral surface of the abdomen is variously microsculptured, in most cases minutely striate transversally (fig. 19A) but in others delicately wrinkled (fig.

C. *T. migrans*.

19B, C). The length and density of the setae covering the venter are in some cases taxonomically significant. The abdominal venter is convex in most species, but somewhat flattened longitudinally along the center in others, to the point where the flattened portion is very conspicuous and limited laterally by distinct ridges (e.g., *Triatoma neotomae*, *T. rubida* [fig. 156A]).

The abdomen incorporates 11 variously developed segments composed of the dorsal plates, the urotergites, and the ventral ones, the urosternites. The first urotergite is subtriangular in shape and embedded in the second. The second to seventh urotergites are transversal. In the female, the eighth urotergite is small but distinct (fig. 18D), while there is no visible eighth urotergite in the male, in which the seventh, the terminal urotergite, is widely rounded behind (fig. 18A). The second to seventh urotergites and urosternites have lateral flanges, separated from the large transversal sclerites by a distinct suture, and in most cases fused or

hinged along their external margins. These paratergites and parasternites combined form the connexivum; its width and color pattern furnish useful taxonomic characters. Segments VIII and IX form part of the external (ectodermal) genitalia (fig. 18E-G) and segments X and XI the anus.

Spiracles (fig. 18B) are found on the lateral portions of the first urotergite or in the membrane between the metathorax and the basal urotergite, and laterally on urosternites II-VII. An additional pair of spiracles occurs on the parts of the genitalic structures corresponding to the eighth segment. The distance of the spiracles from the connexival suture is of importance taxonomically.

The connexivum allows expansion of the abdomen during meals, and various strategies toward this aim have been employed by the triatomines (fig. 20). In the simplest case (fig. 20A: *Panstrongylus*, *Eratyrus*, *Linchcosteus* and most species of *Triatoma*) the outer hinge of the connexivum allows the flange to open,

and thus a considerable dilatation of the abdomen becomes possible. This is the generalized situation in the Hemiptera.

In *Dipetalogaster maximus* (fig. 20D) the dorsal connexival plate is well developed, but there is no ventral connexival plate and we must assume that it is either completely fused to the urosternite, or entirely absent. The rather lateral position of the spiracle, invariably situated on the urosternite, makes the latter hypothesis more probable. A very wide membrane connects the dorsal connexival plate to the ven-

tral sclerite. In unfed specimens, this membrane is folded and longitudinally pleated (fig. 210C) and allows for an unusual expansion of the abdomen when the specimen feeds to capacity, as shown in figure 210B. The same species possesses an additional mechanism of expansion (also found, although less conspicuous, in *Triatoma spinolai*) where in the unfed specimen the anterior portion of the urotergites overlaps the posterior portion of the preceding urotergite (fig. 20F). When feeding takes place, the posterior urotergite recedes until the mem-

brane connecting the respective urotergites fully expands. The expansion mechanisms are identical in both sexes.

Another type of connexival modification is found in *Triatoma spinolai* (fig. 20B, C). The dorsal connexival plates are fused to the urotergites (on slide mounts, vestigial connexival sutures can be observed in the female). In the males (fig. 20B), macropterous as well as micropterous ones, the ventral connexival plates are normally developed although comparatively narrow; they are directly articulated to the respective urosternite and the dorsal sclerite (urotergite and connexival plate). In the invariably micropterous females (fig. 20C) the ventral connexival plates are narrow, hinged to the dorsal connexival plates and connected to the respective urosternites by a large membranous area similar in appearance to that of *Dipetalogaster maximus*. It is noteworthy that this is the only case of sexual dimorphism of the connexival structure in all the triatomines.

A fourth mechanism of connexival expansion (fig. 20E) is realized in *Paratriatoma* and all Rhodniini, Alberproseniini, Bolboderini, and Cavernicolini. In both sexes of these insects the dorsal and ventral connexival plates are normally developed, but in unfed specimens the urosternite overlaps the mesal portion of the ventral connexival plate, with a distinct membrane interpolated between the mesal border of the connexival plate and the lateral border of the urosternum. This membrane is not normally visible in museum specimens, in which the ventral connexival plates seem to be exceptionally narrow, due to their being partially covered by the urosternites.

GENITALIA: The genitalia of the Reduviidae generally and of the Triatominae specifically have been investigated in considerable detail by several hemipterists, the most important references being Singh-Pruthi (1925), Galliard (1935, 1936), Dupuis (1955, 1963), Ryckman (1962), N. T. Davis (1966), and Ramfrez Pérez (1969). The reader is referred to these works as well as to the systematic papers by Lent and Jurberg (1965, 1967, 1968, 1969b, 1969c, 1970, 1972, 1975) for study in depth. Our own discussion of the genitalia will be restricted here

to those morphological features necessary for the understanding of our descriptions and keys. Our terminology is a combination of that of Dupuis (1955, 1963) and of Davis (1966).

The male genitalia, entirely ventrally situated (fig. 18B, E), consist of the narrow eighth urosternite, the ninth urosternite transformed into a genital capsule or pygophore, the actual reproductive organ or aedeagus, and one pair of small articulate appendages, the parameres. The eighth urosternite is a narrow transversal band, almost completely concealed by the seventh urosternite when at rest. Laterally, it bears the spiracles corresponding to the eighth segment. The pygophore (fig. 21D) is a semiglobular strongly sclerotized capsule with a largely membranous dorsal surface. The posterior rim of the pygophore bears a median sclerotized projection, spine-shaped in most species (e.g., those of *Triatoma*, *Eratyrus*, *Panstrongylus*) and shortly truncate or bifid in others (e.g., *Parabelminus*, *Rhodnius*, *Dipetalogaster*). The dorsal surface of the ninth segment bears the anal cone; its characters have not yet been used for taxonomic purposes, although the small sclerotized areas and their setae provide usable characters. The parameres (figs. 18C, E; 19D) insert on the dorsolateral surface of the pygophore, they are clavate, variously curved subapically, rounded, pointed or truncate distally, and beset with numerous bristles. Generic or even specific differences based on the parameres are not striking, and will not be described in this paper.

The lumen of the pygophore contains the intromittent organ, the aedeagus (fig. 21D), divided into a basal articulatory apparatus and an apical phallus. The articulatory apparatus (fig. 21C) situated dorsally above the phallus when at rest (fig. 21A) consists of the roughly horse-shoe-shaped basal plates, enclosing the basal foramen and connected near their base by the transverse basal plate bridge, the latter missing only in *Cavernicola*. The basal foramen contains a Y-shaped sclerotized structure, with the stem of the Y forming the median bridge and its arms the ductifer. The basal plates are connected to the base of the phallus by the pedicel, a structure of varying relative length in differ-

ent genera and species; it is unusually elongate in *Belminius* (fig. 23G).

The articulatory apparatus is highly modified in the bolboderine genera *Parabelminus* and *Microtriatoma* where it is transformed into a transverse plate (fig. 23D, E) with no visible pedicel.

The phallus in rest (fig. 21A, B) is an oval body, consisting of an outer phallosoma or phallotheca, and an evversible structure, the endosoma. The phallosoma is membranous with its dorsal and in many cases part of the lateral surfaces, sclerotized. The shape and extension of this dorsal phallothecal plate are useful for the identification of genera and species. It is large and from oval to subrectangular in Triatomini (fig. 21A, B; 22), from parabolic in *Rhodnius* (fig. 23B) to broadly subrectangular in *Psammolestes* (fig. 23A), very narrow sub-

rectangular in *Cavernicola* (fig. 23C) and elliptical or transverse in the Bolboderini (fig. 23F, H). Below the dorsal phallothecal plate there are normally 1+1 elongate ribbons, the basal plate struts (short, struts: fig. 21A, B) which articulate at their base with the apex of the articulatory apparatus. The struts maintain their plesiomorphic, simple structure in the Triatomini where they are in many cases connected apically to one another (fig. 21B; 22). In the Rhodniini, the struts are transformed into short convoluted plates, in most cases fused to each other (fig. 23A, B). In the Cavernicolini, the struts are roughly ribbon-shaped but not connected at their apices (fig. 23C). In the bolboderine *Belminius*, the struts are of generalized structure (fig. 23F), but in *Microtriatoma* and *Parabelminus* the basal portions of the struts are somewhat widened and closely ap-

proximated, with their apical halves fused into a single narrow, tonguelike structure (fig. 23H).

The endosoma, invaginated into the phallosoma when at rest (fig. 21A) everts into a subcylindrical, membranous structure, with several conspicuously sclerotized projections which have not been clearly homologized in the literature. The most obvious and taxonomically most useful endosomal features are the lateral endosomal processes, and a median frequently heavily sclerotized group of structures associated with the secondary gonopore. The lateral endosomal processes seem to be permanently everted in *Triatoma spinolai* (fig. 22B), but in all other triatomines examined these processes are seen through the phallosomal wall of the uninflated phallus. The processes are variously

shaped, mostly elongate, and apically either smooth, rugose and/or minutely denticulate. The potential variety of their structure is exceptionally well demonstrated by Lent and Jurberg (1975) for the genus *Panstrongylus*. In some cases, the microstructure of the lateral endosomal processes serves to identify species otherwise difficult to distinguish, e.g., *Triatoma maculata* (fig. 105D) and *T. pseudomaculata* (fig. 150D). In the first species, the appendages show longitudinal ridges and are otherwise glabrous, whereas in *pseudomaculata* there are no ridges but a number of conspicuous denticles.

The median more heavily sclerotized structures observed in the unevolved endosoma are apical in the everted phallosoma and associated with the secondary gonopore; they were de-

nominated “chitinous thickening” by Galliard (1936), “dorsal expansible medial lamella” by Ryckman (1962) and “vesica” by Lent and Jurberg in their series of descriptive papers. We use here the terminology of the last authors. The vesica (fig. 21A, B) varies from almost hyaline and membranous to more or less thickened and pigmented or it may be platelike or

hoodlike in *Panstrongylus* and some species of *Triatoma*.

The taxonomic value of the phallic structures is considerable, but because the main purpose of this paper is identification, which is generally feasible without recourse to these features, they are mentioned only in selected cases in our descriptions and keys. Lent and Jurberg

(1965, 1969b, 1969c, 1970, 1971, 1972, 1975) have systematically surveyed, described, and illustrated the male (and female) genitalia in the genera *Psammoletes*, *Rhodnius*, *Cavernicola*, *Eratyrus*, *Paratriatoma*, and *Panstrongylus*. Genitalia of the species of the large genus *Triatoma* have only been described for a few species; the most detailed but geographically restricted treatment is that by Abalos and Wygodzinsky (1961) for Argentinian species. Research done during the preparation of the present paper strongly suggests that a comparative study of the male genitalia, in combination with that of somatic characters, could assist in the much needed division of the genus *Triatoma* into species groups.

The general structure of the female genital

region is illustrated in figure 18D, F, G, which is self-explanatory. The genitalia of the female are rather uniform and furnish few taxonomic characters. The shape and vestiture of the gonocoxites IX when seen in a slide mount may differ from one species to the other (e.g., *Panstrongylus*, according to Lent and Jurberg, 1975, fig. 3), but this character need not be examined for purposes of species identification. The urotergites IX and X combine to form a rigid plate and are declivous in most genera, with the abdomen appearing pointed distally. They are practically vertical in the Rhodniini and most Bolboderini, as well as in some Triatomini, giving the abdominal tip a truncate shape.

S T R U C T U R E O F N Y M P H S

Nymphs of Triatominae can be distinguished from those of other Hemiptera by the combination of a more or less elongate, cone-shaped horizontal head, with a straight rostrum not extending beyond the prosternum, and, in most species, the presence of a prosternal stridulitrum, characteristic for almost all reduviids and found in no other group of Hemiptera.

Triatomine nymphs differ from those of other reduviid subfamilies by the combination of the stout body, the straight rostrum closely adpressed to the generally straight gula, the absence of glandular hairs (present in Apiomerinae which also have a straight rostrum) and the absence of dorsal abdominal scent gland openings (and, of course, glands) on the urotergites; these glands are present in most other reduviid subfamilies except Saicinae and Emesinae which, however, are also characterized by a very narrow body shape.

Triatominae nymphs of all instars differ from adults by the much smaller eyes, the absence of ocelli, of hemelytra and of hind wings, as well as of external genitalia. Their pronotum is not shieldlike, the tarsi have invariably two segments (three in all adult triatomines except *Parabelminus* and *Microtriatoma*), there are no spongy fossulae except in *Microtriatoma* and *Parabelminus*, and the sclerotization of the abdomen is incomplete.

There are five nymphal instars. First instar nymphs can be recognized by the pinkish color of their abdomen and the unicolorous abdominal margin, whereas in the remaining nymphal instars the connexivum is spotted. The second instar nymphs are very similar morphologically to those of the first instar except for their increased size, best measured as head length. In the first and second instars, the hind margin of the mesothorax is straight or rounded posteriorly (figs. 24A; 25D, H). In third instar nymphs, the future wing pads are delineated as faint posterolateral bulges on the meso- and metanotum (fig. 29A). These bulges become more pronounced in the fourth instar (fig. 29B) where the mesothoracic wing pads fall considerably short of the apex of the metathoracic ones. In fifth instar nymphs, the wing pads are quite elongate, with those of the mesothorax completely covering the metathoracic ones (figs. 27, 29C).

We have prepared keys for the generic determination of triatomine nymphs of the first and fifth instars. Those for the first instar will in many cases also correctly key out nymphs of the second instar. The keys for fifth instar nymphs are applicable, to a certain degree, also to third and fourth instar nymphs.

Specific characters in triatomine nymphs are notable in some cases, e.g., very long setae in

nymphs of *Panstrongylus chinai* (fig. 28A) as opposed to the short setae in other species of the genus, and the presence of conspicuous color markings in nymphs of some species of *Rhodnius*, but in others they are less striking. Keys for the specific determination of triatomine nymphs, based on color and structural characters, have previously been published, such as those by Usinger (1944) for some North American fifth instar nymphs, Abalos and Wygodzinsky (1951) for first and fifth instar nymphs of Argentinian species, and Ryckman (1961) for fifth instar nymphs of the "greater *protracta* complex." Because the nymphs of so many species of triatomines have not been described we refrain from offering specific keys to nymphs of Triatominae, which would be necessarily incomplete. The practical importance of being able to identify triatomine nymphs to species is, of course, considerable, and taxonomically and geographically comprehensive work is urgently needed.

A few notes on the morphology of triatomine nymphs follow. They should be useful for the understanding of the generic keys; also, we hope that they will stimulate further research on taxonomy of the nymphs.

First instar. Color and color patterns of first instar nymphs can be important for identification, e.g., the mottled pigment pattern characterizing the Rhodniini, or the absence or presence of leg annulation. Due to the small size and soft body of first instar nymphs, especially unfed ones, shrinkage frequently occurs in preserved specimens; therefore, structural details are best observed on slide mounts (fig. 24A). The integument is variously wrinkled (fig. 4D, E) and/or tuberculate. This cuticular microstructure is species-specific. The setae found on different body parts are extremely important taxonomically, as regards their structure and arrangement. Setae are spinulose in most genera and species (figs. 24F; 25B, F, I) but entirely smooth in *Cavernicola* (fig. 25H, K).

The head of the first instar nymphs is in most cases reminiscent of that of later instars and of the adult (e.g., *Psammolestes*, fig. 24B; *Rhodnius*, fig. 24C, *Cavernicola*, fig. 25D) and even agrees with the adult in such specialized characters as the abbreviated rostrum in

Linchcosteus (fig. 24H). The head of the first instar nymph of *Paratriatoma hirsuta*, however, is strikingly different from that of later instar nymphs and the adult, in being slender in lateral view (fig. 25E) as opposed to the strongly elevated head of later instars (fig. 29I). The first antennal segment is normally sclerotized and wrinkled in a fashion similar to that of the body integument (fig. 7A). Articles II and III as well as the basal portion of IV are sclerotized as on article I, but the apical portion of article IV is membranous and minutely annulated (fig. 7B, C). The second antennal segment bears one subapical (figs. 7A; 25F) or submedian (fig. 25I) trichobothrium in all species examined for this character.

The relative length of the rostral segments (fig. 24 H-S) provides useful key characters.

The structure and chaetotaxy of the thoracic nota provide helpful features for identification purposes. The pronotum (figs. 24A-D; 25C, D) is the largest sclerite, and has a narrow ecdysial line along its middle. The mesonotum is smaller than the pronotum and in most species decidedly longer at its middle than at its sides (fig. 24A-D). This difference in length becomes minute in *Paratriatoma hirsuta* (fig. 25C) and in *Cavernicola pilosa* the mesonotum is a narrow, transversal, ribbon-like sclerite (fig. 25D, H). The metanotum of all first instar nymphs is reduced to a pair of sublateral sclerotized plates. The size of these plates and their distance is taxonomically useful. In *Panstrongylus*, *Dipetalogaster*, *Eratyrus*, and *Linchcosteus* and in many species of *Triatoma* the metanotal plates are comparatively large, and wider than half the distance separating them (fig. 24A), but in some *Triatoma* (e.g., *T. rubrofasciata*) in *Paratriatoma* and in the Rhodniini, *Belminius*, *Parabelminius*, and *Cavernicola* the metanotal plates become much smaller, from slightly (*Paratriatoma*, fig. 25C) to considerably (e.g., *Psammolestes*, fig. 24B, and *Cavernicola*, fig. 25D) narrower than half the distance between them. This is clearly a derived condition within the subfamily (the metanotal plates are normally large in first instar nymphs of other reduviids) and may be correlated with a trend of progressive "membranization" of the body in order to allow for its greater expansion and thus facilitate larger

bloodmeals. The outer border of the metanotal plates bears normally four or five setae inserted on distinct tubercles. There are no ancillary setae in the rhodniine genera and, of course, in *Cavernicola*, but the metanotal plates of the triatomine and bolboderine first instar nymphs

have one or two discal setae. Their number and position is too variable to provide reliable taxonomic characters.

The legs of first instar nymphs are not unlike those of the adults as regards their shape, but their setae are less numerous and the tarsi

are invariably two-segmented (fig. 26A-D). The size and structure of the leg setae provide specific characters, and will have to be taken into account for descriptions of such nymphs. A character possibly of value for the characterization of higher taxa is the presence of a group of more or less numerous, very long, delicate hairs on the apical portion of the second tarsal segment (figs. 17A; 26E, F). These setae are not trichobothria, and their function is not known; it is possibly mechanical or sensory. Among the species examined for this character, these specialized tarsal hairs were found in *Dipetalogaster maximus*, *Eratyrus mucronatus*, *Linshcosteus* sp., *Panstrongylus chinai*, *herrei*, and *megistus*, and in many species of *Triatoma*, viz., *cavernicola*, *eratyrusiformis*, *gerstaeckeri*, *guasayana*, *infestans*, *lenti*, *longipennis*, *maculata*, *pallidipennis*, *rubida*,

rubrofasciata, *rubrovaria*, *sordida*, *spinolai*, and *vitticeps*. These hairs were not observed in *Triatoma barberi*, *lecticularia*, *neotomae*, *protracta*, and *sanguisuga*, or in *Paratriatoma hirsuta*, *Rhodnius neivai*, *prolixus*, *robustus* and *pictipes*, *Psammolestes arthuri*, *coreodes* and *tertius*, *Belminus peruvianus*, and *Cavernicola pilosa*. At least in *Panstrongylus chinai*, similar setae, although fewer in number, are also present on the hind tarsi of second instar nymphs.

Cavernicola pilosa first (and later) instar nymphs are unique in the subfamily in having from three to five trichobothria on the femora, and unusually long setae on the tibiae (fig. 26C).

Another taxonomic character found on the abdomen of first instar triatomine nymphs is the arrangement of the setae of the urotergites. Among the species examined, the most fre-

quent pattern is the arrangement of the setae in two transverse rows (figs. 24A, F; 25B), generally with the anterior and posterior rows quite similar, as in *Belminius peruvianus*, *Cavernicola pilosa*, *Eratyrus mucronatus*, *Linchostes sp.*, *Panstrongylus chinai*, *herrei*, and *megisitus*, *Paratriatoma hirsuta*, and *Triatoma eratyrusiformis*, *infestans*, *lecticularia*, *lenti*, *longipennis*, *maculata*, *pallidipennis*, *protracta*, *rubida*, *rubrofasciata*, *sordida*, and *vitticeps*. In *Dipetalogaster maximus*, there is a distinct posterior row, but the anterior row is irregular, and the setae are not arranged in a straight transverse row. The first instar nymph of *Triatoma gerstaeckeri* and *Parabelminus yurupucu* has the setae of the urotergites arranged in three distinct rows (fig. 24E). In the Rhodniini examined, viz., *Psammolestes arthuri*, *coreodes*, and *tertius*, and *Rhodnius neivai*, *prolixus*, *robustus*, and *neglectus*, the setae are irregularly scattered and do not form transverse rows (fig. 24G).

Fifth instar. Fifth instar nymphs agree with the corresponding adults in many structural characters which makes it easy to assign them to their respective genera (see our key to fifth

instar nymphs). We are giving descriptions of fifth instar nymphs on the tribal and generic level, where possible. However, reared material is usually required to establish the specific identity of late instar nymphs, especially when two or more congeneric species occur sympatrically. Color patterns of adults and nymphs can be quite different, and relative measurements of different body parts of late instar nymphs and adults may differ enough to make identification by comparison uncertain.

A few fifth instar nymphs are illustrated in figures 27; 28A; 29C-P. We have made no attempt to describe or illustrate these nymphs for all species even though they may be known.

The structure of the head of fifth instar nymphs is much as in the adult, except for the absence of ocelli and the much smaller eyes. *Triatoma circummaculata* is unique because in the nymph the rostral ratio is very different from that of the adult (fig. 55C, D). The antennae are similar to those of the first instar, viz., there is only one trichobothrium on the second segment, and in most cases only the fourth segment shows annulation. The exceptions are

the entirely unrelated *Cavernicola pilosa* and *Dipetalogaster maximus* where also the third segment is annulate.

The pronotum is trapezoidal, and shows distal and lateral tubercles when these are present in the adult (fig. 29C). The legs are structurally very much like those of the adult, except the two-segmented tarsi. Spongy fossulae are absent except in *Microtriatoma* and *Parabelminus* where they occur on all three pairs of legs, similar to the condition found in the adult.

Taxonomically useful characters are found in the abdomen, especially as regards the structure of the integument of the dorsal surface (fig. 27; 27A). It may be smooth, minutely granulose, rugose or even coarsely tuberculate, and with (fig. 27A, B, D) or without (figs. 27C; 28A) a series of large median tubercles. When present, these tubercles normally number five, but in at least one species (*Triatoma nigromaculata*) there are only four, in *T. rubrofasciata* there are either 3 or 4, or none and in *Panstrongylus geniculatus* (fig. 27A) there are either three or two tubercles, or none. In all other species examined, the number of tubercles, or their absence, has been found to be constant. The presence or absence of median tubercles or tubercle-like aggregations of granules in the examined species of Triatominae are shown as follows:

STRUCTURE OF DORSAL SURFACE OF ABDOMEN OF FIFTH INSTAR NYMPHS OF TRIATOMINAE

Urotergites without series of submedian tubercles or aggregations of granules along midline

Triatoma barberi, *lecticularia*, *nitida*, *peninsularis*, *protracta*, *rubida*, some *rubrofasciata*, *spinolai*; *Dipetalogaster maximus*; *Panstrongylus chinai*, some *geniculatus*; *Paratriatoma hirsuta*; *Rhodnius neivai*, *pictipes*, *prolixus*, *robustus*; *Psammolestes arthuri*, *coreodes*, *tertius*; *Cavernicola pilosa*; *Belminus peruvianus*; *Microtriatoma trinidadensis*; *Parabelminus yurupucu*; *Alberprosenia goyovargasi*.

Urotergites with series of submedian tubercles or aggregations of granules along midline, in some cases very faint (number of tubercles or aggregations in parentheses).

Surface of urotergites smooth or only minutely granulate or rugose

Triatoma cavernicola (2-3), *dimidiata* (5), *eratyrusiformis* (5), *flavida* (3-4), *gerstaeckeri* (5), *longipennis* (5), *nigromaculata* (4), *pallidipennis* (4-5), *phylllosoma* (5), *recurve* (5), some *rubrofasciata* (3-4), *sanguisuga* (5); *Eratyrus mucronatus* (5); *Linchosteteus* sp. (5); *Panstrongylus herreri* (5), some *geniculatus* (2-3), *lignarius* (5), *lutzi* (5), *megistus* (5), *rufotuberculatus* (5).

Surface of urotergites with numerous coarse granules

Triatoma arthurneivai (5), *brasiliensis* (5), *circummaculata* (5), *deanei* (5), *delpontei* (5), *dispar* (5), *guasayana* (5), *infestans* (5), *lenti* (5), *maculata* (5), *matogrossensis* (5), *patagonica* (5), *platensis* (5), *pseudomaculata* (5-6), *sordida* (5), *tibiamaculata* (5), *vitticeps* (5), *williami* (5).

KEY TO THE GENERA OF TRIATOMINAE, BASED ON FIRST INSTAR NYMPHS¹

1. Fourth antennal segment longer than first, second and third combined (fig. 25A); mesonotum in shape of narrow transverse band, shorter than half the length of pronotum (fig. 25D, H); surface of body, antennae and legs with very long erect or decumbent simple setae (figs. 25K, H; 26C); femora with trichobothria (fig. 26C) *Cavernicola*
Fourth antennal segment shorter than first, second and third combined (figs. 24A-C; 25E); mesonotum longer at midline than at sides, and not shorter than half the length of pronotum (fig. 24A-D); surface of body in most cases only with short setae, some being spinulose (fig. 24E-G); when setae elongate, then invariably spinulose (fig. 25B, J); femora not with trichobothria 2
2. Spongy fossulae present on all three pairs of legs *Parabelminus*; *Microtriatoma*²
Spongy fossulae absent 3
3. Head, thorax and legs mottled with light and dark; setae of urotergites very short, irregularly scattered (fig. 24G) 4
Head, thorax and legs of uniform color, or dark with light areas, never mottled; setae of

¹Spanish version of key, p. 464, Portuguese version, p. 483.

²Not seen; characters deduced from those of fifth instar nymph.

- urotergites in most cases arranged in two transverse rows (fig. 24A, F) 5
4. Head elongate, conical, antecular region about twice as long as wide (fig. 24C), rostrum slender (fig. 24Q) *Rhodnius*
- Head short and wide, antecular region about as long as wide (fig. 24B); rostrum stout (fig. 25S) *Psammolestes*
5. Rostrum abbreviated, not attaining prosternum (fig. 24H) *Linchosteus*
- Rostrum of normal length, attaining prosternum (fig. 24I) 6
6. Setae of body and appendages very long, erect or decumbent (fig. 25B, C, E, G); apex of distal segment of hind tarsus without specialized sensory hairs *Paratriatoma*
- Setae of body and appendages shorter than shown in fig. 25B, C, E, G; apex of distal segment of hind tarsus with (fig. 26E, F) or without (fig. 26A-D) specialized sensory hairs 7
7. Hind tarsus without specialized sensory hairs 8
- Hind tarsus with specialized sensory hairs (fig. 26E, F) 10
8. Head very short, not longer than wide across eyes *Alberprosenia*¹
- Head longer than wide (fig. 24A, D) 9
9. Underside of femora with conspicuous setiferous denticles; postocular portion of head with sides parallel, abruptly constricted before neck (fig. 24D) *Belminus*
- Underside of femora with setiferous tubercles not different from remaining; sides of postocular portion of head rounded, gradually converging with neck (fig. 24A) *Triatoma* (part)
10. Rostrum stout or slender; if slender, then first segment less than half as long as second (fig. 24P) 11
- Rostrum slender, with first segment more than half as long as second (fig. 24M) *Eratyrus*
11. Third rostral segment with paired rostral organ (fig. 10D); body length more than 6 mm. *Dipetalogaster*
- Paired rostral organ absent; body length less than 6 mm. *Panstrongylus*; *Triatoma* (part)

Bolbodera is not included in the above key.

KEY TO THE GENERA OF TRIATOMINAE, BASED ON
FIFTH INSTAR NYMPHS²

1. Body and appendages with numerous erect or decumbent very long hairs (figs. 28A; 29F, I); head strongly convex dorsally (fig. 29F,

¹Not seen; characters deduced from those of fifth instar nymph.

²Spanish version of key, p. 464; Portuguese version, p. 483.

- I); antenniferous tubercles without apicolateral process; abdomen without series of tubercles at center of urotergites (fig. 28A) 2
- Body and appendages without numerous very long erect or decumbent hairs; head strongly convex above only in a few cases (fig. 29J); antenniferous tubercles with or without apicolateral process; abdomen with (fig. 27A, B, D) or without (figs. 27C; 28B) series of tubercles along midline of urotergites ... 4
2. All setae simple (as in fig. 25H, K); eyes situated at middle of head laterally (fig. 29F); fourth antennal segment longer than any of the preceding (fig. 29F); third and fourth antennal segments microscopically annulate; stridulatory sulcus absent; tarsi elongate, fore tarsi about half as long as tibiae *Cavernicola*
- Setae spinulose (as in fig. 25J); eyes situated behind middle of head (fig. 29I); fourth antennal segment about as long as second or third (fig. 29F); only fourth antennal segment microscopically annulate; stridulatory sulcus present; tarsi not elongate, fore tarsi shorter than half the length of tibiae 3
3. Legs relatively long and slender (fig. 28A), with posterior femora 8.5 times as long as wide; first rostral segment twice as long as third *Panstrongylus* (part)
Legs short and stout (as in fig. 28B), with posterior femora less than six times as long as wide; first rostral segment less than twice as long as wide (l:0.7) *Paratriatoma*
4. Genae very prominent, projecting beyond level of apex of clypeus by distance equal to width of clypeus apically (fig. 29H, K); antenniferous tubercles with conspicuous api-

- colateral projections (fig. 29K); abdomen without series of large tubercles dorsally along middle 5
- Genae not or only slightly surpassing level of apex of clypeus anteriorly (fig. 29E, G, J, L-Q); antenniferous tubercles with or without conspicuous apicolateral process; abdomen with or without series of four or five tubercles dorsally along midline 8
5. Femora without spines or denticles on under surface; spongy fossulae present on tibiae of all pairs of legs; thorax not granulose, with numerous short scalelike setae *Microtriatoma*
 Femora with conspicuous spinelike processes on under surface; tibiae with or without spongy fossulae; dorsal integument heavily granulose 6
6. First and second rostral segments subequal in length (fig. 29H); spongy fossulae absent *Belminus*
 First rostral segment much shorter than second; spongy fossulae absent or present 7
7. Genae spinelike; spongy fossulae absent; tarsi elongate, several times as long as diameter of tibia apically *Bolbodera*¹
 Genae platelike, laterally compressed, apex rounded in side view; spongy fossulae present on all legs; tarsi very short, about as long as diameter of tibia apically *Parabelminus*
8. Total length not more than 5 mm.; overall color piceous or black; head delicately granulose, short and very wide (fig. 29P), not longer than wide across eyes; rostrum with third segment only half as long as first (as in fig. 320B); femora fusiform, but not compressed laterally *Alberprosenia*
 Length more than 5 mm., head longer than wide across eyes; remaining characters varied 9
9. Head short and wide, smooth (fig. 29Q); lateral postocular callosities very prominent, about four-fifths as wide as eyes (fig. 29Q); stridulatory sulcus less than twice as long as wide (fig. 12D); rostrum strongly flattened dorsoventrally; pronotum smooth; femora widened, compressed laterally; abdomen granulate but without large tubercles dorsally along midline *Psammolestes*
 Head not as above; prominent lateral postocular callosities absent; stridulatory sulcus, when present, more than twice as long as wide (fig. 12A, C, E); remaining characters varied 10
10. Head elongate (fig. 29 O); antenniferous tubercles situated on anterior third or fourth of anteocular region (fig. 29 O); abdomen granulose dorsally but without row of median tubercles *Rhodnius*
 Head elongate or short; antenniferous tubercles situated behind anterior fourth of anteocular region (fig. 29D, E, G, J, L-N); abdomen dorsally with or without series of median tubercles 11
11. Rostrum abbreviated, not extending back beyond level of eyes (as in fig. 24H); stridulatory sulcus not developed *Linshcosteus*
 Rostrum of normal length, attaining prosternum (figs 29D-J); stridulatory sulcus present 12
12. Rostrum with first and second segments elongate, subequal in length, third short (fig. 29G); abdomen dorsally with a series of five prominent median tubercles *Eratyrus*
 Rostrum with first segment invariably shorter than second (fig. 29D-F, H-J); abdomen dorsally with or without series of median tubercles 13
13. Head short, wide (fig. 29M); antenniferous tubercles situated behind middle of anteocular region (fig. 29J, M) *Panstrongylus* (part)
 Head long and narrow; antenniferous tubercles situated at or before middle of anteocular region (fig. 29D, E, L, N) 14
14. Genae distinctly surpassing apex of clypeus (fig. 29N), pointed; third and fourth antennal segments minutely annulate; abdomen without series of median tubercles dorsally; size more than 25 mm. *Dipetalogaster*
 Genae tapering or rounded apically, not or only slightly surpassing apex of clypeus (fig. 29L); only fourth antennal segment annulated; abdomen dorsally with or without series of median tubercles; size 25 mm. or less *Triatoma*

STRUCTURE OF EGGS

Detailed descriptions and illustrations of eggs of Triatominae have been published by Galliard (1935), Usinger (1944), Abalos and

Wygodzinsky (1951), Ryckman (1962), and others. These papers should be consulted for more detailed information than that given here.

The eggs of most triatomines are slightly asymmetrical and oval, such as in *Triatoma*

¹Not seen; characters deduced from those of adult.

(fig. 30A), *Panstrongylus*, *Dipetalogaster*, *Eratyrus*, *Paratriatoma*, *Belminius*, and *Parabelminius*. These eggs have an almost imperceptible neck and a convex lid, the outlines of which are continuous with those of the main body of the egg. In these species, the chorion is covered with mainly hexagonal markings, which may be smooth (fig. 30E, F) or provided with apparent perforations (fig. 30B, D), tubercles, or small projections. These features on the chorion—and very similar ones on the lid—are species specific. An exception is the two types of morphologically different eggs, smooth and rough, produced by females of different populations of *Triatoma protracta*. In *Rhodnius* (fig.

31C) the egg has a distinctly constricted neck and the chorion reticulations are concave with an apparent median opening (fig. 30D). The egg of *Psammolestes coreodes* is oval, but that of *P. arthuri*, frequently laid in masses (fig. 282B), is subcylindrical (fig. 31A). *Psammolestes* eggs resemble those of *Rhodnius* by their distinctly constricted neck and overall chorion structure, but differ by their flat lid.

The eggs of the aberrant genus *Cavernicola* (fig. 31E) are oval and have a distinctly constricted neck; their chorion is provided with apparently deep, transverse pits arranged in short, irregular rows (fig. 31F).

A U T H O R S ' R E M A R K S

KEYS AND DESCRIPTIONS: The initial step leading to identification of a triatomine tribe, genus, or species is the use of the keys, followed by comparison of the specimen with the respective description and illustrations. Reliance on the keys alone is not recommended, unless much familiarity with the group has been gained. Our keys are in English, but many—gathered in an appendix—are translated into Spanish or Portuguese, or both, in order to facilitate usage by local workers in Latin America.

The style of descriptions is standardized within genera, but may differ from one genus to the other.

The description of color involves in many cases the use of generalized terms such as light brown, reddish, fumose, and others, reflecting not only the innate variability of color in the Triatominae, but also its variability according to the bugs' state of preservation. Specimens caught and killed shortly after a bloodmeal tend to be darker than those killed between meals.

Measurements of body length and of width of pronotum and abdomen are given as ranges. For the dimensions of other body parts, ratios, again as ranges, are given, as follows:

Length/width of head (head measured longitudinally from apex of clypeus to neck, the latter not included; head measured transversally across eyes).

Length of head/length of pronotum (with

pronotum measured along midline, from anterior border of collar to posterior margin of hind lobe).

Anteocular/postocular portion of head (measured dorsally from level of apex of clypeus to anterior border of eye, and from posterior border of eye to neck, the latter not included), as in figure 4C.

Width of eye/synthlipsis, as shown in figure 4C.

Ratio of antennal segments, viz., relative length of segments with first segment forming the basic unit of 1.

Ratio of rostral segments, viz., their relative length, with first segment forming the basic unit of 1.

The few other measurements given need not be explained in detail.

When possible, five males and five females were measured for a given species, but in many cases fewer specimens were available. No statistical treatment of measurements was made.

ILLUSTRATIONS: We have illustrated this paper as profusely as possible, in the hope of thus providing the reader with a useful aid to understanding structure and to facilitate determination. Most of the photographs are original as are the detailed drawings, but many of the habitus drawings have been published before in scattered publications, mainly by us and our previous collaborators.

LITERATURE: The vast bibliography of Cha-

gas' disease contains literally thousands of minor references to triatomines, mostly regarding some biological detail, restricted distributional data, or physiological, medical, or protozoological information irrelevant to the purpose of the present paper. Such references are not listed here. Even thus, "Literature Cited" is selective; papers contained are restricted to those mentioned either in the current text or in the synonymous or bibliographical references under the headings for the various taxa. We have endeavored to list references to all original descriptions, to the first publication of all existing combinations, and to all synonyms. We have also included papers that contain other important, principally systematic, information on the Triatominae. However, no attempt has been made to indicate bibliographical sources for all statements contained in the text.

SPECIES CONCEPT: In this paper, species are based on external morphological and chromatic characters, including the genitalia. Subspecies are not recognized.

We have taken into account the experimental work done on hybridization in the Triatominae. For instance, *Triatoma peninsularis* and *T. sinaloensis*, separated geographically by the Gulf of California, differ somatically, as much as we know, by a single character, viz., the degree of overall pigmentation. This relatively insignificant feature taken alone would not suggest specific status were it not that Ryckman (1962) has shown that *sinaloensis* and *peninsularis*, when

crossed in the laboratory, produce at most early embryos but not any viable descendants. On the other hand, we also agree with Ryckman (1971) when he considers as conspecific the numerous allopatric color forms of *Paratriatoma hirsuta*, although nothing is gained by actually giving these color forms taxonomic status as Ryckman does.

We do not consider the production of fertile laboratory hybrids between specimens widely separated by numerous behavioral, structural, and chromatic characters as proof for conspecificity of the parents, because in this case it is man who has eliminated the geographical and/or ecological barriers that separate the parent species in nature. An example is the case of *Triatoma infestans* and *T. platensis*, which easily produce fertile hybrids in the laboratory. These hybrids are identical with those found naturally in a peridomestic situation (primitive chicken coop, fig. 2C) after reproductive barriers (geographical and niche separation) had broken down due to human activity. On the other hand, if fertile hybrids cannot be produced under laboratory conditions, specific difference between the putative parents is strongly suggested (see above). Usinger, Wygodzinsky and Ryckman (1966) gave a useful summary of reported hybridization experiments. These authors (*loc. cit.*) and Schreiber et al. (1974) also contributed to and surveyed our knowledge of the cytotaxonomy and cytogenetics of the Triatominae.

S Y S T E M A T I C S

TRIATOMINAE JEANNEL

- "Conorhinides" Amyot and Serville, 1843, p. 383 (part).
Conorhinidae: Walker, 1873a, p. 50 (part).
Conorhinaria: Distant, 1904, p. 282 (part).
Conorhinini: Banks, 1910, p. 17 (part).
Triatomini Jeannel, 1919, p. 176.
Triatomidae: Pinto, 1926c, p. 485.
Triatominae: Usinger, 1939, p. 34; Lima, 1940, p. 167; Usinger, 1944, p. 26.

Hematophagous Reduviidae. Head in most cases elongate, twice as long as wide across eyes or even longer; dorsal interocular sulcus weakly developed or obsolete. Antennae insert-

ed laterally before eyes; their first segment the shortest, not or only very slightly surpassing apex of head; second segment with one or several trichobothria; third and fourth segments filiform. Rostrum with second and third segments forming a continuous straight line, close to under surface of head; third segment capable of flexing upward when rostrum is forwardly directed. Ocelli invariably present, rarely obsolescent, in many cases inserted on distinct, widely separated protuberances. Pronotum with posterior longer than anterior lobe; posterior lobe in no case with 1+1 tongue-like flat processes at hind margin. Scutellum triangular,

with single posterior process; in one genus scutellum trapezoidal, truncate posteriorly, without process. Hemelytra distinctly divided into normal-sized corium and membrane; venation not specialized, membrane with two cells, cubital cell not developed. Nymphs without dorsal abdominal glands; adults without scars of dorsal abdominal gland openings.

TYPE GENUS: *Triatoma* Laporte.

DISTRIBUTION: Western Hemisphere; Oriental region.

DISCUSSION: The Triatominae is one of about 22 subfamilies of the Reduviidae. The family itself can be distinguished from other, superficially similar Hemiptera, e.g., certain Coreidae (figs. 32B, 33C), and others by the combination of a distinct neck (figs. 32A, C; 33A), the relatively short rostrum which does not extend beyond the prosternum (figs. 4I; 11A; 33A; 88), the almost universal presence of a stridulatory sulcus on the prosternum (figs. 11A, 13) and, at least in the Triatominae, the two simple, elongate membranal cells of the hemelytra (figs. 4A; 11E).

The Triatominae differs from other reduviid subfamilies by a combination of various characters: the absence of a well-developed interocular sulcus (fig. 4A, C); the laterally inserted antennae (fig. 4E, I), the straight rostrum close to the under surface of the head when in rest (fig. 4I) as opposed to the more or less curved rostrum of many other reduviids (figs. 4F, 33B), the membranous articulation of the second and third rostral segments allowing the third to be flexed upward when the rostrum is in feeding position (fig. 4E), the absence of dorsal abdominal scent glands, and, of course, the need for bloodmeals.

RELATIONSHIPS, PHYLOGENY, AND CLASSIFICATION

The genera of hematophagous Reduviidae have classically been listed in the subfamily Reduviinae (formerly Acanthaspidae) by Stål (1872), Lethierry and Severin (1896), and others. It was Jeannel (1919) who for the first time formally differentiated the group on a su-

prageneric level, as the tribe Triatomini. Ever since, these insects have been recognized as a monophyletic group, in most cases as a subfamily. We have attempted to establish the sister group of the Triatominae.

The obviously apomorphic traits of the triatomines, viz., the obligatory hematophagous condition and the upwardly flexible third rostral segment when the rostrum is in feeding position (fig. 4E), are to our knowledge not found in any other reduviid. These characters are autapomorphic and thus of no value for determining relationships with other groups of Reduviidae, but they do establish the Triatominae as a monophyletic group. The absence of dorsal abdominal scent gland openings in the Triatominae (an apomorphy within the Reduviidae), although comparatively uncommon in the family, is also found in all Saicinae and Emesinae as well as in scattered genera placed in the Reduviinae. None of these share any other apomorphic character with the Triatominae, and no close relationship between the former and the latter is postulated.

The external genitalia of the Triatominae are of plesiomorphic structure in the less special-

ized forms (Triatomini) and agree symplesiomorphically with the genitalia of many other reduviids, a fact certainly not helpful for the analysis of relationships. The same applies to the venation of the hemelytra and hind wings.

Of possible significance is the combination, unusual for the Reduviidae, of a straight rostrum closely adjoining the gula, and the lateral insertion of the antennae (fig. 4I). These features, apomorphic within the Reduviidae, are not restricted to the Triatominae, being also found in some Harpactorinae and Apiomerinae. These groups, however, belong to a different phyletic lineage, the "harpactorine complex" (Davis, 1961) and are not closely related to the Triatominae.

A possible sister group, sharing with the Triatominae a straight rostrum adpressed to the gula and distinctly laterally inserted antennae (fig. 4G, H), is the Physoderinae. This is a small monophyletic group, with one speciose genus ranging widely over the Oriental region, 11 small genera in Madagascar, and one small Neotropical genus known from Panama and northern Venezuela. The physoderine bugs

have dorsal abdominal glands as opposed to their absence in the Triatominae, and although the rostrum is straight and closely parallel to the gula as in the Triatominae, the third rostral segment is apparently not capable of flexing upward when the insects are feeding. Regarding feeding habits, however, Carcavallo and Tonn (1976) mentioned *Cryptophysoderes*—the only Western Hemisphere physoderine—as being of “hábitos optativos hematófagos.” If the hematophagous habits of *Cryptophysoderes* were confirmed, even as facultative, the hypothesis of a sister group relationship between the Triatominae and Physoderinae would be strengthened because the bloodsucking habit is derived within the Reduviidae and can be assumed to have arisen only once in the family.

Traditionally (e.g., Usinger, 1944) the Triatominae have been divided into four tribes: the Triatomini, Rhodniini, Cavernicolini, and Bolboderini to which the Alberproseniini has recently been added (Martínez and Carcavallo, 1977) (see Contents for genera included). The Rhodniini, Cavernicolini, Bolboderini, and Alberproseniini each constitute a well-defined monophyletic or monotypic group, but the Triatomini as customarily understood is paraphyletic. Furthermore, while there are good autapomorphic characters to define each of the monophyletic and monotypic assemblages, we were unable to discover synapomorphic characters that would unequivocally point out the relationships of these assemblages to each other and/or to the rest of the subfamily. The Triatomini is at this time defined only by a symplesiomorphic character, viz., the lack of specialization of the male genitalia as compared to the other tribes of the subfamily where the male genitalia have a specialized, although different, structure in each tribe.

All monophyletic and monotypic tribes do share one apomorphic character, viz., the connexival modification shown in figure 20E, which is not found in the Triatomini except in the monotypic *Paratriatoma*. However, *Paratriatoma* shares derived characters also with certain Triatomini, viz., *Triatoma protracta* and its allies, such as the elongate body shape and unusually short legs, as well as the obligatory host-relationship with *Neotoma*. The fore-

going allows for two phylogenetic hypotheses. The first hypothesis is that *Paratriatoma* is closest to the monophyletic and monotypic tribes because it shares with them a peculiar apomorphic connexival structure, but being plesiomorphic within the assemblage because it has unmodified male genitalia. In this case, the peculiar body shape and short legs of *Paratriatoma* would be similar to those of *protracta* and its allies due to convergence. The second hypothesis postulates a sister-group relationship between the *protracta* complex and *Paratriatoma*; this would require the assumption that the connexival modification mentioned above had arisen independently at least twice, once in a *protracta*-like triatomine and at least once in the lineage or lineages leading to the tribes having modified male genitalia. The hypothesis of a multiple origin of the connexival modification is made plausible by the fact that connexival modifications of somewhat different kind but with similar results (enlargement of abdominal capacity) have appeared at least twice more independently in the Triatominae, in *Triatoma spinolai* (fig. 20B, C) and in *Dipetalogaster maximus* (fig. 20D).

If additional discoveries were to show that *Paratriatoma* is indeed the closest relative of the *protracta* complex of *Triatoma*, then the former would have to be included in *Triatoma*, or, if a sister-group relationship between *Triatoma* and the *protracta* complex + *Paratriatoma* can be shown to exist, then the *protracta* group would either have to be assigned generic rank as a sister-group of *Paratriatoma* or be included in *Paratriatoma*. In any case, we are left with the problem that *Triatoma* (including or not the *protracta* group) and the Triatomini have not been defined by a synapomorphic character common to all of their components.

There is one newly discovered character of possible phylogenetic importance worth mentioning here. The majority of the species of Triatomini examined have first instar nymphs with a distinctive group of very fine, long hairs on the second segment of the metatarsus (fig. 17A). These hairs are found in many but not all *Triatoma*, in *Panstrongylus*, *Eratyrus*, *Dipetalogaster*, and *Linchcosteus*. These hairs are

absent in *Triatoma protracta*, *lecticularia*, and *neotomae* and in *Paratriatoma* as they are in the Rhodniini, Cavernicolini, and in *Belminius peruvianus* (the other Bolboderini and *Alberprosenia* could not be examined for this character). These hairs are derived within the framework of the Reduviidae, and when more species of *Triatoma* have been examined for it (so far only 18 out of 64) it may become necessary to restrict the genus *Triatoma* to species with specialized tarsal hairs. The genotype, *Triatoma rubrofasciata*, belongs here.

The cladistic relationships of the other genera of Triatomini (*Panstrongylus*, *Eratyrus*, *Dipetalogaster*, and *Linchcosteus*) to *Triatoma* and to each other could not be worked out with the information at hand. All genera of Triatomini except *Triatoma* are definable by autapomorphic features but we found no character that would allow us to infer their mutual relationship or their position in a cladistic scheme including *Triatoma*.

KEY TO THE TRIBES AND GENERA OF TRIATOMINAE¹

1. Ocelli not elevated, situated at level of integument, inconspicuous among coarse head granules (figs. 304, 305B, D; 310, 311F; 317, 318A), or in or very close to interocular sulcus (figs. 292, 293B) 2
- Ocelli situated on distinct elevations on disc of postocular portion of head (e.g., figs. 5C; 162B; 205A) 6
2. Head in most cases elongate, subconical, not strongly convex dorsally in lateral view (figs. 297B; 305B; 311F; 318N-R); genae large, elongate, projecting beyond apex of clypeus by distance as large as width of clypeus (figs. 296, 297A; 304, 305D; 310, 313A; 317, 318D); antenniferous tubercles situated before middle of anteocular region of head (figs. 297B; 305B; 313B; 318B), with spiniferous apicolateral process; ocelli situated on disc of postocular region of head (figs. 297A; 305D; 313A; 318A); interocular sulcus obsolescent; corium with veins distinct; body integument heavily rugose and granulose [Bolboderini] 3
- Head ovoid, strongly convex dorsally in lateral view (fig. 293C): genae less conspicuous, not surpassing level of apex of clypeus; antenniferous tubercles inserted close to anterior border of eyes (figs. 292, 293B, C), without setiferous lateral process apically; ocelli situated in or closely behind interocular sulcus, the latter strongly backwardly curved and almost attaining level of posterior border of head (figs. 292, 293B, C); corium with veins obsolescent (figs. 291, 292); body integument smooth, hairy (figs. 292, 293B, C) [Cavernicolini] *Cavernicola*
- Rostrum with first segment longer than (fig. 300A) or as long as (fig. 302A) second; scutellum at base sublaterally with 1+1 triangular projections (figs. 300D; 302B; 304, 305E); dorsal connexival segments with distinctive submarginal ridge (figs. 299, 302B; 304) *Belminius*
- Rostrum with first segment much shorter than second (figs. 297B; 311F; 313B; 315A); scutellum without sublateral processes at base; connexivum plain 4
- Scutellum trapezoidal, hind margin straight across, without posterior process (figs. 310, 311A); first urotergite exposed (fig. 310) *Parabelminius*
- Scutellum triangular, with well-developed posterior process (figs. 296, 317); first urotergite not exposed 5
- Genae compressed laterally (figs. 315A; 318A, B, I, N-R); femora not spined (fig. 315F); tibiae of all pairs of legs with spongy fossulae, tarsi two-segmented, short, not more than one-fifth of length of tibiae (fig. 315F) *Microtriatoma*
- Genae spiniform (fig. 297B); femora spined (fig. 297C); spongy fossulae absent; tarsi three-segmented, about one-third as long as tibiae (fig. 297C) *Bolbodera*
- Head laterally behind eyes with distinct callosities beset with setiferous tubercles (fig. 5, 290A, C, D); insertion of antennae situated close to apex of head (figs. 270, 278A, B; 287, 290B, C) [Rhodniini] 7
- Head without callosities mentioned; antennae inserted remote from apex of head 8
- Head subtriangular, somewhat flattened, distinctly less than twice as long as wide across eyes (figs. 286, 287A; 289); postocular region very short, from one-fourth to one-third as long as wide; apical rostral segment deeply emarginated distally (fig. 106); femora conspicuously widened and laterally compressed (fig. 284B) *Psammolestes*
- Head subcylindrical, not flattened dorso-

¹Spanish version of key, p. 466, Portuguese version, p. 485.

- ventrally, twice or more than twice as long as wide across eyes (figs. 271, 272, 276, 277, 278A); postocular region longer, at most twice as wide as long; last rostral segment pointed apically (fig. 10F); femora in most species elongate, subcylindrical, never laterally compressed *Rhodnius*
8. Size approximately 5 mm.; head very short and wide, not longer than wide across eyes (fig. 320A); clypeus widest before middle (fig. 320A); hemelytra with small branch connecting basal portion of R+M to Sc (fig. 320F) [Alberproseniini] *Alberprosenia*
Size more than 5 mm.; head more elongate, longer than wide across eyes; small branch connecting basal portion of R+M to Sc absent [Triatomini] 9
9. Head very short and wide (e.g., figs. 240, 241, 242A); antenniferous tubercles inserted extremely close to anterior border of eyes (e.g., fig. 242C); head and body glabrous or with short adpressed setae ... *Panstrongylus*
Head varied in shape, in most cases subcylindrical (e.g., figs. 95A, B; 162A, B); antenniferous tubercles not in close proximity to eyes (e.g., figs. 95B; 162B); in very rare cases, head comparatively short and antenniferous tubercles relatively close to eyes (fig. 250B), but then head and body with conspicuous long hairs (figs. 250A, B) .. 10
10. Rostrum not extending backward beyond level of eyes (e.g., fig. 200B); prosternum without stridulatory groove (fig. 15A). *Linchcosteus*
Rostrum extending to prosternum (e.g., fig. 4I), the latter with stridulatory groove present (fig. 13A) 11
11. Posterior process of scutellum (figs. 195A; 197, 198A) in shape of oblique apically sharply pointed spine, as long as or longer than main body of scutellum; first rostral segment very long, almost as long as second, extending to point midway between antenniferous tubercle and anterior border of eye (figs. 195B; 198A) *Eratyrus*
Posterior process of scutellum not as above; first rostral segment distinctly shorter than second, not extending backward beyond level of antenniferous tubercle (e.g., fig. 4I) 12
12. Head, body, and appendages with abundant, long, curved, semierect hairs (fig. 250A, B); head strongly convex above (fig. 250B, C); eyes small (fig. 250A-C, F); antenniferous tubercles inserted close to anterior margin of eyes (fig. 250B, C); fore femora without denticles; spongy fossulae absent; length 12.5-14.5 mm. *Paratriatoma*
- Head, body, and appendages appearing glabrous or with short hairs, or only appendages with long hairs (e.g., fig. 68) but less numerous than above; head less strongly convex above; eyes larger (e.g., figs. 69B; 162A; 211B); antenniferous tubercles inserted at or close to middle of anteocular region of head, remote from eyes (e.g., figs. 162A; 211B); fore femora in most species with two or more denticles below; spongy fossulae absent or present; length 9.5-42 mm. 13
13. Very large species, 33-42 mm. long; femora not denticulate; ventral connexival plates not perceptible (fig. 211A); conspicuous longitudinally pleated membrane connecting dorsal connexival plates to urosternites (fig. 210C); posterior process of pygophore short, transversally rectangular, truncate apically (fig. 211F); monotypic genus restricted to southern Baja California Sur *Dipetalogaster*
Species rarely 33 mm. or more, in most cases less than 30 mm.; femora denticulate or not; ventral connexival plates distinct (figs. 18B; 88), although very narrow in some cases; sides of abdomen rarely membranous, then only in micropterous female (fig. 177C), with membrane connecting dorsal and ventral connexival plates; posterior process of pygophore narrowly tapering apically (figs. 21D; 162D); speciose, widely distributed genus *Triatoma*

TRIATOMINI JEANNEL

Triatomini Jeannel, 1919, p. 176; Usinger, 1944, p. 36.

Triatominae Pinto, 1926c, p. 485.

Small- to large-sized Triatominae (9.5-42.0 mm. long). Body integument from smooth to rugose, with or without small setiferous granules. Body from glabrous to heavily hirsute.

Antenniferous tubercles without apical spine-like projection. Antenna inserted from very close to anterior margin of eye to center of anterior half of anteocular region of head. Genae from falling short of to slightly surpassing level of apex of clypeus, the latter widened at base, narrow apically. Ocelli situated posterolaterally behind eyes, in most cases on conspicuous elevations, behind interocular sulcus, the latter not fully developed. Head without setiferous callosities behind eyes. Second antennal segment with 4-10 trichobothria arranged

in one row along length of segment. Remaining setae of second antennal segment not of uni-form size.

Corium with veins distinct.

Abdomen in most cases with well-developed dorsal and ventral connexival segments, the latter not covered by urosternites; in some cases, dorsal connexival segments fused with urotergites, with ventral connexival segments either well developed or obsolescent, in latter case dorsal and ventral surface of abdomen laterally separated by wide membranous area.

Genitalia of male. Articulatory apparatus with basal plate bridge. Basal plate struts narrow, rodlike, elongate, separate, extending almost along entire length of phallosoma, fused apically or not. Dorsal sclerotization of phallosoma large, subsemi-elliptical. Vesica heavily sclerotized in many cases.

Fifth instar nymph: Body surface delicately or strongly granulose or rugose, glabrous or with short setae, if setae long, then spinulose; head not or very rarely strongly convex dorsally; genae not or only slightly projecting beyond level of apex of clypeus; eyes situated laterally at or behind middle of head; antenniferous tubercles without prominent apicolateral process; fourth antennal segment not or only slightly longer than any of the preceding; fourth or third and fourth antennal segments delicately annulate; stridulatory sulcus present in most genera (except *Linshcosteus*, genus with abbreviated rostrum); fore and mid femora slender or incrassate, with or without denticles; femora without trichobothria; fore tarsi much shorter than half the length of tibiae; abdomen without or with series of large tubercles dorsally along midline.

First instar nymph: Head, thorax and legs uniformly dark or with light-colored annuli, never mottled; setae simple or spinulose; fourth antennal segment not longer than first, second and third combined; stridulatory sulcus present, rarely absent; mesonotum longer at midline than at sides; metanotal plates large, distance between plates varied; femora without trichobothria; hind tarsi apically with or without numerous long, delicate sensory hairs; setae of urotergites arranged in two transversal rows, very rarely three irregular rows.

Eggs laid singly.

TYPE GENUS: *Triatoma* Laporte, 1832.

DISTRIBUTION: Western Hemisphere from southern Argentina and Chile to northern USA; Oriental region from China to northern Australia; Indian Ocean and Africa (introduced).

OTHER GENERA INCLUDED: *Dipetalogaster*, *Eratyrus*, *Linshcosteus*, *Panstrongylus*, *Paratriatoma*.

Triatoma Laporte

Triatoma Laporte, 1832, p. 11; 1833, p. 77. Kirkaldy, 1900, p. 241. Van Duzee, 1917, p. 247. Neiva, 1911a, p. 421; 1914a, p. 18. Del Ponte, 1930, p. 860. Pinto, 1931, p. 57. Usinger, 1939, p. 34. Neiva and Lent, 1941, p. 70. Usinger, 1944, p. 28.

Triatoma (Triatoma): Lima, 1940, p. 188.

Conorhinus Laporte, 1833, p. 77. Amyot and Serville, 1843, p. 383. Herrich-Schaeffer, 1848, p. 69. Stål, 1859, p. 100; 1865, p. 120; 1868, p. 123; 1872, p. 108. Walker, 1873a, p. 81; 1873b, p. 12. Stål, 1874, p. 64.

Meccus Stål, 1859, p. 102; 1868, p. 123; 1872, p. 108. Walker, 1873a, p. 81; 1873b, p. 12. Champion, 1899, p. 206. Van Duzee, 1916, p. 29. Readio, 1927, p. 112.

Eutriatoma Pinto, 1926c, p. 485; 1831, p. 86. Del Ponte, 1930, p. 858. Usinger, 1939, p. 34.

Triatoma (Eutriatoma): Lima, 1940, p. 188.

Neotriatoma Pinto, 1931, p. 120 (new synonymy).

Triatoma (Neotriatoma): Lima, 1940, p. 198.

Triatomaptera Neiva and Lent, 1940a, p. 265.

Mepraia Mazza, Gajardo and Jörg, 1940, p. 3.

Nesotriatoma Usinger, 1944, p. 38 (new synonymy).

Triatomini. Small- to large-sized (9.5-39.5 mm.). Body not conspicuously flattened. Color varied; head and thorax with or without setiferous granules, and with setae from very short and sparse to long.

Head subcylindrical. Antenniferous tubercles situated at or behind middle of anteocular portion of head. Rostrum as long as head, extending to level of prosternum; first rostral segment invariably much shorter than second; third without rostral organ.

Anterior lobe of pronotum with or without discal and lateral tubercles. Humeral angles rounded or angular but not spined. Prosternum with stridulatory sulcus. Scutellar process from subconical to subcylindrical. Legs with femora armed or unarmed; spongy fossulae of tibiae present or absent.

Abdomen from narrow to wide, with lateral portions of urotergites exposed or completely covered by hemelytra. Dorsal and ventral connexival segments normally developed (except in *T. spinolai*, with dorsal connexival segments fused to urotergites and, in female, large membranous area separating ventral connexival plates from urosternites). Venter of abdomen rounded or flattened longitudinally along middle. Posterior process of pygophore pointed.

Fifth instar nymph: As described for tribe; antenniferous tubercles situated at or behind middle of anteocular portion of head; fourth antennal segment delicately annulate; rostrum of normal length, first segment much shorter than second, third without rostral organ; stridulatory sulcus well developed; abdomen dorsally with or without series of median tubercles.

First instar nymph: As described for tribe; rostrum stout or slender, if slender, then first segment less than half as long as second; stridulatory sulcus present; hind tarsi apically with or without long delicate sensory hairs.

TYPE SPECIES: *Cimex rubrofasciatus* De Geer (as *Reduvius gigas* Fabricius); type species of *Conorhinus*, *Cimex rubrofasciatus* De Geer; of *Meccus*, *Conorhinus phyllosoma* Burmeister; of *Eutriatoma*, *Eutriatoma tibiamaculata* Pinto; of *Neotriatoma*, *Conorhinus circummaculatus* Stål; of *Triatomaptera*, *Triatoma spinolai* Porter (as *Triatomaptera porteri* Neiva and Lent); of *Mepraia*, *Triatoma spinolai* Porter; of *Nesotriatoma*, *Triatoma flava* Neiva.

DISTRIBUTION: Native in the Nearctic, Neotropical, Oriental, and (marginally) Australian regions, adventitious in Palearctic and Ethiopian regions.

BIOLOGY: Species associated with mammals, rarely with birds or reptiles; several species domestic or peridomestic, of considerable importance as vectors of Chagas' disease.

OBSERVATIONS: Laporte (1832-1833) is the author of the first described triatomine genus. The correct date for the description is 1832, even though many authors have accepted 1833. Laporte's paper was published in two parts, one dated 1832 and one dated 1833. However, the respective volume of the *Magasin de Zoologie* contains a statement by the editor (Guérin) explaining a delay in distribution of the journal

which was carried out only in March of 1833, hence 1833 is the year of publication accepted by many. Notwithstanding the above, Declaration no. 63 (Opinions and Declarations rendered by the International Commission on Zoological Nomenclature, 1958, vol. 1, section E, p. 27) fixed 1832 as date of publication of the first part of Laporte's paper (pp. 1-16) and 1833 for parts 2-6 (pp. 17-88).

We newly synonymize *Nesotriatoma* Usinger (type: *Triatoma flava* Neiva) and *Neotriatoma* Pinto (type: *Conorhinus circummaculatus* Stål) with *Triatoma*. *Nesotriatoma*, a group restricted to the Greater Antilles, differs, according to its author, from *Triatoma* by the subangular, explanate humeri and the 1+1 conspicuous elevated tubercles on the anterior margin of the scutellum. The explanate portion of the humeri is variable in extension, and tends to be narrow in small specimens of *flava* and in the more recently described *obscura*. Similar angular humeri are found also in the unrelated *T. mexicana* and *T. eratyrusiformis*. Regarding the 1+1 prominent anterior tubercles of the scutellum of *Nesotriatoma*, a homologous condition is found in the unrelated *T. ryckmani* and *T. platensis*. The general structure of the male genitalia of *flava*, now examined, fully agrees with that of other *Triatoma*.

We conclude that although *flava* and *obscura* form a distinctive group, their characters fit well within the total range of *Triatoma*, and do not deserve generic rank.

Neotriatoma Pinto, a southern South American group, consists of two species, *circummaculata* and *limai*, which differ from *Triatoma* by the structure of the rostrum of the adult, with its short first and elongate second and third segments, the third being conspicuously flattened. In all other characters, including the structure of the genitalia, the agreement with *Triatoma* is complete. However, we have found that the rostrum of nymphs (fig. 55D) is quite different from that of adults, and much more similar to that commonly found in *Triatoma*, with the third rostral segment much shorter than the second, and not conspicuously flattened. Thus, nymphs of *Triatoma* and of *Neotriatoma* are not distinguishable on a superspecific level. We therefore include *circum-*

maculata and *limai* in *Triatoma* where they constitute a distinctive group.

The genus is defined mostly by plesiomorphic characters, and thus is probably paraphyletic. Nymphal characters will be of special importance for dividing the genus cladistically.

SPECIES GROUPS IN *Triatoma*: Usinger (1944) gave a "phylogenetic key to groups within the genus *Triatoma*" for North and Central American species, based on characters of the adult only. Our scheme presented below is more elaborate in that it comprehends the entire range of the genus geographically and systematically, and also uses, to a considerable extent, characters of the nymphs. Our recognition of the several species assemblages listed below is not translated into a taxonomic scheme, because only a fraction of the named species could be examined for all characters used to place a species in its group, and because the polarity of the characters used is not known in all cases. Thus, the following arrangement is not intended to express cladistic relationships.

Metatarsus of first instar nymph without specialized hairs; dorsum of abdomen of fifth instar nymph without, rarely with, series of tubercles

..... *protracta* group

Body fusiform; legs comparatively short; dorsum of abdomen of fifth instar nymph without tubercles

protracta complex

Body of normal width; legs not unusually short; dorsum of abdomen of fifth instar nymph with or without median longitudinal series of tubercles

lecticularia complex

Metatarsus of first nymphal instar with specialized hairs; fifth instar nymph with or rarely without row of tubercles along middle of abdomen dorsally

rubrofasciata group

Dorsal abdominal surface of fifth instar nymphs heavily granulose

infestans subgroup

Third rostral segment about as long as second

..... *circummaculata* complex

Third rostral segment much shorter than second

Intersegmental sutures of connexivum bordered by, or included in, dark areas of connexivum

infestans complex

Intersegmental sutures of connexivum included in light colored areas of connexivum

dispar complex

Dorsal abdominal surface of fifth instar nymph smooth or minutely granulose

..... *rubrofasciata* subgroup

Microsculpture of venter of adult intricate

..... *rubrofasciata* complex

Microsculpture of venter of adult in shape of transverse striae

Abdomen of adult very wide and thoracic tubercles unusually prominent

..... *phyllosoma* complex

Abdomen of adult not unusually wide and thoracic tubercles not unusually prominent

Metasternum of adult strongly carinate longitudinally along middle; second antennal segment with setae of two conspicuously different types

..... *spinolai* complex

Metasternum of adult not strongly carinate along middle; setae of second antennal segment not of two conspicuously different sizes.

1+1 anterior processes of scutellum overlapping posterior declivity of pronotum

flavida complex

No such processes on scutellum

Species predominantly dark; dorsum of abdomen of fifth instar nymph with series of five median tubercles

recurva complex

Species light colored, with complex dark pattern; fifth instar nymph with series of four median tubercles

nigromaculata

The *protracta* group is defined by the absence of specialized metatarsal hairs in first instar nymphs, very probably a plesiomorphic character, and the species mentioned below as belonging in the group are not necessarily closely related. The *protracta* complex, however, does seem to be a monophyletic group, its species sharing synapomorphically a peculiar fusiform body and relatively short legs. First instar nymphs are known only for *barberi* and *protracta*, but the great overall similarity between *barberi*, *protracta*, *in-crassata*, *peninsularis*, and *sinaloensis* make the inclusion also of the latter three species in the group highly plausible. *Triatoma nitida* and *T. neotomae*, two closely related species, may also belong here, as suggested by the structure of the metatarsus of the first instar nymph of *neotomae* and the structure of the fifth instar

nymph of *nitida*, as well as their relatively narrow body and short legs. The species of this complex inhabit the southwestern USA and portions of Mexico and Central America.

The species of the *lecticularia* complex, *T. lecticularia* and *T. sanguisuga*, both have first instar nymphs without specialized metatarsal hairs, but differ from the species of the *protracta* complex by a comparatively wide body and by legs that are not noticeably short. The abdominal dorsum of the fifth instar nymph of *lecticularia* has no tubercles, but there are five in *sanguisuga*. There is no evidence that these two species constitute a monophyletic group. Both occupy a wide range in the USA, east, south, and west. *Triatoma indictiva* is also included here because we consider it to be very close to *sanguisuga*, even though we do not know its nymphs.

The *rubrofasciata*-group comprehends the majority of the species of *Triatoma* and is characterized by the specialized metatarsal hairs of the first instar nymph. The group occupies the entire geographical range of the genus. The fifth instar nymphs of most species have a row of longitudinally arranged, conspicuous tubercles along the middle of the abdomen dorsally, but *T. rubida* (southwestern USA and part of Mexico) does not, and, even more remarkably, *T. rubrofasciata* (a species of Oriental origin) has nymphs with and others without the tubercles mentioned. Thus, the presence or absence of tubercles is not a reliable taxonomic character, at least in this systematic area.

The *infestans* subgroup encompasses species the fifth instar nymphs of which have a coarsely granulate abdominal dorsum. Three complexes can be distinguished.

The *circummaculata* complex, distinguished by unusual rostral proportions, consists of only two species, *circummaculata* and *limai*, restricted to southern Brazil, Uruguay, and central Argentina.

The *infestans* complex, with the intersegmental connexival sutures of the adult included in or bordered by dark areas is restricted to South America, especially the less humid areas found from Venezuela to Patagonia. The complex is absent from Central America and the mesic forest areas of northern South America.

The species listed below are included in the complex; species in parentheses are included because of their obviously close affinities with the other species of the assemblage, even though their fifth instar nymph is unknown: *Triatoma arthurneivai*, *brasiliensis*, *circummaculata*, (*costalimai*), *delpontei*, *guasayana*, *infestans*, *lenti*, *maculata*, *matogrossensis*, (*melanocephala*), *patagonica*, (*petrochii*), *platensis*, *pseudomaculata*, *rubrovaria*, *sordida*, *tibiamaculata*, *vitticeps*, *williami*, (*wygodzinskyi*).

The *dispar* complex is placed in the *infestans* subgroup with less than complete confidence. The intersegmental connexival sutures are enclosed entirely in light-colored areas. The complex consists of *T. dispar* (the only species whose fifth instar nymph is known) and of *carrioni* and *venosa*. The first instar nymph of none of these species is known, and its discovery will test our hypothesis of the position of the complex in our scheme. The species of the complex occur in Central and northwestern South America, and are found mostly in mesic forestland. The *infestans* and *dispar* complexes are thus vicarians geographically and ecologically.

The *rubrofasciata*-subgroup, defined by the smooth or only minutely granulose dorsum of the abdomen of fifth instar nymphs can be divided into various species complexes as follows.

The *rubrofasciata* complex is characterized by the intricate microsculpture of the venter of the adult, forming minute meandering or labyrinthine structures. The nymphs of *T. amicitiae*, *bouvieri*, *leopoldi*, *migrans*, *pugasi*, and *sinica* are not known, but the species are Oriental as are *rubrofasciata* (secondarily pantropical) and *cavernicola*. The highly derived integumental structure shared by all components suggests that this is a monophyletic assemblage.

The *phyllosoma* complex is a closely knit assemblage of large Mexican species with unusually wide abdomen and conspicuous thoracic tubercles (*Triatoma longipennis*, *mazzottii*, *pallidipennis*, *phyllosoma*, and *picturata*). *Triatoma mexicana* may also belong here because its female has an unusually wide abdomen

though the male has not; no nymphs of this species are known so that this hypothesis cannot yet be corroborated. *Triatoma dimidiata*, ranging from Mexico to Peru, is superficially somewhat similar to the species of the *phyllosoma* group and agrees in the features of the abdomen of the fifth instar nymph, but the first instar nymph has not been examined.

The *spinolai* complex, a small, taxonomically isolated and distributionally marginal group, inhabits semiarid areas of southern South America. The species included are *T. spinolai* (central and northern Chile) and the central and western Argentinian *T. eratyrusiformis* and *breyeri*. The species share with others of the *rubrofasciata* subgroup a minutely granulose abdominal dorsum in the fifth instar nymphs. The adults of the three species share synapomorphically a longitudinally carinate metasternum limited posteriorly by a straight transverse ridge, a second antennal segment with setae of two conspicuously different types, and extremely fine transverse striation on the urosternites. However, whereas the fifth instar nymph of *spinolai* does not seem to have any median dorsal tubercles, these are well developed in *eratyrusiformis* (nymph of *breyeri* unknown). Also, while the male genitalia of *eratyrusiformis* and *breyeri* are of simple structure, those of *spinolai* are more complex, although still within the framework of the overall structure of the phallus in the Triatomini. Furthermore, *T. spinolai* is unique among triatomines due to the existence of micropterous forms. Knowledge of the fifth instar nymph of *T. breyeri* is required before the phylogenetic relationships of these three species can be established.

The small *flavida* complex, characterized mainly by the two anterior projections of the scutellum, is restricted to the Greater Antilles, viz., Cuba (*flavida*) and Jamaica (*obscura*); these are the two only native *Triatoma* of the Antilles.

Triatoma recurva and *T. gerstaeckeri*, relatively large species with slender legs, occur in the southwestern USA and in parts of Mexico. First instar nymphs are not well known. The dorsum of the abdomen of fifth instar nymphs is minutely granulose and has a series of five

median tubercles. We have no evidence to indicate that this is a monophyletic group.

Triatoma nigromaculata, from Venezuela, is very similar chromatically to the species of the *dispar* complex but differs by the delicately granulose abdomen of the fifth instar nymph, coarsely granulose in *dispar*.

The preceding schematic arrangement of the species of *Triatoma* leaves several species unaccounted for. The Brazilian *T. oliveirai* and the Paraguayan *T. guazu* are known from adults only. They may belong in the *infestans* complex but are phenetically quite distinct from species of that assemblage. Knowledge of nymphs is required before a definite assignment can be made. The Central American *T. ryckmani* is isolated phenetically as is the Mexican *hegneri*. In both cases, examination of nymphs is necessary before the species can be placed in the scheme.

KEY TO THE SPECIES OF *Triatoma*¹

1. Adults micropterous (figs. 177B, C; 179B); second antennal segment with many setae conspicuously longer than diameter of segment (fig. 6G); general color dark brown or black, with connexivum and adjacent lateral portions of uromeres red, red area continuous or interrupted by dark markings between intersegmental sutures *spinolai* (part)
Adults macropterous, rarely brachypterous 2
2. Legs with conspicuous light and dark areas (figs. 44, 60D; 74, 75, 76C; 88, 90B; 106, 119, 120, 166, 174, 175, 176C; 181, 182) 3
Legs with all segments, except tarsi, uniformly colored, in most cases dark; very rarely femora apically with very small light-colored spot or annulus 11
3. Pronotum black, lateral margins and submedian carinae red (figs. 181, 182); tibiae yellow except dark apex, strongly contrasting with black femora *tibiamaculata*
Pronotum with color pattern different, or entirely dark; color pattern of legs not as above 4
4. Large species (28 mm.); anteocular region almost 5 times as long as postocular (figs. 106, 107A); pronotum (fig. 106) brown, with 1+1 yellowish spots near humeral an-

¹Spanish version of key, p. 468; Portuguese version, p. 487.

- gles; femora and tibiae light orange-brown, the former with dark brown subapical annulus; connexivum with very narrow dark transversal markings on intersegmental sutures (fig. 107C, D) *matogrossensis*
- Species of varied sizes; color of legs and pronotum not as above 5
5. Dark markings of connexivum on center of each segment (figs. 119, 120, 166) 6
- Dark markings of connexivum enclosing intersegmental sutures (figs. 43, 44, 59, 74, 75, 87, 89, 174, 175) 7
6. Femora light orange-brown, with dark apical annulus; pronotum without conspicuous pattern elements (fig. 166); hemelytra dark, with only base and apex of corium light colored (fig. 166); disc of connexival segments with simple dark spot *ryckmani*
- Femora dark, with light-colored apical annulus (figs. 119, 120); pronotum and hemelytra with conspicuous, complex patterns (figs. 119, 120); disc of connexival segments dorsally at center with anvil-shaped or with two smaller dark spots (figs. 119, 120) *nigromaculata*
7. Pronotum entirely black; legs black, with trochanter and base of femora contrasting yellow (figs. 60D; 90B) 8
- Pronotum entirely dark or with light-colored areas; legs not colored as above 9
8. Head longer than pronotum; transversal dark markings of connexivum in shape of musical notes (figs. 59, 60D) *deanei*
- Head as long as pronotum; transversal dark markings of connexivum in shape of wide bands (figs. 87, 89) *infestans*
9. Femora dark, with light-colored annuli (fig. 43A; 44); transversal dark markings of connexivum almost as wide as intervening light-colored spaces, and not distinctly constricted at middle (figs. 43, 44); large species \pm 25 mm.) *brasiliensis* (part)
- Femora with extensive light-colored areas, with distinct dark subapical annulus (figs. 74, 75, 76C; 174, 175, 176C); transversal dark markings of connexivum in most specimens very narrow, conspicuously constricted at middle, in shape of musical notes (figs. 74, 75, 174, 175, 176D-H); smaller species, not more than 20.5 mm. 10
10. Posterior lobe of pronotum and scutellum uniformly dark (figs. 74, 75); coxae dark (fig. 76C); rostrum with second segment less than twice as long as first (fig. 76B) *guasayana*
- Posterior lobe of pronotum with 1+1 light-col-
- ored spots on humeral region (figs. 174, 175); apex of coxae and scutellar spine light colored (fig. 176C); rostrum with second segment more than twice as long as first (fig. 176B) *sordida*
11. Rostrum with third segment elongate, approximately as long as second (fig. 55C; 100B) 12
- Rostrum with third segment invariably shorter than second 13
12. Light-colored areas of connexivum red; eyes slightly smaller and head less high posteriorly in lateral view (fig. 55C) *circummaculata*
- Light-colored areas of connexivum yellow; eyes slightly larger and head higher posteriorly in lateral view (fig. 100B) *limai*
13. Antennae with first segment extending considerably beyond apex of clypeus (fig. 162B); pronotum strongly granulose, its color piceous or black, with lateral margins entirely red (figs. 159, 161) *rubrofasciata*
- Antennae with first segment not or rarely extending considerably beyond apex of clypeus, in most cases just attaining level of apex of clypeus, or even shorter; pronotum not as above 14
14. First rostral segment longer than third (e.g., figs. 36B; 93B; 131B; 148E; 180C, D; 188B) (if in doubt run to 53) 15
- First rostral segment as long as or shorter than third (e.g., figs. 66A; 79B; 105E; 146B; 158B; 165B) 53
15. Integument of body and of corium of hemelytra distinctly pilose, setae easily perceptible dorsally (figs. 16, 93D; 142A, B) 16
- Body integument and corium practically glabrous, at most very short scattered hairs 21
16. Head strongly convex dorsally (fig. 93B); antenniferous tubercles elongate, comparatively close to eyes (fig. 93B) *lecticularia*
- Head not strongly convex dorsally (e.g., fig. 142B); antenniferous tubercles short, remote from eyes (e.g., fig. 142B) 17
17. Corium largely yellowish white, narrowly orange at base and black at apex (fig. 130) *pallidipennis*
- Corium without extensive white area, largely black with yellow or orange-red markings basally and subapically (figs. 101, 109, 140, 141, 143) 18
18. Corium with long, delicate, suberect hairs about 0.5 mm. long 19
- Corium with short, strongly decumbent or

- adpressed setae not more than 0.3 mm. long (fig. 16A) 20
19. Hemelytra short, not extending beyond urotergite VI (figs. 140, 141); connexivum dorsally with orange-red spots occupying part of posterior sixth to third of segments (fig. 142C-E) *phyllosoma*
Hemelytra elongate, extending or almost extending to apex of abdomen (fig. 108); connexivum dorsally with orange-red spots covering entire posterior third to half of segments (fig. 109) *mazzottii*
20. Genae invariably attaining or surpassing level of apex of clypeus (fig. 144A, B); posterior lobe of pronotum extensively orange-yellow (fig. 143); in most specimens, dorsal connexival segments largely orange-yellow, with anterolateral black spot (fig. 144G); rarely connexival segments black, with orange-yellow posterolateral spot (fig. 144D-F); mesosternum, metasternum and venter invariably with long suberect hairs *picturata*
Genae in many cases not attaining level of apex of clypeus (fig. 102D); pronotum with posterior lobe entirely black (fig. 101), or with 1+1 small light-colored spots on humeri (fig. 102D); dorsal connexival segments black, with yellow or orange-yellow spot on posterior third or half, extending or not to connexival suture (fig. 102B, C, E); mesosternum with long suberect hairs, metasternum and venter with similar or with short decumbent hairs *longipennis*
21. Disc of scutellum at base with a pair of prominent anteriorly directed tubercles overlapping posterior margin of pronotum (figs. 70B; 126D); humeral angles explanate (figs. 70B; 126D) 22
Disc of scutellum without tubercles mentioned; humeral angles not explanate 23
22. General color light brown (fig. 70A); discal and lateral tubercles of anterior lobe of pronotum prominent (fig. 70B); femora of first and second pair of legs with denticles *flavida*
General color very dark brown (fig. 125); discal and lateral tubercles of anterior lobe of pronotum not prominent (fig. 126D); fore and mid femora without denticles *obscura*
23. Hemelytra uniformly smoky brown (figs. 177A; 179A); second antennal segment with numerous setae several times as long as diameter of segment (fig. 6G); pronotum without discal tubercles; scutellar process extremely short (fig. 179A); metasternum longitudinally carinate along middle posteriorly (figs. 178,
- 180A); urotergites entire, dorsal connexival sutures absent *spinolai* (part)
Different combination of characters 24
24. Connexivum uniformly colored dorsally 25
Connexivum dorsally with distinct dark and light-colored areas 29
25. Species uniformly light orange-brown (figs. 34, 35, 151, 152); width of basal portion of outer membranal cell larger than that of inner membranal cell (figs. 34, 35, 151, 152) 26
Species uniformly brown or black (figs. 134, 135, 147, 170); width of basal portion of outer membranal cell approximately equal to that of inner membranal cell (figs. 135, 147B, C; 170) 27
26. Head strongly convex above (fig. 36B); genae extending to level of apex of clypeus (fig. 36A); eyes very small, synthlipsis four times as large as width of eyes dorsally (fig. 36A); femora without denticles; small species, 15 mm. long *amicitiae*
Head subcylindrical (fig. 153B); genae extending beyond level of apex of clypeus (fig. 153A); eyes larger, synthlipsis only about twice as wide as width of eyes dorsally (fig. 153A); femora with denticles; larger species, about 24 mm. long *pugasi*
27. Head with slight arcuate depression behind clypeus (fig. 148A, B; C); elongate in lateral view, with eyes close to level of under surface of head (fig. 148E); length 15-22 mm. *protracta*
Head without arcuate depression behind clypeus (figs. 136A, 171A, C), and relatively much shorter in lateral view, with eyes remote from level of under surface of head (figs. 136B; 171B); length 9.5-13 mm. 28
28. General color black (fig. 134) *peninsularis*
General color brown, polished (fig. 170) *sinaloensis*
29. General color (fig. 51), including legs, pale yellow; first antennal segment pale yellow, second blackish (fig. 51, 52E); corium light yellow, with minute or almost imperceptible central dark spot; connexival segments (figs. 51, 52D) with central dark spot adjacent to inner connexival suture, but not attaining outer border or anterior and posterior connexival sutures; integument of venter minutely crinkled *cavernicola*
Different combination of characters 30
30. Connexivum dorsally with light-colored area extending broadly along entire lateral border (figs. 39, 46, 47, 82, 154, 156, 158C), with

- dark color of urotergites continuing onto inner portion of connexivum, in some cases extending to center of each segment 31
 Connexival segments with alternating, transverse dark and light-colored areas, both extending across entire width of segment (e.g., figs. 63, 94, 113, 115, 122A; 149, 168, 186) 35
31. Anterior lobe of pronotum without discal tubercles (fig. 40A); postocular portion of head distinctly rounded laterally, in dorsal view (figs. 40A, G; 83A; 158A) 32
 Anterior lobe of pronotum with 1+1 discal tubercles (figs. 47, 155A); postocular portion of head with sides not rounded, in dorsal view (figs. 47, 48A, 155A) 34
32. Posterior process of scutellum short, subconical (figs. 39, 82); first antennal segment falling considerably short of level of apex of clypeus (figs. 40A-C; 83A) 33
 Posterior process of scutellum elongate, subcylindrical (fig. 156B, C); first antennal segment attaining level of clypeus (fig. 158A) *rubida* (part)
33. Clypeus strongly swollen posteriorly (fig. 83A), its upper surface very convex in lateral view (fig. 83B); under surface of head sinuate in lateral view (fig. 83B); venter evenly rounded *incrassata*
 Clypeus less salient above, its upper surface only very slightly convex in lateral view (fig. 40B, C); under surface of head almost straight in lateral view (fig. 40B, C); venter slightly flattened longitudinally along middle *barberi* (part)
34. Antennae with second segment bearing short and numerous very long setae (as in fig. 6G); femora inermous; mesosternum limited posteriorly by conspicuous transversal carina (as in figs. 178, 180); connexivum with yellowish areas; spiracles adjacent to connexival suture; length about 21 mm. *breyeri* (part)
 Antennae with second segment bearing only short setae; femora with denticles; mesosternum continuous with metasternum; connexivum with orange-red or yellowish areas adjacent to outer margin; spiracles remote from connexival suture; length 25-33 mm. *recurva*
35. Black spots of connexivum including intersegmental sutures (figs. 94, 186) 36
 Black spots of connexivum not including intersegmental sutures (figs. 63, 113, 115, 122A; 149, 168) 38
36. Pronotum and generally corium entirely black; head longer than pronotum *lenti*
 Pronotum and corium black, with reddish or yellowish pattern elements; head as long as or shorter than pronotum 37
37. Black with red markings as follows (figs. 186, 187): longitudinal stripe on head dorsally from behind clypeus to interocular sulcus, 3+3 elongate markings on posterior lobe of pronotum, with 1+1 between submedian carinae and 2+2 between carinae and lateral borders, and on central depression of scutellum; pleura and under surface of thorax and abdomen dull *vitticeps*
 Black with 1+1 small yellow spots on posterior lobe of pronotum, between submedian carinae and lateral margins, on anterior portion of lobe; remainder of pronotum and scutellum black (figs. 110, 111); pleura and under surface of thorax and abdomen highly polished *melanocephala*
38. Black spots of connexival segments situated anteriorly, adjacent to intersegmental suture (figs. 63, 113, 168); light-colored area occupying posterior portion of connexival segments 39
 Black spots of connexival segments situated at center of each segment (figs. 115, 122A; 149), anterior and posterior portions light colored 45
39. Anterior lobe of pronotum without discal tubercles (fig. 40A); scutellum with apical process short, subconical (fig. 39); connexivum dorsally with irregularly shaped orange-red spots on posterior one-half to one-fourth of each segment (fig. 40E, F), extending partially to respective intersegmental sutures, [in some cases red area extending uninterrupted over entire outer margin of connexivum, occasionally with a dark spot on anteroexternal angle of segments (fig. 40D)] *barberi* (part.)
- Anterior lobe of pronotum with discal tubercles (figs. 64A, D; 73A; 81A; 85A); apical process of scutellum elongate, cylindrical or spiniform (figs. 63, 72, 80, 84, 114A; 168) 40
40. Pronotum (fig. 168) dark, with red or yellow markings extending as narrow band on collar, anterolateral angles, and sides of pronotum, with humeri and some portions of posterior margin of pronotum also light colored; light-colored markings of connexivum (fig. 168) occupying posterior third of each

- segment, dorsally and ventrally *sanguisuga*
Pronotum uniformly dark, without markings, at
most humeral area faintly lighter 41
41. Humeral angles of pronotum pointed (figs. 113,
114A, C) *mexicana*
Humeral angles rounded (64A, D; 73A; 85A)
..... 42
42. Corium (fig. 63) preponderantly yellow or
orange yellow, with apical and central dark
spot, latter variable in size and in some
cases absent; connexival segments (fig. 63)
dorsally and ventrally with yellow or orange
yellow spot occupying more than posterior
half of each segment *dimidiata*
Corium preponderantly dark brown or black
(figs. 72B; 80, 84); light-colored spots of
connexivum narrow (figs. 72B; 80, 84) .43
43. Connexival segments each marked transversely
with yellow or orange-yellow along posterior
fourth or third adjacent to intersegmental suture
(fig. 72B); corium with small yellow
spot basally and subapically (fig. 72B)
..... *gerstaeckeri*
Connexival segments dorsally and ventrally al-
most entirely dark, with barely visible light
markings in shape of incomplete narrow
band along hind border of segments, extend-
ing onto intersegmental sutures (figs. 80, 84)
..... 44
44. Sides of postocular region of head subparallel,
slightly converging posteriorly (fig. 81A);
corium with basal and transversal subapical
spot yellow (fig. 80); size about 28 mm.
..... *hegneri*
Sides of postocular region of head conspic-
uously convex (fig. 85A, C); corium almost
entirely dark, only somewhat lighter near
clavus (fig. 84); size less than 20 mm.
..... *indictiva*
45. Pronotum and corium entirely dark 46
Pronotum and corium dark, with light-colored
markings 48
46. Second article of antennae with stiff bristles not
distinctly longer than diameter of article; median
depression of scutellum triangular, well
defined by sharp lateral carinae; second rostral
segment subcylindrical (fig. 58B)
..... *rubida* (part)
Second article of antennae with stiff bristles
more than twice as long as diameter of arti-
cle (figs. 47, 68); median depression of
scutellum ill defined or absent (figs. 47, 68);
second rostral segment conspicuously flat-
tened dorsoventrally (figs. 48B; 69A) ...47
47. Humeral angles narrowly rounded (figs. 46, 47);
posterior process of scutellum as long as
main body of sclerite (fig. 46); light mark-
ings of connexivum in most specimens
yellow and occupying most of surface of
connexival plates including entire outer mar-
gin (figs. 46, 47) *breyeri* (part)
Humeral angles acute or pointed (figs. 67, 68);
posterior process of scutellum shorter than
main body of sclerite (fig. 68); light mark-
ings of connexivum orange-yellow, rarely
pale yellow, alternating with transverse black
markings extending for entire width of con-
nexival plates (figs. 67, 68) .*eratyrusiformis*
48. Pronotum subquadrate (figs. 117, 118A; 122);
genae not extending beyond level of apex of
clypeus (figs. 118A, C; 122B; 124A); apex
of second and almost entire third rostral seg-
ment with dense, long hairs (figs. 118B, D;
124C) 49
- Pronotum distinctly trapezoidal (figs. 41, 96,
97A; 115, 172); genae extending beyond
level of apex of clypeus; all rostral segments
with scattered hairs only (figs. 42B; 97B;
116B; 173B) 50
49. Larger insects (19.5-22.5 mm.); head dorsally
with light-colored areas of varied extension
(fig. 122B); postocular portion of head very
faintly rounded, with sides distinctly con-
verging posteriorly (figs. 122B; 124A); pro-
notum dark, yellowish along anterior and
lateral borders and on looplike ridges of fore
lobe (fig. 122) *nitida*
Smaller insects (16.5-19.5 mm.); head entirely
dark dorsally (figs. 117, 118A); postocular
portion distinctly rounded laterally (fig.
118A, C); pronotum entirely dark except
1+1 light-colored spots on humeri (figs.
117, 118A) *neotomae*
50. Pronotum black, with sides, collar and ante-
rolateral processes, elevated looplike carinae
of fore lobe, submedian carinae of hind lobe
and median longitudinal stripe, yellowish
brown (fig. 172) *sinica*
Color pattern of pronotum different 51
51. Anterolateral angles of pronotum with rounded
apex (figs. 42A; 115, 116A); pronotum red,
with 2+2 elongate black spots on hind lobe
(figs. 41, 115) 52
- Anterolateral angles of pronotum conical,
pointed apically (figs. 96, 97A); pronotum
red, with 1+1 elongate black spots on hind
lobe (fig. 96) *leopoldi*
52. Eyes more than half as wide as synthlipsis (fig.

- 116A); anterolateral angles of pronotum in most cases large, finger-like (fig. 115); larger species, 22-25 mm. *migrans*
 Eyes somewhat less than half as wide as synthlipsis; anterolateral angles of pronotum short, not finger-like (fig. 42A); smaller species, 17-20 mm. *bouvieri*
53. Connexival segments (figs. 156B, C; 158D, E) each posteriorly with pale reddish transverse marking adjoining intersegmental suture, and in many cases pale along entire outer margin; pronotum not granulose, reddish brown to black, with lateral margins and humeral areas pale reddish orange, rarely entirely black; first antennal segment attaining or slightly surpassing level of apex of clypeus (fig. 158A) *rubida* (part)
 Connexivum not as above; pronotum uniformly dark, or with markings on disc; first antennal segment in most species falling short of level of apex of clypeus, only very rarely attaining level of apex of clypeus (*T. brasiliensis*), in this case intersegmental sutures of connexivum enclosed in dark transverse markings 54
54. Head as long as or shorter than pronotum 55
 Head longer than pronotum 60
55. Surface of body, corium and legs with numerous adpressed golden colored setae (figs. 61, 145); legs stout (figs. 61, 145); cells of membrane light brown with conspicuous irregularly shaped dark markings (figs. 61, 145) 56
 Surface of body, corium and legs appearing glabrous; legs slender; cells of membrane uniformly light brown 57
56. Setae of hind tibiae (fig. 146D) bristle-like, shorter than diameter of segment, not perceptible without magnification; body extremely hairy; scutellum at base with 1+1 prominent anteriorly directed tubercles meeting hind border of pronotum (fig. 145) *platensis*
 Setae of hind tibiae (fig. 62C) hairlike, longer, many as long as diameter of segment, easily visible without magnification; body less hairy; scutellum without conspicuous tubercles mentioned *delpontei*
57. Pronotum with discal and lateral tubercles on anterior lobe (figs. 103A, 104, 149) 58
 Anterior lobe of pronotum without discal and lateral tubercles 59
58. Head dorsally in most cases with more or less extensive orange colored markings, only rarely entirely black; in many specimens, a light-colored spot each on propleura and mesopleura (fig. 105E), or on mesopleura only; head very high posteriorly in lateral view (fig. 105B); eyes large (fig. 105A); rostrum with first segment as long as or slightly longer than third, latter with very long hairs (fig. 105B); second rostral segment comparatively thicker in side view (fig. 105B); lateral endosoma processes with wide longitudinal, more heavily sclerotized stripes, and without denticles apically (fig. 105D) *maculata*
 Head invariably entirely black dorsally; in many specimens, light-colored spot only on propleura, or absent; head less high posteriorly in lateral view (fig. 150B); eyes smaller (fig. 150A); rostrum with first segment slightly shorter than third, latter with shorter hairs (fig. 150B); second rostral segment more slender in side view (fig. 150B); lateral endosoma processes without wide longitudinal ridges, denticulate apically (fig. 150D) *pseudomaculata*
59. Pronotum uniformly dark (fig. 37); corium and clavus almost uniformly dark, except apical two-thirds of clavus and adjoining portion of cell of corium, both smoky brown (fig. 37); endosoma processes of male heavily sclerotized, over half as long as phallosoma, and with about 100 denticles apically (fig. 38D) *arthurneivai*
 Pronotum dark, with 1+1 distinct reddish spots on humeri (figs. 192, 193A), and, in some specimens, with large reddish spot on disc between carinae posteriorly; corium (figs. 191, 192) with extensive, confluent reddish areas; endosoma processes of male weakly sclerotized, not over half as long as phallosoma, and with only about 20 apical denticles (fig. 193D) *wygodzinskyi*
60. Dark pattern elements of connexivum in shape of distinct wide transverse bands 62
 Dark pattern elements of connexivum much reduced, not in shape of wide transverse bands 61
61. Hemelytra (figs. 56, 57) with corium black, with dark orange spots apically, also on clavus; connexivum entirely black along inner portion, orange colored on outer half, interrupted by very narrow black bands on intersegmental sutures (figs. 56, 57, 58B, D) *costalimai*
 Hemelytra (fig. 189) with corium entirely

- yellow except veins, base of clavus also dark; connexivum entirely yellow, except small black spot on external margin, situated on or just posterior to intersegmental suture (figs. 189, 190C) *williami*
62. Pronotum black, with lateral borders and three percurrent longitudinal stripes on posterior lobe reddish (figs. 49, 65A; 184, 185B); intersegmental sutures of connexivum included in light-colored areas (figs. 49, 65A, B; 66C, D; 184, 185C) 63
- Pronotum with light-colored areas different, or entirely black; connexivum with intersegmental sutures included in black areas (figs. 43, 44, 77, 78, 127, 128, 132, 133B, C; 137, 138, 163, 164) 65
63. Body with conspicuous golden colored pilosity; membrane of hemelytra with variegated pattern elements (fig. 65); femora dark, with ferruginous nodules and more than five setiferous denticles on under surface; connexivum (figs. 65, 66C, D) black, with two orange-red spots on each segment, one situated on posterior fourth of segment, straddling intersegmental suture and occupying entire width of segment, and another, incomplete one, at center of segment adjacent to margin *dispar*
- Pilosity of body inconspicuous; membrane of hemelytra without variegated pattern elements; femora without nodules and with not more than three denticles on under surface; connexival pattern different 64
64. Head and legs reddish brown; veins of membrane (fig. 184) conspicuously light colored and margined with light; anterolateral projections of pronotum subcylindrical (fig. 185B); apex of posterior process of scutellum rounded-truncate; pleura with extensive light colored areas *venosa*
- Head and legs dark brown or black; veins of membrane less prominent (fig. 49); anterolateral projections of pronotum (fig. 50A) compressed dorsoventrally; apex of posterior process of scutellum spoon-shaped (fig. 50D); pleura practically uniformly dark *carrioni*
65. Hemelytra (figs. 77, 78, 127, 128) entirely light yellowish brown except clavus and veins which are dark; corium not darker than membrane 66
- Hemelytra variously darkened, at least portion of corium darker than membrane 67
66. Pronotum (figs. 127, 128) black, with 1+1 yellow spots on humeri; hemelytra abbreviated, at least in female, with seventh tergite almost fully exposed (figs. 127, 128); eyes comparatively small, not attaining level of under surface of head in lateral view (fig. 119B); synthlipsis twice as large as width of eyes in dorsal view (fig. 129A); most setae of third rostral segment longer than diameter of article (fig. 129B); apical process of scutellum obliquely elevated (fig. 129C) *oliveirai*
- Pronotum (figs. 77, 78) entirely black; hemelytra not abbreviated, fully covering seventh and eighth urotergite (figs. 77, 78); eyes comparatively large, surpassing level of lower surface of head, in lateral view (fig. 79B); synthlipsis less than twice as large as width of eyes in dorsal aspect (fig. 79A); most setae of third rostral segment shorter than diameter of segment (fig. 79B); apical process of scutellum horizontal *guazu*
67. Membrane uniformly dark, with veins practically concolorous (figs. 132, 163, 164) 68
- Membrane light colored, with more or less extensive areas distinctly darker; veins conspicuously dark (figs. 44, 137, 138) 69
68. Length 21 mm. or less; apex of femora (fig. 133E) narrowly annulate with yellow; spots of connexivum yellow; pronotum invariably uniformly black (fig. 132) *patagonica*
- Length 21 mm. or more; femora entirely black; spots of connexivum red, orange or very rarely yellow; pronotum rarely entirely black, in most specimens with reddish pattern elements (figs. 165C, D, F-J) *rubrovaria*
69. First antennal segment attaining level of apex of clypeus (fig. 45A); rostrum with abundant long hairs (fig. 45B); pronotum and scutellum entirely black (fig. 43B) *brasiliensis* (part)
- First antennal segment falling considerably short of level of apex of clypeus (figs. 137-139); rostrum (fig. 139B) with isolated short hairs, practically glabrous; pronotum with more or less distinct light yellowish pattern elements, apex of process of scutellum light colored (fig. 138) *petrochii*

KEY TO THE SPECIES OF *Triatoma* OF THE OLD WORLD

1. Pronotum unicolorous; connexivum not spotted (figs. 34, 35, 151, 152) 2

- Pronotum and connexivum with conspicuous markings (figs. 41, 51, 96, 115, 159, 172A) 3
2. Head strongly convex above (fig. 36B); genae extending to level of apex of clypeus (fig. 36A); eyes very small, synthlipsis four times as large as width of eye dorsally (fig. 36A); femora without denticles; small species. 15 mm. long *amicitiae*
- Head subcylindrical (figs. 151, 152, 153); genae extending beyond level of apex of clypeus (fig. 153A); eyes larger, synthlipsis only about twice as large as width of eyes dorsally (fig. 153A); femora with denticles; larger species, about 24 mm. long *pugasi*
3. General color, including legs, pale yellow; first antennal segment pale yellow, second blackish (fig. 51, 52E); corium (fig. 51) light yellow, with minute or almost imperceptible central dark spot; connexival segments ventrally with narrow elongate black spot adjacent to inner connexival border (fig. 52D); surface of venter minutely crinkled *cavernicola*
- General color from reddish brown to black, including legs; first and second antennal segments dark; corium mainly dark; connexival segments dorsally and ventrally with large dark central spot, extending almost or entirely across width of segment (figs. 41, 96, 115, 159, 172A); surface of venter with meandering or labyrinthine microstructure (fig. 19B, C) 4
4. Pronotum (fig. 172) black, with sides, collar with anterolateral processes, elevated portions of fore lobe of pronotum, submedian carinae of hind lobe, median longitudinal stripe and 1+1 posterosublateral spots, yellowish brown *sinica*
- Pronotum with different color pattern (figs. 41, 96, 115, 159) 5
5. First antennal segment extending beyond level of apex of clypeus (fig. 162B); pronotum piceous or black, with lateral margins entirely red (figs. 159, 161) *rubrofasciata*
- First antennal segment falling considerably short of level of apex of clypeus (figs. 42, 97, 116); pronotum differently colored 6
6. Anterolateral angles of pronotum with rounded apex (figs. 42, 116); pronotum red, with 2+2 elongate black spots on posterior lobe (figs. 41, 115) 7
- Anterolateral angles of pronotum conical, pointed apically (figs. 96, 97); pronotum red, with 1+1 elongate black markings on posterior lobe (fig. 96) *leopoldi*
7. Eyes distinctly more than half as wide as synthlipsis (fig. 116A); genae rounded apically (fig. 116B); anterolateral angles of pronotum in most specimens large, finger-like (fig. 116A, B); outer pair of dark stripes of posterior lobe of pronotum attaining posterior margin of sclerite (fig. 115); length 22-25 mm. *migrans*
- Eyes approximately half as wide or somewhat less than half as wide as synthlipsis (fig. 4A); genae pointed (fig. 4A); anterolateral angles of pronotum short, not finger-like (fig. 4A); outer pair of dark stripes on posterior lobe of pronotum in many specimens abbreviated, not attaining posterior margin of sclerite (fig. 41); length 17-20 mm. *bouvieri*

KEY TO THE SPECIES OF *Triatoma* OF THE UNITED STATES

- Body clothed with numerous black setae, conspicuous on head, all three rostral segments, pronotum and corium (fig. 93D); head strongly convex dorsally, especially between eyes (fig. 93B); antenniferous tubercles elongate, comparatively close to eyes (fig. 93B) *lectularia*
- Body practically glabrous, with at most short, scattered setae; rostrum either entirely glabrous, or with long setae on second and third but not on first segment; head not strongly convex above; antenniferous tubercles short, remote from eyes 2
- First antennal segment attaining or surpassing level of apex of clypeus (figs. 158A; 162B) 3
- First antennal segment not attaining level of apex of clypeus 4
- Head and pronotum strongly granulose (figs. 161, 162B); anterolateral angles of pronotum prominent, oblique (figs. 161, 162B); posterior process of scutellum short (figs. 161, 162C) *rubrofasciata*
- Head and pronotum not granulose; anterolateral angles of pronotum short, obtuse (figs. 156, 158A); apical process of scutellum elongate (fig. 156) *rubida*
- Larger insects, more than 24 mm. long, very rarely only 23 mm.; postocular region with sides straight, subparallel (figs. 73A; 155A); rostrum practically glabrous (figs. 73B; 155B) 5

- Smaller insects, length 24 mm. or less; postocular region with sides distinctly convex; rostrum glabrous or with numerous long setae on second and third segments 6
5. Connexivum dorsally with light-colored area extending along entire lateral border (fig. 154); corium of uniformly dark color (fig. 154) *recurva*
 Connexival segments black, narrowly marked with yellow along posterior fourth or third adjacent to intersegmental suture (fig. 72B); corium dark, with base and subapical spot yellowish (fig. 72A, B) *gerstaeckeri*
6. Anterior lobe of pronotum with the usual ridges but without tubercles (117, 118A; 147B, C; 148A); anterolateral angles obtuse, not prominent; rostrum with abundant long hairs on second and third segments (figs. 83B; 118B, D; 148E) 7
 Anterior lobe of pronotum with distinct discal tubercles; anterolateral angles of pronotum pointed, prominent; rostrum practically glabrous 9
7. Upper and lower surface of connexival segments marked transversally with dark and light (fig. 117); abdomen conspicuously flattened ventrally along middle; body integument highly polished *neotomae*
 Connexivum without transversal markings; abdomen convex below; body integument dull 8
8. Head comparatively short in side view (fig. 83B); base of clypeus conspicuously swollen, strongly convex in lateral view (fig. 83B); spongy fossulae present on fore tibia in both sexes; connexivum dorsally light colored on outer portion, dark on inner portion (fig. 82) *incrassata*
 Head more elongate in side view (fig. 148E); base of clypeus not strongly swollen, its dorsal surface straight in lateral aspect (fig. 148E); spongy fossulae absent in both sexes; connexivum unicolorous (fig. 147) *protracta*
9. Pronotum dark, with red or yellowish markings in form of narrow band on collar, on anterolateral angles and sides of pronotum, and on humeri and some portions along hind border of pronotum (fig. 168); dorsal and ventral surface of connexivum with light colored markings occupying from one-fourth to one-half of each segment posteriorly, including intersegmental sutures, with a very narrow light-colored area situated behind suture (fig. 168) *sanguisuga*
- Pronotum uniformly piceous or black (fig. 84); connexivum dorsally and ventrally with faint reddish band on posterior portion of segments adjacent to intersegmental suture (fig. 184) *indictiva*

KEY TO THE SPECIES OF *Triatoma* OF MEXICO¹

1. Pronotum with humeral angles acute (figs. 113, 114A, C) *mexicana*
 Pronotum with humeral angles rounded 2
2. Large insects, more than 25 mm., most species with strongly widened abdomen (e.g., figs. 140, 141) 3
 Smaller insects, less than 25 mm., abdomen not strongly widened 11
3. Pilosity abundant (figs. 102A, D; 109B; 141); first antennal segment attaining or surpassing level of apex of clypeus (figs. 102A, D; 109B, C; 130A; 142A, B); spongy fossulae absent in both sexes 4
 Head and thorax appearing glabrous dorsally; first antennal segment rarely attaining but not projecting beyond level of apex of clypeus (figs. 64B-G; 73A; 81A; 155A); spongy fossulae present on fore and mid tibiae, but only in males 8
4. Corium largely yellowish white (fig. 130), narrowly orange at base and black at apex *pallidipennis*
 Corium without extensive white area, largely black, with yellow or orange-red markings basally and subapically (figs. 101, 108, 140, 143) 5
5. Corium with long, delicate, suberect hairs about 0.5 mm. long (fig. 16B) 6
 Corium with short, slightly decumbent or appressed setae not more than 0.3 mm. long (fig. 16A) 7
6. Hemelytra short, not extending beyond urotergite VI (figs. 140, 141); connexivum dorsally with orange-red spots occupying part of posterior sixth to third of segments (figs. 140, 141) *phyllosoma*
 Hemelytra long, extending or almost extending to apex of abdomen (fig. 108); connexivum dorsally with orange-red spots covering entire posterior third to half of segments (fig. 108) *mazzottii*
7. Genae invariably attaining or surpassing level of apex of clypeus (fig. 144A); posterior lobe of pronotum extensively orange-yellow (fig.

¹Spanish version of key, p. 474.

- 143); in most specimens, dorsal connexival segments largely orange-yellow, with anterolateral black spot (fig. 144G); rarely connexival segments black with orange-yellow posterolateral spot (fig. 144D-F); mesosternum, metasternum, and abdominal venter invariably with long suberect hairs. *picturata*
Genae in many cases not attaining level of apex of clypeus (fig. 102A, B); pronotum with posterior lobe entirely black (fig. 101), or with 1+1 small light-colored spots on humeri (fig. 102D); dorsal connexival segments (figs. 101, 102B, C, E) black, with yellow or orange-yellow spots on posterior third or half, extending or not to connexival suture; mesosternum with long suberect hairs, metasternum and abdominal venter with similar or with short decumbent hairs
.....*longipennis*
8. Corium entirely piceous (fig. 154); connexivum along outer margin with narrow percurrent orange-red band, wider ventrally than on dorsum (fig. 154)*recurva*
Corium with light markings (figs. 63, 72B; 80); connexivum with different color pattern (figs. 63, 72B; 80)9
9. Connexivum dorsally and ventrally uniformly dark, or each segment with very small light colored spot at junction of intersegmental suture with outer border (fig. 80); corium yellow at base and with wide transversal marking subapically (fig. 80)*hegneri*
Connexivum with more prominent light-colored markings dorsally and ventrally (figs. 63, 72B); corium differently marked10
10. Connexival segments (fig. 63) each marked transversally on upper and lower surface with yellow or orange-yellow along posterior fourth or third of segment adjacent to intersegmental suture (fig. 72B); clavus black basally, smoky brown apically; corium dark, with small yellow spot basally and again subapically*gerstaecheri* (part)
Connexival segments dorsally and ventrally with yellow or orange-yellow spot occupying more than posterior third of each segment (fig. 63); clavus black basally, yellow apically; corium preponderantly yellow or orange-yellow, with apical and central dark spot, the latter of varied size (fig. 63) and occasionally missing*dimidiata*
11. Insects distinctly pilose, with strong, black, decumbent setae conspicuous on head, pronotum and corium (fig. 93D); head distinctly convex dorsally (fig. 93B); antenniferous tu-
bercles comparatively close to eyes (fig. 93B)*lecticularia*
Body practically glabrous, at most with short, sparse setae; head not conspicuously convex dorsally; antenniferous tubercles remote from eyes (e.g., figs. 72B; 124C; 148E)12
12. Antennae with first segment elongate, attaining or slightly surpassing level of apex of clypeus (fig. 158A, B); pronotum reddish brown or black, with lateral margins and humeral angles pale (fig. 156B, C), very rarely entirely dark*rubida*
Antennae with first segment short, falling distinctly short of apex of clypeus (e.g., 40A; 73A); pronotum different, in most cases unicolorous13
13. Pronotum with light markings on fore lobe and on humeral angles (fig. 122); corium with light and dark markings (fig. 122A); abdominal venter sharply flattened longitudinally along middle; spongy fossulae on first and second pairs of legs of male, but only on first pair in female*nitida*
Pronotum and corium unicolorous; abdominal venter convex, only very slightly flattened; spongy fossulae on first and second pairs of legs of male but absent in female14
14. Anterior lobe of pronotum with discal tubercles (figs. 73A; 85A); anterolateral angles of pronotum prominent (figs. 73A; 85A); scutellum with elongate apical process (figs. 72B; 84); connexivum with narrow reddish markings along intersegmental sutures15
Anterior lobe of pronotum without discal tubercles; anterolateral angles not prominent; posterior scutellar process short; connexivum not as above16
15. Size 23 mm. or more; postocular portion of head with sides subparallel (figs. 72B; 73A); pronotum with discal and lateral tubercles (fig. 73A); fore femora relatively slender, from eight to nine times as long as wide; base of hemelytra conspicuously light colored (fig. 72B)*gerstaecheri* (part)
Size 22 mm. or less; postocular portion of head distinctly rounded laterally (figs. 84, 85A); pronotum without lateral tubercles (fig. 85A); fore femora relatively stout, about six times as long as wide; base of hemelytra only slightly lighter than remainder (fig. 84)
.....*indictiva*
16. Connexivum dorsally with orange-red or yellowish, irregularly shaped markings situated on posterior one fourth to one half of each segment (fig. 40E, F); in some cases, light

- markings occupying uninterrupted entire margin of connexivum (fig. 82), in other cases (figs. 39, 40D) with a small dark spot on anterolateral angle of each segment; spongy fossulae on tibiae of first pair of legs in both sexes 17
- Connexivum uniformly dark (figs. 134, 147B; 170); spongy fossulae absent in both sexes 18
17. Base of clypeus strongly swollen (fig. 83), conspicuously convex in lateral view; under surface of head sinuate in side view (fig. 83); venter evenly rounded *incrassata*
Clypeus less swollen and less salient above (fig. 40B, C), its upper surface only very slightly convex in lateral view; under surface of head almost straight in lateral view (figs. 40B, C); venter slightly flattened longitudinally along middle *barberi*
18. Head with slight arcuate depression dorsally behind clypeus (fig. 148A-E); head elongate in lateral view, with eyes close to level of under surface of head (fig. 148E); length of insects 13-23 mm. *protracta*
Head without arcuate depression behind clypeus (fig. 136A; 171A, C), and relatively much shorter in lateral view (fig. 171B), with eyes remote from level of under surface of head; length 9.5-13 mm. 19
19. General color black (fig. 134) *peninsularis*
General color brown, polished (fig. 170) *sinaloensis*
- KEY TO THE SPECIES OF *Triatoma* OF CENTRAL AMERICA AND THE ANTILLES¹**
1. First antennal segment distinctly extending beyond level of apex of clypeus (figs. 161, 162B); pronotum (figs. 159, 161) heavily granulose, piceous or black, with lateral borders entirely red *rubrofasciata*
First antennal segment not or barely attaining level of apex of clypeus; pronotum differently colored 2
2. Disc of scutellum at base with a pair of prominent anteriorly directed tubercles overlapping posterior margin of pronotum (fig. 170) 3
Disc of scutellum without tubercles mentioned 4
3. General color light brown (fig. 70A); discal and lateral tubercles of fore lobe of pronotum prominent, subconical (fig. 70A); femora of first and second pairs of legs with denticles *flavida*
- General color piceous (fig. 125); discal and lateral tubercles of fore lobe of pronotum very small, wartlike; fore and mid femora without denticles *obscura*
4. Abdomen flattened longitudinally along venter; anterior lobe of pronotum without discal tubercles (fig. 122) 5
Abdomen convex ventrally; anterior lobe of pronotum with discal tubercles 6
5. Genae extending beyond apex of clypeus (fig. 167A, B); pronotum (fig. 166) of uniform color with sides constricted at level of interlobular transverse sulcus *ryckmani*
Genae not extending beyond apex of clypeus (fig. 124A, B); pronotum (fig. 122) dark brown with light-colored pattern elements, its sides not constricted *nitida*
6. Anterior lobe of pronotum with lateral tubercles (fig. 64A, D); scutellum with elongate posterior process (fig. 63); connexival segments dark on anterior third (fig. 63) *dimidiata*
Anterior lobe of pronotum without lateral tubercles (fig. 66B, 84); scutellum with short posterior process; connexival segments in most cases with dark area larger than light one (figs. 65, 66C; 184, 185C) 7
7. Membrane of hemelytra with variegated pattern elements (fig. 65); femora dark, with ferruginous nodules and more than five setiferous denticles on under surface; connexival segments with irregularly shaped black spot occupying almost entire surface of each segment (figs. 65, 66C); body with conspicuous golden-colored pilosity *dispar*
Hemelytra not with variegated pattern elements (fig. 184); femora uniformly ferruginous, without nodules, and with not more than three setiferous denticles; connexivum with dark transversal spot occupying three-fourths of each segment (fig. 184); pilosity of body inconspicuous *venosa*
- KEY TO THE SPECIES OF *Triatoma* OF VENEZUELA, COLOMBIA, TRINIDAD AND THE GUYANAS²**
1. First antennal segment extending beyond level of apex of clypeus (fig. 161, 162B); head and pronotum heavily granulose (fig. 161, 162B); pronotum piceous or black, with lateral margins entirely red (figs. 159, 166) *rubrofasciata*
First antennal segment not extending beyond level of apex of clypeus; head and pronotum

¹Spanish version of key, p. 476.

²Spanish version of key, p. 477.

- not heavily granulose; color pattern of pronotum different 2
2. Pronotum entirely black (fig. 63); connexival segments yellow, their anterior third black (fig. 63) *dimidiata*
- Pronotum dark with light-colored pattern elements (figs. 104, 119, 120, 184); connexival pattern not as above 3
3. Dark areas of connexival segments covering intersegmental sutures (fig. 103, 104); veins of membrane dark on light background (figs. 103, 104) *maculata*
- Dark spots of connexival segments situated on disc of segments, not attaining intersegmental sutures (figs. 119, 120, 184, 185C); veins of membrane light colored on dark background (figs. 119, 120, 184) 4
4. Anterolateral angles of pronotum elongate (figs. 119, 120); legs black, apex of femora and base of tibiae narrowly annulated with yellow (figs. 119, 120); connexival segments at center with anvil-shaped dark spot (figs. 119, 120) *nigromaculata*
- Anterolateral angles of pronotum not prominent (figs. 184); legs uniformly ferruginous; connexival segments with transversal dark bands remote from intersegmental sutures, occupying three-fourths of each segment (figs. 184, 185C) *venosa*

KEY TO THE SPECIES OF *Triatoma* OF ECUADOR AND PERU¹

1. Pronotum uniformly piceous or black (figs. 63, 87) 2
- Pronotum dark with light markings (figs. 49, 65A) 3
2. Legs uniformly dark; dark spots of connexivum situated on anterior third of each segment, attaining but not including intersegmental sutures; corium extensively yellow (fig. 63) *dimidiata*
- Legs dark, with trochantera and adjacent base of femora, as well as faint basal annulus of tibiae, yellow (figs. 88, 90B); dark spots of connexivum including intersegmental suture (fig. 87); corium preponderantly black (fig. 87) *infestans*
3. Body with conspicuous golden colored pilosity; membrane of hemelytra with variegated pattern elements (fig. 65); femora dark, with ferruginous nodules and more than five setiferous denticles on under surface; connexivum black, with two orange-red spots on

each segment, one situated on posterior portion of segment including intersegmental suture and occupying entire width of segment, and another, incomplete one, situated at center of segment adjacent to outer margin (fig. 55, 56C), rarely light-colored spots fused (fig. 56D) *dispar*

Pilosity of body inconspicuous, golden-colored setae absent; membrane of hemelytra without variegated pattern elements (fig. 49); femora not nodulose and with not more than three denticles on under surface; connexival pattern different (fig. 49) *carrioni*

KEY TO THE SPECIES OF *Triatoma* OF ARGENTINA, URUGUAY, PARAGUAY, BOLIVIA AND CHILE²

1. Adults micropterous (figs. 177B, C; 179B); second antennal segment with many setae conspicuously longer than diameter of segment (fig. 6E); general color dark brown or black, with connexivum and adjacent lateral portions of urosternites red, the red area continuous or interrupted by black markings not on or adjacent to intersegmental sutures (figs. 179B; 180F) *spinolai* (part)
- Adults macropterous, rarely brachypterous; different combination of characters 2
2. First antennal segment distinctly projecting beyond level of apex of clypeus (figs. 161, 162B); pronotum piceous or black, only lateral margins entirely red (fig. 161) *rubrofasciata*
- First antennal segment either just attaining level of apex of clypeus, or even shorter, pronotum different 3
3. Rostrum with third segment elongate, approximately as long as second (figs. 55C; 100B) 4
- Rostrum with third segment invariably shorter than second (e.g., figs. 69B; 90C) 5
4. Light-colored areas of connexivum red; eyes comparatively smaller and head less high posteriorly, in lateral view (fig. 55C) *circummaculata*
- Light-colored areas of connexivum yellow; eyes comparatively larger and head higher posteriorly, in lateral view (fig. 100B) *limai*
5. Femora light colored (figs. 75, 76C; 175, 176C); connexivum with very narrow, medially constricted, transversal dark markings, similar to musical notes (figs. 74, 75, 174, 175) 6
- Femora with reduced light-colored areas, or en-

¹Spanish version of key, p. 477.

²Spanish version of key, p. 478.

- tirely dark; dark connexival markings different 7
6. Posterior lobe of pronotum and scutellum entirely dark (figs. 74, 75); coxae dark (fig. 76C); rostrum with second segment less than twice as long as first *guasayana*
 Pronotum with 1+1 light-colored spots on humeral region (figs. 174, 175); apex of scutellar spine (fig. 175) and coxae (fig. 176C) light-colored; rostrum with second segment more than twice as long as first (fig. 176B) *sordida*
7. Legs black, except for yellow trochanterae and adjacent basal region of femora (fig. 90B) *infestans*
 Legs entirely dark 8
8. Membrane of hemelytra (figs. 61, 145) light brown, with conspicuous irregularly shaped dark central markings; body, corium and legs with numerous adpressed golden colored setae; legs stout (figs. 61, 145) 9
 Membrane of hemelytra uniformly smoky brown; dorsal surface of body and corium glabrous; legs slender (e.g., figs. 132, 163, 164) 10
9. Setae of hind tibiae (fig. 146D) bristle-like, shorter than diameter of segment, not perceptible without magnification; body extremely hairy (fig. 145); scutellum at base with a pair of prominent anteriorly directed tubercles overlapping hind border of pronotum (fig. 145) *platensis*
 Setae of hind tibiae (fig. 62C) hairlike, longer, many as long as diameter of segment, easily visible without magnification; body less hairy (fig. 61); scutellum without conspicuous tubercles mentioned (fig. 61) *delpontei*
10. Second antennal segment bearing, in addition to short setae, numerous long hairs, longer than diameter of segment (figs. 6G; 47, 68, 179A) 11
 Second segment of antennae only with short setae (figs. 78, 164) 13
11. Humeral angles acute or pointed (figs. 67, 68, 69A, C, E-L) *eratyrusiformis*
 Humeral angles rounded (figs. 46, 47, 177A, 179A) 12
12. Anterior lobe of pronotum without discal tubercles (fig. 179); scutellum with very short apical process (fig. 179); general color black, with red markings on connexivum *spinolai* (part)
 Anterior lobe of pronotum with discal tubercles (figs. 46, 47); scutellum with long apical process (fig. 147); general color black, with yellow markings on connexivum *breyeri*
13. Hemelytra entirely light yellowish brown except base of clavus and veins which are dark (figs. 77, 78); corium not darker than membrane (figs. 77, 78) *guazu*
 Hemelytra with at least part of corium darker than membrane, the latter with veins not prominently darker than rest of surface (figs. 132, 163, 164) 14
14. Length 21 mm. or less; pronotum uniformly black (fig. 132); femora narrowly annulated with yellow apically (fig. 133E); connexival spots yellow *patagonica*
 Length 21 mm. or more; pronotum rarely uniformly black (fig. 165A); in most specimens with red markings (figs. 163, 164, 165C, D, F-J); femora entirely black; connexival spots red or orange, only rarely yellow *rubrovaria*

KEY TO THE SPECIES OF *Triatoma* OF BRAZIL¹

1. Antennae with first segment projecting considerably beyond apex of clypeus (figs. 161, 162B); pronotum piceous or black, with entire lateral borders red (figs. 159, 161); light-colored areas of connexival segments straddling intersegmental sutures and extending narrowly along outer margin anteriorly and posteriorly (fig. 161); venter of abdomen conspicuously flattened longitudinally along middle *rubrofasciata*
 Antennae with first segment not or just attaining level of apex of clypeus; pronotum entirely dark or with diverse markings; dark markings of connexivum straddling intersegmental sutures or in shape of wide bands situated immediately behind sutures; abdomen convex below 2
2. Tibiae uniformly light colored except apex (figs. 106, 181, 182) 3
 Tibiae uniformly dark colored, or with light-colored annulus subapically 4
3. Femora predominantly dark (figs. 181, 182); dark markings of connexivum in shape of wide transversal band immediately behind intersegmental suture (figs. 181, 182); pronotum dark with sides, hind margin, anterolateral angles and 1+1 stripes covering submedian carinae and discal tubercles, orange-red (figs. 181, 182) *tibiamaculata*
 Femora predominantly light colored (fig. 106); dark markings of connexivum (figs. 106, 107C, D) straddling intersegmental sutures, somewhat widened near inner and outer borders; pronotum brown with 1 + 1 yellow spots on humeri (fig. 106) *matogrossensis*

¹Portuguese version of key, p. 494.

4. Trochantera light colored, yellowish (figs. 60D; 90B; 176C); femora dark, with light-colored areas (figs. 43A; 44; 59, 60D; 88, 90B; 174, 175, 176C) 5
 Femora entirely, trochantera partially or entirely dark 8
5. Coxae and most of femora light colored (figs. 174, 175, 176C); femora with subapical brown annulus and irregularly shaped dark markings on dorsal surface (figs. 174, 175, 176C); pronotum brown, with 1+1 yellowish spots on humeral region (figs. 174, 175) *sordida*
 Coxae and greatest part of femora dark; in other respects, femora and pronotum also different from above 6
6. Trochantera and base of femora yellow (figs. 60D; 88, 90B; pronotum entirely black (figs. 59, 87, 89) 7
 Trochantera yellow; femora light colored near middle, in many cases annulate (figs. 43A; 44); pronotum brown with 1+1 elongate yellow spots covering submedian carinae entirely (figs. 43A; 44) *brasiliensis* (part)
7. Transversal dark markings of connexivum in shape of wide bands (figs. 87, 89); head as long as pronotum *infestans*
 Transversal dark markings of connexivum approximately in shape of musical notes (fig. 59); head longer than pronotum *deanei*
8. Head longer than pronotum 9
 Head as long as or shorter than pronotum 16
9. Third rostral segment elongate, about as long as second (fig. 55C); small species (\pm 16 mm. long) with red markings *circummaculata*
 Third rostral segment invariably shorter than second (e.g., figs. 45B; 188B); larger species, markings yellow, orange, or reddish... 10
10. First antennal segment falling conspicuously short of level of apex of clypeus (figs. 56, 58A, C; 137-139, 189, 190A, B) 11
 First antennal segment attaining or almost attaining level of apex of clypeus (e.g., fig. 45A) 13
11. Pronotum dark with light-colored markings (figs. 137, 138); connexival markings in shape of wide light and dark transversal bands extending across entire width of segment (figs. 137, 138); rostrum with very short, scattered setae, almost glabrous (fig. 139B); membrane with dark cloudy spot across vein separating the two cells (figs. 137, 138) *petrochii*
 Pronotum entirely dark (figs. 56, 57, 189); connexival markings not as above; second and third rostral segments with numerous long hairs (figs. 58A; 190B); membrane without spot mentioned 12
12. Corium black, with orange or reddish spots on apical half (figs. 56, 57); connexivum (fig. 58B, D) entirely black along inner portion, orange colored on outer half, interrupted by very narrow black bands on intersegmental suture *costalimai*
 Corium entirely yellow except veins (fig. 183); connexivum (figs. 189, 190C) almost entirely yellow, except small black longitudinal spot on external margin, situated on or just posterior to intersegmental suture, and dorsally but not ventrally with reduced dark areas along inner border *williami* (part)
13. Hemelytra short, leaving seventh urotergite exposed (figs. 127, 128); apical process of scutellum short (fig. 129C), entirely black; corium and membrane entirely yellowish with most veins dark, membrane without dark spot across cells (figs. 127, 128) *oliveirai*
 Hemelytra attaining apex of abdomen (figs. 43, 44, 94, 163, 164); apical process of scutellum elongate, horizontal (fig. 43); corium and membrane with different color pattern 14
14. Corium generally entirely black (figs. 94A, C); pronotum entirely black (fig. 94); connexivum marked with orange-yellow *lenti*
 Corium dark with light-colored spots (figs. 43); pronotum entirely black or marked with red; connexivum marked with red or yellow 15
15. Rostrum stout, second and third segments with very numerous long hairs (fig. 45B); pronotum entirely black, in some specimens carinae of posterior lobe partially yellowish (fig. 43B); connexivum and corium marked with yellow *brasiliensis* (part)
 Rostrum slender, second and third segments sparsely and shortly pilose (fig. 165B); anterior lobe of pronotum entirely black, posterior lobe from entirely black to more or less extensively marked with red (figs. 163, 164, 165C, D, F-J); connexivum and corium marked with red, orange, or very rarely yellow *rubrovaria*
16. Genae not extended beyond level of apex of clypeus (figs. 112, 188), the latter conspicuously swollen subbasally; second and third rostral segments with very numerous long hairs (figs. 112B, 188B); size 25 mm. or more 17
 Genae extending distinctly beyond level of apex of clypeus (figs. 38B; 105A; 150A, B;

- 193A); the latter only very slightly widened subbasally; second and third rostral segments with sparse, short setae, or only third segment with long hairs (figs. 38A; 105B; 150B; 193B); size 22 mm. or less 18
17. Black, with red markings (figs. 186, 187) as follows: longitudinal stripe on head dorsally from clypeus to interocular sulcus, 3+3 elongate markings on hind lobe of pronotum (1+1 between submedian carinae and 2+2 between carinae and lateral borders) and on central depression of scutellum; pleura and under surface of thorax and abdomen dull *vitticeps*
- Black (figs. 110, 111) with 1+1 small yellow spots on anterior portion of hind lobe of pronotum, between submedian carinae and lateral margins; remainder of pronotum and scutellum black; pleura and under surface of thorax and abdomen highly polished *melanocephala*
18. Anterior lobe of pronotum with discal and lateral tubercles (figs. 104, 149); anterolateral angles of pronotum light yellow (figs. 104, 149) 19
- Anterior lobe of pronotum without discal and lateral tubercles; anterolateral angles of pronotum black 20
19. Head dorsally in most cases with more or less extensive orange colored markings; (figs. 103A; 104), only rarely entirely black; in many specimens, a light-colored spot each on propleura and mesopleura (fig. 105E), or on mesopleura only; head very high posteriorly in lateral view (fig. 105B); eyes large; rostrum (fig. 105B) with first segment as long as or slightly longer than third, latter with very long hairs; second rostral segment comparatively thicker in side view (fig. 105B); lateral endosoma processes with wide longitudinal more heavily sclerotized stripes, and without denticles apically (fig. 105D) *maculata*
- Head invariably entirely black dorsally (fig. 149); in many specimens, light-colored spot only on propleura, or absent; head less high posteriorly in lateral view (fig. 150B); eyes smaller, rostrum (fig. 150B) with first segment slightly shorter than third, latter with shorter hairs; second rostral segment more slender in side view; lateral endosoma processes without wide longitudinal ridges, denticulate apically (fig. 150D) *pseudomaculata*
20. Pronotum uniformly dark (fig. 37); corium and clavus (fig. 37) almost uniformly dark, except apical half of clavus and adjoining portion of cell of corium, both smoky brown; endosoma processes of male (fig. 38C, D) over half as long as phallosoma, heavily sclerotized, and with about 100 denticles apically *arthurneivai*
- Pronotum (figs. 191, 192) dark, with 1+1 distinct reddish spots on humeri, and, in some specimens, with large reddish spot on disc between carinae posteriorly; corium (figs. 191, 192) with extensive, confluent reddish areas; endosoma processes (fig. 193C, D) weakly sclerotized, not over half as long as phallosoma, and with only about 20 apical denticles *wygodzinskyi*

Triatoma amicitiae Lent

Figures 34-36

Triatoma amicitiae Lent, 1951d, p. 427, figs. 1-3; Monteith, 1974, p. 91.

Female (male not known). Length 15 mm.; width of pronotum 4 mm., of abdomen 7 mm.

Overall color uniformly orange-brown, with only extreme apex of corium and entire membrane, dark. Integument granulose on head and thorax. Setae very short and sparse.

Head (figs. 34, 35, 36A, B) strongly convex dorsally between eyes, slightly less than twice as long as wide across eyes (1:0.55) and as long as pronotum. Anteocular region twice as long as postocular (1:0.45); postocular with sides slightly rounded, somewhat converging posteriorly. Clypeus widened on posterior half, elevated in lateral view. Genae slightly tapering distally, their apex rounded, extending to level of apex of clypeus. Eyes unusually small, in lateral view not quite attaining level of lower surface and remote from level of upper surface of head. Ratio width of eye to synthlipsis 1:4.2. Ocelli small. Antenniferous tubercles situated behind middle of anteocular region. First and second antennal segments dark brown; first with apex falling short of level of apex of clypeus, second segment only with very short setae. Second segment four times as long as first. Rostrum (fig. 36B) with short setae on all segments, slightly longer on apex of second and on third segment. First rostral segment attaining level of base of antenniferous tubercles, second falling slightly short of level of posterior border of head. Ratio of rostral segments 1:1.4:0.5.

ish, lighter colored than rest of body, only its apex darkened. Membrane dark.

Legs stout, with fore femur about four times as long as wide, and without denticles. Tibiae without spongy fossulae (probably present in male).

Venter slightly flattened longitudinally along middle, its microsculpture consisting of meandering or labyrinthine wrinkles; transverse striation not developed. Dorsal connexival segments (fig. 34) with conspicuous rugosities along outer margin. Spiracles adjacent to connexival suture. Connexivum unicolorous, not spotted.

TYPE: British Museum (Natural History).

DISTRIBUTION: Sri Lanka [Ceylon]. This species was described (Lent, 1951d) from a specimen supposedly collected in Australia ("Wiraurla") but it was shown by Monteith

Anterior lobe of pronotum (figs. 34, 35, 36A) without discal or lateral tubercles. Posterior lobe irregularly rugose-granulose. Submedian carinae evanescent before hind margin of pronotum; humeri rounded. Anterolateral angles with short, triangular, anterolaterally directed projections.

Scutellum with central depression limited by distinct carinae. Posterior process almost as long as main body of scutellum, stout, subconical, its apex slightly upward turned.

Hemelytra (figs. 34, 35) attaining posterior margin of seventh urotergite. Corium yellow-

wide-angled apically. Eyes in lateral view considerably surpassing level of under surface and approaching level of upper surface of head. Ratio width of eye to synthlipsis 1:1.0-1.3. Ocelli large. Antenniferous tubercles situated slightly behind middle of anteocular region. First antennal segment falling considerably short of level of apex of clypeus. Second segment compressed, beset with numerous adpressed setae shorter than its diameter. Ratio of antennal segments 1:5.0-6.0:3.0-3.2:2.0-2.3. Rostrum (fig. 38A) reddish brown, lighter than head capsule. Second and third rostral segments

(1974) that the type and only specimen was actually collected in southern Sri Lanka (Wirawala).

BIOLOGY: Unknown.

OBSERVATION: This is the smallest of all Old World species of *Triatoma*. Only a single specimen is known.

Triatoma arthurneivai Lent and Martins Figures 37, 38

Triatoma arthurneivai Lent and Martins, 1940, p. 881, fig. 1, pls. 26. Corrêa, Alves and Noda, 1965, p. 217, figs. 1-15.

Length of male 22 mm., of female 19.5-21.0 mm.; width of pronotum of male and female 5.0 mm., width of abdomen of male 7.5 mm., of female 8.0 mm.

Overall color black, in some specimens with delicate blue pruinescence; orange-red markings on connexivum. Integument almost glabrous, setae very short and sparse.

Head (figs. 37, 38A, B) black, delicately granulose, less than twice as long as wide (1:0.6), and slightly shorter than pronotum (1:1.1). Anteocular region two and one-half to three times as long as postocular (1:0.3-0.4), postocular with sides rounded, almost angulate. Clypeus long and narrow, only very feebly widened behind middle. Genae narrowly tapering apically, almost pointed, distinctly surpassing level of apex of clypeus. Jugae rounded or

somewhat compressed dorsoventrally, very slender in side view. Rostrum appearing glabrous, only third segment with numerous distinctly perceptible but very short hairs. First segment not attaining level of apex of antenniferous tubercles, second reaching to level of hind margin of eyes. Ratio of rostral segments 1:1.8-1.9:0.9-1.0. Neck dark, with a pair of very small yellow spots laterally.

Pronotum (fig. 37) entirely black, only very rarely humeral area tinged with orange. Anterior lobe not granulose, with obsolescent or without dorsal and invariably without lateral tubercles. Posterior lobe heavily wrinkled. Submedian carinae extending to posterior third or almost to hind border of sclerite. Humeral angles narrowly rounded. Anterolateral projections prominent, conical, not flattened dorsoventrally.

Scutellum (fig. 37) with distinct median depression. Posterior process of scutellum subcylindrical, about as long as main body of scutellum, horizontal, with apex slightly upturned, rounded in dorsal and obliquely truncate in lateral view. Distal portion of process light colored in some specimens.

Hemelytra (fig. 37) extending to apex of seventh urotergite, in both sexes. Corium black; clavus black on basal third or fourth, light grayish brown on remainder, this color extending to adjoining portion of corium. Membrane fumose, light brown, lighter than corium, veins distinctly darker than cells.

Legs uniformly black, very slender. Fore femora 7-8 times as long as wide; femora of fore and mid pairs of legs with a pair of small subapical denticles. Fore and mid tibiae of male with spongy fossulae, absent in female.

Venter convex, very slightly flattened longitudinally along middle in female, delicately striate transversally, sparsely beset with short yellowish hairs. Spiracles very close to or adjoining connexival sutures. Urosternites dark brown or black, spiracles surrounded each by small yellow area. Connexivum (fig. 37) with orange-red subsemicircular spots in central portion of each segment and adjacent to outer margin, and black marks in shape of wide transverse bands on intersegmental sutures widened toward inner connexival suture; light-

colored areas longer than dark ones, at least along outer margin.

Male genitalia with endosomal processes much over half as long as phallosoma (fig. 38D), heavily sclerotized, their apices with close to 100 denticles (fig. 38C).

TYPE: Instituto Oswaldo Cruz, Rio de Janeiro.

DISTRIBUTION: Brazil (Bahia, Minas Geraes, São Paulo).

BIOLOGY: *Triatoma arthurneivai* has not been found infected with *Trypanosoma cruzi*, nor has it been reported in association with man. The species has been collected in loosely constructed stone walls where small rodents (*Cavia aperea* Erxleben and *Cerodion rupestris* Wied, as well as others) occurred. The species was also observed to colonize where lizards (*Tropidurus torquatus* [Wied]) took shelter. *Triatoma arthurneivai* is attracted to artificial light.

OBSERVATION: *Triatoma arthurneivai* is very close to *T. wygodzinskyi*, as discussed under the heading of the latter species.

Triatoma barberi Usinger
Figures 24N, 39, 40

Triatoma sp., Mazzotti, 1939b, p. 74, fig. 2.
Triatoma barberi Usinger, 1939, p. 44; 1944, p. 72,
pl. 12, fig. C. Ryckman, 1962, pl. 9, fig. P.

Length of males 16-18, of females 18.5-20.0 mm.; width of pronotum of males 3.5-4.0 mm., of females 4.0-4.5 mm.; of abdomen of males 5.5-6.5, of females 6.5-7.0 mm.

Color from piceous to black, with reddish markings on connexivum. Setae short and sparse.

Head (fig. 40, A-C, G), granulose and slightly rugose, distinctly convex above, twice as long as wide across eyes (1:0.55), and as long as pronotum. Anteocular region slightly over twice as long as postocular (1:0.45), postocular with sides rounded, verrucose. Clypeus narrow anteriorly, strongly widened on posterior half. Head with distinct arcuate transverse impression at base of clypeus. Genae narrowly tapered apically, almost attaining apex of clypeus. Upper surface of head in side view with distinct depression at level of base of clypeus; ventrally not salient behind eyes. Eyes in lateral view not attaining level of dorsal but very close to level of under surface of head. Eyes small, ratio width of eye to synthlipsis 1:2.2-3.0. Antenniferous tubercles situated slightly behind level of center of anteocular region. First antennal segment very short, attaining only two-thirds of distance between its base and level of apex of clypeus. Second segment only with short, adpressed setae. Ratio of antennal segments 1:2.6-3.0:1.7-2:1.6-1.8. Ros-trum (figs. 40B, C) with relatively short hairs, somewhat longer toward apex of second and uniformly long on third segment. First segment attaining level of center of antenniferous tuber-cle, second attaining level of hind border of head. Ratio of rostral segments 1:1.2-1.4:0.5-0.6.

Pronotum (figs. 39, 40A) entirely dark, trap-ezoidal, with sides delicately carinate, only faintly constricted at level of transverse sulcus. Anterior lobe slightly elevated, distinctly gran-ulose on ridges, without discal or lateral tuber-cles. Posterior lobe distinctly rugose, submedian carinae falling short of hind margin.

Humeri rounded, not elevated. Anterolateral angles salient but short, rounded apically.

Scutellum rugose; central portion distinctly impressed, limited laterally by sharp carinae. Apical process of scutellum very short, one-half as long as main body of scutellum, conical, apex deflected.

Hemelytra (fig. 39) falling short of apex of abdomen by 0.5-1.0 mm., in either sex; uniformly dark colored.

Legs uniformly dark, short and stout; fore femora 4.5 times as long as wide, minutely granulose. Fore and median femora with two pairs of subapical denticles. Males with minute spongy fossulae on tibiae of first and second

pairs of leg. Females with spongy fossulae on first pair only.

Venter slightly but distinctly flattened longitudinally along middle, but flattened portion not distinctly separated from convex one. Urosternites minutely striate transversally; hairs inconspicuous. Spiracles close but not adjacent to connexival suture. Connexivum (fig. 40D-F) from dark red to orange-red, segments with black markings of varied extension, from occupying entire anterior four-fifths of segment (fig. 40E) to somewhat reduced with two pointed posterior projections, the outer one shorter than the inner one (fig. 40F), and to broken up into two dark spots, the outer one small, situated at anteroexternal angle of segment, the inner one large, elongate, adjacent to inner border of connexival segment (fig. 40D). Dark markings in no case forming continuous longitudinal band.

TYPE: California Academy of Sciences..

DISTRIBUTION: Mexico (Colima, Federal District, Guerrero, Hidalgo, Jalisco, Michoacan, Morelos, Oaxaca, Puebla, Tlaxcala).

BIOLOGY: *Triatoma barberi* has been found naturally infected with *Trypanosoma cruzi*. It is attracted to light, occurs in chicken houses and frequently in human habitations, where all instars have been found. Its eggs adhere to the substrate. In houses the species normally bites at night but will occasionally do so during the day.

Triatoma bouvieri Larrousse
Figures 41, 42

Triatoma bouvieri Larrousse, 1924a, p. 67, fig. 3.
Lent, 1953b, p. 316.

Panstrongylus bouvieri: Pinto, 1931, p. 106.

Length of male 17.0-18.0 mm., of female 19.5-20.0 mm.; width of pronotum of male 4.0-4.5 mm., of female 4.8 mm.; width of abdomen of male 7.0-7.8 mm., of female 8.0 mm.

Overall color from yellowish to reddish brown, with dark brown or black markings on head, pronotum, corium, and connexivum (fig. 41). Integument rugose, granulose in some areas. Setae very short and sparse.

Head (fig. 42) granulose and irregularly rugose above; its color dark reddish brown with 1+1 longitudinal black stripes on dorsum sublaterally. Head less than twice as long as wide across eyes (1:0.65) and slightly shorter than pronotum (1:1.1). Anteocular region twice or slightly more than twice as long as postocular (1:0.4-0.5); postocular with sides rounded. Clypeus narrow anteriorly, rather abruptly widened on posterior half, conspicuously convex in side view. Genae narrowly tapering apically, distinctly surpassing level of apex of clypeus. Eyes in lateral view attaining level of under surface but remote from upper surface of head. Ratio width of eye to synthlipsis 1:1.9-2.4. Distance from ocelli to hind border of eyes subequal to length of diameter of ocelli. First and second antennal segments dark brown to black; first segment very short, not attaining level of apex of clypeus. Second antennal segment only with adpressed setae, shorter than diameter of segment. Ratio of an-

brown or black on smooth areas of anterior lobe and with four longitudinal dark stripes on posterior lobe, 1+1 in area between submedian carinae and lateral margin of pronotum, and 1+1 in space between carinae, adjacent to same. Outer stripes abbreviated in some specimens. Fore lobe granulose on elevated areas, with faint discal and without lateral tubercles. Submedian carinae evanescent before posterior margin. Humeral angles rounded. Anterolateral angles shortly conical, rounded or tapered apically.

Scutellum (fig. 41) with variable color pattern, its basal portion dark brown or black, central depression and posterior process in most cases reddish. Sublateral carinae limiting central depression distinct. Posterior process of scutellum relatively short, only twice as long as main body of scutellum, horizontal, subconical, sharply tapering from wide base to narrow apex.

Hemelytra (fig. 41) almost attaining apex of abdomen in males and in some females; in other females not extending beyond middle of seventh urotergite. Corium yellowish brown, with irregular central spot of varied size, extending to costal margin of hemelytron or separated from margin by more or less wide light colored stripe connecting subbasal and subapical light spots, or the latter separated by extended central dark spot. Base and apex of corium dark.

Legs reddish brown, stout; fore femur 4.0-4.5 times as long as wide. Fore and mid femora subapically with 3-4 denticles. Tibiae of first and second pair of male with spongy fosulae, absent in female.

Abdomen rounded below but faintly flattened longitudinally along middle, more perceptibly so in female. Surface microstructure of

tentorial segments 1:3.1-3.5:2.4-2.6:2.3-2.5. Rostrum (fig. 42B) with short, inconspicuous setae except on apex of second and on third segment, but not numerous and not forming brushlike structure at junction of second and third segments. First rostral segment attaining level of base of antenniferous tubercle, second attaining level of hind border of head. Ratio of rostral segments 1:1.6-0.5. Neck uniformly yellowish or reddish.

Pronotum (fig. 41) light reddish brown; dark

venter in shape of minute meandering or labyrinthine wrinkles (as in fig. 19C); transverse striations not developed. Spiracles adjacent to connexival suture or remote from same by distance not larger than their own diameter. Abdomen dark reddish brown. Connexivum light reddish brown. Connexival segments at center (fig. 41) with dark brown or black roundish or square spot, larger dorsally than ventrally, in some specimens attaining lateral margin of segment, in others not extending to lateral margin. Membrane as dark as dark portions of corium.

TYPE: Muséum National d'Histoire Naturelle, Paris

DISTRIBUTION: Nicobar Islands; Philippines; Vietnam.

BIOLOGY: No data are available on the biology of this species.

OBSERVATIONS: *Triatoma bouvieri* is obviously very closely related to *T. migrans*, and it is not unthinkable that specimens obtained through further collecting will bridge the morphological gap between the two species. At this time, however, the differential characters given in our key allow placement of every specimen examined unequivocally in one of the two species named, viz., no intermediate forms have been encountered.

Triatoma brasiliensis Neiva

Figures 43-45

Triatoma brasiliensis Neiva, 1911d, p. 461; 1914, p. 33. Pinto, 1925a, p. 53, figs. 11, 34-36. Lucena, 1958, p. 311; 1970, p. 81

Conorhinus brasiliensis: Patton and Cragg, 1913, p. 495.

Triatoma brasiliensis melanica Neiva and Lent, 1941, p. 72.

Triatoma brasiliensis macromelasoma Galvão, 1956, p. 456, fig. I.

Length of male 22-25 mm., of female 23.0-25.5 mm.; width of pronotum of male 4.5 mm., of female 4.5-5.5 mm.; width of abdomen of male 6-9 mm., of female 7.5-10.0 mm.

Overall color from dark brown to black, in some cases lighter brown dorsally; brownish yellow markings (figs. 43, 44) on neck, pronotum, legs, hemelytra, and connexivum. Integument with sparse, short, yellowish or black setae.

Head dark brown or black, in some cases tinged with light brown dorsally; rugose dorsally and laterally, slightly granulose. Head (figs. 44, 45A) twice as long as wide across eyes (1:0.50-0.55) and distinctly longer than pronotum (1:0.85-0.95). Anteocular region four times as long as postocular (1:0.25), postocular with sides slightly rounded. Clypeus distinctly but not abruptly widened behind middle. Genae tapering distally but their apex narrowly rounded, not pointed, slightly projecting beyond level of apex of clypeus. Jugae widely rounded apically. Eyes in lateral view approaching but not attaining level of under surface and remote from level of upper surface of head. Ratio width of eye to synthlipsis 1:2.0-2.25. Antenniferous tubercles inserted at or slightly before middle of anteocular region. First antennal segment attaining level of apex of clypeus; second segment subcylindrical, beset with declivous setae shorter than diameter of segment. Ratio of antennal segments 1:3.6-4.2:2.4-2.7:1.9-2.2. Rostrum (fig. 45B) thick, as dark as head capsule, with medium-sized hairs on first and on underside of second segment, and with long and very numerous hairs on upper surface of second and on entire third segment; hairs especially dense dorsally at junction of second and third segments. First rostral segment extending to level of apex of antenniferous tubercles, second to level of apex of middle of eyes. Ratio of rostral segments 1:1.7-1.9:0.9-1.05. Neck dark, with a pair of light-colored spots laterally.

Pronotum (figs. 43, 44) very sparsely granulose, from dark brown to black, in some cases entirely dark, more frequently with some or all of the following yellow: collar, anterolateral processes, discal tubercles of fore lobe, submedian carinae along their entire length, a pair of large, elongate, subrectangular markings on hind lobe laterad of carinae, and narrower markings parallel to lateral margins. Anterior lobe with very low discal tubercles, difficult to perceive when concolorous with overall surface of fore lobe; lateral tubercles absent. Posterior lobe coarsely rugose. Submedian carinae evanescent on posterior fourth of hind lobe. Humeral angles rounded, slightly angular.

Scutellum (figs. 43, 44) dark brown, poste-

rior process with yellow point in light-colored specimens. Scutellum coarsely rugose, with distinct central depression. Posterior process as long as main body of scutellum, subcylindrical, but slightly compressed laterally, apex slightly elevated, rounded.

Hemelytra (figs. 43, 44) extending to variable levels from base to apex of seventh urotergite. Corium light yellow, with dark areas

of variable extension, mainly in lateral area limited by Sc, R+M and free portion of R, and on central area adjoining bases of membranal cells; areas mentioned joined in some specimens. Clavus entirely dark. Membrane fumose, from light yellow to light yellowish brown, as light as or slightly darker than light-colored areas of corium. Veins of membrane black; lumen of cells either uniformly light or, in

black spot enclosing intersegmental sutures; yellow and black spots of about identical size, occupying entire width of segments.

TYPES: Of *brasiliensis* and *brasiliensis melanica*, Instituto Oswaldo Cruz, Rio de Janeiro; of *brasiliensis macromelasoma*, unknown.

DISTRIBUTION: Brazil (Alagoas, Bahia, Ceará, Goiás, Minas Gerais, Pará, Pernambuco, Piauí, Rio Grande do Norte).

BIOLOGY: *Triatoma brasiliensis* has in many cases been found infected with *Trypanosoma cruzi*, and, being frequently domestic, is the second most important vector of Chagas' disease in the caatinga, the semiarid zone of northeastern Brazil. In the wild, the species is found in hollow spaces between and under rocks where the large rodent *Cerodontha rupestris* finds shelter. Another rodent, *Cavia aperea*, is also a host for *T. brasiliensis*. Wild rats caught in traps were frequently found to be a blood source for this species of triatomine, which even has been reported to suck the blood of goats.

OBSERVATION: Melanic forms of this species which occur in various areas have been described as two different subspecies, but intergrading forms are frequent.

Triatoma breyeri Del Ponte

Figures 46-48

Triatoma breyeri Del Ponte, 1929, p. 3, fig. 4; 1930, p. 863, pl. 41. Abalos and Wygodzinsky, 1951,

most specimens, with more or less extensive, irregularly shaped sooty spot extending over central portion of cells.

Legs (fig. 44) dark, with light markings on trochanter, on middle and rarely also at base of femora, as well as apically on tibiae. Extension of light areas variable, from extensive to very reduced and completely absent in melanic forms. Legs slender, fore femora from six to seven times as long as wide. Fore and mid femora salient below subapically or with one or two weak denticles. Male with spongy fossulae on tibiae of fore and mid legs; absent in females.

Abdomen slightly flattened below in both sexes, delicately striate transversally, sparsely setose. Spiracles adjoining connexival suture. Abdomen of female very wide, lateral portions of urotergites exposed. Venter dark brown or black, in some specimens suffused with light brown; spiracles enclosed in minute yellow area. Connexival segments on disc with yellow rectangular or subtriangular yellow spot; wide

p. 118, figs. 232-239. Carcavallo and Martínez, 1968, p. 63, pl. 2, fig. 2. Mariluis, 1974, p. 7, figs. 16-19.

Triatoma breyeri dallasi Del Ponte, 1930, p. 863.

Length of male 18.0-18.5 mm., of female 20-22 mm.; width of pronotum of male 4.0 mm., of female 4.5 mm.; width of abdomen of male 5.5 mm.; of female 6.0-7.0 mm.

Overall color (figs. 46, 47) dark brown to black, with connexivum partly or entirely pale yellow. Pilosity of body inconspicuous.

Head (figs. 46-48A, B) dark, transversally

rugose dorsally, weakly granulose. Head approximately twice as long as wide (1:0.50-0.55), and distinctly longer than pronotum (1:0.85-0.90). Anteocular region two and one-half to three times as long as postocular (1:0.35-0.40); postocular with sides feebly rounded. Clypeus narrow, distinctly but not abruptly widened on posterior half. Genae narrowly rounded apically, attaining level of apex of clypeus. Jugae short, blunt apically. Eyes large, in lateral view surpassing level of under surface but distant from level of upper surface of head. Ratio width of eyes to synthlipsis 1:1.45-1.75. Antenniferous tubercles situated slightly behind center of anteocular region of head. First antennal segment falling short of level of apex of clypeus. Second antennal segment with numerous semierect ciliate hairs twice as long as diameter of segment, and less numerous regularly spaced elongate bristles from twice to more than four times as long as diameter of segment (as in *T. spinolai*; see fig. 6G); similar hairs and bristles on third and fourth segments. Ratio of antennal segments 1:3.2-3.5:3.2-3.5:1.8-2.0. Rostrum (fig. 48B) light brown, not so dark as head. First rostral segment attaining level of apex of antenniferous tubercles, second extending beyond level of hind border of head. Rostral segments slender, the second compressed dorsoventrally. First and second segments with hairs approximately as long as diameter of segments, but longer than diameter of segment on third; hairs not dense. Ratio of rostral segments 1:1.5-1.8:0.5-0.6. Neck dark, with 1+1 distinct yellowish spots laterally.

Pronotum (figs. 46; 47; 48A) uniformly dark. Anterior lobe feebly sculptured, not perceptibly granulose, with 1+1 small but distinct discal and 1+1 small lateral tubercles, the latter in some specimens obsolete. Posterior lobe wrinkled-rugose. Submedian carinae low, not extending beyond middle of hind lobe. Humeral angles narrowly rounded, subangular.

Scutellum (fig. 47) heavily rugose, central depression ill defined, from linear to imperceptible. Posterior process of scutellum horizontal, about as long as main body of scutellum, slender, narrowly tapering or pointed apically (fig. 48C). Mesosternum limited posteriorly by prominent transverse straight ridge (as in fig.

178). Metasternum carinate longitudinally along middle (as in fig. 178).

Hemelytra (figs. 46, 47) closely approaching or attaining apex of abdomen; corium uniformly black; membrane fumose, greyish brown.

Legs uniformly dark. Fore femora about six times as long as wide. Femora inermous, with short adpressed setae and ventrally with long

bristles, most numerous on fore legs. Fore and mid tibiae of male with spongy fossulae, absent in female.

Venter convex, carinate longitudinally along middle in male, almost imperceptibly flattened in female. Venter minutely striate transversally, more coarsely so on seventh urosternite of female. Spiracles adjacent to connexival suture. Connexivum pale yellow, entirely so ventrally,

but dorsally with disc of each connexival segment spotted with dark, in most specimens spot restricted to area adjacent to connexival suture, in others extending to a larger or smaller degree to outer area of connexivum.

TYPES: Of *breyeri* and *breyeri dallasi*, Instituto Oswaldo Cruz, Rio de Janeiro.

DISTRIBUTION: Argentina (Catamarca, Córdoba, La Rioja).

BIOLOGY: This species has not been reported as naturally infected by *Trypanosoma cruzi*. Although occasionally attracted to light or found peridomestically, *T. breyeri* is basically a sylvatic species; it has been found associated with rodents (Caviidae and Cricetidae).

Triatoma carrioni Larrousse
Figures 49, 50

Triatoma carrioni Larrousse, 1926, p. 136, figs. 1, 3,
4. Campos, 1928, p. 61. León, 1953, p. 2, fig.
C. Herrer, 1955, p. 70, fig. 2.

Eutriatoma carrioni: Pinto, 1931, p. 87.

Length of male 19.5-21.0 mm., of female 20.0-22.5 mm.; width of pronotum of male 4.5-5.0 mm., of female 4.5-5.5 mm.; width of abdomen of male 6.0-7.5 mm., of female 6.5-8.0 mm.

Overall color (fig. 49) dark brown or black, with orange-red or yellowish markings on thorax, hemelytra and connexivum. Setae

slender, very short, golden colored, inconspicuous.

Head (figs. 49; 50A-C) black, dorsally along middle with elevated longitudinal granulose ridge. Head about twice as long as wide across eyes (1:0.4-0.5) and distinctly longer than pronotum (1:0.8-0.9). Anteocular region about three times as long as postocular (1:0.35), postocular with sides slightly rounded, converging towards behind. Clypeus narrow, elongate, slightly widened on posterior half. Genae narrowly tapering apically, in some cases pointed, not quite attaining level of apex of clypeus. In side view, eyes reaching level of lower but not of upper surface of head. Ratio width of eye to synthlipsis 1:0.8-0.9 in male, 1:1.0-1.6 in female, viz., eyes wider than synthlipsis in male (fig. 50C) but as wide as, or narrower than, synthlipsis in female (fig. 50A). Antenniferous tubercles inserted distinctly behind middle of anteocular area. First and second antennal segments dark brown or black; first very short, not extending beyond basal two-thirds of genae. Second antennal segment with stout decumbent setae slightly longer than diameter of segment. Ratio of antennal segments 1:2.8-3.3:2.8-3.2:2.3-2.8. Rostrum (fig. 50B) dark brown or black, with short inconspicuous setae. First rostral segment only reaching to level of center of genae; second segment very long and slender, attaining level of ocelli, viz., not reaching to level of posterior border of head. Third rostral segment longer than first. Ratio of rostral segments 1:3.0-3.5:1.2-1.3.

Pronotum (fig. 49; 50A) dark brown or black. Anterior lobe margined laterally with red, with discal and 1+1 posterosublateral tubercles; lateral tubercles absent but lateral borders of anterior lobe angularly salient behind. Posterior lobe black, with lateral margin bordered with orange-red; additionally, one central and 1+1 sublateral longitudinal markings extending from transversal sulcus to pronotum, markings medially constricted or even interrupted. Posterior lobe strongly rugose, wrinkled, not granulose. Submedian carinae evanescent on posterior third. Humeral angles rounded. Anterolateral angles and in some cases also center of collar, red. Anterolateral projections subconical, somewhat compressed dorsoventrally.

cells light colored and bordered with light, extension of light areas variable. Inner membranal cell with light-colored spot subbasally.

Legs black, stout; fore femur 5.5-6.0 times as long as wide. Femora of first and second pairs of legs with three, hind femora with two, unusually large denticles. Fore and mid tibiae of male with spongy fossulae, absent in female.

Abdomen minutely striate transversally below. Spiracles adjacent or very close to connexival suture. Pilosity of venter inconspicuous, adpressed. Venter of male convex, with faint trace of median longitudinal keel. Venter of female faintly but perceptibly flattened longitudinally along middle from second to sixth urosternite; seventh urosternite keeled longitudinally along middle. Venter dark brown or black. Connexivum (fig. 49) black, with narrow transversal reddish spots straddling intersegmental sutures.

TYPES: National Museum of Natural History, Smithsonian Institution, Washington, D. C.

DISTRIBUTION: Southern Ecuador; northern Peru.

BIOLOGY: *Triatoma carrioni* has been found naturally infected with *Trypanosoma cruzi*. It is a semidomestic species which has been found attacking humans and also horses. In the wild, the species has been collected in holes inhabited by wild animals. The species has been reported from altitudes between 1000 and 2650 meters.

Scutellum (fig. 49) black, heavily rugose, its posterior process about as long as main body of scutellum, black at base, red distally, its apex spoon-shaped (fig. 50D). Pleura uniformly dark brown or black.

Hemelytra (fig. 49) reaching apex of abdomen, black. Corium with one subbasal and one subapical very irregularly shaped transverse yellowish marking; apex of corium also yellowish. Some portions of veins forming membranal

Triatoma cavernicola Else and Cheong
Figures 51, 52

Triatoma cavernicola Else and Cheong in Else, Cheong, Mahadevan and Zárate, 1977, p. 367, 2 figs.

Length of males 18.5-20.5 mm., of females 20.5-21.0 mm.; width of pronotum of males 6.5-7.5 mm., of females 4.5 mm.; width of abdomen of males 6.5-7.5 mm., of females 7.0-7.5 mm. General shape comparatively slender.

Overall color (fig. 51) pale stramineous, with dark brown or black markings mainly on head, pronotum, scutellum, apex of corium, connexivum, and on pleura. Body integument rugose. Setae very short and sparse.

Head (figs. 51; 52A, B, E) stramineous, with sides partly black, its surface slightly rugose and heavily granulose, approximately twice as long as wide across eyes (1:0.55), and as long as pronotum. Anteocular region approximately three times as long as postocular (1:0.33); postocular region with sides rounded, heavily granulose. Clypeus widened at base, but not abruptly so. Genae narrowly tapering apically but not pointed. Under surface of head with distinct protuberance behind eyes. In lateral view eyes attaining level of under surface of head and remote from level of upper surface. Ratio width of eye to synthlipsis 1:2.1-2.4. Antenniferous tubercles situated at middle of anteocular region of head, without apicolateral projection. First antennal segment light colored, falling short of level of apex of clypeus; second segment entirely dark. Ratio of antennal segments 1:4.5:3.1:2.5. Rostrum (fig. 52B, E) with sparse short hairs except those on third segment which are more numerous and as long as diameter of segment. First rostral segment attaining level of insertion of antenniferous tubercles, second segment attaining level of hind border of head. Ratio of rostral segments 1:1.5:0.5. Neck of general body color, with 1+1 dark lateral spots, being part of discontinuous lateral dark area extending from sides of head to first visible urosternite.

Pronotum with anterior lobe slightly granulose, almost flat, without discal or lateral tu-

bercles; its color uniformly light. Posterior lobe delicately rugose and granulose, with submedian carinae delimitating a central and 1+1 lateral depressed areas, the latter on their anterior half with 1+1 elongate dark markings; 1+1 similar but shorter markings, not distinct in all specimens, close to inner border of carinae, at sides of central depression. Humeral angles rounded. Anterolateral angles of pronotum subtriangular, anterolaterally directed.

Scutellum (figs. 51; 52C) granulose and coarsely rugose transversally, dark laterally and light colored at center. Posterior process of scutellum subconical, shorter than main body

of scutellum, horizontal (fig. 52D), rounded apically; its color light yellow. Sterna and pleura, except acetabula, dark (fig. 52E); meso-sternum lighter.

Legs uniformly yellow, relatively slender; fore femur 6-7 times as long as wide, with one or two weakly developed or without denticles. Tibiae of first and second pair of legs of male with spongy fossulae, absent in female.

Hemelytra (fig. 51) attaining or slightly surpassing middle of seventh urotergite. Corium almost entirely pale yellow, with one elongate black spot subapically and, in some specimens, with a small and faint spot at center. Membrane smoky brown.

Venter flattened longitudinally along center, more pronouncedly so in female. Abdomen light colored ventrally, with external genitalia darkened somewhat irregularly in both sexes (artifact?). Integument of venter with extremely small irregular wrinkles, giving it an overall minutely crinkled aspect. Connexivum delicately creased longitudinally along outer margin. Color of connexivum pale yellow, disk of each segment (fig. 52D) with dark central spot adjacent to inner connexival suture but not attaining outer border; these spots very distinct dorsally from first to fifth visible segment, ab-

sent on last segment; corresponding spots of ventral surface of connexivum narrower.

TYPE: British Museum (Natural History)

DISTRIBUTION: Malaysia (Malaya).

BIOLOGY: This species was collected in a limestone cave, attacking humans.

OBSERVATIONS: *Triatoma cavernicola* differs from all New World species by the integument of the abdominal venter, and from all Old World Triatominae by its unique color pattern. There is no other species with uniform yellow legs, with a striking color difference between the first and second antennal segment, and with the abbreviated longitudinal markings on the hind lobe of the pronotum. Morphologically, the new species differs from all other Oriental species, except *T. rubrofasciata*, by its comparatively narrow abdomen. *T. cavernicola* differs further from all known Oriental *Triatoma* by the minutely crinkled integument of the venter, as opposed to the small but distinct grooves forming an intricate labyrinthine pattern, as in all other Oriental species.

Triatoma circummaculata (Stål)

Figures 53-55

Conorhinus circummaculatus Stål, 1859, p. 114.

Triatoma circummaculata: Neiva, 1913, p. 196; 1914a, p. 35. Del Ponte, 1930, p. 868, pl. 44, fig. 1.

Triatoma (Neotriatoma) circummaculata: Lima, 1940, p. 198. Mazza, Talice and Jörg, 1942, p. 8, figs. 1-11, pl. 1.

Neotriatoma circummaculata: Pinto, 1931, p. 121, figs. 32, 61. Abalos and Wygodzinsky, 1961, p. 128, figs. 241, 253. Di Primio, 1962, p. 16, fig. 2.

Length of male 15-16 mm., of female 15-17 mm.; width of pronotum of male and female 3.0-3.5 mm., of abdomen of male 5-6 mm., of female 6 mm.

Overall color dark brown or black, with bright red markings on pronotum, corium, and connexivum; extension of markings variable (figs. 53; 54). Pilosity very short, inconspicuous, insects appearing glabrous.

Head (figs. 53; 54; 55B, C) of general body color, delicately rugose and granulose, with setae short and inapparent. Head from twice to slightly more than twice as long as wide across

eyes (1:0.4-0.5), and much longer than pronotum (1:0.7-0.8). Anteocular region about two and one-half times as long as postocular (1:0.35-0.4), postocular with sides distinctly convex, angularly projecting. Clypeus narrow, gradually widened on posterior half. Genae large, rounded distally, slightly projecting beyond level of apex of clypeus. Eyes in lateral view surpassing level of under surface but remote from level of upper surface of head. Ratio width of eye to synthlipsis 1:1.35-1.75. Antenniferous tubercles situated slightly behind middle of anteocular region. First antennal segment very short, not projecting beyond middle of genae. Second antennal segment comparatively thick, beset with longitudinal rows of stout adpressed setae shorter than diameter of segment. Ratio of antennal segments 1:3.3-4.0:3.0-4.2;2.0-2.7. Rostrum (fig. 55C) in most specimens light brown, contrasting with dark head. Setae of rostrum very short and sparse except scattered longer ones on apical portion of third segment. First segment very short, not attaining basal third of distance between apex of antenniferous tubercles and apex of head; second segment extending to level of anterior border of eyes or slightly beyond, third as long

as second, reaching to or even beyond base of neck. First segment subcylindrical, second from subcylindrical to slightly flattened, third very strongly flattened dorsoventrally, very thin in lateral view, and in some specimens distinctly curved. Ratio of rostral segments 1:2:2. Neck dark brown, with a pair of lateral reddish spots.

Pronotum (fig. 53; 54) with anterior lobe from dark brown to black, posterior lobe pigmented as anterior lobe, or from partially to entirely bright red (fig. 55B). Fore lobe delicately granulose on ridges, and without discal or lateral tubercles. Posterior lobe feebly rugose. Submedian carinae penetrating only to anterior fourth or fifth of posterior lobe, obsolete beyond. Humeral angles rounded. Anterolateral projections laterally directed, very short, subconical, blunt apically.

Scutellum (figs. 53; 54) of general dark color, rarely apex of posterior process lighter colored; central depression of scutellum distinctly delimited by carinae. Posterior process short, only half as long as main body of scutellum, horizontal, subconical, tapering to rounded and in some cases slightly upwardly bent point.

Hemelytra (figs. 53; 54) attaining or closely

TYPE: Zoologisches Museum, Berlin.

DISTRIBUTION: Argentina (?Buenos Aires, ?Cordoba, ?San Luis); Brazil (Rio Grande do Sul); Uruguay. The occurrence of this species in Argentina, especially in Córdoba and San Luis, is doubtful and requires confirmation.

BIOLOGY: *Triatoma circummaculata* has been found naturally infected with *Trypanosoma cruzi*. Specimens of *circummaculata* dwell under rocks and in the interstices of stone walls, frequently together with *Triatoma rubrovaria*.

OBSERVATION: The chromatic variability of the posterior lobe of the pronotum—from entirely black to entirely red—in *circummaculata* parallels that of *T. rubrovaria* (fig. 165A, C, D, F-J) together with which it occurs.

Triatoma costalimai Verano and Galvão
Figures 56-58

Triatoma costalimai Verano and Galvão, 1959, p. 199, 4 figs.

Length of male 26 mm., of female 25.5-26.5 mm.; width of pronotum of male and female 5.0-5.5 mm., of abdomen of male and female 7.5-8.0 mm.

Overall color (figs. 56; 57) dark brown to black, with reddish markings on neck, corium and connexivum. Pilosity short and sparse.

approaching apex of urotergite VII. Corium dark brown or blackish, red at base and with smaller reddish spot subapically; these spots in some individuals more extended and occasionally confluent. Membrane brown, fumose, almost as dark as dark portions of corium.

Legs uniformly dark, comparatively short; fore femur 5.5 times as long as wide. Fore and mid femora with one pair of small subapical denticles. Fore and mid tibiae of male with spongy fossulae, absent in female.

Venter rounded below in both sexes, rarely very slightly flattened in female. Integument of venter delicately striate transversally, sparsely and inconspicuously pilose. Spiracles adjacent or very close to connexival suture. Venter dark brown, connexivum bright red, with transverse black stripe straddling intersegmental suture (figs. 53; 54; 55A); transverse markings very narrow, only about one-fifth as long as red areas. Light color of connexivum invading urosternites, especially at spiracles.

Head (figs. 56; 57; 58A, C) black, feebly rugose and granulose-punctate, approximately twice as long as wide (1:0.45), and distinctly longer than pronotum (1:0.75). Anteocular region four times as long as postocular (1:0.25), postocular with sides almost straight, distinctly converging posteriorly. Clypeus narrow, gradually widened behind middle. Genae pointed, projecting beyond level of apex of clypeus. Jugae angular apically. Eyes small, in lateral view approaching but not attaining level of under surface and distant from upper surface of

head. Ratio width of eye to synthlipsis 1:1.6-2.0. Antenniferous tubercles inserted at middle of anteocular region. First antennal segment falling distinctly short of level of apex of clypeus; second with decumbent setae shorter than diameter of segment. Ratio of antennal segments 1:5.6-6.4:4.4:3.2. Rostrum as dark as head or somewhat lighter. First rostral segment attaining or slightly surpassing level of hind margin of eyes. Rostrum (fig. 58A) stout; first segment and most of under surface of second with short hairs; upper surface of second segment, especially toward apex, and entire third segment with numerous very dense setae longer than diameter of segment. Ratio of rostral segments 1:2.6-2.7:1. Neck dark, with pair of lateral reddish spots.

Pronotum (figs. 56; 57) entirely dark brown or black. Fore lobe feebly sculptured and weakly granulose, with 1+1 barely perceptible discal tubercles; lateral tubercles absent. Hind lobe heavily rugose. Submedian carinae extending close to posterior margin of sclerite. Humeral angles rounded.

Scutellum (figs. 56; 57) heavily rugose, with well-developed central depression. Posterior process almost as long as main body of scutellum, subcylindrical or somewhat compressed laterally, its apex slightly elevated, narrowly rounded in dorsal and obliquely truncate in lateral view.

Hemelytra (figs. 56, 57) attaining posterior border of seventh urotergite, in both sexes. Corium and clavus black, apex of corium bordered with reddish, and conspicuous orange-red marking subapically adjacent to base of outer membranal cell. Membrane dark gray, faintly tinged with reddish; veins of membrane black.

Legs (figs. 56; 57) uniformly dark, slender. Fore femora eight times as long as wide. Fore and mid femora with one pair of small denticles subapically. Spongy fossulae on fore and mid tibiae of male, absent in female.

Venter convex in both sexes, highly polished, appearing glabrous, delicately striate transversally. Spiracles adjoining connexival suture. Urosternites dark brown; spiracles yellowish. Connexivum extensively dark brown; connexival segments (fig. 58B, D) each with orange-red marking of variable width extending along outer connexival border; dark portion of

connexivum advancing towards external border along intersegmental sutures.

TYPE: Instituto Oswaldo Cruz, Rio de Janeiro

DISTRIBUTION: Brazil (Bahia, Goiás).

BIOLOGY: *T. costalimai* was collected among calcareous rocks close to nests of mocó (*Kerodon rupestris* [Wied.]). No other information is available.

Triatoma deanei Galvão, Souza and Lima

Figures 59, 60

Triatoma deanei Galvão, Souza and Lima, 1967, p. 401, fig. Galvão and Fuentes, 1971, p. 141, figs. 1, 2, 4.

Length of male (holotype) 25 mm., width of pronotum 6 mm., of abdomen 8.5 mm.

Overall color dark brown. Pilosity short and sparse.

Head (figs. 59; 60A, B) dark brown, delicately rugose and granulose, slightly less than twice as long as wide (1:0.55), and distinctly longer than pronotum (1:0.9). Anteocular region four times as long as postocular (1:0.25), postocular with sides almost straight, distinctly converging toward behind. Clypeus elongate, abruptly widened on posterior half. In lateral view eyes attaining level of under surface and approaching level of upper surface of head. Ratio width of eye to synthlipsis 1:1.3. Genae narrowly tapering apically, distinctly surpassing level of apex of clypeus. Jugae angular apically. Antenniferous tubercles located at middle of anteocular region. First antennal segment falling distinctly short of level of apex of clypeus; remaining segments not preserved. Rostrum reddish brown, relatively stout; first segment not quite attaining level of apex of antenniferous tubercles, second extending to level of hind margin of eyes. First and under surface of second segment of rostrum with short hairs, upper surface of second and entire third segments with hairs as long as or longer than diameter of respective segment, very numerous on apex of second and entire third segments. Ratio of rostral segments 1:2.25:1. Neck dark, with pair of lateral yellowish spots.

Pronotum (fig. 59) black. Anterior lobe (fig. 60B) feebly sculptured, not granulose, with dis-

tinct although small discal and lateral tubercles, somewhat lighter colored than rest of surface of pronotum. Posterior lobe conspicuously rugose. Submedian carinae extending close to hind margin of sclerite. Humeral angles rounded. Anterolateral projections small, subconical.

Scutellum (fig. 59) uniformly dark, with well-developed median impression. Posterior process shortly subconical, wide at base, narrowly tapering apically, horizontal.

Hemelytra (fig. 59) attaining apex of seventh urotergite. Clavus yellowish, dark along outer margin. Corium light yellowish brown with veins mostly dark, central portion of corium also darkened, dark area extending apicad and proximad along cell formed by Sc, R+M and R. Membrane light yellowish brown, with veins narrowly dark.

Legs dark brown, trochantera and base of femora contrastingly yellow (fig. 60D). Fore and mid femora with pair of very small subapical denticles. Spongy fossulae present on fore and mid legs.

Venter convex, delicately striate transversally, with sparse short setae. Spiracles adjoining connexival suture. Lateral portions of urotergites not exposed. Urosternites dark brown, except for minute yellow spots enclosing spiracles. Connexivum (figs. 59; 60C) pale yellow, with small dark mark at intersegmental suture along outer border of segment, and darkened along connexival suture dorsally but not ventrally; some of the intersegmental sutures of connexivum slightly and narrowly darkened, markings similar to musical notes.

TYPE: Instituto Butantan, São Paulo.

DISTRIBUTION: Brazil (Goiás).

BIOLOGY: The species is based upon specimens found dead in human habitations. The sylvatic habits of *T. deanei* are unknown.

OBSERVATIONS: *Triatoma deanei* is close to *T. williami* with which it is sympatric; it differs from the latter species by its slightly but distinctly wider head (figs. 60B and 190A), the longer and more numerous setae of the rostrum, the light-colored trochantera and femora bases, the small but distinct discal and lateral tubercles of the fore lobe of the pronotum, and the darker central portion of the corium.

We have examined fifth instar nymphs de-

scribed by Galvão and Fuentes (1971). As in the adults, the head of the nymph identified as *T. deanei* is stouter than in *williami*. The legs of the nymphs identified as *T. williami* are uniformly dark, whereas in the nymphs of *deanei* the apex of the coxae and the entire

trochantera are distinctly lighter colored than the remainder of the legs.

We have entertained the idea that *T. deanei* might represent a hybrid between *T. williami* and *T. infestans*, both of which occur together in houses; *deanei* is chromatically and mor-

in *T. platensis*, the most closely related species.

Head (figs. 61; 62A, B) dark reddish brown or black, pilose, sparsely granulose. Head comparatively stout in dorsal and lateral view, slightly less than twice as long as wide across eyes (1:0.6), and as long as pronotum. Ante-

phologically intermediate between the two hypothesized parent species. *Triatoma deanei* shares with *inf. es tans* the differential characters enumerated above; it shares with *williami* the slender body and legs, and the peculiar connexival pattern. Additional fieldwork and laboratory studies are necessary to elucidate this point.

Triatoma delpontei Romaña and Abalos Figures
61, 62

Triatoma delpontei Romaña and Abalos, 1947, p. 80, figs. 1-7, 1 pl. Abalos and Wygodzinsky, 1951, p. 69, figs. 43, 47, 60, 102, 104-118. Car-cavallo and Martínez, 1968, p. 69, pl. 1, fig. 3.

Length of male 24-26 mm., of female 25-27 mm.; width of pronotum of male and female 6.5-7.5 mm.; width of abdomen of male 7.5-9.5 mm., of female 8.5-10.0 mm.

Robust, heavily sclerotized species (fig. 61). Overall color dark reddish brown or black, matte or slightly polished, with yellow markings on neck and connexivum, and with elytra also partly yellowish. Pilosity pale golden colored, adpressed, distinct but not as abundant as

ocular region from three to four times as long as postocular, the latter with sides rounded. Clypeus abruptly and almost circularly widened behind middle. Genae pointed, heavily sclerotized distally, extending considerably beyond level of apex of clypeus. Apex of jugae angular, also heavily sclerotized. Head dorsally with distinct transverse impression at base of clypeus and of jugae. Eyes in lateral view attaining or falling slightly short of level of lower surface and distant from level of upper surface of head. Ratio width of eye to synthlipsis 1:2.1-2.2. Ocelli inserted on very conspicuous pro-tuberances. Antenniferous tubercles situated slightly behind middle of anteocular region. First antennal segment falling considerably short of apex of clypeus. Second and third antennal segments slightly compressed; second with adpressed setae, much shorter than diameter of segment. Ratio of antennal segments 1:3.3-3.5:2.0-2.3:1.5. Rostrum (fig. 62B) as dark as head. Setae of rostrum very short on first and most of under surface of second segment; distal portion of under surface and entire upper surface of second as well as entire third segment dorsally, ventrally and laterally with very dense setae much longer than diameter of segment, longest at base of third segment, progressively decreasing in length toward apex of rostrum. First segment attaining level of apex of jugae, viz., not quite reaching level of apex of antenniferous tubercles. Second rostral segment attaining level of hind border of eyes.

Ratio of rostral segments 1:2:1.0-1.1. Neck dark, with 1+1 lateral yellow spots.

Pronotum (fig. 61) of general body color, from matte to slightly polished, covered with adpressed setae less numerous than in *T. platensis*. Anterior lobe slightly granulose, with 1+1 pointed vertical discal and 1+1 smaller, apically rounded lateral tubercles, as well as with 1+1 obsolescent posterosublateral tubercles. Posterior lobe coarsely and irregularly

wrinkled, moderately setose. Submedian carinae evanescent just before hind border of pronotum. Humeral angles rounded; humeral area elevated. Anterolateral angles of pronotum small but distinct, conical, laterally directed.

Scutellum (fig. 61) heavily rugose; central depression with scattered setae, remainder more densely setose. Base of scutellum with submedian projections obsolescent. Posterior process of scutellum two-fifths as long as main body of scutellum, horizontal, subconical, wide at base, subcylindrical on apical portion, rounded distally.

Hemelytra (fig. 61) attaining apex of urotergite VII, in both sexes. Clavus and corium distinctly although sparingly setose. Hemelytra lighter colored than body generally, yellowish, especially on corium, irregularly mottled with dark, dark pigment coalescing into large, irregularly delimited spot centered in apical half of inner membranal cell but extending to outer cell.

Legs uniformly dark brown or blackish, stout, fore femur about five times as long as wide. Fore and mid femora with a pair of obsolescent subapical denticles. Spongy fosculae on fore and mid tibiae of males, absent in female. Setae of legs very numerous, visible to the unaided eye, many of those on tibiae longer than diameter of article (fig. 62C).

Venter convex, in female slightly flattened longitudinally along middle. Integument of venter coarsely although shallowly striate transversally; setae adpressed, numerous, but less so than in *T. platensis*. Spiracles adjacent or very close to connexival suture, included in small, round yellow spot. Color of venter dark brown or blackish, with small medially constricted transverse yellow spot close but not adjacent to hind border of each segment.

TYPE: Instituto Miguel Lillo, Tucumán.

DISTRIBUTION: Argentina (Catamarca, Chaco, Córdoba, Formosa, Jujuy, La Pampa, La Rioja, Salta, Santiago del Estero); Paraguay; Uruguay.

The species has not been reported from Uruguay before; we have examined one male and one female from Artigas, Tomás Gomensoro, May 7, 1968, K. K. Gunther and C. S. Carbonell. These specimens are blackish, as op-

posed to the normally dark reddish brown specimens from Argentina.

BIOLOGY: *Triatoma delpontei* has been found naturally infected by *Trypanosoma cruzi*. The species is basically ornithophilic, and has been found most frequently in nests of the parrot *Myopsitta monacha cotorra* (Vieillot) where it normally feeds on the birds; however, nests abandoned by the birds may continue to harbor *T. delpontei* which then feed on small rodents or didelphids that take over the nests. Material from Uruguay now examined by us was collected in nests of *Phacelldomus* sp. (Furnariidae), nests of a construction similar to those of *Myopsitta*.

The eggs of *T. delpontei* are glued to the substratum, e.g., pieces forming the birds' nests; this prevents the eggs from falling to the ground.

Triatoma dimidiata (Latreille)

Figures 19A; 27B; 63, 64

Reduvius dimidiatus Latreille in Humboldt and Bonpland, 1811, p. 223, pl. 15, fig. 11. *Conorhinus dimidiatus*: Stål, 1859, p. 110, pl. 6, fig.

2.

Conorrhinus dimidiatus: Champion, 1899, p. 206, pl. 12, figs. 20, 21.

Triatoma dimidiata: Neiva, 1914a, p. 36. Mazza,

1944, p. 62, pl. 1, fig. 2. Usinger, 1944, p. 53, pl. 9, fig. D. Blanco Salgado, 1943, p. 38, figs.

Conorhinus maculipennis Stål, 1859, p. 111.

Triatoma maculipennis: Pinto, 1931, p. 70, fig. 12.

Conorhinus dimidiatus var. *maculipennis*: Champion,

1899, p. 207, pl. 12, fig. 21. Hoffmann, 1928, p. 12, figs. 1-6.

Conorhinus dimidiata maculipennis: Neiva, 1914, p. 36. Usinger, 1944, p. 54, pl. 9, fig. F.

Triatoma capitata Usinger, 1941, p. 52.

Triatoma dimidiata capitata: Usinger, 1944, p. 54, pl. 9, fig. E.

Length of male 24.5-32.0 mm., of female 24.5-35.0 mm.; width of pronotum of male 5.5-7.0 mm., of female 6.5-9.0 mm.; width of abdomen of male 9.0-12.0 mm., of female 9.5-13.0 mm.

Overall color (fig. 63) from piceous to black, with connexivum and corium from pale yellow to orange yellow. Pilosity short, inconspicuous.

Head (fig. 54A-G) rugose dorsally, from slightly less to slightly more than twice as long as wide across eyes (1:0.4-0.6) and about as long as pronotum (1:0.9-1.1). Anteocular region from 2.5 to 3.0 times as long as postocular

(1:0.3-0.4), postocular with sides rounded, converging posteriorly. Eyes in lateral view attaining level of under but not of upper surface of head. Ratio width of eye to synthlipsis 1:1.0-2.0, varying considerably even among sympatric specimens. Ocelli large, as long as distance from their anterior border to posterior margin of eye. Antenniferous tubercles subcylindrical, comparatively elongate, situated slightly posterior of middle of anteocular region of head; first antennal segment attaining level of apex of clypeus; second segment with many strong setae slightly longer than diameter of segment, as well as with numerous short, delicate erect hairs. Ratio of antennal segments 1:3.2-3.8:2.5:2.2. Rostrum (fig. 64B, C, E, F) slender; first segment attaining level of apex of antenniferous tubercle, second attaining level of posterior border of head. Ratio of rostral segments 1:2.3:0.7. Most setae of rostrum short, distinctly longer but not very numerous on apex

of second and on third segment. Neck dark, with 1+1 lateral spots yellowish.

Pronotum (fig. 64A, D) uniformly piceous or black. Anterior lobe with 1+1 discal and 1+1 smaller lateral tubercles, but not pointed and not elevated. Anterolateral angles anterolaterally directed, short, subconical, in some specimens yellowish apically.

Scutellum (fig. 63) shallowly rugose, central area not depressed; apical process about as long as body of scutellum, subcylindrical, slightly downwardly bent at apex.

Hemelytra (fig. 63) attaining apex of abdomen but leaving female genital segments exposed, and in some cases surpassing apex of abdomen in male. Basal portion of clavus black, apical half pale. Corium from pale to orange-yellow, its extreme apex black, and with a dark central spot which varies from barely perceptible to very extensive, forming an

almost complete transversal band across hemelytron. Membrane smoky brown, distinctly darker than corium, in many specimens darkest on basal area of membranal cells.

Legs uniformly dark. Fore and mid femora with 1+1 small subapical denticles. Fore and mid tibiae of male with spongy fossulae, absent in female.

Abdomen convex below, minutely striate transversally, shortly pilose. Spiracles close but not adjacent to connexival suture (fig. 64H). Color of venter from piceous to black except area of variable extension adjacent to connexival suture (fig. 64H). Connexival segments piceous or black on anterior half or third across their entire width, pale or orange-yellow on posterior portion.

TYPES: Of *dimidiatus*, unknown; of *mactulipennis*, Zoologisches Museum, Berlin; of *capitata*, California Academy of Sciences.

DISTRIBUTION: Belize; Colombia; Costa Rica; Ecuador; Guatemala; Honduras; Mexico (Campeche, Chiapas, Jalisco, Tabasco, San Luis Potosí, Puebla, Quintana Roo, Veracruz, Yucatan); Nicaragua; Panama; Peru; San Salvador; Venezuela.

BIOLOGY: *Triatoma dimidiata* has been found naturally infected by *Trypanosoma cruzi*. It is attracted to light, frequently domestic and peridomestic, and has been shown to be an important vector of Chagas' disease in Central America, Ecuador, and Peru. In the field, the species has been found in armadillo burrows.

In houses, nymphs of *T. dimidiata* have been observed to cover themselves with soil particles; similar behavior has been recorded for the reduviine reduviid *Reduvius personatus* and in the field (personal observ.) for the reduviine *Leogorras* sp.

OBSERVATIONS: *Triatoma dimidiata* is a highly variable species as regards the overall size, the extension of the dark spot in the middle of the corium, the degree of darkening of the membrane, and especially the relative measurements of the head and eyes. We have measured 160 specimens from the entire range of the species and have found that the characters used by Usinger (1941, 1944) to distinguish *dimidiata*, *maculipennis*, and *capitata* as species or even as subspecies do not hold up when enough specimens are examined. Total size increases gradually from north to south within the range of the species but with many exceptions. The ratio length of head to width of head across eyes fluctuates between 1:0.4 and 1:0.6, with the head becoming relatively longer (and the eyes smaller) from north to south, being shortest in some Mexican specimens ("maculipennis") and longest in Colombian material ("capitata"), but becoming shorter again in Ecuador and Peru. Usinger (1941) has already stated that the extension of the corial markings "approaches a continuum." It is interesting to note that extensive dark markings are found only in Mexican specimens (fig. 63A) but Biagi (1956) observed in a single Mexican population "toda la variación cromática en el corium, desde una pequeña mancha negra hasta una gran mancha que lo cubre casi totalmente."

According to the available evidence, *Triatoma dimidiata*, although highly variable chromatically and in body proportions, has not segregated into clearly separable allopatric populations; the observable differences are roughly clinal in nature, but many specimens are difficult to place. The only exception is that specimens with large corial markings are restricted to Mexico, where they occur together with morphologically similar specimens which have intermediate sized or small markings.

We have studied a population sample from the cave of Lanquin, Alta Vera Paz, Guatemala, collected by R. D. Mitchell. There are five specimens (fig. 63C) which agree closely with each other in their large although not exceptional size of ($\delta 29$ mm., $\varphi 33$ mm.), the pale membrane which is not darker than the corium, and the comparatively very small eyes and ocelli, with the former in the female not attaining the level of the undersurface of the head, and the latter removed from the hind margin of the eyes by several times their diameter, the longer anteocular portion of the head (approximately four times as long as the posterior), the postocular region with its sides subparallel and not rounded, the comparatively longer first antennal segment which surpasses the level of the apex of the clypeus, the antennal ratio being 1:2.5:2.2:2.3. Many of these characters (diminished pigmentation, reduction in size of eyes and ocelli, longer head) are similar to conditions found in other cave adapted arthropods.

A specimen of *T. dimidiata* collected by S. and J. Peck in Cave C, Rio Frio, Augustine, Belize, is identical phenotypically with the specimens from Lanquín Cave. It is not surprising that such a genetically labile species as *T. dimidiata* would react to the cave habitat so strikingly and in identical fashion in two quite distinct cave systems.

Triatoma dispar Lent Figures 65, 66

Conorrhinus venosus Champion, 1899, p. 209, pl. 12, fig. 23 (nec Stål).

Triatoma venosa: Usinger, 1944, p. 61, pl. 9, fig. I (nec Stål).

Triatoma dispar Lent, 1950, p. 437, figs. 3, 4

León, 1953, p. 3, fig. D. Galindo and Fairchild, 1962, p. 229. Vargas and Montero, 1971, p. 454, figs. 1-4.

Length of male 21.0-22.5 mm., of female 23-24 mm., width of pronotum of male 5.0-5.5 mm., of female 7.0 mm.; width of abdomen of male 5.5-6.5 mm., of female 8.0-8.5 mm.

Overall color dark reddish brown, with black markings on head, fore lobe of pronotum and connexivum, and with red or yellowish red markings on hind lobe of pronotum, scutellum, connexivum, and hemelytra. Pilosity conspicuous, decumbent, golden colored.

Head (figs. 65; 66A, B) rugose and granulose, reddish brown, with 1+1 glabrous black stripes extending dorsally from level of base of clypeus to ocellar tubercles, enclosing elevated median granulose band. Head about twice as long as wide across eyes (1:0.4-0.5), and longer than pronotum (1:0.8-0.9). Anteocular region three times as long as postocular (1:0.3), postocular with sides only very feebly convex,

distinctly converging toward behind. Clypeus extremely narrow, only very slightly widened on posterior half. Genae narrow, rounded apically, not quite attaining level of apex of clypeus. Eyes in lateral view attaining level of ventral but not of dorsal surface of head. Ratio width of eye to synthlipsis 1:0.9-1.0. Antenniferous tubercles inserted slightly behind middle of anteocular region of head. First and second antennal segments dark brown; first falling slightly short of level of apex of clypeus. Second antennal segment with decumbent setae of two sizes, the larger ones slightly longer than diameter of segment. Ratio of antennal segments 1:2.0-2.4:2.2:1.8. Rostrum (fig. 66A) reddish brown, with short, inconspicuous setae. First rostral segment short, not extending beyond middle of genae, second very long and slender, reaching to level of posterior border of head; third longer than first. Ratio of rostral segments 1:3.4-3.8:1.3-1.4. Neck uniformly reddish brown.

Pronotum (figs. 65; 66B) of general reddish

brown color. Anterior lobe with elevated areas reddish brown, smooth areas black. Posterior lobe dark brown, with submedian carinae, one median and 1+1 sublateral elongate red markings extending from transverse furrow to posterior margin of pronotum, red. Lateral and posterior margins of pronotum also red, except area occupied by submedian dark markings which extend to hind border. Anterolateral angles extensively reddish. Anterior lobe with 1+1 well-developed discal tubercles, and 1+1 smaller posterosublateral ones; lateral tubercles absent. Posterior lobe heavily rugose and wrinkled. Submedian carinae evanescent on posterior third of pronotum. Humeral angles rounded, with humeri distinctly elevated. Anterolateral projections subtriangular, salient, elongate, somewhat compressed laterally.

Scutellum (fig. 65) reddish brown, in some cases black at middle of central depression, anteriorly with convolute wrinkles. Posterior process of scutellum light red or yellowish, stout, not over half as long as main body of scutellum, horizontal, subcylindrical, rounded-truncate apically. Pleura reddish brown, acetabula lighter.

Hemelytra (fig. 65) covering entire length of abdomen, including genitalia of female. Color of hemelytra dark brown; most veins yellowish, those of membrane dark but bordered with yellow. Corium with short accessory veinlike elements, their color also yellow. Clavus yellow on basal third, blackish on apical two-thirds. Area of corium adjacent to apical portion of clavus deeply black, similar black areas on basal portions of membranal cells, very conspicuously so on base of outer membranal cell. Lumen of membranal cells and of adjacent areas of membrane variegated with pale yellowish.

Legs dark reddish brown, relatively slender, with fore femur seven times as long as wide. Femora nodulose, nodules light red; pilosity distinct. Fore and mid femora subapically with four or five denticles, hind femora with two. Fore and mid tibiae of male with spongy fosulae, absent in female.

Abdomen rounded or very slightly flattened below, minutely striate transversally. Spiracles

adjacent or very close to connexival suture. Pilosity of venter distinct, decumbent, or appressed. Venter from reddish brown to dark brown; spiracles yellowish. Connexivum (fig. 66C) black, each segment with two orange-yellow marks: one, incomplete, on anterior third of disc of segment, adjacent to outer but not attaining inner border of segment, the other large spot extending over entire width of segment, situated on its basal third, adjoining intersegmental suture which is also light colored; dark markings (in some specimens) much reduced, as shown in figure 66D.

TYPE: National Museum of Natural History, Smithsonian Institution, Washington, D. C.

DISTRIBUTION: Costa Rica; Ecuador; Panama.

BIOLOGY: *Triatoma dispar* has been reported as infected with a *Trypanosoma* similar to *T. cruzi*. The species is sylvatic, and has not been found associated with man. In Panama, engorged adults and nymphs of *dispar* were found in a shelter of a sloth, *Choloepus hoffmanni* Peters high up on a tree; specimens were also found to attack a human stationed on an arboreal observation platform at 90 feet above the ground.

OBSERVATION: We have now examined two specimens from Cerro Campana, Panamá. One

is described as above; in the other, the connexivum is much more extensively light colored (fig. 66D).

Triatoma eratyrusiformis Del Ponte
Figures 67-69

Triatoma eratyrusiforme Del Ponte, 1929, p. 5, fig. 1; 1930, p. 871, fig. 5, pl. 45. Abalos and Wygodzinsky, 1951, p. 111, figs. 38, 51, 56, 210-230. Carcavallo and Martínez, 1968, p. 66, fig. 27. Martínez and Cichero, 1972, p. 31, figs. 17, 18. Mariluis, 1974, p. 7, figs. 1-10.

Triatoma niñoi Carcavallo, Martínez, Prosen and Cichero, 1964, p. 152, figs. 1-7 (new synonymy).

Triatoma niñoi Carcavallo and Martínez, 1968, p. 67, pl. 2, fig. 3. Martínez and Cichero, 1972, p. 39, fig. 22. Mariluis, 1974, figs. 11-15.

Eratyrus eratyrusiforme: Pinto, 1931, p. 134. Mazza and Jörg, 1937, p. 44, figs. 9-13.

Length of male 18.5-21.0 mm., of female 21-24 mm.; width of pronotum of male 5.0-5.5 mm., of female 5-6 mm.; width of abdomen of male 6-7 mm., of female 7.0-7.5 mm.

Overall color from dark brown to black, with connexivum and portions of adjacent urosternites orange yellow or rarely pale yellow colored. Head and thorax from highly polished to rarely dull. Body hairs short except long hairs on appendages (fig. 68).

Head (figs. 67, 68, 69A, B) very dark, transversally rugose dorsally and irregularly so laterally, very weakly granulose; less than twice as long as wide (1:0.6-0.7) and longer than pronotum (1:0.8-0.9). Anteocular region three times as long as postocular (1:0.3-0.35); postocular with sides faintly convex, slightly converging toward behind. Clypeus narrow, slightly widened at apex and gradually so on posterior half. Genae blunt apically, attaining level of apex of clypeus. Jugae short, wide-angled apically. Eyes large, in lateral view surpassing level of lower surface but distant from level of upper surface of head. Ratio width of eyes to synthlipsis 1:1.4-1.9. Ocelli very large, their length equal to their distance from eye. Antenniferous tubercles situated at middle of anteocular portion of head. First antennal segment from almost attaining to very slightly surpassing level of apex of clypeus. Second antennal segment (fig. 70) as in *spinolai* (see fig. 6G), viz., with numerous semierect ciliate

hairs about twice as long as diameter of segment and less numerous setae from twice to more than four times as long as diameter of segment; similar hairs and setae on third and fourth segments. Ratio of antennal segments 1:3.3-4.0:2.6-3.0:1.5-1.8. Rostrum reddish brown, lighter than head capsule. Rostral segments (fig. 69B) slender, compressed dorsoventrally; first and second segments with hairs approximately as long as diameter of segments, but much longer than diameter of segments on apex of second dorsally and on entire third segment. Ratio of rostral segments 1:1.6-1.8:0.5-0.6. Neck somewhat lighter than

head capsule, with 1+1 small distinct yellow spots laterally.

Pronotum (figs. 67, 68; 69C-L) uniformly dark, its surface in most cases highly polished, rarely only slightly polished or dull. Anterior lobe feebly sculptured, with 1+1 low but invariably distinct discal tubercles; lateral tubercles small, variable, from perceptible to absent. Posterior lobe irregularly rugose and wrinkled. Submedian carinae extending to posterior third of hind lobe. Humeri angular, from slightly projecting to conspicuously flaring and exaplate; invariably pointed. Anterolateral projections small, from blunt to narrowly conical.

Scutellum with surface heavily rugose, its median depression ill defined, from narrowly linear to absent. Posterior scutellar process (fig. 69D) half as long as main body of scutellum, very narrowly conical, sharply tapered distally, its apex in most specimens obliquely elevated. Mesosternum limited posteriorly by prominent straight transverse carina. Metasternum longitudinally carinate along middle and behind (as in figs. 178; 180A).

Hemelytra (figs. 67, 68) attaining apex of abdomen. Corium dark brown or black; membrane fumose, somewhat lighter brown.

Legs (fig. 68) uniformly dark brown, slender. Fore femur 6.5-8.5 times as long as wide. Femora inermous. Fore and mid tibiae of male with spongy fossula, absent in female. Femora of fore legs and frequently but not invariably also those of mid and hind legs with scattered but distinct long setae; similar but very numerous setae on all tibiae.

Venter convex, in female flattened longitudinally along middle but not sharply so. Venter minutely striate transversally, and with fine semierect setae on posterior segments. Spiracles adjoining connexival suture. Connexivum (fig. 68) orange or rarely pale yellow, with areas of lighter color slightly advancing onto urosternites along intersegmental sutures. Disc of connexival segments with large dark spot occupying entire width of connexivum; light areas of connexivum straddling intersegmental sutures, varying from smaller to larger than dark portions.

TYPES: Of *eratyrusiformis*: Museo Argentino de Ciencias Naturales; of *ninoi*: unknown.

DISTRIBUTION: Argentina (Catamarca,

Chubut, Córdoba, La Pampa, La Rioja, Mendoza, Neuquén, Río Negro, San Juan, San Luis, Salta, Tucumán).

BIOLOGY: Specimens of *T. eratyrusiformis* have been found naturally infected with *Trypanosoma cruzi*. This is basically a sylvatic species, but also found in peridomestic situations (corrals, chicken houses) and occasionally attracted to light. Adults have even been collected in houses, but the species is not known to colonize in human habitations. Sylvatic specimens have been found among rocks and in stone walls, near resting places of rodents and edentates. The species has been reported from burrows of *Microcavia australis* (I. Geoffroy and D'Orbigny).

OBSERVATIONS: This is a highly variable species as regards its overall color and the color of the connexivum, the appearance of the integument on head and thorax, the degree of development of the humeral angles, the shape of the anterolateral projection of the pronotum, the number of long setae of the mid and hind femora, the time of development from egg to adult, and even biochemical characters.

Carcavallo et al. (1964) described *Triatoma ninoi* (as *ninoi*) from a locality in the Argentinian province of Córdoba. According to the authors, *ninoi* differs from *eratyrusiformis* by the humeral angles which are not laterally projecting and spinelike, the intensive overall black color (a character subject to the state of preservation of the specimen), the absence of long setae on the mid and hind femora, the yellow spots of the connexivum, the structure of the chorion of the egg (insufficiently illustrated and not described), and the different genitalia, viz., the basal plates, the "base" and the aedeagus, as well as the setae of the parameres. Mariluis (1974) reexamined the male genitalia of *eratyrusiformis* and *ninoi* as well as those of the related *breyeri*. Although Mariluis enumerated differences between the first two species, his drawings do not confirm these differences. We ourselves have dissected the male genitalia of a specimen of *ninoi* from the type locality, determined by its authors, and those of a typical *eratyrusiformis*, viz., an individual with conspicuously spiniform humeral angles (fig. 69L) and have found the genitalia of these specimens to be fully identical.

Among six specimens from the type locality of *ninoi* now examined, four have pale yellow connexival spots, but in the remaining two the spots are tinged with orange. In most *eratyrusiformis* from other localities now examined, orange is the predominant color of the connexival spots, but specimens with yellow spots also occur.

While it is true that the humeral angles of

specimens from the type locality of *ninoi* are much less salient than those of *eratyrusiformis* as originally described, transitions exist between the two extremes (figs. 68; 69A, C-L) and in the absence of other clearcut differential characters it is impossible to place every specimen with certainty either in *eratyrusiformis* or *ninoi*; we therefore conclude that the shape of the humeral angles is not specific. The same

applies to the number of long setae on the mid and hind femora, very low or nil in specimens from the type locality of *ninoi* but variable in other specimens; this variability is not correlated with the degree of development of the humeral angles. We do not exclude the possibility that a careful analysis of the distribution of such characters as body size, the degree of development of the humeral angles, the number of long setae on the mid and hind femora, and the color of the connexivum may show correlation of these parameters with geographical distribution, but this has not yet been proven.

Carcavallo and Martínez (1972) indicated different average development times for these bugs, with much slower development in *eratyrusiformis* than in *ninoi*. Interestingly enough, Abalos and Wygodzinsky (1951) had previously called attention to the extremely slow development in *eratyrusiformis*, but, unfortunately for the defenders of the distinctiveness of *eratyrusiformis* and *ninoi*, a reexamination of Abalos and Wygodzinsky's material shows it to fit the concept of *ninoi* rather than that of *eratyrusiformis*. It must be concluded that *eratyrusiformis* contains different populations

distinguishable by their life cycles but that this variation is apparently not correlated with somatic characters.

Considering the above, and taking into account the absence of correlated morphological gaps between *eratusiformis* and *ninoi*, we find it necessary to synonymize *ninoi* with *eratusiformis*.

Triatoma flava Neiva
Figures 70, 71

Rhodosisu probixus: Valdés, 1910, p. 435 (*sic; nec Stål*).

Rhoduris prolixus: Valdés, 1914, p. 101 (*sic; nec Stål*).

Rhodnius prolixus: Hoffman, 1922, p. 263 (*nec Stål*).

Triatoma flava Neiva, 1911c, p. 441. Hoffmann, 1923, p. 299, figs. 1-2. Autuori, 1932, p. 271, figs. 1-6

Conorhinus flava: Patton and Cragg, 1913, p. 495.

Meccus flavidus: Fracker and Bruner, 1924, p. 165.

Eutriatoma flava: Pinto, 1931, p. 88, fig. 33
Bruner and Barber, 1937, p. 183

Triatoma (Eutriatoma) flava: Lima, 1940, p. 198.

Nesotriatoma flava: Usinger, 1944, p. 39; 1946, p. 20. Maldonado and Farr, 1962, p. 190, figs. 19, 20. Alayo, 1967, p. 28, pl. 6, fig. 2

Nesotriatoma bruneri Usinger, 1944, p. 39, pl. 8,
fig. E.

Length of male 21-28 mm., of female 24-30 mm.; width of pronotum of male and female 5-7 mm., of abdomen of male and female 7-9 mm.

Overall color light yellowish brown, with small dark brown spots; under surface dark. Integument rugose and faintly granulose in some areas. Setae very short, scalelike (fig. 71A), sparse.

Head (fig. 71B, C) dorsally strongly rugose and faintly granulose, light yellowish brown, with 1+1 longitudinal dark brown or black stripes extending from level of antenniferous tubercles to neck. Head laterally and ventrally dark brown, rugose. Head twice as long as wide across eyes (1:0.5), and slightly longer than or as long as pronotum (1:0.9-1.0). Ante-ocular region three times as long as postocular (1:0.33-0.38), postocular with sides subparallel, very slightly converging behind. Clypeus narrow anteriorly, abruptly widened behind middle, and very narrow again on posterior third. Genae attaining level of apex of clypeus, narrowly tapering apically but not pointed. Eyes in

lateral view attaining level of under but not of upper surface of head. Ratio width of eye to synthlipsis 1:2 in small specimens, 1:1.7 in large males and 1:1.5 in large females. Antenniferous tubercles situated slightly behind middle of anteocular region. First and second antennal segments from yellowish brown to dark brown; first segment falling slightly short of level of apex of clypeus. Second antennal segment with adpressed setae shorter than diameter of segment. Ratio of antennal segments 1:2.7-3.1:1.9-2.4:1.5. Rostrum (fig. 68C) slender, with short inconspicuous setae except scattered long hairs on distal segment. First rostral segment not attaining level of antenniferous tubercles, second extending to level of neck; third shorter than first. Ratio of rostral segments 1:2.4-2.6:0.7-0.8. Neck dark brown, with 1+1 lateral yellow spots.

Pronotum (figs. 70; 71B) of general body color; smooth area of fore lobe black, impressions of posterior lobe dark brown. Posterior lobe margined with dark along declivous hind border. Anterior lobe with discal and lateral tubercles. Tubercles of varying size, the discal ones from rounded to strong subconical; development of tubercles not correlated with overall size of specimens. Hind lobe with sides strongly flaring, heavily and irregularly rugose, not granulose. Submedian carinae evanescent

on posterior third of lobe, interrupted by transverse rugosities. Humeral angles entirely yellowish, angular, explanate. Anterolateral angles yellowish, elongate conical with narrowly rounded apex.

Scutellum dark, elevated portion yellowish, coarsely and irregularly rugose, anteriorly with 1+1 forwardly inclined projections of variable size, overlapping declivous posterior margin of pronotum (fig. 67B). Carinae limiting central depression of scutellum divided by transverse rugosities into a series of tubercles. Posterior process of scutellum yellowish, horizontal, subcylindrical, swollen apically, rounded at tip.

Hemelytra (fig. 67A) slightly variable in length, reaching to seventh urotergite, in some cases not extending beyond its basal third, in others covering urotergite completely. Hemelytra of general color, extensively mottled with irregularly shaped dark dots of variable size. Dots most numerous and densest at base of membranal cells, otherwise membrane not or only very slightly darker than corium.

Legs dark reddish brown, relatively slender; fore femur from six to seven times as long as wide. Fore and mid femora ventrally on apical half with from eight to ten very small setiferous denticles, some arranged in pairs, others single; subapical denticles the largest. Tibiae of first and second pairs of legs of males with spongy fossulae; females with spongy fossulae only on fore tibiae, or absent.

Abdomen with venter from convex to, in most cases, slightly but distinctly flattened, in both sexes. Surface microsculpture of venter consisting of relatively coarse transverse striae. Spiracles close but not adjacent to connexival suture, their distance from suture equal to at least diameter of spiracles. Pilosity of venter very short, sparse, adpressed, scalelike (fig. 71A). Venter dark reddish brown, spiracles enclosed in small yellow area. Connexivum (fig. 71D) light yellowish brown; in well-preserved specimens each segment with two dark spots: a large anterior one adjacent to anterior margin of segment, irregularly shaped posteriorly, extending across entire width of segment although darkest along outer margin, and one very small dot, obsolescent in some specimens, adjacent to posterior border of segment, remote from lateral margin.

TYPES: Of *flavida*, National Museum of Natural History, Smithsonian Institution, Washington, D. C.; of *bruneri*, California Academy of Sciences.

DISTRIBUTION: Cuba.

BIOLOGY: *Triatoma flavida* occurs in human habitations in the countryside, and has been found near beds (Dr. F. Sotolongo, *in litt.*) but we do not know of any record indicating that it actually colonizes in houses. Although the natural host of this triatomine is not known with certainty, there are indications that *T. flavida* is associated with the rodent *Capromys pilorides* (Say) (Dr. F. Sotolongo, *in litt.*).

OBSERVATIONS: Usinger (1944) redescribed *Triatoma flavida* (as *Nesotriatoma flavida*) and described as new *Nesotriatoma bruneri*, based on such differential characters as overall size, the relative length of the first antennal segment, the size of the eyes, and the absence or presence of spongy fossulae on the fore legs of the female. However, two years later the same author (Usinger, 1946), having examined additional material of this complex, synonymized his own species with the older one. We accept this synonymy, but suggest that additional collecting complemented by rearing experiments is desirable in order to evaluate correctly the significance of the unusual variability in this complex.

Triatoma gerstaeckeri (Stål)

Figures 72, 73

Conorhinus gerstaeckeri Stål, 1859, p. 111.

Triatoma gerstaeckeri: Neiva, 1914, p. 40. Van Duzee, 1916, p. 248. Pinto, 1931, p. 65, fig. 13.

Packchanian, 1939, p. 1548, pls. 1-3. Usinger, 1944, p. 56, pl. 1, fig. G, pl. 4, pl. 9, fig. G. Eads, 1957, p. 27.

Length of male 23-26 mm., of female 24.0-28.5 mm.; width of pronotum of male 5.0-6.5 mm., of female 5.5-7.0 mm.; width of abdomen of male 7.5-9.5 mm., of female 9.5-11.0 mm.

Color from dark brown to black, with yellow or orange-yellow markings on neck, corium, and connexivum. Setae short and very sparse, inconspicuous.

Head (fig. 73) slightly rugose above along midline, otherwise smooth, twice as long as wide across eyes (1:0.5), and of varied length

as compared to pronotum (1:0.9-1.1). Antecocular region three times as long as postocular (1:0.35), postocular with sides subparallel, slightly converging toward behind. Clypeus very narrow, its posterior portion widening gradually. Genae tapering apically, attaining

level of apex of clypeus. Eyes in lateral view approaching level of upper and attaining or slightly surpassing level of lower surface of head. Ratio width of eye to synthlipsis 1:1.3-1.9. Ocelli large, their distance from eyes equal to their diameter. Antenniferous tubercles situated slightly behind middle of antecular region. First antennal segment falling short of level of apex of clypeus. Second segment with strong decumbent setae at least as long as diameter of segment, as well as with numerous short, delicate erect hairs. Ratio of antennal segments 1:3.0-4.0:2.3-3.0:2.1-2.5. Rostrum (fig. 73B) with very short and sparse setae, longest and most numerous on third segment. First segment attaining level of antenniferous tubercles, second attaining level of base of head. Ratio of rostral segments 1:1.5-1.6:0.45-0.5.

Neck black, laterally with 1+1 conspicuous yellow spots.

Pronotum (figs. 72, 73A) of general body color, distinctly constricted at level of transverse sulcus. Anterior lobe slightly elevated, smooth, ridges not prominent. Discal and lateral tubercles present. Posterior lobe heavily rugose; submedian carinae not attaining posterior border. Lateral margins carinate, slightly reflexed. Humeri faintly angulate. Anterolateral angles obliquely forward directed, conical, narrowly tapering apically.

Scutellum with depressed portion shallowly rugose, limited by distinct carinae. Posterior process almost as long as main body of scutellum, subcylindrical, slightly compressed laterally; downward bent at apex.

Hemelytra (fig. 72) in most specimens attaining apex of abdomen, in some individuals, mainly females, falling short of apex by 0.5 to 1.0 mm. Overall color of hemelytra from dark brown to black, somewhat lighter on and adjacent to apex of clavus. Clavus black basally, smoky brown apically. Base of corium strikingly light yellow or orange-yellow, best observed on deflexed portion of base of hemelytron; a narrow line along basal half of margin of corium also yellow; a small yellowish subapical spot in many cases present.

Legs uniformly black, slender; fore femora eight to nine times as long as wide. Fore and mid femora subapically with 1+1 small denti-

cles. Fore and mid tibiae of males with small spongy fossulae, absent in females.

Abdomen rounded below, with minute transverse wrinkles. Hairs of venter short, inconspicuous. Spiracles close to connexival suture, distant from latter by about twice their diameter. Abdomen from dark brown to black. Connexival segments (fig. 72) with transverse yellow or orange-yellow markings, occupying posterior third or fourth of each segment adjacent to intersegmental sutures; yellow spots projecting narrowly onto urosternites. Spiracles light colored.

TYPE: Zoologisches Museum, Berlin.

DISTRIBUTION: USA (New Mexico, Texas); Mexico (Chihuahua, Coahuila, Nuevo León, San Luis Potosí, Tamaulipas). The species had not been reported from San Luis Potosí previously; we have examined a male from El Naranjo, El Salto, June 29, 1965 (P. J. Span-gler; USNM).

BIOLOGY: *Triatoma gerstaeckeri* has been found naturally infected with *Trypanosoma cruzi*.

The natural hosts of this species are wood-rats; *T. gerstaeckeri* occurs in nests of *Neotoma micropus micropus* Baird (Texas) and *N. mi-cropus canescens* J. A. Allen (Mexico). The species has also been reported from a shelter of *Didelphis marsupialis californica* Bennett, from a crow's nest, and feeding on a colubrid snake (*Drymarchon corais* [Boie]). *Triatoma gerstaeckeri* occurs in peridomestic situations

such as chickenhouses, pigsties, horse stables and horse and cattle corrals. Adult specimens have on occasion been found in large numbers in human habitations, but the species does not colonize in houses.

OBSERVATION: Small specimens of *T. gerstaeckeri* resemble the partially sympatric *Triatoma indictiva*; the species can be distinguished as shown in our key to the Mexican species of *Triatoma*.

Triatoma guasayana Wygodzinsky and Abalos
Figures 74-76

Triatoma guasayana Wygodzinsky and Abalos, 1949, p. 2; 1950, p. 54, figs. 1, 4-6, 8-11. Abalos and Wygodzinsky, 1951, p. 84, figs. 40, 45, 62, 150-174. Carcavallo and Martínez, 1968, p. 37, fig. 11. Martínez and Cichero, 1972, p. 34, fig. 20.

Length of male 16.0-18.5 mm., of female 18.0-20.5 mm.; width of pronotum of male 3.5-4.0, of female 4.0-4.5 mm.; width of abdomen of male 5.5-6.5 mm., of female 6-9 mm.

Overall color very dark brown or black, with pale yellow markings on neck, hemelytra, legs and connexivum. Integument with short sparse setae.

Head (figs. 75; 76A, B) dark, rugose and granulose, heavily so on sides of head before and behind eyes. Head slightly less than twice as long as wide across eyes (1:0.55-0.60) and distinctly longer than pronotum (1:0.85-0.90). Anteocular region three times as long as postocular (1:0.35), postocular with sides slightly rounded, converging toward behind. Clypeus narrow, only slightly widened behind middle. Genae narrowly tapering or pointed distally, distinctly extending beyond level of apex of clypeus. Jugae angular apically. Eyes in lateral view attaining level of under but distant from level of upper surface of head. Ratio width of eye to synthlipsis 1:1.2-2.0. Antenniferous tubercles inserted slightly behind middle of anteocular region. First antennal segment falling distinctly short of level of apex of clypeus; second segment compressed, beset with adpressed setae shorter than its diameter. Ratio of antennal segments 1:3.6-3.8:2.5-2.8:2.0-2.4. Rostrum (fig. 76B) from yellowish to light brown, contrasting with dark head.

Setae of rostrum sparse and short, those of apical segment more elongate, but not longer than diameter of segment. First rostral segment very short, extending only to level of apex of jugae, second not quite reaching level of hind margin of eyes. Ratio of rostral segments 1:1.60-1.95:1.10-1.20. Neck dark, with a pair of lateral yellow spots.

Pronotum sparsely granulose, blackish, in some specimens with anterior and lateral tubercles of anterior lobe and with apex of anterolateral projections yellowish. Anterior lobe with discal and with lateral tubercles, none prominent. Posterior lobe strongly wrinkled,

uniformly dark. Submedian carinae not prominent, evanescent on posterior third of hind lobe. Humeral angles narrowly rounded, subangular. Anterolateral projections of pronotum small, conical, somewhat flattened dorsoventrally.

Scutellum (fig. 75) coarsely rugose, with distinct central depression. Posterior process of scutellum slightly less than half as long as main body of scutellum, horizontal, subcylindrical,

obliquely truncate at apex, in lateral view. Pleura dark, acetabula with small areas yellowish.

Hemelytra (figs. 74, 75) attaining or surpassing apex of seventh urotergite in male, in female more variable in length, from falling short of apex of seventh urotergite by up to 2 mm. to closely approaching it. Corium largely pale yellow, irregularly darkened at center, with veins of central portion conspicuously

dark. Membrane fumose, light brown, much lighter than darker portions of corium. Veins of membrane somewhat darker than cells but not strikingly so, and portion of Cu separating cells not darker than remainder of vein and not bordered with dark.

Legs (figs. 75; 76C) with coxae dark brown; trochantera and femora pale yellow, the latter with subapical annulus, in some cases also darkened subbasally. Tibiae from yellow to brown, with narrow basal annulus very pale, and apex darkest; yellow portions of legs of varying color intensity. Legs relatively slender, fore femora about six times as long as wide. Fore and mid femora with pair of stout denticles subapically. Spongy fossulae on fore and mid tibiae of males, absent in females.

Venter convex, very slightly flattened in females, delicately striate transversally. Spiracles close but not adjacent to connexival suture. Venter uniformly brown except small areas at outer margin adjacent to connexivum; the latter (figs. 74, 75) pale yellow, dorsally and ventrally with dark spot at margin, straddling intersegmental suture; in some cases, transverse narrow dark line along intersegmental sutures.

TYPE: Instituto Miguel Lillo, Tucumán.

DISTRIBUTION: Argentina (Buenos Aires, Catamarca, Chaco, Córdoba, Jujuy, La Pampa, La Rioja, Mendoza, Salta, San Juan, San Luis, Santiago del Estero, Santa Fé, Tucumán); Bolivia; Paraguay.

BIOLOGY: *Triatoma guasayana* has been found naturally infected with *Trypanosoma cruzi*, and is potentially an important vector of Chagas' disease because it colonizes in human habitations, side by side with *Triatoma in-*

festans or *Triatoma sordida*. *Triatoma guasayana* also occurs frequently in peridomestic situations, such as in chicken houses, pigeon coops, and goat and other corrals. The species is found in sylvatic conditions under loose bark of trees and between cactus trunks, under rocks together with rodents and toads (*Bufo arenarum* Hensel), under trunks of fallen trees where geckos also occur, and finally in nests of birds. The eggs are laid loose.

***Triatoma guazu*, new species**

Figures 77-79

DIAGNOSIS: This species resembles *T. oliveirai*, but differs from the latter by many characters, such as the short rostral setae, the larger eyes and ocelli, the unicolorous pronotum, the horizontal scutellar process, the nonabbreviated hemelytra, and the quite different shape of the ninth urotergite.

Female (only sex known). Length 30 mm., width of pronotum 7 mm., of abdomen 12 mm.

Overall color black, with yellow markings on neck, corium and connexivum (figs. 77, 78). Pilosity short and sparse; integument polished.

Head (figs. 78; 79A, B) black, rugose, weakly granulose, twice as long as wide (1:0.5), and longer than pronotum (1:0.9). Anteocular region four times as long as postocular (1:0.25), postocular with sides straight, converging toward behind. Clypeus narrow, only slightly widened on posterior half. Genae narrowly rounded apically, extending considerably beyond level of apex of clypeus. Jugae narrowly rounded distally. Eyes large, in lateral view slightly surpassing level of lower and but little distant from level of upper surface of head. Ratio width of eye to synthlipsis 1:1.25. Ocelli large, their distance from eyes equal to their length. Antenniferous tubercles situated at middle of anteocular region of head. First antennal segment falling short of level of apex of clypeus; second segment with adpressed setae shorter than diameter of segment. Ratio of antennal segments 1:4.8:2.8:?. Rostrum dark reddish brown; first article falling slightly short of level of apex of antenniferous tubercle, second attaining level of hind margin of eyes. Rostrum

stout, with relatively sparse hairs, shorter than diameter of respective articles, longest at base of third article dorsally. Ratio of rostral segments 1:2.5:1.2. Neck black, with 1+1 lateral spots yellow.

Pronotum (fig. 78) entirely black. Anterior lobe weakly sculptured, without discal or lateral tubercles. Posterior lobe rugose; submedian

carinae extending to posterior third of posterior lobe. Humeri broadly rounded. Anterolateral projections laterally directed, very small, subconical.

Scutellum (fig. 78) black, strongly rugose, median depression shallow, small. Posterior process of scutellum short, one-half as long as main body of sclerite, narrowly rounded dis-

tally, horizontal, with apex slightly down-turned.

Hemelytra (figs. 77, 78) attaining apex of

eighth urotergite, their overall color pale. Clavus black at base and narrowly along outer border. Basal half of corium light yellow; api-

cal half of corium and entire membrane light yellowish brown; membrane fumose. Veins of hemelytra dark brown except pale at base of corium.

Legs entirely black. Fore femora 6.3 times as long as wide. Fore and mid femora with pair of small subapical denticles. Spongy fossulae absent (male unknown).

Abdomen wide (figs. 77, 78), with most urotergites narrowly exposed. Venter convex, slightly flattened longitudinally along middle, delicately striate transversally, with sparse short setae. Spiracles close to but not adjoining connexival suture (fig. 79C). Apex of abdomen as shown in figure 79D, with sides of eighth urotergite rounded. Urosternites black. Connexivum black, disc of each segment with large subrectangular yellow spot, extending ventrally from outer margin to connexival suture and enclosing spiracle on adjacent portion of urosternite; dorsally, yellow spot not attaining connexival suture. Intersegmental sutures enclosed in narrow transverse black band.

MATERIAL EXAMINED: Paraguay: Villarica, Nov. 1934 (F. Schade; AMNH), one female, holotype.

DISTRIBUTION: Paraguay.

BIOLOGY: Unknown.

DISCUSSION: Even though *T. guazu* is known only from a single specimen, we do not hesitate to describe it as new, because the combination of its characters is such as to exclude its inclusion in any described species.

ETYMOLOGY: The specific name is taken from the guarani *guazu*, large, in allusion to the large size of this species.

Triatoma hegneri Mazzotti

Figures 80, 81

Triatoma hegneri Mazzotti, 1940c, p. 22, 1 fig. Usinger, 1944, p. 55, pl. 9, fig. B.

Male (female unknown). Length 28-29 mm.; width of pronotum 6.5-7.0 mm., of abdomen 10.5-11.0 mm.

Overall color from dark brown to black, with orange-yellow spots on neck and connexivum and yellow markings on corium. Setae very short and sparse, inapparent.

Head (figs. 80, 81) transversely rugose dorsally, punctate, about twice as long as wide across eyes (1:0.45-0.50) and slightly shorter than pronotum (1:1.1). Anteocular region about three times as long as postocular (1:0.3); postocular with sides subparallel, slightly converging toward behind. Genae tapering distally, almost attaining level of apex of clypeus. Eyes large, in lateral view surpassing level of lower but not quite attaining level of upper surface of head. Ratio width of eye to synthlipsis 1:1.2-1.3. Antenniferous tubercles situated slightly behind middle of anteocular region. First antennal segment falling short of level of apex of clypeus, appearing bare, viz., its setae very short and sparse. Second segment with strong declinate setae about as long as diameter of segment, as well as with very numerous short, delicate, erect hairs. Ratio of first two antennal segments 1:2.5-3.0. Rostrum (fig. 81B) with very short, inconspicuous hairs, becoming longer only on third segment. First segment attaining level of apex of antenniferous tubercles, second attaining level of hind border of head. Ratio of rostral segments 1:1.8-2.0:0.5-0.6. Neck dark, with 1+1 orange yellow spots laterally.

Pronotum (figs. 80, 81A) with anterior lobe

pressed, rugose, not limited by distinct ridges. Posterior process stout, about as long as main body of scutellum, subcylindrical, slightly deflected apically. Anterolateral angles shortly conical, pointed, laterally directed.

Hemelytra (fig. 80) attaining apex of abdomen. Corium without perceptible setae, yellow, with large central dark spot of variable size but not reaching costal margin; apex of corium dark.

Legs of medium length, fore femur six times as long as wide. Fore and mid femora with one pair of subapical denticles. Spongy fossulae on fore and mid legs.

Abdomen flattened below longitudinally along middle, but flattened portion not sharply divided from lateral rounded portion of venter. Urosternites minutely striate transversally. Hairs of venter inconspicuous. Spiracles distant from connexival suture by from one to two times their diameter. Venter and connexivum uniformly dark, or connexival segments on posteroexternal angle each with small orange yellow spot of variable extension, extending onto connexival suture (fig. 80).

TYPE: Instituto de Salubridad y Enfermedades Tropicales, Mexico.

DISTRIBUTION: This species is only known

black, posterior lobe contrastingly dark reddish brown. Pronotum distinctly constricted laterally at level of transverse sulcus. Surface of anterior lobe smooth, glabrous, with low carinae. Dis-cal and lateral tubercles small but distinct. Posterior lobe conspicuously rugose, in some specimens sublateral carinae crossed by rugosities; carinae not attaining posterior margin. Humeral angles rounded.

Scutellum (fig. 80) with central portion de-

from the Island of Cozumel, Quintana Roo, Mexico.

BIOLOGY: *Triatoma hegneri* has been found naturally infected with *Trypanosoma cruzi*. Nothing is known about its habitat or host.

Triatoma incrassata Usinger

Figures 82, 83

Triatoma incrassata Usinger, 1939, p. 45; 1944, p. 70, pl. 12, fig. D.

Triatoma incrassata incrassata: Ryckman, 1962, p. 109, pl. 9, fig. Q.

Triatoma incrassata apachensis Ryckman, 1962, p. 119, pl. 9, fig. R.

Length of male 17.5, of female 19.0-19.8 mm.; width of pronotum of male 4.0, of female 4.5 mm., of abdomen of male 6.0, of females 6.5 mm.

Head (figs. 182, 183) granulose, distinctly convex above, slightly less than twice as long as wide across eyes (1:0.6), and distinctly shorter than pronotum (1:1.2). Anteocular region over twice as long as postocular (1:0.4), postocular with sides rounded but less prominently so than in *barberi*, verrucose. Clypeus narrow anteriorly, very strongly swollen posteriorly. Head with distinctive arcuate impression at base of clypeus. Genae narrowly tapered anteriorly, almost attaining level of apex of clypeus. Upper surface of head in side view with clypeus and region above eyes strongly elevated, separated by very deep depression; under surface sinuate, salient behind eyes. Eyes remote from level of dorsal and almost attaining level of under surface of head. Eyes small, ratio width of eye to synthlipsis 1:3.0-3.5. Antenniferous tubercles situated slightly behind level of center of anteocular region. First antennal segment extending beyond two-thirds of distance between its base and level of apex of clypeus. Second segment only with short adpressed setae. Ratio of antennal segments 1:2.9-3.2:2.3-2.4:1.8. Rostrum (fig. 83) with relatively short hairs, the latter becoming longer at apex of second and uniformly long on third segment. First segment attaining level of center of antenniferous tubercle, second attaining level of posterior border of head. Ratio of rostral segments 1:1.25:0.40. Neck with 1+1 lateral light-colored spots.

Pronotum (fig. 82) uniformly dark, trapezoi-

dal, with sides conspicuously diverging toward behind, delicately carinate, only faintly constricted at level of transverse sulcus. Anterior lobe distinctly elevated, granulose on rough areas, without discal or lateral tubercles. Posterior lobe rugose, submedian carinae falling short of hind margin. Humeri rounded, distinctly elevated. Anterolateral angles salient, anterolaterally directed, rounded apically.

Scutellum (fig. 82) rugose, central portion distinctly impressed, limited laterally by sharp carinae. Apical process of scutellum very short, conical, half as long as main body of scutellum, its apex deflected.

Hemelytra (fig. 82) falling short of apex of abdomen by 0.5 mm. in female, practically attaining apex of abdomen in male; of general body color, but membrane dark brown, fumose, somewhat lighter colored along base.

Legs uniformly dark, short and stout; fore femora 3.5-3.7 times as long as wide, minutely granulose. Fore and mid femora with four to five small denticles subapically. Male with minute spongy fossula on fore and mid tibiae. Females with spongy fossula on fore tibia only.

Venter convex, its setae inconspicuous. Urosternites minutely striate transversally. Spiracles close but not adjacent to connexival suture. Connexivum (fig. 82) entirely yellow ventrally and broadly along entire connexival margin dorsally; inner portion of dorsal connexival segments of general body color.

TYPES: Of *incrassata*, California Academy of Sciences; of *apachensis*, Los Angeles County Museum.

DISTRIBUTION: Mexico ("Valle de Mexico," Sonora); USA (Arizona).

BIOLOGY: Unknown.

OBSERVATIONS: We have examined the type of *incrassata*, as well as a specimen from Arizona (Santa Rita Mountains, from where *T. incrassata apachensis* was described). The comparison of the descriptions of *incrassata* and of *incrassata apachensis* or of the actual specimens does not permit any distinction between the nominate subspecies and *apachensis*. The size differences (17.5 mm. in the male of *i. incrassata*, and 19.8 mm. in the female of *i. apachensis*) fall well within the size difference to be expected between the two sexes (our

female from Arizona is only 18 mm. long!) and the color differences (brown for *i. incrassata* and black for *i. apachensis*) fall within the range of pigment intensity to be expected among specimens kept for different times in collections. We conclude that *Triatoma incrassata incrassata* and *T. i. apachensis* are identical.

Triatoma indictiva Neiva

Figures 84, 85

Triatoma indictiva Neiva, 1912, p. 22. Pinto, 1931, p. 66, figs. 18, 19.

Triatoma sanguisuga indictiva: Usinger, 1944, p. 68, pl. 11, fig. E.

Triatoma sanguisuga occidentalis Usinger, 1944, p. 69, pl. 11, fig. D.

Length of male 18.0-20.5 mm., of female 18.5-22.0 mm.; maximum width of pronotum of male 4.5-5.0 mm., of female 5.0-5.5 mm.; maximum width of abdomen of male 6.5-7.5 mm., of female 7-8 mm.

Overall color from piceous to black, with reddish markings on connexivum; base and subapical region of corium faintly lightened, hind lobe of pronotum equally somewhat lighter, possibly due to fading of preserved specimens; lighter areas in no case distinctly contrasting with dark areas. Pilosity inconspicuous, most distinct on under surface of abdomen and on legs.

Head (fig. 84, 85A-C) granulose, about twice as long as wide across eyes (1:0.5-0.6), and as long as or slightly shorter than pronotum (1:1.0-1.1). Anteocular region about three times as long as postocular (1:0.4). Postocular region distinctly rounded in dorsal view. Eyes in lateral view attaining level of under but not of upper surface of head. Ratio width of eye to synthlipsis 1:1.35-1.70 (1:0.8-1.1 in specimens from west coast of Mexico). Ocelli comparatively small, their diameter smaller than their distance from eyes. Antenniferous tubercles situated on basal third of anteocular region. First antennal segment falling short of apex of clypeus; second segment only with adpressed hairs shorter than diameter of segment. Ratio of antennal segments 1:3:2.0:1.7. Rostrum only with short, scattered hairs; first segment attaining level of apex of antenniferous

Hemelytra (fig. 84) attaining apex of abdomen. Corium with short, inconspicuous concolorous setae. Hemelytra uniformly dark brown or piceous when observed directly, but with faint lighter markings on corium basally and subapically, as well as on clavus when seen with magnification.

Legs uniformly dark, stout, fore femora about six times as long as wide. Femora of first and second pairs with 1+1 subapical pointed denticles. Tibiae of first and second pairs of male with minute spongy fossula, absent in female.

Abdomen except connexivum uniformly dark; ventrally with abundant but short pilosity; delicately striae transversally. Spiracles close to but not contiguous with connexival suture (fig. 85E). Connexivum (fig. 84) from piceous to black; posterior sixth or seventh of each connexival segment narrowly reddish, reddish

tubercles, second segment attaining level of neck. Ratio of rostral segments 1:1.75-1.85:0.50. Neck with 1+1 lateral reddish spots.

Pronotum (figs. 84, 85A) uniformly piceous or black, almost imperceptibly lightened on posterior lobe. Anterior lobe with 1+1 low but distinct discal tubercles; lateral tubercles absent. Posterior lobe rugose; submedian carinae extending along entire length of hind lobe. Humeral angles rounded, not distinctly elevated. Anterolateral angles of pronotum short and stout, conical or blunt and widely rounded apically.

Scutellum (fig. 84) heavily rugose, with cor-diform central depression, sublateral carinae acute, continuous. Apical scutellar process straight, narrow, apex deflected, rounded, process almost as long as main body of scutellum.

color extending on to suture; markings identical ventrally and dorsally, not extending on urosternites. Venter from convex to slightly flattened on center longitudinally.

TYPES: Of *indictiva*, National Museum of Natural History, Smithsonian Institution, Washington, D. C.; of *occidentalis*, California Academy of Sciences.

DISTRIBUTION: U. S. A. (Arizona, New Mexico, Texas); Mexico (Sinaloa, Chihuahua).

BIOLOGY: This species has been reported from woodrat nests, but has not been found naturally infected with *Trypanosoma cruzi*.

OBSERVATIONS: Usinger (1944) considered *indictiva* and *occidentalis* as subspecies of *sanguisuga* but no reasons were given. We have found that *indictiva* differs constantly from *sanguisuga* and its other named subspecies (*ambigua* and *texana*) by its color pattern; intermediate specimens have not been found. Available distribution records for Texas (fig. 86) furthermore show *indictiva* and *sanguisuga* to be at least parapatric if not sympatric in part of their ranges, and we have found no evidence of intergrading forms. Usinger's subspecies *oc-*

cidentalis differs from *indictiva* only by its larger eyes (they are distinctly wider than or as wide as the synthlipsis in *occidentalis* (fig. 85C, D) but distinctly narrower than the synthlipsis in typical *indictiva* (fig. 85A, B)). *Occidentalis* has only been found on the west coast of Mexico (Mazatlan), and probably represents the southern limit of the range of *indictiva*. The relative eye size, not correlated with any other characters, does not deserve taxonomic recognition, at least until representatives from the total range of *indictiva* have been examined; we assume that the occurrences on the Mexican west coast are connected to what seems to be the main range of *indictiva*, from Arizona to Texas.

Triatoma infestans (Klug)

Figures 24A, F, L; 25F; 26F; 27D; 30A, B; 87-90

Reduvius infestans Klug in Meyen, 1834, p. 412.

Conorhinus infestans: Berg, 1879a, p. 266. Reed, 1901, p. 94.

Triatoma infestans: Neiva, 1911d, p. 462; 1914a, p. 45. Porter, 1920, p. 16, fig. 2. Del Ponte, 1930, p. 876, pl. 47, fig. 1. Pinto, 1930, p. 216, figs

49-51, pl. 4, fig. 1; 1931, p. 68, fig. 19. Mazza and Jörg, 1940, p. 3, figs. 1-13. Wygodzinsky, 1949, p. 337. Abalos and Wygodzinsky, 1951, p. 54, figs. 36, 49, 58, 64-80. Carcavallo and Martínez, 1968, p. 45

Conorhinus renggeri Herrich-Schaeffer, 1848, p. 71,
pl. 271, fig. 838

Conorhinus sex-tuberculatus Spinola in Gay, 1852,
p. 218.

Conorrhinus paulseni Philippi, 1860, p. 156.

Conorrhinus gracilipes Philippi, 1860, p. 156.

Conorrhinus octotuberculatus Philippi, 1860, p. 156.

Conorhinus gigas Burmeister, 1861, p. 167 (*nec Fabricius*)

Conorhinus nigrovarius Blanchard, 1890, p. 473.

Triatoma infestans erythrophthalmus Noé and Silva,
1949, p. 5.

Triatoma oswaldoi Neiva and Pinto, 1923b, p. 46.

Eutriatoma oswaldoi: Niño, 1936, p. 607.

Triatoma sordelli Dios and Zuccarini, 1926, p. 179,
pl. 1.

Triatoma mazzae Jörg, 1937, p. 33, figs. 1-9, 11-14.

Length of male 21-26 mm., of female 26-29 mm.; width of pronotum of male 5.5-6.5 mm., of female 6.0-6.5 mm.; width of abdomen of male 8-10 mm., of female 8.5-10.0 mm.

Overall color black (dark brown in many museum specimens), with yellow markings on corium, legs, and connexivum. Integument sparsely granulose; pilosity short and sparse.

Head (fig. 89, 90A, C) black, delicately rugose and sparsely granulose. Head twice as long as wide across eyes (1:0.50-0.55), and as long as pronotum. Anteocular region three times as long as postocular (1:0.3), the latter with sides rounded. Clypeus widened on posterior half. Genae rounded distally, slightly surpassing level of apex of clypeus. Eyes in lateral view very close to or attaining level of under surface of head but remote from level of its upper surface. Ratio width of eye to synthlipsis 1:1.5-1.8. Antenniferous tubercles situated at middle of anteocular region. First antennal segment approaching but not attaining level of apex of clypeus; second segment with numerous adpressed bristles not more than half as long as diameter of segment. Ratio of antennal segments 1:3.5-3.7:2.9-3.3:2.0-2.3. Rostrum (fig. 90C) as dark as or distinctly lighter colored than head. Setae of rostrum very short on first and most of under surface of second segment. Distal portion of under surface of second segment and its entire upper surface as well as

entire third segment dorsally, ventrally, and laterally with dense hairs much longer than diameter of segment, longest at base of third segment and progressively decreasing in length toward apex of rostrum. First rostral segment attaining level of apex of jugae, viz., not quite reaching level of apex of antenniferous tubercles. Second segment attaining level of hind border of eyes. Ratio of rostral segments 1:1.7-2.0:1.0. Neck black, with 1+1 lateral spots yellow.

apex of seventh urotergite, in both sexes. Overall color of hemelytra dark, with corium almost black but membrane brown, fumose, not as dark as dark portions of corium. Clavus black, with large pale yellow spots at base. Corium in most specimens with one pale yellow spot subbasally and invariably with yellow subapical spot situated at apex of cell formed by r and m. Veins of membrane dark.

Legs (figs. 88; 90B) with fore femur from five to six times as long as wide. Legs black, with trochantera and bases of femora conspicuously yellow; in some specimens, a faint yellow subbasal annulus on tibiae and a somewhat light-colored area on femor submedially. Fore and mid femora with 1+1 small subapical denticles, very rarely present also on hind femur. Spongy fossulae on fore and mid tibiae of males, absent in females.

Venter convex, very slightly flattened longitudinally along middle, rather coarsely striate transversally, sparsely and inconspicuously setose. Spiracles adjacent to connexival suture. Venter dark brown to black. Connexivum (figs. 87-89) black, each segment with large yellow spot, remote from anterior but closely approaching posterior border of segment and adjoining connexival suture; yellow area briefly extending on urosternite mainly at area of spiracles.

TYPES: Of *infestans*, Zoologisches Museum, Berlin; of *paulseni*, *gracilipes*, and *octotuberculatus*, Museo de Historia Natural de Santiago, Chile; of *oswaldoi*, Instituto Oswaldo Cruz, Rio de Janeiro; of *sordelli*, Instituto Bacteriológico, Buenos Aires; of *mazzae*, Mision de Estudios de Patología Regional, Buenos Aires; of the remaining, unknown.

DISTRIBUTION: Argentina (Buenos Aires, Catamarca, Chaco, Chubut, Córdoba, Corrientes, Entre Ríos, Formosa, Jujuy, La Pampa, La Rioja, Mendoza, Misiones, Neuquén, Río Negro, Salta, San Luis, San Juan, Santiago del Estero, Santa Fé, Tucumán); Bolivia; Brazil (Alagoas, Bahia, Goiás, Mato Grosso, Minas Gerais, Paraná, Pernambuco, Rio de Janeiro, Rio Grande do Sul, São Paulo, Santa Catarina); Chile; Ecuador; Paraguay; Peru; Uruguay.

This species occupies a very large area in South America south of the equator, reaching 46° 35' S (between the Argentinian provinces

Pronotum (figs. 87, 89) uniformly shining black. Anterior lobe with 1+1 small discal tubercles, their apex in many cases yellowish, and in some specimens with 1+1 feeble posterosublateral tubercles; lateral tubercles invariably present although small. Elevated portions of anterior lobe setose but not granulose. Posterior lobe strongly rugose. Submedian carinae extending to posterior third of hind lobe but evanescent before posterior margin. Humeral angles rounded; humeri distinctly elevated, convex. Anterolateral projections short and blunt.

Scutellum (figs. 87; 89) entirely black, strongly rugose, with distinct central depression. Posterior process of scutellum elongate, conical, wide at base, narrowly tapering apically, horizontal, slightly shorter than main body of scutellum.

Hemelytra (figs. 87, 89) falling short of

of Chubut and Santa Cruz). Altitudes of 4100 meters are reached by *T. infestans* in Bolivia. Part of the actual range of the species is doubtlessly due to dispersal through man; *T. in-*

festans has on various occasions been found in travelers' luggage.

BIOLOGY: *Triatoma infestans* is predominantly domestic and peridomestic, and is only

The eggs of this species are not attached to the substrate.

OBSERVATION: *Triatoma infestans* can be distinguished from all other species with which it could possibly be confused, by the color pattern of its legs.

Triatoma lecticularia (Stål)
Figures 24K; 91-93

Conorhinus lecticularius Stål, 1859:107.

Triatoma lecticularius: Usinger, 1944, p. 62. Thurman et al., 1948, p. 59, fig. 1.

Conorhinus lenticularius: Stål, 1868: 124 (*sic*).

Conorhinus variegatus Stål, 1872, p. 111 (*pro parte*).

Triatoma heidemanni Neiva, 1911c, p. 441; 1914a, p. 41. Blatchley, 1926, p. 554. Pinto, 1931, p. 66, fig. 15. Packchanian, 1940, p. 1300, pl. 1, figs. 1-33. Usinger, 1943, p. 604, figs. 1A, B.

Conorhinus heidemanni: Patton and Cragg, 1913, p. 495.

Triatoma occulta Neiva, 1911c, p. 441; 1914a, p. 56.

Triatoma lecticularius occulta: Usinger, 1944, p. 63, pl. 1, fig. L; pl. 11, fig. H.

Triatoma sanguisuga Neiva, 1914a, p. 63 (*pro parte*)

Conorhinus lecticularius: Neiva, 1914a, p. 63.

Conorhinus oculata Patton and Cragg, 1913, p. 495.

Triatoma lecticularius floridana Usinger, 1944, p. 63, pl. 11, fig. G.

Length of male 16-22 mm., of female 18-23 mm., width of pronotum of male 3.7-5.5 mm., of female 4.2-6.0 mm.; width of abdomen of male 5-8 mm., of female 6.5-8.5 mm.

Overall color piceous, with orange or orange-yellow markings on pronotum, pleura, corium, connexivum, and ventral surface of abdomen. Pilosity well developed on entire body including corium.

Head (fig. 93A, B) granulose, uniformly dark, conspicuously convex between eyes; slightly less than twice as long as wide across eyes (1:0.6) and slightly shorter than pronotum (1:1.1-1.2). Anteocular region about three times as long as postocular (1:0.35), postocular with sides convex, converging posteriorly. Eyes in lateral view attaining or slightly surpassing level of under but not attaining level of upper surface of head. Ratio width of eye to synthlipsis 1:2.1-2.3 (1:1.4 in Florida specimens). Antenniferous tubercles situated on posterior third of anteocular region, comparatively close to

occasionally found in sylvatic conditions. The species is very frequently infected naturally by *Trypanosoma cruzi*, and is considered to be the main vector of Chagas' disease in all of south-ern South America. The species colonizes human habitations where it hides during daytime in cracks in the walls, in thatch roofs, among clothing, in boxes and trunks filled with miscellaneous objects and under mattresses, like the common bed bug. The bugs emerge at night to feed on humans, dogs, cats, guinea pigs, or whatever other warmblooded vertebrates share the habitation. Peridomestically, the species is common in chicken and pigeon houses, in rabbit hutches and guinea pig en-closures, and even in goat or sheep corrals. In sylvatic conditions, *Triatoma infestans* occurs in interstices of stone walls or among rocks, in hollow trees or under bark, under rocks on the ground or under trunks of fallen trees. *Triatoma infestans* also has been collected in shel-ters, burrows or nests of various animals, such as marsupials (didelphids), rodents (*Microcavia australis*, *Graomys* sp., *Galea musteloides leu-coblephara* [Burmeister]) or birds (owls); it also inhabits birds' nests abandoned by its orig-inal inhabitants and occupied by small mam-mals. It should be stressed, however, that *Triatoma infestans* is now mainly domestic, and that the finding of sylvatic specimens is the exception rather than the rule in this species.

Triatoma infestans tolerates temperatures from below 0°C. to 37°C.

short, rounded apically. Pleura dark, acetabula yellowish in many specimens.

Scutellum (figs. 91, 92) dark; central portion only very slightly depressed, limited by irregular carinae; apical process shorter than main body of scutellum, setose, tapering distally, its apex deflected.

Hemelytra (figs. 91, 92) attaining apex of abdomen. Corium with large central spot of general color, with basal and subapical spots

eyes. First antennal segment falling short of apex of clypeus; second segment with short hairs only. Ratio of antennal segments 1:2.4-3.7:2:1.8. Rostrum (fig. 93B) conspicuously hairy, especially on second and third segments; first segment attaining level of apex of antenniferous tubercle, second attaining level of neck. Ratio of rostral segments 1:1.5:0.5. Neck of uniform light color.

Pronotum (figs. 91, 92, 93A) dark, with 1+1 orange bands on lateral margins of posterior lobe, narrow anteriorly, becoming wider posteriorly and extending onto humeri; posterior margin of pronotum in some specimens lighter colored, as are submedian carinae and collar with anterolateral processes; in some specimens, dark areas of posterior lobe of pronotum reduced to one wide median and 1+1 sublateral stripes, with orange color extending as 1+1 wide lateral and 1+1 submedian spots occupying carinae and triangularly widened posteriorly, confluent behind with lateral markings. Anterior lobe without discal or lateral tubercles. Posterior lobe rugose, with conspicuous dark setae on entire surface; submedian carinae evanescent posteriorly. Humeral angles rounded, slightly elevated. Anterolateral angles

orange-yellow; outer border of corium narrowly bordered with light color; entire surface of corium with conspicuous adpressed black setae (fig. 93D).

Legs hairy, dark, but with coxae in many cases lightened. Fore and mid femora with 2+2 very short denticles subapically. Tibiae of first and second pair of male with small spongy fossulae, absent in female.

Abdomen convex below in male, from convex to distinctly flattened in center longitudinally in female. Surface sculpture consisting of irregular wrinkles, delicate transverse striation limited to small areas. Spiracles remote from connexival suture (fig. 93C). Venter conspicuously pilose, piceous with orange-yellow markings at level of light-colored connexival markings, covering intersegmental sutures and extending along lateral borders of urosternites; in some cases, entire venter tinged with orange, especially on basal half. Connexival segments (figs. 91, 92) dark, posteriorly with orange-yellow spot narrowly extending across intersegmental suture onto anterior portion of following segment; extension of light markings variable. Connexivum with distinct adpressed setae.

TYPES: Of *lecticularius*, Zoologisches Museum, Berlin; of *heidemanni*, National Museum of Natural History, Smithsonian Institution, Washington, D. C.; of *occulta*, Zoologisches Museum, Berlin; of *floridana*, California Academy of Sciences.

DISTRIBUTION: USA (Arizona, California, Florida, Georgia, Illinois, Kansas, Louisiana, Maryland, Missouri, New Mexico, North Carolina, Oklahoma, Pennsylvania, South Carolina, Tennessee, Texas); Mexico (Nuevo Leon).

BIOLOGY: This species has been found naturally infected with *Trypanosoma cruzi*. Packchanian (1940) collected specimens in human habitations; nymphs were encountered under bolsters and in beds, as well as in crack in wood or behind wall paper. Sylvatic specimens occur in nests of *Neotoma micropus* Baird, and have also been found in a resting place occupied by a squirrel, probably *Spermophilus variagatus* (Erxleben).

OBSERVATIONS: Stål (1859) described this species as *Conorhinus lecticularius*, based upon specimens from "Carolina" and "India orient-

alis," the former specimen belonging to the Stockholm Museum, the latter to the Berlin Museum. In 1872, Stål synonymized his *lec-ticularius* with *variegatus*, a synonym of *rubrofasciata*. Neiva (1914a) placed *lec-ticularius* in the synonymy of *sanguisuga*, stating that he had seen the type of *lecticularius* in the Stockholm Museum.

The supposed syntype of *lecticularius* at the Stockholm Museum was examined by the first author of this paper; it bears labels indicating "Texas; Belfrage" as collecting data. Texas is not mentioned as a locality in the original description of the species; therefore, this specimen cannot be a syntype of *lecticularius*, but it may well be a syntype of *heidemanni* Neiva, a synonym of *lecticularius* which was indeed described from a specimen labeled "Belfrage, Texas," as well as from other localities. No-well (1975) has called attention to the fact that

Belfrage is a collector's name and not a Texas locality.

No lectotype has been designated for *lecticularius*; this is herewith done for the syntype kept in the Berlin Museum and which we have now examined. The specimen bears a yellow label with the handwritten inscription "Ind. or." and "III," which we assume stands for the entomologist Illiger. The insect bears an obviously erroneous locality label because *Triatoma lecticularia* does not occur in the East Indies. The specimen is figured here (fig. 91).

Triatoma lecticularia is variable in size and in the shape and extension of its light markings which vary from light yellow over orange to red. The smallest specimens are found in southern Texas and in New Mexico; their second antennal segment is less than three times as long as the first (1:2.5-2.7). Large specimens, predominant in the rest of the range of the species, have their second antennal segment over three times as long as the first (1:3.1-3.7). Usinger (1944) treated the small specimens from Texas as a subspecies, *T. lecticularius occulta*; but we have seen enough specimens intermediate in size and in antennal measurements to make even subspecific distinction untenable. Usinger (*loc. cit.*) also described a new subspecies, *lecticularius floridana*, based on a single specimen with unusually widely extended light pronatal markings and eyes wider than half the synthlipsis. We have seen an additional Florida specimen with large eyes, but its pronotum is more extensively darkened than in the specimen figured by Usinger. Additional specimens are needed to decide on the taxonomic status of these Florida specimens; at this time the subspecies *floridana* is synonymized with *lecticularia*.

Triatoma lenti Sherlock and Serafim
Figures 24J; 94, 95

Triatoma lenti Sherlock and Serafim, 1967, p. 76,
figs. 1, 5, 6, 8-10, 14-16.

Triatoma pessoai Sherlock and Serafim, 1967, p. 80,
figs. 2, 4, 7, 11-13, 17-19 (new synonymy).

Triatoma bahiensis Sherlock and Serafim, 1967, p.
86, figs. 3, 20-22 (new synonymy).

Triatoma pessoai var. *bahiensis*: Sherlock and
Serafim, 1972, p. 268.

Length of male 25-26 mm., of female

26.5-27.5 mm.; width of pronotum of male and female 5.5-6.0 mm.; width of abdomen of male 8.5-10.0 mm.; of female 11 mm.

Overall color black, with yellow or orange-yellow markings on neck and connexivum, rarely on corium. Pilosity short and sparse.

Head black, feebly rugose and granulose-punctate, approximately twice as long as wide (1:0.45-0.50), and distinctly longer than pronotum (1:0.80-0.85). Anteocular region four to five times as long as postocular (1:0.20-0.25), postocular with sides slightly rounded, distinctly converging toward behind. Clypeus elongate, gradually widened on posterior half. Genae narrowly rounded apically, slightly projecting beyond level of apex of clypeus. Jugae rounded apically. Eyes small, in lateral view not attaining level of lower and remote from level of upper surface of head. Ratio width of eyes to synthlipsis 1:2.1-2.4. Antenniferous tubercles unusually long and slender, their apex situated slightly before middle of anteocular region of head. First antennal segment attaining level of apex of clypeus; second segment with numerous adpressed setae shorter than diameter of segment. First, second, and extreme base of third segment black, remainder contrastingly yellow. Ratio of antennal segments 1:3.4-4.25:2.1-2.5:1.8-2.1. Rostrum (fig. 95B) black; first segment attaining level of apex of antenniferous tubercle; second segment extending approximately to level of center of eye or slightly longer, but invariably falling short of level of hind margin of eyes. Rostral segments stout, subcylindrical, with medium-sized hairs, becoming as long as or longer than diameter of respective segments on upper surface of apical portion of second and on entire third segment, especially numerous on upper surface. Ratio of rostral segments 1:1.7-2.1:0.7-0.9. Neck black, with pair of lateral orange-yellow spots.

Pronotum entirely black. Anterior lobe feebly sculptured, not granulose, without discal or lateral tubercles. Posterior lobe shallowly rugose. Submedian carinae extending over two-thirds or three-fourths of lobe, evanescent posteriorly. Humeral angles rounded. Anterolateral projections short, stout, rounded apically.

Scutellum (fig. 94A-C) with median depression shallow, its posterior process elongate, about as long as main body of scutellum, sub-

cylindrical, horizontal, rugose at base, rounded apically.

Hemelytra (fig. 94A-C) in most cases conspicuously shorter than abdomen; in males generally not extending beyond base or middle of seventh urotergite; in female, hemelytra extending to middle or to apical portion of sixth urotergite. Corium and clavus black, membrane fumose, dark brown, with black veins; small yellowish stripe between apical portion of corium and adjacent area of membrane. Rarely, corium with small basal and somewhat larger subapical spots whitish.

Legs uniformly black, slender. Fore femora seven to eight times as long as wide, conspicuously narrowed submedially (fig. 95E). Fore and mid femora with one pair of small denticles subapically. Fore and mid tibiae of male with spongy fossulae, absent in female.

Abdomen unusually wide (fig. 94A-C); lat-

eral portions of urotergites not covered by hemelytra. Venter convex, almost imperceptibly flattened in female, delicately striate transversally, with sparse short setae. Urosternites dark brown or black, except small yellow areas enclosing spiracles. Connexivum black, with disc of each segment occupied by yellow or orange-yellow spot; size of light-colored spots variable (figs. 94A-C; 95C, D), attaining or not connexival suture, and almost invariably remote from intersegmental sutures and generally closer to anterior than to posterior suture.

TYPES: Of *lenti*, *pessoai*, and *bahiensis*, Instituto Oswaldo Cruz, Rio de Janeiro.

DISTRIBUTION: Brazil (Bahia).

BIOLOGY: This species has been found in houses, in goat corrals and in hiding places of animals between rocks.

OBSERVATIONS: *Triatoma lenti* was published simultaneously with *T. pessoai* and *T.*

bahiensis, all from a geographically restricted area in the state of Bahia. *T. bahiensis* was later relegated to a variety of *pessoai* by its authors. We have before us material of all three nominal species, and have been unable to find any morphological or mensural characters, including the male genitalia, that would allow a specific separation. The only difference found is in the size of the light areas of the connexivum, larger in *pessoai* (fig. 94C) than in *lenti* (fig. 94A); the color differences adduced in the original descriptions do not hold, because in specimens of *pessoai* the spots are either yellow as in *lenti*, or turn reddish. The degree of variation found in the size of the light-colored spots is well within the limits commonly accepted with species of *Triatoma*, and until evidence to the contrary becomes available, we prefer to list *pessoai* (and *bahiensis*) as synonyms of *lenti*. The latter name is chosen as the valid one because of page priority.

Triatoma leopoldi (Schouteden)

Figures 96, 97

Conorhinus leopoldi Schouteden, 1933, p. 64.

Triatoma leopoldi: Neiva and Lent, 1936, p. 186. Lent, 1951d, p. 426; 1953b, p. 316. Monteith, 1974, p. 91.

Triatoma novaeguineae Miller, 1958, p. 67, figs 93-95. Monteith, 1974, p. 91, figs. 1, 2 (new synonymy).

Length of male 19.5-20.5 mm., of female 21-23 mm.; width of pronotum of male 5.0-5.5, of female 5.5-6.5 mm.; width of abdomen of male 7.5 mm., of female 8.5-9.5 mm.

Overall color dark brown or black, with yellowish or orange-red markings on pronotum, corium and connexivum. Integument rugose, granulose in some areas. Pilosity short, inapparent.

Head (fig. 96, 97A, B) granulose and slightly rugose dorsally, dark reddish brown with 1+1 longitudinal black stripes on dorsum sublaterally. Head less than twice as long as wide across eyes (1:0.6) and as long as pronotum (1:1). Anteocular region about three times as long as postocular (1:0.35); postocular with sides slightly rounded, convergent posteriorly. Clypeus narrow anteriorly, abruptly wid-

ened on basal half. Genae pointed apically. In lateral view, eyes attaining or slightly surpassing level of lower surface but not reaching level of upper surface of head. Ratio width of eye to synthlipsis 1:1.9-2.3. Distance of ocelli from hind border of eyes subequal to length of diameter of ocelli. First and second antennal segments dark brown or black; first segment small, its apex falling considerably short of level of apex of clypeus. Second antennal segment only with adpressed setae shorter than diameter of segment. Ratio of antennal segments 1:3.8-4.5:2.5-3.0:2.5. Rostrum (fig. 97B) with short inconspicuous setae except distally on second and on third segment, setae not forming brushlike structure at junction of second and third segments. First rostral segment attaining level of base of antenniferous tubercles, second attaining level of hind border of head. Ratio of rostral segments 1:1.4-1.6:0.4.

Pronotum (figs. 96, 97B) dark brown or black, with collar and anterolateral processes, lateral margins, elevated areas of anterior lobe, and large central spot and lateral areas of posterior lobe, light reddish brown. Central light

area and posterior process red. Central depression and limiting ridges distinct. Posterior process as long as main body of scutellum, horizontal, subcylindrical, slightly compressed laterally.

Hemelytra (fig. 96) attaining apex of abdomen in male; in female extending only slightly beyond center of seventh urotergite. Corium yellowish red at base and subapically. Clavus, apex of corium and large spot of variable size at center of corium, dark brown or black. Large central spot of corium connected to apical dark spot or not, partially separated from costal margin by narrow yellow line along margin. Membrane as dark as darkest area of corium.

Legs dark reddish brown, stout; fore femur five times as long as wide. Fore and mid femora with 3-4 subapical denticles. Tibiae of first and second pair of legs of male with small spongy fossulae, absent in females.

Venter convex, very slightly flattened longitudinally along middle in male, more distinctly but not conspicuously so in female. Surface microsculpture of venter consisting of minute meandering or labyrinthine wrinkles; transverse striation not developed. Spiracles adjacent to connexival suture. Venter dark reddish brown; pilosity inapparent. Connexivum (fig.

spot of posterior lobe elongate subtriangular, beginning narrowly at level of transverse suture, widening posteriorly and attaining posterior margin of pronotum. Lateral markings of posterior lobe elongate, widest on humeri, from there extending shortly mesad to area of median carinae, thus irregular L-shaped. Anterior lobe granulose on elevated areas, with obsolescent discal and without lateral tubercles. Posterior lobe heavily rugose, faintly granulose. Submedian carinae evanescent before posterior border. Humeral angles rounded. Anterolateral angles narrowly conical, conspicuously pointed. Scutellum (fig. 96) with sides dark, central

96) yellowish or orange-red, dorsally and ventrally with large dark spot at center of each segment, spots not attaining outer border or intersegmental sutures.

TYPES: Of *leopoldi*, Institut Royal des Sciences Naturelles de Belgique; of *novaeguineae*, Rijksmuseum van Natuurlijke Historie, Leiden.

DISTRIBUTION: Australia (North Queensland); Indonesia (West Irian; Sulawesi [Celebes]).

BIOLOGY: This species has been collected at light.

OBSERVATION: We have examined the holotype and paratype of *T. novaeguineae* Miller and found them to be identical with Schouteden's species.

Triatoma limai Del Ponte
Figures 98-100

Triatoma limai Del Ponte, 1929, p. 6, fig. 6.

Neotriatoma limai: Pinto, 1931, p. 122. Mazza and Jörg, 1937, p. 33, figs. 1-5. Abalos and Wygodzinsky, 1951, p. 124, figs. 240, 242-251a.

Triatoma (Neotriatoma) limai: Lima, 1940, p. 198.

Triatoma circummaculata limai: Carcavallo and Martínez, 1968, p. 45, figs. 17, 18.

Length of male 15-17, of female 16.5-18.0 mm.; width of pronotum of male 4 mm., of female 4.0-4.5 mm., width of abdomen of male 6 mm., of female 6.0-6.5 mm.

Overall color from dark brown to black, with pale yellow markings on corium and conhexivum. Pilosity very short, inconspicuous.

Head (figs. 98, 99, 100A, B) of general body color, distinctly rugose and granulose, with setae short, inapparent. Head twice as long as wide across eyes (1:0.5), and slightly longer than pronotum (1:0.9). Anteocular region about two and one-half times as long as postocular (1:0.40-0.45); postocular with sides distinctly convex, angularly projecting. Clypeus narrow, gradually widened on posterior half. Genae large, rounded distally, slightly projecting beyond level of apex of clypeus. Eyes in lateral view surpassing level of under but not attaining level of upper surface of head. Ratio width of eye to synthlipsis 1:1.1-1.4. Antenniferous tubercles situated slightly behind middle of anteocular region. First antennal segment very short, not projecting beyond middle of

genae. Second antennal segment comparatively thick, very slightly flattened, beset with longitudinally arranged stout adpressed setae shorter than diameter of segment. Ratio of antennal segments 1:4.5:3.3:2.5. Rostrum of same color or only slightly lighter than head. Setae of rostrum (fig. 100C) very short and sparse, except scattered longer ones at apex of third

segment. First rostral segment very short, not attaining basal third of distance between apex of antenniferous tubercle and apex of head. Second rostral segment extending to level of anterior margin of eyes, third as long as second, reaching to or even beyond base of neck. First rostral segment subcylindrical, second slightly and third very strongly flattened dorsoventrally, very thin in lateral view. Ratio of rostral segments 1:2.3:2.3-2.4. Neck dark, with a pair of lateral yellow spots.

Pronotum (figs. 98, 99) uniformly dark

brown, in some cases humeri slightly lighter. Anterior lobe delicately granulose on elevated portions, and without discal or lateral tubercles. Posterior lobe distinctly rugose. Submedian carinae extending to middle of posterior lobe. Humeral angles rounded. Anterolateral projections of pronotum sublaterally directed, subconical, very short.

Scutellum of general body color, with distinct median depression. Posterior process subcylindrical, horizontal or slightly upward bent at tip, more than half as long as main body of scutellum, narrowly tapering apically.

Hemelytra (figs. 98, 99) attaining or closely approaching apex of seventh urotergite. Corium dark brown or blackish, with large basal and apical areas light yellow, connected by narrow yellow line along costal margin. Membrane light brown, fumose, much lighter than dark portions of corium; veins of membrane conspicuously dark.

Legs uniformly dark, comparatively short; fore femur six times as long as wide. Fore and mid femora with one pair of small subapical denticles. Fore and mid tibiae of male with spongy fossulae, absent in female.

Venter rounded in both sexes, delicately striate transversally, sparsely and inconspicuously pilose. Spiracles adjacent to connexival suture. Venter dark brown. Connexivum (figs. 98, 99, 100C) pale yellow, with transverse black stripe straddling intersegmental suture, the portion occupying hind border of anterior segment smaller than that on anterior portion of posterior segment. Transverse dark markings relatively large, one-half or more than one-half as long as intervening yellow spaces. Light color of connexivum shortly invading urosternites, especially on area of spiracles.

TYPE: Instituto Oswaldo Cruz, Rio de Janeiro.

DISTRIBUTION: Argentina (Córdoba).

BIOLOGY: This species is found under rocks on the ground, and is believed to feed on wild rodents.

OBSERVATIONS: *Triatoma limai* is obviously closely related to *Triatoma circummaculata*, from which, however, it is separated by a considerable geographical gap and slight but constant structural and chromatic characters.

male 12.0-13.5 mm., of female 13-15 mm.
Body unusually wide.

Overall color dark brown or black, with yellow or orange spots on neck, rarely on humeri, on corium and on connexivum. Setae abundant, 0.1-0.3 mm. long.

Head (figs. 101, 102A, D) black, weakly granulose, shallowly rugose transversally along

Triatoma limai is slightly larger and has somewhat larger eyes (fig. 100A, B) than *circummaculata* (fig. 55B, C). The posterior portion of the head of *limai* (fig. 100B) is somewhat higher than in *circummaculata* (fig. 55C), an admittedly slight but surprisingly constant character. The submedian carinae of the posterior lobe of the pronotum are distinctly longer in *limai* (fig. 99) than in *circummaculata* (fig. 55B) where they are unusually short. The color difference (light-colored areas yellow versus red) are constant, as are the comparatively wide dark transversal bands on the connexivum of *circummaculata*. No intermediate forms have been found in nature, and no laboratory crossings between the two populations have been attempted. Until evidence to the contrary becomes available, we maintain separate specific status for *circummaculata* and *limai*.

Triatoma longipennis Usinger
Figures 16A; 101, 102

Triatoma longipennis Usinger, 1939, p. 48. *Triatoma phyllosoma longipennis*: Usinger, 1944, p. 61, pl. 10, fig. C.

Triatoma phyllosoma usingeri Mazzotti, 1943a, p. 81
(*pro parte*); 1944, p. 60, pl. 10, fig. D.
Triatoma phyllosoma intermedia Usinger, 1944, p. 61.

Length of male 29-34 mm., of female 30-37 mm.; width of pronotum of male 6.5-7.0 mm., of female 6.5-8.0 mm.; width of abdomen of

center above, with numerous forwardly inclined setae. Head two to two and one-half times as long as wide (1:0.4-0.5) and from longer to very slightly shorter than pronotum (1:0.85-1.05). Anteocular region about three times as long as postocular (1:0.30-0.35); postocular with sides subparallel, very slightly rounded. Clypeus narrow anteriorly, shortly and abruptly widened on basal half. Genae narrowly tapering apically, either attaining but not surpassing level of apex of clypeus, or falling slightly short of it. Eyes in side view from barely attaining to slightly surpassing level of under surface and distant from level of upper surface of head. Ratio width of eye to synthlipsis of male 1:1.4-2.1, of female 1:2.1-2.5, viz., eyes of males larger than those of females. Antenniferous tubercles situated slightly behind middle of anteocular region of head. First antennal segment from attaining to slightly surpassing level of apex of clypeus; second segment with decumbent stiff setae about as long as diameter of segment. Ratio of antennal segments 1:2.5-2.9:2.0:1.8. Rostral segments (fig. 102A) stout, cylindrical, with short setae but hairs longer than diameter of segment on third. Ratio of rostral segments 1:1.45-1.55:0.5-0.6. Rostrum dark reddish brown to black. Neck laterally with 1+1 orange-red markings.

Pronotum (figs. 101, 102D) uniformly dark brown or black, in some specimens with small orange spot on humeri. Pronotum not granulose, with stiff setae from very short (\pm 0.1 mm.) and adpressed to longer (up to 0.3 mm.) and semierect. Structure of pronotum and scutellum as in *phyllosoma*; scutellum uniformly dark. Mesosternum with numerous long erect hairs; metasternum with similar hairs in large or small number, or only with short decumbent setae.

Hemelytra (fig. 101) and wings fully developed although appearing narrow as compared to unusually wide abdomen, leaving extreme lateral portions of urotergites exposed. Hemelytra of males attaining middle or apex of urotergite VII, those of female reaching but not extending beyond hind margin of urotergite VI. Corium with short (0.1 mm.) adpressed setae (fig. 16A), or somewhat longer (0.2 mm.) decumbent ones. Corium black, with large triangular

basal marking yellow or orange colored, and with smaller subapical spot of similar color, the latter mark in some specimens very small or imperceptible. Clavus entirely dark.

Legs as in *phyllosoma*; fore femora 6.1-6.9 times as long as wide.

Venter convex, delicately but shallowly striate transversally; pilosity of venter varying from short and decumbent (in specimens with short setae on metasternum) to long and semi-erect (in specimens with long hairs on metasternum). Spiracles remote from connexival suture by one to several times their diameter. Connexivum (figs. 101, 102B, C, E) dark brown or black, each segment on posterior half or third with yellow or orange-red irregularly shaped marking adjoining abdominal margin and extending or not to connexival suture. Spots similar on dorsal and ventral surface; ventral spots in some cases extending very shortly to posterolateral corner of respective urosternite.

TYPES: Of *longipennis*, California Academy of Sciences; of *usingeri* and *intermedia*, Instituto de Salubridad y Enfermedades Tropicales, Mexico.

DISTRIBUTION: Mexico (Aguascalientes, Chihuahua, Colima, Jalisco, Nayarit, Sinaloa, Zacatecas).

BIOLOGY: *Triatoma longipennis* has been found naturally infected by *Trypanosoma cruzi*. The species (as *T. phyllosoma intermedia*) has been reported to be domestic and peridomestic in Zacatecas. A specimen from Sinaloa now examined bears a label suggesting association with bats in a cave.

OBSERVATIONS: In 1939, Usinger described *Triatoma longipennis* (fig. 102C), differentiating it from *T. phyllosoma*, among other characters, by the short setae of its corium and pronotum, its longer hemelytra and the different pilosity of its under surface. The long fine semierect hairs so characteristic of *phyllosoma* and the other species of the group are restricted in *longipennis* to the mesosternum; the metasternum and abdominal venter have short decurved hairs.

In 1943, Mazzotti described *Triatoma phyllosoma usingeri*, paratypes of which we have seen. Mazzotti's subspecies possesses, according to the author, two color forms, one with

Usinger (1944) reduced his *longipennis* to subspecific rank, as *T. phyllosoma longipennis*, again defined, among other characters, by the unusually short hairs on the metasternum and abdominal venter. In the same paper, Usinger distinguished *T. phyllosoma picturata* from *T. longipennis* by the long setae of the entire under surface of the body. Still in the same paper, Usinger introduced *T. phyllosoma intermedia*, comparing it to *T. phyllosoma picturata* but not to *longipennis* which it resembles closely. *Triatoma phyllosoma intermedia* has long hairs on the entire under surface of the body, and the setae of the corium are longer (0.2 mm.) than in *longipennis* and *usingeri* (0.1 mm.), which also applies to the hairs of the pronotum (0.2-0.3 mm., versus 0.1 mm.).

The differences of pilosity narrated here are not sufficient to warrant formal taxonomic rank for their bearers, and we therefore list the names already in existence under *longipennis*, as the oldest available name. However, intensive collecting over the entire area of the complex and rigorously planned and executed rearing and crossing experiments are necessary to provide the definitive answer regarding the taxonomic rank of the components of the group. We do not ignore the rearing experiments carried out by Mazzotti (1943) but consider them as inconclusive.

Triatoma maculata (Erichson)

Figures 7A-D; 8B; 10B; 17; 30C, D; 103-105

La Punaise Mouche Bigarrée Stoll, 1788, p. 82, pl. 20, fig. 140.

Conorrhinus maculatus Erichson in Schomburgk, 1848, p. 614.

Conorhinus maculatus: Stål, 1859, p. 108.

Triatoma maculata: Neiva, 1914, p. 47. Del Ponte, 1930, p. 881, fig. 8. Correa and Espinola, 1964, p. 117, figs. 5, 6, 9, 10. Lucena, 1973, p. 176. Galvão, 1973, p. 367, figs. 1a, 1c, 3a, 3c, 4a, 4c, 5a, 5c, 6a, 6c. Cobben and Wygodzinsky, 1975, p. 15, figs. 155, 156.

Eutriatoma maculata: Pinto, 1931, p. 90, fig. 35.

Conorhinus immaculata Patton and Cragg, 1913, p. 495.

Length of male 16.5-21.5 mm., of female 17.5-22.0 mm.; width of pronotum of male 4-5 mm., of female 4.0-5.5 mm., width of abdo-men of male and female 5.5-8.0 mm.

the corium extensively yellowish white, the other one with the corium largely dark, marked with light basally and subapically. The holo-type belongs to the form with a light-colored corium; this "form" agrees with our definition of *pallidipennis*, and we have synonymized it with that species. The dark-colored form of *usingeri* is very similar to *longipennis*, but there are long hairs not only on the meso- and metasternum but also on the abdominal venter, although not as long as those of *phyllosoma*. On the other hand, one of the three original *longipennis* examined has long hairs also on the metasternum although they are admittedly more scarce than on the mesosternum.

Overall color from dark brown to black, with light yellow, orange-yellow or light red marks on head, neck, thorax (fig. 105E), cormum and connexivum. Integument almost glabrous, setae very short and sparse.

Head (figs. 103, 104, 107A, B) comparatively wide, very high posteriorly in lateral view, delicately rugose and granulose, especially at sides. Overall color of head from dark brown to black; very rarely uniformly dark, in most specimens dorsally with light pattern elements of variable extension, from very extensive to scarcely perceptible. Head much less than twice as long as wide across eyes (1:0.6-0.7) and as long as or slightly shorter than pronotum (1:1.0-1.1). Anteocular region from three to four times as long as postocular (1:0.25-0.35), postocular almost entirely occupied by ocelliferous tubercles with ocelli, its sides rounded but strongly converging toward behind. Clypeus narrow, slightly widened behind middle. Genae tapering apically but not pointed, distinctly surpassing level of apex of clypeus (fig. 105A, B). Jugae rounded or wide-

angled apically. Eyes very large, in lateral view considerable surpassing level of under, and almost attaining level of upper, surface of head. Ratio width of eye to synthlipsis 1:0.9-1.1. Ocelli large. Antenniferous tubercles situated slightly behind middle of anteocular region. First antennal segment falling short of level of apex of clypeus. Second antennal segment slightly compressed, beset with numerous short adpressed setae shorter than diameter of segment. Ratio of antennal segments 1:4.2-5.0:2.8-3.2:1.9-2.4. Rostrum as dark as head capsule, relatively stout. Setae of rostrum (fig. 105B) short and sparse on first and second and very numerous and elongate on third segment, as long as diameter of same. First rostral segment not quite attaining level of apex of antenniferous tubercle, second extending to level of hind margin of eyes. Ratio of rostral segments 1:1.9-2.2:0.9-1.0., viz., first segment as long as or slightly longer than third. Neck with pair of lateral light-colored spots.

Pronotum not distinctly granulose, its overall color from dark brown to black. Anterior lobe

bly at least one pair present. Anterior lobe of pronotum with distinct although not large discal and lateral tubercles. Posterior lobe coarsely wrinkled. Submedian carinae extending close to hind margin of sclerite. Humeral angles narrowly rounded. Anterolateral projections (fig. 105C) elongate subtriangular, compressed dorsoventrally, anterolaterally directed.

Pleura dark, propleura and mesopleura with light spot at hind margin (fig. 105E), in some cases spot also on mesopleura.

Scutellum entirely dark, coarsely rugose, with distinct central depression; sides of scutellum swollen. Posterior process of scutellum subcylindrical, about as long as main body of scutellum, horizontal, rounded apically.

Hemelytra closely approaching or attaining apex of urotergite VII, in both sexes; their color from light to very dark brown (fig. 103A, B), with veins of membrane and of central portion of corium contrastingly blackish. Clavus dark on basal fourth, contrastingly light

entirely dark, or with discal and lateral tubercles, or only discal tubercles, or also with small area on each side between base of longitudinal carinae and lateral tubercles, orange or yellow. Posterior lobe dark, in most specimens with three pairs of yellow or orange-yellow spots, one pair anterosublateral, one humeral, and one posteromedian. Spots in some specimens confluent to a certain degree, or one or the other pair evanescent, but invaria-

colored on remainder. Corium with more or less extensive yellowish or orange longitudinal markings intermixed with dark areas. Membrane fumose, lighter colored than dark portions of corium.

Legs uniformly dark. Fore femur 4.5-5.5 times as long as wide. Fore and mid femora with a pair of small subapical denticles. Tibiae of first and second pair of legs of male with spongy fossulae (fig. 17B, C), absent in female.

Venter convex, slightly flattened longitudinally along middle in females, delicately striate transversally, sparsely setose. Spiracles close but not adjacent to connexival suture. Urosternites from dark brown to black, except small lateral yellow area enclosing spiracles. Connexivum from light yellow to orange-yellow or reddish, with wide transverse black bands on intersegmental sutures, occupying entire width of connexival segments. Light-colored areas occupying from one-half to three-fifths of length of respective connexival segment.

Male genitalia with endosomal processes of aedeagus lacking apical denticles, their distal portion with irregularly ribbon-shaped sclerotizations (fig. 105D).

TYPE: Zoologisches Museum, Berlin

DISTRIBUTION: Brazil (Roraima); Colombia; Guyana; Netherlands Antilles (Aruba, Bonaire, Curaçao); Surinam; Venezuela. Records of this species from northeastern and central Brazil refer to the closely related *Triatoma pseudomaculata*; *T. maculata* does not occur south of the Amazons.

BIOLOGY: *Triatoma maculata* is commonly found infected with *Trypanosoma cruzi*, and, being sometimes domestic, is a vector of Chagas' disease, the second in importance in Venezuela. The species occurs peridomestically in chicken houses, pigeon coops, and corrals and has been collected under stones near cattle watering holes. *Triatoma maculata* also has been collected in birds' nests, such as those of *Phaeocleldomus rufifrons inornatus* Ridgway, in company with the triatomine *Psammolestes arthuri*.

OBSERVATIONS: This species is highly vari-

able in size, intensity of pigment (fig. 103) and color pattern. At least some of this variation is geographic as shown by the ample material before us and as demonstrated by Cobben and Wygodzinsky (1975) who found constant size and color differences between populations from different islands in the Netherlands Antilles.

The species is extremely similar to *Triatoma pseudomaculata* which has only recently been segregated from it and from which it cannot easily be distinguished on external characters alone; only the striking structural differences of the endosomal processes of the phallus allow secure identification (figs. 105E and 150D).

Triatoma matogrossensis Leite and Barbosa

Figures 29E; 106, 107

Triatoma (Eutriatoma) matogrossensis Leite and Barbosa, 1953, p. 1, figs. 1-4.

Length of male 24.5-28.0 mm., of female 28-30 mm.; width of pronotum of male 4.8-6.0 mm., of female 5.5-6.0 mm.; width of abdomen of male 7-9 mm., of female 9-10 mm.

Overall color dark brown or dark reddish brown, with light yellowish brown areas on neck, hind lobe of pronotum, hemelytra, legs, and connexivum. Pilosity short and sparse, even on legs.

Head (figs. 106, 107A, B) dark brown, feebly rugose and granulose-punctate, more than twice as long as wide (1:0.4), and much longer than pronotum (1:0.75). Anteocular region four to five times as long as postocular (1:0.2-0.25), postocular with sides almost straight, slightly converging toward behind. Clypeus narrow, gradually widened on posterior half. Jugae angular apically. Eyes in lateral view attaining or closely approaching level of lower surface but distant from level of upper surface of head. Ratio width of eye to synthlipsis 1:1.3-1.7. Antenniferous tubercles relatively slender, situated at center of anteocular region. First antennal segment falling distinctly short of level of apex of clypeus; second segment with numerous adpressed setae shorter than diameter of segment. First, second, and extreme base of third segment black, remainder contrastingly yellow. Ratio of antennal segments 1:4.7-

discal tubercles from small but distinct to forming inconspicuous elevations. Lateral tubercles not developed. Posterior lobe distinctly rugose. Submedian carinae extending to posterior third of hind lobe, evanescent posteriorly. Humeral angles rounded. Anterolateral projections shortly conical, rounded or almost pointed apically.

Scutellum (fig. 106) with median depression shallow. Apical process of scutellum short, slightly over half as long as main body of scutellum, horizontal, subconical, wide at base, narrowly rounded or almost pointed apically.

Hemelytra (fig. 106) approaching or attaining posterior margin of seventh urotergite in male, approaching base of seventh urotergite in female. Clavus dark brown at base, pale on apical half. Corium light brownish yellow, with area limited by Sc, R+M and R, a subapical spot, and part of veins, dark brown. Membrane fumose, light grayish brown, darker than light areas of corium; veins of membrane dark brown.

Legs (fig. 106) light yellowish brown; femora subapically with faint but perceptible dark spot or annulus; apex of tibiae darkened. Legs very long and slender; fore femora eight times as long as wide. Fore and mid femora with one pair of small denticles subapically. Spongy fossulae on fore and mid tibiae of male, absent in female.

Abdomen wide, lateral portions of urotergites exposed in many specimens. Venter distinctly flattened longitudinally along middle in female, slightly so in male, delicately striate transversally, with distinct although short golden setae. Spiracles adjoining connexival sutures. Urosternites dark brown except small yellowish area enclosing spiracles. Connexivum (fig. 107C, D) light yellow or yellowish brown, dorsally with narrow transverse markings straddling intersegmental sutures; these markings very narrowly constricted at middle, widened along connexival suture and in some cases along outer margin posterior to intersegmental sutures. Ventral markings of connexivum faint, reduced in extension.

TYPE: Instituto Oswaldo Cruz, Rio de Janeiro.

5.1:3.1-3.6:2.4-2.8. Rostrum (fig. 107B) yellowish brown, lighter than head capsule, very slender. First rostral segment falling considerably short of level of apex of antenniferous tubercle; second segment extending to level of posterior border of eyes. Setae of rostrum short and sparse, only slightly longer at base of up-per surface of third segment. Ratio of rostral segments 1:2.5-2.8:1.2-1.4. Neck dark, with pair of lateral yellow spots.

Pronotum (fig. 106) dark brown or reddish brown, with 1+ 1 yellowish brown spots on humeri. Anterior lobe sparsely granulose, with

DISTRIBUTION: Brazil (Mato Grosso).
BIOLOGY: Unknown.

Triatoma mazzottii Usinger
Figures 16B; 108, 109

Meccus phyllosoma: Champion, 1899, p. 209, pl. 12,
fig. 25 (nec Burmeister).
Triatoma mazzottii Usinger, 1941, p. 54.
Triatoma phyllosoma mazzottii: Usinger, 1944, p.
59, pl. 10, fig. A.

Length of male 33 mm., of female 34 mm.
Width of pronotum of male and female 7 mm.,
of abdomen of male 13 mm., of female 14 mm.
Body unusually wide.

Overall color dark brown to black, with orange-red markings on corium and connexivum.
Setae numerous, most delicately hairlike (fig. 16B), up to 0.5 mm. in length.

Head (figs. 108, 109B) black, faintly rugose along center above, not granulose, with long hairs. Head twice as long as wide (1:0.45-0.50), and as long as or very slightly longer than pronotum. Anteocular region three times as long as postocular (1:0.3), postocular with sides almost straight, subparallel. Clypeus narrow, widened on posterior half. Genae narrowly tapering apically, almost pointed. Jugae angular apically. Eyes in lateral view invariably attaining level of lower surface and distant from level of upper surface of head. Ratio width of eye to synthlipsis 1:1.5-1.6. Anten-

niferous tubercles situated slightly behind center of anteocular portion of head. First antennal segment extending distinctly beyond level of apex of clypeus; second segment with decumbent stiff setae about as long as diameter of segment. Ratio of antennal segments 1:2.4:1.9:? Rostrum (fig. 109C) dark brown or black. First rostral segment extending to level of middle of antenniferous tubercles, second extending to level of neck. Rostral segments stout, subcylindrical, with short setae except hairs longer than diameter of segment on third. Ratio of rostral segments 1:1.55-1.70:0.25. Neck laterally with 1+1 reddish markings.

Thorax (figs. 108, 109B) as in *T. phyllosoma*.

Hemelytra (fig. 108) and wings of normal size, but leaving entire connexivum and lateral portions of urotergites of unusually wide abdomen exposed. Hemelytra of males attaining or slightly extending beyond apex of abdomen, those of female attaining middle of urotergite VII. Corium with long (0.3-0.4 mm.) decumbent hairs (fig. 16B), its surface dull black, with one basal triangular and one subapical subquadrate spot red or orange-red. Clavus and membrane black.

Legs black, elongate. Fore femur 7.5-8.3 times as long as wide. Fore and mid femora with two subapical denticles, in some cases obsolescent. Spongy fossulae absent in both sexes.

Venter convex, delicately and shallowly striate transversally, with numerous decumbent long hairs. Spiracles remote from connexival suture by a distance equal to from two to three times their diameter. Connexivum (fig. 109A) black, posterior third or half of each segment with subquadrate orange red marking. On ventral surface, light-colored area of connexival segments posteriorly with short triangular extension on respective urosternites.

TYPE: California Academy of Sciences.

DISTRIBUTION: Mexico (Durango, Guerrero, Michoacán, ?Nayarit, Oaxaca).

BIOLOGY: This species has been found naturally infected with *Trypanosoma cruzi*. This triatomine is frequent in human habitations where all instars can be collected. Peridomestically, it

Triatoma melanocephala Neiva and Pinto
Figures 110-112

Triatoma melanocephala Neiva and Pinto, 1923c, p.
75. Pinto, 1925, p. 59, fig. 39; 1931, p. 71 fig. 8.

Length of male 25.5-26.5 mm., of female
28 mm.; width of pronotum of male 6-7 mm.,
of female 7 mm.; width of abdomen of male
9.5-10.0 mm., of female 10 mm.

Overall color from dark brown to black,
with yellowish markings on neck, pronotum,
hemelytra and connexivum. Pilosity short,
sparse, inconspicuous. Pleura and under surface
of thorax and abdomen lightly polished.

Head (figs. 110, 111, 112) black, rugose, deli-
cately granulose, less than twice as long as wide
(1:0.6) and approximately as long as pro-
notum. Anteocular region from two and one-
half to three times as wide as postocular (1:0.3-
0.4), postocular with sides straight, converging
toward behind. Clypeus conspicuously widened
on posterior half. Genae narrowly tapering api-
cally but not pointed, attaining or very slightly
surpassing level of apex of clypeus. Jugae
pointed apically. Eyes in lateral view attaining

occurs associated with armadillos and wood
rats (*Neotoma* sp.).

OBSERVATIONS: *Triatoma mazzottii* is very
close to *T. phyllosoma* with which it agrees in
its color pattern and the long hairs of head,
thorax, and abdomen. The main differences be-
tween the two species are the relatively longer
head in *phyllosoma*, the length of the hemelytra
(normal in *mazzottii* and remarkably shortened
and narrowed in *phyllosoma*), and the size of
the eyes (over half as wide as the synthlipsis in
mazzottii and nearly half as wide as the synth-
lipsis or even smaller in *phyllosoma*).

but not surpassing level of under surface and remote from level of upper surface of head. Ratio width of eye to synthlipsis 1:1.8-2.2. Antenniferous tubercles situated slightly behind middle of anteocular region. First antennal segment extending slightly beyond level of apex of clypeus. Second antennal segment (remaining

not preserved) about three times as long as first, with semierect setae almost as long as diameter of segment. Rostrum (fig. 112B) as dark as head capsule; first segment extending to level of insertion of antennae, second extending slightly beyond level of hind margin of eyes. Rostral segments stout, subcylindrical; dorsal surface of second segment, and under surface of apical half of second and entire third segment with dense long hairs, many longer than diameter of respective segments. Ratio of rostral segments 1:1.6-1.8:0.7-0.8. Neck dark, with a pair of yellow spots laterally.

Pronotum (figs. 110, 111) dark brown, with 1+1 yellowish brown oval markings on disc of anterior half of posterior lobe, laterad of submedian carinae. Anterior lobe with one pair each of small but distinct discal and lateral tubercles. Posterior lobe heavily wrinkled. Submedian carinae relatively short, evanescent on posterior third of posterior lobe. Humeral angles rounded. Anterolateral projections subconical, somewhat compressed dorsoventrally, their outer border yellowish.

Scutellum (figs. 110, 111) uniformly dark. Median depression well developed, narrow. Posterior process of scutellum subcylindrical, about as long as main body of scutellum, horizontal; apex slightly upturned, distally rounded.

Hemelytra attaining posterior border of seventh urotergite. Color of hemelytra brown; base of clavus, cells of corium, especially that limited by Sc, R+M and R, and base of cells of membrane, darkest; apical two-thirds or three-fourths of membranal cells distinctly lighter brown. Most veins of hemelytra contrastingly yellow, most also bordered with yellow; a conspicuous elongate yellow area near base of corium, adjoining claval suture.

Venter convex, delicately striate transversally, with short setae. Spiracles very close to or adjoining connexival suture. Urosternites uniformly dark, except minute yellow spot enclosing spiracles. Connexival segments (figs. 110, 111) with alternate black and light yellow transverse markings. Black markings straddling intersegmental sutures, of irregular shape and longer than yellow markings; the latter closer to posterior than to anterior intersegmental sutures.

TYPE: Instituto Oswaldo Cruz, Rio de Janeiro.

DISTRIBUTION: Brazil (Bahia, Paraíba, Pernambuco).

BIOLOGY: Adult specimens have been found occasionally in human habitations; nothing is known regarding the sylvatic habits of this species.

Triatoma mexicana (Herrick-Schaeffer) Figures
6C; 113, 114

Conorhinus mexicanus Herrich-Schaeffer, 1848, p.
71, pl. 272, figs. 839, 840.

Meccus mexicanus: Stål, 1859, p. 105.

Triatoma mexicana: Del Ponte, 1930, p. 886. Pinto,

1931, p. 71, fig. 23. Mazzotti, 1940b, p. 2, fig. 1.
Usinger, 1944, p. 52, pl. 9, fig. C.

Male. Length 25-26 mm.; width of thorax
5.5-6.0 mm., of abdomen 9-10 mm.

General color black, with yellow markings
on neck, corium, and connexivum.

Head (figs. 113, 114A, B) long and narrow,
longer than pronotum (1:0.85), delicately and
sparsely granulose, dorsum transversally rugose
along middle. Anteocular region three times as
long as postocular, the latter with sides faintly
rounded, slightly converging toward behind.
Clypeus narrow, widened posteriorly. Genae
narrowly tapered apically, not attaining level of
apex of clypeus. Jugae blunt apically. Eyes
prominent, in lateral view extending below
level of under but not attaining level of upper
surface of head. Ratio width of eye to synthlipsis
1:1.0-1.3. Antenniferous tubercles situated
slightly behind middle of anteocular region.
First antennal segment falling considerably
short of level of apex of clypeus. Second (and
third) segments (fig. 6C) with strong declinate
setae somewhat longer than diameter of seg-
ment, and with very numerous short, delicate,
erect hairs. Ratio of antennal segments
1:4:2.7-3.0:2.5. Rostrum (fig. 114B) slender,
with very short and sparse setae, becoming
slightly longer on third segment. First rostral

segment attaining level of center of anten-
niferous tubercle, second extending to level of
base of neck. Ratio of rostral segments
1:1.70-1.75:0.45-0.50. Neck black, with 1+1
lateral yellow spots.

Pronotum (figs. 113, 114A) uniformly black.
Anterior lobe smooth, ridges not prominent;
discal tubercles present, elongate conical. Lat-
eral tubercles distinct but smaller, subconical.
Posterior lobe rugose, with lateral portions flar-
ing; sides forming conspicuous angle with sides
of fore lobe. Submedian carinae not attaining
hind border of pronotum. Humeral angles (figs.
113, 114A, C) acute, explanate or not. Sides of
posterior lobe slightly reflexed, more strongly
so posteriorly. Anterolateral angles prominent,
spinelike.

Scutellum (fig. 114A) with central portion
depressed, rugose, sclerite carinate laterally.
Posterior process about as long as main body of
scutellum, cylindrical, declinate apically.

Hemelytra (fig. 113) from approaching to
slightly surpassing apex of abdomen. Clavus
black on basal half, brownish translucent on
apical portion. Corium yellow, including de-
flexed portion at its base, with large black spot
along R extending almost to lateral margin and
to basal portion of M; cu and m-cu crossvein
equally black. Base of dark area of Cu con-
nected to sublateral dark spot; apex of corium
black. Almost entire lateral border of corium
narrowly yellow.

Legs black, slender, fore femora 8.5-9.1
times as long as wide. Fore and mid femora
with a pair of small subapical denticles. Ante-
rior tibiae of male with very small spongy fos-
sula, absent on second pair (female not
examined).

Abdomen convex, flattened ventrally on seg-
ments III-V, flattened portion not limited by a
ridge. Venter polished, minutely striate trans-
versally, its setae inconspicuous. Spiracles dis-
tant from connexival suture by approximately
twice their diameter. General color of abdomen
black. Connexivum (fig. 113) yellow, with ir-
regularly shaped black markings on anterior
third or half of each segment adjacent to inter-
segmental suture.

Female. (Not seen; data taken from illustration
in Herrich-Schaeffer, 1848). Similar to
male, but with hemelytra abbreviated, not ex-

tending beyond base of seventh urotergite. Abdomen strongly widened (as in *phyllosoma* group), with hemelytra leaving lateral portions of urotergites exposed.

TYPE: Unknown.

DISTRIBUTION: Mexico (Hidalgo, Queretaro). This apparently rare species was originally described from Mexico, without any additional data; another specimen was discovered almost 100 years later in Hidalgo (Mazzotti, 1940; Usinger, 1844). We have now seen one more male, also from Mexico (Queretaro: 1 mile NW of Ayutla, July 24, 1970, at light, Murray et al.; A & M University, College Station, Texas).

BIOLOGY: Unknown.

Triatoma migrans Breddin
Figures 19C; 115, 116

Triatoma migrans Breddin, 1903, p. 111. Larrousse, 1924a, p. 69, fig. 4. Lent, 1951d, p. 426.

Triatoma pallidula Miller, 1941, p. 787, fig. 11a-c.
(new synonymy).

Length of male 22.5-24.5 mm. (very rarely 20 mm.), of female 23.5-25.0 mm.; width of pronotum of male 6.5-7.0 mm., of female 6.5-7.5 mm.; width of abdomen of male 9-10 mm., of female 6.5-7.0 mm.

Overall color from yellowish to reddish brown, with dark brown or black markings on head, pronotum, corium, and connexivum. Integument rugose, granulose in some areas. Setae very short and sparse.

Head (figs. 115, 116) granulose and slightly rugose dorsally, reddish brown with 1+1 longitudinal black stripes on dorsum sublaterally. Head less than twice as long as wide across eyes (1:0.6) and distinctly shorter than pronotum (1:1.2). Anteocular region approximately three times as long as postocular (1:0.35), postocular with sides rounded, subsemicircular. Clypeus narrow anteriorly, abruptly widened on basal half which is conspicuously elevated in side view. Genae rounded apically in lateral view, considerably surpassing level of apex of clypeus. Eyes distinctly surpassing level of un-

Pronotum (fig. 115) reddish brown; dark brown or black on smooth areas of anterior lobe and with four dark longitudinal stripes on posterior lobe, 1+1 in areas between submedian carinae and outer border and 1+1 in space between carinae, adjacent to same. Anterior lobe granulose on elevated areas, with obsolescent discal and without lateral tubercles. Posterior lobe strongly rugose, only faintly granulose. Submedian carinae evanescent before posterior margin. Humeral angles rounded. Anterolateral angles with unusually elongate, fingerlike, distally rounded projections.

Scutellum (fig. 115) with variable color pattern, in many cases black on anterior half and with apical process light colored, but in some

der surface and close to level of upper surface of head. Ratio width of eye to synthlipsis 1:1.5-1.8. Ocelli unusually close to eyes, distance from ocellus to eye shorter than diameter of ocellus. First and second antennal segments dark brown or black; first very short, not extending beyond basal two-thirds of gena. Second antennal segment only with adpressed setae shorter than diameter of segment. Ratio of antennal segments 1:3.8-4.2:2.4-2.9:1.9-2.6. Rostrum (fig. 116B) with short, inconspicuous setae except distally on second and on third segment, but not forming brushlike structure at junction of second and third segments. First rostral segment attaining level of base of antenniferous tubercles, second attaining level of hind border of head. Ratio of rostral segments 1:1.3-1.5:0.4-0.5. Neck of uniform reddish color.

specimens either color more or less widely extended. Posterior process only two-thirds as long as main body of scutellum, horizontal, subconical, strongly tapering from wide base to narrow apex.

Hemelytra (fig. 115) extending to apex of abdomen, in both sexes. Corium dark at base, at apex and along external margin, and with irregularly shaped large central spot dark. Subbasal and subapical yellowish or reddish markings connected or not by a narrow light line along apical portion of R. Membrane as dark as dark portions of corium.

Legs dark reddish brown, stout; fore femora 4.0-4.5 times as long as wide. Fore and mid femora with 3-4 subapical denticles. Tibiae of first and second pair of males with small spongy fossulae, absent in females.

Abdomen rounded below although only very slightly so along center longitudinally. Surface microsculpture (fig. 19C) of venter consisting of minute meandering or labyrinthine wrinkles; transverse striation not developed. Spiracles adjacent to connexival suture or distant from same by diameter of spiracles. Pilosity of venter inapparent. Abdomen of general body color. Connexivum (fig. 115) reddish, dorsally and ventrally with subrectangular transverse dark spot at center of each segment.

TYPES: Of *migrans*, Deutsches Entomologisches Institut; of *pallidula*, British Museum (Natural History).

DISTRIBUTION: India (Sikkim); Indonesia (Borneo, Java, Sumatra); Malaysia (Malaya, Sarawak); Philippines; Thailand.

BIOLOGY: According to its label, a specimen from Sarawak was collected in "rotten heart-wood of felled tree."

OBSERVATIONS: *Triatoma pallidula* Miller was tentatively synonymized with *migrans* by Lent (1951d). We have now examined the type of *pallidula* and establish here the synonymy formally. The type specimen of *pallidula* agrees with other *migrans* in most characters accepted for this species, except the unusually small size (only 20 mm.) and the low intensity of pigmentation of the dark areas of the body, the latter a phenomenon not infrequent in preserved specimens of Triatominae.

Triatoma neotomae Neiva

Figures 26B; 117, 118

Triatoma neotomae Neiva, 1911a, p. 422; 1914a, p

53. Pinto, 1931, p. 73, fig. 24. Usinger, 1944, p 70, pl. 12, fig. E. Thurman, 1944, p. 116
Conorhinus neotomae: Patton and Cragg, 1913, p 494.

Length of males 16.5-17.5 mm., of females 17.5-19.5 mm., width of pronotum of males 4.0-4.5, of females 4.2-5.5 mm., of abdomen of males 5.0-5.5, of females 6.0-6.5 mm.

General color from dark brown to blackish, with orange-yellow markings on neck, humeral angles and connexivum, the corium partially light yellow.

Head (figs. 117, 118) heavily rugose, slightly granulose, distinctly convex above eyes, not over twice as long as wide across eyes (1:0.5-0.6), and as long as or slightly shorter than pronotum (1:1.0-1.1). Antecocular region from two to three times as long as postocular (1:0.3-0.45); postocular with sides rounded, widest at middle, somewhat convergent toward behind. Clypeus narrow anteriorly, abruptly and strongly widened toward posterior half. Head with distinct arcuate transverse impression at base of clypeus. Genae conspicuously rugose transversally, tapered apically, almost attaining level of apex of clypeus. Upper surface of head evenly convex above, but in side view with slight but distinct depression at level of base of clypeus; ventrally not salient behind eyes. Eyes in lateral view remote from level of upper but very close to level of under surface of head.

structure at junction of second and third segment. First segment not quite attaining level of apex of antenniferous tubercle, second reaching level of posterior border of head. Ratio of rostral segments 1:1.6-1.7:0.6-0.7. Neck entirely yellowish.

Pronotum (figs. 117, 118) subquadrate, with sides carinate, not constricted at level of transverse sulcus. Thorax of general body color, humeral angles of pronotum each with yellowish spot attaining margin of sclerite. Anterior lobe slightly elevated, polished, without discal or lateral tubercles, very sparsely granulose. Posterior lobe rugose; humeri rounded. Anterolateral angles in shape of dorsoventrally flattened flap, broadly rounded and very short.

Scutellum (fig. 117) with depressed central portion limited by broad carinae; posterior process not more than half as long as main body of scutellum, pointed, declinate at apex.

Eyes comparatively small, ratio width of eye to synthlipsis 1:2.5-3.0. Antenniferous tubercles situated closer to eyes than to level of apex of anteocular region. First antennal segment short, not attaining level of apex of clypeus. Second segment with short decumbent setae. Ratio of antennal segments 1:2.3-2.6:2.0-2.4:1.7-2.0. Rostrum (fig. 118B, D) with hairs becoming progressively longer toward apex of second and on third segment, forming dense brushlike

Hemelytra (fig. 117) attaining or surpassing middle of eighth urotergite. Corium without perceptible setae, orange or pale yellow with large dark central spot which is longer than wide; dark also base of clavus and apex of corium. Membrane light fumose.

Legs of general body color, stout; fore femora 3.6-3.8 times as long as wide. Fore and mid femora with 2+2 denticles subapically. Spongy fossulae present on fore and mid tibiae of males and only on fore tibiae of females.

Venter convex, sharply flattened longitudinally along middle, delicately striate transversally, with inconspicuous setae. Spiracles distant by one to three times their own diameter from connexival suture. Urosternites and urotergites of general body color. Connexival segments (fig. 117) orange-yellow, each at middle with large dark, transversal, irregularly shaped marking extending over entire width of connexival segment, dorsally and ventrally.

TYPE: National Museum of Natural History, Smithsonian Institution, Washington, D. C.

DISTRIBUTION: U. S. A. (Arizona, California, New Mexico, Texas).

BIOLOGY: This species has been found naturally infected by *Trypanosoma cruzi*. It occurs in nests of the woodrats *Neotoma micropus* and *N. albigena* Hartley.

OBSERVATION: Usinger (1944) redescribed this species as having the terminal antennal segment as long as the penultimate. This is not a general rule; in our specimens, the ratio penultimate to ultimate antennal segment varies between 1:0.8 and 1:0.95 (average 1:0.88).

Triatoma nigromaculata (Stål)
Figures 119-121

Conorhinus variegatus: Stål, 1859, p. 113 (nec Drury, 1773).

Conorhinus nigromaculatus Stål, 1872, p. 111.

Triatoma nigromaculata: Neiva, 1914a, p. 55. Mazza and Jörg, 1944c, p. 34, figs. 1-10, pl. 2.

Eutriatoma nigromaculata: Lent and Pifano, 1939, p. 627, figs. 1, 2.

Length of male 21-22 mm., of female 23-24 mm.; width of pronotum of male 5.0-5.5 mm., of female 5.5-6.0 mm.; width of abdomen of male 7.0-7.5 mm., of female 8-9 mm.

Overall color yellowish brown or light reddish brown, with numerous black areas and markings dorsally and dark brown areas ventrally. Setae yellow, short and sparse except longer and more numerous on venter.

Head (figs. 119, 120; 121A, C) dark laterally and ventrally, yellowish brown dorsally on clypeus, dorsal surface of jugae, and entire dorsal surface of head from base of clypeus to hind border of head. Head rugose laterally, approximately twice as long as wide (1:0.45-0.50) and slightly longer than pronotum

(1:0.85-0.95). Anteocular region three to four times as long as postocular (1:0.25-0.30), postocular with sides straight, distinctly converging toward behind. Clypeus elongate, very narrow subapically, gradually widened on posterior half. Genae blunt apically, attaining level of apex of clypeus. Jugae unusually small, narrowly rounded at apex. Eyes in lateral view slightly surpassing level of lower but not attaining level of upper surface of head, and in dorsal aspect from slightly narrower to slightly wider than synthlipsis (1:0.9-1.2). Antenniferous tubercles inserted at center of anteocular region. First antennal segment falling considerably short of level of apex of clypeus; second segment with numerous inclined setae as long as or longer than diameter of segment. Ratio of antennal segments 1:3.3-3.9:2.8-3.1:2.0-2.3. Rostrum black, very slender. First rostral segment unusually short, not extending beyond middle of distance from apex of antenniferous tubercles to level of apex of clypeus. Second segment attaining level of neck. Rostrum with very short, sparse setae, except about as long as diameter of segment on lower surface of apical portion of second and on entire third segment; setae not dense. Ratio of rostral segments 1:3.3-3.9:1.1-1.3. Neck black, without spots.

Pronotum (figs. 119, 120) light yellowish brown, with conspicuous black markings. Anterior lobe with 1+1 discal but without lateral tubercles. Posterior lobe heavily wrinkled. Submedian carinae evanescent on posterior fourth of hind lobe. Humeral angles rounded. Anterolateral projections strongly flattened dorsoventrally, large, prominent, cat-ear like. Anterior lobe of pronotum with elevated areas yellowish brown, smooth low areas (central area four-leaf clover shaped and sublateral areas H-shaped) black. Posterior lobe with 2+2 black markings covered with distinct golden hairs, the 1+1 submedian spots subrectangular, with transverse inferointernal incision, the 1+1 sublateral spots oval. Collar and anterolateral projections light colored, collar with 1+1 black spots forming continuation of inner arms of H-shaped black area on fore lobe of pronotum.

Scutellum (figs. 119, 120) light colored, with

sides and central depression black, heavily rugose; posterior process reddish, almost as long as main body of scutellum, subcylindrical, rounded apically in dorsal and obliquely truncate in lateral view.

Hemelytra (figs. 119, 120) attaining apical margin of urotergite VII, in both sexes. Color of hemelytra light yellowish brown, with dark brown or black pattern elements; small golden-colored setae scattered over corium, most numerous on veins. Corium with small elongate dark markings in lumen of cells; apical half of clavus also dark. Membrane with dark markings in cells and spaces between veins which are light colored; membranal cells with dark areas occupying almost entire lumen of cells, dark spot of inner membranal cell interrupted near base.

Overall color of legs black; apex of femora and base of tibiae conspicuously annulate with yellow (figs. 119, 120). Fore and mid femora with three or four stout spinelike denticles, two or three of which arranged continuously on one side, and one median less strongly developed one closer to apex. Hind femora with one smaller denticle. Spongy fossulae not developed in either sex.

Abdomen convex below, delicately striate transversally. Urosternites II-IV of male carinate longitudinally along middle; venter slightly flattened in female. Venter dark brown, with lateral portions of urosternites (fig. 121B) light colored, light areas forming undulate band. Setae of venter golden colored, longer and more dense than on rest of body. Connexivum (fig. 119, 120) light yellowish brown, disc of each segment dorsally with dark anvil-shaped spot at center, reduced in size on first and last visible segments. In some specimens median constriction of black markings complete so as to form two separate dark spots. Connexival segments with ventral spots (fig. 121) simple, subrectangular.

TYPE: Of *variegatus*, Zoologisches Museum, Berlin.

DISTRIBUTION: Venezuela.

BIOLOGY: *Triatoma nigromaculata* has been found naturally infected with *Trypanosoma cruzi*. It is a sylvatic species that has been

found in hollow trees and attracted to light, but it has also been observed occasionally in chicken houses and human habitations.

Triatoma nitida Usinger
Figures 122-124

Triatoma nitida Usinger, 1939, p. 43; 1944, p. 71.

Length of male 19.5-21.5 mm., of female 21.0-22.5 mm.; width of pronotum of male 4.5-5.0 mm., of female 5.0-5.5 mm.; of abdomen of male 6.5-7.0, of female 7.2-8.0 mm.

General color dark brown to black, with orange-yellow markings on head, neck, pronotum, acetabula, corium, and connexivum. Setae short, inapparent.

Head (figs. 122, 124A, C) of general body color but dorsally with orange-yellow markings of varied extension, from covering almost entire surface to only covering clypeus. Head heavily rugose, very slightly granulose, distinctly convex above, not over twice as long as wide across eyes (1:0.5), and distinctly shorter than pronotum (1:1.2-1.3). Anteocular region two and one-half times as long as postocular (1:0.4); postocular with sides only very slightly rounded, widest anteriorly, converging toward behind. Clypeus narrow anteriorly, abruptly widened toward posterior half. Head with distinct arcuate impression at base of clypeus. Genae conspicuously rugose transversally, ta-

pered at apex, almost attaining level of apex of clypeus. Upper surface of head with distinct depression at level of base of clypeus, in side view. Head not salient behind eyes ventrally. Eyes in lateral aspect remote from level of dorsal but extending very close to level of ventral surface of head. Ratio width of eye to synthlipsis 1:2.3-2.7. Antenniferous tubercles closer to eyes than to apex of head. First antennal segment falling distinctly short of level of apex of clypeus. Second segment with decumbent short setae. Ratio of antennal segments 1:2.6-2.8:2.3:1.8-1.9. Rostrum (fig. 124C) with hairs becoming progressively longer toward apex of second and on third segment, forming dense brushlike structure at junction of second and third segments. First segment falling slightly short of level of apex of antenniferous tubercle, second attaining level of posterior border of head. Ratio of rostral segments 1:1.8:0.6. Neck dark at center, light colored laterally.

Pronotum (fig. 122B) subquadrate, with sides carinate, not distinctly constricted laterally at level of transverse sulcus. General color of thorax dark brown to black. Pronotum with collar and anterolateral angles, entire lateral border including humeral angles, and elevated looplike elements of anterior lobe, orange-yellow or light yellowish brown. Pronotum polished, anterior lobe not distinctly granulose; posterior lobe rugose, with sublateral carinae not very prominent. Humeri rounded. Anterolateral angles in shape of dorsoventrally flattened flap, broadly rounded and very short. Acetabula partially or entirely orange-yellow, contrasting with dark pleural areas.

Scutellum (fig. 122B) of general body color but posterior process orange-yellow. Central depressed area of scutellum heavily rugose, limited by broad carinae; posterior process pointed, not more than half as long as main body of scutellum, declinate at apex.

Hemelytra (fig. 122) almost reaching apex of abdomen. Corium without perceptible setae, from pale to orange-yellow, with large central dark spot which is longer than wide; dark pigment also at base of clavus and on apex of corium. Membrane dark fumose.

Legs stout, fore femora 4.5 times as long as

wide. Fore and mid femora with 2+2 denticles subapically. Spongy fossulae present on fore and mid tibiae of males and only on fore tibiae of females. Legs dark brown, in some specimens coxae, trochantera, and base of femora somewhat lighter colored but not strongly contrasting with color or rest of leg.

Venter sharply flattened longitudinally along middle, with irregular transverse minute wrinkles. Hairs of venter inapparent. Spiracles close to connexival suture, distant from latter by not more than their own diameter. Urosternites and urotergites of general body color. Connexivum (figs. 122A) orange-yellow, each segment at middle with large medially constricted dark spot extending across entire width of connexival segment.

TYPE: The American Museum of Natural History.

DISTRIBUTION: Costa Rica; Guatemala; Honduras; Mexico (Yucatan).

BIOLOGY: *Triatoma nitida* has been found naturally infected by *Trypanosoma cruzi*.

DISCUSSION: Usinger (1944) gave the larger body size, the complex cephalic and thoracic color pattern, and the comparatively shorter fourth antennal segment as main characters to distinguish *T. nitida* from the closely related earlier described *T. neotomae*. It is true that total sizes (as measured independently for males and females) do not overlap, and that the Central American *nitida* possesses invariably a more complex color pattern on head and thorax than the southwestern North American *neotomae*. The difference in the relative length of the fourth antennal segment does not hold, however. The ratio third to fourth antennal segment in specimens of *neotomae* (1:1 according to Usinger) varies from 1:0.85 to 1:0.95, and is uniformly close to 1:0.8 in the specimens of *nitida* examined. Another difference, not mentioned before, can be observed in the shape of

versitaria, May 2, 1963, G. Muñoz, one male, Instituto Oswaldo Cruz, Rio de Janeiro) of a specimen (figs. 123, 124B) corresponding in size (21 mm.) to *nitida* but in most chromatic characters similar to *neotomae*, and with the postocular region of the head even more strongly rounded than in *neotomae*! Additional material is clearly needed before a final decision on the taxonomic status of the populations involved can be made.

Triatoma obscura (Maldonado and Farr), new combination
Figures 125, 126

Nesotriatoma obscura Maldonado and Farr, 1962, p. 190, figs. 10-18.

Length of female examined, 25 mm., width of pronotum 5.5 mm., of abdomen 8.5 mm.

Overall color from dark brown to black, with small yellowish brown spots on neck, anterolateral projections, discal and lateral tubercles of fore lobe of pronotum, apex of scutellum and on connexivum. Setae short but distinct, more slender than those of *flavida*.

the hind lobe of the head, clearly rounded laterally in *neotomae* (fig. 118A), and only very faintly rounded and with its sides distinctly converging toward behind, in *nitida* (fig. 122B). It is imaginable that the differences shown correspond only to two points on a cline and that there exist intermediate forms between these geographically so widely separated populations. The situation is complicated by the finding in Costa Rica (San José, Ciudad Uni-

of first and second antennal segments 1:2.7. Rostrum (fig. 126) slender, with inconspicuous short setae, but scattered long setae on apical segment. First rostral segment attaining level of apex of antenniferous tubercle; second segment reaching to neck; third segment shorter than first. Ratio of rostral segments 1:2.3:0.6. Neck dark brown, with 1+1 yellowish lateral spots.

Pronotum (fig. 125) of general color. Anterior lobe granulose, with 1+1 lateral small yellowish tubercles. Posterior lobe coarsely rugose, wrinkled, not granulose. Submedian carinae poorly developed, evanescent on posterior half of posterior lobe. Humeral angles yellowish, angular, narrowly explanate, the explanate portion reflected in specimen examined. Lateral carinae of pronotum partly yellow. Anterolateral angles yellowish, subtriangular, compressed dorsoventrally.

Scutellum (figs. 125, 126D) dark, apex of posterior process yellow. Main body of scutellum heavily and irregularly rugose, central depression barely developed. Scutellum anteriorly with 1+1 conspicuous submedian forwardly inclined pointed projections. Posterior process of scutellum subcylindrical, horizontal, swollen apically, rounded at tip.

Hemelytra (fig. 125) attaining or closely approaching apex of seventh urotergite, their overall color blackish, with almost imperceptible light-colored areas.

Legs (fig. 125) with femora dark brown,

Head (figs. 125, 126A, C) conspicuously granulose dorsally, of general body color, twice as long as wide across eyes (1:0.5) and as long as pronotum (1:1). Anteocular region two and one-half times as long as postocular (1:0.4); postocular with sides subparallel, slightly converging toward behind. Clypeus only faintly widened behind middle. Genae slightly surpassing level of apex of clypeus, their apex narrowly tapered, almost pointed. Eyes in lateral view surpassing level of under but not attaining level of upper surface of head. Ratio width of eye to synthlipsis 1:1.6. Antenniferous tubercles situated slightly behind middle of anteocular region. First antennal segment blackish, second dark reddish brown. First segment attaining level of apex of clypeus, second segment with adpressed setae shorter than its diameter. Ratio

tibiae slightly lighter reddish brown. Legs slender, fore femora about eight times as long as wide. Femora without denticles, only somewhat prominent at usual area of insertion of denticles. Spongy fossulae absent.

Venter flattened longitudinally along middle; delicately striate transversally. Spiracles distant from connexival suture by their own diameter. Pilosity of venter short but distinct. Venter dark reddish brown, spiracles enclosed in small yellowish area. Connexivum (figs. 125, 126B) dark brown, segments with posterior fourth occupied by narrow transverse yellowish band, wider at external than at internal border of segment.

Female genitalia strongly projecting backwards.

TYPE: Institute of Jamaica.

DISTRIBUTION: Jamaica.

BIOLOGY: We have no relevant information on the habits of *Triatoma obscura*; one specimen was collected biting a woman.

OBSERVATION: The above redescription, although aided by data from the original description, is mainly based upon personal observation of the female allotype kindly made available for study by Dr. Maldonado.

Triatoma oliveirai (Neiva, Pinto and Lent)

Figures 127-129

Eutriatoma oliveirai Neiva, Pinto and Lent, 1939, p. 608, figs. 1, 2.

Triatoma (Eutriatoma) oliveirai: Lima, 1940, p. 200.

Female (male unknown). Length 25-27 mm.; width of pronotum 5 mm., of abdomen 10 mm.

Overall color black, with orange or yellow markings on neck, in some cases on pronotum, and on connexivum; hemelytra largely yellow. Pilosity short and sparse; integument polished.

Head (figs. 127, 128, 129A, B) black, rugose, weakly granulose, approximately twice as long as wide (1:0.45) and much longer than pronotum (1:0.75-0.80). Anteocular region approximately three times as long as postocular (1:0.3); postocular with sides straight, slightly converging toward behind. Clypeus elongate, slightly widened on posterior half. Genae narrowly rounded apically, extending considerably

beyond level of apex of clypeus. Jugae narrowly rounded apically. Eyes small, in lateral view close to but not attaining level of under surface and distant from level of upper surface of head. Ratio width of eyes to synthlipsis 1:2. Ocelli small, their distance from eyes equal to twice their length. Antenniferous tubercles situated at middle of anteocular region of head. First antennal segment approaching level of apex of clypeus; second segment with adpressed setae shorter than diameter of segment. Ratio of antennal segments

1:4.0-4.2:2.7-3.0:2.2. Rostrum (fig. 129B) dark reddish brown; first segment attaining level of apex of antenniferous tubercles, second extending to slightly beyond level of hind margin of eyes. Rostrum stout; first and second segments with short hairs, apex of second dorsally and entire third segment with hairs as long as or longer than diameter of segment, most numerous at upper surface near base of third segment. Ratio of rostral segments 1:1.95-2.1:1.0-1.2. Neck black, with 1+1 lateral spots yellow.

Pronotum (figs. 127-129) black, with 1+1 large humeral spots yellowish. Anterior lobe feebly sculptured, with 1+1 low discal and 1+1 more conspicuous lateral tubercles; these tubercles black or orange yellow. Posterior lobe heavily rugose. Submedian carinae extending to middle of posterior lobe. Humeral angles broadly rounded. Anterolateral projections short, subconical, rounded apically.

Scutellum (figs. 128, 129C) black, heavily rugose, with deep but narrow median depression; lateral portions of scutellum strongly elevated. Posterior process of scutellum unusually short, only about half as long as main body of scutellum, oblique, subconical, its apex rounded.

Hemelytra (figs. 127, 128) much shorter than abdomen, attaining or slightly surpassing limit between sixth and seventh urotergites. Overall color of hemelytra pale yellow, on corium as well as on membrane, without dark marks, only veins conspicuously darkened. Clavus of general color, except black at base and along outer margin.

Legs (fig. 128) uniformly black, slender. Fore femora seven times as long as wide. Femora of all pairs of legs with pair of small denticles subapically. Spongy fossulae absent (male not known).

Abdomen very wide, lateral portions of urotergites widely exposed. Venter convex, distinctly but not sharply flattened longitudinally along middle, delicately striate transversally, with sparse, short setae. Spiracles adjoining connexival suture. Apex of abdomen as shown in figure 129D; sides of eighth urotergite straight or slightly emarginated. Urosternites black; connexivum (figs. 127, 128) black, disc

of each segment with large yellow mark extending from outer margin to connexival suture and ventrally enclosing spiracles; intersegmental sutures enclosed in narrow transverse black band.

TYPE: Instituto Oswaldo Cruz, Rio de Janeiro.

DISTRIBUTION: Brazil (Rio Grande do Sul).

BIOLOGY: The species was found in burrows of the préa (*Cavia aperea*); it was collected only twice.

Triatoma pallidipennis (Stål)
Figures 130, 131

Meccus pallidipennis Stål, 1872, p. 110. Champion, 1899, p. 210, pl. 12, figs, 24, 24a.

Triatoma pallidipennis: Pinto, 1927, p. 108, figs. 8, 11.

Triatoma phyllosoma pallidipennis: Usinger, 1944, p. 59, pl. 10, fig. E. Usinger, Wygodzinsky and Ryckman, 1966, p. 310, fig. 1E.

Triatoma phyllosoma usingeri Mazzotti, 1943a, p. 81, fig. 2. Usinger, 1944, p. 60, pl. 10, fig. D, (new synonymy).

Length of male 31-34 mm., of female 32-35 mm. Width of pronotum of male 6-7 mm., of female 6.0-7.5 mm.; width of abdomen of male 12-13 mm., of female 13-16 mm.

Body very wide (fig. 130), with relatively narrow wings. Overall color from very dark

Genae very narrowly tapering apically, pointed in some specimens. Jugae blunt apically. Eyes in lateral view approaching or attaining level of under surface and distant from level of upper surface of head. Ratio width of eye to synthlipsis 1:2.0-2.4. Antenniferous tubercles short, situated slightly before middle of antecular portion of head. First antennal segment extending distinctly beyond level of apex of clypeus; second segment with stiff decumbent hairs about as long as diameter of segment. Ratio of antennal segments 1:2.5-2.7:1.9-2.0:1.4-1.7. Rostrum (fig. 131B) dark reddish brown to in most cases black. First rostral segment attaining level of apex of antenniferous tubercle; second extending to level of hind border of head. Rosstral segments subcylindrical, with short sparse setae, only third segment with not very dense setae as long as or longer than diameter of segment. Ratio of rostral segments 1:1.40-1.75:0.40-0.65 Neck laterally with 1+1 orange-red spots.

Pronotum (fig. 130) black, strongly constricted at level of transverse sulcus, not granulose, with numerous short, strongly decumbent or adpressed setae not longer than 0.3 mm. Pronotum and scutellum otherwise as in *phyllosoma*. Meso and metasternum with long suberect hairs.

Hemelytra (fig. 130) and wings leaving entire connexivum and lateral portions of urotergites exposed. Hemelytra of males extending to middle of urotergite VII, of females not quite attaining posterior margin of urotergite VI. Corium with numerous short (0.1-0.2 mm.) decumbent or adpressed setae (fig. 131F, G), most of its surface yellowish white, faintly tinged with orange at base, dark at extreme apex. Basal half of clavus dark, apical half yellowish white. Membrane from dark brown to sooty black, yellowish white on narrow area adjacent to corium.

Legs as in *phyllosoma*; fore femora 6.3-7.5 times as long as wide.

Venter convex, delicately striate transversally, and with numerous long semierect hairs. Spiracles remote from connexival suture by a distance equal to several times their diameter. Connexivum unusually wide, black; connexival plates posteriorly with orange-red markings of

brown to black, with orange-red markings on neck and connexivum, and with corium almost entirely yellowish white. Setae of dorsal surface numerous, most short, not more than 0.3

mm. long (fig. 131F, G).

Head (figs. 130, 131A, B) black, faintly rugose above along center, not granulose, and with numerous stiff black setae. Head slightly more than twice as long as wide across eyes (1:0.40-0.45) and slightly longer than pronotum (1:0.90-0.95). Antecular region three times as long as postocular (1:0.35); postocular with sides feebly rounded, subparallel. Clypeus narrow, somewhat widened on posterior half.

BIOLOGY: *Triatoma pallidipennis* has been found naturally infected with *Trypanosoma cruzi*. The species is frequently domestic or peridomestic. In sylvatic conditions, *T. pallidipennis* has been found in the nests of the woodrat, *Neotoma alleni* Merriam and in the burrow of the armadillo *Dasyurus novemcinctus mexicanus* Peters.

OBSERVATIONS: The above description is that of specimens, the most numerous before us, which agree with the type of the species in the Naturhistoriska Riksmuseet in Stockholm; the latter has been examined by one of us (Lent). The type has short adpressed setae on the thorax as well as on the corium, and so have our specimens. This characteristic is the same as that found in the holotype and other specimens of *Triatoma phyllosoma usingeri* Mazzotti, one paratype of which we have examined, and which fully agrees with *T. pallidipennis*. We thus synonymize *T. phyllosoma usingeri* with *T. pallidipennis*.

Usinger (1944) applied the name *phyllosoma pallidipennis* to specimens similar to those described above, but having the pronotum clothed with long black hairs (instead of short adpressed setae). We have seen such specimens which are also characterized, just as Usinger described, by the connexival segments which are only very narrowly orange posterolaterally (fig. 131H). Other specimens we have seen now have the setae on the corium somewhat more delicate (fig. 131J) than in those described above although still short (0.3 mm.), and similar setae on the pronotum; these specimens have large orange spots on their connexival segments (fig. 131E, I). Whatever the taxonomic fate of these and other *pallidipennis*-like forms in the future, the concept of true *pallidipennis* is fixed by the type and as described above.

varied size (figs. 130, 131C-E, H, I), in most cases subtriangular and longest along outer connexival margin.

TYPES: Of *pallidipennis*: Naturhistoriska Riksmuseet, Stockholm; of *usingeri*, Instituto de Salubridad y Enfermedades Tropicales, Mexico.

DISTRIBUTION: Mexico (Colima, Guerrero, Jalisco, Michoacán, México, Morelos, Nayarit, Puebla, ?Veracruz).

Triatoma patagonica Del Ponte
Figures 132, 133

Triatoma patagonica Del Ponte, 1929, p. 6, fig. 5; 1930, p. 889, pl. 51, figs. 1-3. Wygodzinsky and Abalos, 1950, p. 60, figs. 2, 6E, I, M; 7A-E; 8C; 11. Abalos and Wygodzinsky, 1951, p. 95, figs. 41, 63, 175, 190-193. Carcavallo and Martínez, 1968, p. 54, pl. 2, fig. 5. Martínez and Cichero, 1972, p. 40, fig. 23

Eutriatoma (Triatoma) patagonica: Mazza, 1937, p 5, figs. 1-20.

Length of male 17.0-18.5 mm., of female 18-21 mm.; width of pronotum of male 3.5-4.0, of female 4.0-4.5 mm.; width of abdomen of male 5-6, of female 6.5-8.0 mm.

Overall color blackish brown or black, with yellow or rarely reddish markings on neck, hemelytra, and connexivum. Integument sparsely setose, appearing glabrous.

Head (figs. 132, 133A, B) black, delicate rugose dorsally, sparsely granulose, twice as

long as wide across eyes (1:0.5) and distinctly longer than pronotum (1:0.8-0.9). Anteocular region two and one-half times as long as postocular (1:0.4), postocular with sides faintly convex, converging posteriorly. Clypeus narrow, distinctly widened behind middle. Genae narrowly tapering apically, distinctly surpassing level of apex of clypeus. Jugae angular apically. Eyes in lateral view attaining or slightly surpassing level of under surface but distant from level of upper surface of head. Ratio width of eye to synthlipsis 1:1.45-1.75. Antenniferous tubercles situated slightly behind middle of anteocular region. First antennal segment extending close to level of apex of clypeus. Second antennal segment flattened, beset with numerous setae shorter than diameter of segment. Ratio of antennal segments 1:3.3-4.0:2.3-3.0:1.8-2.1. Rostrum (fig. 133B) as dark as head capsule or more or less reddish. Setae of rostrum very short, except at apex of second and on third segment where setae are more numerous and about as long as diameter of segment, decreasing in length toward apex of third segment. First rostral segment attaining level of apex of jugae, second extending to level of posterior margin of eyes. Ratio of rostral segments 1:1.8-2.1:1.0-1.2. Neck dark, with a pair of light-colored spots laterally.

Pronotum (fig. 132) polished, black, in some specimens outer margin of anterolateral processes narrowly yellow. Anterior lobe with central portion conspicuously elevated, with 1+1

obsolescent discal tubercles. Lateral tubercles obsolescent. Posterior lobe distinctly rugose. Submedian carinae extending to middle or posterior third of hind lobe. Humeri slightly elevated, humeral angles rounded. Anterolateral projections small, their apex rounded or blunt.

Scutellum (fig. 132) entirely dark, slightly convex, heavily rugose, its central depression well developed. Posterior process of scutellum about three-fifths as long as main body of sclerite, horizontal, subcylindrical or slightly compressed laterally, rounded at apex.

Hemelytra (fig. 132) approaching or attaining apex of seventh urotergite, in both sexes. Corium brownish black, with large yellow subtriangular mark basally, not extending onto clavus. In some specimens, a yellow spot also on apex of corium, connected or not to basal spot by narrow light-colored stripe along costal margin of hemelytron. Membrane almost as dark as or slightly lighter than dark portion of corium, with veins slightly darker than membrane.

Legs dark, femora with very narrow complete or incomplete apical annulus yellow (fig. 133E). Legs slender, fore femora from six to six and one-half times as long as wide. Fore and mid femora with a pair of small denticles subapically, hind femora slightly prominent subapically below. Spongy fossulae on fore and mid tibiae of males, absent in females.

Venter convex, feebly flattened at center in female, shallowly striate transversally, sparsely setose. Spiracles adjacent or close to connexival suture, distant from latter by not more than their own diameter. Venter black. Connexivum (figs. 132, 133C, D) yellow, rarely reddish, light-colored area briefly extending to urotergites and urosternites, in latter including spiracles. Black transverse mark straddling intersegmental sutures, this dark area wide or more or less narrowed or constricted medially, in rare cases divided into two spots.

TYPE: Museo Argentino de Historia Natural.

DISTRIBUTION: Argentina (Buenos Aires, Catamarca, Chubut, Córdoba, Corrientes, Entre Ríos, La Pampa, La Rioja, Mendoza, Neuquén, Río Negro, Salta, San Juan, San Luis, Santa Fe).

BIOLOGY: *Triatoma patagonica* has been

found naturally infected by *Trypanosoma cruzi*. This triatomine, easily attracted by artificial light, occurs in human habitations but has not yet been reported to colonize there. It has also been found in peridomestic situations, such as in chicken houses and rabbit coops. In the wild, the species has been found under tree bark, among and under rocks on the ground, and in burrows of *Microcavia australis* and *Graomys* sp. This is an aggressive species, not only inside human habitations, but it also has been reported to attack humans sleeping on the ground in the desert.

The eggs of *T. patagonica* do not adhere to the substrate.

OBSERVATIONS: *Triatoma patagonica* is highly variable regarding the distribution of the pattern elements on the corium and connexivum; the dark pattern elements seem to be more extensive and intensive in the eastern, more humid portion of its range, and become more reduced in the semiarid western portion of Argentina. Light-colored specimens with reduced connexival spots (fig. 133D) superficially resemble *T. guasayana* and *T. sordida* but can easily be distinguished from the latter by their dark legs.

Triatoma peninsularis Usinger
Figures 28B; 134-136

Triatoma peninsularis Usinger, 1940, p. 73, Ryckman, 1962, p. 116, pl. 2, fig. N.
Triatoma protracta peninsularis: Usinger, 1944, p. 74.

Length of male 10.5-11.0 mm., of female 11-12 mm.; width of pronotum of male and female 2.5-3.0 mm., width of abdomen of male and female 3.5-4.0 mm.

Overall color dark brown or black, only neck and membrane lighter colored. Body and appendages with short, inconspicuous setae.

Head (figs. 134, 135, 136A, B) granulose, convex above, as long as pronotum and twice as long as wide across eyes (1:0.45-0.50). Antecular region twice as long as postocular (1:0.45-0.50), postocular with sides prominently rounded. Clypeus narrow anteriorly, strongly widened posteriorly; arcuate impression at base of clypeus absent. Genae narrowly

and level of apex of clypeus. Second antennal segment only with short adpressed setae. Ratio of antennal segments 1:2.3-2.5:2.3-2.5:2.0-2.3. Rostrum (fig. 136B) with long hairs, not forming dense brushlike structure at junction of second and third segments. First rostral segment attaining level of apex of antenniferous tubercle, second attaining level of hind border of head. Ratio of rostral segments 1:1.2-1.3:0.6. Neck dark, lighter laterally and below.

Pronotum (figs. 134, 135) of general body color, smooth, trapezoidal, carinate laterally, only very slightly constricted at level of transverse sulcus. Anterior lobe only faintly convex, without discal and lateral tubercles, slightly granulose. Posterior lobe rugose, submedian

rounded apically, not attaining level of apex of clypeus. Upper surface of head evenly convex above, in lateral view without perceptible depression at level of base of clypeus; head ven-trally not salient behind eyes. Eyes very small, in lateral view not attaining level of upper and lower surface of head. Ratio width of eye to synthlipsis 1:1.35-1.50. Antenniferous tubercles situated at level of center of anteocular region. First antennal segment very short, barely exceeding middle of distance between its base

carinae not attaining hind border. Humeri rounded, slightly elevated. Anterolateral angles very little pronounced, rounded.

Scutellum (figs. 134, 135) with central portion depressed, limited by distinct carinae. Apical process rugose, short, about half as long as main body of scutellum, subconical, its apex deflected.

Hemelytra (figs. 134, 135) almost attaining apex of abdomen, in both sexes. Corium of general body color, slightly lighter on area adjacent to clavus, and on apical half of the latter; membrane smoky brown.

Legs (fig. 134) unicolorous, short and stout; fore femur 3.4-3.8 times as long as wide. Fore and mid femora with two pairs of denticles subapically. Tibiae without spongy fossulae, in either sex.

Venter convex or very slightly flattened. Surface microsculpture of venter consisting of irregular, shallow, transversal wrinkles. Spiracles distant from connexival suture by several times their diameter (fig. 136C). Connexivum twice as wide dorsally as ventrally. Entire abdomen of general color, intersegmental connexival sutures almost imperceptibly lighter.

TYPE: California Academy of Sciences.

DISTRIBUTION: Mexico (southern portion of Baja California Sur).

BIOLOGY: The species has been found naturally infected with *Trypanosoma cruzi*. *T. peninsularis* has been collected at light, and obtained from nests of *Neotoma lepida molagrandis* Huey and *N. lepida arenacea* J. A. Allen.

OBSERVATIONS: *Triatoma peninsularis* as well as the very closely related *sinaloensis* differ from *T. protracta* mainly by the absence of

a transverse arcuate furrow behind the base of the clypeus and the uniform outline of the dorsal surface of the head when observed laterally; *peninsularis* is also smaller than any form of *protracta*. Ryckman (1962) crossed *T. peninsularis* with all forms of *T. protracta* and obtained only sterile eggs, embryos or weak F₁ nymphs that died in the first or second instar; the results of these experiments confirm the specific status of *peninsularis*.

Triatoma petrochii Pinto and Barreto
Figures 137-139

Triatoma petrochii Pinto and Barreto, 1925, p. 769.

Sherlock and Guittot, 1967, p. 625, figs. 1-8.
Lucena, 1970, p. 75. Espínola, 1971, p. 278,
figs. 5-7.

Eutriatoma petrochii: Pinto, 1931, p. 95. figs. 40-42.

Length of male 17.0-21.5 mm., of female 18-23 mm.; width of pronotum of male and female 3.5-5.0 mm.; width of abdomen of male 6-8 mm., of female 6-9 mm.

Overall color dark brown, with yellowish markings on pronotum, scutellum, hemelytra, and connexivum. Integument appearing glabrous, only with very sparse, short, inapparent setae.

Head (figs. 137-139) uniformly dark, slightly rugose and granulose, somewhat over twice as long as wide across eyes (1:0.40-0.45) and unusually elongate as compared to pronotum (1:0.70-0.75). Anteocular region four times as long as postocular (1:0.25), postocular with sides from very faintly rounded to almost straight, distinctly converging toward behind. Clypeus widened slightly behind middle. Genae narrowly tapering or pointed apically, distinctly surpassing level of apex of clypeus. Jugae angular apically. Eyes small, in lateral view approaching but not attaining level of lower and remote from level of upper surface of head. Ratio width of eye to synthlipsis 1:1.8-2.0(♂), 1:2.5 (♀). Antenniferous tubercles situated at or slightly before middle of anteocular region. First antennal segment appearing unusually short, extending only slightly beyond half the distance from its base to apex of head, viz., falling considerably short of level of apex of clypeus. Second segment subcylindrical, with adpressed setae shorter than its diameter. Ratio

with discal tubercles reduced to suboval transverse callosities; lateral tubercles absent. Posterior lobe shallowly rugose. Submedian carinae extending close to hind margin of sclerite. Humeri narrowly rounded, almost angular.

Scutellum (fig. 138) rugose, dark brown, with shallow central depression. Posterior process almost entirely yellow, about two-thirds as long as main body of scutellum, subcylindrical, horizontal, rounded apically.

Hemelytra (figs. 137, 138) attaining or closely approaching apex of seventh urotergite. Corium dark brown, with irregularly shaped large light yellow markings basally and subapically; entire costal margin narrowly yellow. Membrane yellowish white, lighter than yellow areas of corium. Veins of membrane narrowly dark brown; cells of membrane with conspicuous dark spot of variable extension, centered on vein separating cells.

Legs (figs. 137, 138) uniformly dark, femora in some specimens slightly lighter at middle. Legs slender; fore femora 6-7 times as long as wide. Femora either only slightly salient below subapically, or with one or two inconspicuous denticles. Spongy fossulae absent in both sexes.

Abdomen slightly flattened below in male and more distinctly so in female. Venter delicately striate transversally, sparsely setose. Spiracles adjoining connexival suture. Venter dark brown, but spiracles enclosed in small yellow area confluent with corresponding yellow spots of connexivum. Connexivum (fig. 137, 138) dark brown, segments on disc with large yellowish spot occupying two-thirds of surface of each segment, approaching but not adjoining posterior and remote from anterior intersegmental suture. Both dark and light areas occupying entire width of connexival segments, light areas shortly extending on respective urosternite.

TYPE: Instituto Oswaldo Cruz, Rio de Janeiro.

DISTRIBUTION: Brazil (Bahia, Pernambuco, Rio Grande do Norte).

BIOLOGY: This species occurs in xeric habitats; it has been found in burrows of "mocós," *Kerodon rupestris*.

DISCUSSION: *Triatoma petrochii* is superficially similar to *T. brasiliensis* to which it is possibly closely related. In addition to its very

of antennal segments 1:3.3-4.2:2.3-2.8:2.1-2.5. Rostrum (fig. 139B) slender, practically glabrous, except for group of long hairs at apex of third segment. First segment not quite attaining level of apex of antenniferous tubercles, second approaching level of hind margin of eyes. Second segment slightly and third segment strongly flattened dorsoventrally, appearing very thin in lateral view. Ratio of rostral segments 1:2.2-2.8:1.1-1.2. Neck dark, with a pair of light colored spots laterally.

Pronotum (figs. 137, 138) very sparsely granulose, dark brown, yellow on collar, on discal callosities and in some cases on lateral margins of anterior lobe, on entire submedian carinae and on humeral area. Anterior lobe

long head, *T. petrochii* differs from *brasiliensis* by such characters as the relatively very short first antennal segment, the practically glabrous rostrum, and the absence of spongy fossulae in males as well as in females. The two species, which have been found sympatrically, are mutually sterile.

Triatoma phyllosoma (Burmeister)
Figures 140-142

Conorhinus phyllosoma Burmeister, 1835, p. 246
Meccus phyllosoma: Stål, 1859, p. 105
Meccus phyllosomus: Stål, 1872, p. 110. Banks, 1910, p. 18. Van Duzee, 1917, p. 247
Triatoma phyllosoma: Del Ponte, 1930, p. 890

Length of male 26.5-38.0 mm., of female 29.0-39.5 mm.; width of pronotum of male and female 5.5-7.3 mm.; width of abdomen of male 12.0-14.5 mm., of female 11.5-18.5 mm.

Body unusually wide, with short and narrow wings. Overall color from dark brown to black, with red or orange-red markings on corium and connexivum. Setae numerous, most delicately hairlike (fig. 142I), up to 0.5 mm. in length.

Head (figs. 140, 141, 142A, B) black, faintly transversally rugose along center above, not granulose, with numerous stiff black setae. Head about twice as long as wide (1:0.4-0.55) and slightly longer than pronotum (1:0.90-0.95). Antecular region from two and one-half to three times as long as postocular (1:0.3-0.4); postocular with sides subparallel, very slightly rounded. Clypeus narrow, widened on posterior half. Genae narrowly rounded distally, attaining or very rarely surpassing level of apex of clypeus. Jugae blunt apically. Eyes in most cases not attaining, very rarely slightly surpassing level of under surface and invariably distant from level of upper surface of head. Ratio width of eyes to synthlipsis 1:1.8-2.1 in male, 1:1.9-2.4 in female, viz., eyes of female generally smaller than those of male. Antenniferous tubercles short, situated slightly behind middle of antecular portion of head. First antennal segment extending slightly but distinctly beyond level of apex of clypeus; second antennal segment with stiff decumbent setae about as long as diameter of segment. Ratio of antennal segments 1:2.5-2.9:1.8-2.2:1.5-2.0. Rostrum (fig. 142B) with first segment dark brown or black, second and third segments dark or light reddish brown. First rostral segment attaining level of middle of antenniferous tubercle, second extending to level of neck. Rostral segments stout, subcylindrical, with short, sparse setae, only third segment with not very dense hairs as long as or longer than diameter of segment. Ratio of rostral segments 1:1.5-1.8:0.5-0.6. Neck laterally with 1+1 reddish spots.

Pronotum (figs. 140, 141, 142A) black, strongly constricted at level of transverse sulcus, not granulose, with numerous long erect hairs pointing in several directions. Anterior

Mazzotti, 1937, p. 161, figs. 1, 2. Usinger, 1944, p. 58, pl. 10, fig. B. Usinger, Wygodzinsky and Ryckman, 1966, p. 310, fig. 1B.

lobe with elevated areas pilose, remaining surface smooth, dull. Discal tubercles large, pilose. Lateral tubercles well developed although somewhat smaller than discal ones. Posterior lobe distinctly rugose, transversely between carinae, more irregularly so on lateral portions. Submedian carinae not extending beyond basal two-thirds of length of posterior lobe. Humeri distinctly elevated; humeral angles rounded, narrowly explanate. Anterolateral projections large, elongate conical.

Scutellum (fig. 141) with median depression distinct but shallow and narrow; posterior process two-thirds as long as main body of scutellum, subcylindrical, horizontal or slightly elevated obliquely, rounded distally and with extreme apex declinate in some cases. Mesosternum and metasternum with long erect hairs.

Hemelytra (fig. 140, 141) and wings short and narrow, leaving entire connexivum and lateral portions of urotergites exposed. Hemelytra extending in most males and some females only to apex of urotergite V and in most males and some females to urotergite VI but not beyond. Corium with numerous long (0.3-0.4 mm.) decumbent hairs (fig. 142I), its surface dull black, with one basal triangular and one subapical subquadrate spot red or orange-red. Clavus black. Membrane sooty or velvety black.

Legs (figs. 140, 141) black, elongate; fore femora 6.0-7.5 times as long as wide. Fore and mid femora with two subapical denticles, in some individuals barely perceptible. Spongy fossulae absent in both sexes.

Venter convex, delicately striate transversally, more irregularly so on lateral portions, and with numerous semierect hairs. Setae of visible portion of dorsal surface of abdomen short. Spiracles remote from connexival suture by a distance equal to several times their diameter (fig. 140H). Connexivum unusually wide (fig. 140, 141), black, connexival plates posteriorly with red or orange-red markings extending over entire width of segment, their shape (fig. 142C-F) varying from transverse band-shaped to subtriangular, with apex of triangle directed cephalad.

Male genitalia with apex of lateral endosoma process heavily denticulate (fig. 142G).

TYPE: Unknown.

DISTRIBUTION: Mexico (Oaxaca). In addition

to Oaxaca, the literature contains references to *phylllosoma* from Chiapas, Durango, Guerrero, Jalisco, Michoacan, Nayarit, Sinaloa, and Zacatecas. Many of these references (e.g., Mazzotti, 1962) obviously refer to the *phylllosoma* complex, and are not pertinent to the establishment of the area of *phylllosoma sensu stricto*.

Usinger (1944) and Usinger, Wygodzinsky and Ryckman (1966) imply that the species (as "typical" *phylllosoma*) is restricted to Oaxaca, from where it was also described. Usinger (1944) considered it as rare, and in our own research we have not seen specimens from any state but Oaxaca.

BIOLOGY: This species has been found naturally infected with *Trypanosoma cruzi*. It has been captured in human habitations and peridomestically (in chicken and pigeon coops, in pig sties and sheep stables).

OBSERVATIONS: *Triatoma phyllosoma* is one of the members of a group of several closely related species of *Triatoma*, all of which occur in Western Mexico. The first representatives of the group were placed by Stål in a separate genus, *Meccus* Stål. The following specific or subspecific names have been applied to the *phyllosoma* group, listed here in chronological order:

- phyllosoma* Burmeister, 1835
- pallidipennis* Stål, 1872
- picturata* Usinger, 1939
- longipennis* Usinger, 1939
- mazzottii* Usinger, 1941
- usingeri* Mazzotti, 1943
- intermedia* Usinger, 1944

Until 1941, the then-named forms were dealt with as separate species. Mazzotti and Osorio (1941), Mazzotti (1943a) and mainly Usinger (1944) reduced these names to subspecific rank with *phyllosoma* being the nominal subspecies; Usinger, Wygodzinsky and Ryckman (1966) followed the same procedure. Usinger (1944) stated that he was basing his concept of the *phyllosoma* group as an assemblage of subspecies within a single species complex on lab-

oratory work by Mazzotti and Osorio (1942) who "crossed several of the forms in this group and concluded that they thus represent subspecies within a single species concept." Usinger (*loc. cit.*) said further that Mazzotti's "experimental work is the foundation upon which the entire treatment of the group is based." Usinger, Wygodzinsky and Ryckman (1966) considered the complex as being "a polytypic species of the type with abrupt steps rather than gradual morphological differences," a statement that does not reinforce the hypothesis of subspecific status for the components of the complex. Infertility between populations under laboratory conditions [another argument adduced by Mazzotti and Osorio (1942) and Usinger, Wygodzinsky and Ryckman (1966) for the subspecific status of the components of the group] is not a valid indicator of taxonomic rank, although intersterility would strongly suggest specific rank of the putative parents. Furthermore, a careful analysis of Mazzotti and Osorio's (1942) paper shows incongruencies which, at least in our eyes, greatly diminish the value of their studies. The design of the experiments as well as the interpretations of the re-

sults are vastly inferior to such exhaustive procedures and careful analysis as those employed in an exemplary way by Ryckman (1962) for the *Triatoma protracta* group. A similarly careful analysis of the *phyllosoma* group, combined with intensive collecting over the entire range of the complex, are required before a definitive taxonomic treatment of these insects can be attempted with a reasonable chance of success.

We do not doubt that the members of the *phyllosoma* complex share a recent common ancestor not shared by any other species, and thus constitute a monophyletic group. However, until acceptable distributional and genetical evidence to the contrary becomes available we will treat the taxonomically distinct components of the group as species.

The *phyllosoma* group contains seven named forms as listed above; we now synonymize *intermedia* and *usingeri* with *longipennis*, because their differences from *longipennis* are minor as compared with those normally accepted for indicating specific rank in the *Triatominae*.

As Usinger (1944) stated, *phyllosoma* and *mazzottii* are closely related, as are *picturata* and *longipennis*, with *pallidipennis* being intermediate in setal characters.

Triatoma phyllosoma differs from the other species of its group by the combination of long hairs on the entire body, the brachypterous condition in both sexes, and the overall black color with relatively small red spots on corium and connexivum. The characteristic lateral endosoma processes of the male genitalia (fig. 142G) are very similar in all species of the *phyllosoma* group.

Triatoma picturata Usinger
Figures 143, 144

Triatoma sp. Mazzotti, 1939a, p. 197, fig. 1

Triatoma picturata Usinger, 1939, p. 47, Mazzotti, 1940a, p. 98, pl. 2, fig. 2. Islas, 1941, p. 311, pls. 1-4

Triatoma phyllosoma picturata: Usinger, 1944, p. 60, pl. 10, fig. F.

Length of male 30.5-32.0 mm., of female 32-33 mm.; width of pronotum of male 6.5-7.0 mm., of female 7.0-7.5 mm.; width of abdomen of male 12-14 mm., of female 12-15 mm.

Body unusually wide (fig. 143). Overall color dark brown to black, with orange-red markings on neck, hind lobe of pronotum, propleura, occasionally on apex of scutellum, and extensively on corium. Setae numerous, adpressed, short (0.1-0.2 mm. on corium, 0.2-0.3 mm. on pronotum.)

Head (figs. 143, 144A, B) black, faintly rugose dorsally along center, not granulose, with stiff decumbent setae. Head about twice as long as wide (1:0.45-0.5), and from slightly longer than to as long as pronotum (1:0.85-1.0). Anteocular region three times as long as postocular (1:0.30-0.35); postocular with sides very slightly convex, almost straight, subparallel. Clypeus narrow, distinctly but shortly widened subbasally. Genae very narrowly ta-

pering apically, in some cases pointed, attaining or slightly surpassing level of apex of clypeus. Jugae blunt apically. Eyes in lateral view attaining but not surpassing level of under and distant from level of upper surface of head. Ratio width of eyes to synthlipsis 1:1.5-2.15. Antenniferous tubercles short, situated slightly behind center of anteocular portion of head. First antennal segment attaining or shortly surpassing level of apex of clypeus; second segment with stiff decumbent setae about as long as diameter of segment. Ratio of antennal segments 1:2.3-2.5:2.0-2.15:1.9. Rostrum (fig. 144B) as dark as head capsule, its segments narrowly subcylindrical. First segment attaining level of apex of antenniferous tubercle, second extending to level of hind border of head. Rostral segments with very short setae, only third segment with setae as long as or longer than diameter of segment. Ratio of rostral segments 1:1.5-1.7:0.5-0.6. Neck dark, laterally with pair of orange red spots.

Pronotum (fig. 143) moderately constricted at level of transverse sulcus, not granulose, with adpressed setae not longer than 0.3 mm. Overall color of pronotum black, with orange-red areas of varied extension, from almost entirely occupying hind lobe (fig. 143) to restricted to portion laterad of submedian carinae. Discal tubercles prominent, from blunt to pointed. Lateral tubercles well developed although smaller than discal ones. Posterior lobe coarsely rugose transversally. Submedian carinae extending over anterior two third of posterior lobe. Humeri slightly elevated, rounded. Anterolateral projections large, elongate conical.

Scutellum (fig. 143) with median depression shallow but distinct, narrow; posterior process two-thirds as long as main body of scutellum, subcylindrical, horizontal or slightly elevated, rounded distally. Scutellum dark, in some specimens distal half of posterior process reddish orange. Pleura and sterna dark, but hind portion of propleura orange colored. Meso and Metasternum with long semierect hairs.

Hemelytra (fig. 143) fully developed, but leaving in most specimens entire connexivum and lateral portions of urotergites exposed, due to the unusually wide abdomen. Hemelytra of male attaining or closely approaching hind

border of urotergite VII, those of female not extending beyond basal third of urotergite VII. Corium with decumbent or adpressed very short setae (0.1-0.2 mm.), its overall color dark brown to black, with one large subtriangular basal and one irregularly shaped subapical mark orange-red. Clavus uniformly dark brown. Membrane black.

Legs as in *phylllosoma*. Fore femur 5.6-6.7 times as long as wide.

Venter convex, delicately and shallowly striate transversally, more irregularly so on lateral portions, and with numerous long semi-erect hairs. Spiracles remote from connexival suture by several times their diameter (fig. 144C). Connexivum (fig. 144C-G) yellowish or reddish orange, in most specimens examined dorsally with subrectangular black spot on anterolateral portion of each connexival segment, adjoining outer but distant from inner connexival margin (fig. 144G). In other specimens, dorsal black connexival spot connected to inner connexival margin by less intense dark area (fig. 144F), and in others black spot and adjoining dark area extending posteriorly so as to

occupy more than one-half of length of respective connexival spot invariably occupying entire width of connexival plate (fig. 144C). Postero-lateral angles of urosternites and occasionally urotergites invaded by yellowish orange area adjoining orange portions of connexival segments.

TYPE: California Academy of Sciences.

DISTRIBUTION: Mexico (Colima, Jalisco, Nayarit, Oaxaca).

BIOLOGY: *Triatoma picturata* has been found naturally infected with *Trypanosoma cruzi*.

Triatoma platensis Neiva
Figures 145, 146

Triatoma platensis Neiva, 1913b, p. 197. Del Ponte, 1930, p. 891, pl. 47, fig. 2. Pinto, 1931, p. 78, fig. 20. Neiva and Lent, 1936, p. 174. Romaña and Abalos, 1947, p. 83, figs. 1-5 (part), unnumbered plate. Wygodzinsky, 1949, p. 338. Abalos and Wygodzinsky, 1951, p. 62, figs. 37, 42, 48, 59, 82-101. Carcavallo and Martínez, 1968, p. 75, fig. 33. Martínez and Cichero, 1972, p. 42.

Triatoma rosenbuschi Mazza 1936a, p. 6, figs. 1-5; 1936c, p. 1, figs. 2-7. Mazza and Jörg, 1944d, p. 47, figs. 1-3.

Length of male 22-24 mm., of female 22.5-26.0 mm. Width of pronotum of male and female 6-7 mm., of abdomen of male 7.5-8.5 mm., of female 8-9 mm.

Robust, heavily sclerotized species. Overall color dark brown, matte, with yellowish markings on neck and connexivum. Pilosity golden colored, adpressed, elongate scalelike, very dense on most body areas.

Head (figs. 145, 146A, B) dark reddish brown, very densely pilose dorsally and laterally, setae forwardly directed; surface sparsely granulose. Head comparatively slender in lateral and dorsal view, slightly less than twice as long as wide across eyes (1:0.60-0.65), and slightly shorter than pronotum (1:1.1-1.2). Ante-ocular region three times as long as postocular (1:0.3), postocular with sides rounded. Clypeus strongly widened behind middle. Genae pointed, heavily sclerotized distally, extending considerably beyond level of apex of clypeus. Apex of jugae angular, also heavily sclerotized. Head dorsally with transverse impression at

base of clypeus and of jugae. Eyes in lateral view attaining or slightly surpassing level of under surface but distant from level of upper surface of head. Ratio width of eye to synthlipsis 1:1.5-2.0. Ocelli inserted on conspicuous protuberances. Antenniferous tubercles situated slightly behind middle of anteocular region. First antennal segment falling distinctly short of

level of apex of clypeus. Second and third antennal segments compressed; second with adpressed setae, much shorter than diameter of segment. Ratio of antennal segments 1:2.8-3.4:2.6-2.8:1.5-1.7. Rostrum (fig. 146B) as dark as head. Setae of rostrum very short on first and part of under surface of second segment; distal portion of under surface and entire upper surface of second as well as entire third segment dorsally, laterally, and ventrally with very dense setae much longer than diameter of segment, longest at base of third segment, progressively decreasing in length towards apex of rostrum. First segment attaining level of apex of jugae, viz., not quite reaching level of apex of antenniferous tubercles. Second rostral segment attaining level of hind border of eyes. Ratio of rostral segments 1:1.7-2.0:0.9-1.1. Neck dark brown, with 1+1 lateral yellow spots.

Pronotum (fig. 145) brown, matte. Anterior lobe with 1+1 discal and 1+1 lateral tubercles densely covered with adpressed setae as are other elevated areas of fore lobe. Posterior lobe irregularly wrinkled and densely beset with backwardly directed adpressed setae. Submedian carinae evanescent on posterior third of hind lobe. Humeral angles rounded, humeral area elevated. Anterolateral projections short, conical, laterally directed.

Scutellum (fig. 145) heavily rugose; central depression glabrous or with scattered setae, remainder densely setose. Base of scutellum with a pair of submedian, prominent projections,

overlapping declivous portion of posterior margin of pronotum. Posterior process of scutellum about three-fifths as long as main body of sclerite, horizontal, subconical, wide at base, narrow at apex, rounded distally.

Hemelytra (fig. 143) closely approaching, attaining or slightly surpassing apex of seventh urotergite. Clavus and corium distinctly setose. Hemelytra of general body color. Corium tinged with light yellow, sparsely spotted with dark. Membrane irregularly mottled with dark, dark pigment elements coalescing into large dark spot straddling vein separating membranal cells.

Legs (fig. 143) uniformly dark reddish brown, stout; fore femora from four to five times as long as wide. Fore and mid femora with a pair of subapical denticles. Spongy fosulae on fore and mid tibiae of male, absent in female. Setae of legs numerous, short, those of tibiae not longer than half the diameter of article (fig. 144D).

Venter prominently convex, feebly flattened longitudinally along middle in female, coarsely striate transversally. Setae numerous, backwardly directed. Spiracles adjacent or very close to connexival suture (fig. 144C). Color of venter and connexivum dark brown. Connexival segments dorsally and ventrally each with medially constricted transverse yellow mark on posterior half of segment, distant from intersegmental suture. Development of spots varied, in some cases spots divided into two.

TYPES: Of *platensis*, Museo Argentino de Ciencias Naturales; of *rosenbuschi*, Misión de Estudios de Patología Regional Argentina, Buenos Aires.

DISTRIBUTION: Argentina (Buenos Aires, Catamarca, Chaco, Córdoba, Corrientes, Entre Ríos, Formosa, Jujuy, La Pampa, La Rioja, Mendoza, Río Negro, San Juan, San Luis, Santa Fe, Santiago del Estero, Salta, Tucumán); southern Bolivia; southern Paraguay.

BIOLOGY: *Triatoma platensis* has been found naturally infected by *Trypanosoma cruzi*. Although occasionally occurring in peridomestic situations, such as in primitively constructed chicken houses or in goat corrals, the species lives mainly in birds' nests, such as those of

Pseudoseisura lophotes (Reichenbach) (Furnariidae), rarely in nests of *Myiopsitta monacha cotorra*, and other, nonidentified species. In some cases, the nests had been abandoned and taken over by marsupials (*Lutreolina crassacauda paranalensis* Thomas) or rodents (*Phyllotis cachinus* J. A. Allen). *Triatoma platensis* has also been found in nests of *Microcavia australis*. The species may occur together with other triatomines, such as *Triatoma infestans*, *T. sordida*, or *Psammolestes coreodes*.

The eggs of *T. platensis* are glued to the substrate, isolated or in small, irregular groups. With this species occurring mainly in birds' nests, the fixing of the eggs to the substrate prevents them from falling to the ground.

Occasional hybrids between *Triatoma platensis* and *Triatoma infestans* have been found in nature.

Triatoma protracta (Uhler)

Figures 22A; 147, 148

Conorhinus protractus Uhler, 1894, p. 284

Triatoma protracta: Neiva, 1914a, p. 58. Readio, 1927, p. 118. Pinto, 1931, p. 79, figs. 25-28. Usinger, 1944, pl. 1, figs. D, E.; pl. 6; pl. 12, fig. B

Triatoma protracta protracta: Ryckman, 1962, p. 110, pl. 1, figs. A, B; pl. 2, fig. W

Triatoma protracta woodi Usinger, 1939, p. 42; 1944, p. 73, pl. 1, fig. F; pl. 12, fig. A. Ryckman, 1962, p. 113, pl. 1, figs. C, E, F; pl. 2, figs. K, O

Triatoma protracta navajoensis Ryckman, 1962, p. 114, pl. 1, fig. D

Triatoma protracta zacatecensis Ryckman, 1962, p. 115, pl. 1, fig. H, pl. 2, figs. I, J

Triatoma protracta nahuatlae Ryckman, 1962, p. 115, pl. 2, fig. M.

Length of male 13.0-19.5, of female 15-23 mm.; width of pronotum of male 3.5-4.0, of female 3.5-5.0 mm., width of abdomen of male 5.0-5.5, of female 5.0-8.5 mm.

Color either from piceous to black, with intersegmental connexival sutures light, and membrane in some cases light gray, or from light to dark brown, with connexival sutures as above or with entire connexivum from slightly to distinctly lighter than rest of abdomen.

Head (figs. 147, 148A-E) granulose and slightly rugose, distinctly convex above, about

twice as long as wide across eyes (1:0.45-0.55), and about as long as pronotum. Antecular region slightly less than three times as long as postocular (1:0.34-0.4), postocular with sides rounded. Clypeus narrow anteriorly, strongly widened on posterior half. Head with distinct arcuate transverse impression at base of clypeus. Genae narrowly tapered apically, not attaining level of apex of clypeus. Upper surface of head evenly convex above, but in side view with slight although distinct depression at level of base of clypeus. Head not salient ventrally behind eyes. Eyes in lateral view attaining levels of upper or lower surface of head. Eyes comparatively small, ratio width of eye to synthlipsis 1:3.25-3.60. Antenniferous tubercles situated at level of center of antecular region. First antennal segment very short, barely exceeding middle of distance between its base and level of apex of clypeus. Second segment only with short, adpressed setae. Ratio of antennal segments 1:2.70-2.95:2.20-2.55:1.95-2.30. Rostrum (fig. 148E) with short hairs becoming progressively longer toward apex of second segment, uniformly long on third segment, but not forming dense brushlike structure at junction of second and third. First segment attaining level of center of antenniferous tubercle, second attaining level of neck. Ratio of rostral segments 1:1.15-1.30:0.50. Neck dark, light colored anterolaterally.

Pronotum from light brown to black, smooth, carinate laterally, trapezoidal, only very slightly constricted at level of transverse sulcus. Anterior lobe only slightly elevated, without discal or lateral tubercles, slightly granulose. Posterior lobe rugose, submedian carinae almost attaining hind margin; humeri rounded. Anterolateral angles very short, inconspicuous, rounded apically.

Scutellum (figs. 147, 148I) with central portion depressed, limited by distinct carinae. Apical process about half as long as main body of scutellum, subconical, faintly depressed dorsoventrally, its pointed apex deflected.

Hemelytra (fig. 147) almost attaining apex of abdomen, their color from brownish in light colored to almost black in dark specimens, in some cases membrane lighter than corium, and the latter with faint light-colored subapical spot;

rarely center of corium darker than rest of hemelytra.

Legs (figs. 147, 148H) short and stout; fore femora from four to five times as long as wide. Fore and mid femora subapically with two pairs of denticles. Tibiae of both sexes without spongy fossulae.

Venter rounded or slightly flattened, irregularly wrinkled transversally. Hairs of venter

inconspicuous. Spiracles close to connexival suture (fig. 148G). General color of abdomen as on rest of body, from light reddish brown to black; intersegmental sutures of dark specimens in most cases narrowly yellow (fig. 148I). Brownish forms frequently with connexivum contrastingly very light brown or yellow (fig. 147A, C), in other specimens concolorous with urosternites.

TYPES: Of *protractus*, National Museum of Natural History, Smithsonian Institution, Washington, D.C. of *woodi*, *navajoensis*, *zacatecensis* and *nahuatlae*, California Academy of Sciences.

DISTRIBUTION: USA (Arizona, California, Colorado, Nevada, New Mexico, Texas and Utah); Mexico (Baja California Norte, Coahuila, Chihuahua, Durango, Nuevo Leon, San Luis Potosí, Sinaloa, Sonora, Tamaulipas, and Zacatecas).

BIOLOGY: *T. protracta* has been found naturally infected by *Trypanosoma cruzi*. Specimens have been caught in domiciles, even in beds, but the species does not colonize in human habitations. The natural hosts of *T. protracta* are woodrats of the genus *Neotoma*; the bugs have been collected from the lodges of the following: *Neotoma albigena albigena*; *N. a. leucodon* Merriam; *N. fuscipes annectens* Elliot; *N. f. fuscipes* Baird; *N. f. macrotis* Thomas; *N. f. martirensis* Orr; *N. f. simplex* True; *N. lepida egressa* Orr; *N. l. grinelli* Hall; *N. l. lepida* Thomas; *N. l. molagrandis*; *N. micropus canescens*, and *N. m. micropus*.

OBSERVATIONS: *Triatoma protracta* is an exceedingly polymorphic species; Ryckman (1962) divided it into five subspecies. Ryck-

man's paper is based on very extensive rearing and hybridizing experiments, and is the most painstaking work on experimental triatomine systematics, which should be consulted by anyone interested in the problem of species and infraspecific taxa in this group. Although specimens of *protracta* can usually be placed in one or the other of the subspecies adopted by Ryckman, intermediates between the named subspecies are found, one subspecies (*woodi*) is admittedly polymorphic, and in others, such as *p. zacatecensis* and *p. nahuatlae*, the apparent differences are extremely slight. A good summary of the genetic relationships of the forms of *protracta* (and of the closely related *T. barberi*, *T. peninsularis* and *P. sinaloensis*) was given by Usinger, Ryckman and Wygodzinsky (1966).

The typical form of *protracta* (fig. 147B; 148C, D, E) is widely distributed in the southwestern USA (Arizona, California, Nevada, and Utah) and northern Mexico (Baja California Norte, Sonora). The overall color of this form is dark brown or black, and the size varies in the male from 14 to 19.5 mm. and in the female from 14 to 20.5 mm. Last instar nymphs are generally dark.

Triatoma protracta navajoensis occurs only

on the high Colorado Plateau (Arizona, Colorado, New Mexico, and Utah). This form is very similar to the nominal one. Its color varies from dark brown to black, but it is larger than *p. protracta*: the males vary from 20 to 21 mm., and the females from 20.5 to 23 mm. The fifth instar nymphs are very light colored.

Triatoma protracta woodi (fig. 147A, C; 148A, B) is largely restricted to the Rio Grande River drainage system (USA: Arizona, Texas and New Mexico; Mexico: Coahuila, Chihuahua, Nuevo León, Tamaulipas). Specimens of *woodi* are from dark to light brown in color; some have a large dark spot on the corium and many, but by no means all, have the connexivum contrastingly lighter than the rest of the abdomen. This form is smaller than *p. protracta*: males range from 13 to 16.5 mm., females from 14 to 17 mm. The nymphs are brownish.

Triatoma protracta zacatecensis inhabits the central Mexican plateau (Chihuahua, Coahuila, Durango, Nuevo León, San Luis Potosí, Zacatecas). This form is dark brown or black except for the contrastingly light-colored membrane and some light areas on the corium. The size of the male ranges from 13.1 to 15.3 mm., of the female from 13.5 to 16.2 mm. The color of the nymph varies from light to dark brown.

Triatoma protracta nahuatlæ has only been reported from the lowlands of the Pacific coast states of Sonora and Sinaloa. This is the smallest member of the group, with males ranging from 12.5 to 14.5 mm., and the females from 13.0-14.8 mm. *T. p. nahuatlæ* seems close to *zacatecensis*, and although some specimens do have a dark membrane, others are lighter and tend toward the condition in *zacatecensis*. The nymph of *nahuatlæ* is dark.

The eggs of *T. protracta* normally have a rough surface, except in the populations from southwestern California and northwestern Baja California where the eggs are smooth and glossy.

Triatoma pseudomaculata Corrêa and Espínola Figures 149, 150

Triatoma pseudomaculata Corrêa and Espínola, 1964, p. 116, figs. 3, 4, 7, 8, 11-14. Lucena, 1973, p. 176 (pro parte). Galvão, 1973, p. 371, figs. 1b, 1d, 2b, 3b, 3d, 4b, 4d, 5b, 5d, 6b, 6d.

Length of male 17-19 mm., of female 19-20 mm.; width of pronotum of male 4.0-4.8 mm., of female 4.5-5.0 mm.; width of abdomen of male 5.5-7.0 mm., of female 6.5-7.5 mm.

Overall color from dark brown to black, with yellow or orange-red marks on neck, thorax, corium, and connexivum. Integument almost glabrous, setae very short and sparse.

Head (figs. 149, 150A, B) uniformly dark

brown or black, less high in lateral view than in *maculata*, delicately granulose, especially at sides. Head much less than twice as long as wide across eyes (1:0.6-0.7), and as long as pronotum (1:1). Anteocular region about three times as long as postocular (1:0.30-0.35), postocular with sides rounded but strongly converging posteriorly. Clypeus narrow, slightly widened behind middle. Genae tapering or pointed apically, distinctly surpassing level of apex of clypeus. Jugae wide-angled apically. Eyes large, in lateral view surpassing level of under and almost attaining level of upper surface of eyes. Ratio width of eye to synthlipsis 1:1.1-1.4. Ocelli large. Antenniferous tubercles situated slightly behind middle of anteocular region. First antennal segment falling short of level of apex of clypeus, second slightly compressed, with numerous short adpressed setae shorter than diameter of segment. Ratio of antennal segments 1:4.0-4.8:2.4-3.6:1.8-2.6. Rostrum (fig. 150B) dark as head capsule, relatively slender (as compared to *T. maculata*). Setae of rostrum short and sparse on first and second segments but very numerous and longer on third, although not quite as long as diameter of segment. Ratio of rostral segments 1:2.4-3.1:1.0-1.1, viz., first segment as long as or slightly shorter than third. Neck with 1+1 lateral yellow or orange spots.

Pronotum (fig. 149) not distinctly granulose, its overall color from dark brown to black, with variable yellowish or orange-red pattern elements. Discal and lateral tubercles of fore lobe yellowish. Posterior lobe dark, with three pairs of yellow or reddish spots, one pair anterosublateral, one humeral and one posteromedian, the latter in many cases reduced in size, or obsolescent. Anterosublateral and humeral spots either separated or fused, in the latter case forming a single lateral spot on each side. Anterolateral projections light colored. Anterior lobe of pronotum with distinct discal and lateral tubercles. Posterior lobe coarsely wrinkled. Submedian carinae evanescent on posterior fourth of hind lobe. Humeral angles rounded, humeral area distinctly elevated. Anterolateral projections (149, 150C) prominently conical, in some cases elongate subtriangular as in *maculata*, in most specimens seen somewhat shorter, subconical. Pleura dark, in most indi-

viduals propleura with light spot at posterior margin, in some specimens absent. Mid and hind acetabula spotted with light color in occasional specimens.

Scutellum (fig. 149) entirely dark, coarsely rugose, with distinct central depression; sides of scutellum swollen. Posterior process subcylindrical, about as long as main body of scutellum, horizontal but apex slightly upturned, obliquely truncate in lateral view.

Hemelytra (fig. 149) almost attaining or in some males slightly surpassing apex of seventh urotergite. Overall color of hemelytra dark brown or black. Clavus dark at base, yellowish on apical two-thirds. Corium with subbasal and subapical spots yellow or reddish. Membrane either black and as dark as dark portions of corium, or fumose, brown, distinctly lighter than dark portion of corium, and with veins conspicuously dark.

Legs (fig. 149) uniformly dark. Fore femur 5.0-5.5 times as long as wide. Fore and mid femora with a pair of small subapical denticles. Tibiae of first and second pair of legs of male with spongy fossulae, absent in female.

Venter convex, very slightly flattened longitudinally along middle in female, delicately striate transversally, sparsely setose. Spiracles adjacent or very close to connexival suture. Urosternites dark brown, in some specimens irregularly clouded with yellowish brown; small lateral area enclosing spiracles yellow. Connex-

ivum light yellow or reddish orange, with wide transversal black bands across entire width of connexival segment, on intersegmental sutures. Light-colored areas of connexivum about as large as dark ones.

Male genitalia with endosomal processes denticulate apically.

TYPE: Instituto Oswaldo Cruz, Rio de Janeiro.

DISTRIBUTION: Brazil (Alagoas, Bahia, Brasilia, D. F., Ceará, Goiás, Minas Gerais, Pará, Pernambuco, Piauí, Rio Grande do Norte).

BIOLOGY: *Triatoma pseudomaculata* has been found naturally infected by *Trypanosoma cruzi*, and has been collected peridomestically and in human habitations. In most cases, this species occurs in low numbers as compared to other domestic species in northeastern Brazil, and is not considered an important vector of Chagas' disease.

OBSERVATIONS: *Triatoma pseudomaculata* and *T. maculata* are very similar and cannot in all cases be distinguished by their color pattern. The number and extension of spots on the hind lobe of the pronotum is extremely variable in either species, and so is the number and extension of the yellow or red spots on the propleura and mesopleura. Most *pseudomaculata* are darker than *maculata*, but some are not. The head is somewhat higher posteriorly in *maculata* than it is in *pseudomaculata*, and the eyes of the latter species seem to be comparatively smaller (see fig. 105B and fig. 150B). The rostrum furnishes good characters as shown in our keys and figures 105B and 150B; these characters seem to be constant. By far the best differential character is found in the structure of the apex of the lateral endosomal processes of the phallus of the male, first clearly pointed out by Galvão (1973): the apex of the endosomal process of *maculata* (fig. 105D) is coarsely ridged longitudinally, but delicately striate and beset with denticles apically in *pseudomaculata* (fig. 150D). The two species are vicarians geographically, with *maculata* occupying the northern and *pseudomaculata* the southern portion of the range. The fact that *pseudomaculata* and *maculata* are good species is confirmed by their partial sterility when crossed in the laboratory (Corrêa and Espínola, 1964).

Triatoma pugasi Lent

Figures 151-153

Triatoma pugasi Lent, 1953b, p. 316, figs. 2-4. Monteith, 1974, p. 91.

Length of male 24.0-24.5 mm., of female 24.0 mm., width of pronotum of male 6.5 mm., of female 6.0 mm.; width of abdomen of male 10.0 mm., of female 9.5 mm.

Overall color dorsally light orange-brown or yellowish brown, with head, antennae, membrane, legs, and venter darker. Integument rugose, granulose in some areas. Setae very short and sparse.

Head (figs. 151-153) dorsally faintly rugose and distinctly granulose; dark reddish brown with 1+1 submedian black lines on dorsum. Head about twice as long as wide across eyes (1:0.55) and slightly shorter than pronotum (1:1.1). Anteocular region about two and one-half times as long as postocular (1:0.40-0.45); postocular with sides slightly convex, somewhat converging toward behind. Clypeus widened posteriorly, not strongly elevated. Genae narrowly tapering apically but not pointed, distinctly surpassing level of apex of clypeus. Eyes in lateral view distinctly surpassing level of under surface but not attaining level of upper surface of head. Ratio width of eye to synthlipsis 1:1.5 (δ), 1:2.1 (φ). Ocelli small, their diameter equal to or smaller than their distance from eyes. Antenniferous tubercles inserted slightly behind middle of anteocular region. First and second antennal segments dark brown; first very small, falling short of level of apex of clypeus. Second antennal segment only with adpressed setae much shorter than diameter of segment. Ratio of antennal segments 1:4.4-4.8:2.7:2.0. Rostrum (fig. 153B) with short inconspicuous setae except distally on second and on third segment but not forming brushlike structure at junction of second and third segments. First rostral segment attaining level of base of antenniferous tubercles, second attaining level of middle of neck. Ratio of rostral segments 1:1.30:0.35.

Pronotum (figs. 151-153) uniformly orange-brown. Anterior lobe granulose on elevated portions, with 1+1 obsolescent discal but without lateral tubercles. Hind lobe coarsely rugose, slightly granulose. Submedian carinae very

abdomen in male, reaching to posterior margin of seventh urotergite in female. Corium light yellowish brown, extensively brown fumose on basal half and at extreme apex. Membrane darker than dark portions of corium.

Legs (fig. 152) dark reddish brown, stout; fore femur five times as long as wide. Fore and mid femora with 2+2 subapical denticles. Tibiae of first and second pair of legs of male with small spongy fossulae, the latter present in females only on fore tibiae.

Venter slightly flattened longitudinally along middle in male and more strongly so in female, with flattened portion not distinctly separated from lateral convex area. Surface microsculpture of venter consisting of meandering and labyrinthine wrinkles; transverse striation not developed. Connexival segments with conspicuous oblique rugosities. Spiracles adjacent to connexival suture. Venter dark reddish brown. Connexivum light brown, not spotted.

TYPE: British Museum (Natural History).

DISTRIBUTION: Java.

BIOLOGY: Unknown.

Triatoma recurva (Stål)

Figures 154, 155

Conorhinus recurvus Stål, 1868, p. 124.

Triatoma recurva: Neiva, 1914a, p. 59. Lent, 1951c, p. 156, figs. 1-3.

Triatoma longipes Barber, 1937b, p. 86. Usinger, 1944, p. 57, pl. 1, fig. I; pl. 5, pl. 9, fig. H.

Triatoma longipes nigricollis Usinger, 1944, p. 57.

Triatoma recurva nigricollis: Ryckman and Ryckman, 1967b, p. 383.

Length of males 25.5-30.0 mm., of females 29-33 mm.; width of pronotum of males 5.5-7.0 mm., of females 6.0-7.5 mm.; width of abdomen of males 8.5-10.5 mm., of females 11.0-13.5 mm.

General color from piceous to black, in some cases hind lobe of pronotum slightly lighter colored; connexivum orange-yellow along outer margin. Setae short and sparse, inconspicuous.

Head (figs. 154, 155) narrow, rugose transversally along middle on dorsum, faintly granulose, slightly more than twice as long as wide across eyes (1:0.40-0.45), and longer than pronotum (1:0.9). Anteocular region from three to

short, evanescent at middle of posterior lobe. Humeral angles rounded, slightly explanate and elevated. Anterolateral angles with short subtriangular forward directed projections.

Scutellum (figs. 151, 152) orange-brown, its central depressed portion rugose, limited by distinct carinae. Posterior process of scutellum less than half as long as main body of scutellum, horizontal, narrowly subconical.

Hemelytra (figs. 151, 152) attaining apex of

four times as long as postocular (1:0.25-0.35), postocular with sides straight, slightly converging toward behind. Clypeus very narrow, gradually widened behind its middle. Genae pointed apically, falling short of apex of clypeus. In side view, eyes approaching but not attaining level of upper surface but extending below level of lower surface of head. In dorsal view,

ratio width of eyes to synthlipsis 1:1.4-1.7. Antenniferous tubercles situated slightly behind middle of anteocular region, without apical spiniferous process. First antennal segment falling short of apex of clypeus. Second segment only with decumbent setae. Ratio of antennal segments 1:3-3.5:2.4-2.7:2.1-2.3. Rostrum (fig. 155B) slender, first and second segments with

males with small spongy fossulae, absent in females.

Abdomen convex below. Venter delicately striate transversally; setae inconspicuous. Spiracles very close to connexival suture, their distance from suture equal to once or twice their diameter. Connexivum (fig. 154) wide, in many specimens strongly reflexed. Connexivum dark, with orange-yellow outer margin dorsally and ventrally, this margin in many specimens wider toward posterior portion of each segment; light color in some cases slightly extended mesad along intersegmental connexival sutures.

very short, sparse setae, third with a few long hairs. First segment attaining level of base of antenniferous tubercles, second attaining level of base of neck. Ratio of rostral segments 1:1.6-1.8:0.5. Neck light colored laterally.

Pronotum (figs. 154, 155A) with sides conspicuously constricted at level of transversal sulcus. Anterior lobe with halves distinctly convex, delicately granulose, with 1 + 1 discal tubercles and 1 + 1 less well developed but still perceptible lateral tubercles. Posterior lobe shallowly rugose, submedian carinae not attaining posterior margin of pronotum. Humeri narrowly rounded. Anterolateral angles shortly conical, rounded apically.

Scutellum (fig. 154) heavily rugose, with central portion only slightly depressed; apical process elongate cylindrical, almost as long as disc of sclerite, horizontal, its apex slightly tapering, from horizontal to slightly downward bent.

Hemelytra uniformly dark, those of male attaining or slightly surpassing apex of abdomen, those of female only attaining base or at most middle of urotergite VIII. Hemelytra narrow compared to wide abdomen, in females leaving lateral portions of urotergites exposed.

Legs (fig. 154) slender and elongate, only with short sparse setae. Fore femora 7.5-10.0 times as long as wide. Fore and mid femora with 1+1 larger and occasionally 1+1 smaller subapical denticles. Fore and mid tibiae of

served specimens varies in intensity according to the state of preservation of the specimens from dark brown to black. Although there is a tendency toward an extension of the yellow areas of the connexivum in Mexican specimens, similarly extended light areas are found in occasional specimens from Arizona. The eye measurements of *nigricollis* fall within the range of such measurements in specimens from Arizona. We conclude that *nigricollis* should not be maintained as a valid name.

Triatoma rubida (Uhler)
Figures 156-158

Conorhinus rubidus Uhler, 1894, p. 285.
Triatoma rubida: Neiva, 1914a, p. 59. Readio, 1927,

Conorrhinus rubrofasciatus: Champion, 1899, p. 208, pl. 12, fig. 22 (nec DeGeer)

Triatoma uhleri Neiva, 1911a, p. 421; 1914, p. 66. Readio, 1927, p. 124.

Conorhinus uhleri: Patton and Cragg, 1913, p. 494.

Eutriatoma uhleri: Pinto, 1931, p. 102, figs. 45-48.

Triatoma rubida uhleri: Usinger, 1944, p. 66, pl. I, fig. J; pl. 2; pl. 11, fig. F.

Triatoma mexicana Neiva, 1912, p. 21 (nec Herrich-Schaeffer).

Eutriatoma mexicana: Pinto, 1931, p. 92, fig. 38.

Conorhinus rubrofasciatus var. *mexicana*: Patton and Cragg, 1913, p. 492.

Triatoma ocellata Neiva, 1914a, p. 55. Pinto, 1931,

Triatoma sonoriana Del Ponte, 1930, p. 900, fig. 14.

Triatoma rubida sonoriana: Usinger, 1944, p. 66, pl. 11, fig. I.

Triatoma rubida jaegeri Ryckman, 1967, pl. 1.

Triatoma rubida cochimiensis Ryckman, 1967, p. 1.

Length of male 15.5-20.0 mm., of female 19.5-23.0 mm.; width of pronotum of male 4.0-4.5 mm., of female 5.0-5.5 mm.; width of pronotum of male 5-6 mm., of female 6.5-8.0 mm.

Overall color from light reddish brown to dark reddish brown or black, with light markings from deep red to orange-red and yellow, on neck, pronotum, corium, and connexivum; pronotum and corium in some cases entirely dark. Setae inconspicuous, short, sparse.

Head (figs. 156, 157, 158A, B) rugose, not perceptibly granulose, uniformly dark, only slightly elevated between eyes; as long as pro-

TYPES: Of *recurvus*, Naturhistoriska Riksmuseet, Stockholm; of *longipes* and of *nigricollis*, National Museum of Natural History, Smithsonian Institution, Washington.

DISTRIBUTION: Mexico (Chihuahua, Nayarit, Sinaloa, Sonora); USA (Arizona).

BIOLOGY: This species has been reported as being naturally infected with *Trypanosoma cruzi*. In the laboratory, the species will feed on lizards and snakes. *Triatoma recurva* is not normally found associated with species of *Neotoma* as are so many other species of triatomines in the American Southwest and in Mexico, but it does occur in nests of another rodent, *Citellus variegatus grammurus* (Say). The species is attracted by light.

OBSERVATIONS: Usinger (1944) described a subspecies *longipes nigricollis* from Nayarit, based upon a single specimen, which, according to the author, differs from typical *recurva* by the somewhat wider extension of the yellow portion of the connexivum, the slightly larger eyes, and the almost black overall color. We have observed that the overall color of pre-

notum, and distinctly less than twice as long as wide across eyes (1:0.60-0.75). Anteocular region about three times as long as postocular (1:0.35-0.40), postocular with sides rounded. Eyes in lateral view distinctly surpassing level of under surface of head. Ratio width of eye to synthlipsis 1:1.20-1.75. Antenniferous tubercles inserted at center of anteocular region. First antennal segment attaining or slightly surpassing level of apex of clypeus; second antennal segment with short, stiff, decumbent hairs.

Ratio of antennal segments 1:2.9-3.3:2.4-2.9:2.4-2.5. Rostrum (fig. 158B) stout, with short setae except at apex of second and base of third segment where there are very long, dense hairs. Ratio of rostral segments 1:2.0-2.3:0.8-0.9. Neck yellowish on anterior, dark on posterior half.

Pronotum (figs. 156, 157) dark, with sides, posterior margin, humeral angles and anterolateral processes light colored, with in some cases several or all of these regions dark. Ante-

rior lobe not granulose, smooth, without discal or lateral tubercles. Posterior lobe shallowly rugose, with submedian carinae almost attaining hind border. Humeral angles rounded, not elevated. Anterolateral angles outwardly directed, very short, rounded apically.

Scutellum dark, rugose, central depression shallow, limited by narrow ridges. Scutellar process only slightly shorter than main body of scutellum, narrowly cylindrical or somewhat compressed laterally, its apex widened or not, slightly declinate.

Hemelytra (fig. 156B, C) extending close to apex of abdomen. Corium dark, rarely unicolorous, in most cases with large triangular area at base, most of costal margin, and small subapical spot, light colored.

Legs (figs. 156, 157) uniformly dark. Femora of first and second pair with 1+1 small denticles subapically. Fore and mid tibiae of male with small spongy fossulae, absent in female.

Abdomen uniformly dark except connexivum, sharply flattened below longitudinally along middle in both sexes, flattened portion bordered by sharp, posteriorly converging carinae (fig. 156A). Surface microsculpture consisting mostly of delicate transverse striae. Spiracles close to connexival suture. Connexival segments dark on disc, pale along intersegmental sutures and along outer margin (fig. 156); in some cases dark area extending to connexival border or almost so, leaving only intersegmental sutures light colored.

TYPES: Of *rubida*, *uhleri*, and *ocellata*, National Museum of Natural History, Smithsonian Institution, Washington; of *mexicana*, British Museum (Natural History); of *sonoriana*, Brit-

ish Museum (Natural History); of *jaegeri* and *cochimiensis*, unknown.

DISTRIBUTION: USA (Arizona, California, New Mexico, Texas); Mexico (Baja California, Nayarit, Sinaloa, Sonora, Vera Cruz). The species had been known in Mexico only from states on the West Coast; we have now examined a female from the east coast: Mexico: Veracruz: Citlaltepetl, 3000 [ft.?], Aug. 3, 1964, Swan col. (CAS).

BIOLOGY: *Triatoma rubida* has been found infected naturally by *T. cruzi*. The species has been collected from nests of woodrats (*Neotoma albigena albigena* and *N. lepida* Thomas), and has been reported feeding on the fish-eating bat *Pizonyx vivesi* (Menegaux).

OBSERVATIONS: This species varies considerably in size and in the distribution and intensity of its pattern elements. Usinger (1944) and Ryckman (1967) recognized three respectively five subspecies. Ryckman (*loc. cit.*) gave a tabular key to the subspecies. The characters used by these authors are the tonality of light-colored markings as well as their absence, presence and extension on the different parts of the body, and the extension of the dark and light connexival markings. In typical *rubida* (figs. 156, 158C) the connexival margin is entirely light colored, but in *sonoriana* and *jaegeri* (fig. 158D, E) dark connexival markings attain the outer connexival margins, and the pronotum and corium are uniformly dark in *jaegeri* (fig. 157). The light markings are red in *rubida* and the humeral angles are dark except their margins; the light-colored markings of *uhleri* and *cochimiensis* are yellow respectively light brown or orange. The nominate form of *rubida* seems to be restricted to the Cape region of Baja California, *cochimiensis* is found in central Baja California, *jaegeri* has only been reported from one small island in the central Gulf of Lower California, *sonoriana* occurs in the Mexican states of Sonora, Sinaloa, and Nayarit, whereas *uhleri* is found in the American Southwest and in the Mexican state of Veracruz.

Although specimens seem to cluster around the phenotypes mentioned, not all fall easily into the categories listed above; there does seem to be a prevalence of comparatively light-colored, large-sized forms in the north and of

smaller, more intensely pigmented forms in the southern part of the total range of the species. Much more abundant material than that examined by us, especially from Mexico, combined with rearing experiments, is needed for an understanding of the biosystematics of *Triatoma rubida*.

Triatoma rubida can be distinguished from other North American species by its relatively long first antennal segment which attains, or projects beyond, the apex of the clypeus. This character is also found in *Triatoma rubrofasciata*, which is superficially similar to *rubida*, but the former species is conspicuously granulose on the head and pronotum, and *rubida* is not.

Triatoma rubrofasciata (De Geer)

Figures 4A-D; 6B; 8A; 11, 12A; 13, 18, 19B; 21, 29D, L; 159-162

Cimex rubrofasciatus De Geer, 1773, p. 349, pl. 35, fig. 12

Conorhinus rubrofasciatus: Amyot and Serville, 1843, p. 384, pl. 8, figs. 2, 2a. Stål, 1859, p. 106. Distant, 1904, p. 285, fig. 189

Triatoma rubrofasciata: Breddin, 1905, p. 146. Neiva, 1914a, p. 30. Larrousse, 1924a, p. 63, fig 1. Pinto, 1930, p. 210, pl. 4; 1931, p. 81, figs 1-6, 29. Neiva and Lent, 1936, p. 175; 1941, p. 84, figs. 5, 13. Gillett, 1934, p. 4. Lent, 1943a, p. 246, figs. 6-8. Usinger, 1944, p. 64, pl. 9, fig A. Abalos and Wygodzinsky, 1951, p. 74, figs 35, 53, 119-132

Cimex variegatus Drury, 1773, p. 109, pl. 45, fig. 5

Reduvius (Conorhinus) variegatus: Westwood, 1837, p. 103, pl. 45, fig. 5

Conorhinus variegatus: Stål, 1872, p. 111 (pro parte)

Triatoma variegata: Neiva, 1914a, p. 68

Reduvius gigas Fabricius, 1775, p. 729; Wolff, 1802, p. 119, pl. 12, fig. 113

Cimex gigas: Gmelin, 1788, p. 2195

Nabis gigas: Latreille, 1804, p. 257

Triatoma gigas: Laporte, 1833, p. 11

Conorhinus gigas: Laporte, 1832, p. 77. Herrich-Schaeffer, 1848, p. 72, pl. 271, figs. A, B, pl. 272, figs. 841-842

Cimex claviger Gmelin, 1788, p. 2179

Cimex erythrozonias Gmelin, 1788, p. 2181

La Punaise-Mouche de Surinam, Stoll, 1788, p. 55, pl. 13, fig. 85

Reduvius giganti Klug in Meyen, 1834, p. 412

Conorhinus stali Signoret, 1860, p. 967

Conorhinus limbatus Schouteden, 1907, p. 287
(*nomen nudum*)

Triatoma rufofasciata Van Duzee, 1916, p. 29, 1917,
p. 248

Triatoma evandroi Figueiredo, 1938, p. 20.

Length of male 19.5-24.0 mm., of female 20-25 mm.; width of pronotum of male and female 4.5-6.0 mm., of abdomen of male 6.5-9.0 mm., of female 7-10 mm.

Overall color dark brown to black, with yellowish and orange-red markings on neck, pronotum, corium, and connexivum. Dorsal surface conspicuously granulose. Setae short, inapparent.

Head (figs. 4C, I; 159-161, 162A, B) heavily granulose dorsally, uniformly dark, slightly less than twice as long as wide across eyes (1:0.6) and slightly shorter than pronotum (1:1.1). Antecular region about 2.5 times as long as postocular (1:0.35), postocular with sides slightly rounded. Eyes in lateral view attaining level of under surface but remote from level of upper surface of head. Ratio width of eye to synthlipsis 1:1.9-2.2. Antenniferous tubercles

situated at center of antecular region. First antennal segment distinctly projecting beyond apex of clypeus; second segment (fig. 6B) with adpressed hairs shorter than diameter of segment. Ratio of antennal segments 1:3.8-4.0:2.2-2.6:1.6-1.9. Rostrum (fig. 162A) with abundant pilosity, hairs short on first and basal half of second segment, becoming progressively longer toward apex of second and on third segment, but not forming dense brushlike structure at junction of second and third segments. First rostral segment attaining level of base of antenniferous tubercle, second extending to level of posterior border of head. Ratio of rostral segments 1:1.6-1.7:0.6.

Neck uniformly yellowish dorsally.

Pronotum (figs. 4B; 159-161) dark brown or black, with sides and anterolateral processes reddish, in some cases also collar light colored; occasionally, red color invading central portion of hind lobe of pronotum. Anterior and posterior lobes of pronotum conspicuously granulose. Anterior lobe without discal or lateral

Scutellum (figs. 159-161, 162C) of general body color but in some cases with apex of process reddish, rugose-granulose, with distinct median depression limited by posteriorly confluent carinae. Posterior process conical, subtriangular, strongly tapering from wide base to point, about two-thirds as long as main body of scutellum.

Hemelytra (figs. 159-161) variable in length, in most specimens reaching only to basal portion or at most to middle of seventh urotergite, but in some males attaining apical portion of said urotergite. Corium granulose, from dark brown to black, its entire outer margin delicately bordered with orange-red. R+M and free portion of R enclosed in a wide reddish fascia extending to base of membrane, then sharply inwardly bent and extending along base of outer membranal cell. Membrane fumose, slightly lighter than dark portions of corium.

Legs (figs. 159-161) uniformly dark, relatively short and stout, with fore femur about five times as long as wide. Fore and mid femora subapically with two to four obsolescent denticles. Spongy fossulae on fore and mid tibiae of male, absent in females.

Venter (fig. 18B) flattened longitudinally along middle, more conspicuously so in females; flattened portion not sharply delimited from lateral convex area. Hairs of venter very short, golden colored. Surface of venter with very irregular microsculpture, from delicately striate transversally to minutely meandering or labyrinthine (fig. 19B). Spiracles of variable position, either adjacent to connexival suture or remote from latter by once or twice their own diameter. General color of abdomen from dark brown to black; spiracles orange. Connexival segments dark, their outer border and intersegmental sutures orange-red.

Female genital region strongly projecting posteriad.

TYPES: Of *rubro-fasciatus* and of *stalii*, Naturhistoriska Riksmuseet, Stockholm; types of the remaining, unknown.

DISTRIBUTION: Neotropical region: Antigua; Argentina (Buenos Aires); Bahamas; Brazil (Alagoas, Bahia, Maranhão, Minas Gerais, Pará, Paraíba, Pernambuco, Rio de Janeiro,

tubercles. Lateral margins of pronotum only slightly indented at level of transverse constriction. Posterior lobe from very faintly to distinctly rugose transversally, most conspicuously so on central portion between sublateral carinae; the latter evanescent before posterior margin. Humeral angles rounded, slightly elevated. Anterolateral angles short, subconical, or narrowly rounded apically. Prosternum and meso and metapleura granulose ..

Rio Grande do Norte, São Paulo, Sergipe); Cuba; Dominican Republic; French Guiana; Grenada; Guadeloupe; Haiti; Jamaica; Martinique; St. Croix; St. Vincent; Trinidad; Venezuela; Virgin Islands.

NEARCTIC REGION: USA (Florida).

PALEARCTIC REGION: Azores; Saudi Arabia

ETHIOPIAN REGION: Angola, ?Congo; Central African Republic; Comores; Madagascar; Mauritius, Réunion; Sierra Leone; South Africa; Zanzibar.

ORIENTAL REGION: Andaman Islands, Burma, Cambodia; China; Formosa; Goa; Hongkong; India; Indonesia (Borneo, Java,

some occasions, *T. rubrofasciata* has been found in pigeon coops.

OBSERVATIONS: This wide-ranging species is easily distinguished from all others of the genus by the combination of the elongate first antennal segment, the conspicuous granules of the head and thorax, and the characteristic color pattern, especially the light-colored margin of the pronotum. There is some individual variation in the extension of the reddish markings in this species, but the light-colored sides of the pronotum are always distinctly perceptible.

We have examined a lot of melanistic specimens of *T. rubrofasciata* obtained from a lizard cage at the Honolulu Zoo, which to the unaided eye appear entirely black except the faintly perceptible reddish markings of the connexivum (fig. 160). No normally colored individuals were found among this lot composed of about 10 adults and numerous nymphs; the latter also appeared entirely black, whereas normal nymphs of the species are reddish.

Sumatra); Malaya; Okinawa; Philippines; Seychelles; Singapore; Sri Lanka; Thailand; Vietnam.

AUSTRALIAN REGION AND PACIFIC: Caroline Islands; Hawaii; New Guinea.

This is the only tropicopolitan species of the genus. It is most frequently encountered in port cities, although in some countries, such as India and Brazil, it has been found hundreds of kilometers inland.

BIOLOGY: *Triatoma rubrofasciata*, even though in many cases found naturally infected with *Trypanosoma cruzi* and entering and colonizing human habitations in many parts of the world, is not commonly an active vector of Chagas' disease. *Trypanosoma cruzi*, of course, is not found in the Old World, but even in the Americas *T. rubrofasciata*, exclusively domestic here, has been shown to be a vector of Chagas' disease only in three cases. On the other hand, *T. rubrofasciata* frequently harbors another species of *Trypanosoma*, *conorhini*, a species limited to triatomines as vectors and *Rattus rattus* (L.) as its vertebrate host. On

Triatoma rubrovaria (Blanchard)

Figures 163-165

Conorhinus rubro-varius Blanchard in Blanchard and Brullé, 1843, p. 219, pl. 29, fig. 7. Stål, 1859, p. 113

Triatoma rubrovaria: Neiva, 1913b, p. 196. Larrousse, 1924a, p. 66, fig. 2. Del Ponte, 1930, p. 894, figs. 12a, b, pl. 44, fig. 3. Talice, Costa, Rial and Osimani, 1940, p. 43, pl. 1. Abalos and Wygodzinsky, 1951, p. 101, figs. 44, 57, 194-208. Carcavallo and Martínez, 1968, p. 62, pl. 2, fig. 1

Eutriatoma rubrovaria: Pinto, 1931, p. 98, fig. 37. Lent, 1942, p. 222, figs. 1-30. Neiva and Lent, 1943, p. 52, pl. 2

Triatoma (Eutriatoma) rubrovaria: Lima, 1940, p. 200. Mazza, Talice and Jörg, 1942, p. 25, figs. 14-34, pl. 2

Conorhinus phyllosoma Herrich-Schaeffer, 1848, p. 70, pl. 2, fig. 837 (nec Burmeister) *Conorhinus rubroniger* Stål, 1859, p. 114. *Triatoma gomesi*: Neiva and Pinto, 1923d, p. 86. *Eutriatoma gomesi*: Pinto, 1931, p. 53, fig. 34. *Triatoma bruchi* Mazza and Jörg, 1944a, p. 3, figs

1-7. Abalos and Wygodzinsky, 1951, p. 107, fig. 209 (new synonymy).

Length of male 21-24 mm., of female 22-25 mm., width of pronotum of male 4.5-5.5 mm.,

of female 4.5-7.0 mm.; width of abdomen of male 6.5-8.5 mm., of female 8-12 mm.

Overall color black, with red, orange, or rarely yellowish markings on neck, pronotum, corium, and connexivum. Integument sparsely granulose; setae short, sparse, integument appearing glabrous.

Head (figs. 163, 164, 165A, B) long and slender, black, delicately rugose transversally on dorsum, faintly granulose. Head twice as long as wide across eyes (1:0.5) and slightly longer than pronotum (1:0.9). Anteocular region three times as long as postocular (1:0.3);

postocular with sides very faintly convex. Clypeus narrow, gradually and only slightly widened behind middle. Genae narrowly tapering apically, distinctly surpassing level of apex of clypeus. Jugae angular apically. Eyes in lateral view slightly surpassing level of under but not attaining level of upper surface of head. Ratio width of eyes to synthipsis 1:1.4-1.6. Antenniferous tubercles situated slightly behind middle of anteocular region. First antennal segment approaching but not attaining level of apex of clypeus. Second antennal segment flattened, with numerous adpressed hairs shorter than diameter of segment. Ratio of antennal segments 1:3.8-4.5:3.2:2.6. Rostrum (fig. 165B) as dark as head capsule or with second and third segments reddish. Setae of rostrum short, except at apex of second and on third segment where setae are about as long as diameter of segment, decreasing in length toward apex of last segment. First rostral segment attaining level of apex of jugae, second attaining level of hind border of eyes. Ratio of rostral segments 1:2.2-2.5:1.1-1.4. Neck dark, with pair of light-colored lateral spots.

Pronotum (figs. 163, 164, 165C-J) with anterior lobe invariably black; posterior lobe rarely entirely black or entirely red, in most specimens with area between submedian carinae, with carinae included, black to a varied degree (fig. 165C-J). Collar and anterolateral tubercles from red to black. Anterior lobe of pronotum with elevated portions smooth, shining; with 1+1 weak discal elevations which are not distinct tubercles; lateral tubercles not developed. Posterior lobe of pronotum distinctly rugose; submedian carinae extending to posterior fourth of hind lobe, evanescent before posterior margin. Humeral angles rounded, humeri slightly elevated. Anterolateral projections short and blunt.

Scutellum (fig. 164) entirely dark, convex, heavily rugose, basal projections obsolete. Central depression shallow. Posterior process of scutellum short, about two-fifths as long as main body of scutellum, horizontal, broad at base, cylindrical on apical portion, its apex rounded. Propleura entirely dark or with red spot of varied size adjacent to hind margin of sclerite.

femora from six to seven times as long as wide. Fore and mid femora with a pair of small denticles subapically, femora of third pair slightly salient below subapically. Spongy fosulae on fore and mid tibiae of males, absent in females.

Abdomen very wide in some specimens (fig. 163), with lateral areas of urotergites exposed. Venter convex, faintly flattened longitudinally along middle in females. Integument of venter delicately striate transversally, sparsely and inconspicuously setose. Spiracles close to connexival suture, distant from latter by not more than their diameter. Venter black. Connexivum black, each segment with large central red or orange spot attaining external margin of segment. Dorsally, posterior portion of light connexival spot attaining connexival margin; ventrally, light spot extending shortly onto adjacent lateral portions of urosternites so as to include spiracles.

TYPES: Of *rubrovarius*, unknown; of *ruberiger*, Zoologisches Museum, Berlin; of *gomesi*, Instituto Oswaldo Cruz; of *bruchi*, Misión de Estudios de Patología Regional Argentina, Buenos Aires.

DISTRIBUTION: Argentina (Córdoba, Corrientes, Entre Ríos, Misiones); Brazil (Paraná, Rio Grande do Sul); Uruguay. There are literature references for this species from Java, Chile, and the Brazilian state of Bahia. We consider these references as spurious, because they do not fit the established geographic pattern of *rubrovaria*, and have not been confirmed by additional findings.

Hemelytra (figs. 163, 164) attaining apex of seventh urotergite in males and in some females, in other females not projecting beyond middle of seventh urotergite. Corium black, with basal and subapical light-colored spot of variable size, spots connected by narrow light-colored line along margin of hemelytron. Membrane brown, fumose, somewhat lighter than dark area of corium. Veins of membrane only very slightly darker than membrane.

Legs (fig. 164) uniformly dark, slender; fore

BIOLOGY: *Triatoma rubrovaria* has been found naturally infected by *Trypanosoma cruzi*. The species occurs only very rarely in human habitations where it does not colonize. *Triatoma rubrovaria* is a sylvatic species with apparent preference for rocky habitats (stonewalls, corrals, land covered with stones) where it lives in the interstices between stones and under rocks. This niche also serves lizards, geckos, and amphibians which provide blood-meals for the triatomines. In the laboratory, *T. rubrovaria* will feed on birds or mammals, as is also suggested by a find of this species in a burrow of the armadillo *Dasyurus hybridus*.

(Desmarest). Under laboratory conditions, *T. rubrovaria* has readily fed on mygalomorph spiders and even attacked silkworms.

The eggs of this species are not attached to the substrate.

OBSERVATIONS: Carcavallo et al. (1967) stated that the type of *Triatoma bruchi* appears to be a natural hybrid between *T. rubrovaria* and *T. infestans*. Carcavallo and Martínez (1968) repeated this opinion. The first author of the present paper re-examined the type and did not find it to differ from specimens of true *T. rubrovaria* characterized by an entirely black pronotum. A comparison of the single specimen of *T. bruchi* with actual hybrids between *T. infestans* and *T. rubrovaria* obtained in the laboratory by the second author of this paper also showed that they are not identical. For these reasons, *T. bruchi* is here synonymized with *T. rubrovaria*.

We have now examined three specimens of *rubroniger* belonging to the Berlin Museum, constituting the type series, and all numbered as 2927. We selected as lectotype a female, the only specimen bearing an obviously old, handwritten collectors' label (Sello, or Sellow) and an equally old handwritten determination label, probably in Stål's handwriting (*rubroniger* Stål). The remaining two specimens, a male and a female, bear handwritten number labels

and comparatively recent locality and determination labels.

The pronotum of the lectotype is almost entirely black, but 1+1 very small reddish spots are visible in the humeral area.

Various authors have illustrated some of the chromatic variations of the pronotum and corium of the species; a few of the variations of the pronotum are shown here again (fig. 165C-J). Lent (1942) has proved that these variations are individual and not geographic.

Triatoma ryckmani Zeledón and Ponce
Figures 166-167

Triatoma ryckmani Zeledón and Ponce, 1972, p. 276, fig. 1.

Female. Length 20.0-20.5 mm.; width of pronotum 4.5 mm., of abdomen 7.0-7.5 mm.

Dark brown on dorsum of head, on thorax and on hemelytra; yellowish brown on entire under surface as well as on corium, the latter spotted with dark. Setae of body surface short, black, adpressed, but longer and semierect on under surface of thorax and on abdominal urosternites.

Head (figs. 166, 167A, B) heavily rugose-granulose dorsally and laterally, smooth below along middle, about twice as long as wide across eyes (1:0.55), and slightly shorter than

pronotum (1:1.1). Anteocular region two and one-half times as long as postocular (1:0.4); postocular with sides rounded. Clypeus narrow, with short abrupt swelling on basal third. Genae with inner margin light colored, their apex pointed, extending beyond level of apex of clypeus. In lateral view, eyes close to level of upper surface of head, and attaining level of lower surface. Ratio width of eyes to synthlipsis 1:1.3-1.5. Antenniferous tubercle situated at level of center of anteocular region, with distinct apicoexternal setiferous projection. Antennal segments I and II dark brown. First antennal segment falling distinctly short of level of apex of clypeus. Second segment with short, decumbent setae only. Ratio of antennal segments 1:3.0-3.5:2.2-2.6:2.1-2.6. Rostrum (fig. 167B) slender, with very short hairs only. First rostral segment almost attaining level of apex of antenniferous tubercle, second attaining level of hind margin of head. Ratio of rostral segments 1:2.6-2.7:1.0. Head dark brown,

smooth, central portion of under surface and anterior portion of neck, light yellow brown.

Pronotum (fig. 166) dark brown, light to varied degree on sublateral carinae, borders of posterior and ridges of anterior lobes. Sides of pronotum strongly constricted at level of transverse sulcus. Anterior lobe elevated, granulose but not forming distinct tubercles with ridges prominent. Posterior lobe heavily granulose, its lateral margin carinate; humeri rounded, sublateral carinae approaching posterior margin. Anterolateral angles short but distinct, broadly subconical.

Scutellum (figs. 166, 167C) with central depressed portion heavily rugose, limited by broad carinae; at its base 1+1 conspicuous submedian tubercles, overlapping posterior border of pronotum. Posterior process over half as long as main body of scutellum, cylindrical, its apex rounded or subtruncate, slightly elevated. Color of scutellum uniformly dark brown. Thoracic sterna, acetabula, and part of pleura

yellowish brown, remainder of pleura contrastingly dark brown. Thoracic sterna with long, semierect hairs.

Hemelytra (fig. 166) attaining apex of abdomen, appearing narrow compared to wide abdomen, leaving entire connexivum and narrow lateral portion of urotergites exposed. Clavus, most of corium and entire membrane dark brown; base of corium, its entire external margin narrowly as well as preapical spot, brownish yellow.

Legs (fig. 166) stout, fore femora 4.0-4.5 times as long as wide. Fore and mid femora with two pairs of denticles followed by one or two rows of small setiferous tubercles. Tibiae without spongy fossulae. Coxae, trochantera, and basal two-thirds or three-fourths of femora yellowish, apex of femora with tibiae and tarsi dark brown.

Venter conspicuously flattened below along middle; flattened portion limited laterally by 1+1 distinct carinae converging medially at base of third and at middle of seventh segment. Venter with irregular transverse wrinkles and numerous long, semierect hairs. Spiracles close to connexival suture (fig. 167D). Connexival segments very wide dorsally and wider than usual for the genus ventrally (fig. 167D). Setae of under surface of connexivum restricted to outer half of each segment (fig. 167D). Urostermites yellowish brown; genital area dark brown.

Connexival segments yellowish, with central transversal dark spot of varied size and intensity (fig. 166).

TYPE: The American Museum of Natural History.

DISTRIBUTION: Guatemala; Honduras. The species was described from one specimen found in barracks in Honduras. We have seen an additional female from Honduras, intercepted in an airplane in Miami, Florida, and two females intercepted in Miami in bromeliads proceeding from Guatemala.

BIOLOGY: Unknown; possibly arboreal.

DISCUSSION: This is a taxonomically isolated species. The 1+1 anterior projections of the scutellum, quite characteristic of *T. ryckmani*, are similar to those found in the Cuban *Triatoma flavigaster* and the Argentinean *T. platensis*, but we have not found any other character that would imply close relationship between *T. ryckmani* and the other species mentioned.

The Honduran and Guatemalan specimens agree entirely except for the somewhat darker and more extensive connexival markings of the Guatemalan specimens (fig. 166B).

Triatoma sanguisuga (Leconte)
Figures 26A; 168, 169

Conorhinus sanguisuga Leconte, 1855, p. 404.
Walsh and Riley, 1869, p. 87, fig. 74. Marlatt,
1896, p. 38, figs. 10-12. Kimball, 1896, p. 128.
Howard, 1900, p. 28, figs. 22-24.

Triatoma sanguisuga: Kirkaldy, 1907, p. 156. Neiva,
1914a, p. 63. Van Duzee, 1916, p. 29; 1917, p.
248. Blatchley, 1926, p. 554, fig. 135. Readio,
1927, p. 120. Froeschner, 1944, p. 652, fig. 86.
Usinger, 1944, p. 67, pl. 11, fig. C. Mead, 1965,
p. 1, figs. 1, 2. Olsen, 1966, p. 1.

Conorhinus lateralis Stål, 1859, p. 107.

Conorhinus variegatus Stål, 1872, p. 111 (*nec*
Drury).

Triatoma sanguisuga ambigua Neiva, 1911a, p. 422.
Usinger, 1944, p. 68, pl. 11, fig. B.

Triatoma ambigua: Davis, McGregor and Shazo,
1943, p. 353.

Triatoma pintoi Larrousse, 1926, p. 138, fig. 2; Del
Ponte, 1930, p. 913, fig. 17.

Triatoma sanguisuga texana Usinger, 1944, p. 69,
pl. 11, fig. A.

Length of male 15.5-22.0 mm., of female
20.5-23.0 mm.; maximum width of pronotum

of male and female 4.0-5.5 mm., of abdomen of male 5.5-8.0 mm., of female 6-9 mm.

Overall color from dark brown to black, with orange-red or yellowish markings on neck, pronotum, hemelytra and connexivum. Pilosity inconspicuous, most distinct on under surface of abdomen and on legs.

Head (figs. 168, 169) granulose, uniformly dark, about twice as long as wide across eyes (1:0.55), and very slightly shorter than pronotum (1:1.05). Postocular region distinctly rounded in dorsal view. Anteocular region somewhat more than twice as long as postocular (1:0.45). Eyes in side view attaining or slightly surpassing level of under surface of head, remote from level of upper surface. Ratio width of eye to synthlipsis 1:1.65-2.10. Antenniferous tubercles situated on posterior third of anteocular region. First antennal segment falling slightly short of apex of clypeus; second segment with short hairs only. Ratio of anten-

nal segments 1:3.3-3.5:2.3-2.8:2.0-2.5 Rostrum (fig. 169B) with sparse, very short setae only; first segment attaining level of apex of antenniferous tubercle, second attaining level of base of neck. Ratio of rostral segments 1:2.0:0.5. Neck reddish or dark with 1+1 lateral spots reddish.

Pronotum (fig. 168) with fore lobe slightly granulose; discal tubercles very low or imperceptible; lateral tubercles missing. Hind lobe rugose, with humeral angles rounded, slightly elevated. General color of pronotum dark brown to black, with lateral margins from orange-red to yellowish, the light area in many cases extending onto humeral disc and on collar including anterolateral angles. General aspect of pronotum thus characterized by dark disc contrasting with light-colored anterior and lateral borders as well as lateral portions of hind margin, bordered by reddish line of varied width.

Scutellum rugose with irregular delicate carinae limiting central depression; apical process subcylindrical, not quite as long as main body of scutellum, subcylindrical, apex rounded and slightly declinate.

Hemelytra (fig. 168) attaining apex of abdomen. Corium with sparse, short, inconspicuous setae; basal triangle reddish orange or yellowish, a large central area dark brown and extending over entire width of corium, a smaller subapical spot orange-red or yellowish, extreme apex of corium dark; clavus dark on basal, light brown on apical half.

Legs (fig. 168) uniformly dark; femora of first and second pairs with 1+1 pointed denticles subapically. Fore femur 4.3-4.9 times as long as wide. Tibiae of first and second pairs of male with small spongy fossulae, absent in female.

General color of abdomen uniformly dark; ventrally with abundant pilosity and delicately striae transversally. Spiracles close to but not contiguous with connexival suture. Connexival segments (fig. 168) dorsally and ventrally dark, with the posterior third or fourth orange-red or yellowish, the light color extending briefly onto urosternites.

TYPES: Of *sanguisuga*, unknown; of *lateralis*, Zoologisches Museum, Berlin; of *ambigua*, National Museum of Natural History, Smithsonian Institution, Washington, D.C.; of *pintoi*, unknown; of *texana*, California Academy of Sciences.

DISTRIBUTION: USA (Alabama, Arizona, Arkansas, Florida, Georgia, Illinois, Indiana, Kansas, Kentucky, Louisiana, Maryland, Mississippi, Missouri, North Carolina, Ohio, Oklahoma, Pennsylvania, South Carolina, Tennessee, Texas, Virginia).

BIOLOGY: *T. sanguisuga* has been found infected with *Trypanosoma cruzi*, and, together with the opossum, is an important reservoir of Chagas' disease. This triatomine has also been reported infected with equine encephalitis virus. *Triatoma sanguisuga* is frequently found in human habitations, even in urban situations, but it does not colonize in houses; Walsh and Riley (1869) were the first to report the species in habitations. *Triatoma sanguisuga* will feed on humans, a fact known since its original

description. First instar nymphs have been reported to attack frequently other insects and suck their hemolymph, a behavior pattern also observed in some other Triatominae. Peridomestic *T. sanguisuga* have been collected in chicken coops, dog houses, stables, and corrals where they attack horses and other animals. The species occurs in sylvatic habitats such as hollow trees inhabited by various invertebrates and vertebrates, e.g., raccoons and opossums, under logs and at the base of palmetto fronds coexisting with *Hyla* sp. The bugs are frequently found in or near woodrat nests (*Neotoma floridana* [Ord], *baylei* Merriam, *micropus* Baird) and those of cotton rats (*Sigmodon hispidus texicanus* [Audubon and Bachman]). The bugs are attracted to artificial light. **OBSERVATIONS:** This species is quite variable as regards size and chromatic distribution. Over most of its range, *T. sanguisuga* specimens attain or surpass 20 mm. in length, but in the extreme south of Texas and in the southern two-thirds of Florida specimens are much smaller (16-19 mm.). In the small Texas specimens (fig. 169C) the light connexival markings seem to be smaller than in most specimens of the typical form, but in specimens from southern Florida (fig. 169B) they tend to be larger. The eyes are approximately half as long as the dorsal interocular distance over most of the range of the species, including southern Texas, but in southern Florida specimens the eyes tend

to be wider than half the width of the dorsal interocular distance. Finally, the light-colored areas of the connexivum are mostly reddish and only rarely yellow in the typical form, but yellowish in most although not all specimens from southern Texas and southern Florida. Usinger (1944) recognized the southern Texas form (*texana*) and the Florida form (*ambigua*) as subspecies of *sanguisuga*, but the distinguishing characters used are minor and the populations are not separated by a distinctive gap geographically or in characters. Mead (1965) stated that there is an intergrading zone in the Gainesville area of Florida and that much of north-central Florida yields intermediate forms between *sanguisuga sanguisuga* and *sanguisuga ambigua*. We agree with Mead that "a long series of specimens around the state is needed for a better understanding of the forms," a suggestion that may well apply to the entire *sanguisuga* complex. A careful statistical analysis of wild-caught specimens and appropriate rearing and breeding experiments are necessary to understand fully this species and the closely related *indictiva*. At this time, we do not accept the subspecies proposed.

The original series of *lateralis*, kept in the Berlin Museum, consists of two females, three males, and one nymph, all labeled as from Georgia, and numbered 2923. We designate as lectotype the only specimen (a female) that has a printed number label, a handwritten locality label (Georgia Esch.), and an obviously old handwritten determination label (*lateralis* Stål).

Triatoma sinaloensis Ryckman
Figures 170, 171

Triatoma sinaloensis Ryckman, 1962, p. 118, pl. 2, fig. L.

This species is so similar to *T. peninsularis* that a detailed redescription is not necessary. *Triatoma sinaloensis* is slightly smaller than *peninsularis* (males 10.3-11.5 mm., females 10.4-12.5 mm.), the overall color is from light to dark reddish brown, and the body surface is highly polished. The slight difference in head shape (see figs. 136B and 171B) may also be of taxonomic importance.

TYPE: California Academy of Sciences.

DISTRIBUTION: Mexico (Sinaloa; Sonora).

BIOLOGY: *T. sinaloensis* has been found naturally infected with *Trypanosoma cruzi*. The species occurs in nests of the woodrats *Neo-toma phenax* Merriam and *N. albicula melanura* Merriam.

OBSERVATION: Ryckman (1962) has shown that crosses between *T. sinaloensis* and *T. peninsularis* produce either sterile eggs, or em-bryos only, thus proving that they are two different species, even though very close phe-notypically.

Triatoma sinica Hsiao
Figures 172, 173

Triatoma sinica Hsiao, 1965, p. 197, fig. 1.

Length of male 22 mm., of female 24 mm.; width of pronotum of female 6 mm., of abdo-men 9.5 mm.

Female (male not examined). Overall color dark brown to black, with yellowish or reddish markings on pronotum, scutellum, corium, and connexivum. Body integument highly polished; pilosity very short and sparse.

Head (figs. 172, 173A, B) including clypeus and genae heavily rugose transversally on dor-sum and only slightly granulose; dark reddish brown, with sides black dorsally. Head much less than twice as long as wide across eyes (1:0.7), and distinctly shorter than pronotum (1:1.2). Anteocular region two and one-half times as long as postocular (1:0.4), postocular with sides rounded. Clypeus elevated in lateral view, rather broad on anterior portion, basal third abruptly widened. Genae tapering but not pointed apically, slightly but distinctly surpass-

FIG. 172. *Triatoma sinica*, female, paratype. A. General aspect. B. Anterior portion of insect, dorsal view, higher magnification.

ing level of apex of clypeus. Eyes in side view surpassing level of lower and not attaining level of upper surface of head. Ratio width of eye to synthipsis 1:1.7. Ocelli large, their diameter greater than their distance from hind border of eyes. Antenniferous tubercles inserted slightly behind center of anteocular portion of head. First and second antennal segments dark brown or black. First segment slightly surpassing level of apex of clypeus and of genae; second about five times as long as first, only with adpressed setae shorter than diameter of segment. Ratio of antennal segments (calculated from measurements given by Hsiao, 1965) 1:4.6:2.9:2.4. Rostrum (fig. 173B) with short hairs except on apex of second and on third segment, but not forming brushlike structure at junction of second and third segments. First rostral segment attaining level of base of antenniferous tubercle, second reaching level of hind border of head. Ratio of rostral segments 1:1.4-1.6:0.5. Neck entirely yellowish dorsally.

Pronotum (fig. 172B) highly polished. Anterior lobe with smooth areas dark brown or black, elevated areas yellowish brown. Lateral margins of pronotum with humeri, as well as collar with anterolateral processes light colored. Posterior lobe black, with submedian carinae, a median band arising at transversal sulcus and attaining posterior margin of pronotum, and 1+1 sublateral spots at posterior margin, reddish brown. Pronotum trapezoidal, with sides not constricted at level of transverse sulcus. Anterior lobe not granulose; submedian carinae of posterior lobe short, not extending beyond middle of hind lobe. Humeral angles rounded, slightly explanate. Anterolateral angles (fig. 173C) short, rounded or angular apically. Pleura heavily rugose, dark, with acetabula slightly lighter.

Scutellum (fig. 172A) dark, with central depression and posterior process rugose, yellowish brown. Posterior process about two-thirds as long as main body of scutellum, horizontal, subcylindrical, its apex rounded.

Hemelytra (fig. 172A) approaching apex of abdomen. Corium dark, with small orange-colored narrow subbasal spot and subapical U-shaped spot. Costal margin narrowly yellow. Membrane smoky brown, lighter than dark portion of corium.

Legs uniformly dark brown, stout; fore femur six times as long as wide. Fore and mid femora with 3-4 small setiferous denticles. Tibiae without spongy fossulae (possibly present in male).

Abdomen (fig. 172A) wide, with lateral portions of urotergites not completely covered by hemelytra. Venter distinctly flattened longitudinally along middle, flattened portion not sharply separated from lateral convex portion. Surface microsculpture of venter consisting of minute meandering or labyrinthine wrinkles; transverse striation not developed. Spiracles adjacent to connexival suture or separated from same by distance less than diameter of spiracle. Pilosity of venter inapparent. Venter dark reddish brown; connexivum pale yellow, faintly tinged with pink. Each connexival segment (fig. 172A) at center with irregular shaped transverse black spot wider at outer than at inner margin of segment.

TYPE: Nankai University Collection, Tientsin.

DISTRIBUTION: China (Nanking).

BIOLOGY: Unknown.

Triatoma sordida (Stål)
Figures 174-176

Conorhinus sordidus Stål, 1859, p. 108.

Triatoma sordida: Chagas, 1912, p. 306. Neiva, 1914a, p. 35. Del Ponte, 1930, p. 901, pl. 44, fig. 2. Mazza and Jörg, 1944e, p. 51, figs. 1-5. Wygodzinsky and Abalos, 1950, p. 63, figs. 3, 4B, D, G; 6K, N; 8D-F; 9B, C, F. H. K, M; 11. Abalos and Wygodzinsky, 1951, p. 79, figs. 39,

46, 61, 133-149, 176-178. Carcavallo and Martínez, 1968, p. 39, pl. 1, fig. 1. Martínez and Cichero, 1972, p. 44, fig. 25.
Eutriatoma sordida: Pinto, 1931, p. 100, figs. 43, 44. Mazza and Jörg, 1938, p. 26, figs. 1-7, pl. 1.
Triatoma garciabesi Carcavallo et al., 1967, p. 44, figs. 1, 3, 5, 7, 9, 11, 13. Carcavallo and Martínez, 1968, p. 43, pl. 1, fig. 4. (new synonymy).

Length of male 14-19 mm., of female 15-20 mm.; width of pronotum of male and female 4-5 mm., of abdomen of male 6.5-7.0 mm., of female 7-8 mm.

Overall color from light to (rarely) dark brown, with pale yellow areas on head, neck, pronotum, scutellum, hemelytra, legs, connexivum, and in some specimens, venter. Integument beset with short, sparse setae.

Head (figs. 174, 175, 176A, B) brown, with anteocular area yellowish; head rugose and granulose, heavily so on sides before and behind eyes. Head slightly less than twice as long as wide across eyes (1:0.55-0.60), and from as long as to slightly longer than pronotum (1:0.85-1.0). Anteocular region about three times as long as postocular (1:0.30-0.35), postocular with sides slightly rounded, converging toward behind. Clypeus very narrow, slightly widened behind middle. Genae narrowly tapering or rarely pointed apically, distinctly extending beyond level of apex of clypeus. Jugae yellowish, subangular apically. Eyes in lateral view attaining level of under and approaching but not attaining level of upper surface of head. Ratio width of eye to synthlipsis 1:0.75-1.20. Antenniferous tubercles inserted slightly behind middle of anteocular region. First antennal segment falling slightly short of level of apex of clypeus; second segment subcylindrical, beset with numerous inclined setae shorter than diameter of segment. Ratio of antennal segments 1:2.5-3.6:2.5-2.8:1.7-2.0. Rostrum (fig. 176B) as dark as head capsule, or, more frequently, with some or all segments very light yellowish brown. Setae of rostrum very short, a few slightly longer ones on apical segment, these setae not longer than diameter of segment. First rostral segment very short, not quite extending to level of apex of jugae, second attaining level of hind margin of eyes. Ratio of rostral segments

1:2.4-2.9:1.1-1.4. Neck dark, with a pair of light-colored spots laterally.

Pronotum (figs. 174, 175) sparsely granulose, brown, in most specimens with anterolateral processes and elevated areas of anterior lobe including tubercles yellow; humeri invariably with yellow mark. Anterior lobe with distinct discal and lateral tubercles. Posterior lobe strongly wrinkled. Submedian carinae extending close to hind border of pronotum.

Humeral angles narrowly rounded, faintly angular. Anterolateral projections of pronotum small but salient, narrowly rounded apically.

Scutellum (figs. 174, 175) coarsely rugose; central depression well developed. Color of scutellum dark brown except apical portion of posterior scutellar process yellow. Scutellar process large, about three-fourths as long as main body of scutellum, horizontal, sub-

cylindrical, slightly tapering apically, obliquely truncate distally in lateral view.

Hemelytra (figs. 174, 175) closely approaching or attaining apex of seventh urotergite, in both sexes. General color of hemelytra from light to very dark brown. Corium with triangular basal spot yellow, and with apex also yellow, or not, or corium entirely yellowish with only veins on apical two-thirds of corium

conspicuously darkened. Membrane fumose, from light to very dark brown, veins darker than cells, especially distal two-thirds of Cu separating membranal cells, this portion of vein narrowly bordered with dark.

Legs (figs. 174, 175, 176C) with coxae and trochantera pale yellow, in some specimens with faint brownish spots. Femora yellow, with subapical annulus dark. Tibiae brown, darkest at apex, and with small light-colored annulus at base. Legs relatively slender, fore femora 4.6 to 5.4 times as long as wide. Fore and mid femora with pair of stout denticles subapically. Spongy fossulae on fore and mid tibiae of male, absent in females.

Venter convex, feebly flattened in some specimens of either sex, delicately striate transversally, sparsely setose. Spiracles (fig. 176H) variable in position, from adjacent to connexival margin to distant from latter by twice their diameter. Venter (fig. 176H) either entirely brown except narrowly at sides, or suffused to greater or lesser extent with yellow. Connexivum yellow, light-colored areas briefly extending on urotergites and urosternites including area of spiracles. Connexivum (figs. 174, 175, 176D-G) dorsally with transverse black marks, viz., a narrow black line along intersegmental sutures, expanded on connexival margin into a large spot; in some specimens, a wider and rather uniform black transverse stripe straddling intersegmental suture. Under surface of connexival segments (fig. 176H) yellow, with small dark spot straddling intersegmental suture adjacent to outer margin; transversal markings invariably absent on ventral portion of connexivum.

TYPES: Of *sordida*, Zoologisches Museum, Berlin; of *garciabesi*, Museo Argentino de Ciencias Naturales, Buenos Aires.

DISTRIBUTION: Argentina (Buenos Aires, Chaco, Córdoba, Corrientes, Formosa, Jujuy, La Rioja, Misiones, Salta, Santa Fé, Santiago del Estero, Tucumán); Bolivia; Brazil (Bahia, Goiás, Mato Grosso, Minas Gerais, Paraná, Pernambuco, Piauí, Rio Grande do Sul, Santa Catarina, São Paulo); Paraguay; Uruguay. The only record of this species from Chile has not been confirmed by additional findings, and is doubtful.

BIOLOGY: This species is frequently found naturally infected by *Trypanosoma cruzi*. *Triatoma sordida* colonizes in human habitations, and is an important vector of Chagas' disease in certain areas. The invasion of human habitations is facilitated by the frequently peridomestic condition of *T. sordida* which colonizes in chicken and pigeon houses, has been found in sparrows' nests, and is known to occur in rats' nests and in places where domestic guinea pigs and rabbits are kept. *Triatoma sordida* has been collected from nests of wild birds, such as *Phacellodomus rufifrons rufifrons* (Wied), *Ph. rufifrons sincipitalis cabanis*, *Anumbius annumbi* (Vieillot), *Heleodytes unicolor* (Lafresnaye), *Myopsitta monacha cotorra*, and

Pseudoseisura lophotes. *Triatoma sordida* has been found in hollow trees, among exposed tree roots, and under loose bark of trees and fence posts; it occurs in the crown of palm trees, in clumps of agaves and bromeliads, in clumps of herbaceous vegetation, and in stone walls. There are references indicating that this species prefers the vicinity of water courses.

The eggs of *T. sordida* are laid loose.

OBSERVATIONS: Specimens from the semi-arid areas of northwestern Argentina tend to be smaller and, in many cases although not invariably, darker than most individuals of this species. Abalos and Wygodzinsky (1951), after examining large numbers of specimens from the entire range of the species, could not find constant characters to distinguish unequivocally the Argentinian population mentioned from other *sordida*. Carcavallo et al. (1967) described these small bugs as a separate species, *garciabesi*. Upon comparison of paratypes of *garciabesi* (fig. 176F, G) with specimens of *sordida* from outside the range of *garciabesi* (fig. 176D, E), we found that none of the chromatic and morphological characters considered as diagnostic by Carcavallo et al. (*loc. cit.*) and Carcavallo and Martínez (1968) is either constant or serves to distinguish *garciabesi* from all specimens of *sordida* examined. We conclude that, in the absence of experimental work, *garciabesi* cannot be maintained as a separate species.

Triatoma spinolai Porter

Figures 6E, G; 8C; 20B, C; 22B; 177-180

Triatoma spinolai Porter, 1934, p. 192; 1939, p. 124, pl. 8. Gajardo, 1939, p. 35, figs. 1, 2. Neiva and Lent, 1940b, p. 355, figs. 1, 4, 5. Lent and Jurberg, 1967, p. 273, figs. 1-42

Triatoma chilena Usinger, 1939, p. 45

Mepraia spinolai: Mazza, Gajardo and Jörg, 1940, p. 3, figs. 1-27. Mazza, Jörg and Gajardo, 1941, p. 3, figs. 3-7, 13-17, 20-24. Gajardo, 1954, p. 117

Triatomaptera porteri Neiva and Lent, 1940a, p. 266; 1940b, p. 357, figs. 2, 3, 6; 1943, p. 62, figs. 2, 3, 6, pl. 3

Sexually dimorphic species; males macropertous, brachypterous, or micropterous; females micropterous

Macropterous male (figs. 177, 179A).

Length 18-22 mm., width of pronotum 3.5-5 mm., of abdomen 4.8-6.5 mm.

Overall color dark brown, connexivum and part of adjacent sclerites red. Dorsal body surface shortly pilose; antennae, rostrum, legs, and under surface of body with long hairs.

Head (figs. 177A; 178, 179A; 180D) very dark, transversally rugose dorsally, weakly granulose, narrowly cylindrical, apical portion (from level of apex of antenniferous tubercles to apex) conspicuously compressed laterally; under surface of head with scattered long hairs. Head approximately twice as long as wide (1:0.45-0.50), and much longer than pronotum (1:0.65-0.80). Anteocular region three to four times as long as wide (1:0.25-0.30); postocular with sides very feebly rounded, almost straight, converging toward behind. Clypeus narrow, slightly widened at apex and gradually so on posterior third. Genae narrowly rounded apically, falling slightly short of level of apex of clypeus. Jugae short, blunt apically. Eyes in side view attaining or surpassing level of under surface but distant from level of upper surface of head. Ratio width of eyes to synthlipsis 1:1.40-1.75. Ocelli large, their length equal to their distance from eyes. Antenniferous tubercles situated at middle of anteocular region. First antennal segment slender, almost glabrous, extending slightly beyond level of apex of clypeus. Second antennal segment (fig. 6E, G) with very numerous semi-erect ciliate hairs about twice as long as diameter of segment, and less numerous scattered elongate bristles from twice to more than four times as long as diameter of segment; similar hairs and bristles on third and fourth segments. Ratio of antennal segments 1:4.9:3:2.2. Rostrum (figs. 178, 180C-E) of same color as head. First segment attaining level of apex of antenniferous tubercle; second extending to slightly behind level of hind margin of eyes. Rostral segments slender, the second compressed dorsoventrally; first and second with hairs approximately as long as diameter of segments, but longer than diameter on third segment. Hairs not dense. Ratio of rostral segments 1:2-2.8:0.6-0.7. Neck lighter than head, with 1+1 very faint lateral spots yellow.

Pronotum (figs. 177, 179) subtrapezoidal, uniformly dark, although somewhat lighter than

remaining parts of body. Anterior lobe deeply sculptured and granulose, without discal or lateral tubercles. Posterior lobe delicately rugose and wrinkled. Submedian carinae extending slightly beyond middle of posterior lobe. Humeral angles rounded. Anterolateral projections small, conical.

Scutellum subtriangular, its surface from rugose to almost smooth, conspicuously elevated, and with median depression from small to indistinct. Posterior process of scutellum (fig. 179A) extremely small, subconical, only from one-sixth to one-eighth of length of main body of scutellum; its apex horizontal or upturned. Mesosternum limited posteriorly by prominent transverse straight ridge; metasternum longitudinally carinate along middle posteriorly (figs. 178, 180A).

Hemelytra (figs. 177, 179, 180G) attaining or surpassing apex of abdomen by up to two mm., their color uniformly dark brown. Hind wings as illustrated (fig. 180H).

Legs (figs. 177A; 179A) uniformly dark, unusually long and slender, especially third pair. Fore femora from 8 to 10 times as long as wide. Femora inermous. Fore and mid tibiae with spongy fossulae. Femora and especially tibiae and tarsi in addition to normal hairs with others several times as long as diameter of article. Setae of posterior tarsus shown in figure 180B.

Venter convex, minutely striate transversally, and with delicate elongate semierect setae most numerous on posterior segments, in preserved specimens examined appearing carinate longitudinally along middle. Spiracles (fig. 180F) close to but not adjoining connexival suture. Ventral connexival plates hinged to dorsal sclerites; dorsal connexival plates fused to urotergites (fig. 20B). Connexivum red, either entirely so, or especially dorsally, each connexival plate on disc with black spot (fig. 177A), variable in size, attaining or not lateral margin of sclerite. Red color extending to a varied

Head dark (figs. 177B, C; 179B; 180C, E), somewhat lighter laterally and ventrally. General structure of head as in winged form; head approximately twice as long as wide (1:0.45) and almost twice as long as pronotum (1:0.5-0.6). Anteocular region close to three times as long as postocular (1:0.3); postocular with sides almost straight, subparallel. Clypeus, genae, and jugae as in winged form. Eyes small, in side view from slightly to considerably distant from level of lower surface and remote from level of upper surface of head. Ratio width of eye to synthlipsis 1:1.7-2.1 in male, 1:3.3-3.8 in female. Ocelli small, their length equal to half their distance from eyes. Antenniferous tubercle and first antennal segment as in winged form. Second antennal segment of male with long bristles and ciliate hairs, the latter less numerous than in macropterous male, in female only with long bristles; setae of third and fourth segments of both sexes as in winged male. Ratio of antennal segments 1:3.6-4.1:3.1-3.3:2.0. Rostrum as in winged form (fig. 180C-E).

Pronotum (figs. 177B, C; 179B) much reduced in size, subquadrate, posterior lobe about as long as anterior. Anterior lobe conspicuously convex; elevated ridges delicately granulose. Posterior lobe strongly rugose and wrinkled; submedian carinae conspicuous, occupying three-fourths of length of hind lobe; disc of posterior lobe depressed between carinae and between carinae and lateral margins. Posterior margin of pronotum rounded; lateral borders of posterior lobe emarginated. Humeral angles rounded. Anterolateral corners as in winged form.

Scutellum (fig. 179B) situated on semicircular sclerite, subtriangular, wider than long, heavily rugose, with an ill-defined, narrow median longitudinal impression, this depression in some specimens imperceptible. Posterior process of scutellum obsolescent.

Hemelytra reduced to small suboval sclerites (figs. 177B, C; 179B; 180L) not extending beyond hind margin of mesonotum; veins absent, but claval suture perceptible. Hind wings reduced to minute pads (fig. 180I), all but their extreme apex covered by hemelytra.

degree to urosternites, especially along intersegmental suture (fig. 180F). Spiracles enclosed in light spot.

Male genitalia as usual for genus, but lateral endosoma process large and foliaceous, appearing permanently everted (fig. 22B).

Brachypterus male. Similar to macropterous male, but hemelytra and wings abbreviated (fig. 180J, K), only attaining fifth or sixth urotergite, their venation complete.

Micropterous male and female (fig. 177B, C). Length of male 17.5-19.0 mm., of female 19.5-21.5 mm.; width of pronotum of male and female 3 mm., width of abdomen of male 5.2-6.0 mm., of female 6.5-8.0 mm.

Overall color black, with red markings on abdomen. Pilosity as in winged form.

Legs of male and female (figs. 177B, C; 179B) as in winged form; legs of male longer than those of female. Legs of female without spongy fossulae.

Venter convex, appearing carinate in preserved males examined, not flattened below in well-preserved females. Surface of urotergites and urosternites with extremely fine transverse striation, coarser on seventh urotergite of male and seventh and eighth urotergites of female. Anterolateral portion of urosternites delicately chagrined. Spiracles as in winged form. Struc-

ture of connexivum of male as in winged form. In female (fig. 20C) dorsal connexival plates fused to urotergites, with vestigial connexival suture perceptible in some cases. Ventral connexival plates of female narrow, hinged to dorsal plates but separated from lateral portion of urosternites by large membranous area. Connexivum red, with variable black markings (fig. 179B) as in winged form, red color extending to a varied degree to urotergites and urosternites along intersegmental sutures. Dorsal intersegmental sutures separating urotergites reddish

in many specimens. Anterior urotergites in some cases reddish at center.

Genitalia of male as in winged form (fig. 22B).

TYPES: Of *spinolai*, Instituto Oswaldo Cruz, Rio de Janeiro; of *chilena*, The American Museum of Natural History; of *porteri*, Instituto Oswaldo Cruz, Rio de Janeiro.

DISTRIBUTION: Chile (between 18°S and 34°S).

BIOLOGY: *Triatoma spinolai* has been found naturally infected by *Trypanosoma cruzi*. The species is restricted to the semiarid and arid regions of Chile. It has been collected among stones and in rock crevices, as well as in resting places of the wolf *Dusicyon* sp., rabbits

and hares, vizcachas (*Lagidium* sp.), and other rodents. *Triatoma spinolai* has also been encountered associated with marsupials (*Marmosa* sp.) and in corrals of domestic animals. In the area of coastal cliffs various guano birds are attacked—the bugs bite the birds' legs and feet. Fisherman and shell gatherers are also attacked at the seashore. The species has been found to attack man, mammals, and birds also in inland localities, in plain daylight. *Triatoma spinolai* has been found in human habitations but does not colonize there.

In the laboratory, this species could not be maintained for more than two generations when fed on pigeons.

OBSERVATIONS: This is the only conspic-

uously polymorphic species of triatomines, with macropterous, brachypterous, or micropterous males and invariably micropterous females. The genetics of this situation has not been worked out, and would constitute a fascinating subject, combined with mapping—geographically and ecologically—the occurrence of the various morphs.

Two generic names, *Mepraia* and *Triatomaaptera*, have almost simultaneously been proposed for *Triatoma spinolai*, both because of the extreme alary polymorphism in this species, unique in the subfamily Triatominae. Alary polymorphism is a quite common occurrence in other reduviid subfamilies (Reduviinae, Ectrichodiinae, Emesinae, and others); it appears in many genera independently, frequently although not exclusively in deserticolous species. Alary polymorphism is of limited systematic value because at least in the subfamilies mentioned above it occurs in species closely related to fully macropterous, clearly congeneric species.

Another unusual autapomorphic character of *T. spinolai*, on the specific level, is the specialized connexivum with a large membranous area separating the ventral connexival plates from the urosternites in the female (fig. 20C) but not in the male (fig. 20B). The presence of ciliate setae on the second antennal segment of the male (fig. 6G) but not of the female (fig. 6E) is equally of interest. Sensory setae on the tarsal segments (fig. 180B) of the adult are more numerous in this species than in other *Triatoma*.

Triatoma tibiamaculata (Pinto) Figures 181-183

Eutriatoma tibiamaculata Pinto, 1926a, p. 134, figs. C-E; 1931, p. 101, figs. 30, 39.

Triatoma (Eutriatoma) tibia-maculata: Lima, 1940, p. 199, fig. 383.

Triatoma tibiamaculata: Del Ponte, 1930, p. 902, fig. 2. Lent, 1943a, p. 242, figs. 1-5. Correa, 1954, p. 5, figs. 1, 2. Borba and Luz, 1972, p. 58.

Length of male 29-30 mm., of female 32.0-33.5 mm.; width of pronotum of male 7.0-7.5 mm., of female 7.5-8.0 mm.; width of

abdomen of male 10.0-10.5 mm., of female 11.0-12.5 mm.

Overall color black, with red and light orange-brown markings on neck pronotum, scutellum, corium, legs, and connexivum. Pilosity short and sparse, inconspicuous.

Head (figs. 181-183) black, slightly granulose-punctate, conspicuously rugose laterally. Head twice as long as wide (1:0.5), and as long as or slightly shorter than pronotum (1:1.0-1.1). Clypeus elongate, slightly widened behind middle. Genae blunt apically, falling distinctly short of apex of clypeus. Jugae small, narrowly angular, apical portion diverging from surface of cephalic capsule. Eyes in lateral view surpassing level of under but not attaining level of upper surface of head. Ratio width of eye to

synthlipsis 1:1.3-1.6. Antenniferous tubercles located behind center of anteocular region of head. First antennal segment with apex very close to level of apex of clypeus; second segment with numerous short adpressed setae and other, decumbent ones as long as or slightly longer than diameter of segment. Ratio of antennal segments 1:2.7-3.0:2.4-2.7:1.7-1.8. Rostrum (fig. 183B) black; first segment falling short of apex of antenniferous tubercles; second segment extending to level of posterior limit of neck. Rostral segments subcylindrical, with short setae, except on third segment with not very numerous setae as long as diameter of article. Ratio of rostral segments 1:2.2-2.6:0.4-0.6. Neck black, with pair of lateral orange-brown spots.

Pronotum (figs. 181, 182) black, with bright red markings on tubercles and forming narrow stripes. Anterior lobe with 1+1 discal and 1+1 lateral red tubercles; submedian carinae beginning immediately behind discal tubercles, extending close to posterior margin of sclerite, red, with red stripes continuing to hind border of sclerite, their ends connected by transversal red stripe along hind border. Lateral carinae of pronotum undulate, bordered with red from anterolateral processes to humeral angles. Posterior lobe distinctly rugose. Humeral angles rounded. Anterolateral processes of pronotum prominent, subconical, red. Pleura and sterna black, propleura light colored along hind margin.

Scutellum (figs. 181, 182) black, apex of posterior process contrastingly red; median depression shallow, narrowly subtriangular. Posterior process of scutellum two-thirds as long as main body of scutellum, horizontal, rugose, conical, wide at base, rounded-obtuse apically.

Hemelytra (figs. 181, 182) extending to or closely approaching posterior border of seventh urotergite, in both sexes. Corium light orange-brown, in some cases basally tinged with red, and with elongate wide black markings along some veins and in cells. Base of clavus and part of its outer margin dark. Membrane fumose, brownish, veins black.

Legs (figs. 181, 182) black on coxae, trochantera and femora, the latter with short

apical annulus yellowish, similarly colored on extreme base extending in some specimens to trochanter. Tibiae light yellowish brown, their apex annulate with black. Legs long and slender; fore femora from seven to eight times as long as wide. Femora without subapical denticles. Spongy fossulae on fore and mid tibiae of males, only on fore tibiae in females.

Venter convex, not distinctly flattened, delicately striate transversally, with very short, sparse setae. Spiracles close to or adjoining connexival suture. Urosternites dark brown, spiracles yellowish. Connexivum (figs. 181, 182) marked with black and light yellowish brown or reddish brown. Anterior two-thirds of each connexival segment dark, posterior third light; connexival sutures separating dark and light areas.

TYPE: Instituto Oswaldo Cruz, Rio de Janeiro.

DISTRIBUTION: Brazil (Bahia, Espírito Santo, Minas Gerais, Paraná, Rio de Janeiro, São Paulo, Santa Catarina, Sergipe).

BIOLOGY: This widespread species has been found naturally infected with *Trypanosoma cruzi*. It has been collected in epiphytic bromeliads, near or in the nests of the marsupials *Didelphis azarae azarea* Temminck and *Marmosa cinerea paraguayana* Thomas, as well as of *Oryzomys* sp. and of spiny rats (Echimyidae). Miles (1975) suggested that the coloration in this species is a camouflage for the bug's occurrence at the dry junction of epiphytes and trees.

Triatoma venosa (Stål)

Figures 184, 185

Conorhinus venosus Stål, 1872, p. 111.

Triatoma venosa: Neiva, 1914a, p. 70. Lent, 1950, p. 437, fig. 1. Marinkelle, 1972, p. 15.

Eutriatoma venosa: Pinto, 1931, p. 104.

Length of male 18.5 mm., of female 22 mm.; width of pronotum of male 4.5 mm., of female 5.0 mm., width of abdomen of male 6.5 mm., of female 9.0 mm.

Overall color dark brown or black, with head and legs reddish brown and yellowish or orange-red markings on thorax, hemelytra, and connexivum. Integument rugose, granulose on

some areas. Setae slender, short, golden colored, not conspicuous.

Head (figs. 184, 185) delicately rugose, reddish brown, dorsally with 1+1 black stripes

border of pronotum. Lateral and posterior margins of pronotum bordered with red except area of submedian dark markings which extend to hind border. Anterolateral angles red. Anterior lobe with 1+1 discal but without lateral tubercles. Posterior lobe rugose and slightly gran-

extending from level of base of clypeus to ocellar tubercles, enclosing median longitudinal granulose band. Head about twice as long as wide across eyes (1:0.4-0.5), and slightly longer than pronotum (1:0.9). Anteocular region three times as long as postocular (1:0.33), postocular with sides very faintly rounded, distinctly converging toward behind. Clypeus narrow, elongate, slightly widened on posterior half. Genae rounded distally, almost attaining level of apex of clypeus. Eyes in side view attaining level of lower but remote from level of upper surface of head. Ratio width of eye to synthlipsis 1:1.4. Antenniferous tubercles inserted slightly behind middle of anteocular region. First and second antennal segments dark brown or black; first very short, not extending beyond basal two-thirds of gena. Second antennal segment with stout decumbent setae slightly longer than diameter of segment. Ratio of antennal segments 1:3.0-3.3:2.8-2.9:1.8. Rostrum (fig. 185B) dark brown, darker than reddish head capsule, with short, inconspicuous setae. First rostral segment short, not extending beyond level of center of gena; second segment very long and slender, attaining level of hind border of head; third as long as or longer than first. Ratio of rostral segments 1:3.2-3.5:1.0-1.1. Neck uniformly reddish brown.

Pronotum (figs. 184, 185B) black, with orange-red markings. Anterior lobe with one central reddish spot extending from collar to transversal furrow, and 1 + 1 sublateral shorter markings. Posterior lobe with elongate red markings, one central and 1+1 sublateral, all extending from transverse furrow to posterior

ulose. Submedian carinae evanescent on posterior third of pronotum. Humeral angles rounded. Anterolateral projections shortly subcylindrical, rounded apically.

Scutellum (fig. 184) black, heavily rugose, its posterior process red, stout, two-thirds as long as main body of scutellum, horizontal, subcylindrical, rounded-truncate apically. Pleura black, with extensive reddish or yellowish areas.

Hemelytra (fig. 184) reaching apex of abdomen. Clavus, corium, and membrane black, with veins conspicuously yellowish and bordered with yellow. Base of corium with V-shaped marking extending onto subbasal portion of clavus. Apex of corium yellowish red. Cells of membrane unicolorous.

Legs dark reddish brown, stout; fore femur about six times as long as wide. Femora faintly granulose as sides and below; femora of all pairs of legs subapically with two or three unusually large denticles. Fore and mid tibiae of male with spongy fossulae, absent in female.

Abdomen rounded below, minutely striate transversally. Spiracles adjacent or very close to connexival suture. Pilosity of venter inconspicuous, delicate, adpressed. Venter dark brown, spiracles yellowish. Connexivum (figs. 184, 185C) black, with narrow transversal yellowish red markings straddling intersegmental sutures, with red area occupying anterior segment larger than that on posterior segment.

TYPE: Naturhistoriska Riksmuseet, Stockholm.

DISTRIBUTION: Colombia; Costa Rica.

BIOLOGY: *Triatoma venosa* has been found naturally infected with *Trypanosoma cruzi*. The habits and hosts of the species are unknown. In Colombia, specimens were collected between 1600 and 2200 m. altitude.

Triatoma vitticeps (Stål)
Figures 86; 186-188

Conorhinus vitticeps Stål, 1859, p. 109

Triatoma vitticeps: Neiva, 1914a, p. 71. Del Ponte, 1930, p. 905, pl. 53. Pinto, 1931, p. 62, fig. 9
Triatoma chagasi Brumpt and Gomes, 1914, p. 75, fig. 1

Triatoma holmbergi Del Ponte, 1923, p. 66; 1925, p. 28, pl. I, fig. B

Triatoma chagasi var. *holmbergi*: Del Ponte, 1930, p. 865, pl. 42, fig. 1

Triatoma neivai Del Ponte, 1923, p. 66; 1925, p. 30, pl. I, fig. C

Triatoma chagasi var. *neivai*: Del Ponte, 1930, p. 867, pl. 42, fig. 2.

Length of male 27.5-33.0 mm., of female 28.5-38.0 mm.; width of pronotum of male 7-8 mm., of female 7.0-8.5 mm.; width of abdomen of male 10.0-13.5 mm., of female 10.0-14.5 mm.

Overall color very dark brown tending toward black, with reddish brown or orange-red markings on head, neck, pronotum, pleura, scutellum, hemelytra, and connexivum. Pleura and under surface of thorax and abdomen dull. Pilosity short and sparse.

Head (figs. 186-188) dark brown, dorsally along center with reddish brown band extending from level of ocelli to clypeus. Head feebly rugose and granulose, less than twice as long as wide (1:0.6) and distinctly shorter than pronotum (1:1.1-1.2). Anteocular region three times as long as postocular (1:0.35), postocular with sides straight, converging toward behind. Clypeus abruptly widened on posterior half.

Genae narrowly tapering apically but not pointed, attaining or slightly extending beyond level of apex of clypeus. Jugae pointed apically, terminal portion toothlike, in some cases diverging from surface of head capsule. Eyes in lateral view attaining but not surpassing level of lower and remote from level of upper surface of head. Ratio width of eyes to synthlipsis 1:1.9-2.4. Antenniferous tubercles situated slightly beyond middle of anteocular region. First antennal segment attaining or slightly surpassing level of apex of clypeus. Second article

with numerous adpressed setae shorter than diameter of segment. Ratio of antennal segments 1:3.0-3.2:2.2-2.7:1.9-2.0. Rostrum (fig. 188B) as dark as head capsule; first segment falling short of level of apex of antenniferous tubercles; second segment extending to or beyond level of hind margin of eyes. Rostral segments stout, subcylindrical; dorsal surface of second and third segments, and under surface of apical third or half of second, and entire third segment with dense long hairs, many longer than diameter of respective segment. Remainder of rostrum with sparse short hairs. Ratio of rostral segments 1:1.7-1.9:0.8. Neck dark brown, with a pair of lateral yellow spots.

Pronotum (figs. 186, 187) dark brown, with reddish pattern elements. Anterior lobe faintly granulose, with 1+1 small, low, reddish discal protuberances; in some specimens, lateral tubercles in shape of low protuberances also perceptible. Posterior lobe rugose. Submedian carinae relatively short, evanescent on posterior third. Humeral angles rounded. Posterior lobe of pronotum dark brown, with three pairs of reddish brown markings; 1+1 on lateral portion of lobe extending to humeral angles; 1+1 sub-lateral markings lateral of submedian carinae extending for whole length of posterior lobe, and 1+1 shorter submedian markings separated medially only by central longitudinal sulcus of posterior lobe. Size of reddish markings variable, in some cases more extended than described above, partly confluent; in some specimens almost entire anterior lobe reddish, or pronotum with entire lateral and posterior margin narrowly bordered with red. Anterolateral projections reddish brown, large, truncate or subconical, slightly flattened dorsoventrally.

Scutellum (fig. 187) rugose and faintly granulose, dark brown, with central depression wide, reddish. Posterior process of scutellum about as long as main body of scutellum, subcylindrical, horizontal, with apex rounded and slightly elevated. Propleura posteriorly with reddish spot of variable extension, in some cases occupying almost entire pleura. Anterior acetabula variously marked with reddish.

Hemelytra (figs. 186, 187) in most specimens attaining posterior border of seventh urotergite, only rarely slightly shorter. Color of

hemelytra dark brown, darkest at center of corium and at base of membranal cells. Corium

with light markings basally or subbasally or both, subapically, and in some cases also nar-

Triatoma williami Galvão, Souza and Lima
Figures 189, 190

Triatoma williami Galvão, Souza and Lima, 1965, p. 363, fig. 1. Galvão, Souza and Lima, 1967, p. 400, figs. Travassos Filho, 1972, p. 263, fig. 1. Galvão and Fuentes, 1971, p. 141, figs. 1-3.

Length of male 25.0-25.5 mm., of female 26-28 mm.; width of pronotum of male 5.5 mm., of female 6 mm.; width of abdomen of male 8.5-9.0 mm., of female 10.0-10.5 mm.

Overall color dark brown to black, with yellow markings on neck, hemelytra, and connexivum. Pilosity short and sparse.

Head (figs. 189, 190A, B) black, delicately rugose and granulose, approximately twice as long as wide (1:0.45-0.50), and distinctly longer than pronotum (1:0.8-0.9). Anteocular region four times as long as postocular (1:0.25), postocular with sides straight, distinctly converging posteriorly. Clypeus elongate, gradually widened on posterior half. Genae narrowly tapering apically, distinctly projecting beyond level of apex of clypeus. Jugae angular apically. Eyes in lateral view surpassing level of under and approaching level of upper surface of head. Ratio width of eye to synthlipsis 1:1.25-1.45. Antenniferous tubercles located at center of anteocular region of head. First antennal segment falling distinctly short of level of apex of clypeus; second segment with numerous adpressed setae shorter than diameter of segment. Ratio of antennal segments 1:4.9-5.1:3.2:? Rostrum (fig. 190B) as dark as head or lighter brown; first segment falling short of level of apex of antenniferous tubercle, second attaining level of posterior margin of eyes. Rostrum slender, with short hairs except on third segment where hairs are as long as diameter of segment although not very dense. Ratio of rostral segments 1:2.3-2.6:1.0-1.05. Neck dark, with pair of lateral yellowish spots.

rowly along costal margin. Portion of Cu in corium and portions of veins enclosing basal half of inner membranal cell very light colored and bordered with light. Membrane fumose, dark brown.

Legs (figs. 186, 187) uniformly dark. Fore femora slender, six to seven times as long as wide. Fore and mid femora with pair of well-developed denticles subapically. Fore and mid tibiae with spongy fossulae in both sexes.

Venter convex, slightly flattened longitudinally along middle, delicately striate transversally, and with short setae. Spiracles adjoining or very close to connexival suture. Urosternites dark brown, except small light spots enclosing spiracles. Connexivum (figs. 186, 187) extensively dark brown, disc of segments with yellowish or light orange-red transverse markings distinctly smaller than dark areas; light markings coming closer to posterior than to anterior intersegmental sutures. Yellow markings of under surface of connexivum in some cases smaller than corresponding ones on dorsal surface.

TYPES: Of *vitticeps*, Zoologisches Museum, Berlin; of *chagasi*, Faculté de Médecine, Paris; of *holmbergi* and *neivai*, unknown.

DISTRIBUTION: Brazil (Espírito Santo; Minas Gerais, Rio de Janeiro).

BIOLOGY: *T. vitticeps* has been found naturally infected with *Trypanosoma cruzi*. The species is known to colonize in houses. Sylvatic specimens were found in burrows of the rodent *Kerodon rupestris* and in shelters of opossum (*Didelphis* sp.).

Pronotum (fig. 189) entirely black. Anterior lobe feebly sculptured, not granulose, without discal or lateral tubercles. Posterior lobe conspicuously rugose. Submedian carinae extending close to hind margin of sclerite. Humeral angles rounded. Anterolateral projections small, conical, subacute apically.

lowish brown with veins dark, in some places veins also bordered with dark. Membrane fumose, grayish brown, darker than light colored areas of corium; veins of membrane conspicuously dark.

Legs (fig. 189) uniformly dark, long and slender. Fore femora 7-8 times as long as wide. Fore and mid femora with one pair of small denticles subapically. Fore and mid tibiae of male with spongy fossulae, absent in female.

Venter convex, slightly flattened longitudinally along middle in female, not distinctly so in male, delicately striate transversally, with sparse, very short setae. Spiracles adjoining connexival suture. Abdomen wide, extreme lateral portions of urotergites exposed, not covered by hemelytra (fig. 189). Urosternites dark brown, except minute yellow spots enclosing spiracles. Connexivum (figs. 189, 190C) pale yellow, segments with small dark mark at intersegmental suture along outer border of segment, and dorsally but not ventrally darkened along connexival suture.

TYPE: Instituto Butantan, São Paulo.

DISTRIBUTION: Brazil (Goiás, Mato Grosso).

BIOLOGY: *Triatoma williami* has been found naturally infected by *Trypanosoma cruzi*. The species occurs in human habitations; its sylvatic habits are not known.

Triatoma wygodzinskyi Lent
Figures 191-193

Triatoma wygodzinskyi Lent, 1951b, p. 349, figs. 1-3.

Scutellum (fig. 189) uniformly dark, with shallow median depression; posterior process shortly subconical, not more than half as long as main body of scutellum, horizontal, wide at base, very narrowly rounded apically.

Hemelytra (fig. 189) attaining apex of seventh urotergite in both sexes. Clavus dark at base and along outer margin. Corium light yel-

Length of male 19.0-19.5 mm., of female 19-20 mm.; width of pronotum of male 4.5-5.0 mm., of female 4.0-4.5 mm.; width of abdomen of male 6.0-6.5 mm., of female 6.5-7.0 mm.

Overall color black, with reddish markings on neck, humeral region of pronotum, corium, and connexivum. Integument almost glabrous, setae very short and sparse.

Head (figs. 191, 192, 193A, B) black, rugose anterolaterally, granulose dorsally, less than twice as long as wide (1:0.6) and as long as

pronotum. Anteocular region three times as long as postocular (1:0.35), postocular with sides rounded and converging toward behind. Clypeus long and narrow, only slightly widened behind middle. Genae narrowly tapering apically but not pointed, distinctly surpassing level of apex of clypeus. Jugae blunt apically. Eyes in side view considerably surpassing level of lower and approaching level of upper surface of head. Ratio width of eye to synthlipsis 1:1.3-1.4. Antenniferous tubercles situated slightly behind middle of anteocular region. First antennal segment falling considerably short of level of apex of clypeus; second antennal segment 4.5 times as long as first (remaining not preserved). Rostrum (fig. 193B) from reddish brown to black. Second and third segments somewhat compressed dorsoventrally, slender in lateral view. Rostrum appearing glabrous, except third segment with numerous distinct but short hairs. First segment attaining level of apex of jugae, viz., not reaching to apex of antenniferous tubercles; second attaining level of hind margin of eye. Ratio of rostral segments 1:2.2-2.4:1.0. Neck dark, with pair of very small reddish spots laterally.

Pronotum (figs. 191, 192, 193A) black, with distinct reddish spot on each humeral region, and, in some specimens, with large spot on disc between carinae posteriorly. Anterior lobe not granulose, without discal and lateral tubercles. Posterior lobe heavily wrinkled; submedian carinae evanescent on posterior third of lobe. Humeral angles narrowly rounded. Anterolateral projections prominent, conical, not flattened dorsoventrally.

Scutellum with distinct median depression. Posterior process of scutellum (fig. 192) subcylindrical, about three-fourths as long as main body of scutellum, horizontal with apex slightly upturned, distally rounded in dorsal and obliquely truncate in lateral view. Process uniformly dark.

Hemelytra (figs. 191, 192) extending to apex of seventh urotergite, in both sexes. Corium dark brown, with extensive areas subbasally, subapically and at center, reddish. Base of clavus also reddish, its remainder light brown. Membrane fumose, light brown, lightest at base; veins distinctly darker than cells.

with central two-thirds occupied by light red spot extending across entire width of segment, thus transverse narrow black band straddling intersegmental suture.

Male genitalia with endosomal processes (fig. 192C) not over half as long as phallosoma, weakly sclerotized, their apices with about 20 teeth (fig. 192D).

TYPE: Instituto Oswaldo Cruz, Rio de Janeiro

DISTRIBUTION: Brazil (Minas Gerais).

BIOLOGY: Unknown.

DISCUSSION: This species is very similar to *T. arthurneivai* chromatically and in its external morphology, although the corium is uniformly dark in *arthurneivai*; the latter species also seems to lack the light colored spots on the humeral area. These color characters may be subject to slight variation, and chromatically intermediate forms are imaginable. However, the structure of the endosoma processes of the male genitalia (figs. 38C, D, and 193C, D) is sufficient to differentiate the species.

Legs (fig. 192) uniformly dark. Fore femora 5-6 times as long as wide. Femora of fore and mid legs with a pair of small subapical denticles. Fore and mid tibiae of male with spongy fossulae, absent in female.

Venter convex, very slightly flattened in female, delicately striate transversally, sparsely beset with short setae. Spiracles adjoining connexival suture. Urosternites uniformly dark, except minute light colored spot enclosing spiracles. Connexival segments (figs. 191, 192)

ERATYRUS STÅL

Eratyrus Stål, 1859, p. 103. Pinto, 1931, p. 131
Usinger, 1944, p. 37. Lent and Jurberg, 1970, p.
297.

Triatomini. Large sized (23-29 mm). Body not conspicuously flattened. Overall color dark, with few pattern elements. Head and thorax not granulose, with short setae only.

Head elongate, narrowly cylindrical. Antenniferous tubercles situated at middle of antecocular region of head. Rostrum as long as head, slender, extending to level of prosternum; first and second segments elongate, although first not quite as long as second; third very short, without rostral organ. Antennae unusually long, reaching to basal portion of membrane when bent backward.

Anterior lobe of pronotum with conspicuous discal tubercles or spines, but without lateral tubercles. Humeri with spinelike processes. Prosternum with stridulatory sulcus. Scutellum with unusually long process, as long as or longer than main body of scutellum, reflexed, acute. Hemelytra with corium (except cell adjoining clavus) covered with conspicuous short erect bristles. Femora armed with series of small denticles. Spongy fossulae present in males.

Abdomen with connexival segments normally developed. Venter flattened longitudinally along middle. Female genitalia elongate, pointed. Male genitalia with vesica strongly sclerotized.

Fifth instar nymph: As described for tribe; fourth antennal segment delicately annulate; rostrum of normal length, first and second segments elongate, third short, without rostral organ; stridulatory sulcus well developed; antenniferous tubercles situated at center of antecocular region; abdomen semimembranous, not granulose, dorsally with series of five prominent median tubercles.

First instar nymph: As described for tribe; rostrum attaining prosternum, slender, first segment slightly over half as long as second; stridulatory sulcus present; hind tarsi apically with long, delicate sensory hairs.

TYPE SPECIES: *Eratyrus mucronatus* Stål.

DISTRIBUTION: Central America and South America south of Bolivia.

BIOLOGY: Occasionally in houses or peridomestic, otherwise associated with bats.

OBSERVATIONS: *Eratyrus* differs from *Triatoma* by the characters given in the keys and furthermore by the unusually long antennae which in *Triatoma* fall short of the apex of the scutellum when bent backward.

The two species included in the genus are very similar and not easily to be determined specifically in all cases. However, the shape of the free portion of the vesica is constantly different, and serves to identify securely at least the males. The ranges of the two species are different: *E. cuspidatus* occurs in Central America and in South America west of the Andes, while *E. mucronatus* is found in the vast continental reaches east of the Andean chain. However, the species may be sympatric in some areas of western and northern Venezuela.

KEY TO THE SPECIES OF *Eratyrus*¹

1. Fore lobe of pronotum with 1+1 strong discal spines (figs. 197, 198A, E-G); humeral angles distinctly spinose (figs. 196, 197, 198A, H-N); subapical reddish spot of corium comparatively small, anteriorly not attaining level of m-cu cross-vein (figs. 196, 197, 198B-D); free portion of vesica flattened apically in side view (fig. 195H) *mucronatus*
Fore lobe of pronotum with 1+1 low apically rounded discal tubercles (figs. 195A, B); humeral angles angular or pointed but not spinose (fig. 195A, B); subapical reddish spot of corium relatively large, anteriorly attaining or surpassing level of m-cu cross-vein (figs. 194, 195F); free portion of vesica convex apically in side view (fig. 195G) *cuspidatus*

Eratyrus cuspidatus Stål
Figures 8H, 194, 195A-G, I

Eratyrus cuspidatus Stål, 1859, p. 103. Usinger, 1944, p. 37, pl. 8, fig. A. Lent and Jurberg, 1970, p. 306, figs. 4-9, 17-20, 23-24, 29-32, 37-38, 45-50, 58-64.

Conorhinus cuspidatus: Walker, 1873b, p. 14.

Length of male 24-27 mm., of female 25-31 mm.; width of thorax of male and female 5-6

¹Spanish version of key, p. 479; Portuguese version, p. 496.

mm.; width of abdomen of male 7-8 mm., of female 8-10 mm.

Overall color dark brown or black, with sides of neck and abdominal venter yellowish; corium with reddish mark subapically. Integument not granulose, setae of dorsal surface numerous, short.

Head (figs. 194, 195A, B) of general color, its integument smooth, with numerous short strong bristles. Head two and one-half times as long as wide (1:0.40-0.45) and from distinctly to slightly longer than pronotum (1:0.75-0.95). Anteocular region from three to four times as long as postocular (1:0.25-0.35); postocular relatively short, ratio width to length 1:0.5-0.6, its sides distinctly rounded. Clypeus narrow, slightly swollen on posterior half. Genae narrowly tapering apically but not pointed, falling slightly short of level of apex of clypeus. Jugae blunt apically. Eyes in lateral aspect attaining level of lower and closely approaching level of upper surface of head. Ratio width of eye to synthlipsis 1:1.2-1.65. Antenniferous tubercles situated at center of anteocular region. First antennal segment attaining but not surpassing level of apex of clypeus; second segment with inclined bristles, shorter than diameter of segment. Ratio of antennal segments 1:4.0-4.5:3.75-4.05:3.15-3.45. Rostrum (fig. 195B) of same color as head capsule, slender, segments subcylindrical. Setae of rostrum short, scattered, about as long as diameter of second segment on its apical half, on third segment longer than its diameter. First rostral segment extending to or slightly beyond middle of distance from antenniferous tubercle to anterior margin of eye. Second rostral segment slightly longer than first, extending to base of neck. Ratio of rostral segments 1:1.10-1.15:0.30-0.35. Neck yellowish at sides, dark at center above.

Pronotum (figs. 194, 195A, B) with numerous short stiff bristles. Ridges of anterior lobe low but conspicuous. Discal tubercles low, rounded apically, occasionally almost imperceptible. Posterior lobe irregularly and shallowly rugose throughout. Submedian carinae attaining posterior margin of sclerite, inwardly curved apically. Humeri salient, angulate but not spined (fig. 195A, C, D).

Scutellum (fig. 195A) transversally rugose,

with shallow median depression; remainder of scutellum only faintly rugose. Inclination of scutellar spine (fig. 195B) variable; angle formed by spine and surface of hemelytra varying from 30 to 50 degrees.

Hemelytra (fig. 194) covering entire length of abdomen, but leaving genitalia of female exposed. Hemelytra dark brown or black, darkest on corium; clavus, cell adjoining clavus, and membrane all fumose, dark brown; corium black, with relatively large subapical reddish spot, attaining or surpassing level of m-cu cross-vein (figs. 194, 195F).

Legs (figs. 194) strong, elongate, fore femur

5.5-6.8 times as long as wide. Fore femora with double row of 4-6 minute setigerous tubercles, more conspicuous in male than in female; mid and hind femora without distinct denticles. Fore and mid tibiae of male with small spongy fossulae, absent in female.

Abdomen dark, with center of dorsal and ventral surface pale yellow. Venter convex, distinctly and abruptly flattened longitudinally along middle, in both sexes. Urosternites delicately and shallowly striate transversally, with numerous fine decumbent hairs. Spiracles distant from connexival suture by a distance equal to once or twice their diameter. Connexivum

(fig. 194) uniformly dark, almost twice as wide dorsally as ventrally.

Genitalia of male as shown in figure 195E, G; free portion of vesica convex in side view (fig. 195G). Genitalia of female in dorsal view as shown in figure 195I.

TYPE: Zoologisches Museum, Berlin.

DISTRIBUTION: Colombia; Ecuador; Guatemala; Panama; Venezuela. *Eratyrus cuspidatus* occurs in Central America and in South America west of the Andes.

BIOLOGY: *Eratyrus cuspidatus* has been reported naturally infected by *Trypanosoma cruzi*. The species has been collected occa-

sionally in houses, attracted by artificial light. Peridomestically, it has been found in bundles of firewood and in goat corrals. The species has also been reported as associated with bats.

Eratyrus mucronatus Stål

Figures 13B; 14D; 22E; 24M; 29G; 30F; 196-198

Eratyrus mucronatus Stål, 1859, p. 103. Neiva and Lent, 1941, p. 70, fig. 18. Lumbreiras, 1960, p. 214, figs. 1, 2. Lent and Jurberg, 1970, p. 304, figs. 2, 3, 10-16, 21-22, 25-28, 33-36, 39-44, 51-57.

Conorhinus mucronatus: Walker, 1873b, p. 14.

Length of male 23-27 mm., of female 25.5-29.0 mm., width of thorax of male and female 5.0-5.5 mm.; width of abdomen of male 6.0-7.5 mm., of female 8.0-8.5 mm.

Overall color dark brown or black, with sides of neck and underside of abdomen yellowish; corium with reddish mark subapically. Integument not granulose; setae short.

Head (figs. 196, 197, 198A) of general color, its integument not granulose or rugose, with scattered stout bristles. Head two and one-half times as long as wide across eyes (1:0.4) and distinctly longer than pronotum (1:0.75-0.80). Anteocular region about three times as long as postocular (1:0.30-0.35); postocular relatively elongate, ratio width to length 1:0.6-0.7; its sides faintly convex, slightly converging posteriorly. Clypeus narrow, somewhat swollen on posterior half. Genae tapering apically but not pointed, falling slightly short of level of apex of clypeus. Jugae blunt apically. Eyes in lateral aspect attaining level of upper and of lower surface of head. Ratio width of eye to synthlipsis widely variable, 1:0.80-1.45. Antenniferous tubercles situated at center of anteocular region. First antennal segment attaining or slightly surpassing level of apex of clypeus; second segment beset with short inclined bristles shorter than diameter of article. Ratio of antennal segments 1:4.6-5.0:3.6-3.9:2.9-3.2. Rostrum (fig. 198A) dark reddish brown, slightly lighter than head capsule, slender, segments subcylindrical. Setae of rostrum very short and comparatively sparse, except third segment with setae longer than its diameter. First rostral segment extending to middle or beyond middle of space between antenniferous tubercle and anterior margin of eye. Second segment of rostrum from slightly to distinctly longer than first, extending to level of base of neck. Ratio of rostral segments 1:1.05-1.25:0.25-0.35. Neck yellowish at sides, dark above at center.

Pronotum (figs. 196, 197, 198A, E-N) with anterior lobe almost smooth, ridges poorly developed. Discal tubercles in shape of short or long acutely pointed spines, when elongate curving slightly backward. Posterior lobe irregularly wrinkled throughout, with submedian carinae extending very closely to posterior margin of pronotum, their apical portion mediad curved. Humeri with distinct suberect spinelike projections of varied length but invariably shorter than spines of anterior lobe. Anterolateral projections of pronotum large, prominent, elongate subconical but not spinelike.

Scutellum (figs. 197, 198A) with shallow median transversely rugose impression, re-

mainder of scutellum glabrous. Inclination of scutellar spine extremely variable, angle formed

by spine and hemelytra (fig. 198A) varying between 30 and 60 degrees.

Hemelytra (figs. 196, 197) covering entire abdominal length, but leaving genitalia of female exposed. Hemelytra of general dark color, with subapical reddish spot on corium relatively small, not attaining anteriorly level of m-cu cross vein (figs. 196, 197, 198B-D).

Legs (figs. 196, 197) strong, elongate; fore femur 5.7-6.3 times as long as wide. Fore femora with double row of 6-7 small setiferous denticles on apical half below; mid and hind femora with one or two similar denticles. Fore and mid tibiae of male with small spongy fossulae, absent in female.

Abdomen dark, but center of dorsal and ventral surface pale yellow. Venter convex, distinctly flattened longitudinally along middle in both sexes although more conspicuously so in female. Urosternites delicately and very shallowly striate transversally, with delicate decumbent hairs. Spiracles close to connexival suture, separated from latter by distance not larger than their diameter. Connexivum (figs. 196, 197) uniformly dark, almost twice as wide dorsally as ventrally.

Genitalia of male with free portion of vesica flattened or slightly concave in lateral view (fig. 195H).

TYPE: Zoologisches Museum, Berlin.

DISTRIBUTION: Bolivia; Brazil (Amazonas, Mato Grosso, Pará); Colombia; French Guiana; Guyana; Peru; Surinam; Trinidad; Venezuela. This species does not occur in Central America, or in South America west of the Andes.

BIOLOGY: *Eratyrus mucronatus* has been reported naturally infected by *Trypanosoma cruzi*. A Peruvian specimen has been found inside a human habitation, and the species has been collected outside houses in urban and rural areas in Colombia. P. H. van Doesburgh, Jr. (in lett.) has collected specimens of this species (examined by us) in hollow trees inhabited by bats, in the Botanical Garden in Paramaribo, Surinam.

LINSHCOSTEUS DISTANT

Linshcosteus Distant, 1904, p. 287. Pinto, 1931, p. 134. Usinger, 1939, p. 35. Neiva and Lent, 1941, p. 69. Ghauri, 1976, p. 183.
Cenaeus Pinto, 1925a, p. 88 (*nec* Stål).

Triatomini. Medium sized (17-28 mm.). Body conspicuously flattened. Overall color

black. Head and thorax densely beset with setiferous granules; setae short and inconspicuous.

Head elongate subcylindrical. Antenniferous tubercles situated before middle of anteocular region of head. Rostrum abbreviated, shorter than head, not extending to level of prosternum. First and third rostral segments short, second elongate. Third segment without rostral organ.

Fore lobe of pronotum without discal or lateral tubercles. Humeral angles not spined. Prosternum without stridulatory sulcus. Scutellar spine subconical, narrowly tapering apically. Legs with femora unarmed; spongy fossulae absent in both sexes.

Abdomen very wide; lateral portions of urotergites exposed, not covered by hemelytra. Dorsal and ventral connexival segments normally developed. Venter of abdomen conspicuously flattened longitudinally along middle.

Fifth instar nymph: With the characters of the tribe; fourth antennal segment delicately annulate; rostrum abbreviated, not extending to level of neck, first segment much shorter than second, third segment without rostral organ; stridulatory sulcus absent; antenniferous tubercles situated at center of anteocular region; abdomen dorsally with series of well-developed median tubercles.

First instar nymph: As described for tribe; rostrum abbreviated, not attaining level of neck; stridulatory sulcus absent; hind tarsi apically with long, delicate sensory hairs.

TYPE SPECIES: *Linshcosteus carnifex* Distant.

DISTRIBUTION: India.

BIOLOGY: Found under rocks and boulders.

OBSERVATIONS: The abbreviated rostrum combined with the absence of a stridulatory groove is an apomorphic condition unique among the Triatomini, but we have not been able to determine the cladistic relationships between *Linshcosteus* and the remaining genera of the tribe.

KEY TO THE SPECIES OF *Linshcosteus*

1. Body length approximately 25 mm., or less than 18 mm.; humeral angles prominent (figs. 200A; 202, 203A), narrowly rounded; anteocular region about five times as long as postocular (figs. 200A; 203A)
Body length 20-21 mm., humeral angles broadly rounded, not prominent (figs. 204,

- 205A; 206, 207A; 209A); anteocular region not more than four times as long as postocular (figs. 205A; 207A; 209A) 3
2. Length about 26 mm.; eyes about half as wide as synthlipsis (fig. 200A); genae extending beyond level of apex of clypeus, the latter not conspicuously swollen (fig. 200B) *carnifex*
Length about 17 mm.; eyes distinctly less than half as wide as synthlipsis (fig. 203A); genae not extending beyond level of apex of clypeus, the latter strongly swollen (fig. 203B) *chota*
3. Eyes more than half as wide as synthlipsis (fig. 207A); costal margin of hemelytra broadly light reddish or yellowish brown (fig. 206) *costalis*
Eyes half or less than half as wide as synthlipsis (figs. 205A; 209A); costal margin of hemelytra black, concolorous with rest of hemelytra (figs. 204, 208) 4
4. Apex of second rostral segment falling short of level of anterior margin of eyes, in lateral view (fig. 209C), third not extending beyond level of hind margin of eyes (fig. 209C); postocular portion of head conspicuously convex below *kali*
Apex of second rostral segment attaining or surpassing level of anterior margin of eyes (fig. 205B, C); third rostral segment extending beyond level of posterior margin of eyes (fig. 205B, C); postocular portion of head only feebly convex below (fig. 205B, C) *confimus*
- Linshcosteus carnifex* Distant
Figures 199, 200
- Linshcosteus carnifex* Distant, 1904, p. 287, fig. 190.
Pinto, 1927, p. 111, fig. 11; 1931, p. 135, fig. 70.
Neiva and Lent, 1941, p. 74, figs. 11, 12. Ghauri,
1976, p. 184 (part), figs. 1, 2.
- Cenaeus carnifex*: Pinto, 1925a, p. 88, figs. 57, 58
(*nec* Fabricius).
- Female holotype (fig. 199). Length 25.5 mm.; width of pronotum 5.6 mm., of abdomen 10 mm.
- Overall color dark brown or black. Pilosity short, inconspicuous.

Head (fig. 200) with numerous low setiferous tubercles, except narrowly along middle below. Head over twice as long as wide (1:0.4) and much longer than pronotum (1:0.7). Anterior region five times as long as postocular (1:0.2); postocular with sides slightly rounded, widest at middle, and only slightly convex below. Clypeus strongly widened on posterior half, not conspicuously elevated in lateral aspect. Genae narrowly tapering apically, extending beyond level of apex of clypeus. Jugae acute but not pointed apically. Eyes in lateral view extending close to level of lower surface but distant from level of upper surface of head. Ratio width of eyes to synthlipsis 1:1.60-1.85. First antennal segment falling short of level of apex of clypeus; remaining segments not preserved. Setae of rostrum not examined. Apex of first rostral segment (fig. 200B) falling distinctly short of level of apex of antenniferous tubercle; second segment not attaining level of anterior margin of eyes; third segment extending close to but not attaining level of hind margin of eyes. Ratio of rostral segments 1:2.25:0.60.

Pronotum (fig. 200A) black, its sides not carinate. Anterior lobe not strongly elevated, ridges granulose. Posterior lobe rugose, granulose, with submedian carinae extending backward to slightly beyond middle of posterior lobe. Humeral angles prominent, very narrowly rounded. Anterolateral projections small, subconical, blunt apically. Scutellum black, coarsely rugose, its center faintly depressed; posterior process as long as main body of scutellum, horizontal, conical, narrowly tapering apically.

Hemelytra (fig. 199) attaining apex of eighth urotergite. Corium black; membrane fumose, dark brown, veins yellowish brown. Legs (fig. 199) uniformly black, slender; fore femora 8.5 times as long as wide.

Abdomen as described for *L. costalis*.

TYPE: British Museum (Natural History).

DISTRIBUTION: Distant (1904) indicated this species to be from "North India"; the type bears a label reading "E. Ind."

BIOLOGY: Unknown.

OBSERVATIONS: This is the largest species of *Linhcosteus*, known only from the female. A male in the British Museum, labeled but not published by Ghauri as allotype of *carnifex*, and included by Ghauri (1976) with doubts in this species, is being described as a new species in this paper.

Cenaeus carnifex, described as *Cimex carnifex* by Fabricius, is a South African pyrrhocorid; it happens to share its specific name with the type species of *Linhcosteus*.

There is a poorly preserved female specimen of *Linshcosteus* in the collection of the Instituto Oswaldo Cruz. This specimen, illustrated by Pinto (1925; figs. 57, 58), is labeled Cawnpore, India/, P.R. Uhler Collection/*Linshcosteus carnifex* Stål. This is a female, 26.5 mm. long, which agrees with the type of *carnifex* except that its hemelytra are conspicuously shortened, leaving the seventh and following urotergites entirely exposed. Cawnpore [Kanpur] is in the northern Indian state of Uttar Pradesh; thus, even if we do not assign the specimen definitely to *carnifex*, it does provide evidence that *Linshcosteus* is not restricted to South India.

***Linshcosteus chota*, new species**

Figures 22C; 201-203

Linshcosteus carnifex: Ghauri, 1976, p. 184 (part),
figs. 3, 4, 14, 19, 22.

Male holotype. Length 17.5 mm.; width of pronotum 3.9 mm., of abdomen 6.3 mm. Overall color reddish brown (probably faded from dark brown or black). Pilosity short, black.

Head (figs. 201-203) with numerous small, low setigerous granules except narrowly along middle ventrally. Head over twice as long as wide (1:0.4) and much longer than pronotum (1:0.7). Anteocular region five times as long as postocular (1:0.2); postocular with sides feebly rounded, widest at middle, very faintly convex below. Clypeus strongly widened on posterior half, unusually elevated in lateral aspect. Genae narrowly tapering apically, not extending beyond level of apex of clypeus. Jugae narrowly tapering but not pointed apically. Eyes in side view approaching but not attaining level of under surface and distant from level of upper surface of head. Ratio width of eye to synthlipsis 1:2.6. First antennal segment falling short of level of apex of clypeus; second segment with decumbent setae as long as diameter of segment. Ratio of first two antennal segments 1:4.8; remaining not preserved. Rostrum (fig. 203B) with hairs shorter than diameter on first and most of second segment, as long as or longer than diameter at apex of second and on third segment. Apex of first rostral segment falling distinctly short of level of apex of an-

tenniferous tubercle; second not attaining level of anterior border of eyes, third extending to level of posterior margin of eyes. Ratio of antennal segments 1:1.8:0.55.

Pronotum (figs. 201, 202, 203A) with sides carinate. Anterior lobe more strongly convex than in other species; ridges granulose. Posterior lobe strongly rugose, granulose; submedian carinae extending slightly beyond middle of posterior lobe. Humeral angles very narrowly rounded. Anterolateral processes conical, narrowly rounded apically.

Scutellum (figs. 201, 202) coarsely rugose transversally, its center slightly depressed; posterior process approximately as long as main body of scutellum, horizontal, conical, narrowly tapering apically.

Hemelytra leaving apical third of eighth

urotergite exposed. Corium dark; membrane fumose, somewhat lighter than corium.

Legs uniformly dark, slender; fore femora six times as long as wide.

Abdomen as described for *L. costalis*.

MATERIAL EXAMINED: South India / T. V. Campbell coll., B. M. 1930-599/1145 Bellary (British Museum [Natural History]), one male, holotype.

BIOLOGY: Unknown.

OBSERVATIONS: This specimen, labeled by Usinger as "n. sp." in 1949, was identified in 1951 by Lent as *Linshcosteus carnifex* and labeled Alloty whole. Ghauri (1976) included the

FIG. 203. *Linshcosteus chota*. A. Head and pronotum. B. Head, lateral view.

specimen with doubts under *carnifex*. We now agree with Usinger's opinion, and consequently describe this specimen as representing a new species.

In addition to the differential characters contained in the key and description, *L. chota* is distinguished from the males of the other species where this sex is known, by the apically blunt process of the pygophore (see Ghauri, 1976, fig. 19); the process is pointed apically in *confusus*, *costalis* and *kali*.

ETYMOLOGY: The specific name is taken from the Hindi *chota*, small.

Linshcosteus confusus Ghauri
Figures 204, 205

Linshcosteus confusus Ghauri, 1976, p. 184, figs. 5-8, 15, 16, 20, 23, 25, 26, 28.

Length of male 21.8 mm., of female 23.2 mm.; width of pronotum of male 4.8-5.0 mm., of female 5 mm.; width of abdomen of male 9.0 mm., of female 10.6-10.8 mm.

Overall color very dark brown or black. Pilosity short, inconspicuous.

Head (figs. 204, 205) with numerous setiferous granules except on narrow band along middle ventrally. Head very slender, almost three times as long as wide (1:0.35), and much longer than pronotum (1:0.7). Anteocular region approximately four times as long as postocular (1:0.25-0.30); postocular with sides

ment. Ratio of first and second antennal segments (only one specimen examined for this character) 1:5.2. Rostrum (fig. 205C) with hairs shorter than diameter of segments except third segment with scattered setae longer than its diameter. Apex of first rostral segment approaching or attaining level of apex of antenniferous tubercle; second segment extending beyond level of anterior margin of eyes, third segment extending distinctly beyond level of hind margin of eyes. Ratio of rostral segments 1:1.90-2.05:0.55.

Pronotum (figs. 204, 205A) black, sides carinate. Anterior lobe not strongly elevated, ridges granulose. Posterior lobe rugose, wrinkled, granulose; submedian carinae extending to middle of posterior lobe. Humeral angles broadly rounded. Anterolateral projections small, subconical, narrowly tapering but not pointed apically.

Scutellum coarsely rugose transversally, its center only shallowly depressed. Posterior process approximately as long as main body of scutellum, horizontal, conical, narrowly tapering apically.

Hemelytra of male (fig. 204) extending to middle of seventh urotergite but only to base of seventh urotergite in female. Clavus and cornua black. Membrane fumose, dark greyish

faintly rounded, widest behind middle; postocular region only very slightly convex below. Clypeus strongly widened on its posterior half, but not conspicuously elevated in side view. Genae narrowly tapering apically, extending beyond level of apex of clypeus. Jugae acute but not pointed apically. Eyes in lateral view closely approaching level of under surface but distant from level of upper surface of head. Ratio width of eyes to synthlipsis 1:2.3-2.5. First antennal segment falling short of level of apex of clypeus; second segment with adpressed setae shorter than diameter of seg-

brown, with faint cloudy dark reddish brown pattern elements; veins of membrane faintly reddish brown.

Legs uniformly black, slender; fore femora 6-7 times as long as wide.

Venter as described for *L. costalis*.

TYPE: British Museum (Natural History).

DISTRIBUTION: South India (Mysore).

BIOLOGY: This species has been collected under boulders and rocks, associated with *Linshcosteus costalis*.

OBSERVATIONS: We have examined four paratypes of *confusus* which agree well with the original description. This species is easily distinguished from all other species of the genus by its relatively elongate rostrum which extends distinctly beyond the level of the hind margin of the eyes. It is distinguished from the sympatric *costalis* furthermore by its uniformly dark corium and the small eyes.

Linshcosteus costalis Ghauri

Figures 206, 207

Linshcosteus costalis Ghauri, 1976, p. 187, figs. 9-12, 17, 18, 21, 24, 29.

Length of male 20.5 mm., of female 21.5 mm.; width of pronotum of male and female 5.0-5.2 mm.; of abdomen of male 8.8-9.0 mm., of female 9.0-11.2 mm. Overall color very dark brown to black, with wide band along costal margin and membranal veins, light reddish or yellowish brown. Pilosity short, inconspicuous, except on light-colored portions of corium.

Head (figs. 206, 207) with numerous setiferous granules except narrowly along middle ventrally. Head over twice as long as wide (1:0.40-0.45) and distinctly longer than pronotum (1:0.80-0.85). Anteocular region four times as long as postocular (1:0.25); postocular with sides rounded, widest slightly behind middle; postocular region faintly convex below. Clypeus widened on posterior half, not strongly elevated in side view. Genae narrowly tapering apically, extending beyond level of apex of clypeus. Jugae acute but not pointed apically. Eyes in side view attaining but not surpassing level of lower and distant from level of upper surface of head. Ratio width of eyes to synthlipsis 1:1.60-1.85. First antennal segment falling

short of level of apex of clypeus; second segment with decumbent setae shorter than diameter of segment. Ratio of antennal segments 1:4.8-5.3:3. 1:? Rostrum with hairs shorter than diameter of respective segments, only third segment with a few scattered setae longer than diameter of segment. Apex of first rostral segment (fig. 207B) falling distinctly short of apex of antenniferous tubercles; second segment not attaining level of anterior margin of eyes, third not extending beyond level of hind margin of eyes. Ratio of rostral segments 1:1. 9-2.1:0.6.

Pronotum (figs. 206, 207 A) black, in some specimens with anterolateral projections, lateral margin and/or submedian carinae tinged with reddish. Sides of pronotum carinate. Anterior lobe not strongly elevated, ridges granulose. Posterior lobe strongly rugose, granulose, sub-

tal sutures, especially on connexivum, narrowly reddish or orange colored.

TYPE: British Museum (Natural History).

DISTRIBUTION: South India; Mysore.

BIOLOGY: This species was found under boulders and rocks, associated with *Linshcosteus confumus*.

OBSERVATIONS: We have examined four paratypes which agree well with the original description. The color pattern alone will serve to distinguish *costalis* from the remaining species of the genus. Even though fully sympatric and sharing identical microhabitat, intermediate forms between *costalis* and *confumus* have not been found, confirming the specific rank of the two populations.

Linshcosteus kali, new species

Figures 8K, L; 15A; 208, 209

median carinae extending backward to slightly beyond middle of disc of posterior lobe. Humeral angles broadly rounded. Anterolateral projections small, triangular, pointed, some-what compressed dorsoventrally.

Scutellum black, coarsely rugose transversally, its center only faintly depressed; posterior process about as long as main body of scutellum, horizontal, conical, narrowly taper-ing apically.

Hemelytra of male (fig. 206) falling slightly short of apex of seventh urotergite, those of female extending only slightly beyond base of seventh urotergite. Clavus and corium black, base of corium and costal margin between Sc

and R + M and R light reddish or yellowish brown; apex of corium black. Membrane fumose, dark brown, veins yellowish brown.

Legs uniformly black, slender; fore femora 6-8 times as long as wide.

Venter strongly flattened longitudinally along middle, in both sexes; delicately striate transversally on and near flattened area, irregularly wrinkled on lateral portions of urosternites. Setae short, numerous but not conspicuous. Abdomen very wide, with lateral portions of urotergites amply exposed. Spiracles adjoining connexival sutures. Abdomen dark, irregularly and faintly clouded with dark reddish brown. Spiracles yellow. Intersegmen-

DIAGNOSIS: *Linshcosteus kali* differs from the most similar species, *L. confumus* and *L. costalis*, by the conspicuously convex lower surface of the postocular region, from *costalis* furthermore by its uniformly dark corium, and from *confumus* by its relatively short rostrum and its larger eyes

DESCRIPTION.

Length of male 19 mm., of female 20 mm.; width of pronotum of male and female 4.5 mm.; width of abdomen of male 8.8-9.0 mm., of female 10 mm.

Overall color very dark brown or black. Pilosity short and inconspicuous.

Head (figs. 208, 209A, C) with very numer-ous setiferous granules, except on narrow strip along middle ventrally. Head over twice as long as wide (1:0.40-0.45) and distinctly longer than pronotum (1:0.7-0.8). Antecular region three and one-half to four times as long as postocular (1:0.25-0.30); postocular with sides faintly rounded, widest behind middle. Postocular region strongly convex below. Clypeus gently widened on posterior half, not strongly elevated in side view. Genae narrowly tapering apically, extending beyond level of apex of clypeus. Jugae acute but not pointed apically. Eyes in lateral view attaining but not surpassing level of under surface, but distant from level of upper surface of head. Ratio width of eyes to synthlipsis 1:2.0-2.3. First antennal segment falling short of level of apex of

clypeus; second segment with decumbent setae shorter than diameter of segment. Ratio of antennal segments 1:4.7-5.1:2.7-3.1:2.2-2.4. Ros-trum (fig. 209C) with hairs shorter than diameter of segments except third segment with a few scattered setae longer than diameter of segment. Apex of first rostral segment falling distinctly short of level of apex of anten-niferous tubercle; apex of second segment not attaining level of anterior margin of eyes; third segment not extending to level of hind margin of eyes. Ratio of rostral segments 1:1.55-1.85:0.50-0.65.

Pronotum (figs. 208, 209A) black, its sides

carinate. Anterior lobe not strongly elevated; ridges granulose. Posterior lobe rugose-gran-ulose; submedian carinae not extending beyond middle of posterior lobe. Humeral angles broadly rounded. Anterolateral projections small, subtriangular, pointed.

Scutellum (fig. 208) black, heavily rugose transversally, its center only faintly depressed. Posterior process about as long as main body of scutellum, horizontal, elongate conical, nar-rowly tapering apically.

Hemelytra of male and female falling short of apex of seventh urotergite. Clavus and cornium black; membrane fumose, very dark brown; veins yellowish brown.

Legs (fig. 208) uniformly black, slender; fore femora 6.0-7.5 times as long as wide.

Venter as described for *L. costalis*.

DISTRIBUTION: South India: Madras State: Coimbatore, 1400 ft., April 5, 1963, Nov., 1963, Sept., 1966 (P. Susai Nathan; AMNH), one male, holotype, one female, allotype, two

males, paratypes, one dissected male; one male, paratype, Instituto Oswaldo Cruz, Rio de Janeiro.

BIOLOGY: Unknown.

OBSERVATION: Although the differences from the superficially rather similar *L. costalis* and *L. confumus* are slight, they are constant; the type series of *kali* is uniform for the diagnostic and key characters.

ETYMOLOGY: This species is named for the Hindu goddess, Kali.

DIPETALOGASTER USINGER

Dipetalogaster Usinger, 1939, p. 40; 1944, p. 40.
Lent and Jurberg, 1972, p. 465.

Triatomini. Large sized (33-42 mm.). Body not flattened. Overall color dark. Body surface smooth, not granulose; setae short.

Head elongate subcylindrical. Antenniferous tubercles situated at center of anteocular portion of head. Rostrum as long as head, extending to level of prosternum. First and third rostral segments short, second elongate. Third rostral segment with double invaginated flasklike rostral organ.

Anterior lobe of pronotum with discal tubercles; humeral angles rounded. Prosternum with stridulatory sulcus. Posterior projection of scutellum tubercle-like. Legs strong, elongate. Spongy fossulae absent in both sexes.

Abdomen wide, with lateral portions not covered by hemelytra. In both sexes, dorsal connexival plates normal; ventral connexival plates not developed. Wide longitudinally pleated connexival membrane connecting dorsal connexival plates to ventral sclerites. In unfed specimens, anterior portion of urotergites overlapping posterior portion of preceding urotergites; urotergites connected by expandable membrane. Median process of pygophore subrectangular, truncate.

Fifth instar nymph: With the characters of the tribe; third and fourth antennal segments delicately annulate; rostrum of normal length, first segment much shorter than second, third with paired rostral organ; stridulatory sulcus well developed; antenniferous tubercles situated at center of anteocular region; abdomen dorsally without median tubercles.

First instar nymph: As described for tribe; rostrum attaining prosternum, slender; third segment with paired rostral organ; stridulatory sulcus present; hind tarsi apically with long, delicate sensory hairs.

TYPE SPECIES: *Conorhinus maximus* Uhler

DISTRIBUTION: Mexico (Baja California Sur).

BIOLOGY: Found among rocks, associated with lizards and possibly mammals.

OBSERVATIONS: *Dipetalogaster* differs from all other triatomines by such highly apomorphic characters as its extraordinarily large size, the unique structure of the connexival margin of the abdomen (fig. 210C) and the double invaginated flasklike organ (fig. 10C-E) on the third rostral segment in all instars. *Dipetalogaster maximus* possesses other characters which are apomorphic within the framework of the Triatomini, viz., the tubercle-like process of the scutellum, the median longitudinal carina of the metasternum, the two conspicuously different kinds of setae on the second antennal segment of the adult and, in the fifth nymphal instar, the delicately annulate third and fourth antennal segment (only fourth segment annulate in fifth instar nymphs of most Triatominae). The apomorphic characters mentioned in the foregoing sentence are shared with the Chilean *Triatoma spinolai* which inhabits the semiarid and arid coastal area of that country.

Dipetalogaster maximus (Uhler)

Figures 6A, D; 10C-E; 12C; 20D, F; 22D; 24P; 27C; 29N; 210, 211

Conorhinus maximus Uhler, 1894, p. 286.

Triatoma maxima: Neiva, 1914a, p. 48. Larousse, 1924b, p. 208, figs. 1, 2. Pinto, 1925a, p. 62, figs. 40, 41.

Eutriatoma maxima: Pinto, 1931, p. 92.

Dipetalogaster maximus: Usinger, 1939, p. 36; 1944, p. 41, pl. 8, fig. F. Ryckman and Ryckman, 1967a, p. 180, figs. 1-9. Mazzotti, 1970, p. 320. Lent and Jurberg, 1972, p. 466, figs. 1-49.

Length of male 33-35 mm., of female 41-42 mm.; width of pronotum of male 8 mm., of female 8.5-9.5 mm.; width of abdomen of male 12 mm., of female 15-16 mm.

Overall color from dark brown to black, with reddish stripe along outer edge of connex-

ivum. Body surface highly polished. Setae short and sparse, inconspicuous.

Head (figs. 210, 211B, D) black, delicately granulose, distinctly rugose dorsally and laterally. Head about twice as long as wide (1:0.5-0.6) and slightly shorter than pronotum (1:1.05-1.10). Anteocular region four times as long as postocular, the latter very short, with sides conspicuously produced at middle, almost angular. Clypeus slightly widened on posterior

half, conspicuously elevated in lateral view. Genae very narrowly tapering apically, almost pointed, distinctly extending beyond level of apex of clypeus. Jugae blunt apically. Eyes in lateral view approaching but not attaining level of under and distant from level of upper surface of head. Ratio width of eye to synthlipsis 1:1.55-1.70. Ocelli situated close to hind border of head. Antenniferous tubercles inserted at middle of anteocular portion of head. First an-

tennal segment extending distinctly beyond level of apex of clypeus. Second antennal segment with approximately seven trichobothria, three closely spaced at and near base, four more widely spaced along entire length of segment (fig. 8D). Second segment also with numerous stiff setae from as long to up to twice as long as diameter of segment, and with numerous short delicate hairs. Ratio of antennal segments 1:3.0-3.5:3.5-3.7:2.0-2.25. Third segment invariably longer than second. Rostrum (fig. 211B) black or dark reddish brown. First rostral segment attaining level of apex of anteniferous tubercles, second extending to level of hind border of head. Rostral segments stout, subcylindrical, with very short and sparse setae, appearing glabrous, except third segment with numerous hairs as long as or longer than diameter of segment. Rostral organ as shown in figure 10C-E. Ratio of rostral segments 1:2.1-2.3:0.65-0.70. Neck laterally with 1+1 faint reddish spots.

Pronotum (fig. 210A) black, polished. Anterior lobe with irregular protuberances; discal tubercles distinct but low, subhemispherical; lateral carinae with multiple constrictions, but without lateral tubercles. Posterior lobe of pronotum prominently elevated at middle, shallowly rugose. Submedian carinae very low, inconspicuous, distinct only on anterior half of posterior lobe of pronotum. Humeri distinctly elevated, rounded. Anterolateral projections small, subconical, from pointed to blunt.

Scutellum (figs. 210, 211E) coarsely rugose, with center of disc deeply depressed, lateral portions elevated; posterior process short and thick, rounded apically, horizontal or deflected distally, only about half as long as main body of scutellum. Metasternum on posterior half carinate along middle longitudinally.

Hemelytra (fig. 210A) fully developed but falling slightly short of apex of abdomen; those of male extending to middle of urotergite VII, those of female extending at least to base of urotergite VII but not beyond base of urotergite VIII.

Legs (fig. 210A, B) black, slender, elongate; fore femur 7.0-7.5 times as long as wide. Femora apically with 0-2 minute setiferous denticles.

Venter convex, faintly flattened lon-gitudinally along middle in both sexes. Uroster-nites minutely striate transversally (fig. 210C), irregularly wrinkled close to lateral border. Spiracles distant from lateral margin of urosternite by several times their diameter (fig. 211A). Connexivum as in generic description (figs. 20D; 210C). Abdomen dark brown or black, with outer half of connexival plates orange or red (figs. 210A; 211C). Median process of pygophore as shown in figure 22F. Phallus as illustrated (fig. 22D); vesica heavily sclerotized.

TYPE: National Museum of Natural History, Smithsonian Institution, Washington, D. C.

DISTRIBUTION: Mexico (southernmost Baja California Sur).

BIOLOGY: *Dipetalogaster maximus* has been found naturally infected with *Trypanosoma cruzi*. It is a sylvatic species with only accidental occurrences in rural habitations. Specimens were found among exfoliative rocks, and their main hosts seem to be lizards (*Sauromalus australis* Shaw and *Petrosaurus thalassinus* [Cope]) but they also feed on woodrats, and probably other mammals. In the laboratory, a variety of hosts are accepted. It has been observed that the bugs will emerge from their hideouts, even around noon on very hot days,

to attack people resting on the rocks. A similar phenomenon was observed in the unrelated *Triatoma spinolai* inhabiting the Chilean desert. Both species have developed special although different connexival modifications permitting an extraordinary abdominal extension allowing them to ingest unusually large bloodmeals, possibly an advantage under the harsh semiarid or arid conditions where these species occur. The potential extension of the abdomen of *D. maximus* is illustrated by Ryckman and Ryckman (1967a), Mazzotti (1970), Lent and Jurberg (1972), and in our figure 210B.

PANSTRONGYLUS BERG

Lamus Stål, 1859, p. 115 (*nec* Stål, 1854 [Pentatomidae]); 1872, p. 112.
Panstrongylus Berg, 1879a, p. 268; 1879b, p. 167.
 Champion, 1899, p. 206. Pinto, 1931, p. 104.
 Lent and Pifano, 1940, p. 629. Lima, 1940, p. 188. Usinger, 1944, p. 42. Abalos and Wygodzinsky, 1951, p. 132. Lent and Jurberg, 1975, p. 379.
Mestor Kirkaldy, 1904, p. 280. Usinger, 1944, p. 44.

Triatomini. Medium-sized to very large (19-38 mm.). Body not conspicuously flattened. Color varied. Setiferous granules absent; setae of adults invariably short, in most cases inconspicuous.

Head short and wide, subconical, invariably shorter than pronotum. Antenniferous tubercles situated close to anterior margin of eyes. Rostrum as long as head, extending to level of prosternum. First rostral article in most cases shorter than second, only in one species subequal; third article the shortest, without rostral organ.

Fore lobe of pronotum with or without discal and lateral tubercles. Humeral angles rounded or angular but not spined. Prosternum with stridulatory sulcus. Scutellar process from elongate cylindrical to very short. Legs with femora in most cases armed with denticles, the latter rarely obsolete. Spongy fossulae present or absent.

Abdomen wide, with lateral portions of urotergites covered by hemelytra. Connexivum free, its segments normally developed. Venter of abdomen convex or flattened longitudinally

along middle. Median process of pygophore narrowly spinelike.

Fifth instar nymph: As described for tribe. Fourth antennal article delicately annulate; rostrum of normal length; first rostral segment shorter than second (except possibly in *tupynambai*), third without rostral organ; stridulatory sulcus present; antenniferous tubercles situated well behind middle of anteocular region; abdomen dorsally with or without series of median tubercles.

First instar nymph: As described for tribe. Rostrum attaining prosternum, stout; stridulatory sulcus present; hind tarsi apically with long, delicate sensory hairs.

TYPE SPECIES: *Panstrongylus guentheri* Berg; type species of *Lamus*, *Conorhinus megistus* Burmeister; type species of *Mestor*, *Conorhinus megistus* Burmeister.

DISTRIBUTION: Neotropical region.

BIOLOGY: Species associated with mammals; several species domestic or peridomestic, some of importance as vectors of Chagas' disease.

OBSERVATION: We have prepared a cladogram (fig. 212) to show our concept of the cladistic relationships within the genus *Panstrongylus*. This scheme is based on characters of the adults. An analysis of the characters of the nymphs, not possible at this time due to lack of sufficient material, will be a test for the hypothesis visualized in the cladogram.

KEY TO THE SPECIES OF *Panstrongylus*¹

1. Posterior process of scutellum elongate subcylindrical, narrowly tapering apically (figs. 215C; 217, 220, 223, 228, 238, 246, 247) 2
- Process of scutellum short, rounded, conical or truncate apically (figs. 226C; 231B; 235, 236D; 242D; 244) 9
2. Specimens almost completely black (figs. 213, 214); hind lobe of pronotum with, in some cases, barely perceptible reddish markings on humeral angles and submedially at hind border (fig. 215B); connexival segments dorsally with small red spot on posterolateral angle (figs. 213, 214, 215D) *chinai*
- Specimens differently colored 3

¹Spanish version of key, p. 479; Portuguese version, p. 496.

3. Abdomen light colored ventrally, with longitudinal series of black spots (figs. 219, 221E) 4
Abdomen differently colored, without series of black spots 5
4. Length more than 20 mm.; head comparatively short and stout, in lateral view (fig. 221E); pronotum with extensive, conspicuous black markings (figs. 219A; 220); all connexival segments with light and dark markings (figs. 219, 220, 221E) *geniculatus*
Length less than 20 mm.; head slender, in lateral view (fig. 233C); pronotum without distinct black markings (fig. 232); dorsal connexival segments light colored, only disc of third and fourth segments each with small black spot *lenti*
5. Rostrum with second article as long as or shorter than first (fig. 248D, E) *tupynambai*
Rostrum with second segment invariably longer than first (figs. 218C; 224B; 229B; 239B) 6
6. Corium yellow except at extreme base and subapically (figs. 227, 228), strongly contrasting with dark gray membrane; abdomen black below, with connexivum and lateral portions of urosternites contrastingly yellow (fig. 229C); synthipsis much less than twice as large as width of eyes in dorsal view (fig. 229A); femora with slight subapical protuberances but without denticles *howardi*
Corium as dark as membrane, with base and apex lighter colored (figs. 217, 222, 223, 237, 238); venter of abdomen reddish

- brown; synthlipsis twice or more than twice as large as width of eyes in dorsal view (figs. 218A; 224A; 238, 239A); fore and mid femora with several conspicuous denticles (figs. 218B; 224C, D; 238C) 7
7. Fore lobe of pronotum with well-developed discal tubercles (figs. 238, 239) *lutzi*
Fore lobe of pronotum with only obsolete or without discal tubercles (figs. 217, 218D; 223, 224E) 8
8. Anterolateral processes of pronotum very short, blunt (fig. 218D); upper surface of head straight, in lateral view (fig. 218C); fore and mid femora with 2-3 denticles each (fig. 218B); lateral borders of fore and hind lobe of pronotum forming a practically continuous line (figs. 216, 217, 218D) *diasi*
Anterolateral projections of pronotum elongate, salient (figs. 222, 223, 224B, E); head conspicuously convex above, in lateral view (fig. 224B); fore and mid femora (fig. 224C, D) with more than three denticles each; lateral borders of fore and hind lobe of pronotum forming distinct angle (figs. 222, 223, 224E) *guentheri*
9. Jugae blunt (fig. 245B); tubercles of fore lobe of pronotum invariably red; connexivum with dark spot at center of segments as well as with narrow transverse dark band adjacent to anterior border of segment (figs. 243, 244, 245J, K); body integument dorsally with numerous adpressed golden colored setae; overall color of hemelytra pale green *rufotuberculatus*
Jugae with curved hooklike projection (figs. 226D; 231C; 236E; 242B, C); tubercles of fore lobe of pronotum not or rarely reddish; connexival segments with large dark spot on anterior portion, posterior portion light colored (figs. 225, 230, 234, 235, 240, 241); body integument practically glabrous; overall color of hemelytra not green 10
10. Third antennal segment distinctly shorter than second (fig. 242A); insects black with red markings; hind lobe of pronotum black, with 2+2 large red spots (fig. 240, 241) *megistus*
Third antennal segment as long as second; insects yellowish or yellowish brown, with complex dark markings (figs. 225, 230, 234, 235); hind lobe of pronotum light colored, with one median and 2+2 sublateral narrow longitudinal markings black (figs. 226B; 230, 234, 235) 11
11. Scutellum yellowish, with median longitudinal stripe black (fig. 230), posterior process of scutellum with heavy hump basally (fig. 231B); fore lobe of pronotum without sublateral tubercles (fig. 231D) *humeralis*
Scutellum black, with median longitudinal stripe yellow (figs. 226C; 234, 235); posterior process of scutellum with light hump basally (fig. 236D); fore lobe of pronotum invariably with sublateral tubercles, in addition to discal and lateral tubercles (figs. 226B, 236C) 12
12. Tibiae black, with small basal spot yellow (figs. 234, 235, 236B); head relatively short, ratio head to length of pronotum 1:1.3-1.4 *lignarius*
Tibiae entirely black (fig. 225); head relatively long, ratio length of head to length of pronotum 1:1.1-1.15 *herreri*

The following redescriptions of the species of *Panstrongylus* do not in most cases mention characters of the genitalia except those of the lateral endosoma processes of the male. Because identification of the species of *Panstrongylus* is perfectly feasible without the examination of the male genitalia, the lateral endosoma processes are not figured here. A profusely illustrated study of the male and female genitalia of all species of *Panstrongylus* has been made by Lent and Jurberg (1975) and should be consulted by those wishing further information.

Panstrongylus chinai (Del Ponte)
Figures 24O; 26E; 28A; 213-215

Triatoma chinai Del Ponte, 1929, p. 4, fig. 2; 1930, p. 868, pl. 43.

Panstrongylus chinai: Pinto, 1931, p. 107. Wygodzinsky, 1948, p. 204, fig. 4. Lent and Jurberg, 1975, p. 386, figs. 4-28.

Length of male 22-27 mm., of female 21-25 mm.; width of pronotum of male 5.5-6.5 mm., of female 5.5-7.0 mm.; width of abdomen of male 7-9 mm., of female 9-10 mm.

Overall color brownish black to black, many specimens with bluish waxlike pruinosity; small reddish marks on neck, pronotum and connexivum, rarely absent.

Head (figs. 113, 114, 115A, B) uniformly black, shallowly rugose transversally on entire upper surface. Head about one and one-half times as long as wide (1:0.60-0.65), and from

1:1.55-2.00. Antenniferous tubercles without apico-external process. First antennal segment attaining level of apex of clypeus; second segment with inclined stiff setae longer than diameter of segment, some more than twice as long, and also with numerous shorter sensory hairs. Ratio of antennal segments 1:2.5-3.4:1.9-2.3:1.5-1.8. Rostrum as shown in figure 215A. First rostral segment attaining level of apex of antenniferous tubercle, second extending to level of middle of neck. Entire rostrum with very short setae, conspicuous only on dorsal surface of apex of second and on entire third segment, but even there most setae not longer than diameter of segment. Ratio of rostral segments 1:1.6-2.0:0.5-0.6. Neck black, with 1+1 lateral spots reddish.

Pronotum (figs. 213, 214, 215B) black, with orange-red markings as follows: apex of anterolateral projections, discal tubercles, lateral carinae of fore lobe and 2+2 spots along hind border of sclerite, 1+1 on humeral angles and

slightly to distinctly shorter than pronotum (1:1.05-1.20). Antecular region more than twice as long as postocular (1:0.35-0.45), postocular very short and wide, its sides rounded and converging posteriorly. Clypeus widened posteriorly. Genae narrowly rounded apically, not extending beyond level of apex of clypeus. Jugae small, apically curved, pointed. Head flat or slightly convex above in lateral view. Eyes in side view extending below level of under but distant from level of upper surface of head. Ratio width of eyes to synthlipsis

1+1 at level of submedian carinae. Extension of red markings variable, from well developed as described above and illustrated in figure 215B to almost completely absent except faint reddening of humeral area. Anterior lobe of pronotum slightly convex, with ridges distinct, 1+1 small but distinct round discal tubercles, lateral tubercles obsolescent. Posterior lobe of pronotum irregularly wrinkled. Submedian carinae approaching or attaining hind border of sclerite. Humeral angles rounded, slightly ex-planate. Anterolateral projections variable in shape, from subconical to slightly flattened and rounded apically.

Scutellum (figs. 214, 215C) black, posterior process reddish at apex in some individuals. Scutellum transversally rugose; median depression shallow but distinct, not extending onto base of posterior process, the latter approximately two-thirds as long as main body of scutellum, subhorizontal, subcylindrical, apex rounded and slightly swollen in dorsal view.

Hemelytra (figs. 213, 214) approaching hind margin of seventh urotergite, in both sexes. Corium and clavus uniformly dark brown or black, membrane fumose, dark brown. Veins of corium frequently shining, thus more conspicuous than those of membrane.

Legs (figs. 213, 214) uniformly dark brown or black, slender, fore femora 5-7 times as long as wide. Femora with a slight protuberance apically below but without distinct denticles. Spongy fossulae absent in both sexes.

Venter convex, very slightly flattened longitudinally along middle in female. Urosternites striate transversally; setae of venter short, inconspicuous. Spiracles yellowish, close to connexival border, distance equal to their diameter or less. Urosternites II and III fused. Connexivum (figs. 213, 214, 215D) dark brown or black, with orange-red irregularly shaped spots in posterolateral angle of each connexival plate, spots increasing in size from anterior to posterior segments; spots larger on under than on upper connexival surface in some specimens.

MALE GENITALIA: Lateral phallosoma processes large, denticulate apically below; vesica large, semiglobose, heavily sclerotized.

TYPE: British Museum (Natural History).
DISTRIBUTION: Ecuador; Peru.

BIOLOGY: *Panstrongylus chinai* has been found naturally infected with *Trypanosoma cruzi*. The species has been found to occur in chicken houses and occasionally in human habitations where a few nymphs were also collected, but it is not truly domestic. Specimens have also been attracted to light. The sylvatic habitat of *P. chinai* and its true hosts are unknown.

In Peru, *P. chinai* occurs in the Amazonian drainage basin as well as on the Pacific slope of the Andes, between sea level and 1500 meters.

Panstrongylus diasi Pinto and Lent
Figures 216-218

Panstrongylus diasi Pinto and Lent, 1946, p. 461, figs. 1, 2, 5, 6, 9, 10, 13, 14, 17. Corrêa and Carvalho, 1956, p. 80, figs. 1-3. Lent and Jurberg, 1975, p. 391, figs. 1 (part), 2 (part), 29-47.

Length of male 26 mm., of female 27 mm.; width of pronotum of male 6.5 mm., of female 7.0 mm.; width of abdomen of male and female 9.5 mm.

Overall color yellowish brown, with dark

brown areas on pronotum, pleura, scutellum, corium, and connexivum. Body surface appearing glabrous.

Head (figs. 217, 218A, C) uniformly brown, shallowly rugose dorsally along middle, otherwise smooth, polished. Head about one and one-half times as long as wide across eyes (1:0.60-0.65), and much shorter than pronotum (1:1.3). Anteocular region less than twice as long as postocular (1:0.60-0.65); postocular with sides rounded. Clypeus narrow, widened posteriorly. Genae narrowly tapering apically, not quite attaining level of apex of clypeus. Jugae blunt apically. Head not conspicuously elevated between eyes, its surface flat in lateral view. Eyes in side view extending in both sexes below level of ventral surface of head but

remote from dorsal. Ratio width of eye to synthlipsis 1:2.3-2.8. Antenniferous tubercles with small but distinct apicolateral process. Antennae dark brown. First antennal segment extending beyond level of apex of clypeus by about one-third of its own length. Second antennal segment with short adpressed bristles, shorter than diameter of segment. Ratio of first and second antennal segments 1:2.6-3.1:?:?. Rostrum as shown in figure 218C. First rostral segment extending close to level of anterior margin of eyes, second extending to level of base of neck. First and second rostral segments almost entirely glabrous or with short sparse setae only, third segment with numerous setae as long as or longer than diameter of segment. Ratio of rostral segments 1:1.45:0.60-0.65.

Pronotum (figs. 216, 217, 218D) light reddish brown, with the following areas dark brown: center of collar, anterior lobe of pro-

notum anteriorly at middle behind collar and in longitudinal furrow, posterior lobe with large central longitudinal mark as wide as space separating submedian carinae anteriorly but gradually tapering posteriorly, as well as 1+1 sublateral markings in areas between submedian and lateral carinae, these markings most conspicuous and largest anteriorly and posteriorly; posterior margin also dark except on posterolateral angles. Anterior lobe of pronotum moderately convex, its surface even, ridges faint; discal and lateral tubercles absent. Lateral carinae of anterior and posterior lobes almost continuous, not forming a distinct angle. Posterior lobe of pronotum distinctly but not deeply rugose. Submedian carinae low, evanescent on posterior third of posterior lobe. Humeral angles rounded. Anterolateral projections of pronotum short and blunt.

Scutellum (figs. 216, 217) dark brown, posterior process dark or light reddish brown. Scutellum conspicuously rugose, with shallow depression. Posterior process approximately as long as main body of scutellum, horizontal, narrowly cylindrical, rounded apically.

Hemelytra (figs. 216, 217) extending to apex of abdomen; their color yellowish brown, with large central area of corium dark brown; clavus light brown. Membrane fumose, slightly lighter colored than dark areas of corium.

Legs (figs. 216, 217) slender, with fore femora about six times as long as wide. Fore femora (fig. 218B) armed with one pair of strong subapical denticles followed or not by one additional, small denticle, or with one denticle only; mid femora with similar denticles, or unarmed. Spongy fossulae on fore and mid tibiae in both sexes. Legs uniformly dark brown.

Venter with short inconspicuous setae. Spiracles distant from connexival suture by about three times their diameter. Suture between urosternites II and III absent. Venter brownish yellow, darkened laterally. Connexivum (fig. 217) yellowish brown, anterior half or third of each connexival plate with black subrectangular spot, adjacent to intersegmental suture.

MALE GENITALIA: Vesica with lateral projections. Lateral endosoma process not denticulate.

TYPE: Instituto Oswaldo Cruz, Rio de Janeiro.

DISTRIBUTION: Bolivia; Brazil (Bahia, Goiás, Minas Gerais, São Paulo).

BIOLOGY: Unknown. Occasional specimens have been found in human habitations. In the state of Bahia, the species seems to occur only in the area of the caatinga, characterized by its semiarid condition..

Panstrongylus geniculatus (Latreille)
Figures 27 A; 219-221

Reduvius geniculatus Latreille, 1811, p. 225, pl. 15,
fig. 12

Lamus geniculatus: Stål 1859, p. 116, pl. 6, fig. 4

Conorhinus geniculatus: Walker, 1873b, p. 17

Triatoma geniculata: Chagas, 1912, p. 305. *Mestor*

geniculatus: Brindley, 1931, p. 136. *Panstrongylus*

geniculatus: Pinto, 1931, p. 108, figs

50, 53, 54. Usinger, 1944, p. 43, pl. 8, fig. B
Abalos and Wygodzinsky, 1951, p. 146, figs
287-298. Lent and Jurburg, 1968, p. 499, figs
1-37; 1969a, p. 125, figs. 1-7; 1975, p. 395, figs
1 (part), 2 (part)

Conorrhinus lutulentus Erichson, 1848, p. 614

Conorhinus corticalis Walker, 1873b, p. 17 *Lamus*

corticalis: Lethierry and Severin, 1896, p

115

Triatoma tenuis Neiva, 1914b, p. 37

Triatoma fluminensis Neiva and Pinto, 1922, p. 403

Panstrongylus parageniculatus Ortiz, 1971, p. 80,
pl. 10, fig. B, pl. 11, fig. B, pl. 12, fig. B.

Length of male 22-28 mm., of female 22.5-29.5 mm.; width of pronotum of male 5.5-7.0 mm., of female 5.5-8.0 mm.; width of abdomen of male 7-10 mm., of female 7-12 mm.

Overall color light brown or light orange-brown, with dark brown or black pattern elements on various body parts. Body surface appearing glabrous.

Head (figs. 219, 220, 221A-C) uniformly light colored, or, in some specimens, dorsum with 1+1 narrow dark submedian stripes extending from base of jugae to space between ocelli. Dorsal surface of head shallowly rugose. Anterior portion of head conspicuously upturned. Head about one and one-half times as long as wide across eyes (1:0.70-0.75), and distinctly shorter than pronotum (1:1.15-1.30). Anteocular region about twice as long as postocular (1:0.45-0.55); postocular with sides straight, slightly converging toward behind. Clypeus only slightly widened posteriorly.

Genae very narrowly tapering apically, attaining level of apex of clypeus. Jugae short, angular, with incipient hook-shaped process (fig. 221B, C). Head convex above between eyes, in lateral view. Eyes in lateral view extending below level of under surface but distant from level of upper surface of head. Ratio width of eyes to synthlipsis 1:1.45-1.9. Ocellar tubercles black at base. Antenniferous tubercles dark, with pronounced apicolateral process. Antennae from reddish brown to black. First antennal segment slightly extending beyond level of apex of clypeus; second segment with stiff inclined setae about as long as diameter of segment, as well as with numerous sensory hairs. Ratio of antennal segments 1:3.0-3.7:2.35-2.80:2.5-2.7. Rostrum (fig. 221B) dark brown. First rostral segment approaching or extending to or slightly beyond level of anterior margin of eyes; second rostral segment attaining level of middle of neck. First and under surface of second rostral segment with very short in-

conspicuous setae; upper surface of second and entire third segment with hairs about as long as diameter of respective segment. Ratio of rostral segments 1:1.0-1.3:0.45-0.55.

Pronotum (figs. 219A; 220) light orange-brown. Collar with or without dark area. Anterior lobe of pronotum with central black marking in shape of four leaf clover, and 1+1 lateral black markings in shape of interrupted

H; in some specimens short dark marking extending from base of H onto posterior lobe. Posterior lobe with black band along posterior margin except at humeral area, this band parallel sided or with anterior projections. Anterior lobe slightly convex, elevated areas low, faintly rugose. Discal and lateral tubercles from small to obsolescent. Posterior lobe irregularly rugose; submedian carinae in most specimens

evanescent on posterior half of hind lobe. Humeral angles rounded. Anterolateral projections of pronotum shortly subconical, rounded apically.

Scutellum (figs. 219A; 220) and its process black, sublateral callosities limiting shallow median depression orange-yellow; apex of process in some specimens light colored. Process large, as long as or slightly longer than main body of scutellum, narrowly cylindrical, horizontal, its apex rounded and in some specimens slightly deflected. Pleura and sterna of general body color, with dark markings.

Hemelytra (figs. 219A; 220) attaining apex of abdomen, in both sexes; their overall color light brown or light yellowish brown, with veins, especially those of membrane, conspicuously darker. Corium as light as or slightly lighter than membrane, dark at extreme apex. In some specimens, corium and membrane mottled with small dark spots.

Legs (figs. 219, 220) with fore femur about five and one-half times as long as wide. Fore and mid femora with 2-6 (most frequently 4) small subapical denticles arranged in two rows (fig. 221H). Spongy fossulae on fore and mid tibiae in both sexes, those of males larger, about as long as diameter of article, those of females not more than half as long as diameter of tibia apically. Coxae and trochantera light yellow or orange-yellow. Femora and tibiae dark brown or black, femora with short, orange apical annulus, in many specimens a similar though shorter annulus on base of tibiae. Apex of tibiae in some specimens also with short reddish annulus.

Venter (figs. 219B; 221E) convex, not flattened distinctly on disc; urosternites delicately striate transversally. Setae of venter short, sparse, inconspicuous. Spiracles close to connexival suture, distant from the latter by not more than their own diameter. Suture between urosternites II and III obsolescent (figs. 219; 221E). Overall color of abdomen light orange-brown, with pattern formed by large median and smaller sublateral and lateral spots as shown in figures 219B; 221E (see discussion). Connexivum (fig. 219, 220) light yellowish brown with black subrectangular marks on anterior third of dorsal connexival plates, of var-

ied shape, frequently indented posteriorly. Dark markings on ventral portion of connexivum larger than on dorsal surface.

MALE GENITALIA: Vesica without conspicuous lateral projections. Lateral endosoma processes wide, subapically below with field of small denticles.

TYPES: Of *geniculatus*, unknown; of *lutulentus*, unknown; of *corticalis*, British Museum (Natural History), of *tenuis* and *fluminensis*, Instituto Oswaldo Cruz, Rio de Janeiro; of *parageniculatus*, unknown.

DISTRIBUTION: Argentina (Chaco, Corrientes, Formosa, Misiones, Santa Fe, Santiago del Estero); Bolivia; Brazil (Acre, Amapá, Amazonas, Bahia, Brasilia, D. F., Ceará, Espírito Santo, Goiás, Maranhão, Mato Grosso, Minas Gerais, Pará, Paraná, Rio de Janeiro, Rondonia, São Paulo); Colombia; Costa Rica; Ecuador; French Guiana; Guyana; Nicaragua; Surinam; Panama; Paraguay; Peru; Trinidad; Uruguay; Venezuela. This is the first record for the species from Nicaragua: El Recreo, Blue-fields, March 3, 1948 (L. E. Long; Field Museum of Natural History, Chicago), one male.

BIOLOGY: *Panstrongylus geniculatus* is known to carry *Trypanosoma cruzi* and to transmit this protozoan among armadillos in whose burrows it frequently lives. The species has also been collected in burrows of anteaters, pacas, and of *Coendou*, in bat caves, under tree bark close to birds' nests, and on various palm trees. The species is commonly attracted to light and can be found in human habitations but does not colonize there; it is a sylvatic species.

Panstrongylus geniculatus proves difficult to rear under laboratory conditions unless 100 percent humidity is maintained.

OBSERVATIONS: This is a highly variable species as regards its size and markings. The description given above points out the chromatric variation of the head, antennae, thorax and legs, but the most striking pattern differences are found in the number, size and distribution of the dark spots on the abdominal venter (figs. 219, 221D-G, I-L). The great majority of the specimens examined by us now (\pm 150) possess one median row of large markings, their shape varying from subsemicircular to subtriangular. This median series is absent in two

specimens from Venezuela (fig. 221L) and in one specimen from Bolivia that we have examined. The most frequent pattern formed by the smaller spots is represented in fig. 221E, viz., urosternites IV-VI with 1+1 anterosubmedian and 1+1 posterolateral spots; this combination was found in 34 out of 76 specimens from Barro Colorado Island, 7 out of 12 specimens from the Colombian and Peruvian Amazonas, three specimens out of five from Tingo Maria, one out of 2 from Guyana, 1 out of two each from the states of Bahia and Mato Grosso, Brazil, and others. Urosternites IV-VI with 3+3 spots (figs. 221D, I), viz., 1+1 anterosubmedian, 1+1 anterolateral and 1+1 posterolateral occur in Barro Colorado Island (42 out of 76) Trinidad (1 out of 18), Peruvian and Colombian Amazonas (5 out of 12), Sinop,

Mato Grosso (1 out of 2), Bahia (1 out of 2) and others. The extreme is found in specimens with 4+4 small spots (not counting the spiracular area which is also frequently darkened), viz., anterosubmedian, posterosubmedian, anterolateral and posterolateral (figs. 221F, G). We have found this pattern mainly in Trinidad (17 out of 18 specimens) and in one specimen from the Venezuelan state of Miranda. We have also seen a specimen with the small spots reduced to the anterosubmedian one (fig. 221J) from Chavantina, Mato Grosso. There is great variation not only in the number but also in the relative size of the various spots mentioned (figs. 221F and G, D, and I). All morphological details inclusive those of the diagnostic male genitalia of the above specimens agree, and we are confident that a single species is

involved. The comparatively high frequency of an extreme pattern (fig. 221F) (4+4 small spots in 17 specimens out of 18) in a geographically well circumscribed and isolated area (Trinidad) suggests the possible existence of geographic races in this species.

Panstrongylus guentheri Berg
Figures 6L; 22F; 222-224

Panstrongylus guntheri Berg, 1879a, p. 269; 1879b, p. 168. Pinto, 1931, p. 110. Abalos and Wygodzinsky, 1951, p. 140, figs. 274-286.

Panstrongylus guentheri: Neiva and Lent, 1936, p. 171. Wygodzinsky, 1949, p. 337. Carcavallo and Martinez, 1968, p. 33, figs. 8, 9. Lent and Jurberg, 1975, p. 396, fig. 1 (part), 2 (part).

Triatoma guentheri: Neiva, 1914a, p. 6. Del Ponte, 1930, p. 875, pl. 46.

Triatoma larroussei Pinto, 1925b, p. 454, figs. 1, 2.

Panstrongylus larroussei: Pinto, 1931, p. 112, figs. 57, 60. Pinto and Lent, 1946, p. 459, figs. 3, 4, 7, 8, 11, 12, 15, 16, 18, 19.

Triatoma seai Del Ponte, 1929, p. 7, fig. 3; 1930, p. 900, pl. 52.

Panstrongylus seai: Pinto, 1931, p. 119; Mazza and Jörg, 1937, p. 40, figs. 6-8.

Length of male 22-25 mm., of female 24-27 mm.; width of pronotum of male and female 6-7 mm.; width of abdomen of male 8.5-9.5 mm., of female 9.5-10.0 mm.

Overall color reddish or orange-brown, with dark brown areas on pronotum, pleura, scutellum, corium, and connexivum. Body surface appearing glabrous.

Head (figs. 222, 223, 224A, B) uniformly orange-brown, very shallowly rugose dorsally along middle, otherwise smooth, polished. Head about one and one-half times as long as wide across eyes (1:0.6-0.7), and much shorter than pronotum (1:1.4-1.5). Anteocular region slightly less than twice as long as postocular (1:0.55-0.65); postocular very short and wide, its sides rounded. Clypeus narrow, widened posteriorly. Genae narrowly rounded apically, not quite attaining level of apex of clypeus. Jugae blunt apically. Head strongly elevated between eyes dorsally. Eyes in lateral view comparatively small, remote from level of upper surface of head; eyes of male (fig. 224B) extending ventrally below level of under surface of head, but those of female not quite

attaining level of under surface of head. Ratio width of eyes to synthlipsis (only males examined) 1:2.10-2.65. Ocelli surrounded by ring of dark pigment. Antenniferous tubercles as shown in fig. 224A, with small but distinct

apicolateral process. Antennae dark reddish brown. First antennal segment unusually long, extending beyond level of apex of clypeus by

close to one-half of its own length. Second antennal segment with adpressed setae shorter than diameter of segment. Ratio of antennal

segments 1:2.8-3.2:2.2-2.5:?. Rostrum as shown in figure 224B, its first segment attaining level of anterior margin of eyes; second segment extending to level of base of neck. First and under surface of second rostral segments practically glabrous; upper surface of second and entire third segment with hairs as long as or longer than diameter of respective segment. Ratio of rostral segments 1:1.55-1.70:0.55-0.70.

Pronotum (figs. 222, 223, 224E) with anterior lobe light reddish brown, posterior lobe from uniformly light reddish brown to entirely dark brown, in some specimens dark color less extensive, with area of lateral margin and submedian carinae lighter. Anterior lobe conspicuously convex; elevated areas low, irregularly rugose; discal tubercles obsolescent, lateral tubercles absent. Lateral carinae of anterior and posterior lobes forming distinct angle. Posterior lobe of pronotum distinctly rugose transversally. Submedian carinae low, evanescent on posterior half or third of posterior lobe. Humeral angles narrowly rounded. Anterolateral projections of pronotum prominent, from narrowly conical to blunt.

Scutellum (fig. 223) dark brown, posterior process light brown in some specimens, conspicuously rugose, with shallow median depression. Posterior scutellar process as long as main body of scutellum, horizontal, narrowly cylindrical, rounded apically.

Hemelytra (figs. 222, 223) extending close to apex of seventh urotergite. Color of corium dark brown except subtriangular light spot at base; adjacent areas of clavus also lighter brown. Membrane somewhat lighter than dark portion of corium, fumose.

Legs (fig. 223) with fore femur approximately five times as long as wide. Fore and mid femora (fig. 224C, D) with two rows of three to five conspicuous denticles each, extending over half the length of femur. Additional small denticles irregularly arranged near base of femur. Spongy fossulae on fore and mid legs of male, in female very small and distinct only on fore tibia. Legs uniformly reddish or orange-brown.

Venter convex, slightly flattened longitudinally along middle, delicately striate

transversally. Setae of venter short, inconspicuous. Spiracles remote from connexival suture by about three times their diameter. Suture between urosternites II and III obsolescent. Venter reddish brown, irregularly darkened at sides and in some specimens on genital region. Connexivum (figs. 222, 223) orange brown; anterior half or third of each connexival plate with dark brown or black irregularly shaped subrectangular spot, adjacent to intersegmental suture.

MALE GENITALIA: Phallus as shown in figure 22F. Vesica with lateral projections. Lateral endosoma processes large, not denticulate.

TYPES: Of *guentheri*, Museo de La Plata; of *larroussei*, Instituto Oswaldo Cruz, Rio de Janeiro; of *seai*, unknown.

DISTRIBUTION: Argentina (Buenos Aires, Catamarca, Corrientes, Chaco, Chubut, Córdoba, Entre Ríos, Jujuy, La Pampa, La Rioja, Mendoza, Neuquén, Río Negro, Salta, Santiago del Estero, San Juan, San Luis, Santa Fe, Tucumán); Bolivia; Paraguay.

BIOLOGY: *Panstrongylus guentheri* has been found naturally infected with *Trypanosoma cruzi*. Although attracted to artificial light and accidentally captured in human habitations, the species does not colonize in houses. It has been found peridomestically among firewood, but basically it is a sylvatic species, associated with rodents and didelphids.

Panstrongylus herreri Wygodzinsky
Figures 225, 226

Panstrongylus herreri Wygodzinsky, 1948, p. 198,
figs. 1-3. Lent and Jurberg, 1975, p. 401, figs. 1
(part), 2 (part), 78-110.

Length of male 20.5-22.0 mm., of female
23.0-27.5 mm.; width of pronotum of male
5.3-6.2 mm., of female 6.5-7.0 mm., width of
abdomen of male 6.8-7.0 mm., of female
8.2-10.0 mm.

Overall color light brownish yellow dorsally,
dark brown or black ventrally. Markings of
dorsal surface complex (fig. 225), from dark
brown to black, present on head, neck, pro-
notum, scutellum, hemelytra, and connexivum.
Legs black with yellow markings. Body surface
with very short, inconspicuous golden setae.

Head (figs. 225, 226A, D) light brownish yellow,
including genae and antenniferous tu-
bercles; bucculae and entire under surface of
head black. Dorsally, a narrow black stripe
longitudinally along middle, extending from
level of middle of clypeus to that of hind
border of eyes, conspicuously widened shortly
before middle. Surface of head faintly rugose
above. Head about one and one-half times as
long as wide across eyes (1:0.6-0.7), slightly
shorter than pronotum (1:1.10-1.15). Antecular
region three times as long as postocular
(1:0.30-0.35); postocular with sides faintly
rounded, strongly converging toward behind.
Clypeus narrow, widened on posterior half.
Genae narrowly tapering apically, attaining but
not surpassing level of apex of clypeus. Jugae
with curved, apically tapering projection. Head
not strongly elevated between eyes above, dor-
sal surface almost straight in lateral view. Eyes
in side view surpassing level of under and dis-
tant from level of upper surface of head, in
lateral view. Ratio width of eyes to synthlipsis
1:1.6-1.8 (in males), 1:2.0 (in females), viz.,
eyes of males larger than those of females.
Antenniferous tubercles without apicolateral
process. Antennae with first and second seg-
ment black. First antennal segment approaching
but not attaining level of apex of clypeus; sec-
ond with inclined stiff setae not longer than
diameter of segment, and with numerous short
sensory hairs mainly on under surface of arti-
cle. Ratio of antennal segments 1:2.3-

2.5:2.1-2.5:2.1. Rostrum (fig. 226D) black. First
rostral segment attaining level of apex of
antenniferous tubercles, second extending to
level of neck. First and most of second seg-ment
with very short, inconspicuous setae, third with
setae as long as or longer than diam-eter of
segment. Ratio of rostral segments
1:1.3-1.4:0.45-0.55. Neck with 1+ 1 dark spots
dorsally.

Pronotum (figs. 225, 226B) with posterior

lobe unusually wide. Overall color of pronotum light brownish yellow, with narrow longitudinal markings on posterior lobe as shown in figure 226B. Anterior lobe slightly convex, elevated areas slightly uneven, with 1+1 comparatively small discal tubercles, followed or not by 1+1 similar but smaller tubercles at base of submedian carinae; lateral tubercles present, well developed although smaller than discal tubercles; 1+1 additional, sublateral tubercles invariably present, situated between posterior submedian and lateral tubercles. All tubercles mentioned yellow, polished. Posterior lobe of pronotum coarsely rugose, conspicuously flaring posterolaterally. Submedian carinae attaining posterior third of posterior lobe. Humeral angles salient, narrowly rounded, slightly explanate. Collar of general body color, with 1+1 dark areas at center, and slightly darkened at base of anterolateral projections, the latter tongue-shaped, compressed dorsoventrally.

Scutellum (figs. 225, 226C) black, with light brown or yellowish median longitudinal stripe including entire posterior process, and light again at sides. Median depression of scutellum narrow, shallow, faintly rugose, remainder of disc of scutellum flat, smooth. Posterior process of scutellum very short, about one-third as long as main body of scutellum, only slightly elevated at base, its apex knobbed. Pleura extensively black, with yellowish spots. Sterna black.

Hemelytra closely approaching tip of abdomen, light yellowish brown or yellow, with complex dark brown and black pattern elements as illustrated in figure 225. Base of membranal cells dark velvet brown or sooty black.

Legs (fig. 225) with fore femora 5.0-5.5 times as long as wide. Fore and mid femora with 1+1 subapical denticles. Fore and mid tibiae of both sexes with well-developed spongy fossulae, those of male very slightly longer than those of female. Coxae and basal half of trochantera black; apex of trochantera, and base and apex of femora yellow. Remaining portion of femora and tibiae entirely black.

Venter convex, flattened longitudinally along middle, more strongly so in female than in male. Urosternites delicately striate transversally, with short, inconspicuous setae. Spiracles adjoining connexival suture. Suture between

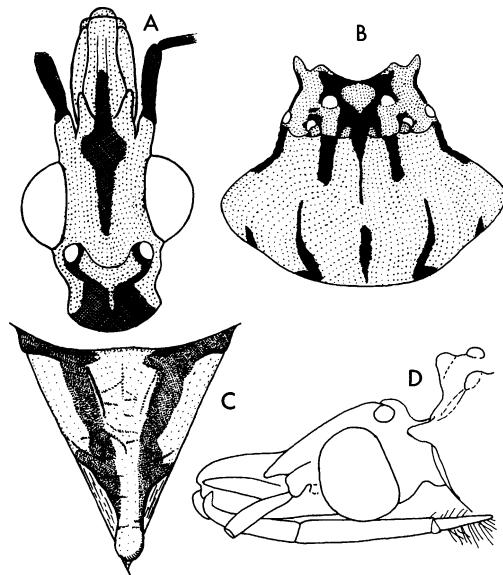


FIG. 226. *Panstrongylus herreri*. A. Head, dorsal view. B. Pronotum. C. Scutellum. D. Head and anterior portion of thorax, side view.

urosternites II and III well developed. Urosternites black; spiracles included in small yellow spots. Connexivum (fig. 225) yellow or light yellowish brown. Each connexival segment dorsally at anterolateral corner, adjacent to intersegmental suture, with wedge-shaped mark from one-third to one-half as long but less than half as wide as segment. Ventral connexival segments as above or with transverse black marking adjacent to anterior intersegmental suture, extending over entire width of connexival plate.

MALE GENITALIA: Vesica with short lateral projections. Lateral endosoma processes denticulate on entire apical portion.

TYPE: Instituto Miguel Lillo, Tucumán.

DISTRIBUTION: Peru.

BIOLOGY: *Panstrongylus herreri* has been found infected with *Trypanosoma cruzi*. In northern Peru, this species colonizes human habitations and is thus of significance for the transmission of Chagas' disease. It has also been found in chicken coops and among domestic guinea pigs. The species occurs at an altitude of up to 1500 meters.

OBSERVATIONS: *Panstrongylus herreri* and

lignarius are very similar but their differences, as given in our key and descriptions seem to be constant, and no intermediate forms have been found.

Panstrongylus howardi (Neiva)
Figures 227-229

Triatoma howardi Neiva, 1911b, p. 240.

Panstrongylus howardi: Pinto, 1931, p. 111. Lent, 1960, p. 164, figs. 1-3. Lent and Jurberg, 1975, p. 404, figs. 101-115.

Male (female unknown). Length 25-29 mm., width of pronotum 6.0-6.5 mm., of abdomen 8.5-11.0 mm.

Overall color dark brown or black, with reddish or yellowish areas on pronotum, scutellum, hemelytra, and abdomen with connexivum. Body surface with very short setae.

Head (figs. 227, 228, 229A, B) entirely black, coarsely rugose on entire dorsal surface including clypeus. Head from one and one-half times to almost twice as long as wide across eyes (1:0.55-0.70), and distinctly shorter than pronotum (1:1.15-1.25). Anteocular region slightly over twice as long as postocular (1:0.40-0.45), postocular short and wide, with sides converging toward behind. Clypeus slightly widened posteriorly. Genae narrowly rounded apically, not quite extending to level of apex of clypeus. Jugae small, pointed, hook-like. Head almost flat above in lateral view, not strongly elevated. Eyes large, in lateral view considerably surpassing level of under surface but not attaining level of upper surface of head. Ratio width of eye to synthlipsis 1:1.0-1.35. Antenniferous tubercles without apicolateral process. Antennae dark brown. First antennal segment attaining or slightly surpassing level of apex of clypeus; second segment with inclined stiff setae up to twice as long as diameter of segment, and with numerous short sensory hairs. Ratio of antennal segments 1:3.0-3.5:2.5:2.0. Rostrum (fig. 229B) comparatively stout. First rostral segment attaining level of apex of antenniferous tubercle, second extending to level of middle of neck. First and most of second rostral segment with very short and inconspicuous setae, apex of second segment dorsally and entire third segment with hairs as long as diameter of segment. Ratio of rostral segments 1:1.40-1.55:0.50.

Pronotum (figs. 227, 228) black; orange-red on anterolateral processes, discal tubercles of anterior lobe and lateral carinae with lateral tubercles. Posterior lobe with 1 + 1 submedian triangular spots enclosing posterior two-thirds of submedian carinae, as well as 1+1 large lateral markings, including humeral area and region immediately anterior to it but without attaining, or only narrowly attaining, transverse furrow of pronotum. Anterior lobe of pronotum slightly convex, elevated areas not prominent. Discal tubercles well developed, rounded; lat-

eral tubercles distinct although smaller than dis-
cal ones. Posterior lobe irregularly wrinkled.

Submedian carinae extending close to posterior
margin of sclerite. Humeral angles broadly

rounded, slightly explanate. Anterolateral projections of pronotum prominent, subconical, rounded apically.

Scutellum (fig. 228) black, strongly rugose, its depression shallow, not extending to base of posterior process. Process dark at base, reddish on apical half, about two-thirds as long as main body of scutellum, subhorizontal, almost cylindrical, slightly compressed laterally and with apex very faintly swollen, rounded.

Hemelytra (figs. 227, 228) attaining apex of abdomen, their overall color pale yellowish brown, extreme base of corium and spot close to apex dark, cu-pcu cross-vein with short adjacent portions of other veins conspicuously darkened; apical two-thirds or three-fourths of membranal cells with some adjacent areas also darker brown.

Legs uniformly black, slender, fore femora seven times as long as wide. Femora with slight subapical protuberance but without denticles. Minute spongy fossulae on fore and mid tibiae (probably absent in female).

Venter (fig. 229C) convex, almost imperceptibly flattened longitudinally along middle, delicately striate transversally; setae short, inconspicuous. Spiracles distant from connexival suture by about three times their own diameter. Suture between urosternites II and III faint. Venter of abdomen black, lateral portion of urosternites light yellowish or reddish brown, light portion forming continuous band. Connexivum (figs. 227, 228, 229C) light reddish brown, each segment anteriorly with subrectangular black spot adjacent to intersegmental suture; spots occupying from one-third to one-half of total length of respective segment, extending over entire width of sclerite on under surface, but anterolaterally situated on dorsal connexival segments.

GENITALIA: Endosoma processes narrow, denticulate apically. Vesica large, semiglobose, heavily sclerotized.

TYPE: Zoologisches Museum, Berlin.

DISTRIBUTION: Ecuador. This species was first, and erroneously, described as occurring in Africa.

BIOLOGY: *Panstrongylus howardi* has been shown to be infected naturally with *Trypanosoma cruzi*. Adults of this species have

been collected in houses; nothing is known about its sylvatic habits.

Panstrongylus humeralis (Usinger)
Figures 230, 231

Mestor humeralis Usinger, 1939, p. 38; 1944, p. 46,
pl. 8, fig. C

Panstrongylus humeralis: Lent and Pifano, 1940, p

631. Lent, 1943b, p. 492, figs. 7-9. Lent and Jurberg, 1974, p. 409, figs. 1 (part), 2 (part), 116-138.

Length of male 27.0-27.5 mm., of female 30-32 mm.; width of pronotum of male 8 mm., of female 9 mm.; width of abdomen of male 9-10 mm., of female 11.5-12.0 mm.

Overall color light brown dorsally and dark brown or black below. Markings of dorsal surface complex, dark brown or black, present on head, pronotum, scutellum, hemelytra, and connexivum. Overall color of legs ferruginous. Body surface with short, golden-colored setae, most distinct on head.

Head (figs. 230, 231A, C) light brown, with dark markings as follows: a median stripe extending from level of jugae to level of anterior margin of ocelli, stripe wide anteriorly, narrowed toward behind; antenniferous tubercles, genae, bucculae, base of ocelliferous tubercles and entire under surface of head. Integument of head faintly rugose and punctuate above. Head about one and one-half times as long as wide across eyes (1:0.70-0.75), and much shorter

than pronotum (1:1.35-1.45). Anteocular region three times as long as postocular (1:0.30-0.35); postocular with sides rounded, strongly converging toward behind. Clypeus narrow, slightly widened on posterior half. Genae narrowly tapering apically, falling slightly short of level of apex of clypeus. Jugae with conspicuous slightly curved spinelike projection. Head not strongly elevated between eyes dorsally. Eyes large, in side view surpassing level of

under surface of head in both sexes but distant from level of upper surface of head. Ratio width of eyes to synthlipsis 1:1.7-2.0 (1:1.75-1.85 in males, 1:1.85-2.0 in females), viz., eyes of females slightly smaller than those of males. Antenniferous tubercles without apicolateral process. Antennae with first and second articles black. First antennal segment almost attaining level of apex of clypeus; second with stiff setae as long as diameter of segment, and, mostly on under surface, with numerous short sensory hairs. Ratio of antennal segments 1:2.4-2.8:2.25-2.65:1.8-2.1. Rostrum (fig. 231C) black. First rostral segment attaining level of apex of antenniferous tubercles, second extending to level of middle of neck. First and most of second segment only with very short inconspicuous hairs, somewhat longer setae on apex of second segment; third segment with hairs as long as or longer than diameter of segment. Ratio of rostral segments 1:1.20-1.25:0.4-0.5.

Pronotum (fig. 230) with hind lobe unusually wide. Overall color of pronotum light brown with narrow longitudinal markings. Anterior lobe (fig. 231) slightly convex, elevated areas faintly granulose, with 1+1 large although not high discal tubercles, followed posteriorly by 1+1 similar but smaller tubercles at base of submedian carinae; lateral tubercles present,

well developed although smaller than discal ones. All tubercles mentioned yellow, polished. Posterior lobe coarsely rugose, conspicuously flaring posterolaterally. Humeral angles salient, rounded, narrowly explanate. Collar of general body color, with faint dark spot at center and 1+1 small markings at base of anterolateral processes, the latter large, elongate subtriangular, flattened dorsoventrally.

Scutellum (fig. 230) light yellowish brown, with median dark longitudinal marking, basally as wide as central depression, almost linear apically, extending to dorsum of posterior process to close to its apex. Median impression of scutellum shallow, rugose; lateral portions of scutellum wide and flat, smooth. Posterior process of scutellum (fig. 231B) short, half or less than half as long as body of scutellum, conspicuously humped at base, apical portion slightly widened, rounded, elevated in lateral view. Pleura light colored, acetabula and sutures between sclerites dark. Sterna dark.

Hemelytra closely approaching or attaining apex of abdomen, light brown, with complex dark brown or black pattern elements on corium and membrane, as illustrated (fig. 230); base of membranal cells conspicuously sooty black.

Legs (fig. 230) with coxae black; trochantera yellow, remaining segments rust colored. Femora with subapical annulus black, base of femora adjacent to trochanter yellow. Tibiae with basal and apical annulus black. Femora of first and second pair with 1+1 subapical denticles. Fore and mid tibiae with well developed spongy fossulae, in both sexes.

Venter convex, distinctly flattened longitudinally along middle, in both sexes. Urosternites delicately striate transversally. Setae of venter short, sparse, inconspicuous. Spiracles adjoining connexival suture. Suture between urosternites II and III well developed. Urosternites dark brown or black; spiracles contrastingly yellow. Connexivum light orange-brown; each segment anteriorly with short black marking adjacent to intersegmental suture; posterior margin of dark spots deeply emarginate on upper connexival plates, straight across or oblique on ventral connexival plates.

MALE GENITALIA: Vesica with short lateral

projections. Lateral endosoma processes with denticles on entire apical portion.

TYPE: The American Museum of Natural History.

DISTRIBUTION: Panamá.

BIOLOGY: *Panstrongylus humeralis* has not been found naturally infected with *Trypanosoma cruzi*. The species is sylvatic, and has not been reported from human habitations. It is attracted to light.

Panstrongylus lenti Galvão and Palma
Figures 232, 233

Panstrongylus lenti Galvão and Palma, 1968, p. 403, figs. 1-4. Lent and Jurberg, 1975, p. 409. figs. 139-148.

Female (only specimen known). Length 19 mm.; width of pronotum 5 mm.; of abdomen 7.5 mm.

Overall color very light reddish brown, with dark markings on pronotum, hemelytra, pleura and abdomen with connexivum.

Head (figs. 232, 233A, C) light yellowish brown, very faintly rugose transversally on dorsum along middle, otherwise smooth, polished. Head about one and one-half times as long as wide across eyes (1:0.65) and distinctly shorter than pronotum (1:1.2). Anteocular region slightly less than twice as long as postocular (1:0.55), postocular short and wide, with sides slightly convex, converging toward behind. Clypeus widened posteriorly. Genae narrowly rounded apically, attaining level of apex of clypeus. Jugae blunt apically. Head not conspicuously elevated above. Eyes in lateral view exceeding level of under but remote from level of upper surface of head. Ratio width of eye to synthlipsis 1:2. Antenniferous tubercles with small but distinct apicolateral process. First antennal segment reddish brown, falling short of apex of clypeus; remaining segments not preserved. Rostrum as shown in figure 233C. First rostral segment attaining level of anterior margin of eyes, second extending to level of center of neck. First and second rostral segments almost glabrous, third with hairs as long as or longer than diameter of segment. Ratio of rostral segments 1:1.1:0.5.

Pronotum (fig. 232) of general body color;

color, posterior margin of propleura darkened.

Hemelytra (fig. 232) attaining apex of abdomen. Corium and clavus pale yellow, except cell adjoining clavus and extreme apex of corium which are brown. Membrane brown, fumose, base of membranal cells and closely adjacent areas darker brown.

Legs uniformly light yellowish brown. Fore femora (fig. 233D) five times as long as wide. Apical half of fore femora with three pairs of small denticles. Spongy fossulae absent. Mid legs not preserved.

Abdominal venter shortly pilose. Spiracles distant from connexival suture by approximately three times their own diameter. Suture between urosternites II and III obsolescent. Abdomen of general body color. Urosternites III-VI each with 1+1 conspicuous black sublateral spots (fig. 233B). Dorsal connexival plates III and IV with very small blackish spots near anterior border.

TYPE: Instituto Oswaldo Cruz, Rio de Janeiro.

hind lobe with entire area between submedian carinae and lateral borders, and inner portion of areas between submedian carinae and lateral borders dark brown. Anterior lobe (fig. 233A) convex, elevated areas low. Discal tubercles small but distinct, rounded, subconical in side view. Lateral tubercles obsolete. Posterior lobe of pronotum distinctly and irregularly wrinkled. Submedian carinae low, evanescent on posterior third of hind lobe. Humeral angles rounded. Anterolateral projections of pronotum well developed, subconical.

Scutellum (fig. 233) with process dark brown, rugose, central depression well developed, extending onto base of posterior process. Process elongate, as long as main body of scutellum, subhorizontal, narrowly cylindrical, rounded at apex. Pleura and sterna of general

DISTRIBUTION: Brazil (Goiás or Minas Gerais).

BIOLOGY: The only specimen known was collected in Goiania, Goiás, among clothes of travelers proceeding from the state of Minas Gerais.

DISCUSSION: This is the smallest known species of *Panstrongylus*. *Panstrongylus lenti* was described from a single specimen and no additional material has come to hand. Although poorly preserved and possibly faded, the combination of characters found in this specimen is sufficient to continue considering it as representing a valid species.

Panstrongylus lignarius (Walker)

Figures 29M; 32A; 234-236

Conorhinus lignarius Walker, 1873b, p. 17.

Eratyrus lignarius: Lethierry and Severin, 1896, p. 117.

Conorrhinus lignarius: Champion, 1899, p. 206.

Lamus lignarius: Distant, 1902, p. 191.

Triatoma lignarius: Neiva, 1911d, p. 461.

Panstrongylus lignarius: Pinto, 1931, p. 116. Lent, 1943b, p. 486, figs. 1-6. Deane and Damasceno, 1950, p. 809, figs. 1, 2. Lent and Jurburg, 1975, p. 411, figs. 1 (part), 2 (part), 149-169.

Mestor lignarius: Usinger, 1939, p. 39.

Length of male 25-26 mm., of female 30-31 mm.; width of pronotum of male 7.0-7.5 mm., of female 8.0-8.5 mm.; width of abdomen of male 8-9 mm., of female 11-12 mm.

Overall color light brown dorsally; ferruginous, dark brown or black ventrally. Markings of dorsal surface complex, from dark brown to black, present on head, neck, pronotum, scutellum, hemelytra, and connexivum. Legs ferruginous or black, with yellow markings. Body surface with very short inconspicuous golden setae.

Head (figs. 234, 235, 236A) light brown, including part or all of genae and antenniferous tubercles; bucculae and entire under surface of head black; dorsally, a faded dark stripe of irregular shape longitudinally along middle, extending from level of jugae to that of ocelli. Surface of head faintly rugose above. Head about one and one-half times as long as wide across eyes (1:0.70-0.75) and much shorter than pronotum (1:1.3-1.4). Anteocular region from

three to four times as long as postocular, the latter with sides faintly rounded, strongly converging posteriorly. Clypeus narrow, widened on posterior half. Genae narrowly tapering apically, attaining but not surpassing level of apex of clypeus. Jugae with curved pointed projection. Head not strongly elevated between eyes above, dorsal surface almost straight in lateral view. Eyes large in both sexes, in lateral view surpassing level of under and distant from level of upper surface of head. Ratio width of eye to

synthlipsis 1:1.2-1.6. Antenniferous tubercles without apicolateral process. Antennae with

first and second segments black. First antennal segment approaching level of apex of clypeus;

second with inclined stiff setae not longer than diameter of segment, and with numerous short sensory hairs mainly on under surface of article. Ratio of antennal segments 1:2.4-2.7:2.4-2.7:1.7-2.0. Rostrum (fig. 236E) black. First rostral segment attaining level of apex of antenniferous tubercle, second extending to level of neck. First and most of second segment with very short, inconspicuous setae, third with setae as long as or longer than diameter of segment. Ratio of rostral segments 1:1.3-1.4:0.3-0.5.

Pronotum (figs. 234, 235) with posterior lobe unusually wide. Overall color of pronotum light brown, with narrow longitudinal markings. Anterior lobe (fig. 236C, E) slightly convex, elevated areas faintly granulose, with 1+1 comparatively small discal tubercles, followed or not by 1+1 similar but smaller tubercles at base of submedian carinae; lateral tubercles present, well developed although smaller than discal tubercles; 1+1 additional, sublateral tubercles invariably present, situated between posterior submedian and lateral tubercles. All tubercles mentioned yellow, polished. Posterior lobe coarsely rugose, conspicuously flaring posterolaterally. Submedian carinae short, not attaining posterior third of hind lobe. Humeral angles salient, from rounded to subangular. Humeri elevated, humeral angles narrowly explanate. Collar of general body color, faintly darkened submedially and again, more intensely so, at base of anterolateral projections, the latter large, narrowly conical, somewhat compressed dorsoventrally, narrowly tapering at apex.

Scutellum (figs. 234, 235) black, with light brown or yellowish median longitudinal stripe including entire posterior process, and again at sides of sclerite. Median depression of scutellum narrow, shallow, faintly rugose; remainder of disc of scutellum flat, smooth. Posterior process of scutellum (fig. 236D) very short, one-half to one-third as long as main body of scutellum, only slightly elevated at base, its apex knobbed. Neck with 1+1 dark spots dorsally. Pleura light reddish brown, with sutures between sclerites and parts of the latter dark. Sterna dark.

Hemelytra closely approaching apex of abdomen, light brown, with complex dark brown or black pattern elements as illustrated in figures 234, 235. Base of membranal cells conspicuously sooty black.

Legs (figs. 235, 236B) with fore femora 4.3-5.5 times as long as wide. Fore and mid femora with 1 + 1 subapical denticles. Fore and mid tibiae of both sexes with well developed spongy fossulae, those of male slightly larger than those of females. Coxae and basal half of trochanter black; apex of trochantera, base and apex of femora, and subbasal annulus of tibiae, yellowish. Remaining portion of femora from rust-colored to black; tibia black.

Venter convex, flattened longitudinally along middle, more distinctly so in female than in male. Urosternites delicately striate transversally. Setae of venter short, inconspicuous. Spiracles adjoining connexival suture. Suture between urosternites II and III well developed.

Urosternites from dark rust-colored to black; spiracles included in small yellow spot. Connexivum (figs. 234, 235) yellow or light yellowish brown. Each connexival segment dorsally at anterolateral corner adjacent to intersegmental suture with wedge-shaped black mark from one-third to one-half as long but less than half as wide as segment. Ventrally, connexival segments with transverse black marking adjacent to anterior intersegmental suture extending over entire width of segment and about one-third as long as latter.

MALE GENITALIA: Vesica with short lateral projections. Lateral endosoma processes with denticles on entire apical portion.

TYPE: British Museum (Natural History).

DISTRIBUTION: Brazil (Amazonas, Pará); Guyana; Surinam; Venezuela.

BIOLOGY: *Panstrongylus lignarius* has been found naturally infected with *Trypanosoma cruzi*, but has not been collected in houses. Specimens were captured in hollow trees inhabited by a porcupine (*Coendou* sp.). The species may be arboricolous; specimens were obtained in the forest on platforms at heights from 15 to 25 meters above ground, attracted to human bait.

Panstrongylus lutzi (Neiva and Pinto)
Figures 6J; 237-239

Triatoma lutzi Neiva and Pinto, 1923c, p. 74. Pinto, 1925a, p. 55, figs. 37, 38.

Panstrongylus lutzi: Pinto, 1931, p. 116, fig. 51. Lent and Jurberg, 1975, figs. 170-194.

Length of male 24.0-28.5 mm., of female 28-29 mm.; width of pronotum of male 6.5-8.0 mm., of female 7.5-8.0 mm.; width of abdomen of male 8-11 mm., of female 10.5-11.5 mm.

Overall color yellowish brown, with dark brown markings on head, pronotum, pleura, scutellum, corium, and connexivum. Body surface appearing glabrous.

Head (figs. 237, 238, 239A, B) uniformly dark yellowish brown, antenniferous tubercles dark brown, shallowly rugose dorsally along middle, otherwise smooth. Head about one and one-half times as long as wide across eyes

(1:0.7), and much shorter than pronotum (1:1.3-1.5). Anteocular region twice as long as postocular (1:0.50-0.55); postocular very short and wide, its sides rounded and covered from above by large, laterally protruding ocelli. Clypeus widened posteriorly. Genae very narrowly tapering apically, falling slightly short of level of apex of clypeus. Jugae blunt apically. Head strongly elevated above, in lateral view. Eyes in side view remote from level of upper but projecting below level of lower surface of head. Ratio width of eyes to synthlipsis

1:2.0-2.8. Antenniferous tubercles very short, with small but distinct apicolateral process. Antennae dark reddish brown. First antennal segment extending beyond level of apex of clypeus

by one-third of its own length; second segment with inclined stiff setae and numerous short sensory hairs. Ratio of antennal segments 1:2.9-3.3:2.2-2.4:1.95-2.0. Rostrum as shown

in figure 239B; first segment attaining level of apex of antenniferous tubercle, second segment extending to level of base of neck. First and most of second antennal segment with very short inconspicuous hairs, appearing almost glabrous; apex of second and entire third rostral segment with hairs twice as long as or longer than diameter of respective segment. Ratio of rostral segments 1:1.2-1.3:0.50-0.55.

Overall color of pronotum (figs. 237, 238) yellowish brown, the following areas from dark to black: center of collar, surface of fore lobe except discal tubercles and lateral carinae, three longitudinal markings on posterior lobe, viz., one median mark, widest anteriorly and abruptly narrowed on posterior half, attaining posterior margin of pronotum or not, and 1+1 sublateral markings between submedian and lateral carinae, the latter two marks variable in size, from covering only one-third of length of posterior lobe to as long as hind lobe. Posterior margin of pronotum narrowly darkened. Anterior lobe of pronotum convex; ridges low, inconspicuous; discal tubercles large, rounded; lateral tubercles much smaller than discal ones, mere elevations of lateral carinae. Lateral margins of anterior and posterior lobe of pronotum forming conspicuous angle, pronotum strongly constricted at level of transverse furrow. Posterior lobe of pronotum rugose transversally. Submedian carinae low, evanescent on posterior third. Humeral angles rounded. Anterolateral projections of pronotum about as large as discal tubercles, from conical to rounded. Scutellum dark brown, with posterior process in some specimens lighter brown.

Scutellum (fig. 238) conspicuously rugose, central excavation shallow, elongate, in some specimens extending to base of scutellar process. Posterior scutellar process as long as main body of sclerite, subhorizontal, slender cylindrical, narrowly tapering apically.

Hemelytra (figs. 237, 238) attaining apex of abdomen, in both sexes. Corium yellowish brown, at center with large, irregularly shaped dark brown spot; apex of corium equally dark brown. Membrane almost as dark as dark portion of corium, fumose.

Legs (figs. 237, 238) with fore femur approximately five times as long as wide. Fore and mid femora with numerous denticles (fig.

239C), arranged in two rows on apical two-thirds, irregularly arranged near base of article, progressively increasing in size from base to apex of femora. Fore and mid tibiae with very small spongy fossulae, in both sexes. Legs uniformly reddish brown, faintly darker on apex.

Venter convex in both sexes. Urosternites delicately striate transversally. Setae of venter short and sparse. Spiracles distant from connexival suture by about three times their diameter.

Suture between urosternites II and III shallow. Venter yellowish or reddish brown. Connexivum (figs. 237, 238) yellowish brown, anterior third of half of each connexival segment with dark brown or black irregularly subrectangular spot adjacent to intersegmental suture.

MALE GENITALIA: Vesica small. Lateral endosoma processes short, free portion denticulate.

TYPE: Instituto Oswaldo Cruz, Rio de Janeiro.

DISTRIBUTION: Brazil (Bahia, Ceará, Paraíba, Pernambuco, Piauí, Rio Grande do Norte).

BIOLOGY: *Panstrongylus lutzi* has been found naturally infected by *Trypanosoma cruzi*. The species has occasionally been found in houses; its natural habitat is unknown.

Panstrongylus megistus (Burmeister)
Figures 24I; 29A-C; 30E; 240-242

Conorhinus megistus Burmeister, 1835, p. 246
Neiva, 1910, p. 206. Patton and Cragg, 1913, p 492, pl. 59, fig. 2

Lamus megistus: Stål, 1859, p. 115
Triatoma megistus: Neiva, 1911b, p. 239
Panstrongylus megistus: Pinto, 1931, p. 117, figs. 31,
58, 59. Lent and Jurberg, 1968, p. 510, figs.
38-58; 1975, p. 425, figs. 1 (part), 2 (part)
Mestor megistus: Usinger, 1944, p. 13
Triatoma megista: Neiva, 1911a, p. 421. Pinto, 1925,
p. 39, figs. 20-31. Del Ponte, 1930, p. 882 pl.
48
Conorhinus gigas Burmeister, 1861, p. 320 (*nec* Fab-
ričius)
Conorhinus porrigenus Walker, 1873b, p. 19. Neiva,
1914, p. 12
Triatoma wernickei Del Ponte, 1923, p. 66; 1925, p
29, pl. 1, fig. A
Triatoma megista var. *Wernickei*: Del Ponte, 1930,
p. 883, pl. 49, fig. 1
Triatoma africana Neiva, 1911b, p. 239
Panstrongylus africanus Pinto, 1931, p. 106.

Length of male 26-34 mm., of female 29-38 mm.; width of pronotum of male 7-10 mm., of female 8-10 mm.; width of abdomen of male 11-13 mm., of female 12-14 mm.

Overall color black, with red or light reddish brown markings on neck, pronotum, scutellum, corium, and connexivum. Body surface with short, sparse, inconspicuous setae.

Head (figs. 240, 241, 242A) black, shallowly rugose transversally and slightly punctate above. Head about one and one-half times as long as wide across eyes (1:0.75-0.85), and much shorter than pronotum (1:1.3-1.5). Anterior region from two to three times as long as postocular (1:0.30-0.45); postocular very short and wide, its sides rounded, strongly convergent toward behind. Clypeus narrow, slightly widened posteriorly. Genae narrowly rounded apically, not extending beyond level of apex of clypeus. Jugae terminating with prominent, pointed free projection (fig. 242B, C). Head very strongly elevated on posterior half. Eyes large, in side view considerably surpassing level of under surface but distant from level of upper surface of head. Eyes of males larger than those of females; ratio width of eye to synthlipsis 1:1.25-1.35 in males, 1:1.55-1.80 in females. Antenniferous tubercles without apicolateral projection. Antennae dark brown. First antennal segment distinctly surpassing level of apex of clypeus. Second antennal segment with inclined stiff setae about as long as diameter of segment, and with numerous short

sensory hairs. Ratio of antennal segments 1:2.8-3.3:2.2-2.5: 1.4-1.8. First rostral segment attaining level of apex of antenniferous tubercles or, rarely, of anterior margin of eyes; second segment extending to level of middle of neck. First rostral segment appearing glabrous; second with distinct setae, about half as long as diameter of segment, third with setae as long as or longer than diameter of segment. Ratio of rostral segments 1:1.10-1.25:0.40-0.55.

Pronotum (figs. 240, 241) with anterior lobe entirely black, rarely with 1+1 small reddish

marks between dorsal tubercles and collar, or with tubercles reddish; posterior lobe black, with 2+2 large red markings on posterior half

or third, viz., 1+1 submedian spots as a continuation of submedian carinae, and 1+1 lateral spots occupying humeri and adjacent areas; in

some cases, markings expanded posteriorly and connected, thus entire posterior margin of sclerite red. Anterior lobe convex, smooth, with elevated areas almost imperceptible; discal tubercles in most specimens large, subconical, with apex narrowly pointed but not spinelike; lateral tubercles well developed, similar to discal tubercles, as large as or smaller than latter. Posterior lobe rugose transversally. Submedian carinae low, not extending to posterior half of lobe. Humeral angles narrowly rounded or angular, reflexed, explanate. Anterolateral projections elongate conical.

Scutellum (figs. 240, 241) with lateral portions smooth; median depression extremely shallow, slightly rugose transversally, reddish, the red color continuing onto posterior process. Scutellar process short, from one-third to one-half as long as main body of sclerite, subconical, subhorizontal, rounded apically in dorsal and truncate with upper portion elevated, in lateral view (fig. 242D).

Hemelytra (figs. 240, 241) extending close to apex of abdomen. Corium and membrane black; corium with red spots at base and subapically. Base of clavus light colored. Veins of corium and extreme base of membrane margined with yellow to varied degree.

Legs (figs. 240, 241) black, with fore femora 4.5-6.0 times as long as wide. Fore and mid femora with subapical pair of small denticles. Fore and mid tibiae of male with spongy fossulae, absent in female.

Venter convex, very slightly flattened at center longitudinally in female. Urosternites delicately striate transversally; setae of venter short, inconspicuous. Spiracles distant from connexival suture by about their own diameter. Suture between second and third urosternite well developed. Venter black. Connexivum (figs. 240, 241) black; connexival plates with transversal red markings on posterior fourth dorsally and on posterior third ventrally. Light portion of ventral connexival segments extending in some specimens shortly onto urosternites.

MALE GENITALIA: Vesica with lateral projections; entire lateral endosoma processes covered by denticles.

TYPE: Of *megistus*, unknown; of *porrigens*,

British Museum (Natural History); of *wer-nickei*, Instituto Bacteriológico, Buenos Aires; of *africana*, Zoologisches Museum, Berlin.

DISTRIBUTION: Argentina (Corrientes, Jujuy, Misiones, Salta); Bolivia; Brazil (Alagoas, Bahia, Ceará, Espírito Santo, Goiás, Maranhão, Mato Grosso, Minas Gerais, Pará, Paraíba, Paraná, Pernambuco, Piauí, Rio de Janeiro, Rio Grande do Norte, Rio Grande do Sul, Santa Catarina, São Paulo, Sergipe); Paraguay; Uruguay.

BIOLOGY: *Panstrongylus megistus*, frequently infected with *Trypanosoma cruzi*, is in many areas a common domestic species and an efficient vector of Chagas' disease among humans; it was the first species of triatomines ever to be shown to be such a vector (Chagas, 1909).

In recent years, *Panstrongylus megistus* has been found in peridomestic (chicken houses) and many sylvatic habitats, such as nests and hiding places of opossums and rodents, in decaying or hollow trees, in palm trees (macaúbeiras and aricuris), at the base of bromeliad leaves, in clumps of the agave *Fourcroya gigantea*, among the roots of fig trees, and in fissures in rocks.

Panstrongylus rufotuberculatus (Champion)
Figures 8I, J; 10A; 12B; 14A, B; 243-245

Lamus rufotuberculatus Champion, 1899, p. 210, pl. 12, figs. 27, 27a.

Triatoma rufotuberculata: Neiva, 1914a, p. 61.

Panstrongylus rufotuberculatus: Pinto, 1931, p. 118. Lent and Pifano, 1940, p. 634, figs. 1-2. Lent and Jurberg, 1975, p. 426, figs. 1 (part), 2 (part), 195-217.

Mestor rufotuberculatus: Usinger, 1939, p. 40; 1944, p. 45, pl. 8, fig. D.

Triatoma coxo-rufa Campos, 1932, p. 3.

Length of male 24-27 mm., of female 25-28 mm.; width of pronotum of male and female 6-7 mm., of abdomen of male 8-9 mm., of female 9-10 mm.

Overall color dark brown or black, with light yellowish brown or red markings on head, neck, thorax, legs, and abdomen; hemelytra tinged with pale green, their markings dark brown. Integument of dorsal body surface with conspicuous golden colored adpressed setae, many scalelike (fig. 245D, G-I).

Head (figs. 243, 244, 245A, B, E, F) blackish, including antenniferous tubercles, genae, bucculae, and entire under surface of head. Clypeus reddish, black only at base; dorsal surface of head with elongate reddish mark extending longitudinally along center, approximately Y-shaped, bifurcate anteriorly, extending from level of jugae to interocellar space. Head short and wide, its surface rugose and punctate; ratio length of head to width across eyes 1:0.65-0.80. Head from slightly to considerably shorter than pronotum (1:1.15-1.45). Anteocular region three to four times as long as postocular (1:0.25-0.35); postocular with sides rounded, strongly converging toward behind. Clypeus distinctly widened posteriorly, bilobed apically in many specimens (fig. 245A, C). Genae tapering distally, falling short of apex of clypeus. Jugae blunt. Posterior portion of head much higher than anterior, slightly convex above in lateral view. Eyes large in most specimens, in lateral view surpassing level of under but distant from level of upper surface of head. Ratio width of eye to synthlipsis 1:1.30-1.85; very rarely male, 1:2.3, female 1:3.3. Antenniferous tubercles with obsolescent

apicolateral setiferous process. Antennae with first and second articles black. First antennal article slightly surpassing level of apex of clypeus. Second article with inclined stiff setae slightly longer than diameter of article, as well as with numerous short sensory hairs on under surface of article. Ratio of antennal segments 1:3.0-3.5:2.2-2.8:1.9-2.3. Rostrum (fig. 245B, E) with first and second articles black, third

dark reddish brown. First article attaining level of apex of antenniferous tubercles, second ex-

tending to level of neck. First rostral article with short, sparse setae, second and third with

numerous long hairs, those on third segment longer than diameter of segment. Ratio of rostral segments 1:1.9-2.2:0.6-0.7.

Overall color of pronotum (figs. 243, 244) dark brown to black. Anterior lobe black, with anterolateral projections and discal and lateral tubercles red. Posterior lobe with part of submedian carinae, explanate portion of humeral angles and 1+1 small spots posterior to termination of submedian carinae, red; one large central spot adjacent to hind margin and 1+1 sublateral spots on disc of humeri, yellowish or orange red. Anterior lobe slightly convex, smooth, its ridges with numerous adpressed golden colored setae; 1+1 semiglobose discal and 1+1 smaller, subconical lateral tubercles present. Posterior lobe coarsely rugose. Submedian carinae extending over three-fourths of length of posterior lobe. Humeral angles salient, from narrowly rounded to subangular, narrowly explanate. Anterolateral projections strongly compressed dorsoventrally, subrectangular, their apex obliquely truncate, anterolaterally and slightly upwardly directed. Sterna and pleura dark, acetabula reddish.

Scutellum (figs. 243, 244) black, posterior process apically or entirely red. Carinae limiting central depression red or black. Central depression narrow, strongly rugose transversally, rugosities extending onto base of posterior process. Lateral portion of scutellum smooth. Posterior process shorter than main body of scutellum, subconical, horizontal, not elevated at base, its apex rounded, suboval or subglobose.

Hemelytra (figs. 243, 244) extending to apex of abdomen, in both sexes. Color of hemelytra light brown, conspicuously tinged with pale green. Corium streaked with brown mostly along veins; membrane dotted with dark, outer membranal cell with compact dark area subbasally.

Legs (figs. 243, 244) stout, fore femora 3.8-4.7 times as long as wide. Fore and mid femora with three or four short denticles, rarely only two, in some specimens up to three minute accessory ones. Fore and mid tibiae of male with spongy fossulae, absent in female. Overall color of legs dark brown or black, femora dorsally with longitudinal red stripes of

varied extension and with red apical annulus.

Venter convex, distinctly flattened longitudinally along middle, in both sexes. Urosternites delicately striate transversally. Setae of venter golden colored, numerous, slender, inclinate, well perceptible. Spiracles either adjoining connexival suture or distant from latter by not more than their own diameter. Suture between urosternites II and III normally developed. Urosternites dark brown to black; spiracles enclosed in small yellow spot. Connexivum (figs. 243, 244, 245J, K) spotted with light and dark, the light portions orange or rust-red and yellow. Each connexival segment with subrectangular dark spot at center, adjoining outer margin of segment, dorsally distant from, ventrally adjoining connexival suture.

Connexival plates anteriorly with dark transversal band adjoining intersegmental suture (fig. 245J), in some cases widened near connexival suture and/or connected to median spot along outer connexival margin (fig. 245K).

MALE GENITALIA: Endosoma processes present in two pairs, those of proximal pair delicately denticulate apically.

TYPES: Of *rufotuberculatus*, British Museum (Natural History); of *coxo-rufa*, unknown.

DISTRIBUTION: Bolivia; Brazil (Amazonas, Pará, Mato Grosso); Colombia; Costa Rica; Ecuador; Panama; Peru; Venezuela.

BIOLOGY: *Panstrongylus rufotuberculatus* has been recorded as naturally infected with *Trypanosoma cruzi*. It is attracted to light (mostly males) and known to occur in houses but there is no evidence that it breeds there. Sylvatic specimens have been taken from the shelter of a kinkajou (*Potos flavus* Schreber, Procyonidae).

OBSERVATIONS: This species is somewhat variable morphologically and chromatically. Most specimens have comparatively large eyes (ratio width of eye to synthlipsis 1:1.3-1.8 [fig. 245A, B]) but in a sample of a population from the Valle de la Convención in the Peruvian Department of Cuzco the eyes are notably smaller (male, 1:2.8, female, 1:3.3 [fig. 245E, F]). Regarding color, there is some variation in the carinae limiting the central depression of the scutellum; they are red in all specimens from Panama and Colombia, but black as the rest of the body of the scutellum in the specimens from Costa Rica, Venezuela, Peru, Bolivia, and Brazil we have seen now. The variability described seems to be geographical in nature.

Panstrongylus tupynambai Lent
Figures 246-248

Panstrongylus tupynambai Lent, 1942, p. 227, figs. 31-33. Lent and Jurberg, 1975, p. 432, figs. 218-239.

Length of male 22 mm., of female 25 mm.; width of pronotum of male 5 mm., of female 6 mm.; width of abdomen of male 7.5 mm., of female 9 mm.

Overall color light reddish brown, with dark brown areas on pronotum, corium and connex-

ivum. Body surface with short, sparse hairs, appearing glabrous.

Head (figs. 246, 247, 248A, C-E) uniformly dark brown, neck reddish brown. Head shallowly rugose along middle above, otherwise smooth, polished. Head about one and one-half times as long as wide across eyes (1:0.60-0.75), and slightly shorter than pronotum (1:1.1-1.2). Anteocular region about twice as long as postocular (1:0.45-0.60), postocular very short and wide, its sides rounded but obscured from above by protruding ocelli. Clypeus widened posteriorly. Genae narrowly rounded apically, not quite attaining level of apex of clypeus. Jugae blunt apically. Head strongly elevated dorsally, highest at level of ocelli. Eyes in side view extending below level of under surface but distant from level of upper surface of head. In dorsal view, eyes of male (fig. 248C) larger than those of female (fig. 248A). Ratio width of eye to synthlipsis 1:2.0 in male, 1:2.9-3.2 in female. Antenniferous tubercles with very small but distinct apicolateral

process. Antennae dark brown. First antennal segment extending slightly beyond level of

apex of clypeus; second antennal segment with inclined stiff setae about as long as diameter of

segment as well as with numerous delicate short sensory hairs. Ratio of antennal segments 1:3:2.3:1.9. Rostrum as shown in figure 248D, E; first segment as long as or slightly longer than second, extending beyond level of anterior margin of eyes; second segment attaining level of center of neck. First and second rostral segments with very short inconspicuous setae, thus appearing glabrous under low magnification; third segment with hairs as long as or longer than diameter of segment. Ratio of rostral segments 1:0.9-1.0:0.4.

Pronotum (figs. 246, 247) with collar and anterior lobe reddish brown or dark brown. Posterior lobe reddish brown, with central dark brown marking on anterior half of space between submedian carinae; 1+1 wide dark markings on spaces between submedian and lateral carinae, extending from transversal sulcus to posterior margin of sclerite. Posterior margin of pronotum narrowly dark. Anterior lobe (fig. 248A) convex, with low elevated areas. Discal tubercles distinct but not large, rounded; lateral tubercles smaller, mere elevations of lateral carinae. Lateral markings of anterior and posterior lobes of pronotum forming slight but distinct angle. Submedian carinae low, evanescent on posterior third of posterior lobe of pronotum. Humeral angles rounded. Anterolateral processes of pronotum short, rounded.

Scutellum (figs. 246, 247) dark brown, posterior process dark or light brown. Scutellum heavily rugose; median depression well developed. Posterior scutellar process almost as long as main body of scutellum, slightly elevated, slender cylindrical, narrowly rounded apically.

Hemelytra of male extending to apex of abdomen, but only to middle of seventh urotergite in female (figs. 246, 247). Corium dark reddish brown, light reddish brown at base and narrowly along margin, as well as an irregular reddish spot subapically adjacent to base of outer membranal cell. Apex of corium almost black. Membrane uniformly dark brown, fumose.

Legs (figs. 246, 247) uniformly reddish brown. Fore femora 5.5 times as long as wide. Fore and mid femora with one pair of subapical denticles, and 0-2 smaller denticles further basad (fig. 248B). Males with very small

spongy fossulae on fore and mid tibiae, absent in females.

Venter with short, inconspicuous setae. Spiracles distant from connexival suture by two or three times their own diameter. Suture between urosternites II and III obsolescent. Venter dark reddish brown. Connexivum (figs. 246, 247) reddish brown; anterior half or third of each connexival segment with black, subrectangular spot adjoining intersegmental suture.

MALE GENITALIA: Vesica with 1+1 lateral projections. Lateral endosoma processes denticulate apically.

TYPE: Instituto Oswaldo Cruz, Rio de Janeiro.

DISTRIBUTION: Brazil (Rio Grande do Sul); Uruguay.

BIOLOGY: The few specimens known were collected in human habitations, where they can be presumed to have taken temporary refuge. The sylvatic habits of *Panstrongylus tupynam-bai* are not known.

OBSERVATIONS: In the original description, *P. tupynam-bai* was compared with *P. guentheri* (as *P. larroussei*) but it actually is more similar to *P. lutzi* with which it shares the presence of

denticles on the lateral endosoma processes, the denticles being absent in *guentheri*. *Panstrongylus tupynambai* differs from all other *Panstrongylus* by the length ratios of the first two rostral segments, the first being as long as or even slightly longer than the second, whereas it is invariably and distinctly shorter than the second segment in all other species.

PARATRIATOMA BARBER

Paratriatoma Barber, 1938, p. 104, Neiva and Lent, 1941, p. 62. Usinger, 1944, p. 47. Ryckman, 1971, p. 88. Lent and Jurberg, 1971, p. 39.
Triatoma (Paratriatoma) Lima, 1940, p. 188.

Triatomini. Small insects (12.5-14.5 mm.). Body not flattened. Body and appendages covered with numerous elongate, declinate or semierect, minutely spinose black setae.

Head elongate subconical or ovoid, strongly convex above. Antenniferous tubercles situated behind middle of anteocular portion of head. Rostrum as long as head, extending to level of prosternum. First rostral segment much shorter than second but longer than third; third without rostral organ.

Fore lobe of pronotum without discal or lateral tubercles. Humeral angles rounded. Prosternum with stridulatory sulcus. Scutellar spine narrowly subcylindrical. Legs with femora unarmed; spongy fossulae absent.

Abdomen narrow. Venter convex, slightly flattened along middle longitudinally. Lateral portions of urosternites overlapping mesial portion of connexival segments, the latter connected to margin of urosternites by expandable membrane. Median process of pygophore narrowly triangular, pointed.

Fifth instar nymph: Body surface delicately granulose. Body, antennae, and legs with very long erect or decumbent minutely spinulose setae; genae not projecting beyond level of apex of clypeus; eyes situated laterally behind middle of head; fourth antennal segment not or only slightly longer than any of the preceding; only fourth antennal segment delicately annulate; stridulatory sulcus present; fore and mid femora slightly incrassate, with a few small setiferous tubercles subapically but without denticles; femora without trichobothria; fore

tarsi shorter than half the length of tibiae; abdomen without series of large tubercles dorsally along midline.

First instar nymph: Head, thorax, and abdomen uniformly pigmented, without conspicuous markings and not mottled; setae very elongate, spinulose; fourth antennal segment not longer than first, second and third combined; stridulatory sulcus present; mesonotum in shape of transversal band, only very slightly longer at midline than at sides; metanotal plates small, distance between plates more than twice their width; femora without trichobothria; hind tarsi apically without specialized hairs; setae of urotergites arranged in two transversal rows.

TYPE SPECIES: *Paratriatoma hirsuta* Barber.

DISTRIBUTION: Southwestern USA and northwestern Mexico.

BIOLOGY: Associated with woodrats (*Neotoma* spp.).

Paratriatoma hirsuta Barber

Figures 6F; 8F; 22G; 25B, C, E, G, J; 26D; 249, 250

Paratriatoma hirsuta Barber, 1938, p. 104. Neiva and Lent, 1941, p. 78, figs. 19, 20. Usinger, 1944, p. 48, pl. 1, fig. K, pl. 7, fig. C. Lent and Jurberg, 1971, p. 40, figs. 1-23.

Paratriatoma hirsuta hirsuta Ryckman, 1967, p. 3; 1971, p. 88, figs. 1, 2, 7.

Paratriatoma hirsuta kamiensis Ryckman, 1967, p. 2; 1971, p. 90, figs. 3, 8.

Paratriatoma hirsuta papagoensis Ryckman, 1967, p. 2; 1971, p. 91, fig. 4.

Paratriatoma hirsuta yumanensis Ryckman, 1967, p. 2; 1971, p. 92, figs. 6, 9, 10.

Paratriatoma hirsuta pimae Ryckman, 1967, p. 2; 1971, p. 92, fig. 5.

Length of male 12.0-13.5 mm., of female 12.5-14.5 mm.; width of thorax of male 3.0 mm., of female 3.5 mm.; width of abdomen of male 3.5 mm., of female 5.0 mm.

Overall color pattern consisting of various shades of brown (fig. 249), from light yellow brown to dark brownish black; in dark specimens corium and legs distinctly lighter. Body integument polished. Entire insect with numerous long, dark, adpressed, decumbent or erect setae (fig. 250A, B), except on urotergites and membrane of hemelytra.

Head (figs. 249, 250A-C, F), rugose transversally along middle, with long forwardly inclined setae. Shape of head as shown in illustrations, twice as long as wide across eyes (1:0.5-0.6), and about as long as pronotum (1:0.9-1.1). Anteocular region twice as long as postocular (1:0.5-0.6); postocular with sides straight or convex, in many specimens widest behind middle. Clypeus narrow anteriorly, unusually wide on posterior half, limited posteriorly by transverse impression. Genae narrowly tapering apically, attaining level of apex of clypeus. Jugae short, inconspicuous. Eyes small, in lateral view not attaining levels of under and upper surface of head, more distant from latter than from former. Ratio width of eyes to synthlipsis 1:2.7-3.7. Ocelliferous elevations poorly developed. Antenniferous tubercles inserted near anterior margin of eyes. First article of antennae attaining level of apex of clypeus. Second article with numerous stiff, inclined setae slightly longer than diameter of article (fig. 6F). Ratio of antennal segments 1:2.5-2.9:2.6-3.0:1.3-1.9. Rostrum (fig. 250B,

C) subcylindrical, with long setae on all articles. First article attaining level of apex of antenniferous tubercles; second extending to level of posterior border of eyes. Ratio of rostral segments 1:1.3-1.6:0.5-0.7.

Pronotum (figs. 249, 250A) with anterior lobe slightly convex, without discal or lateral tubercles. Ridges beset with long setae. Posterior lobe rugose transversally, with submedian carinae obsolescent, distinctly perceptible only on anterior third of posterior lobe of pronotum. Humeri rounded. Long posteriorly directed setae scattered over sclerite. Anterolateral projections small, rounded or subconical.

Scutellum (fig. 249) coarsely rugose, in many cases darker than pronotum; median impression shallow but in most specimens distinct, limited by 1+1 distinct narrow carinae. Posterior process of scutellum varied in length, from as long as, to only half as long as, main body of sclerite. Process subcylindrical, horizontal, narrowly tapering apically.

Hemelytra (fig. 249) attaining apex of abdomen in male, extending to seventh or base of

eighth urotergite in female. Corium darker than membrane, covered with numerous long setae.

Legs short (fig. 249), fore femur 4.3-4.8 times as long as wide. Femora without denticles; spongy fossulae absent. Legs with numerous long adpressed or decumbent setae; femora additionally on under surface with long setae perpendicular to longitudinal axis of article (fig. 250G).

Abdomen convex below, distinctly flattened longitudinally along middle, more strongly so in female. Urosternites faintly striate transversally in central portion, irregularly wrinkled on lateral half of each side; microsculpture difficult to make out due to highly polished, reflective integument. Spiracles (fig. 250D) distant from lateral border of urosternites by several times their diameter. Connexivum wide dorsally (fig. 250E), visible portion of ventral connexival plates narrow (fig. 250D). Phallus as shown in figure 22G.

TYPES: Of *hirsuta*, National Museum of Natural History, Smithsonian Institution, Washington, D. C.; of *kamiensis*, *papagoensis*, *yumanensis* and *pimae*, unknown.

DISTRIBUTION: U.S.A. (Arizona, California, Nevada); Mexico (Baja California Sur, Sonora).

BIOLOGY: *Paratriatoma hirsuta* has never been found naturally infected with *Trypanosoma cruzi*, but is easily infected experimentally. Woodrats (*Neotoma* spp.) are the only known natural hosts of the species, viz., *Neotoma albigena* Hartley, *N. albigena venusta*, *N. fuscipes macrotis* Thomas, *N. l. lepida* Thomas, and *N. lepida grinelli*.

DISCUSSION: This is a chromatically variable species. The various populations described as subspecies by Ryckman represent color forms restricted each to a circumscribed geographical area.

RHODNIINI PINTO

Rhodniini Pinto, 1926a, p. 490.
Psammolestiini (*sic*) Carcavallo, 1976, p. 348
(*nomen nudum*).

Small- to medium-sized Triatominae of not more than 26 mm., somewhat compressed dorsoventrally or not. Body surface from smooth

to moderately rugose, with very short bristles only.

Head not strongly convex above. Antenniferous tubercles without apical spinelike projection. Antennae inserted near apex of head. Genae from slightly to considerably surpassing apex of clypeus, the latter slightly but distinctly widened apically. Ocelli situated posterolaterally behind eyes, in most cases inserted on conspicuous elevations behind interocular sulcus, the latter not fully developed. Head laterally behind eyes with callosities beset with setiferous tubercles. Second antennal segment with 4-6 trichobothria arranged in one row along length of article, and two ancillary trichobothria laterad of base of main row. Remaining setae of second antennal segment of uniform size.

Anterolateral corners of scutellum each with small, polished mammiform process.

Corium with veins distinct.

Abdomen with urosternites covering part or all of ventral connexival segments, connected to latter by simple membrane.

MALE GENITALIA: Articulatory apparatus with basal plate bridge well developed. Basal plate struts transformed into short, platelike, curved or convoluted structures. Dorsal sclerotization of phallosoma large, subsemIELliptical. Vesica not strongly sclerotized.

Fifth instar nymph: Body surface rugose-granulose, with short simple spinulose setae; head not strongly convex above; genae slightly surpassing apex of clypeus; eyes situated well behind middle of head; antenniferous tubercles without conspicuous apicolateral process; fourth antennal segment shorter than some of the preceding; only fourth antennal segment delicately annulate; stridulatory sulcus present; femora subcylindrical or incrassate and compressed, but without denticles, trichobothria absent; fore tarsi much shorter than half the length of tibiae; abdomen without series of large tubercles dorsally along middle.

First instar nymph: Head, thorax, and legs mottled with light and dark, in addition to other markings; setae simple or spinulose; fourth antennal segment not longer than first, second, and third combined; stridulatory sulcus present; metanotum longer at middle than at sides; met-

anotal plates small, distance between plates larger than twice their width; femora without trichobothria; hind tarsi apically without specialized hairs; setae of urotergites irregularly scattered.

Eggs laid in masses or singly.

TYPE GENUS: *Rhodnius* Stål, 1859.

Other genus included: *Psammolestes* Bergroth, 1911.

DISTRIBUTION: Southern Mexico, Central America, South America to Argentina.

BIOLOGY: In birds' nests and on palm trees; a few species associated with mammals, or peridomestic and domestic.

OBSERVATIONS: This tribe contains two closely related genera. The postocular callosities, the short ancillary series of trichobothria on the second antennal segment, and the characteristically modified basal plate struts are synapomorphic characters not shared by any other triatomine genus, and sufficient to characterize the tribe.

Carcavallo (1976) included the name *Psammolestiini* in a list of triatomine tribes of the Americas. There is no statement giving differential characters for the taxon, there is no reference to such a statement, and *Psammlestiini* is not proposed as a replacement name; therefore, *Psammlestiini* is to be considered as a *nomen nudum*. In any case, the close relationship between *Rhodnius* and *Psammolestes* does not justify the segregation of *Psammolestes* on the tribal level.

RHODNIUS STÅL

Rhodnius Stål, 1859, p. 104. Lent, 1948a, p. 298.
Lent and Jurberg, 1969c, p. 487.

Triatominae from 11 to 26 mm. long; their general color light brown or straw-colored, with brown or blackish, occasionally reddish brown markings, scattered or in large spots and stripes; rarely black with reddish markings. Setae very short, inconspicuous.

Head slender and elongate, subcylindrical, from two to three times as long as wide across eyes, in most cases longer than pronotum. Head granulose at sides before and behind eyes, its dorsal surface with a narrow median

longitudinal ridge. Anteocular region in most species at least three times as long as postocular; postocular not more than twice as long as wide. Postocular callosities present but not prominent. Clypeus narrow, parallel-sided but widened at apex. Genae situated below level of clypeus, slightly surpassing the latter apically. Jugae inconspicuous, not salient. Postocular furrow shallow, interrupted, distinct only on lateral portions. Eyes from medium-sized to large. Ocelli well developed, inserted on small lateral protuberances, their distance slightly larger than dorsal interocular distance. Antenniferous tubercles short, insertion of antennae situated near apex of head. Antennae with first segment unusually short, attaining level of apex of clypeus; second article at least four and one-half times as long as first, third slightly shorter than second (except in *brethesi* where third is longer than second), fourth shorter than the two preceding. Second article with five or six trichobothria arranged in one row along length of article, their distance progressively larger toward apex of article, and with two ancillary trichobothria laterad of basal trichobothrium of main row. Rostrum attaining prosternum, slender, subcylindrical, slightly flattened dorsoventrally. First and third rostral segments very short, second about four times as long as first or third, only rarely (*R. paraensis*) slightly less than three times as long as first.

Pronotum with sides carinate. Fore lobe simple; hind lobe granulose and rugose. Anterolateral angles shortly projecting, rounded or angular apically. Humeral angles rounded. 1+1 submedian carinae extending from anterior border of fore lobe to posterior margin of posterior lobe. Scutellum coarsely rugose transversally, with depressed area at center; apical process short, subcylindrical, rounded apically. Prosternal groove narrow, with well-developed stridulatory sulcus.

Hemelytra almost attaining apex of abdomen. Veins normally developed, included in most species in light-colored bands. Corium with short inconspicuous setae. Hind wing as in *Triatoma*, viz., with hamus extending to wing base, without apical cell, and secondary vein simple.

Legs long and slender, with scattered short

setae. Femora from parallel-sided to fusiform, without spines or tubercles. Tibiae of first and second pairs of legs with short spongy fossulae, in both sexes.

Abdomen convex below, in some cases center of urosternites slightly flattened. Connexivum wide dorsally, ventral portion partially or entirely covered by sternite, in former case much narrower than dorsal portion. Spiracles distant from lateral border of urosternite.

MALE GENITALIA: Pygophore with median process pointed, blunt, bifurcate or subrectangular. Articulatory apparatus with basal bridge well developed. Basal plate struts transformed into two short, basally connected convolute structures. Genitalia of female truncate, eighth and ninth tergites subvertical.

Fifth instar nymph: With the characters of the tribe; head elongate, subcylindrical; antennae inserted at anterior third or fourth of anteocular region; lateral postocular callosities difficult to perceive; stridulatory sulcus more than twice as long as wide; femora from subcylindrical to fusiform.

First instar nymph: As described for tribe; head elongate, anteocular region longer than wide.

Eggs adhering to substrate, light colored, with subpolar constriction; operculum convex; chorion and operculum reticulate.

TYPE SPECIES: *Rhodnius prolixus* Stål.

DISTRIBUTION: Tropical America: Mexico, Central America and South America to Bolivia and southern Brazil.

BIOLOGY: In palm trees; several species domestic. The eggs are attached to the substrate, either singly or in irregular groups, linear or otherwise.

Several species have been found to be infected with *Trypanosoma cruzi*, and some are active vectors of Chagas' disease.

KEY TO THE SPECIES OF *Rhodnius*¹

1. Head and legs with general color pattern consisting of small irregular spots and dots, thus conspicuously mottled (figs. 257, 268, 269, 273, 274) 2

¹Spanish version of key, p. 480; Portuguese version, p. 497.

- Head and legs of more uniform color, with pattern elements not consisting of small dots, thus not appearing mottled (figs. 251, 254, 259, 262, 263, 265, 266, 271, 276, 277, 279, 280) 4
2. Tibiae of all pairs of legs with dark submedian annulus (figs. 273, 274); eyes invariably wider than synthlipsis (fig. 275A); rectangular dark spots of dorsal connexival segments with conspicuous pointed projection posteriorly, at least on segments 3 to 5 (figs. 273, 274); process of pygophore bispinous (fig. 275D) *pictipes*
- Tibiae without dark annulus mentioned (figs. 257, 268); eyes not wider than synthlipsis (figs. 258A; 269); dark rectangular spot of dorsal connexival segments without pointed posterior projection (figs. 257, 268, 269); process of pygophore not bispinous (figs. 258C, 270C) 3
3. Large species, about 22 mm., head proportionally very elongate, distinctly longer than pronotum (ratio 1:0.8-0.85), viz., as long as pronotum plus scutellum without its apical process (figs. 268, 270); antecular region more than three times as long as postocular in dorsal view (figs. 269-270A); rectangular spots of dorsal connexival plates distinct (figs. 268, 269) *pallescens*
- Small species, about 14 mm.; head proportionally shorter, only slightly longer than pronotum (ratio 1:0.9-0.95) (figs. 257; 258A); antecular region less than three times as long as postocular in dorsal view (fig. 258A); dark spots on dorsal connexival plates diffuse (fig. 257) *ecuadoriensis*
4. Legs conspicuously annulate (figs. 271, 272F); fore femora less than four times as long as wide (fig. 272B); process of pygophore bispinous (fig. 272D, E) *paraensis*
- Legs not annulate; fore femora more than four times as long as wide; pygophore not bispinous 5
5. Pronotum entirely dark brown or black, including the carinae (figs. 265, 266); connexivum blackish, with very small reddish spots situated in posterolateral angles of connexival segments III to VI or VII (figs. 265, 266) *neivai*
- Pronotum yellowish brown with portions dark brown or blackish (figs. 251, 252, 254, 255, 259, 260, 262, 263, 279, 280); connexivum light brown, with rectangular dark spots on segments dorsally (figs. 251, 252, 254, 255, 259, 260, 262, 263, 276, 277, 279, 280) 6
6. Head comparatively short, as long as or only slightly longer than pronotum (ratio 1:0.95-1.00) (figs. 254, 255); process of pygophore rectangular (fig. 256C) *domesticus*
- Head comparatively long, distinctly longer than pronotum (ratio 1:0.65-0.8); process of pygophore elongate, apically pointed or blunt (figs. 253D, 261D; 264D; 278D; 281F) 7
7. Hind lobe of pronotum uniformly black between submedian carinae and between submedian carinae and lateral margins (figs. 251, 252); third segment of antennae longer than second (figs. 252, 253C); eyes invariably distinctly wider in dorsal view than dorsal interocular distance (figs. 251, 252, 253A) *brethesi*
- Hind lobe of pronotum with area between submedian carinae occupied by two dark stripes separated by percurrent median longitudinal light-colored line (figs. 259, 260, 262, 263, 264A; 276, 277); second segment of antennae longer than third; eyes in most species as wide as or less wide than dorsal interocular distance 8
8. Anterolateral angles of pronotum salient, forwardly directed (figs. 261A, C; 264A, C); dark stripes of hind lobe of pronotum confluent, especially those between submedian carinae and lateral margins (figs. 260, 262, 263, 264A) 9
- Anterolateral angles of pronotum rounded, not very prominent (figs. 278C; 281B); dark stripes of hind lobe of pronotum fully separated (figs. 277, 279, 280) 10
9. Overall color dark brown; trochanterae very light colored, strongly contrasting with dark femora; dorsal connexival segments with well delimited dark spots, present also on under surface (figs. 262, 263); basal portion of abdomen centrally below with wide elongate light-colored area extending onto metasternum; median process of pygophore narrow at base (fig. 264D); third antennal segment with basal portion dark, apical light (fig. 263) *neglectus*
- Overall color light reddish brown; trochanterae not contrasting conspicuously with femora; connexival plates with dark spots faint (figs. 259, 260), especially on under surface; abdomen without light-colored area mentioned; process of pygophore wide at base (fig. 261D); third antennal segment with basal portion light, apical dark (figs. 260, 261A) *nasutus*
10. Smaller species; length of males 17.5-20.0

mm., of females 19.5-21.5 mm.; anteocular region slightly over three times as long as postocular (fig. 278A); in most specimens distance between eyes dorsally larger than width of eyes in dorsal view; basal plate struts of aedeagus as shown in fig. 278E; (fourth and fifth instar nymphs with tibiae uniformly dark) *prolixus*
Larger species, length of males 20-23.5 mm., of females 23-26 mm.; anteocular region about four times as long as postocular (fig. 280); distance between eyes dorsally smaller than, or equal to, width of eye in dorsal view; basal plate struts of aedeagus as illustrated in fig. 281E; (fourth and fifth instar nymphs with tibiae conspicuously light colored as compared to femora, only their apices dark) *robustus*

Rhodnius dalessandroi Carcavallo and Barreto could not be included in this key.

The following redescriptions of the species of *Rhodnius* do not mention the structure of the aedeagus of the male; laborious dissection and clearing are required to observe these features. Lent and Jurberg (1969) have given a complete illustrated survey of the morphology of the aedeagus in *Rhodnius*, and the interested reader is referred to that paper.

Rhodnius brethesi Matta

Figures 9I; 251-253

Rhodnius brethesi Matta, 1919a, p. 94, pl. 3, fig 1; 1919b, p. 104. Lent, 1948a, p. 319, figs. 29-31. Lent and Jurberg, 1969c, p. 500, figs. 1, 12, 31-44.

Length of male 19.0-19.5 mm., of female 19-20 mm. Maximum width of pronotum 4.0-4.5 mm., in both sexes; maximum width of abdomen 5-6 mm., in both sexes.

General color black, with light brown spots and stripes on dorsal surface of head and neck, on pronotum, scutellum, hemelytra, connexivum, and ventral surface of abdomen.

Head (figs. 251, 252, 253A, B) granulose, black, with narrow dorsal longitudinal stripe yellowish. Head about twice as long as wide across eyes (1:0.45-0.50) and distinctly longer than pronotum (1:0.75-0.80). Anteocular region between three and four times as long as postocular (1:0.25-0.30). Eyes large, attaining level of under and in lateral view attaining or

closely approaching level of upper surface of head. Ratio width of eye to synthlipsis 1:0.60-0.85. Antennae black; ratio of antennal segments 1:4.5-5.5:6.0-7.3:3.9-4.1. First segment of rostrum (fig. 253B) attaining level of insertion of antennae, second extending beyond level of ocelli; third short. Ratio of rostral segments 1:3.6-3.9:0.9-1.0. Neck black, with light-colored stripe longitudinally along center.

Pronotum (figs. 251, 252) black, with 1+1 submedian longitudinal light brown stripes extending from collar over submedian carinae to hind border of pronotum; stripes thus dividing pronotum into three black areas. Lateral borders of pronotum margined with light brown, from the somewhat pointed anterolateral angles to humeri.

DISTRIBUTION: Brazil (Amazonas, Pará); Venezuela.

BIOLOGY: This is a sylvatic species which has been reported to live on piassaba palms (*Leopoldina piassaba* Wallace) where it takes the blood of animals seeking shelter. The species has also been reported to attack humans harvesting palm fiber. Specimens were collected in the forest at a height of 20 meters above the ground on a mosquito capture platform.

Rhodnius dalessandroi Carcavallo and Barreto

Rhodnius brethesi D'Alessandro, Barreto and Duarte, 1971, p. 162 (misidentification).

Rhodnius dalessandroi Carcavallo and Barreto, 1976, p. 177, figs. 1-4.

The published description and illustrations of this *Rhodnius* are not sufficient to recognize it. We have not examined this species in detail, and have not been able to include *dalessandroi* in our key.

TYPE: Carcavallo collection.

DISTRIBUTION: Colombia.

BIOLOGY: Unknown.

Rhodnius domesticus Neiva and Pinto
Figures 254-256

Rhodnius domesticus Neiva and Pinto, 1923a, p. 22. Pinto, 1925a, p. 79, figs. 52, 53. Larrousse, 1927, p. 82, fig. 7. Lent, 1948a, p. 323, figs. 32-37. Galvão, Mello, Ferreira and Leal, 1962,

Scutellum (figs. 251, 252) black, with 1+1 basally unusually wide light brown carinae meeting at base of posterior process, with light color continuing on process. Legs entirely black.

Hemelytra (figs. 251, 252) dark brown to blackish on corium and membrane, with veins included in prominent light brown bands.

Legs (figs. 251, 252) uniformly dark brown, slender; fore femora about six times as long as wide.

Connexivum (figs. 251, 252) with ventral portion narrowly visible, black dorsally and ventrally, each segment with orange or reddish rectangular spot on posterior half.

MALE GENITALIA: Median process of pygo-phore finger-like, elongate subcylindrical, apically rounded (fig. 253D).

TYPE: Unknown.

times as long as postocular (1:0.3-0.4). Eyes medium-sized, in lateral view attaining level of under but not upper surface of head. Ratio width of eye to synthlipsis 1:1.3-1.5. Antennae with second article brown, turning black toward apex; third article with basal half black and apical half whitish or yellow; fourth yellow, its tip dark. Ratio of antennal segments 1:5.7-5.8:3.5-4.0:2.3-2.5. Second rostral segment (fig. 256B) reaching neck; ratio of rostral segments 1:2.8-3.0:1.0. Neck light colored dorsally, with 1+1 submedian black stripes.

Pronotum (figs. 254, 255) with submedian carinae and lateral ridges bright yellow. General color of fore lobe reddish brown. Submedian carinae with 1+1 mediad directed light-colored projections; space between carinae and

p. 57. Lent and Jurberg, 1969c, p. 505, figs. 2, 13, 45-61.

Length of male 15-17 mm., of female 16.5-18.0 mm. Maximum width of pronotum of male 4 mm., of female 4.0-4.5 mm.; maximum width of abdomen of male 5.5-6.0 mm., of female 6-7 mm.

General color light orange-brown, with dark brown markings on several areas of body and appendages.

Head (figs. 254, 255, 256A, B) dark, with dorsum narrowly light-colored longitudinally, about two and one-half times as long as wide across eyes (1:0.5), and as long as or only slightly longer than pronotum (1:0.95:1.0). Antecular region from two and one-half to three

lateral margin with complex shaped light-colored areas. Anterolateral angles light colored, not prominent.

Scutellum (figs. 254, 255) black; 1+1 light-colored carinae, shortly bifurcate at anterior extremity, meeting before base of posterior process, the latter light colored above.

Hemelytra (figs. 254, 255) pale, with corium reddish brown and membrane faintly pigmented.

Legs (figs. 254, 255) with coxae, trochantera, and femora uniformly dark brown; tibiae light brown with dark apical annulus. Legs slender; fore femora about five times as long as wide.

Connexivum (figs. 254, 255) only very narrowly visible from below. Connexival segments dorsally with reddish brown spot on anterior half, spot emarginated posteriorly or with short pointed posterior projection.

MALE GENITALIA: Median pygophore process large, lamellate, subquadrate (fig. 256C).

TYPE: Instituto Oswaldo Cruz, Rio de Janeiro.

DISTRIBUTION: Brazil (Bahia, Espírito Santo, Rio de Janeiro, Paraná, Santa Catarina and São Paulo).

BIOLOGY: *Rhodnius domesticus* has been found in human habitations but only in isolated instances; in spite of its name it is not a domestic species. Free-living populations have been found in clumps of bromeliads close to shelters of the rodents *Echimys blainvilliei mediuss* (Thomas) and *E. dasythrix* (Hensel), and of the

marsupials *Didelphis azarae azarae* and *Marmosa cinerea paraguayana*.

***Rhodnius ecuadoriensis* Lent and León**
Figures 257, 258

Rhodnius ecuadoriensis Lent and León, 1958, p. 181, figs. 1-4. Lumbrales, 1960, p. 216, fig. 3. Lent and Jurberg, 1969c, p. 510, figs. 3, 14, 62-73.

Rhodnius pallescens Cornejo, 1958, p. 418, fig. (nec Barber).

Length of male 12.5-13.5 mm., of female 14.5 mm. Maximum width of pronotum of male 2.5-3.0 mm., of female 2.8-3.2 mm., maximum width of abdomen of male 3.8-4.2, of female 4.8-5.2 mm.

General color light brown with dark brown markings on body and appendages, in form of stripes or small irregularly shaped spots, the latter especially conspicuous on legs.

Head (figs. 257, 258A, B) granulose, twice as long as wide across eyes (1:0.5), and only little longer than pronotum (1:0.90-0.95). Anterior region two and one-half times as long as postocular (1:0.40-0.45). Eyes medium-sized, in lateral view attaining level of under but not of upper surface of head. Ratio width of eye to synthipsis 1:1.3-1.4. Second antennal segment light brown on basal three-fifths, slightly speckled with darker; apical two-fifths dark brown. Third segment darker on basal than on apical half. Ratio of antennal segments 1:5.0-5.5:4.0:2.7-3.1. Rostrum as shown in figure 258B; second segment attaining or slightly surpassing level of ocelli but not attaining neck. Ratio of rostral segments 1:3.0-3.1:0.9. Neck light colored dorsally, dark at sides.

Pronotum (figs. 257, 258) with anterior lobe granulose and posterior lobe granulose-rugose. Hind lobe light brown. Submedian carinae and lateral margins yellowish. Spaces between submedian carinae and between carinae and lateral margins speckled with dark spots forming two darkish, poorly defined stripes in each space mentioned. Anterolateral angles of pronotum not prominent.

Scutellum (figs. 257, 258A) with 2+2 distinct anterior light-colored carinae, fused into 1+1 at level of center of scutellum and into a single carina posteriorly, with light color extending onto upper surface of posterior process.

Hemelytra (fig. 257) straw colored including veins; spaces between veins with irregularly shaped dark stripes and spots, dotted with lighter.

Legs (figs. 257) light yellowish brown, mottled with dark brown, most conspicuously so on femora, comparatively stout, fore femora four and one-half times as long as wide.

Abdomen light yellowish brown ventrally, irregularly mottled with dark brown. Connexivum narrowly visible from below. Dorsal connexival segments (fig. 257) with faint dark brown spot on anterior third or half, also visible from below.

Genitalia of male with median process of pygophore shortly triangular, its apex pointed (fig. 258C).

TYPE: Instituto Oswaldo Cruz, Rio de Janeiro.

DISTRIBUTION: Ecuador and northern Peru.

BIOLOGY: *Rhodnius ecuadoriensis* has been found naturally infected by *Trypanosoma cruzi*. The species is domestic and peridomestic, having also been collected in guinea pig pens and in hollow trees. Its domestic habitats seem to be of very recent origin.

OBSERVATION: *Rhodnius ecuadoriensis* shares with *R. pictipes* and *R. pallescens* the mottling on the legs and other body parts, and the well-developed 2+2 carinae on the basal portion of the scutellum; it is probably more closely related to these species than to others of the genus.

Rhodnius nasutus Stål
Figures 259-261

Rhodnius nasutus Stål, 1859, p. 105. Lent, 1948a, p. 312, figs. 19-21. Lent and Jurberg, 1969c, p. 514, figs. 4, 15, 74-91.

Rhodnius brumpti Pinto, 1925a, p. 76, figs. 47-51. Larrousse, 1927, p. 84, fig. 8.

Length of male 12.5-16.5 mm., of female 14-18 mm.; maximum width of pronotum of male 2.5-3.5 mm., of female 3.0-4.5 mm.; maximum width of abdomen of male 3.5-5.0 mm., of female 4-6 mm.

General color pale yellowish brown, frequently tinged with reddish, with faint darker brown spots on some regions of body and appendages.

Head (figs. 259, 260, 261A, B) about two and one-half times as long as wide across eyes (1:0.35-0.40), distinctly longer than pronotum (1:0.6-0.7). Anteocular region slightly over three times as long as postocular (1:0.3). Eyes

medium-sized, in lateral view attaining level of under but not of upper surface of head. Ratio width of eye to synthlipsis 1:1.2-1.3. Antennae reddish brown with apex of second and apical half of third articles darker; ratio of antennal segments 1:6.2-7.0:3.2:2.5. Rostrum as shown in figure 261B; second segment attaining neck; ratio of rostral segments 1:3.4-3.7:0.9-1.0. Neck light colored above, dark at sides.

Pronotum (figs. 259, 260) with anterior lobe granulose and posterior lobe granulose-rugose, the latter with area between submedian carinae dark, faintly subdivided by median light-col-

ored stripe; the 1+1 areas between submedian carinae and lateral border with dark stripes confluent, forming uniform dark area. Anterolateral processes of pronotum (figs. 261A, C) distinctly angular.

Scutellum (figs. 259, 260) dark, with 1+1 light-colored carinae, shortly bifurcate anteriorly, fused posteriorly and continuing on to posterior process which is light colored above and dark at sides.

Hemelytra (figs. 259, 260) light reddish brown, with veins narrowly pale yellow; veins of cells and apical extracellular space suffused with lighter color at center.

Legs (figs. 259, 260) uniformly light reddish brown, slender, fore femora six times as long as wide.

Abdomen yellowish brown, almost without spots. Connexivum narrowly visible from below, dorsally with not very prominent darker spots on anterolateral angle of each segment (figs. 259, 260); these spots in some cases with pointed posterior projection, or of washed-out appearance.

Genitalia of male with median process of pygophore (fig. 261D) relatively short, wide at base, narrowly rounded apically.

TYPES: Of *nasutus*, Zoologisches Museum, Berlin; of *brumpti*, Instituto Oswaldo Cruz, Rio de Janeiro.

DISTRIBUTION: Brazil (Ceará, Piauí, Rio Grande do Norte.).

BIOLOGY: This is a species restricted to arid northeastern Brazil; although found in human habitations it is not fully adapted to houses. It also occurs in chicken houses.

OBSERVATIONS: This species is very similar to *R. prolixus* and *R. neglectus*. *Rhodnius prolixus* can be distinguished from *nasutus* by the fully separated dark stripes in the lateral areas of the pronotum; *neglectus* differs from *nasutus* as shown in the key.

Rhodnius neglectus Lent
Figures 262-264

Rhodnius sp. Corrêa and Lima, 1954, p. 267, figs. 1, 2, 5-9, 11, 12, 19.

Rhodnius neglectus Lent, 1954, p. 239, figs. 5, 7, 9, 12. Lent and Jurberg, 1969c, p. 519, figs. 5, 16, 92-109.

Length of male 17.5-19.0 mm., of female 18.5-20.5 mm.; maximum width of pronotum of male 3.5-4.0 mm., of female 4.0-4.5 mm.; maximum width of abdomen of male 5.0-6.5 mm., of female 6.0-7.5 mm.

General color light brown, with dark brown markings on head, pronotum, scutellum, corium, and connexivum, and yellowish areas on abdomen ventrally, on connexivum and on coxae and trochantera.

Head (figs. 262, 263, 264A, B) faintly granulose, about three times as long as wide across eyes (1:0.35-0.40), and much longer than pronotum (1:0.75-0.80). Antecular region over three times as long as postocular (1:0.25-0.30). Eyes medium-sized, in lateral view attaining level of under but remote from level of upper surface of head. Ratio width of eye to synthlipsis 1:0.95-1.20. First and second articles of antennae dark, third dark on basal and light colored on apical half, fourth dark on basal and apical fourths. Ratio of antennal segments 1:6.4-8.5:3.4-4.0:2.5-3.1. Rostrum as shown in figure 264B; second segment attaining neck.

stripe; dark areas between submedian carinae and lateral margin interrupted by light-colored short stripe posteriorly, dark areas confluent on anterior two-thirds. Anterolateral angles of pronotum prominent, forwardly produced (figs. 264A, C).

Scutellum (figs. 262, 263) with 2+2 short but distinct anterior light-colored carinae, fused into 1+1 carinae at level of anterior third of scutellum and into a single carina posteriorly, with light color extending over entire dorsal surface of posterior process.

Hemelytra (figs. 262, 263) dark brown, with veins lighter colored. Legs (figs. 262, 263) dark brown; coxae, trochantera, and short basal annulus of tibiae yellowish. Legs slender, approximately six times as long as wide.

Abdomen with under surface of general brown color, but center of anterior urosternites

Ratio of rostral segments 1:3.3-3.7:0.8-0.9. Neck light colored dorsally, dark at sides. Pronotum (figs. 262, 263, 264A) with anterior lobe almost entirely smooth, posterior lobe rugose-granulose. Submedian carinae extending from collar to hind border of pronotum, light yellowish brown; lateral margins of pronotum also light yellowish brown, light-colored border wider on hind than on fore lobe. Dark area between submedian carinae of hind lobe with light colored percurrent median longitudinal

yellow, thus wide percurrent yellow band extending along center of venter, in many cases extending onto metasternum. Connexivum narrowly visible from below, dorsally (figs. 262, 263) with anterior half or two-thirds brown, the remainder yellow.

MALE GENITALIA: Median process of pygophore shortly subtriangular, wide at base, pointed apically (fig. 264D).

TYPE: Instituto Oswaldo Cruz, Rio de Janeiro.

DISTRIBUTION: Brazil (Bahia, Goiás, Mato Grosso, Minas Gerais, São Paulo).

BIOLOGY: This species is predominantly sylvatic and has been found in the crown of palm trees, such as the babaçu (*Orbignya martima* Barb.), the macaubeira (*Acrocomia macrocarpa* Martius), the buriti (*Mauritia vinifera* Martius) and the aricuri (*Scheelea phalerata* Burret); it is encountered on rare occasions in birds' nests belonging to the family Furnariidae, (*Anumbius annumbi*) and sometimes in clusters of the piteira *Fourcraea gigantea* Vent. (Amaryllidaceae), or in hollow trees. The species is also found in human habitations, chicken houses, pigeon coops, and in other peridomestic situations. It is obviously on the way to becoming a truly domestic species. *Rhodnius*

neglectus has been found naturally infected by *Trypanosoma cruzi*.

In the laboratory, this species proves to be very active and aggressive, moving quickly and abruptly.

Rhodnius neivai Lent
Figures 24C, Q; 265-267

Rhodnius neivai Lent, 1953a, p. 170, figs. 1-3. Lent and Jurberg, 1969c, p. 525, figs. 6, 17, 110-127.

Length of male 17-18 mm., of female 20-21 mm.; maximum width of pronotum of male 3.5-4.0 mm., of female 4.0-4.5 mm.; maximum width of abdomen of male 5.5-6.0 mm., of female 6.0-6.5 mm.

General color uniformly dark brown or blackish; rostrum, antennae, and ventral surface of abdomen reddish brown; second to fifth or sixth connexival segments dorsally and ventrally with small, irregularly shaped spot on posterolateral angles.

Head (figs. 265, 266, 267A, B) granulose, two and one-half times as long as wide across eyes (1:0.4), and much longer than pronotum (1:0.75-0.80). Anteocular region three times as long as postocular (1:0.3). Eyes comparatively small, in lateral view not quite attaining level of lower and distant from level of upper surface of head. Ratio width of eye to synthlipsis 1:1.8-2.0. Ratio of antennal segments 1:6.0-6.5:4.5-5.0:0.3. First rostral segment attaining level of base of antenniferous tubercles, second extending slightly beyond level of ocelli but not reaching neck. Ratio of rostral segments 1:3.4-3.7:0.9-1.0.

Pronotum without special features, uniformly dark. Anterior lobe granulose, with glabrous areas; posterior lobe rugose. Anterolateral angles blunt, not prominent.

Scutellum with posterior process short, strongly tapering apically.

Hemelytra falling considerably short of apex of abdomen, not extending much beyond base and at most reaching middle of seventh urotergite.

Legs (figs. 265, 266) uniformly blackish, slender, fore femora approximately six times as long as wide.

Abdomen with connexival segments narrowly visible ventrally. Dorsal connexival seg-

Rhodnius pallescens Barber
Figures 268-270

Rhodnius pallescens Barber, 1932, p. 514, fig. 1.
Usinger, 1944, p. 35, pl. 7, fig. F. Lent, 1948a,
p. 330, figs. 42-47. Lent and Jurberg, 1969c, p.
530, figs. 7, 18, 128-141.

Rhodnius dunni Pinto, 1932, p. 324.

Length of male 21.5, of female 22.0-23.5 mm.; maximum width of pronotum of male 4.5 mm., of female 4.5-5.0 mm., of abdomen of male 7 mm., of female 6.5-7.0 mm.

General color yellowish brown with dark brown spots, in many cases dotted with lighter.

Head (figs. 268, 269, 270A, B) light colored longitudinally on dorsum, about two and one-half times as long as wide (1:0.35-0.40), and distinctly longer than pronotum (1:0.80-0.85). Anteocular region slightly more than three times as long as postocular (1:0.30). Eyes

ments as described above (figs. 265, 266). Genitalia of male with median process of pygophore simple, narrowly triangular.

TYPE: Instituto Oswaldo Cruz, Rio de Ja-neiro.

DISTRIBUTION: Colombia; Venezuela. This is the first record of this species from Colombia (Magdalena: Valledupar, June 4-7, 1968 [N. Malkin; AMNH] two females).

BIOLOGY: *Rhodnius neivai* has occasionally been found in houses but has not colonized in human habitations. In sylvatic conditions, the species is known to occur in trunks of dead trees and on the palm *Copernitia tectorum* Mart.

OBSERVATION: This species differs from all others of the genus by its almost uniform dark color.

medium-sized, in lateral view attaining level of under but remote from level of upper surface of head. Ratio width of eye to synthlipsis 1:1.15-1.30. Antennae of general body color, second article black on apical third or half, in some specimens third article darkened at base. Ratio of antennal segments 1:5.9-6.6:4.6-5.3:3.1-3.5. Rostrum as shown in figure 270B; ratio of rostral segments 1:3.7-4.6:0.9-1.2. Neck light-colored dorsally, with 1 + 1 sublateral very dark stripes.

Pronotum (figs. 268, 269) with anterior lobe slightly granulose, with irregularly shaped dark spots; posterior lobe rugose and granulose, overall aspect of hind lobe mottled.

Scutellum (figs. 268, 269) dark, with 2+2 yellowish carinae on anterior portion, fused into 1 + 1 at level of center of scutellum, and into a single carina posteriorly, light color extending onto dorsal surface of scutellar process. In some cases, submedian carinae fused to form a single wide median longitudinal elevation.

Hemelytra (figs. 268, 269) straw-colored, clouded with darker, some of the dark areas dotted with lighter color.

Legs (figs. 268, 269) with femora and tibiae

irregularly speckled with light and dark, slender, fore femora approximately seven and one-half times as long as wide.

Abdomen light brown. Connexivum (figs. 268, 269) light yellowish brown, anterior half of each segment with rectangular dark spot, this spot in some cases lighter at center. Ventral visible portion of connexivum very narrow, patterned as dorsal portion.

MALE GENITALIA: Median process of pygophore narrowly triangular (fig. 270C).

TYPES: Of *pallescens*, National Museum of Natural History, Smithsonian Institution, Washington, D.C.; of *dunni*, Instituto Oswaldo Cruz, Rio de Janeiro.

DISTRIBUTION: Belize; Colombia; Panama. This species is reported here for the first time from Belize (San Antonio, June 1931 [J. J. White; Essig Museum of Entomology, Berkeley]).

BIOLOGY: In Panama, this species has become domestic, and is the main vector of Chagas' disease. The species has also been found in chicken houses, pigpens, and in hollow trees, near resting places of opossums and sloths.

Rhodnius paraensis Sherlock, Guitton and Miles
Figures 271, 272

Rhodnius paraensis Sherlock, Guitton and Miles, 1977, p. 71, figs. 1-11.

Length of male 10.5-11.0 mm., of female 10.8-12.0 mm.; width of pronotum of male 2.8 mm., of female 3.0 mm.; width of abdomen of male and female 4 mm.

Overall color light brown, with very dark brown markings on body and appendages; hemelytra almost entirely dark (figs. 271).

Head (figs. 271, 272A, C) granulose, especially so on sides; its color light brown, with anteclypeus, genae, antenniferous tubercles, ocelliferous tubercles, lateral surface except behind eyes and entire under surface, dark brown, almost black. Head twice as long as wide across eyes (1:0.55) and as long as pronotum. Anteocular region less than twice as long as postocular (1:0.65). In lateral view, eyes attaining level of under but distant from level of upper surface of head. Ratio width of eye to synthlipsis 1:1.55. First antennal segment yellowish brown; second and basal three-fifths of third black, apical portion of third whitish; fourth white with short basal annulus dark. Antennal segments comparatively stout and short; ratio of segments 1:4.0:3.6:3.3. Second rostral segment attaining level of hind border of head (fig. 272C). Ratio of rostral segments 1:2.7:0.9. Neck black, yellowish brown at center and laterally.

Pronotum (fig. 271) with anterior lobe feebly granulose, posterior lobe distinctly, irregularly rugose. Pronotum dark brown, with lateral margins, 1+1 elongate longitudinal stripes enclosing submedian carinae and extending to hind border, as well as an elongate cuneiform longitudinal mark at center of hind lobe, yellowish brown. Anterolateral angles of pronotum not prominent (fig. 272A).

Scutellum (fig. 271) with 1+1 distinct anterior light-colored carinae fused posteriorly into a single carina; light color extending along entire posterior process.

Hemelytra (fig. 271) dark brown; narrowly yellowish brown at base.

Legs (figs. 271, 272B, F) light yellowish brown, with coxae, one large basal and one large apical annulus on femora, apical four-fifths of fore tibia, and one large submedian and one large apical annulus on mid and hind tibiae, dark brown. Tarsi dark. Legs comparatively short and stout; femora fusiform; fore femora slightly less than three and one-half times as long as wide.

Abdomen yellowish brown ventrally, irregularly clouded with dark. Connexivum narrowly visible from below. Dorsal and ventral connexival segments dark brown on anterior three-fifths and contrastingly light yellow on posterior two fifths (fig. 271).

MALE GENITALIA: Median process of pygophore wide, bifid (fig. 272D, E).

TYPE: Instituto Oswaldo Cruz, Rio de Janeiro.

DISTRIBUTION: Brazil (Pará).

BIOLOGY: According to M. A. Miles (personal commun.) this species was found naturally infected with *Trypanosoma cruzi*. Specimens were found twice in nests of a rodent, *Echimys chrysurus*; blood tests showed that the bugs had fed on the rodent. An opossum, *Didelphis marsupialis*, was once encountered in the rodent's nest.

OBSERVATION: The short head, stout legs, and the equally short and stout antennae make this one of the most plesiomorphic species of *Rhodnius*, if the progressive elongation of the head and appendages found in most other species is considered as derived.

Rhodnius pictipes Stål

Figures 5A, C; 6K; 9J; 10F; 273-275

Rhodnius pictipes Stål, 1872, p. 110. Lärrousse, 1927, p. 81, fig. 5. Lent, 1948a, p. 314, figs. 22-28. Lent and Jurberg, 1969c, p. 535, figs. 8, 19, 142-158.

Conorhinus limosus Walker, 1873b, p. 18 (pro parte)
Rhodnius amazonicus Almeida, Santos and Sposina, 1973, p. 43, figs. 1-8 (new synonymy).

Length of male 15-20 mm., of female

16.5-22.0 mm. Maximum width of pronotum of male and female 4.5 mm., of abdomen of male 5-7 mm., of female 5.5-8.0 mm.

General color yellowish brown, with dark brown spots on various body regions and appendages; overall aspect mottled (figs. 273, 274).

Head (figs. 5A, C; 273, 274, 275A, B) granulose, about two and one-half times as long as wide across eyes (1:0.40-0.45), and distinctly longer than pronotum (1:0.85-0.95). Anteocular region about three times as long as postocular (1:0.30-0.35). Eyes large, in lateral view attaining level of ventral but not of dorsal surface of head. Ratio width of eye to synthlipsis

1:0.80-0.85. Antennae (fig. 275C) with second article yellow on basal and black on apical half; third article yellow with dark subbasal annulus. Ratio of antennal segments 1:5.9-6.3:3.9-4.7:2.6-3.1. Rostrum as shown in figure 275B; second segment attaining neck; ratio of rostral segments 1:3.9-4.5:0.9-1.2. Neck light-colored dorsally, with 1+1 dark sublateral stripes.

Pronotum (figs. 273, 274) with posterior lobe granulose-rugose; basic color dark brown

or black, with granules light colored; overall aspect mottled. Median longitudinal stripe, 1+1 submedian carinae and lateral borders yellowish; dark area between carinae and lateral border in many cases with irregular median recurrent stripe yellowish.

Scutellum (figs. 273, 274) with 2+2 distinct basal light-colored carinae, fused into 1+1 at central portion of scutellum and into a single carina posteriorly, with light color extending to upper surface of scutellar process.

Hemelytra (figs. 273, 274) straw-colored; corium with numerous irregular small dark spots; membrane rugose; intracellular and extracellular areas dark, with central faintly lighter colored confluent spots.

Legs (figs. 273, 274) yellowish. Coxae, trochantera, and especially femora spotted and mottled with dark brown, dark pigment forming irregular network on femora. Tibiae yellowish, with blackish brown annulus on basal third and on apex. Legs slender, femora approximately six times as long as wide.

Abdomen light yellowish brown, areolate, with dark brown spots. Dorsal surface of connexivum (figs. 273, 274) yellow; anterior half of each segment bearing rectangular dark spot with light-colored center; each dark spot with posterior border drawn out into narrow point approaching posterior border of tergite; visible ventral portion of connexival segments only with simple rectangular spot.

MALE GENITALIA: Median process of

pygophore wide, deeply emarginated, bispinose (fig. 275D).

TYPES: Of *pictipes*, Naturhistoriska Riksmuseet, Stockholm; of *limosus*, British Museum (Natural History); of *amazonicus*, Instituto de Pesquisas da Amazônia, Manaus.

DISTRIBUTION: Belize; Bolivia; Brazil (Amazonas, Goiás, Mato Grosso, Pará); Colombia; Ecuador; French Guiana; Guyana; Peru; Surinam; Trinidad; Venezuela.

The record from Belize (Bengue Viejo, Father Stanton; AMNH, one male) extends the range of the species considerably, because it was previously known only from South America.

BIOLOGY: This is a basically sylvatic species, found on palm trees (*Scheelea* spp.) and in bromeliads (*Aechmea* spp.) but specimens have also been encountered in human habitations or captured at light.

The species has been found infected with *Trypanosoma cruzi*. In the laboratory, *R. pictipes* is not an agile species such as, for instance, *R. prolixus*; when bothered it will become immobilized and feign death, in a variety of unusual positions.

OBSERVATIONS: According to its authors, *Rhodnius amazonicus* is close to *R. pictipes* from which it differs mainly by the uniformly dark femora and the apparent absence of mottling on any dark area. We have not been able to examine the type of *R. amazonicus*, but Dr. W. E. Kerr, Director of the Instituto Nacional de Pesquisas da Amazônia and to whom we are much obliged, arranged for us to see photographs of the type, and obviously very poorly preserved specimen. The photographs do show that a faint mottled pattern is present on the head and thorax (contrary to the information in the original description), but the femora are indeed dark; however, the hind legs are absent, and in dark or poorly preserved specimens of *R. pictipes* it is only the posterior femora that show traces of the characteristic mottling. A further doubt about the validity of *amazonicus* arises from the fact that only a single specimen was collected among the "many" *R. pictipes* attracted to light at the type locality. We conclude that *Rhodnius amazonicus* is an abnormal or poorly preserved specimen of *Rhodnius pictipes*.

types, and therefore synonymize the two species.

Rhodnius prolixus Stål

Figures 9K; 12E; 14F; 23B; 29O; 31C, D; 276-278

Rhodnius prolixus Stål, 1859, p. 104, pl. 6, fig. III. Brumpt, 1913, p. 633, figs. 433, 434. Larrousse, 1927, p. 79, fig. 4. Usinger, 1944, p. 36, pl. 7, fig. E. Lent, 1948a, p. 304, figs. 2-18. Gamboa, 1963, p. 18. Lent and Jurberg, 1969c, p. 540, figs. 9, 10, 20, 159-206. Ramírez Pérez, 1969, p. 11.

Conorhinus limosus Walker, 1873b, p. 18 (pro parte).

Length of male 17.5-20.0 mm., of female 19.5-21.5 mm.; maximum width of pronotum of male 4.0-4.5 mm., of female 4-5 mm.; maximum width of abdomen of male 5.5-6.0 mm., of female 6-7 mm.

General color light yellowish brown, with dark brown markings on various regions of body and appendages.

Head (figs. 276, 277, 278A, B) dark yellowish brown, granulose at sides; dorsally with narrow light-colored percurrent stripe extending from clypeus to neck, this region not granulose but shortly setose, rest of dorsal surface of head dark, only faintly granulose. Head about two and one-half times as long as wide across eyes (1:0.45), and distinctly longer than pronotum (1:0.8). Anteocular region approximately three, rarely up to four times as long as postocular (1:0.20-0.35). Eyes medium-sized, in lateral view attaining level of under but not of upper surface of head. Ratio width of eye to synthlipsis 1:1.0-1.5. Antennae dark, with apical three-fifths of third article, and fourth article entirely except tip, whitish. Ratio of antennal segments 1:5.0-6.8:3.7-4.8:2.7-2.9. Rostrum as shown in figure 278B. Second rostral segment attaining or slightly surpassing level of ocelli but not extending to neck. Ratio of rostral segments 1:3.2-4.0:0.8-1.0.

Pronotum (figs. 276, 277) with submedian carinae and lateral margins light yellowish brown. Posterior lobe with two dark brown, distinctly separated longitudinal stripes between submedian carinae and on each side between submedian carinae and lateral margin. Ante-

rolateral angles of pronotum (fig. 278C) not very prominent.

Scutellum (figs. 276, 277) dark, with 1+1 light yellowish brown carinae, somewhat widened anteriorly and fused at base of scutellar process, the latter light colored above.

Hemelytra (figs. 276, 277) with veins narrowly margined with pale yellow, remainder of hemelytron dark brown, uniform on corium,

(figs. 276, 277) yellowish brown, each with elongate dark brown spot in anterolateral area, in many cases extending far backward, with pigment becoming attenuated and hind border of spot of irregular shape, but in no case attaining posterior border of segment; spots also visible ventrally.

Phallus as shown in figure 23B; struts in figure 278E. Median process of pygophore narrow, pointed apically (fig. 278D).

TYPE: Of *prolixus*, Zoologisches Museum, Berlin

DISTRIBUTION: Bolivia; Brazil (Amazonas, Goiás, Pará); Colombia; Costa Rica; Ecuador; French Guiana; Guatemala; Guyana; Honduras; Mexico; Nicaragua, Panamá; El Salvador; Surinam; Venezuela. The above reference for Honduras is the first for that country (Subirana Yoro [Stakelmann; AMNH], four males, one female).

BIOLOGY: This species is well established in human habitations, and a very important vector of Chagas' disease in Venezuela, Colombia, and French Guiana. In Venezuela, it is the main vector, and occurs in the entire country, from sea level to 2000 meters elevation. It constitutes about 90 percent of all triatomines taken in houses. The species has also been found in burrows of pacas (*Agouti paca* [L.])

brown areas on membrane observable with diffuse illumination.

Legs uniformly brownish (figs. 276, 277); femora in some instances darker on certain areas; tibiae darker at apex, slender, about six times as long as wide.

Ventral surface of abdomen in many specimens rather uniformly dark brown, in some individuals yellowish with dark markings, much as in *robustus*. Connexivum narrowly visible from below, or completely covered by urosternites. Connexival segments dorsally

and armadillos, in chicken houses, pigeon coops, and burrows where infected porcupines (*Coendou prehensilis* [L.]) lived. *Rhodnius prolixus* has furthermore been found associated with various birds, such as *Jabiru mycteria* (Licht.) and *Mycteria americana* L. (Ciconiidae). It has been collected on various species of palms, viz., *Attalea humboldtiana* Spruce, *Acrocomia sclerocarpa* Mart., *Copernicia tectorum* and *Leopoldina piassaba*. These findings are very significant for the understanding of the biology of this *Rhodnius*. Some of the birds mentioned are migratory and eggs of *R. prolixus* have been found adhering to their feathers thus possibly facilitating the dispersal of the triatomine. Some of the palm trees mentioned provide fronds used by local people to construct roofs and sidewalls of their houses; *Rhodnius* nymphs hatched from eggs brought in with the palm fronds will start the domestic cycle of the species.

Rhodnius prolixus has become one of the most important laboratory objects for study of insect physiology; the bugs are relatively large and easy to handle, and colonies are easy to establish and to maintain.

OBSERVATIONS: The collections of the Berlin Museum contain three females of *Rhodnius prolixus* collected by Otto in La Guayra; all bear the number 2916. One of the specimens has a printed number label, its locality and collector label is handwritten and obviously old, and there are two equally old determination labels, probably in Stål's handwriting, as follows: "Rhodnius Stål/prolixus Stål." The other two specimens bear handwritten number labels, and the locality and determination labels are comparatively recent. The first specimen mentioned is herewith designated as lectotype.

Rhodnius robustus Larrousse
Figures 279-281

Rhodnius robustus Larrousse, 1927, p. 85, fig. 9.
Lent, 1948a, p. 327, figs. 38-41. Lent and Jureberg, 1969c, p. 550, figs. 11, 21, 207-219.

Length of male 20.0-23.5 mm., of female 23-26 mm. Maximum width of pronotum of male 4.5-5.0 mm., of female 5-6 mm.; maximum width of abdomen of male 6-7 mm., of female 6.0-7.5 mm.

General color yellowish brown, with very dark brown markings on various regions of body and appendages.

Head (figs. 279, 280, 281A, C) very dark brown, granulose laterally and ventrally; dorsally with narrow light-colored median longitudinal stripe extending from clypeus to neck. Head two and one-half times as long as wide across eyes (1:0.4) and distinctly longer than pronotum (1:0.70-0.80). Anteocular region approximately four times as long as postocular

(1:0.25). Eyes large, in lateral view surpassing level of under but not attaining level of upper surface of head. Ratio width of eye to synthlipsis 1:0.75-1.00. Antennae with second article uniformly blackish brown, third light yellow except dark brown basal fourth; fourth article light colored. Ratio of antennal segments 1:7.6-10.2:5.4-6.3:3.4-4.4. Rostrum as shown in figure 281A; second segment extending beyond level of ocelli, almost attaining neck; ratio of rostral segments 1:4.1-4.4:0.9-1.0.

Pronotum (figs. 279, 280) as in *prolixus*, but anterolateral angles less prominent (fig. 281B). Scutellum (fig. 281D) as in *prolixus*.

Hemelytra (figs. 279, 280) dark brown, veins very conspicuously although narrowly bordered with light color; space between veins uniformly dark on corium, suffused with light on membrane.

Legs (figs. 279, 280) with coxae and trochantera partially or entirely dark; femora reddish brown, tibiae of identical color or yellowish brown, darker at apex. Legs slender, fore femora about seven times as long as wide.

Abdomen in some specimens rather uniformly dark brown ventrally, but in most brown speckled with yellow; longitudinal percurrent dark line along center, widened slightly at middle of each segment; venter also on each segment with 1+1 submedian oblique and 1+1 sublateral longitudinal marks. Connexivum narrowly visible from below or completely covered by urosternites; dorsally (figs. 279, 280) light yellowish brown, each segment with large brownish black spot occupying at least anterior half of each segment, with posterior narrowly pointed projection.

MALE GENITALIA: Median process of pygophore narrow, pointed apically (fig. 281F). Basal plate struts as shown in figure 281E.

TYPE: Faculté de Médecine, Paris.

DISTRIBUTION: Bolivia; Brazil (Amazonas, Pará); Colombia; Ecuador; French Guiana; Peru; Venezuela.

BIOLOGY: *Rhodnius robustus* has been found naturally infected by *Trypanosoma cruzi*. In Colombia, *R. robustus* has been reported from houses but it is not a domestic species. In Venezuela, *R. robustus* is known to occur on the palm *Attalea maracaibensis* Martius, on palms of the genus *Scheelea* and on other, unidentified palm trees. *Rhodnius robustus* has also been taken in epiphytic bromeliads (*Aechmea* sp.?).

OBSERVATIONS: *Rhodnius robustus* is very closely related to *R. prolixus* with which it shares most morphological and chromatic characters. Small *robustus* and large *prolixus* can be difficult to distinguish. The specific status of *robustus*, however, cannot be doubted, not only because of the striking and constant difference in the color of the hind tibiae of the nymphs IV and V as stated in our key, but also because of the small but apparently constant difference in the shape of the modified basal plate struts of the aedeagus (see figs. 278E and 281E).

PSAMMOLESTES BERGROTH

Psammolestes Bergroth, 1911, p. 144. Lima, 1934, p. 1155. Lent, 1935, p. 384. Abalos and Wygodzinsky, 1951, p. 151. Lent and Jurberg, 1965, p. 349.

Small, short bodied, somewhat dorsoventrally compressed Triatominae, 12-15 mm. long; general color light yellowish brown, with diffuse darker markings. Setae very short, inconspicuous.

Head compressed dorsoventrally, short, only slightly longer than wide across eyes, and shorter than pronotum. Anteocular region from two to three times as long as postocular; postocular very short, from one fourth to one-third as long as wide. Callosities behind eyes strongly developed, beset with setiferous tubercles. Clypeus short, parallel-sided or slightly widened apically. Posterior portion of genae situated below level of clypeus; genae slightly

or distinctly surpassing clypeus. Jugae inconspicuous. Postocular furrow obsolete, distinct only as sulcus near hind border of eyes. Eyes medium sized. Ocelli well developed, inserted on protuberances behind above-mentioned sulcus, their distance slightly larger than dorsal interocular distance. Antenniferous tubercles short; antennal insertion closer to apex of head than to anterior margin of eyes. First antennal segment extremely short, second the longest, third as long as or slightly shorter than second, fourth shorter than the two preceding. Second article with 4+4 trichobothria arranged in one row along length of article, and two ancillary trichobothria laterad of basal one of main row. Rostrum strongly flattened dorsoventrally, first and third segments short, subequal, second segment twice as long as first. Apical segment rounded and centrally emarginate distally.

Pronotum with sides carinate; its surface smooth, without tubercles or granules. Humeral angles rounded. Scutellum coarsely rugose transversally, slightly depressed anteriorly at center. Apical process short and stout, distinctly tapering distally. Prosternal groove wide, with well developed stridulatory sulcus. Mesosternum bigibbous.

Hemelytra attaining or almost attaining apex of abdomen; their veins normally developed. Hind wings much as in *Triatoma*, but secondary vein strongly curved.

Legs short, stout without spines or tubercles. Femora and tibia laterally compressed, the femora very conspicuously so. Femora grooved longitudinally for reception of tibiae. Tibiae of first and second pairs with short spongy fosulae, in both sexes.

Abdomen convex below, small central area on each urosternite somewhat flattened. Connexivum wide dorsally, ventral portion partially covered by urosternites. Spiracles distant from lateral border of urosternites.

MALE GENITALIA: Pygophore with short median spinelike process, pointed or rounded apically. Articulatory apparatus with basal plate bridge well developed. Pedicel about as long as wide. Basal plate struts transformed into short curved or convoluted structures. Genitalia of female truncate, last tergites subvertical.

Fifth instar nymph: With the characters of

the tribe; head short and wide; antennae inserted close to middle of antecular region; lateral postocular callosities prominent; stridulatory sulcus less than twice as long as wide; femora incrassate, compressed laterally.

First instar nymph: As described for tribe; head short, antecular region approximately as long as wide.

Eggs agglutinate, dark, with subapical constriction; operculum flattened; chorion and operculum punctured, without hexagonal pattern.

TYPE SPECIES: *Psammolestes coreodes* Berghroth.

DISTRIBUTION: South America east of the Andes, from Venezuela to Argentina.

BIOLOGY: In birds' nests. The species of this genus do not associate with man, and only rarely with mammals; therefore they are not of epidemiological importance in the transmission of Chagas' disease.

KEY TO THE SPECIES OF *Psammolestes*¹

1. Head and thorax highly polished; head not constricted before neck, in lateral view (fig. 284B); head dorsally with wide percurrent yellowish band occupying entire interocular space (figs. 282, 283); long hairs on apex of second and on third rostral segment (fig. 284B); anterolateral angles of pronotum projecting forward to level of ocelli (figs. 282, 283, 284A); male genitalia with basal plate struts fused, large (fig. 284C) *arthuri*
Head and thorax dull; head constricted before neck, in side view (figs. 287B; 290C); head light yellowish brown dorsally, speckled with darker, or dark and with narrow yellow percurrent line dorsally; long hairs on entire second and on third rostral segments (fig. 290C); anterolateral angles shorter, not attaining level of ocelli (figs. 287A; 290D); genitalia of male with basal plate struts shorter, not fused (figs. 23A; 290F) 2
2. Head as long as or slightly shorter than wide across eyes (figs. 285, 286, 287A); antecular region not over twice as long as postocular (fig. 287A); head strongly declivous behind ocelli (fig. 287B); anterolateral angles of pronotum acuminate (figs. 286, 287A); genitalia of male with basal plate struts very

small, hook-shaped, and dorsal sclerotization of phallosoma semielliptical (fig. 23A)

..... *coreodes*

Head slightly longer than wide across eyes (fig. 290D); antecular region from two to two and one-half times as long as postocular (fig. 290D); head moderately declivous behind ocelli (fig. 290C); anterolateral angles of pronotum very short (fig. 290D); genitalia of male with basal plate struts broadly S-shaped and dorsal sclerotization of phallosoma broadly rounded apically (fig. 290E) . *tertius*

Psammolestes arthuri (Pinto)

Figures 5B; 9H; 10G; 24B, G, S; 29P; 31A, B; 282-284

Eutriatoma arthuri Pinto, 1926b, p. 86

Psammolestes arthuri: Pinto and Lent, 1935, p. 333, figs. 1, 3, 4. Torrealba, 1937, p. 31. Pifano, 1938, p. 241, figs. 1-5. Lent and Jurberg, 1965, p. 366, figs. 3, 6 9, 12, 15, 61-78.

Length of male 11-13 mm., of female 12-14 mm. Width of pronotum of male 3.0-3.5, of female 3.2-4.0 mm., width of abdomen of male 4-5 mm., of female 4.5-5.5 mm.

General color pale straw yellow with scattered brownish spots, setae short, golden colored, Integument shining, appearing varnished.

Head (figs. 5B; 282A; 283, 284A, B) distinctly longer than wide (1:0.80-0.85) and as long as or shorter than pronotum (1:0.95-1.15), dorsally with wide longitudinal percurrent yellowish stripe occupying entire dorsal interocular space, tapering anteriorly and posteriorly, covering clypeus as well as interocellar space and center of neck. Lateral portions of neck dark. Antecular region almost three times as long as postocular (1:0.35-0.40). Clypeus parallel-sided; genae parallel, inconspicuous, attaining or slightly surpassing clypeus. Eyes small, in lateral view not attaining level of lower surface of head. Ratio width of eye to synthlipsis 1:1.65-1.90. Ratio of antennal segments 1:3.5-4.0:4.0-5.0:3.0-4.0. Ratio of rostral segments (fig. 284B) 1:1.9-2.2:0.7-0.8. Long hairs present only on apex of second and on third rostral segments.

Pronotum (figs. 282A; 283) conspicuously flattened, light brown, densely beset with short yellowish setae except on smooth dark areas on fore lobe. Anterolateral angles (fig. 284A) pro-

¹Spanish version of key, p. 499; Portuguese version, p. 482.

nounced, pointed, projecting forward to level of ocelli and postocular callosities. Anterior lobe with 1 + 1 anterolateral, more or less oval,

dark spots, and lateral and submedian dark glabrous spots of irregular shape. Posterior lobe rugose, depressed anteriorly, sublaterally on each side with a distinct longitudinal depression, separating humerus from disc of pronotum. Hind margin of pronotum slightly rounded. Scutellum as shown in figures 282, 283.

Hemelytra (figs. 282A; 283) of male attaining, those of female falling very slightly short of, apex of abdomen. Overall color of hemelytra yellowish, cells of membrane only slightly darkened.

Legs (figs. 282A; 283, 284B) with femora light brown, with irregularly scattered dark brown spots. Tibiae dark brown, with light-colored basal annulus.

Abdomen with venter yellowish brown, irregularly reticulated with dark. Connexival seg-

ments (figs. 282A, 283) dark brown, their posterior third or fourth irregularly yellowish.

Genitalia of male with basal plate struts large, fused at base (fig. 284C); dorsal sclerotization of phallosoma slightly angular distally (fig. 284C).

Eggs arranged in well-developed egg mass (fig. 282B).

TYPE: Instituto Oswaldo Cruz, Rio de Janeiro.

DISTRIBUTION: Venezuela.

BIOLOGY: *Psammolestes arthuri* is found in nests of *Phacellodomus rufifrons inornatus*, a bird locally known as "cucarachero de monte," or "guaiti," and in nests of other, unidentified birds. Specimens have also been collected on palm trees and under the bark of dead trees.

The species has been found naturally infected with *Trypanosoma cruzi*; abandoned birds' nests are frequently inhabited by small mammals which may be hosts of *Trypanosoma cruzi* and from which *Psammolestes* might have acquired their infection.

This species is not easy to maintain in the laboratory where it feeds with difficulty on chickens and white mice and does not survive long. A saturated atmosphere improves survival time, but colonies could not be maintained permanently.

Psammolestes coreodes Bergroth
Figures 12D; 13D; 14E; 23A; 285-287

Psammolestes coreodes Bergroth, 1911, p. 144.
Mazza, 1936b, p. 33, figs. 32-38. Abalos and

Wygodzinsky, 1951, p. 151, figs. 33, 50, 54, 299-318. Lent and Jurberg, 1965, p. 354, figs. 1, 4, 7, 10, 13, 16-17, 19-33.

Length of male 12-14 mm., of female 13.5-15.0 mm.; maximum width of pronotum of male 4.0 mm., of female 4.5 mm., of abdomen of male 5.5 mm., of female 6.0 mm.

General color light yellowish brown, speckled and spotted irregularly with dark brown or blackish; setae short, golden colored, integument dull, slightly rugose.

Head (figs. 285-287) as long as or slightly

longer than wide (1:0.8-1.0), and distinctly shorter than pronotum (1:1.2-1.3); its color yellowish dorsally, irregularly mottled with dark brown. Anteocular region about twice as long as postocular (1:0.45-0.55). Clypeus slightly widened anteriorly. Genae conspicuous, strongly diverging, considerably surpassing clypeus. Eyes large, in lateral view attaining or not, but not surpassing, level of lower and closely approaching level of dorsal surface of head. Ratio width of eye to synthlipsis 1:1.60-1.65. Ocelli inserted on conspicuous elevations; head strongly declivous behind ocelli. Antennae yellowish, spotted with dark; second article entirely dark apically, third darkened submedially. Ratio of antennal segments 1:3.3-4.4:3.5-4.5:2.5-3.1. Ratio of rostral segments (fig. 284B) 1:2.1-2.3:0.9-1.0. Long hairs present on entire second and on third rostral segment.

Pronotum (figs. 285, 286) not conspicuously flattened, of general body color; fore lobe and anterolateral angles with small irregularly shaped black areas. Anterolateral angles (fig. 287A) flattened, acuminate, short, not attaining level of ocelli. Posterior lobe irregularly rugose.

Scutellum (figs. 285, 286) coarsely rugose transversally, median depression slight, posterior process narrowly tapered apically.

Hemelytra (figs. 285, 286) of male attaining, of female approaching, apex of abdomen. Hemelytra of general body color, cells of membrane distinctly darkened.

Legs (figs. 285, 286) light brown, with irregularly scattered dark brown spots.

Abdomen with venter yellowish brown, irregularly reticulated with dark, and with longitudinal rows of dark spots. Connexival segments (figs. 285, 286) yellowish, most specimens with two distinct dark brown spots along lateral margin, rest of connexival segment with irregularly distributed smaller dark spots.

Genitalia of male with basal plate struts very small, separated, hookshaped (fig. 23A); dorsal sclerotization of phallosoma semielliptical (fig. 23A).

Eggs agglutinated but not forming regular egg masses.

TYPE: Universitetets Zoologiska Museum, Helsinki.

DISTRIBUTION: Argentina (Catamarca, Chaco, Córdoba, Corrientes, Entre Ríos, Formosa, Jujuy, La Rioja, Salta, Santa Fe, Santiago del Estero, Tucumán); Bolivia; Paraguay.

BIOLOGY: *Psammolestes coreodes* inhabits

nests of *Phacellodomus sibilatrix* Sclater (Furnariidae), *Myiopsitta monacha cotorra* (Psittacidae), *Pseudoseisura lophotes* (Furnariidae), and of other, non-identified birds. It has also been collected under bark of "quebracho colorado" (*Schinopsis quebracho-colorado* [Schlecht.] Barkl. et Meyer). Eggs are laid singly, adhering to the substrate.

Psammolestes coreodes has never been found naturally infected with *Trypanosoma cruzi*, although it can be infected experimentally.

Psammolestes tertius Lent and Jurb erg

Figures 288-290

Psammolestes tertius Lent and Jurb erg, 1965, p. 359, figs. 2, 5, 8, 11, 14, 34-60.

Psammolestes coreodes Lima, 1934, p. 1155, figs. 1-2. Lent, 1935, p. 382, figs. 1-6. Neiva and Lent, 1941, p. 75, figs. 3-4. Lent and Jurb erg, 1965, fig. 18 (nec Bergroth).

Length of male 11.5-12.5 mm., of female 12.5-13.5 mm. Maximum width of pronotum of male 4 mm., of female 4.5 mm., of abdomen of male and female 5.5-6.0 mm.

General color light yellowish brown with scattered dark brown spots. Integument dull, with short golden colored setae.

Head (figs. 288, 289, 290B-D) slightly longer than wide across eyes (1:0.85-0.95) and from slightly to distinctly shorter than pronotum (1:1.05-1.20); its color dorsally from yellowish brown with scattered small dark spots to rather uniformly dark with narrow percurrent yellowish median longitudinal line. Anteocular region from two to two and one-half times as long as postocular (1:0.4-0.5). Clypeus slightly widened anteriorly. Genae conspicuous, strongly divergent, surpassing clypeus considerably. Eyes large, in lateral view attaining level of under and closely approaching level of upper surface of head. Ratio width of eye to synthipsis 1:1.5-1.6. Ocelli inserted on distinct elevations, the latter somewhat less prominent than in *coreodes*. Ratio of antennal segments 1:4.3-6.3:4.1-5.2:3.1-3.6. Rostrum as shown in figure 290C. Ratio of rostral segments 1:2.0-2.3:0.85-1.0. Long hairs present on entire second and third rostral segments.

Pronotum (figs. 288, 289, 290B) not con-

spicuously flattened, of general body color; anterior lobe with numerous dark brown spots. Anterolateral angles very short, not prominent.

Scutellum (figs. 288, 289) coarsely rugose transversally, median depression small and shallow, posterior process narrowly tapering toward apex.

Hemelytra (figs. 288, 289) attaining apex of abdomen in both sexes, of general body color, with cells of membrane distinctly darkened.

Legs of body color, with irregularly scattered dark spots (figs. 288, 289).

Abdomen and connexivum as in coreodes. Genitalia of male (fig. 290E) with basal plate struts of medium size, separated, broadly S-shaped; dorsal sclerotization of phallosoma broadly rounded apically.

Eggs adhering to substrate, not forming regular egg masses.

TYPE: Instituto Oswaldo Cruz, Rio de Janeiro.

DISTRIBUTION: Brazil (Bahia, Ceara, Goias, Mato Grosso, Minas Gerais, Para, Pará, Pernambuco, São Paulo).

BIOLOGY: This species of *Psammoles* is found frequently in nests of birds of the family Fumariidae: *Phacellodomus rufifrons rufifrons*, *P. rufifrons specularis* Hellmayr, and *Anumbius*

annumbi; these birds are locally known as "Joãograveto," "João tenenem" "cochicho," "titiri," "casaca-de-couro." *Psammoles* *tertius* has also been collected from nests of the "sabiá do campo," *Mimus saturninus* (Licht.) (Mimidae) located on buriti palms, as well as under bark of the "jaqueira" (*Artocarpus heterophyllus*) (Moraceae).

This species lays single eggs adhering to the small sticks used by the birds as nest building materials; the eggs are difficult to perceive due to their cryptic coloring.

Psammolestes tertius has been found naturally infected with *Trypanosoma cruzi*, probably acquired from opossums that have been found in abandoned birds' nests still inhabited by the triatomine.

OBSERVATIONS: *Psammolestes tertius* is difficult to distinguish from *P. coreodes* on somatic features alone and we have therefore also included genitalic characters of the male in the descriptions and in our key. Although most specimens examined will fit easily in one or the other species, we have experienced difficulties with *Psammolestes* from Mato Grosso, Brazil, listed by Lent and Jurberg (1965) as *coreodes*. The specimens are somewhat intermediate somatically between "typical" *coreodes* and *tertius*, but the male genitalia are indubitably those of *tertius*, and we are labeling the specimens as such.

CAVERNICOLINI USINGER

Cavernicolini Usinger, 1944, p. 32.

Small Triatominae of not more than 13 mm., not flattened. Body surface smooth, without granulations or conspicuous rugosities, covered with long delicate hairs.

Head strongly convex above. Antenniferous tubercles without apical spinelike projection. Genae inapparent, not extending beyond apex of clypeus. Ocelli not elevated, inconspicuous, situated in or immediately behind interocular sulcus, the latter strongly backwardly curved and almost attaining level of posterior border of head.

Femora short, thickened. Corium with veins obsolescent.

Abdomen elongate oval. Urosternites covering part of ventral connexival segments, connected to latter by simple membrane. Articulatory apparatus of phallus of male without basal plate bridge.

Fifth instar nymph: Body surface smooth, with long simple setae; head strongly convex dorsally; eyes situated laterally at middle of head; antenniferous tubercles without api-

colateral process; fourth antennal segment much longer than any of the remaining; third and fourth antennal segments delicately annulate; fore and mid femora strongly incrassate, without denticles, but all femora with trichobothria; tarsi elongate, fore tarsi about half as long as tibiae; abdomen without series of large tubercles dorsally along middle.

First instar nymph: Head, thorax, and legs uniformly dark; all setae simple; fourth antennal segment longer than first, second and third combined; mesonotum in shape of narrow transversal band, not longer at middle than at sides; metanotal plates very small, their distance much larger than twice their width; femora with trichobothria; hind tarsi without specialized hairs; setae of urotergites arranged in two transversal rows.

TYPE AND ONLY GENUS: *Cavernicola* Barber, 1937.

DISTRIBUTION: Panama and South America to 20 degrees S.

BIOLOGY: In caves and hollow trees, associated with bats.

OBSERVATION: This tribe contains a single, monotypic genus of specialized habits. It shares with the *Rhodniini* and *Bolboderini* as well as with the triatomine genus *Paratriatoma* the derived structure of the abdominal margin described above, and agrees with some of the *Bolboderini* in its reduced ocelli.

CAVERNICOLA BARBER

Cavernicola Barber, 1937a, p. 60. Usinger, 1944, p. 32. Lent and Jurberg, 1969b, p. 318.

General color brown, with yellowish markings.

Head oval, about twice as long as wide across eyes, strongly convex dorsally; antecular and postocular regions subequal in length. Interocular furrow shallow, extending backward almost to hind border of head. Eyes small. Ocelli obsolescent. Antennae inserted close to anterior border of eye. First antennal segment short; the remaining progressively longer from second to fourth. Second antennal segment with three closely spaced subbasal trichobothria, as well as one median and one subapical one. Remaining setae of second segment not of uni-

form size. Rostrum attaining prosternum, with first and third segments very short, second much longer.

Pronotum convex, strongly declivous anteriorly, its surface dull, smooth, or faintly rugose, without dorsal or lateral tubercles. Sides of pronotum rounded, not carinate; posterior lobe with 1+1 narrow submedian carinae attaining hind border, latter with edge narrowly margined. Humeri rounded. Scutellum with disc elevated, convex; posterior process much shorter than disc, blunt, subvertical. Prosternal sulcus without stridulatory groove and without lateral tubercles.

Hemelytra almost attaining apex of abdomen. Veins normally developed, but difficult to perceive on corium. Hind wings comparatively short and wide, anal lobe very wide; hamus attaining base of wing; distinct apical cell present; secondary vein bifurcate.

Legs with femora widened, fusiform without denticles. Spongy fossae of tibiae absent in both sexes. Tarsi elongate.

Abdomen convex below. Connexivum wide dorsally, perceptible ventral portion very narrow, only about one-third as wide as dorsal connexival plates.

Genitalia of male. Pygophore with median process platelike, bifurcate apically. Phallus with articulatory apparatus without basal plate bridge; pedicel extremely short. Basal plate struts short, somewhat curved, apically continued into short, subrectangular sclerotization. Dorsal sclerotization of phallosoma faint. Vesica not conspicuously sclerotized. Genitalia of female subconical, terminal tergites subhorizontal.

First and fifth nymphal instars as described for tribe; prosternum without stridulatory sulcus.

TYPE SPECIES: *Cavernicola pilosa* Barber, 1937.

DISTRIBUTION: As for tribe.

BIOLOGY: As for tribe.

Cavernicola pilosa Barber

Figures 6H; 7E, F; 9F, G; 15B, C; 23C; 25A, C, H, K; 26C; 29F; 31E, F; 291-293

Cavernicola pilosa Barber, 1937a, p. 61, 2 figs. Usinger, 1944, p. 33, pl. 7, fig. D. Lent and Jurberg, 1969b, p. 318, figs. 1-28.

Length of male 11.0-11.5 mm., of females 12.0-13.5 mm.; maximum width of pronotum of male 3.0-3.2 mm., of female 3.5-4.0 mm.; maximum width of abdomen of male. 4.0-4.5, of female 4.5-5.0 mm.

Body abundantly pilose (figs. 292, 293B, C) except membrane of hemelytra; general color from dark brown to piceous, except stramineous on corium, veins of hemelytra, wedge-shaped area adjacent to inner cell of membrane, and coxae, trochantera, and base of femora.

Head as in generic description and figures 291, 292, 293B, C, fusiform, slightly longer than pronotum (1:0.8-0.9). Antecular region as long as postocular, the latter elongate with

sides gradually converging toward behind, in dorsal view. Eyes small, in lateral view approaching but not attaining level of ventral and

distant from level of dorsal surface of head. Ratio width of eye to interocular distance 1:2.6-2.9. First antennal segment attaining or

slightly surpassing level of apex of clypeus. Ratio of antennal segments 1:2.7-3.0:4.3-4.6:4.9-5.0. Trichobothria of second antennal segment (fig. 6H) several times as long as diameter of segment, their distribution as shown in figure 9F, G. Rostrum (fig. 293C) with first segment very short, not attaining level of apex of antenniferous tubercle; second segment very long, attaining level of hind border of head; third segment short. Ratio of rostral segments 1:4.2:1.2.

Pronotum as in generic description and figures 291, 292, 293E. Anterolateral angles with short apically somewhat rounded processes.

Scutellum with posterior process subhorizontal, rounded apically (figs. 292, 293E). Prosternum as illustrated (fig. 15B, C).

Hemelytra as in generic description and figures 291, 292, 293G. Corium more than two-thirds of length of hemelytron. Hind wings (fig. 293F) with m-cu and section of M between m-cu and R+M of identical length, not forming conspicuous angle. Cu bent apically so as to

meet R+M, forming large closed cell. Hamus bifurcate apically.

Legs as in generic description and figures 291, 292. Fore femora (fig. 293H, I) about 4.5 times as long as wide.

Abdomen with spiracles remote from concrexival suture (fig. 293A). Phallus as in generic description and figure 23C. Pygophore of male with apically bifurcate median process (fig. 293D).

TYPE: National Museum of Natural History, Smithsonian Institution, Washington, D.C.

DISTRIBUTION: Brazil (Bahia, Espírito Santo, Mato Grosso, Pará); Colombia; Ecuador; Panama; Venezuela. *Cavernicola pilosa* is here reported for the first time from Ecuador (Pastaza: Confluence of Río Macuma and Río Morona, 300 meters, July 17, 1971 [B. Malkin; the American Museum of Natural History], one male).

BIOLOGY: As for the tribe. The species was found infested by a *Trypanosoma* closely related to *T. cruzi*. *Cavernicola pilosa* has been

obtained from shelters of the following bats: *Desmodus rotundus* (E. Geoffroy); *Dirias albiventris* Desmarest; *Eumops auripendulus* (Shaw), *Molossus molossus* (Pallas) and *Saccopteryx bilineatus* (Temminck); the triatomine is thought to be involved in transmission of *Trypanosoma* species to bats.

OBSERVATIONS: We have been unable to find any differences that would indicate the presence of more than one species among the abundant material examined.

Certain venational anomalies are very frequent in this species. They are found in the inner cell of the membrane of the hemelytra where spurious veins, either free or forming a cell or cells, are common (fig. 293J-N). Among 42 Panamanian specimens examined at random, 21 had spurious veins. Material from Tolima (Colombia) also showed frequent spurious veins. We have not seen a comparative phenomenon in any other triatomine bug.

BOLBODERINI USINGER

Bolboderini Usinger, 1944, p. 28.

Small species of less than 12 mm. long, their body distinctly compressed dorsoventrally. Body integument rugose and with small setigerous granules; body and appendages only with short hairs.

Antenniferous tubercles with apicolateral spinelike projection. Genae salient, large, spinelike or platelike, projecting beyond apex of clypeus at least by distance equal to width of clypeus apically. Ocelli situated somewhat before middle of disc of postocular portion of head, not elevated, inconspicuous. Second antennal segment with 1-4 trichobothria arranged in a single row. Remaining setae of second antennal segment of uniform size.

Prosternum with well-developed stridulatory sulcus. Legs short, femora thickened.

Urosternites covering part of ventral connexival segments, connected to latter by simple membrane. Articulatory apparatus of genitalia of male with basal plate bridge present. Structure of phallus varied.

Fifth instar nymph. Body surface from slightly rugose to heavily granulose, with short spinulose or scalelike setae. Head not strongly convex dorsally; genae surpassing clypeus by

distance equal to width of clypeus apically; eyes situated laterally behind middle of head; antenniferous tubercles with conspicuous apicolateral process; fourth antennal article only very slightly longer than longest of the others; only fourth antennal segment delicately annulate; stridulatory sulcus present; fore and mid femora from subcylindrical to slightly incrassate, with or without denticles; femora without trichobothria; fore tarsi much shorter than half the length of tibiae; abdomen without series of large tubercles dorsally along middle.

First instar nymph: Overall color light, with more or less extensive dark areas on body and appendages, but never mottled; setae simple or spinulose; fourth antennal segment not longer than first, second and third combined; stridulatory sulcus present; mesonotum longer at midline than at sides; metanotal plates small, distance between plates more than twice their width; femora without trichobothria; posterior tarsi apically without specialized hairs.

TYPE GENUS: *Bolbodera* Valdés, 1910.

OTHER GENERA INCLUDED: *Belminus* Stål, 1859; *Microtriatoma* Prosen and Martínez, 1952; *Parabelminus* Lent, 1943.

DISTRIBUTION: Cuba; Central America north to southern Mexico; South America to 26 degrees south (Map, fig. 294).

BIOLOGY: Arboreal, associated with marsupials' or rodents' nests, or in bromeliads; very rarely domestic. The eggs are laid singly.

OBSERVATIONS: Our cladogram (fig. 295) shows the hypothesized relationships between the four genera included in the tribe Bolboderini. The plesiomorphic states for the characters used have been established as such because they represent the nonspecialized conditions found in other triatomines and in non-triatomine reduviids.

The most plesiomorphic genus is *Bolbodera*, with the remaining genera combined forming its sister group. *Bolbodera*, a relict-endemic, has been found only in Cuba; it is the vicariant of the assemblage of the remaining genera, which occurs in Central and South America. The known distribution of the bolboderine genera is shown in figure 294. *Belminus* ranges from southern Mexico to northern Peru, and is roughly sympatric with *Microtriatoma* although the latter extends to southern Brazil. *Para-*

belminus, the sister group of *Microtriatoma*, has so far only been found in a relatively small section of the area of the Brazilian coastal range. *Microtriatoma* has not been collected in the area where *Parabelminus* occurs; a vicariance situation may well obtain here.

Bolboderines are not well collected, and future findings may change the above picture.

BOLBODERA VALDÉS

Bolbodera Ms. Uhler.
Bolbadea Valdés, 1910, p. 435 (*sic*).

Bolbodera Valdés, 1914, p. 101. Bruner and Fracker, 1926, p. 247. Usinger, 1941, p. 49; 1944, p. 28. *Callotriatoma* Usinger, 1939, p. 35.

Triatominae of less than 10 mm. in length; general color black.

Head elongate fusiform, about twice as long as wide. Genae pointed, very slightly compressed laterally at base, surpassing clypeus, the latter widened subbasally, tapering at base; bucculae fully exposed. Postocular region sub-globose. Postocular furrow well perceptible, broadly U-shaped. Eyes small, in lateral view

not attaining levels of upper and lower surface of head. Ocelli small but normally developed, situated on dorsal surface of head, slightly mesad of inner tangent of eyes. Antennae inserted apical of center of anteocular region. Second antennal segment the longest, third and fourth subequal, shorter than second but longer than first. Second segment with one trichobothrium. Rostrum attaining prosternum, subcylindrical, only slightly compressed dorsoventrally; first segment short, attaining level of antenniferous tubercles, second about twice as long as first; third the shortest.

Pronotum with anterior lobe narrow; median constriction prominent. Anterior lobe with 1+1 discal tubercles and with 1+1 acute projections on lateral margin posteriorly. Anterolateral angles large, strongly tapering apically. Posterior lobe carinate laterally, with 1+1 abbreviated submedian carinae; humeral angles obtuse. Scutellum subtriangular, without anterolateral projections; posterior process subcylindrical, more than half as long as scutellum.

Hemelytra almost attaining apex of abdomen, in both sexes. Cu inserted on base of inner membranal cell near inner angle of cell, running straight to base of hemelytron where it meets claval suture. R+M distinct, not connected by small branch to Sc, apical subdivision into R and M well perceptible. Hind wings with hamus extending to base of wing; secondary vein simple.

Legs comparatively slender. Under surface of femora with large conical denticles arranged singly or in pairs, subequal in size. Tibia slender, cylindrical. Spongy fossulae absent. Tarsi elongate, three segmented.

Venter abruptly flattened at center. Connexivum wide, without dorsal longitudinal ridge, its margins reflexed. Spiracles remote from apparent connexival suture.

Genitalia not examined.

Fifth instar nymph (not seen, characters deduced from those of adult). With the characters of the tribe; setae not scalelike; genae spinelike; first rostral segment much shorter than second; femora with large denticles; tibiae without spongy fossulae; tarsi elongate, several times as long as diameter of tibiae apically.

TYPE SPECIES: *bolbodera scabrosa* Valdés;

type species of *Callotriatoma*, *Callotriatoma cubana* Usinger.

BIOLOGY: Associated with rodents of the genus *Capromys*.

OBSERVATION: Although striking in its unusual color pattern, this geographically isolated genus is the most plesiomorphic of the tribe, as shown by the well-developed ocelli, the straight cubital vein of the forewings, the pointed genae, the slender cylindrical tibiae and the elongate, three-segmented tarsi, in addition to other plesiomorphic characters shown in our cladogram (fig. 295).

Bolbodera scabrosa Valdés

Figures 96, 296, 297

Bolbodera scabrosa Ms. Uhler

Bolbadea leabrusa Valdés, 1910, p. 435 (sic)

Bolbodera scabrosa Valdés, 1914, p. 101. Bruner

and Fracker, 1926, p. 248, fig. 1. Usinger, 1941, p. 49; 1944, p. 29, pl. 7, fig. B. Alayo, 1967, p 28, pl. 7, fig. 1

Callotriatoma cubana Usinger, 1939, p. 37, pl. 1.

Male. Length 8.8 mm.; maximum width of pronotum 2.3 mm., of abdomen 3.4 mm.

Head (figs. 296, 297A, B) coarsely granulose, with short inconspicuous setae, black, twice as long as wide (1:0.55), slightly longer than pronotum (1:0.95). Anteocular region about one-fourth longer than postocular (1:0.8). Genae, eyes and ocelli as in generic description and figures 296, 297A, B. Ratio width of eyes to synthlipsis 1:2.1. Ratio of antennal segments (fig. 9L) 1:3.2:1.7:1.8. Rostrum (fig. 297B) with sparse, short, inconspicuous setae; ratio of antennal segments 1:2.5:0.6. Neck testaceous.

Pronotum and upper portion of propleura uniformly red; rest of thorax, including scutellum, black. Pronotum rugose-granulose; median constriction conspicuous; posterior lobe one and one-half times as wide as fore lobe. Scutellum rugose; posterior process subcylindrical, as long as disc of pronotum.

Hemelytra black, (fig. 296) with corium red on its posterior two-thirds; a whitish line separating corium from membrane. Corium irregularly rugose, more strongly so on basal angle, falling distinctly short of level of apex of inner cell of membrane, and extending to level of center of fifth connexival segment.

Legs uniformly black, their structure as in generic description and figure 297C. Femora with four or five denticles. Fore femora 4.3 times as long as wide, widest at middle.

Abdomen black. Connexivum (fig. 296) pink or red, with anterolateral angles of segments IV and V black; connexival segments

VI-IX entirely black.

TYPE of *scabrosa*, Museo Gundlach, La Habana; of *cubana*, the American Museum of Natural History.

DISTRIBUTION: The type of the species is from Cuba, with no exact locality given. The type of *Callotriatoma cubana* was collected at 3000' at Loma del Gato, in the Oriente province. Alayo (1967) mentioned one specimen from Guantánamo (Oriente) and one from Sorroa (Pinar del Río). Dr. F. Sotolongo, professor of parasitology at Habana University informed us (*in litt.*) that the species exists in the provinces of Pinar del Río and La Habana, and that it was also collected in a coffee plantation in Trinidad (Las Villas).

BIOLOGY: Sotolongo informed us (*in litt.*) that the material from Las Villas mentioned above was collected in nests of the rodent *Capromys pilorides* (Say); Alayo (1967) already suggested that a *Capromys, melanurus* Peters, might be the host of *Bolbodera*.

BELMINUS STAL

Belminius, Stål, 1859, p. 498; 1868, p. 101; 1868, p. 123; Lent and Wygodzinsky, 1954, p. 85.
Marlianus Distant, 1902, p. 191.

Small Triatominae of 8.5-12.0 mm. in length; general color black. Body surface granulose and rugose.

Head elongate fusiform, two and one-half to three times as long as wide. Genae compressed laterally, platelike, their apex widely rounded, considerably surpassing clypeus and leaving part of bucculae exposed. Clypeus approximately parallel-sided, slightly tapering at base. Postocular region with sides subparallel or convex. Postocular furrow perceptible, broadly U-shaped. Eyes medium-sized, in lateral view attaining level of ventral but not of dorsal surface of head. Ocelli small or obsolescent, laterally oriented, situated at or slightly laterad of levels

FIG. 295. Cladogram of the hypothesized relationships of the genera of Bolboderini.

of inner tangents of eyes. Antennae inserted slightly apicad of middle of anteocular region. Second and fourth antennal segments the long-

est, third slightly shorter. Second segment with four trichobothria arranged in one row. Rosstrum attaining prosternum, subcylindrical, only very slightly compressed dorsoventrally; first and second segments elongate, subequal in length, third very short.

Pronotum with fore lobe narrow; median constriction prominent. Anterior lobe granulose, with 7+7 discal tubercles. Anterolateral angles salient. Posterior lobe of pronotum with sides carinate; submedian carinae almost attaining posterior margin; surface of lobe heavily rugose transversally. Scutellum triangular, with 1+1 lateral subtriangular projections; posterior process subconical or slightly flattened, as long as main body of scutellum.

Hemelytra falling distinctly short of apex of abdomen, in both sexes. Cu inserted on base of inner membranal cell near inner angle of cell

very close to claval suture, meeting claval suture halfway to base of hemelytron, forming very narrow triangle with claval suture. R+M from distinct to obsolescent, not connected by small branch to Sc; divided apically into separate R and M. Corium heavily rugose transversally. Hind wings with hamus abbreviated. Secondary vein simple.

Legs short. Under surface of femora with one to three denticles, one much larger than remaining. Tibiae slender, slightly curved, distinctly compressed laterally, with distinct ventral carina. Spongy fossulae absent. Tarsi medium sized, three segmented.

Venter abruptly flattened at center. Connexivum wide dorsally, perceptible ventral portion of connexivum very narrow, from one-third to one-fourth as wide as dorsal connexival plates. Dorsal connexival segments with conspicuous

longitudinal ridge. Spiracles very close to apparent connexival suture.

MALE GENITALIA: Pygophore with median process short, pointed. Articulatory apparatus with stapes slightly longer than wide; pedicel narrow and very elongate. Dorsal sclerotization of phallosoma faint; struts narrow, subparallel, not fused. Genitalia of female. Truncate apically, terminal tergites subvertical.

Fifth instar nymph: With the characters of the tribe; setae not scalelike; first and second rostral segments subequal in length; genae platelike; laterally compressed, apex rounded in side view; femora with large denticles; tibiae without spongy fossulae; tarsi elongate, several times as long as diameter of tibiae apically.

First instar nymph: As described for tribe; first rostral segment over half as long as second; spongy fossulae absent; setae of urotergites in two distinct transverse rows.

TYPE SPECIES: *Belminus rugulosus* Stål; type species of *Marlianus*, *Conorhinus diminutus* Walker.

DISTRIBUTION: Central America from southern Mexico to Panama; northern and western South America, from Venezuela to northern Peru (see map, fig. 294).

BIOLOGY: Generally arboreal, in bromeliads or under tree bark; rarely domestic.

Species of *Belminus* have not been found infected by *Trypanosoma cruzi*.

Belminus costaricensis Herrer, Lent and Wygodzinsky
Figures 298-300

Triatoma rugulosa Neiva, 1913a, p. 74 (nec Stål).
Belminus rugulosus: Picado, 1913, p. 347 (sic; nec Stål).

Belminus rugulosus: Usinger, 1944, p. 31, pl. 7, fig. A. (nec Stål).

Belminus costaricensis Herrer, Lent and Wygodzinsky, 1954, p. 95, figs. 42-48.

Length of male 8.5 mm., of female 9 mm.; maximum width of pronotum of male 2.3, of female 3 mm., maximum width of abdomen of male 3.5 mm., of female 5 mm.

General color black, with yellow or orange-brown spots on membrane of hemelytra and on abdomen.

Head (fig. 298, 299, 300A, B) two and one-half Spanish version of key, p. 482.

half times as long as wide (1:0.35), distinctly longer than pronotum (1:0.8). Clypeus with anterior margin slightly rounded. Anteocular region twice as long as postocular (1:0.5). Hind lobe of head oval, widest anteriorly with sides distinctly converging posteriorly. Eyes in lateral view attaining level of under but not of upper surface of head. Ratio width of eye to synthlipsis 1:1.4. Ocelli small but distinct. External spinelike projection of antenniferous tubercle very short, barely projecting beyond base of first antennal segment. Ratio of antennal segments 1:2.0:1.8:2.0. Rostrum (fig. 300A) with first segment closely approaching level of center of eye, second segment shorter, third shortest; ratio of length of segments 1:0.70:0.35.

Pronotum of general body color, its shape as shown in figures 297, 298. Sides of anterior

lobe subparallel, only slightly converging toward behind, forming conspicuous angle with sides of posterior lobe. Anterolateral processes short, subtriangular, angular apically (fig. 300A). Disc of anterior lobe irregularly granulose, tubercles very faint, difficult to perceive.

Scutellum (figs. 299, 300D) excavate on disc; scutellar process lanceolate, depressed dorsoventrally, sulcate longitudinally above.

Hemelytra as shown in figures 289, 299, attaining level of center of seventh urotergite. Hemelytra black; membrane with five yellowish spots: one at base of each vein, one at apex of clavus, and one, the largest, adjacent to apex of corium. Corium over half as long as hemelytron, attaining level of apex of third visible connexival segment, and almost attaining level of apex of inner cell of membrane, the latter not widened subapically.

Fore femora (figs. 297, 298) four times as long as wide, with two spinelike processes; mid and hind femora with only one, larger process.

Abdomen (figs. 297, 298) with posterior

fourth of each connexival segment yellowish or reddish dorsally and ventrally, light color continued ventrally onto lateral portions of urosternites. Spiracles very close to lateral margin of urosternites.

MALE GENITALIA: As in generic description, very similar to those of *B. peruvianus*.

TYPE: National Museum of Natural History, Smithsonian Institution, Washington, D.C.

DISTRIBUTION: Costa Rica; ?Mexico (Veracruz).

BIOLOGY: *Belminus costaricensis* has been collected on a sloth (*Bradypus* sp.) and in nests of *Nasutitermes* sp. (Isoptera) and *Trigona* sp. (Apoidea, Hymenoptera), but these are probably accidental finds. Beutelspacher (*in litt.*) took specimens of what is probably *costaricensis* in the epiphytic bromeliad *Aechmea bracteata* (Swartz) Griseb.

OBSERVATIONS: An adult male from Mexico (Los Tuxtlas Biological Station, Municipio San Andrés, Tuxtla, Veracruz) collected with a nymph by C. R. Beutelspacher in a bromeliad possibly belongs to *costaricensis*. The adult differs from Costa Rican material by its somewhat larger synthipsis (twice the width of one eye) the slightly more pointed anterolateral processes of the pronotum (fig. 300F), the slightly more pronounced tubercles of the fore lobe of the pronotum, and the corium which is distinctly

lighter colored than the membrane. All other characters, including the relative length of the first rostral segment and the sulcate scutellar process agree in the Costa Rican and Mexican specimens.

***Belminus herreri*, new species**
Figures 301,302

DIAGNOSIS: *Belminus herreri* differs from all other species of the genus by the light-colored areas of its thorax and the annulate legs

DESCRIPTION.

Length of male 8.5 mm., of female 9.0 mm.; maximum width of pronotum of male and female 2.5 mm., of abdomen of male 3.8 mm., of female 4.0 mm.

General color black. The following areas yellow: collar including anterolateral processes; the 2+2 anterior discal tubercles of fore lobe of pronotum; submedian carinae of hind lobe of pronotum except their posterior portion; lateral and posterolateral margin of hind lobe of pronotum; apical half of scutellar process; a narrow band on corium adjacent to basal two-fifths of clavus; membrane narrowly along contact

with corium; coxae and trochantera; narrow apical annulus of femora and a comparatively large submedian annulus on hind femora, incomplete on middle and missing on fore femora; posterior third of connexival segments dorsally and ventrally, extended onto adjacent areas of sternites and tergites; posterior border of pygophore, gonocoxites of eighth segment and median longitudinal stripe on eighth and ninth tergites of female.

Head (figs. 301, 302A, D) granulose, two and one-half times as long as wide (1:0.4) and distinctly longer than pronotum (1:0.8). Clypeus truncate apically. Anteocular region twice as long as postocular (1:0.5), the latter subcircular, with sides conspicuously convergent posteriorly. Eyes in lateral view attaining level of lower but not of upper surface of head. Ratio width of eye to synthlipsis 1:2.15. Ocelli small, about as large as individual granule of head integument. External spinelike projection of antenniferous tubercle small, barely extending beyond base of first antennal segment. Rostrum (fig. 302A) with basal segment falling slightly short of level of anterior border of eyes; ratio of rostral segments 1:0.90:0.45.

Shape of pronotum as shown in figures 301, 302B. Sides of anterior lobe not strongly diverging behind, forming conspicuous angle with sides of posterior lobe. Anterolateral processes of pronotum broadly angular. Disc of anterior lobe granulose and with 7+7 tubercles, the 2+2 anterior ones the most conspicuous, the remaining difficult to observe. Carinae of posterior lobe almost attaining posterior border of pronotum.

Scutellar process (figs. 301, 302B) subcylindrical, slightly compressed laterally, rugose transversally on dorsum, not sulcate.

Hemelytra (figs. 301, 302B) attaining basal third of seventh tergite in male (hemelytra of female not examined). Corium over half as long as hemelytra, attaining level of center of third visible connexival segment, and falling considerably short of apex of inner cell of membrane. The only complete specimen examined with cells of membrane modified by presence of subapical spurious transversal vein in outer cell of membrane. Membrane smoky black, with veins enclosed by deeper black areas.

Legs as in generic description and figures 301, 302E. Fore femora four times as long as wide. Femora with one or two spinelike projections, if two then of very different size.

Spiracles very close to lateral margin of urosternites (fig. 302C). Genitalia as in generic description.

MATERIAL EXAMINED: Panama: Sasardi, Sept., 1968 (A. Herrer; the American Museum of Natural History), one male, holotype, one female, allotype, one nymph; Río Mono, April, 1970 (A. Herrer; the American Museum of Natural History), one nymph.

BIOLOGY: The specimens were collected under the bark of a tree (*Anacardium* sp., Anacardiaceae) in the Panamanian rainforest.

OBSERVATIONS: The types of *B. herreri* are imperfect specimens, and the above description is a composite. The chromatic characters alone, unique in the genus, are sufficient to characterize the species. *Belminius herreri* differs mor-

phologically from *B. costaricensis* and *B. rugulosus* by the absence of a sulcus on the scutellar process, and from *peruvianus*, which also has no sulcus, by many characters, such as the shape of the hind lobe of the head and of the fore lobe of the pronotum, and by the relatively longer first rostral segment.

ETYMOLOGY: This species is named for Dr. Aristides Herrer, the Peruvian parasitologist; this is the second species of *Belminus* discovered by Dr. Herrer.

Belminus peruvianus Herrer, Lent and Wygodzinsky

Figures 6I; 9A; 10F; 12F; 13C; 14C; 23F, G; 24D, R; 29K; 303-305

Belminus peruvianus Herrer, Lent and Wygodzinsky, 1954, p. 91, figs. 1-37.

Length of males 10.2-10.8 mm., of female 11.2 mm.; maximum width of pronotum 2.8-2.9 mm.; maximum width of abdomen of male 4.1-4.7 mm., of female 4.8-5.0 mm.

General color black, in some cases faintly tinged with pink. Antennae, rostrum, and in some cases apices of femora and tarsi, light brown. Light yellowish spots at base of the three veins of membrane; a similar spot at apex of corium. Posterior border of connexival segments dorsally and ventrally with irregularly

shaped yellowish red transversal spot occupying from one-third to one-fourth of surface of each connexival segment. Lateral areas of sternites with more or less extensive reddish areas connected to connexival spots. In some specimens, small reddish areas of variable extension before and behind eyes, on sides of hind lobe of head dorsally, on apices of anterolateral projection of pronotum, and on discal tubercles of fore lobe.

Head (figs. 304, 305A, B, D) strongly granulate, granules largest on dorsal surface. Head two and one-half times as long as wide (1:0.4) and distinctly longer than pronotum (1:0.8). Clypeus emarginate apically. Anteocular region

two and one-half times as long as postocular (1:0.4), the latter subrectangular, with sides almost straight, subparallel, only very slightly converging toward behind. Eyes in lateral view not attaining level of dorsal or ventral surface of head. Ratio width of eye to synthlipsis 1:2.5. Ocelli very small, obsolescent, not larger than average granule of head. External spinelike projection of antenniferous tubercle (fig. 305D) large, attaining one-third of length of first antennal segment. Setae of second antennal segment as shown in figure 6I, trichobothrial pattern as shown in figure 9A. Ratio of antennal segments 1:1.85-2.1:1.55-1.65:1.65-1.85. Rostrum (fig. 305B) with first segment not extending beyond level of posterior third of antecular region; ratio of rostral segments 1:1.0:0.45.

Pronotum black, its shape as shown in figure 304. Sides of anterior lobe strongly diverging toward behind, not forming conspicuous angle

with sides of posterior lobe. Anterolateral processes pointed. Disc of anterior lobe with 7+7 very conspicuous tubercles, the latter subconical in side view.

Scutellar process black, subcylindrical, almost pointed posteriorly, rugose transversally on dorsum, not sulcate (figs. 303, 304E).

Hemelytra and wings as in generic description and figures 304, 305C, F, not quite attaining center of seventh urotergite, in both sexes. Corium half as long as hemelytron, its apex attaining level of extreme base of third visible abdominal tergite, and extending only slightly beyond level of middle of internal cell of membrane, the latter cell slightly widened subapically.

Legs (figs. 303, 304, 305H) with fore femora three and one-half times as long as wide. Femora with one large and two or three smaller denticles or processes, the larger ones up to one-half as long as diameter of femur.

Abdomen with spiracles close to external margin of sternites. Genitalia as in generic description and figure 23F, G.

TYPE: Instituto Miguel Lillo, Tucumán.

DISTRIBUTION: This species is only known from a small area in the upper Marañón valley in Peru, at elevations from 350 to 1300 meters.

BIOLOGY: All instars of *B. peruvianus* were found under loose bark of a large specimen of *Schinus molle* L. (Anacardiaceae); the tree served as a semipermanent shelter for an opossum (*Didelphis* sp.) and chickens were sleeping a few feet from the tree. *Belminus peruvianus* was also found, together with *Panstrongylus chinai*, in thatch-roofed adobe house inhabited by humans, dogs, guinea pigs, and geckos. No epidemiological role could be established for *B. peruvianus*.

Specimens of *B. peruvianus* were taken to the laboratory on various occasions. Adults and fourth and fifth instar nymphs fed hesitatingly on man, but would accept chicken quite readily. First instar nymphs hatched in the laboratory refused to feed on humans, rabbits, guinea pigs, or white rats but accepted geckos and tortoises (*Geochelone chilensis*) (Gray). The most frequently observed mode of feeding of first and second instar nymphs was cannibalism (cleptohaemodeipnonism as defined by Ryckman, 1951), which allowed the nymphs to attain the second respectively third instar without any other food.

One feature peculiar to this species is that it occurs in a semiarid region (the upper Marañón Valley), whereas all other Bolboderini appear to be restricted to areas of high rainfall. It is also the only Bolboderini known to have made the transition from a sylvatic to a peridomestic and domestic way of life.

Belminus rugulosus Stål

Figures 306-308

Belminus rugulosus Stål, 1859, p. 102, pl. 6, fig. 1.

Herrer, Lent and Wygodzinsky, 1954, p. 94.

Martínez and Caravallo, 1976, p. 241, fig. 1.

Conorhinus diminutus Walker, 1873b, p. 19.

Marlianus diminutus: Distant, 1902, p. 191.

Female. Length 10.5-11.0 mm. Maximum width of pronotum 2.5-2.8 mm., of abdomen 4.0-4.3 mm.

General color black. Scutellar proc ss, spots at base of membranal cells and at apex of corium, at base of connexival segments dorsally and ventrally and on adjacent area of urosternites, yellowish brown or orange. Third and fourth antennal segments, rostrum, apices of femora, and tarsi brown.

Head (figs. 306, 307, 308) granulose, granules of various sizes. Head slightly more than twice as long as wide (1:0.45-0.50) and distinctly longer than pronotum (1:0.85-0.90). Antecular region about twice as long as postocular (1:0.45-0.50), the latter faintly rounded laterally, with sides strongly converging posteriorly. Eyes in lateral view attaining level of under but not of upper surface of head; ratio width of eye to synthlipsis 1:2.20-2.35. Ocelli small. Ratio of antennal segments 1:1.9-2.0:1.4:1.4. Rostrum (fig. 308B, C) with

approximately half as long as hemelytron, its apex attaining level of center of third visible connexival segment, and approaching level of apex of inner membranal cell, the latter comparatively wide.

Legs as in generic description and figures 306, 307. Femora with two or three spinelike processes.

Venter with spiracles very close to lateral margin of sternites. Genitalia as in generic description.

TYPES: Of *rugulosus*, Zoologisches Museum, Berlin; of *diminutus*, British Museum (Natural History).

DISTRIBUTION: Colombia, Venezuela.

BIOLOGY: Unknown.

OBSERVATIONS: The above redescription is based upon the examination of the types of *rugulosus* and *diminutus*.

The collections of the Berlin Museum contain three females of *rugulosus*, collected by Moritz in "Columbien" and all bearing a label with the number 2913. Only one of the three specimens bears a printed number label, an obviously old handwritten locality label, and similar identification labels, possibly in Stål's handwriting, as follows: "Belminus Stål/*rugulosus* Stål."

The three specimens are very similar and appear conspecific. We herewith designate the

first segment not quite attaining level of anterior border of eyes; ratio of antennal segments 1:0.75-0.85:0.4-0.5.

Pronotum (fig. 306, 307) black, most heavily granulose on fore lobe, with 7+7 distinct tubercles. Sides of anterior lobe subparallel, only slightly diverging toward behind, forming conspicuous angle with sides of posterior lobe. Anterolateral processes large, distinctly pointed.

Scutellum (fig. 307) excavate on disc; scutellar process shallowly sulcate dorsally.

Hemelytra (figs. 306, 307) almost attaining level of posterior border of tergite VII. Corium

female bearing the original determination labels as the lectotype.

PARABELMINUS LENT

Parabelminus Lent, 1943c, p. 497.

Triatominae of 9-10 mm. in length. Basic color black. Distinct, short adpressed setae on most body parts.

Head from one and one-half to twice as long as wide, shallowly but distinctly excavate longitudinally on under surface for reception of rostrum. Genae compressed laterally, their apex widely rounded, considerably surpassing clypeus, and completely covering bucculae. Clypeus wide anteriorly, narrowed posteriorly. Postocular region subrectangular, with sides slightly covering towards behind. Postocular furrow obsolescent. Eyes medium-sized, in lateral view surpassing level of ventral but not attaining level of dorsal surface of head. Ocelli very small, obsolescent, laterally oriented, situated at level of inner tangents of eyes. Antennae inserted on anterior third of antecular region. First segment short, second and third segments subequal in size, fourth slightly longer. Second segment with three equidistant trichobothria. Rostrum attaining prosternum, distinctly flattened dorsoventrally; first and third segment shortest, second much longer.

Pronotum with anterior lobe covered by setiferous granules forming distinct pattern; anterolateral angles short. Posterior lobe with humeri rounded; submedian carinae almost attaining hind border; surface of posterior lobe rugose-granulose.

Scutellum subsemicircular, exposed portion subtrapezoidal; posterior process absent. Surface of scutellum heavily rugose.

Hemelytra falling distinctly short of apex of abdomen, in both sexes. Cu inserted on base of inner cell of membrane remote from inner angle of cell, conspicuously curved, meeting claval suture at center of latter, enclosing wide subtriangular cell. R+M obsolescent, connected on its basal half by small branch to Sc; apical subdivision into R and M not discernible. Hind wing with hamus attaining base of wing; secondary vein bifurcate.

Legs short, granulose. Femora stout, with 1+1 short, spinelike teeth on under surface sub-

apically. Lower surface of femora smooth, somewhat concave, closely fitting tibia when legs closed. Tibiae short, widened, distinctly compressed laterally, conspicuously narrowed at base. Spongy fossulae present on all three pairs of legs, small, not longer than width of tibia apically. Tarsi short, about one fifth the length of tibia, two-segmented.

Abdomen heavily rugose dorsally and ventrally; portion of basal tergite exposed between hemelytra. Central area of venter slightly convex only, but not abruptly flattened. Connexivum very wide dorsally, connexival segments as wide as one-fifth of width of abdomen; perceptible ventral portion of connexivum very narrow, from one-fourth to one-fifth of width of dorsal connexival segments. Spiracles remote from connexival suture.

MALE GENITALIA: Pygophore with short, narrow, subrectangular apical process. Articulatory apparatus short, transverse, subrectangular; pedicel very short. Struts separated at base, their apical portion fused into narrow tongue-like structure. Dorsal sclerotization of phallosoma faint. Genitalia of female truncate apically, terminal tergites vertical.

Fifth instar nymph (not seen, characters deduced from those of fourth instar nymph). With the characters of the tribe; setae not scalelike; first rostral segment much shorter than second; genae platelike, compressed laterally, their apex rounded in side view; femora with small but distinct denticles; tibiae with spongy fossulae on all pairs; tarsi very short, about twice as long as diameter of tibia apically.

First instar nymph: As described for tribe; first rostral segment less than half as long as second; spongy fossulae on all pairs of legs; setae of urotergites in three irregular transverse rows.

TYPE SPECIES: *Parabelminus carioca* Lent.

DISTRIBUTION: Southeastern Brazil.

BIOLOGY: Arboreal, among fronds of palm trees and in epiphytic bromeliads, probably associated with opossums and rodents.

Parabelminus are able to climb smooth surfaces, doubtlessly aided by the three pairs of spongy fossulae.

OBSERVATIONS: Although compared originally by Lent (1943c) to *Belminus* and *Bolbodera*, *Parabelminus* is actually closest to

Microtriatoma, the first species of which was not described before 1951. *Parabelminus* and *Microtriatoma* share a number of apomorphic characters (fig. 295) which make their recent common origin a certainty. The two genera are very close, even as to the color pattern of their species, and differ mainly by different ratios of various of their body parts (see descriptions and illustrations), the loss of the scutellar spine in *Parabelminus*, and the absence of denticles on the legs in *Microtriatoma* (present in *Parabelminus*).

KEY TO THE SPECIES OF *Parabelminus*¹

1. Head stout (figs. 309, 310, 311F); width of eye less than half of interocular distance; anterolateral angles of pronotum pointed (fig. 310); pronotum with sides forming an almost continuous line (figs. 309, 310) *carioca*
Head slender (figs. 312, 313A); width of eye slightly over half of interocular distance; anterolateral angles of pronotum rounded (figs. 312, 313A); pronotum with sides forming conspicuous angle (figs. 312, 313A)
..... *yurupucu*

Parabelminus carioca Lent Figures 9B; 23E; 309-311

Parabelminus carioca Lent, 1943c, p. 509, figs. 3-10.

Length of male 9.0-9.5 mm., of female 10 mm., maximum width of pronotum of male 2.5, of female 3.0 mm., of abdomen of male 4.0-4.5, of female 5.0 mm.

General color black, antennae brown; hemelytra with yellowish spots at base of membrane and adjacent to corium.

Head (figs. 309, 310, 311F) almost twice as long as wide (1:0.5-0.6) and as long as or very slightly longer than pronotum (1:0.9-1.0); anterocular region distinctly longer than postocular (1:0.7). Hind lobe of head one and one-half times as wide as long (1:0.7). Synthipsis equal to more than twice the width of eye (1:2.5-2.7). Trichobothrial pattern of second antennal segment as shown in figure 9B. Ratio of antennal segments 1:2.3:2.4:3.0. Rostrum as in generic description and figure 311; ratio of rostral segments 1:2.8:0.9.

Pronotum as shown in figures 309, 310, 311; median constriction not pronounced, sides of anterior and posterior lobes forming an almost straight line. Anterolateral angles of pronotum shortly pointed. Scutellum as shown in figures 309, 310, 311A.

Hemelytra and hind wings as in generic description and figures 309, 310, 311D. General color of hemelytra black. Yellowish white areas in space enclosed by Cu and claval suture, on bases of inner and outer cells of membrane or of inner cell only, on membrane adjacent to base of inner cell, and in area adjacent to apex of corium. Apex of hemelytra slightly surpass-

¹Portuguese version, p. 499.

ing base of seventh abdominal tergite, falling considerably short of apex of abdomen in both sexes.

Legs as in generic description and figures 309, 310, 311C. Femora each with one pair of distinct spinelike processes; fore femora widest on anterior third, slightly over three times as long as wide.

Abdomen of general body color; posterolateral angles of connexival segments with small light reddish spots (fig. 310).

GENITALIA: Of male and female as in generic description; genitalia of male as illustrated (figs. 23E; 311B, E).

TYPE: Instituto Oswaldo Cruz.

DISTRIBUTION: *Parabelminus carioca* is only known from a hillside within the city limits of Rio de Janeiro, Brazil.

BIOLOGY: The type species of the genus was found on a palm tree (*Attalea indaya* [Drude]) among its frond where opossums (*Didelphis marsupialis aurita* Wied) were obtaining shelter. Both the vertebrate host and the insect

were found to be infected with *Trypanosoma cruzi*. Together with these triatomines, several specimens of the reduviine *Aradomorpha championi* Lent and Wygodzinsky were encountered; we suspect that *Aradomorpha* may prey on the *Parabelminus*.

Parabelminus yurupucu, new species

Figures 23H; 24E; 25I; 312, 313

Parabelminus species, Miles, 1976, p. 51

DIAGNOSIS: *Parabelminus yurupucu* differs from *P. carioca*, the only other known species of the genus, by its more slender head, the larger eyes, the sides of the fore and hind lobe of the pronotum forming a conspicuous angle, and the rounded anterolateral projections of the pronotum

DESCRIPTION.

Length of male 8.9 mm., of female 9.5-9.7 mm., width of pronotum of male 2.3 mm., of female 2.5 mm.; width of abdomen of male 3.9 mm., of female 4.3-4.4 mm.

General color pattern much as in *P. carioca*. Head (figs. 312, 313A, B) twice as long as wide (1:0.5), distinctly longer than pronotum (1:0.8-0.9); anteocular region almost twice as long as postocular (1:0.60-0.65). Hind lobe of head one and one-half times as wide as long (1:0.75). Ratio width of eye to synthlipsis 1:1.65-1.85; viz., eye slightly over half as wide as synthlipsis. Ratio of antennal segments 1:1.75-1.80:1.85-2.10:2.00. Rostrum as shown in figure 313B. Ratio of rostral segments 1:2.40-2.80:0.80-0.85.

Pronotum (figs. 312, 313A) bell-shaped, median constriction pronounced, sides of anterior and posterior lobes meeting at conspicuous angle, viz., fore lobe with sides less diverging than in *carioca*. Anterolateral angles of pronotum bluntly rounded. Scutellum as in *carioca*.

Hemelytra (fig. 312) much as in *carioca*, yellowish spots slightly smaller.

Fore femora (fig. 313C) about three and one-half times as long as wide, with one pair of short denticles; mid and hind femora each with one pair of spinelike processes.

Abdomen and genitalia as in *carioca*; genital region of female as shown in figure 313D.

MATERIAL EXAMINED: Brazil: Bahia: São Felipe, Fazenda Velha, Oct. 27, 1974 (T. Barrett, Instituto Oswaldo Cruz), one female, holotype, one male, allotype, three males, paratypes; ibid. (T. Barrett; the American Mu-seum of Natural History), one male, one fe-male, paratypes, several nymphs; Castro Alves, Fazenda Taperinha, Sept. 21, 1976 (T. Barrett; Instituto Oswaldo Cruz), one fifth instar nymph; Castro Alves, Fazenda da Serra, Au-gust 22, 1975 (T. Barrett, Instituto Oswaldo Cruz), three females, paratypes; Itabuna, CEPLAC, Aug. 20, 1976 (T. Barrett; Instituto Oswaldo Cruz), one female, paratype; Irara, F. Durão, near Salvador, Oct. 22, 1951 (L. C. Mendonça; Instituto Oswaldo Cruz), one fe-male, paratype.

BIOLOGY: The following is based on infor-mation provided us by T. Barrett to whom we

are much obliged. Most specimens collected were found in epiphytic bromeliads, mostly *Aechmea multiflora* L. B. Smith, but one speci-men was found on the trunk of a tree where two different bromeliads (*Hohenbergia* sp. and *Aechmea* sp.) grew in association. The bro-meliads in some cases contained rodent nests, and frogs and geckos also occurred. Although *P. yurupucu* was found associated with *Tri-atoma tibiamaculata* and *Rhodnius domesticus* and both of the last two were infected with *Trypanosoma cruzi*, none of the 31 specimens of *Parabelminus* examined were infected.

The eggs of *P. yurupucu* adhere to the sub-strate. In the laboratory, nymphs fed on mice.

ETYMOLOGY: The specific name is taken from the Guarani *yurupucu*, long-nosed, a com-mon name for triatomines in the Guarani lan-guage area.

MICROTRIATOMA PROSEN AND MARTÍNEZ

Microtriatoma Prosen and Martínez, 1952, p. 6.

Triatominae of 7-8 mm. in length, strongly flattened. Various body regions with distinct adpressed short setae. Basic color black.

Head from 1.2-1.7 times as long as wide, not distinctly sulcate on under surface. Genae compressed laterally, their apex widely rounded, considerably surpassing clypeus, and completely covering bucculae. Clypeus widest near apex, narrowed posteriorly. Postocular region from subrectangular, with sides very slightly converging toward behind to subsemicircular. Postocular furrow obsolescent. Eyes medium-sized, in lateral view surpassing level of lower but not attaining level of upper surface of head. Ocelli very small, laterally oriented, situated at level of inner tangents of eyes. Antennae inserted at center of antecular portion of head. First segment short, second, third, and fourth segments longer, subequal in length. Second segment with three trichobothria, two close to base, one near middle of segment. Rostrum attaining prosternum, distinctly flattened; first segment attaining level of insertion of antennae.

Pronotum with anterior lobe granulose, posterior lobe rugose-granulose; anterolateral angles short; discal and lateral tubercles absent. Posterior lobe with humeri widely rounded; submedian carinae almost attaining hind border. Scutellum subtriangular, heavily rugose-granulose. Posterior process lanceolate, slightly shorter than disc of scutellum.

Hemelytra almost attaining apex of abdomen, in both sexes. Cu inserted on base of inner cell of membrane remote from inner angle of cell, conspicuously curved, meeting claval suture at center of latter, enclosing wide subtriangular cell. R+M obsolescent, connected at middle by a small branch to Sc; apical subdivision into R and M faintly perceptible. Hind wing hamus attaining base of wing; secondary vein bifurcate.

Legs short, femora not as much thickened as in *Parabelminus* and without denticles. Tibiae short, compressed laterally, not conspicuously narrowed at base. Spongy fossulae present on

all three pairs of legs, small, not longer than width of tibiae apically. Tarsi short, about one fifth of length of tibia, two-segmented.

Abdomen heavily rugose dorsally and ventrally. Central portion of venter almost flat but not abruptly so. Connexivum very wide dorsally; perceptible ventral portion of connexivum very narrow, from one-fourth to one-fifth of width of dorsal connexival segments. Spiracles remote from connexival suture.

MALE GENITALIA: Pygophore with short, narrow, apically blunt posterior process. Articulatory apparatus about as long as wide. Pedicel very short. Struts separated at base, their apical halves fused, forming a narrow tongue-like structure. Dorsal sclerotization of phallosoma faint. Genitalia of female truncate posteriorly, eighth and ninth tergites vertical.

Fifth instar nymph: With the characters of the tribe; most setae scalelike; first rostral segment much shorter than second; genae platelike, laterally compressed, apex rounded in lateral view; femora without denticles; tibiae with spongy fossulae on all pairs; tarsi very short, about as long as diameter of tibiae apically.

TYPE SPECIES: *Microtriatoma trinidadensis* (Lent) (as *Microtriatoma mansosotoi* Prosen and Martínez).

DISTRIBUTION: Central America from Costa Rica to Panamá; South America from Trinidad to Peru and Bolivia, as well as southern Brazil. This is by far the widest range of any bolboderine genus.

We have examined a nymph of *Microtriatoma* not associated with adults and therefore not identifiable specifically (Costa Rica: Juan Viñas [USNM]). Because so little is known about the genus, we are listing this nymph as it widens the known geographical range of *Microtriatoma*.

BIOLOGY: Arboreal, in bromeliads; associated with opossums.

OBSERVATIONS: As shown under the heading of *Parabelminus*, that genus and *Microtriatoma* are closely related. *Microtriatoma* could be considered to be the more plesiomorphic genus because it has not lost its scutellar spine, whereas *Parabelminus* has; on the other hand,

the absence in *Microtriatoma* of denticles on the femora and the overall small size might be taken to be apomorphic characters.

KEY TO THE SPECIES OF *Microtriatoma*¹. Membrane of hemelytra speckled with light and

dark (fig. 316A, B); head slender in lateral view (fig. 3188, 1, N-R, W, X); postocular region of head at most 1.6 times as wide as long (fig. 318A, D-H, J-M); third rostral segment much shorter than first (0.7-0.8: 1.0) (fig. 3181, P, K)
trinidadensis

Membrane of hemelytra uniformly dark (fig. 314); head stout in lateral view (fig. 315A); postocular region of head very short, 1.8 times as wide as long (fig. 3158, C); third rostral segment as long as first (fig. 31 A) . *borbai*

.....
***Microtriatoma borbai*, new species**

Figures 314, 315

DIAGNOSIS: A species distinguished from *trinidadensis*, the only other species of the genus, mainly by the very short hind lobe of the head, the comparatively longer third rostral segment, and the uniformly dark membrane of the hemelytra

DESCRIPTION.

Length of male 7.0-8.0 mm., of female 7 .5 mm.

Color pattern as in *trinidadensis*, but general color in most specimens piceous although appearing black to the naked eye.

Head (figs. 314, 315A, C) stout in lateral view, and twice as long as high. In dorsal view, head about one and one-fourth times as long as wide (10.8) and invariably shorter than pronotum (1:1.1-1.2). Anteocular region varying from slightly longer than, to as long as, postocular region (10.9-1.0). Postocular region (fig. 3158, C) subsemicircular, very short, ratio length to width 1:1.7-2.0. Genae, eyes and

ocelli as in *trinidadensis*. Ratio width of eye to synthlipsis 1:2.5. Ratio of antenna segments

1:1.5-1.9:1.3-1.4:1.5-1.9. Rostrum as shown in figure 315A; ratio of rostral segments

1:1.8-2.0:1.0.

Spanish version of key, p. 499, Portuguese version, p. 477.

Pronotum as in *trinidadensis*; anterolateral angles pointed in most specimens (fig. 314).

Hemelytra and hind wings (fig. 315D, E) as in *trinidadensis*, but membrane of hemelytra concolorous dark (fig. 314). Apex of hemelytra of male (fig. 314) approaching posterior border of tergite VII, of female (fig. 315G) shorter, closer to basal than to posterior border of tergite VII. Male genitalia with fused portion of struts narrow, parallel-sided for most of its length (fig. 315H).

Legs (fig. 315F) as in *trinidadensis*.

DISTRIBUTION: Brazil (Parana).

MATERIAL EXAMINED: Brazil: Parana:

Curitiba, August 1970 (A. Borba; Instituto Oswaldo Cruz) one male, holotype, two males,

ETYMOLOGY: The species is named for its collector.

paratypes; *ibid.* (the American Museum of Natural History), one female, allotype, four males, paratypes.

BIOLOGY: Dr. A. Borba, of the School of Medicine, University of Paraná, Curitiba (Brazil), discovered (personal commun.) a small population near Curitiba in clusters of bromeliads, where he also found shelters of opossums (*Didelphis* sp.) and of rodents. In the laboratory, the specimens of *Microtriatoma* refused to feed on pigeons, chickens, mice, or humans. One of the specimens was found to be infested by *Trypanosoma cruzi*. Nymphs of *Phimophorus spissicornis* Bergroth, an entomophagous reduviid bug, were found associated with the *Microtriatoma*.

Microtriatoma trinidadensis (Lent)
Figures 9C, D; 23D; 316-318

Bolbodera trinidadensis Lent, 1951a, p. 153, figs. 1-3.

Microtriatoma trinidadensis: Prosen and Martínez, 1952, p. 8. Carcavallo, Barreto, Martínez and Tonn, 1976, p. 236, figs. 4-7.

Microtriatoma mansosotoi Prosen and Martínez, 1952, p. 8, figs. 1-3. Wygodzinsky, 1960, p. 317, figs. 35-44. D'Alessandro, Barreto and Duarte, 1971, p. 162. Carcavallo, Barreto, Martínez and Tonn, 1976, p. 232, figs. 1-3.

Length of male 7.5-8.0 mm., of female 7.5 mm.; maximum width of pronotum of male 2.0 mm., of female 2.3 mm., of abdomen of male 3.3, of female 3.5 mm. General color piceous to black.

Head (figs. 316, 317, 318A, B, D-R, W, X) of general body color, with adpressed setae. Head slender in lateral view, more than twice as long as high (1:0.38-0.46). In dorsal view, head about one and one-half times as long as wide (1:0.6-0.7), and as long as or slightly shorter than pronotum (1:1.0-1.2). Antecular region varying from slightly longer to slightly shorter than postocular (1:0.8-1.1). Postocular region of head varying from subrectangular to subsemicircular, invariably wider than long, ratio length to width 1:1.3-1.6. Ratio width of eye to synthlipsis 1:2.2. Trichobothrial pattern of second antennal segment as shown in figure 9C, D. Ratio of antennal segments 1:1.3-2.1:1.3-2.1:1.7-2.3. Rostrum as in generic description and figure 318B, I, N, P, X; ratio of segments 1:1.5-1.7:0.7-0.8. Neck of general body color.

Pronotum of general body color, its shape as shown in figures 316, 317, 318A; sides of anterior and posterior lobes almost continuous, not forming conspicuous angle. Anterolateral angles of pronotum from blunt to distinctly pointed. Scutellum (fig. 318C) with disc depressed at center.

Legs as in generic description and figures 316, 317, of general body color, with coxae and trochantera yellowish. Fore femur widest at anterior third, almost four times as long as wide.

Hemelytra and hind wings as in general description and figures 316, 317. Corium distinctly pilose; general color of hemelytra dark, membrane speckled with whitish. Larger whitish areas on apical half of clavus, except extreme apex and conspicuous spot at level of apex of scutellar process, on corium on space enclosed by Cu and claval suture, on adjacent areas of membrane, and on narrow band of membrane adjacent to apical portion of corium. Apex of hemelytra approaching posterior border of tergite VII in both sexes.

Abdomen of general body color. Connexivum (figs. 316B, 317) dorsally and ventrally with narrow transversal yellowish bands before each intersegmental suture, widest near outer margin of connexival segments. Spiracles yellowish.

Genitalia of female as in generic description, of male as in figures 23D, 318S-V.

TYPES: Of *trinidadensis*, Instituto Oswaldo Cruz, Rio de Janeiro; of *mansosotoi*, Misión de Estudios de Patología Regional, Buenos Aires.

DISTRIBUTION: In addition to Trinidad, the species has also been reported, or now examined by us, from Barro Colorado Island, Panamá (American Museum of Natural History); Surinam: Paramaribo (Leyden Museum);

Venezuela: Sucre; Colombia: Meta; Peru: Monson Valley, Tingo Maria (California Academy of Sciences); Bolivia: Chapare and Santa Cruz de la Sierra; and Brazil: Sinop, Mato Grosso (the American Museum of Natural History); Pará: Utinga, near Belem, opossum nest (M. A. Miles; the American Museum of Natural History).

BIOLOGY: Specimens obtained in Trinidad and Bolivia were collected at light, and those from Colombia under tree bark. Venezuelan material was found in an epiphytic bromeliad, together with specimens of *Rhodnius robustus*.

OBSERVATIONS: We have here synonymized *M. mansosotoi* with *M. trinidadensis*, because the differential characters given by the authors of the first species and those presented in the key by Carcavallo et al. (1976) are either subject to variation or have been interpreted erroneously. The shape of the head is quite variable within certain parameters (fig. 318) and does not allow us to place given specimens unequivocally in one or the other of the two previously named species. The same applies to the remaining characters used by the above authors, as well as several others we have explored ourselves.

Future work based upon a much more exten-

in dorsal view. Antenniferous tubercles adjacent to anterior border of eyes, short, without apicolateral projections. Anteocular portion of head with bucculae. Genae inconspicuous, not projecting beyond level of apex of clypeus. Ocelli large, inserted on well-developed ocelliferous elevations on disc of postocular portion of head. Second article of antennae with trichobothria arranged in one row.

Legs short, femora thickened.

Abdomen broadly oval. Urosternites covering part of ventral connexival segments, connected to latter by simple membrane. Genitalia of male not examined in detail.

MALE GENITALIA: of a specialized structure.

Fifth instar nymph: Body surface delicately chagriné, somewhat rugose; genae short, not surpassing level of apex of clypeus; eyes situated laterally on posterior third of head; antenniferous tubercles without apicolateral processes; stridulatory sulcus present; fore and mid femora incrassate, denticulate, without trichobothria; fore tarsi shorter than half the length of tibia; abdomen membranous, without tubercles or granules.

TYPE GENUS: *Alberprosenia* Martínez and Carcavallo, 1977.

DISTRIBUTION: Venezuela.

BIOLOGY: Sylvatic; nymphs found under bark of dead tree.

OBSERVATION: We have been unable to establish the affinities of the tribe.

ALBERPROSENI MARTÍNEZ AND CARCAVALLO

Alberprosenia Martínez and Carcavallo, 1977, p. 113.

Triatominae of approximately 5 mm. in length. Overall body color black, with simple yellow pattern elements. Body surface delicately granulose and rugose.

Head very short, approximately as long as wide across eyes. Genae inconspicuous. Clypeus widest before middle, its apex slightly convex. Postocular region with sides rounded, convergent behind. Postocular furrow faintly perceptible, straight across at level of posterior border of eyes. Dorsal surface of head between eyes with median longitudinal, apically bifurcate crest. Eyes large, occupying considerable

sive material than that available now, reared if possible, and perhaps a careful study of the male genitalia, may require a reconsideration of our procedure but the data available at this time suggest the presence of a widespread species occupying most of the range of the genus.

ALBERPROSENIINI MARTÍNEZ AND CARCA VALLO

Alberproseniini Martínez and Carcavallo, 1977, p.

112.

Very small Triatominae of approximately 5 mm. length, their body somewhat compressed dorsoventrally. Body integument minutely granulose and rugose; body and appendages only with short setae.

Head extraordinarily short and wide, with anteocular portion shorter than length of eyes,

portion of lateral surface of head. Antenniferous tubercles inserted close to anterior margin of eyes. Antennae short, with second and fourth articles the longest, third slightly shorter. Second segment with several trichobothria in one row, the two basal ones closely approximated, the apical one longer than the remaining.

Pronotum with fore lobe divided by deep longitudinal median sulcus into two strongly convex portions, without tubercles. Constriction between anterior and posterior lobes of pronotum well marked. Posterior lobe rugose, with humeral angles narrow, somewhat flaring; submedian carinae well developed, almost attaining posterior margin. Scutellum triangular, disc

deeply excavated. Posterior process of scutellum slightly longer than body of scutellum, stout, horizontal, subcylindrical, rounded apically. Stridulatory sulcus of prosternum well developed.

Hemelytra attaining apex of abdomen. Cu inserted at base of inner membranal cell remote from claval suture, curved, closely approaching claval suture halfway to base of hemelytron. R+M distinct at base, forming short ridge, connected by short branch to Sc; obsolescent on distal two-thirds, apical division into R and M difficult to observe. Entire corium heavily rugose. Inner cell of membrane much narrower and shorter than outer cell.

Legs short. Under surface of femora with

several subequal denticles. Tibiae slender, straight; fore tibiae strongly compressed laterally. Spongy fossulae on first pair of legs in male (female unknown). Tarsi long and slender, three-segmented.

Abdomen convex below. Connexivum wide dorsally; perceptible ventral portion of connexivum very narrow, only about one-third as wide as dorsal connexival plates, the latter without ridges. Urosternites irregularly wrinkled, minutely carinulate along base of each urosternite. Spiracles distant from lateral margin of urosternites by several times their own diameter.

MALE GENITALIA: Pygophore with short triangular platelike process apically. Articulatory apparatus long and slender, not examined in detail. Basal plate struts very short, apparently fused into an upper platelike apically emarginated structure, and 1+1 lower subcircular structures. Dorsal sclerotization of phallus large but faint; vesica and lateral endosoma processes not observed.

Fifth instar nymph: With the characters of the tribe; setae short but not scalelike; second rostral article longer than first, third the shortest; bucculae at base of rostrum distinct; femora denticulate; tibiae without spongy fossulae; tarsi elongate, several times as long as diameter of tibia apically.

TYPE SPECIES: *Alberprosenia goyovargasi* Martínez and Carcavallo, 1977.

DISTRIBUTION: Venezuela

BIOLOGY: Nymphs found under the bark of dead trees.

Alberprosenia goyovargasi Martínez and Carcavallo
Figures 29P; 319, 320

Alberprosenia goyovargasi Martínez and Carcavallo, 1977, p. 114, fig. 1.

Male (female unknown). Length 5.0 mm.; maximum width of pronotum 1.6 mm., of abdomen 1.0 mm. Overall color from dark reddish brown to black, with light brown and yellow pattern elements.

Head (figs. 320A, B) piceous, sides of postocular region light brown; surface granulose, especially on ocelliferous tubercles and on apically bifurcate dorsal longitudinal ridge

along center. Head as long as wide across eyes. Anteocular region four times as long as postocular, the latter subsemicircular, four times as wide as long, entirely occupied on dorsum by large ocelliferous tubercles separated by a longitudinal furrow. Eyes in lateral view considerably surpassing level of under and closely approaching level of upper surface of head. Jugae and genae inconspicuous in lateral view, genae not quite attaining level of apex of clypeus in dorsal view. Antenniferous tubercles very short, adjoining anterior margin of eyes. Antennae with first segment slightly less than twice as long as wide, second with five trichobothria as shown in figure 320C. Ratio of antennal segments 1:4.2:3.3:4.2. Rostrum as in generic description and figure 320B; second and third segments slightly flattened. Ratio of rostral segments 1:1.33:0.47.

Pronotum (fig. 319A) piceous, gradually lighter toward behind; humeri and anterolateral angles yellowish white. Structure of pronotum as in generic description and figures 319A, 320B. Sides of anterior and posterior lobes forming distinct angle. Anterior lobe of pronotum strongly elevated. Humeral angles flaring. Anterolateral processes small, broadly subconical.

Scutellum (fig. 319A) irregularly and coarsely wrinkled; median depression not delimitated by distinct carinae. Meso and metapleura and sterna coarsely and irregularly rugose.

Hemelytra as in generic descriptions and figures 319A, 320F. Corium and basal third of clavus piceous; corium reddish at base, conspicuously yellowish white apically. Membrane brown, fumose, with large yellowish white subcircular spot occupying basal half of inner membranal cell and adjacent areas.

Legs as in generic description and figure 320 D, I, M, stout, fore femora 3.5 times as long as wide. Denticles of femora arranged in two short series. Spongy fossula small. Legs piceous, with coxae, trochantera, base of femora widely and their apex narrowly, yellowish white; tarsi light brown.

Abdomen of general body color. Connexival segments dorsally (fig. 319A) with posterior two-fifths yellowish white. Ventrally, connexival segments and adjacent portions of uroster-

nites with posterior fourth yellowish white. Venter convex. Spiracles remote from lateral margin of urosternites (fig. 320H). Integument of venter (fig. 320K) delicately wrinkled, irregularly so on disc of urosternites, minutely canaliculate longitudinally along posterior margin of sclerites (fig. 320H).

MALE GENITALIA: As in generic description and figures 320G, J, K, L, N.

TYPE: Carcavallo collection.

DISTRIBUTION: Northeastern Venezuela.

BIOLOGY: Found under bark of dead trees in forest; nymphs reared to adult on human blood.

KEYS IN SPANISH

CLAVE DE LOS GÉNEROS DE TRIATOMINAE BASADA SOBRE NINFAS DEL PRIMER ESTADIO

1. Cuarto segmento de las antenas más largo que el primero, segundo y tercero juntos (fig. 25A); mesonoto con la forma de angosta faja transversal, más corto que la mitad de la longitud del pronoto (fig. 25D, H); superficie del cuerpo, antenas y patas con pelos simples muy largos, erectos o decumbentes (figs. 25K, H; 26C); fémures con tricobótrias (fig. 26C) *Cavernicola*
Cuarto segmento de las antenas más corto que el primero, segundo y tercero juntos (figs. 24A-C; 25E); mesonoto más largo en la línea mediana que en los lados y no más corto que la mitad de la longitud del pronoto (fig. 24A-D); superficie del cuerpo, en la mayoría de los casos, solo con pelos cortos, algunos espinulosos (fig. 24E-G); cuando los pelos son alargados presentan invariablemente espinulosos (figs. 25B, J); fémures sin tricobótrias 2
2. Fosetas esponjosas presentes en los tres pares de patas *Parabellminus*; *Microtriatoma*¹
Fosetas esponjosas ausentes 3
3. Cabeza, tórax y patas jaspeados de claro y oscuro; cerdas de los urotergitos muy breves, irregularmente espaciadas (fig. 24G) 4
Cabeza, tórax y patas de color oscuro uniforme o con anillos claros, pero nunca jaspeados; cerdas de los urotergitos, en la mayoría de los casos, dispuestas en dos hileras transversales (fig. 24A, F) 5
4. Cabeza alargada, cónica, el largo de la región anteocular con el doble de su ancho (fig.

¹No examinado; carácter deducido del que se observa en la ninfa V.

- 24C); rostro delicado (fig. 24Q) . *Rhodnius*
Cabeza corta y ancha, con la región anteocular aproximadamente tan larga como ancha (fig. 24B); rostro fuerte (fig. 24S) *Psammolestes*
5. Rostro reducido, no alcanzando el prosterno (fig. 24H) *Linchcosteus*
Rostro de tamaño normal, alcanzando el prosterno (fig. 24I) 6
6. Pelos del cuerpo y apéndices muy largos, erectos o decumbentes (fig. 25B, C, E, G); ápice del segmento distal del tarso posterior sin pelos sensoriales especializados
Paratriatoma
Pelos del cuerpo y apéndices más cortos que en la fig. 25B; C, E, G; tarsos posteriores con (fig. 26E, F) o sin (fig. 26A-D) pelos sensoriales especializados apicales 7
7. Tarsos posteriores sin pelos sensoriales apicales 8
Tarsos posteriores con pelos sensoriales apicales (fig. 26E, F) 10
8. Cabeza muy corta, no más larga que ancha incluidos los ojos *Alberprosenia*²
Cabeza más larga que ancha (fig. 24A, D) 9
9. Faz inferior de los fémures con dentículos setíferos conspicuos; región postocular de la cabeza con los bordes laterales paralelos y súbita contricción adelante del cuello (fig. 24D) *Belminus*
Faz inferior de los fémures con tubérculos setíferos semejantes a los demás; bordes de la región postocular redondeados y convergentes gradualmente en la dirección del cuello (fig. 24A) *Triatoma* (parte)
10. Rostro fuerte o delgado; cuando delgado, el primer segmento menor que la mitad del segundo (fig. 24P) 11
Rostro delgado, el primer segmento más de la mitad del segundo (fig. 24M) *Eratyrus*
11. Tercer segmento del rostro con órgano rostral par (fig. 10D); largo del cuerpo más de 6 mm. *Dipetalogaster*
Órgano rostral ausente; largo del cuerpo menos de 6 mm. *Panstrongylus*; *Triatoma* (parte)

El género *Bolbodera* no está incluido en esta clave.

CLAVE DE LOS GÉNEROS DE TRIATOMINAE BASADA SOBRE NINFAS DEL QUINTO ESTADIO

1. Cuerpo y apéndices con numerosos pelos muy largos, erectos o decumbentes (fig. 29F, I);

²No examinado; carácter deducido del que se observa en la ninfa V.

- cabeza fuertemente convexa dorsalmente (fig. 29F, I); tubérculos anteníferos sin proceso apical lateral; abdómen sin tubérculos a lo largo del centro de los urotergitos 2
- Cuerpo y apéndices sin pelos largos erectos o decumbentes; cabeza fuertemente convexa en el dorso solo en pocos casos (fig. 29J); tubérculos anteníferos con o sin proceso apical lateral; abdómen con (fig. 27A, B, D) o sin (figs. 27C; 28B) tubérculos en serie a lo largo del centro de los urotergitos 4
2. Todos los pelos sencillos (como en fig. 25H, K); ojos situados lateralmente en el medio de la cabeza (fig. 29F); cuarto segmento antenal más largo que cualquier de los demás (fig. 29F); tercer y cuarto segmentos antenales con anillos microscópicos; surco estridulatorio ausente; tarsos alargados, el anterior con cerca de la mitad del largo de la tibia *Cavernicola*
- Cerdas espinulosas (como en fig. 25J); ojos situados lateralmente detrás del medio de la cabeza (fig. 29I); cuarto segmento antenal subigual, en su longitud, con los segmentos segundo o tercero (fig. 29F); solamente el cuarto segmento antenal con anillos microscópicos; surco estridulatorio presente; tarsos no alargados, el anterior más corto que la mitad del largo de la tibia 3
3. Patas relativamente alargadas y delgadas (fig. 28A), los fémures del tercer par de patas más de ocho veces tan largos como anchos; primer artí culo del rostro del doble del largo del último *Panstrongylus* (parte)
- Patas cortas y gruesas (como en la figura 28B), los fémures posteriores menos de seis veces tan largos como anchos; primer artí culo del rostro menos del doble del largo del último (1:0.7) *Paratriatoma*
4. Genas muy salientes, sobrepasando el nivel del ápice del clípeo por una distancia igual al ancho del clípeo apicalmente (fig. 29H, K); tubérculos anteníferos con proceso apical lateral conspicuo (fig. 29K); abdómen sin tubérculos a lo largo del centro de los urotergitos 5
- Genas no sobrepasando o escasamente sobrepasando el nivel del ápice del clípeo (fig. 29E, G, J, L-Q); tubérculos anteníferos con o sin proceso lateral apical conspicuo; abdómen con o sin tubérculos a lo largo del centro de los urotergitos 8
5. Fémures sin procesos espiniformes o dentículos en la superficie inferior; foseta esponjosa presente en todas las tibias; tórax no gra-
- nuloso, con numerosas cerdas espiniformes cortas *Microtriatoma*
- Fémures con conspicuos procesos espiniformes en la superficie inferior; tibias con o sin foseta esponjosa; integumento dorsal fuertemente granuloso 6
6. Primer y segundo segmentos del rostro de largo subigual (fig. 29H); tibias sin foseta esponjosa *Belminus*
- Primer segmento rostral mucho más corto que el segundo; tibias con foseta esponjosa presente o ausente 7
7. Genas en forma de espina; fosetas esponjosas ausentes; tarsos alargados, su longitud igual a varias veces el diámetro de la tibia apicalmente *Bolbodera*¹
- Genas en forma de placa, comprimidas lateralmente, su ápice redondeado en el aspecto lateral; foseta esponjosa presente en todas las patas; tarsos muy cortos, casi tanto como el diámetro de la tibia apicalmente *Parabelminus*
8. Longitud hasta 5 mm.; color general píceo o negro; cabeza ligeramente granulosa, corta y muy ancha (fig. 29P), no más larga que el ancho de lado a lado de los ojos; tercer segmento del rostro solo con la mitad del largo del primer (fig. 320B); fémures fusiformes, no achatados lateralmente *Alberprosenia*
- Más de 5 mm de largo; cabeza más larga que ancha de lado a lado de los ojos; otros caracteres variados 9
9. Cabeza corta y ancha, lisa (fig. 29Q); callosidades postoculares laterales muy salientes, su ancho igual a cuatro quintos del ancho de un ojo (fig. 29Q), en el aspecto dorsal; surco estridulatorio con la longitud con menos del doble de su ancho (fig. 12D); rostro fuertemente achatado dorso-ventralmente; abdomen granuloso, pero sin grandes tubérculos a lo largo de la línea mediana dorsal *Psammolestes*
- Cabeza diferente; callosidades laterales postoculares ausentes; surco estridulatorio, cuando presente, más de dos veces más largo que ancho (fig. 12A, C, E); caracteres restantes variados 10
10. Cabeza larga (fig. 29O); tubérculos anteníferos situados en el tercio o cuarto anterior de la región anteocular (fig. 29O); abdomen granuloso dorsalmente, pero sin hilera de

¹No examinado; carácter deducido del que se observa en el adulto.

- tubérculos a lo largo del medio *Rhodnius*
- Cabeza alargada o corta; tubérculos anteníferos situados detrás del cuarto anterior de la región antecular (fig. 29D, E, G, J, L-N); abdomen con o sin serie de tubérculos a lo largo del centro de los urotergitos 11
11. Rostro abreviado, no sobrepasando el nivel del borde posterior de los ojos (como en fig. 24H); surco estridulatorio no desarrollado *Linhcosteus*
- Rostro de longitud normal, alcanzando el prosterno (fig. 29D); surco estridulatorio presente 12
12. Rostro con el primer y segundo segmentos alargados, de largo subigual, con el tercero corto (fig. 29E); abdomen con una serie de cinco tubérculos salientes a lo largo del centro de los urotergitos *Eratyrus*
- Rostro con el primer segmento invariablemente más corto que el segundo (figs. 29D-F, H-J); abdomen dorsalmente con o sin serie de tubérculos medianos 13
13. Cabeza corta, ancha (fig. 29M); tubérculos anteníferos situados detrás del medio de la región antecular (fig. 29J, M) *Panstrongylus* (parte)
- Cabeza larga y angosta; tubérculos anteníferos situados al nivel o delante del nivel del medio de la región antecular (fig. 29D, E, L, N) 14
14. Genas aguzadas, sobrepasando el nivel del ápice del clípeo (fig. 29N); tercer y cuarto segmentos antenales con diminuto anillado; abdomen dorsal sin tubérculos medianos en serie; longitud mayor que 25 mm *Dipetalogaster*
- Genas adelgazadas o redondeadas en el ápice, no sobrepasando o solo sobrepasando poco el ápice del clípeo (fig. 29L); solamente el cuarto segmento antenal anillado; abdomen dorsal con o sin tubérculos medianos en serie; longitud 25 mm o menos *Triatoma*
- CLAVE PARA TRIBUS Y GÉNEROS DE TRIATOMINAE**
- Ocelos no elevados, situados al nivel del integumento, inconspicuos entre la granulación de la cabeza (figs. 304, 305B, D; 310, 311F; 317, 318A), o situados sobre o muy cerca del surco interocular (figs. 292, 293B) 2
 - Ocelos situados en elevaciones bien destacadas en el disco de la región postocular de la cabeza (figs. 5C; 162B; 205A) 6
 - Cabeza alargada en la mayoría de los casos, subcónica, no fuertemente convexa dorsalmente en el aspecto lateral (figs. 297B; 305B; 311F; 318N-R); genae grandes, alargadas, extendidas más allá del ápice del clípeo a una distancia igual al ancho del clípeo (figs. 296, 297A; 304, 305D; 310, 313A; 317, 318D); tubérculos anteníferos situados adelante del medio de la región antecular (figs. 297B; 305B; 313B; 318B), con proceso espinífero lateral apical; ocelos situados en el disco de la región postocular de la cabeza (figs. 297A; 305D; 313A; 318A); surco interocular obsoleto; corio con las nervaduras bien perceptibles; integumento del cuerpo arrugado y granuloso [Bolboderini] 3
 - Cabeza ovalada, fuertemente convexa dorsalmente en el aspecto lateral (fig. 293C); genae menos conspicuas, no sobrepasando el nivel del ápice del clípeo; tubérculos anteníferos implantados muy próximo del borde anterior de los ojos (figs. 292, 293B, C), sin proceso setífero apical lateral; ocelos situados en el surco interocular o inmediatamente atrás del mismo, el surco fuertemente curvado hacia atrás y casi alcanzando el nivel del borde posterior de la cabeza (figs. 292, 293B, C); nervaduras del corio casi imperceptibles (figs. 291, 292); integumento del cuerpo liso, pero con pelos largos, numerosos y suberectos (figs. 292, 293B, C). [Cavernicolini] *Cavernicola*
 - Primer segmento del rostro mayor (fig. 300A) o tan largo (fig. 302A) como el segundo; escudete en su base lateralmente con 1+1 procesos subtriangulares (figs. 300D; 302B; 304, 305E); segmentos conexivales dorsales con un pliegue submarginal longitudinal nítido (figs. 299, 302B, 304) *Belminus*
 - Primer segmento del rostro mucho más corto que el segundo (figs. 297B; 311F; 313B; 315A); escudete sin procesos laterales en su base; conexivo uniformemente plano 4
 - Escudete trapezoidal, borde posterior rectilíneo, sin proceso posterior (figs. 310, 311A); primer urotergito expuesto (fig. 310) *Parabelminus*
 - Escudete triangular, con proceso posterior bien desarrollado (figs. 296, 317); primer urotergito no expuesto 5
 - Genae comprimidas lateralmente (figs. 315A; 318A, B, I, N, R); fémures sin espinas o dentículos (fig. 315F); tibias de todos los pares de patas con fosetas esponjosas; tarsos con dos segmentos cortos, juntos no mayores

- que un quinto del largo de la tibia (fig. 315F) *Microtriatoma*
- Genae espiniformes (fig. 297B); fémures con procesos espiniformes (fig. 297C); fosetas esponjosas ausentes; tarsos con tres artículos, con cerca de un tercio del largo de la tibia (fig. 297C) *Bolbodera*
6. Cabeza lateralmente detrás de los ojos con callosidades nítidas provistas de tubérculos setíferos (figs. 5, 290A, C, D); antenas implantadas próximas al ápice de la cabeza (figs. 270, 278A, B; 287, 290B, C) [Rhodniini] 7
- Cabeza sin las callosidades mencionadas; inserción de las antenas alejada del ápice de la cabeza 8
7. Cabeza subtriangular, a veces achatada, con la largura nitidamente menor que el doble de su anchura, incluyendo los ojos (figs. 286, 287A; 289); región postocular muy corta, su largo con un cuarto a un tercio del ancho; segmento apical del rostro con incisión distal profunda (fig. 10G); fémures conspicuamente dilatados y comprimidos lateralmente (fig. 248B) *Psammolestes*
- Cabeza subcilíndrica, no achatada dorso-ventralmente, de largura con el doble o más del doble del ancho a través de los ojos (figs. 271, 272, 276, 277, 278A); región postocular más larga, por lo menos con la mitad del ancho; último segmento rostral afilado apicalmente (fig. 10F); fémures alargados en la mayoría de las especies, subcilíndricos y no comprimidos lateralmente *Rhodnius*
8. Largo total hasta 5 mm; cabeza muy corta y ancha, no más larga que el ancho de lado a lado de los ojos (fig. 320A); clípeo más grueso antes del medio (fig. 320A); hemélitros con pequeño ramo conectando la porción basal de la R+M a Sc [Alberproseniini] *Alberprosenia*
- Largo total más de 5 mm; cabeza más larga, más que el ancho de lado a lado de los ojos; sin el pequeño ramo conectando la porción basal de la R+M a Sc [Triatomini] 9
9. Cabeza relativamente corta y ancha (figs. 240, 241, 242A); tubérculos anteniferos insertados muy cerca del borde anterior de los ojos (fig. 242C); cabeza y cuerpo glabros o con pelos cortos, acostados *Panstrongylus*
- Cabeza de forma variada, en la mayoría de los casos subcilíndrica (figs. 95A, B; 162A, B); tubérculos anteniferos no cercanos a los ojos (figs. 95B; 162B); en casos muy poco fre-
- cuentes cabeza relativamente corta y los tubérculos anteniferos muy cerca de los ojos (fig. 250B), pero en estos casos cabeza y cuerpo con pelos largos semierectos muy conspicuos (fig. 250A, B) 10
10. Rostro no sobrepasando posteriormente el nivel de los ojos (fig. 200B); prosterno sin surco estridulatorio (fig. 15A) *Linchcosteus*
- Rostro de largo normal, alcanzando el prosterno (fig. 4I), este último con surco estridulatorio normalmente desarrollado (fig. 13A) 11
11. Proceso posterior del escudete (figs. 195A; 197, 198A) en forma de espina fuerte muy larga, oblicua, de punta afilada, tan larga o más larga como el escudete propiamente dicho; primer segmento del rostro muy largo, casi tan largo como el segundo, alcanzando el nivel del medio de la distancia entre el tubérculo antenifero y el borde anterior del ojo (figs. 195B; 198A) *Eratyrus*
- Proceso posterior del escudete diferente; primer segmento del rostro mucho más corto que el segundo, no sobrepasando posteriormente el nivel del tubérculo antenifero (fig. 4I) 12
12. Cabeza, cuerpo y apéndices con numerosos pelos largos, curvados, semierectos (fig. 250A, B); cabeza muy fuertemente convexa dorsalmente (fig. 250B, C); ojos pequeños (fig. 250A-C, F); tubérculos anteniferos insertados cerca del borde anterior del ojo (fig. 250B, C); fémures anteriores sin dentículos; fosetas esponjosas ausentes; largo 12,5-14,5 mm *Paratriatoma*
- Cabeza, cuerpo y apéndices lisos o con pelos cortos, o solamente apéndices con pelos largos (fig. 68), pero estos menos numerosos que mencionado arriba; cabeza menos convexa dorsalmente; ojos (figs. 69B; 162A; 211B) mayores; tubérculos anteniferos insertados en el medio o cerca del medio de la región anteocular, alejados de los ojos (figs. 162A; 211B); fémures anteriores en la mayoría de los casos con dos o más dentículos; fosetas esponjosas presentes o ausentes; largo 9,5 - 42,0 mm 13
13. Espécie muy grande, con 33-42 mm de largo; fémures no espiníferos; placas ventrales del conexivo invisibles (fig. 211A); membrana conspicua, con pliegues longitudinales, conectando las placas del conexivo a los urosternitos (fig. 210C); proceso posterior del pigóforo corto, transversalmente retangular y truncado en el ápice (fig. 211F); género monotípico y exclusivo de la Baja California (Méjico) *Dipetalogaster*

Espécies raramente con 33 mm o más de largo, en la mayoría de las veces con menos de 30 mm; fémures espinferos o no; placas ventrales del conexivo nítidas (figs. 18B; 88); sin embargo algunas veces angostas; bordes del abdómen raramente membranosos, solamente en la hembra micróptera de una especie con membrana conectando las placas dorsales con las ventrales (fig. 177C); proceso posterior del pigóforo aguzado para el ápice (figs. 21D, 162D); género con numerosas especies y con amplia distribución geográfica *Triatoma*

CLAVE PARA LAS ESPECIES DE *Triatoma*

1. Adultos micrópteros (figs. 177B, C; 179B); segundo segmento de las antenas con muchas cerdas nitidamente más largas que el diámetro del segmento (fig. 6G); color general castaño oscuro o negro, con el conexivo y regiones adyacentes de los urómeros rojos, el área roja continuo o interrumpido por manchas oscuras entre las suturas intersegmentales *spinolai* (parte)
Insectos macrópteros, raras veces braquípteros 2
2. Patas con áreas claras y oscuras nítidas (figs. 44, 60D; 74, 75, 76C; 88, 90B; 106, 119, 120, 166, 174, 175, 176C; 181, 182) 3
Patas con todos los segmentos, excepto los tarsos, de color uniforme, en la mayoría de los casos oscuro; muy raramente los fémures apicalmente con pequeña mancha o pequeño anillo de color claro 11
3. Pronoto negro, con los bordes laterales y carenas submedianas rojos (figs. 181, 182); tibias amarillas excepto su ápice oscuro, formando fuerte contraste con los fémures negros (figs. 181, 182) *tibiamaculata*
Pronoto con dibujo diferente, o completamente oscuro; distribución cromática de las patas diferente 4
4. Especie grande (28 mm); región anteocular casi cinco veces más larga que la postocular (figs. 106, 107A); pronoto (fig. 106) castaño, con 1+1 manchas amarillas cerca de los ángulos humerales; fémures y tibias de color castaño claro, los fémures con anillo castaño oscuro subapical; conexivo con manchas oscuras transversales muy angostas, sobre las suturas intersegmentales (fig. 107C, D) *matogrossensis*
Especies de tamaño variado; color de patas y pronoto diferente 5
5. Manchas oscuras del conexivo en el centro de cada segmento (figs. 119, 120, 166) 6
Manchas oscuras del conexivo situadas sobre las suturas intersegmentales (figs. 43, 44, 59, 74, 75, 87, 89, 174, 175) 7
6. Fémures de color castaño anaranjado claro, con anillo oscuro apical; pronoto sin dibujo colorido nítido (fig. 166); hemélitos oscuros, solamente con la base y el ápice del corio de color claro (fig. 166); disco de los segmentos del conexivo con sencilla mancha oscura *ryckmani*
Fémures oscuros, con anillo claro apical (figs. 119, 120); pronoto y hemélitos con dibujo colorido conspicuo, complejo (figs. 119, 120); disco de los segmentos del conexivo con mancha central en forma de bigornia o con dos pequeñas manchas oscuras (figs. 119, 120) *nigromaculata*
7. Pronoto todo negro; patas negras, con el trocánter y la base del fémur de color amarillo muy contrastado (figs. 60D; 90B) 8
Pronoto todo oscuro o con áreas claras; aspecto cromático de las patas diferente 9
8. Manchas transversales oscuras del conexivo en forma de notas musicales; cabeza más larga que el pronoto (figs. 59, 60D) *deanei*
Manchas transversales del conexivo en forma de fajas anchas; cabeza tan larga cuanto el pronoto (figs. 87, 89) *infestans*
9. Fémures oscuros, con anillo de color claro (figs. 43A; 44); manchas oscuras transversales del conexivo casi tan anchas como los espacios claros intercalados, y no perceptiblemente estranguladas en su centro (figs. 43, 44); especies grandes (ca. 25 mm)
brasiliensis (parte)
Fémures con extensas zonas claras, y con anillo oscuro subapical nítido (figs. 74, 75, 174, 175, 176D-H); manchas transversales del conexivo, en la mayoría de los especímenes, muy angostas, nitidamente estranguladas en su medio, en forma de notas musicales (figs. 74, 75, 174, 175, 176D-H); especies menores, no más largas que 20,5 mm 10
10. Lóbulo posterior del pronoto y escutelo uniformemente oscuros (figs. 74, 75); coxas oscuras; segundo segmento del rostro menos de dos veces tan largo como el primero (fig. 76B) *guasayana*
Lóbulo posterior del pronoto con 1+1 manchitas claras en la región humeral (figs. 174, 175); ápice del proceso del escudete y de las coxas de color claro (fig. 176C); segundo segmento del rostro más de dos veces el largo del primero (fig. 176B) *sordida*

11. Tercer segmento del rostro alargado, aproximadamente tan largo como el segundo (figs. 55C; 100B) 12
 Tercer segmento del rostro en todos los casos más corto que el segundo 13
12. Áreas claras del conexivo rojas; ojos ligeramente menores y cabeza menos alta posteriormente, en el aspecto lateral (fig. 55C)
 *circummaculata*
 Áreas claras del conexivo amarillas; ojos ligeramente mayores y cabeza más alta posteriormente, en el aspecto lateral (fig. 100B) *limai*
13. Antenas con el primer segmento sobre pasando considerablemente el ápice del clípeo (fig. 162B); pronoto fuertemente granuloso, de color píceo o negro y bordeado lateralmente con rojo (figs. 159, 161) *rubrofasciata*
 Primer segmento de las antenas muy pocas veces sobre pasando considerablemente el nivel del ápice del clípeo, en general apenas alcanzándolo, o aún más corto; pronoto diferente 14
14. Primer segmento del rostro más largo que el tercero (figs. 36B; 93B; 131B; 148E; 180C, D; 188B) (en caso de duda pásase al 53) 15
 Primer segmento del rostro tan largo o aún más corto que el tercero (figs. 66A; 79B; 105E; 146B; 158B; 165B) 15
15. Cuerpo y corio de los hemélitros con pelos numerosos y bien perceptibles dorsalmente (figs. 16, 93D; 142A, B) 16
 Cuerpo y corio prácticamente glabros, o con pelos muy breves y esparsos 21
16. Cabeza fuertemente convexa dorsalmente (fig. 93B); tubérculos antenferos alargados, relativamente próximos a los ojos (fig. 93B)
 *lecticularia*
 Cabeza no fuertemente convexa dorsalmente (fig. 142B); tubérculos antenferos cortos, alejados de los ojos (fig. 142B) 17
17. Corio de los hemélitros blanquecino-amarillento en su mayor parte, anaranjado en su base y negro en su ápice (fig. 130) *pallidipennis*
 Corio sin área blanca, preponderantemente negro, solo con manchas amarillas o rojo-anaranjadas en su base y subapicalmente (figs. 101, 109, 140, 141, 143) 18
18. Corio de los hemélitros con pelos largos, delicados y semierectos, con aproximadamente 0,5 mm de largo 19
 Corio de los hemélitros con cerdas cortas, algo achadas, acostadas, con no más que 0,3 mm de largo (fig. 16A) 20
19. Hemélitros cortos, no sobre pasando el sexto urotergito; conexivo dorsalmente con manchas rojo-anaranjadas ocupando un sexto hasta la tercera parte posterior de cada segmento (fig. 142C-E) *phylllosoma*
 Hemélitros alargados, alcanzando o casi alcanzando la extremidad del abdómen; conexivo dorsalmente con manchas rojo-anaranjadas ocupando desde la tercera parte hasta la mitad posterior de cada segmento (fig. 109) *mazzottii*
20. Genas alcanzando o sobre pasando el nivel del ápice del clípeo (fig. 144A, B); lóbulo posterior del pronoto con extensas áreas de color amarillo-anaranjado (fig. 143); en la mayoría de los especímenes, los segmentos del conexivo dorsal de color extensamente amarillo-anaranjado y con mancha negra antero-lateral (fig. 144G); raramente los segmentos del conexivo dorsal negros y con mancha amarillo-anaranjada póstero-lateral (fig. 144D-F); mesosterno, metasterno y vientre del abdómen siempre con pelos suberectos largos *picturata*
 Genas con frecuencia sin atingir el nivel del ápice del clípeo (fig. 102D); pronoto con lóbulo posterior totalmente negro (fig. 101) o con 1+1 pequeñas manchas claras sobre los ángulos humerales (fig. 102D); segmentos del conexivo dorsal negros con mancha amarilla o amarillo-anaranjada en el tercio o en la mitad posterior, que se extiende o no hasta la sutura conexival (fig. 102B, C, D); mesosterno con pelos suberectos largos; metasterno y vientre del abdómen con pelos semejantes o con pelos cortos y acostados *longipennis*
21. Disco del escudete en la base con 1+1 tubérculos salientes dirigidos hacia adelante y tocando el borde posterior del pronoto (figs. 70B; 126D); ángulos humerales explanados (figs. 70B; 126D) 22
 Disco del escudete sin los tubérculos mencionados, ángulos humerales no explanados 23
22. Color general castaño claro (fig. 70A); tubérculos discales y laterales del lóbulo anterior del pronoto muy salientes (fig. 70B); fémures anteriores y medianos con dentículos *flavida*
 Color general píceo (fig. 125); tubérculos discales y laterales del lóbulo anterior poco salientes (fig. 126D); fémures anteriores y medianos sin dentículos *obscura*
23. Hemélitros de color castaño ahumado uniforme (figs. 177A; 179A); segundo segmento antenal con numerosas cerdas algunas veces

- tan largas como el diámetro del segmento (fig. 6G); pronoto sin tubérculos discales; proceso del escudete extremadamente corto (fig. 179A); metasterno posteriormente con carena mediana longitudinal (figs. 178, 180A); urotergitos enteros, sin suturas conexivales dorsales *spinolai* (parte)
- Combinación diferente de caracteres 24
24. Conexivo dorsal de color uniforme 25
 Conexivo dorsal con áreas claras y oscuras nítidas 29
25. Especies de color castaño anaranjado claro uniforme (figs. 34, 35, 151, 152); porción basal de la célula externa de la membrana mucho más ancha que la de la célula interna (figs. 34, 35, 151, 152) 26
 Especies de color castaño o negro uniforme (figs. 134, 135, 147, 170); porción basal de la célula externa aproximadamente del mismo ancho que la de la interna (figs. 135, 147B, C; 170) 27
26. Cabeza fuertemente convexa dorsalmente (fig. 36B); genas alcanzando el nivel del ápice del clípeo (fig. 36A); ojos muy pequeños, distancia interocular dorsal igual a cuatro veces el ancho de un ojo, en el aspecto dorsal (fig. 36A); fémures sin dentículos; especie pequeña (15 mm) *amicitiae*
 Cabeza subciliñdrica (fig. 153B); genas sobrepasando el nivel del ápice del clípeo (fig. 153A); ojos mayores, distancia interocular dorsal solamente igual a dos veces el ancho de un ojo, dorsalmente; fémures con dentículos (fig. 153A); especie mayor, aproximadamente 24 mm *pugasi*
27. Cabeza con ligera depresión curvada atrás del clípeo (figs. 148A, B, C); cabeza alargada en el aspecto lateral, con los ojos próximos al nivel de la superficie inferior de la cabeza (fig. 148E); largo 15-22 mm *protracta*
 Cabeza sin depresión curvada atrás del clípeo (figs. 136A; 171A, C), y relativamente mucho más corta en el aspecto lateral; ojos distantes del nivel del borde inferior de la cabeza (figs. 130B; 171B); largo 9,5-13 mm 28
28. Color general negro (fig. 134) ... *peninsularis*
 Color general castaño, pulido (fig. 170) *sinaloensis*
29. Color general (fig. 51) amarillo claro, incluyendo las patas; primer segmento antenal amarillo-claro y el segundo negruzco (figs. 51, 52E); corio amarillo claro, con mancha oscura central diminuta, o casi imperceptible; segmentos del conexivo (figs. 51, 52D) con mancha central oscura junto a la sutura interna del conexivo, pero no llegando hasta el borde externo o a las suturas anterior y posterior de los segmentos conexivales; vientre del abdomen con diminutas arrugas *cavernicola*
- Combinación diferente de caracteres 30
30. Conexivo dorsal con área clara extendiéndose como una faja ancha a lo largo de todo el borde externo (figs. 39, 46, 47, 82, 154, 156, 158C), con el color oscuro de los urotergitos continuando sobre la porción interna del conexivo, y en algunos casos extendido hasta el centro de cada segmento 31
 Segmentos del conexivo con áreas transversales claras y oscuras alternadas, ambas ocupando el ancho total del segmento (figs. 63, 94, 113, 115, 122A; 149, 168, 186) 35
31. Lóbulo anterior del pronoto sin tubérculos discales (fig. 40A); región postocular de la cabeza redondeada lateralmente, en su aspecto dorsal (figs. 40A, G; 83A; 158A) 32
 Lóbulo anterior del pronoto con 1+1 tubérculos discales (figs. 47, 155A); región postocular de la cabeza no redondeada lateralmente, en su aspecto dorsal (figs. 47, 48A; 155A) 34
32. Proceso posterior del escudete corto, subcónico (figs. 39, 82); primer segmento antenal bastante alejado del nivel del ápice del clípeo (figs. 40A-C; 83A) 33
 Proceso posterior del escudete alargado, subciliñdrico (fig. 156B, C); primer segmento antenal alcanzando el nivel del ápice del clípeo (fig. 158A) *rubida* (parte)
33. Clípeo pareciendo fuertemente inflado posteriormente (fig. 83A), su superficie superior muy convexa en el aspecto lateral (fig. 83B); faz inferior de la cabeza sinuada en el aspecto lateral (fig. 83B); faz ventral del abdomen redondeada *incrassata*
 Clípeo menos saliente, su faz dorsal muy ligeramente convexa en el aspecto lateral (fig. 40B, C); faz inferior de la cabeza casi rectilínea, en el aspecto lateral (fig. 40B, C); faz ventral del abdomen ligeramente achatada en la linea longitudinal mediana *barberi* (parte)
34. Segundo segmento de las antenas con numerosos pelos muy largos además de los cortos (como en fig. 6G); femures inermes; mesosterno limitado posteriormente por carena transversal conspicua (como en figs. 178, 180); conexivo con áreas amarillas; estigmas respiratórios junto al borde del conexivo; largo alrededor de 21 mm .. *breyeri* (parte)

- Segundo segmento de las antenas solamente con pelos cortos; fémures con dentículos; mesosterno y metasterno de superficie continua; conexivo con áreas rojo-anaranjadas o amarillentas junto al borde externo; estigmas respiratorios alejados del borde conexival; largo 25-33 mm *recurva*
35. Manchas negras del conexivo incluyendo las suturas intersegmentales (figs. 94, 186) .. 36
 Manchas negras del conexivo no incluyendo las suturas intersegmentales (figs. 63, 113, 115, 122A; 149, 168) 38
36. Pronoto y, en la mayoría de los casos, también el corio, totalmente negros; cabeza más larga que el pronoto *lenti*
 Pronoto y corio negros, pero con elementos de dibujo rojizos o amarillentos; cabeza tan larga o más corta que el pronoto 37
37. Especie negra con manchas rojas, como sigue (figs. 186, 187): faja longitudinal en la faz dorsal de la cabeza partiendo detrás del clípeo y alcanzando el surco interocular; 3+3 manchas alargadas en el lóbulo posterior del pronoto, de las cuales 1+1 entre las carenas submedianas y 2+2 entre las carenas y los bordes laterales, y en la depresión central del escudete; pleura y faz inferior del tórax y del abdomen hoscas *vitticeps*
 Especie negra, con 1+1 manchitas amarillas en la parte anterior del lóbulo posterior del pronoto, entre las carenas submedianas y los bordes laterales; el resto del pronoto y el escudete, negros (figs. 110, 111); pleura y faz inferior del tórax y del abdomen muy pulidos *melenocephala*
38. Manchas negras de los segmentos del conexivo situadas anteriormente, junto a la respectiva sutura intersegmental (figs. 63, 113, 168); áreas claras en la parte posterior de cada segmento 39
 Manchas negras de los segmentos conexivales situadas en el centro de cada segmento (figs. 115, 122A; 149); regiones anterior y posterior claras 45
39. Lóbulo anterior del pronoto sin tubérculos disciales (fig. 40A); escudete con proceso apical corto, subcónico (fig. 39); conexivo dorsalmente con manchas rojo-anaranjadas de forma irregular, ocupando desde la cuarta parte hasta la mitad posterior de cada segmento (fig. 40E, F), incluyendo parcialmente las suturas intersegmentales respectivas [en algunos casos, área roja extendida sin interrupción a lo largo de todo el margen externo del conexivo; en otros casos, con manchita oscura en el ángulo ánteroexterno de los segmentos (fig. 40D) *barberi* (parte)
- Lóbulo anterior del pronoto con tubérculos disciales (figs. 64A, D; 73A; 81A; 85A); proceso apical del escudete alargado, cilíndrico o espiniforme (figs. 63, 72, 80, 84, 114A; 168) 40
40. Pronoto oscuro (fig. 168), con manchas rojas o amarillas extendidas en forma de banda angosta sobre el borde anterior, los ángulos ántero-laterales y los bordes laterales del pronoto, con los ángulos humerales y parte del borde posterior del pronoto también claros; manchas claras del conexivo ocupando la tercera parte posterior de cada segmento, dorsal y ventralmente (fig. 168) *sanguisuga*
 Pronoto de color oscuro uniforme, sin manchas, en algunos casos con áreas humerales algo más claras 41
41. Ángulos humerales aguzados (figs. 113, 114A, C) *mexicana*
 Ángulos humerales redondeados (figs. 64A, D; 73A; 85A) 42
42. Corio de los hemélitros (fig. 63) en su mayor parte amarillo o amarillo-anaranjado, con una mancha apical y otra central oscuras, esta última de tamaño variado y a veces ausente; segmentos del conexivo (fig. 63) dorsal y ventralmente con mancha amarilla o amarillo-anaranjada ocupando más de la mitad posterior de cada segmento *dimidiata*
 Corio en su mayor parte castaño oscuro o negro (figs. 72B; 80, 84); manchas claras de los segmentos conexivales angostas (figs. 72B; 80, 84) 43
43. Segmentos del conexivo dorsal y ventralmente con mancha irregular transversal amarilla o amarillo-anaranjada en el cuarto o el tercio posterior de cada segmento, junto a la sutura intersegmental (fig. 72B); corio con manchita amarilla basal y otra subapical (fig. 72B) *gerstaeckeri*
 Segmentos del conexivo dorsal y ventralmente casi oscuros, con mancha clara apenas visible en forma de banda angosta incompleta a lo largo del borde posterior del segmento, extendiéndose sobre la sutura intersegmental (figs. 80, 84) 44
44. Bordes laterales de la región postocular de la cabeza subparalelos, muy ligeramente convergentes hacia atrás (fig. 81A); corio con mancha basal y otra transversal subapical, amarillas (fig. 80); tamaño alrededor de 28 mm *hegneri*

- Bordes laterales de la región postocular de la cabeza nitidamente convexos (fig. 85A, C); corio casi totalmente oscuro, solamente algo más claro cerca del clavo (fig. 84); tamaño menos de 20 mm *indictiva*
45. Pronoto y corio totalmente oscuros 46
 Pronoto y corio oscuros con manchas claras 48
46. Segundo segmento de las antenas con cerdas rígidas no más largas que el diámetro del segmento; depresión mediana del escudete triangular, bien caracterizada por las carenas laterales; segundo segmento del rostro subcilíndrico (fig. 58B) *rubida* (parte)
 Segundo segmento de las antenas con cerdas rígidas el doble más largas que el diámetro del segmento (figs. 47, 68); depresión mediana del escudete mal caracterizada o ausente (figs. 47, 68); segundo segmento del rostro achatado dorso-ventralmente (figs. 48B; 69A) 47
47. Ángulos humerales redondeados (figs. 46, 47); proceso posterior del escudete tan largo como el cuerpo principal del esclerito (fig. 46); manchas claras del conexivo amarillas en la mayoría de los ejemplares, ocupando la mayor parte del conexivo incluso todo el margen (figs. 46, 47) *breyeri* (parte)
 Ángulos humerales aguzados o puntiagudos (figs. 67, 68); proceso posterior del escudete más corto que el cuerpo principal del esclerito (fig. 68); manchas claras del conexivo color amarillo-naranja, raramente amarillo pálido, intercaladas con manchas negras transversales que se amplian sobre el ancho del conexivo (figs. 67, 68) *eratyrusiformis*
48. Pronoto subcuadrado (figs. 117, 118A; 122); genas no sobrepasando el nivel del ápice del clípeo (figs. 118A, C; 122B; 124A); ápice del segundo segmento del rostro y el tercero casi totalmente con cerdas largas y densas (figs. 118B, D; 124C) 49
 Pronoto trapezoidal (figs. 41, 96, 97A; 115, 172); genas sobrepasando el nivel del ápice del clípeo; los tres segmentos del rostro solamente con cerdas cortas y esparsas (figs. 42B; 97B; 116B; 173B) 50
49. Insectos mayores, con 19,5-22,5 mm de largo; cabeza con áreas claras y de tamaños diversos en el dorso (fig. 122B); región postocular de la cabeza suavemente redondeada y con los bordes convergentes para trás (figs. 122B; 124A); pronoto negro, castaño claro a lo largo de los bordes anterior y laterales, sobre los ángulos humerales y en fajas curvas del lóbulo anterior (fig. 122) *nitida*
 Insectos menores, con 16,5-19,5 mm de largo;
- cabeza totalmente negra en el dorso (figs. 117, 118A); región postocular de la cabeza bien redondeada en los bordes (fig. 118A, C); pronoto totalmente oscuro o con 1+1 manchas claras sobre los ángulos humerales (figs. 117, 118A) *neotomae*
50. Pronoto negro, con los costados, el borde anterior incluyendo los procesos ánterolaterales, las salientes del lóbulo anterior, las carenas submedianas del lóbulo posterior y una estria mediana longitudinal, de color castaño amarillento (fig. 172) *sinica*
 Distribución cromática del pronoto diferente 51
51. Ángulos ánterolaterales del pronoto redondeados apicalmente (figs. 42A; 115, 116A); pronoto rojo, con 2+2 manchas negras alargadas en el lóbulo posterior (figs. 41, 115) 52
 Ángulos ánterolaterales del pronoto cónicos, puntiagudos apicalmente (figs. 96, 97A); pronoto rojo, con 1+1 manchas negras alargadas en el lóbulo posterior (fig. 96) *leopoldi*
52. Ojos más anchos, en su aspecto dorsal, que la mitad de la distancia interocular dorsal (fig. 116A); ángulos ánterolaterales del pronoto, en la mayoría de los casos, alargados, digitiformes (fig. 115); especie mayor, 22-25 mm *migrans*
 Ojos algo menos anchos, en su aspecto dorsal, que la mitad de la distancia interocular dorsal; ángulos ánterolaterales del pronoto cortos, no digitiformes (fig. 42A); especie menor, 17-20 mm *bouvieri*
53. Segmentos del conexivo (figs. 156B, C; 158D, E) con mancha transversal posterior rojiza junto a la sutura intersegmental y, con relativa frecuencia, de color pálido al largo del borde externo; pronoto no granuloso, castaño-rojizo a negro, con bordes laterales y áreas humerales de color naranja-rojizo pálido, raramente totalmente negro; primer segmento antenal alcanzando el nivel o sobrepasando levemente el ápice del clípeo (fig. 158A) *rubida* (parte)
 Conexivo diferente; pronoto uniformemente negro o con manchas en el disco; primer segmento antenal en el mayor número de las especies sin alcanzar el nivel del ápice del clípeo, solo muy raramente alcanzando (*T. brasiliensis*), en cuyo caso las suturas intersegmentales del conexivo incluidas en las marcas transversales negras 54
54. Cabeza tan larga o más corta que el pronoto 55
 Cabeza más larga que el pronoto 60

55. Superficie del cuerpo, corio y patas con numerosas cerdas doradas, acostadas (figs. 61, 145); patas gruesas (figs. 61, 145); células de la membrana castaño claras, con numerosas manchas oscuras de forma irregular (figs. 61, 145) 56
 Superficie del cuerpo, corio y patas pareciendo glabra; patas delgadas; células de la membrana de color castaño claro uniforme 57
56. Pilosidad de las tibias posteriores (figs. 146D) en forma de cerdas más cortas que el diámetro del segmento, no perceptibles sin aumento; cuerpo fuertemente piloso; escudete en su base con 1+1 tubérculos salientes dirigidos hacia adelante y tocando el borde posterior del pronoto (fig. 145) *platensis*
 Pilosidad de las tibias posteriores (fig. 62C) en forma de pelos largos, muchos de ellos tan largos como el diámetro del segmento y fácilmente visibles sin aumento; cuerpo menos piloso; escudete sin los 1+1 tubérculos salientes mencionados *delpontei*
57. Lóbulo anterior del pronoto con tubérculos disciales y laterales (figs. 103A; 104, 149) 58
 Lóbulo anterior del pronoto sin tubérculos disciales y laterales 59
58. Cabeza en muchos casos dorsalmente con manchas anaranjadas de extensión variada; en muchos ejemplares, sendas manchitas claras sobre la propleura y la mesopleura (fig. 105E), o solo en la mesopleura; cabeza muy alta posteriormente, en su aspecto lateral (fig. 105B); ojos grandes (fig. 105A); primer segmento del rostro tan largo o ligeramente más largo que el tercero, este último con pelos muy largos (fig. 105B); segundo segmento del rostro, en su aspecto lateral, relativamente más grueso (fig. 105B); procesos laterales del endosoma con estrias longitudinales anchas más fuertemente esclerosadas, y sin dentículos en la región apical (fig. 105D) *maculata*
 Cabeza siempre totalmente negra dorsalmente; en muchos ejemplares manchita clara ausente o solo presente sobre la propleura; cabeza menos alta posteriormente, en el aspecto lateral (fig. 150B); ojos menores (fig. 150A); primer segmento del rostro ligeramente más corto que el tercero, este último con pelos más cortos (fig. 150B); segundo segmento del rostro más delgado en su aspecto lateral (fig. 150B); procesos laterales del endosoma sin carenas longitudinales anchas, pero con numerosos dentículos en la parte apical (fig. 150D) *pseudomaculata*
59. Pronoto de color oscuro, uniforme (fig. 37); corio y clavo casi totalmente castaño oscuros, excepto los dos tercios apicales del clavo y porción adyacente de la célula del corio, ambas de color castaño ahumado (fig. 37); procesos del endosoma muy esclerosados, de largo con más de la mitad del falosoma y con cerca de 100 dentículos en el ápice (fig. 38C, D) *arthurneivai*
 Pronoto oscuro, con 1+1 manchas rojizas nitidas en los húmeros (figs. 192, 193A) y, en algunos ejemplares, con extensa mancha rojiza entre las carenas posteriormente; corio (figs. 191, 192) con áreas rojizas extensas, confluyentes; procesos del endosoma poco esclerosados, de largo con no más de la mitad del falosoma y solo con 20 dentículos apicales (fig. 193D) *wygodzinskyi*
60. Elementos de dibujo oscuros del conexivo en forma de fajas transversales anchas, distintas 62
 Elementos de dibujo oscuros del conexivo muy reducidos, no en forma de fajas anchas transversales 61
61. Corio de los hemélitros (figs. 56, 57) negro, con manchas anaranjadas oscuras apicales, manchas semejantes también sobre el clavo; conexivo totalmente negro a lo largo de su porción interna, anaranjado en su mitad externa, interrumpido por fajas negras muy angostas sobre las suturas intersegmentales (figs. 56, 57, 58B, D) *costalimai*
 Corio de los hemélitros (fig. 189) totalmente amarillo excepto las nervaduras oscuras; base y borde externo del clavo oscuros; conexivo totalmente amarillo, excepto manchita negra sobre el borde externo, situada sobre o inmediatamente atrás de la sutura intersegmental (figs. 189, 190C) *williami*
62. Pronoto negro, con los bordes laterales y tres fajas longitudinales en el lóbulo posterior, rojizas (figs. 49, 65A; 184, 185B); suturas intersegmentales del conexivo incluídas en las áreas claras (figs. 49, 65A, B; 66C, D; 184, 185C) 63
 Pronoto con los elementos de dibujo claros diferentes, o totalmente negro; conexivo con suturas intersegmentales incluídas en las áreas negras (figs. 43, 44, 77, 78, 127, 128, 132, 133B, C; 137, 138, 163, 164) 65
63. Cuerpo con pilosidad dorada conspicua; membrana de los hemélitros con dibujo jaspeado (fig. 65); fémures oscuros, con nódulos ferrugíneos y más de cinco dentículos setíferos en su faz inferior; conexivo (figs. 65, 66C, D) negro, con dos manchas rojo-anaranjadas

- en cada segmento, una situada en la parte posterior del segmento, incluyendo la sutura intersegmental y ocupando el ancho total del segmento, la otra incompleta, situada en el centro del segmento junto al borde externo *dispar*
- Pilosidad del cuerpo inaparente; membrana de los hemélitos sin elementos de dibujo jaspeados; fémures sin nódulos y con no más de tres dentículos en la faz inferior; distribución cromática del conexivo diferente
64. Cabeza y patas de color castaño colorado; nervaduras de la membrana (fig. 184) de color claro y bordeadas de claro; ángulos ánterolaterales del pronoto subcilíndricos (fig. 185B); ápice del proceso posterior del escudete truncado redondeado; pleuras con extensas áreas claras *venosa*
- Cabeza y patas de color castaño oscuro o negro; nervaduras de la membrana menos salientes (fig. 49); ángulos ánterolaterales del pronoto (fig. 50D) achatados dorso-ventralmente; ápice del proceso posterior del escudete con aspecto de cuchara (fig. 50D); pleuras prácticamente de color oscuro uniforme
- *carrioni*
65. Hemélitos (figs. 77, 78, 127, 128) de color castaño claro uniforme excepto la base del clavo y las nervaduras que son oscuras; corio no más oscuro que la membrana 66
- Hemélitos parcialmente oscurecidos, por lo menos parte del corio más oscuro que la membrana 67
66. Pronoto (figs. 127, 128) negro, con 1+1 manchas amarillas sobre los húmeros; hemélitos abreviados (por lo menos en la hembra), con el séptimo urotergito completamente expuesto (figs. 127, 128); ojos relativamente pequeños, no alcanzando el nivel de la faz inferior de la cabeza, en vista lateral (fig. 119B); ancho del ojo, en el aspecto dorsal, igual a la mitad de la distancia interocular dorsal (fig. 129A); rostro con gran parte de las cerdas del tercer segmento mayores que el diámetro respectivo (fig. 129B); proceso apical del escudete muy corto, oblicuo (fig. 129C) *oliveirai*
- Pronoto (figs. 77, 78) totalmente negro; hemélitos no abreviados, cubriendo el séptimo y el octavo urotergitos (figs. 77, 78); ojos relativamente grandes, sobrepasando el nivel de la faz inferior de la cabeza, en el aspecto lateral (fig. 79B); en el aspecto dorsal, ancho de los ojos bien mayor que la mitad de la distancia interocular (fig. 79A); rostro con gran parte de las cerdas del tercer segmento más cortas que el diámetro del segmento (fig. 79B); proceso apical del escudete corto, horizontal *guazu*
67. Membrana uniformemente oscura, con las nervaduras prácticamente del mismo color (figs. 132, 163, 164) 68
- Membrana de color claro, con áreas más o menos extensas y nitidamente más oscuras; nervaduras conspicuamente oscuras (figs. 44, 137, 138) 69
68. Insecto con 21 mm o menos de largo; ápice de los fémures con anillo amarillo angosto (fig. 133E); manchas del conexivo de color amarillo; pronoto invariablemente negro (fig. 132) *patagonica*
- Insecto con 21 mm o más de largo; fémures totalmente negros; manchas del conexivo de color rojo o naranja o más raramente amarillo; pronoto en pocos casos completamente negro, en la mayoría de los ejemplares con elementos de dibujo rojos (figs. 165C, D, F-J) *rubrovaria*
69. Primer segmento antenal alcanzando el nivel del ápice del clípeo (fig. 45A); rostro con pelos largos abundantes (fig. 45B); pronoto y escudete totalmente negros (fig. 43B) *brasiliensis* (parte)
- Primer segmento antenal corto, considerablemente alejado del nivel del ápice del clípeo (figs. 137-139); rostro (fig. 139B) con pelos aislados cortos, prácticamente desnudo; pronoto con elementos de dibujo amarillos más o menos nítidos; ápice del proceso del escudete de color claro (fig. 138) .. *petrochii*

CLAVE PARA LAS ESPECIES DE *Triatoma* DE MEXICO

1. Angulos humerales del pronoto agudos (figs. 113; 114A, C) *mexicana*
Angulos humerales del pronoto redondeados .2
2. Especies mayores (más de 25 mm); abdomen muy ancho en la mayoría de las especies (figs. 140, 141) 3
Especies menores (menos de 25 mm); abdomen estrecho 11
3. Pilosidad abundante (figs. 102A, D; 109B; 141); primer segmento antenal alcanzando o sobrepasando el nivel del ápice del clípeo (figs. 102A, D; 109B, C; 130A; 142A, B); fosetas esponjosas tibiales ausentes en ambos sexos 4
Cabeza y tórax glabros dorsalmente; primer segmento de las antenas pocas veces alcanzando

- pero no sobrepasando el nivel del ápice del clípeo (figs. 64B-G; 73A; 81A; 155A); fosetas esponjosas presentes sobre las tibias anteriores y medianas, pero solamente en el macho 8
4. Corio de los hemélitros en su mayor parte de color blanco-amarillento (fig. 130), con estrecha faja color naranja en su base y negro en el ápice *pallidipennis*
 Corio sin el área extensa blanca, de color preponderantemente negra con marcas rojo-amarillentas o rojo-anaranjadas limitadas a su base y sub-apicalmente (figs. 101, 108, 140, 143) 5
5. Corio con pelos suberectos, delicados, largos, con cerca de 0,5 mm de largo (fig. 16B). 6
 Corio con cerdas cortas, achataadas o acostadas, con no más que 0,3 mm de largo (fig. 16A) 7
6. Hemélitros cortos, no sobrepasando el límite del sexto urotergito (figs. 140, 141); conexivo dorsalmente con manchas rojo-anaranjadas ocupando parte del sexto hasta el tercio posterior de cada segmento (figs. 140, 141) *phyllosoma*
 Hemélitros alargados, alcanzando o casi alcanzando el ápice del abdómen (fig. 108); conexivo dorsalmente con manchas rojo-anaranjadas ocupando totalmente desde el tercio hasta la mitad posterior de cada segmento (fig. 108) *mazzottii*
7. Genas alcanzando o sobrepasando el nivel del ápice del clípeo (fig. 144A); lóbulo posterior del pronoto con extensas áreas de color amarillo-anaranjado (fig. 143); en la mayoría de los especímenes, los segmentos del conexivo dorsal de color extensamente amarillo-anaranjado y con mancha negra ántero-lateral (fig. 144G); raramente segmentos del conexivo dorsal negros y con mancha amarillo-anaranjada póstero-lateral (fig. 144D-F); mesosterno, metasterno y vientre del abdómen siempre con pelos suberectos largos *picturata*
 Genas con frecuencia sin alcanzar el nivel del ápice del clípeo (fig. 102A, B); pronoto con lóbulo posterior totalmente negro (fig. 101) o con 1+1 pequeñas manchas claras sobre los ángulos humerales (fig. 102D); segmentos del conexivo dorsal (figs. 101, 102B, C, E) negros con mancha amarilla o amarillo-anaranjada en el tercio o en la mitad posterior, que se extiende o no hasta la sutura conexival; mesosterno con pelos suberectos largos; metasterno y vientre con pelos semejantes o con pelos cortos y acostados *longipennis*
8. Corio totalmente piceo (fig. 154); conexivo dorsalmente con mancha longitudinal continua de color rojo-anaranjado a lo largo del borde externo; mancha correspondiente a la faz ventral más ancha (fig. 154) *recurva*
 Corio con manchas claras (figs. 63, 72B; 80); aspecto dorsal del conexivo de color diferente (figs. 63, 72B, 80) 9
9. Conexivo dorsal y ventralmente de color oscuro uniforme, sin manchas o con mancha clara minúscula en el ángulo póstero-externo al nivel de la sutura intersegmental (fig. 80); corio con mancha amarilla basal y otra subapical transversal (fig. 80) *hegneri*
 Conexivo con manchas claras más nítidas (figs. 63, 72B); corio de color diferente 10
10. Segmentos del conexivo (fig. 63) dorsal y ventralmente con mancha transversal amarilla o amarillo-anaranjada en el tercio o cuarto posterior junto a la sutura intersegmental (fig. 72B); clavo negro en su base, castaño ahumado en el ápice, corio negro con pequeña mancha amarilla basal y otra subapical *gerstaeckeri* (parte)
 Segmentos del conexivo dorsal y ventralmente con mancha amarilla o amarillo-anaranjada ocupando más del tercio posterior de cada segmento (fig. 63); clavo negro en su base, amarillo en la parte apical; corio principalmente amarillo o amarillo-anaranjado, con mancha apical y central oscuras, la última de tamaño variable (fig. 63) o en algunos casos, ausente *dimidiata*
11. Integumento del cuerpo bastante piloso, con pelos negros fuertes decumbentes y bien visibles sobre cabeza, pronoto y corio (fig. 93D); cabeza fuertemente convexa dorsalmente (fig. 93B); tubérculos anteniferos alargados, relativamente próximos a los ojos (fig. 93B) *lecticularia*
 Cuerpo prácticamente glabro, o, en algunos casos, con pelos cortos, poco numerosos; cabeza no fuertemente convexa en el dorso; tubérculos anteniferos cortos, alejados de los ojos (figs. 72B; 124C; 148E) 12
12. Primer segmento de las antenas largo, alcanzando o ligeramente sobrepasando el nivel del ápice del clípeo (fig. 158A, B); pronoto castaño-rojizo o negro, con los bordes laterales y áreas humerales pálidos (fig. 156B, C), muy raramente completamente oscuro *rubida*
 Primer segmento de las antenas corto, no al-

- canzando el nivel del ápice del clípeo (figs. 40A; 73A); pronoto diferente, en la mayoría de los casos unicolor 13
13. Pronoto con manchas claras sobre el lóbulo anterior y ángulos humerales (fig. 122); corio con manchas claras y oscuras (fig. 122A); faz inferior del abdomen achatada longitudinalmente en el medio; fosetas esponjosas en las tibias anteriores y medianas del macho, en la hembra solamente en el primer par *nitida*
 Pronoto y corio de color uniforme; faz inferior del abdomen convexa o muy poco achatada; fosetas esponjosas en las tibias anteriores y medianas del macho, ausentes en la hembra 14
14. Lóbulo anterior del pronoto con tubérculos discales (figs. 73A; 85A); ángulos ántero-laterales del pronoto salientes (figs. 73A; 85A); escutelo con proceso apical alargado (figs. 72B; 84); conexo con manchas rojizas angostas a lo largo de las suturas intersegmentales 15
 Lóbulo anterior del pronoto sin tubérculos discales; ángulos ántero-laterales del pronoto no salientes; proceso apical del escutelo corto; conexo diferente 16
15. Especie con 23 mm o más; porción pos-ocular de la cabeza con lados subparalelos (figs. 72B; 73A); pronoto con tubérculos discales y laterales (fig. 73A); fémures anteriores relativamente delgados, tan largos como 8 a 9 veces su ancho; base de los hemélitros de color bien claro (fig. 72B)
 *gerstaeckeri* (parte)
 Especie con 22 mm o menos; porción pos-ocular de la cabeza distintamente redondeada lateralmente (figs. 84, 85A); pronoto sin tubérculos discales (fig. 85A); fémures anteriores relativamente gruesos, de largo igual a aproximadamente seis veces su ancho; base de los hemélitros ligeramente de color claro (fig. 84) *indictiva*
16. Conexo dorsalmente con manchas rojo-anaranjadas o amarillentas irregulares situadas en la parte posterior de cada segmento (fig. 40E, F), a veces ocupando todo el borde externo del conexivo sin interrupción (fig. 82), y otras veces (figs. 38, 40D) con un punto oscuro en los ángulos ántero-externos de los segmentos; foseta esponjosa tibial solamente en las patas anteriores, en ambos sexos 17
 Conexo de color oscuro uniforme (figs. 134, 147B; 170); foseta esponjosa ausente en ambos sexos 18
17. Clípeo con su base fuertemente inchado (fig. 83), superficie dorsal muy convexa en el aspecto lateral; superficie inferior de la cabeza sinuosa, en la vista lateral; faz ventral del abdomen arqueada (fig. 83)
 *incrassata*
 Clípeo menos inchado y menos saliente (fig. 40B, C), su superficie dorsal solo muy ligeramente convexa, en su aspecto lateral; superficie inferior de la cabeza casi recta, en la vista lateral (fig. 40B, C); faz ventral del abdomen achatada ligeramente en la linea mediana *barberi*
18. Cabeza con delicada depresión encorvada atrás del clípeo (fig. 148A-E); cabeza larga en la vista lateral; ojos casi alcanzando el nivel inferior de la cabeza (fig. 148E); largo total 13-23 mm *protracta*
 Cabeza sin depresión encorvada atrás del clípeo y relativamente mucho más corta en el aspecto lateral (fig. 171B); ojos alejados del nivel de la faz inferior de la cabeza; largo total 9,5 - 13 mm 19
19. Color general del cuerpo negro (fig. 134)
 *peninsularis*
 Color general del cuerpo castaño, pulido (fig. 170) *sinaloensis*

CLAVE PARA LAS ESPECIES DE *Triatoma* DE LA AMÉRICA CENTRAL Y ANTILLAS

1. Primer segmento antenal sobrepasando nitidamente el nivel del ápice del clípeo (figs. 161, 162B); pronoto (figs. 159, 161) fuertemente granuloso, píceo o negro, bordeado en las márgenes laterales por una línea rojiza *rubrofasciata*
 Primer segmento antenal no alcanzando o apenas alcanzando el nivel del ápice del clípeo; pronoto de coloración diferente 2
2. Base del disco del escudete con un par de tubérculos salientes, dirigidos anteriormente y alcanzando el borde posterior del pronoto (fig. 170) 3
 Escudete sin los tubérculos basales mencionados 4
3. Color general castaño claro (fig. 70A); tubérculos discales y laterales del lóbulo anterior salientes, subcónicos (fig. 70A); fémures anteriores y medianos con dentículos *flavida*
 Color general píceo (fig. 125); tubérculos discales y laterales del lóbulo anterior del pronoto muy reducidos, en forma de verruga; fémures anteriores y medianos sin dentículos *obscura*

4. Abdómen aplanado longitudinalmente en la faz ventral; lóbulo anterior del pronoto sin tubérculos discales (fig. 122) 5
 Abdómen convexo ventralmente; lóbulo anterior del pronoto con tubérculos discales 6
5. Genae sobre pasando el ápice del clípeo (fig. 167A, B); pronoto (fig. 166) de color uniforme, con los bordes estrangulados al nivel del surco transversal interlobular *ryckmani*
 Genae no sobre pasando el ápice del clípeo (fig. 124A, B); pronoto (fig. 122) castaño oscuro con elementos de diseño de color claro, sus lados no estrangulados *nitida*
6. Lóbulo anterior del pronoto con tubérculos laterales (fig. 64A, D); escudete con proceso posterior largo (fig. 63); segmentos conexivales oscuros en su tercio anterior (fig. 63)
 *dimidiata*
 Lóbulo anterior del pronoto sin tubérculos laterales (figs. 66B; 84); escudete con proceso posterior corto; segmentos conexivales con el área oscura mayor que la clara, en casi todos los ejemplares (figs. 65, 66C; 184, 185C) 7
7. Membrana de los hemélitros con elementos de dibujo matizados (fig. 65); fémures oscuros, con nódulos ferrugineos y más de cinco dentículos setíferos en la faz inferior; segmentos del conexivo con mancha negra de forma irregular ocupando casi toda la superficie de cada segmento (figs. 65, 66C); cuerpo con pilosidad dorada conspicua *dispar*
 Hemélitros sin elementos de dibujo matizados (fig. 184); fémures de color ferrugineo uniforme, sin nódulos, y con no más de tres dentículos setíferos; conexivo con mancha oscura transversal ocupando las tres cuartas partes de cada segmento (fig. 184); pilosidad del cuerpo poco aparente *venosa*

CLAVE PARA LAS ESPECIES DE *Triatoma* DE VENEZUELA, COLOMBIA, TRINIDAD, Y LAS GUAYANAS

1. Primer segmento de las antenas sobre pasando el nivel del ápice del clípeo (figs. 161, 162B); cabeza y pronoto fuertemente granulosos (figs. 161, 162B); pronoto píceo o negro, bordeado lateralmente con rojo (figs. 159, 161) *rubrofasciata*
 Primer segmento de las antenas no sobre pasando el nivel del ápice del clípeo; cabeza y pronoto no fuertemente granulosos; distribución cromática del pronoto diferente 2

2. Pronoto totalmente negro (fig. 63); segmentos del conexivo amarillos, con el tercio anterior negro (fig. 63) *dimidiata*
 Pronoto oscuro con elementos de dibujo claros (figs. 104, 119, 120, 184); conexivo diferente 3
3. Áreas oscuras del conexivo situadas sobre las suturas intersegmentales (figs. 103, 104); nervaduras de la membrana de los hemélitros oscuras sobre una base clara (figs. 103, 104)
 *maculata*
 Áreas oscuras de los segmentos del conexivo situados en el centro de cada segmento, no alcanzando las suturas intersegmentales (figs. 119, 120, 184, 185C); nervaduras de la membrana claras sobre una base oscura (figs. 119, 120, 184) 4
4. Ángulos ántero-laterales del pronoto alargados (fig. 119, 120); patas negras, con el ápice de los fémures y la base de las tibias con estrecho anillo amarillo (figs. 119, 120); segmentos del conexivo con mancha central oscura en forma de bigornia (figs. 119, 120)
 *nigromaculata*
 Ángulos ántero-laterales del pronoto no salientes (fig. 184); patas de color ferruginoso uniforme; segmentos conexivales con manchas oscuras transversales distantes de las suturas intersegmentales, ocupando tres cuartos de la superficie de cada segmento (figs. 184, 185C) *venosa*

CLAVE PARA LAS ESPECIES DE *Triatoma* DEL PERU Y ECUADOR

1. Pronoto píceo o negro uniforme (figs. 63, 87)
 2
 Pronoto oscuro, con manchas claras (figs. 49, 65A) 3
2. Patas uniformemente oscuras; manchas oscuras del conexivo situadas sobre el tercio anterior de cada segmento, alcanzando, pero no incluyendo, las respectivas suturas intersegmentales; corio de los hemélitros extensamente amarillo (fig. 63) *dimidiata*
 Patas oscuras, con los trocanteres, la parte adyacente de la base de los fémures y un débil anillo basal de las tibias, amarillos (figs. 88, 90B); manchas oscuras del conexivo incluyendo las suturas intersegmentales (fig. 87); corio negro en su mayor parte (fig. 87) *infestans*
3. Integumento del cuerpo con conspicua pilosidad dorada; membrana de los hemélitros con elementos de dibujo (fig. 65) matizados o jas-

peados; fémures oscuros, con nódulos ferruginosos y más de cinco dentículos setíferos en su faz inferior; conexivo negro, con dos manchas de color naranja en cada segmento, una de ellas situada en la parte posterior del segmento, incluyendo la sutura intersegmental y ocupando todo el ancho del segmento, la otra, incompleta, situada en el centro del segmento adyacente al márgen (figs. 55, 56C); raramente, manchas claras fusionadas (fig. 56D) *dispar*
 Pilosidad del cuerpo inconspicua, sin pelos dorados; membrana de los hemélitros sin elementos de dibujo jaspeados (fig. 49); fémures sin nódulos y con no más de tres dentículos en su faz inferior; dibujo del conexivo diferente (fig. 49) *carrioni*

CLAVE PARA LAS ESPECIES DE *Triatoma* DE LA ARGENTINA, URUGUAY, PARAGUAY, BOLIVIA, Y CHILE

1. Adultos micrópteros (figs. 177B, C; 179B); segundo segmento antenal con muchos pelos nitidamente más largos que el diámetro del segmento (fig. 6E); color general castaño oscuro o negro, con el conexivo y regiones adyacentes de los urómeros rojos, el área roja continua o interrumpida por manchas negras entre las suturas intersegmentales (figs. 179B; 180F) *spinolai* (parte)
 Adultos macrópteros, raramente braquípteros; diferente combinación de caracteres 2
2. Primer segmento antenal distintamente sobrepasando el nivel del ápice del clípeo (figs. 161; 162B); pronoto píceo o negro, bordeado de rojo (fig. 161) *rubrofasciata*
 Primer segmento antenal escasamente alcanzando el nivel del ápice del clípeo, o aún más corto; distribución cromática del pronoto diferente 3
3. Tercer segmento del rostro largo, aproximadamente con la misma longitud del segundo (figs. 55C; 100B) 4
 Tercer segmento del rostro invariablemente más corto que el segundo (figs. 69B; 90C) 5
4. Áreas claras del conexivo rojas; ojos relativamente menores y cabeza menos alta posteriormente, en el aspecto lateral (fig. 55C) *circummaculata*
 Áreas claras del conexivo amarillas; ojos relativamente mayores y cabeza más alta posteriormente, en el aspecto lateral (fig. 100B) *limai*
5. Fémures claros (figs. 75, 76C; 175, 176C); co-
- nexivo con manchas oscuras transversales muy angostas, estranguladas en su centro, parecidas a notas musicales (figs. 74, 75, 174, 175) 6
 Fémures con áreas claras reducidas, o totalmente oscuros; manchas oscuras del conexivo diferentes 7
6. Lóbulo posterior del pronoto y el escudete con su proceso posterior totalmente oscuros (figs. 74, 75); coxas oscuras (fig. 76C); rostro con el segundo segmento más corto que el doble del largo del primero *guasayana*
 Lóbulo posterior del pronoto con 1+1 manchas claras en los ángulos humerales (figs. 174, 175); ápice del proceso del escudete (fig. 175) y las coxas (fig. 176C), de color claro; rostro con el segundo segmento más del doble del largo del primero (fig. 176B) *sordida*
7. Patas negras, excepto los trocánteres y la región adyacente basal de los fémures, que son amarillos (fig. 90B) *infestans*
 Patas totalmente oscuras 8
8. Membrana de los hemélitros (figs. 61, 145) castaño clara, con manchas centrales oscuras, conspícuas, de forma irregular; cuerpo, corio de los hemélitros y patas con numerosas cerdas doradas, acostadas; patas gruesas (figs. 61, 145) 9
 Membrana de los hemélitros de color castaño ahumado, con las nervaduras más oscuras; superficie dorsal del cuerpo y del corio desnuda; patas delicadas (figs. 132, 163, 164) 10
9. Pelos de las tibias posteriores (fig. 146D) en forma de cerdas, más cortos que el diámetro del segmento, no perceptibles sin aumento óptico; cuerpo extremadamente piloso (fig. 145); base del escudete con un par de tubérculos salientes dirigidos hacia adelante tocando el borde posterior del pronoto (fig. 145) *platensis*
 Pelos de las tibias posteriores (fig. 62C) delicados, más largos, muchos tan largos como el diámetro del segmento, fácilmente visibles sin aumento; cuerpo menos piloso (fig. 61); escudete sin los tubérculos basales mencionados (fig. 61) *delpontei*
10. Segundo segmento antenal con pelos cortos y también con numerosos pelos que son más largos que el diámetro del segmento (figs. 6G; 47, 68, 179A) 11
 Segundo segmento de las antenas solo con pelos cortos (figs. 78, 164) 13
11. Angulos humerales aguzados o puntiagudos

- (figs. 67, 68, 69A, C, E-L) *eratyrusiformis*
 Angulos humerales redondeados (figs. 46, 47, 177A, 179A) 12
 12. Lóbulo anterior del pronoto sin tubérculos discales (fig. 179); escudete con proceso apical muy corto (fig. 179); color general negro, con manchas rojas en el conexivo *spinolai* (parte)
 Lóbulo anterior del pronoto con tubérculos discales (figs. 46, 47); escudete con proceso apical largo (fig. 47); color general negro, con manchas amarillas en el conexivo *breyeri*
 13. Hemélitos totalmente de color castaño amarillento claro excepto la base del clavo y las nervaduras, que son oscuras (figs. 77, 78); corio no más oscuro que la membrana (figs. 177, 178) *guazu*
 Hemélitos con, por lo menos, parte del cório más oscuro que la membrana, esta última con las nervaduras no destacadamente más oscuras que el resto de su superficie (figs. 132, 163, 164) 14
 14. Tamaño 21 mm o menos; pronoto negro uniforme (fig. 132); fémures con anillo estrecho apical amarillo (fig. 133E); manchas del conexivo amarillas *patagonica*
 Tamaño 21 mm o más; pronoto raras veces de color negro uniforme (fig. 165A), en la mayoría de los casos con áreas rojas (figs. 163, 164, 165C, D, F-J); fémures totalmente negros; manchas del conexivo de color rojo a naranja, más raramente amarillo *rubrovaria*

CLAVE PARA LAS ESPECIES DE *Eratyrus*

1. Lóbulo anterior del pronoto con 1+1 espinas discales fuertes (figs. 197, 198A, E, G); ángulos humerales del pronoto nitidamente espinosos (figs. 196, 197, 198A, H-N); corio con mancha subapical rojiza comparativamente pequeña; anteriormente no llegando hasta el nivel de la nervadura transversa m-cu (figs. 196, 197, 198B-D); parte libre de la vesica convexa en el ápice, en la vista lateral (fig. 195H) *mucronatus*
 Lóbulo anterior del pronoto con 1+1 tubérculos discales cortos y redondeados en el ápice (fig. 195A, B); ángulos humerales del pronoto ligeramente aguzados o puntiagudos, pero nunca con espinas (fig. 195A, B); corio con mancha subapical rojiza comparativamente grande, alcanzando o sobrepasando

anteriormente el nivel de la nervadura transversa m-cu (figs. 194, 195F); parte libre de la vesica achatada o ligeramente cóncava en el ápice, en la vista lateral (fig. 195G) *cuspidatus*

CLAVE PARA LAS ESPECIES DE *Panstrongylus*

1. Proceso posterior del escudete alargado, subcilíndrico, estrechado apicalmente (figs. 215C; 217, 220, 223, 228, 238, 246, 247) 2
 Proceso posterior del escudete corto, redondeado, cónico o truncado apicalmente (figs. 226C; 231B; 235, 236D; 242D; 244) 9
 2. Especímenes casi totalmente negros (figs. 213, 214); lóbulo posterior del pronoto con manchas rojizas, en algunos casos apenas perceptibles, sobre los ángulos humerales y en la región submediana del borde posterior (fig. 215B); segmentos del conexivo dorsalmente con pequeña mancha roja en los ángulos póstero-laterales (figs. 213, 214, 215D) *chinai*
 Especímenes de coloración diferente 3
 3. Abdomen ventralmente de color claro, con series longitudinales de manchas negras (figs. 219, 221E) 4
 Abdomen de coloración diferente, sin series de manchas negras 5
 4. Más de 20 mm de largo; cabeza comparativamente más corta y fuerte en el aspecto lateral (fig. 221B); pronoto con manchas negras conspicuas (figs. 219A; 220); todos los segmentos del conexivo con manchas negras y claras (figs. 219, 220, 221E) *geniculatus*
 Menos de 20 mm de largo; cabeza más estrecha en el aspecto lateral (fig. 233C); pronoto sin manchas negras distintas (fig. 232); segmentos dorsales del conexivo de color claro, solamente el disco del tercer y cuarto segmentos con sendas manchitas negras *lenti*

5. Segundo segmento del rostro tan largo o más corto que el primero (fig. 248D, E) *tupynambai*
 Segundo segmento del rostro más largo que el primero (figs. 218C; 224B; 229B; 239B) 6
 6. Corio amarillo excepto su base y subápice (figs. 227, 228), contrastando fuertemente con la membrana, de color gris oscuro; abdomen ventral negro con el conexivo y las regiones laterales de los urosternitos contrastando debido a su color amarillo (fig. 229C); distancia interocular dorsal menor que el doble del

- ancho de un ojo, en el aspecto dorsal (fig. 229A); fémures con ligeras protuberancias subapicales, pero sin dentículos... *howardi*
- Corio tan oscuro como la membrana, con su base y ápice de color claro (figs. 217, 222, 223, 237, 238); abdomen ventral de color castaño-rojizo uniforme; distancia interocular dorsal con el doble del ancho, o más del doble, de un ojo en aspecto dorsal (figs. 218A; 224A; 238, 239A); fémures anteriores y medianos con dentículos conspicuos (figs. 218B; 224C, D; 238C) 7
7. Lóbulo anterior del pronoto con tubérculos discales bien desarrollados (figs. 238, 239)...
..... *lutzi*
- Lóbulo anterior del pronoto solo con tubérculos discales obsoletos o sin ellos (figs. 217, 218D; 223, 224E) 8
8. Angulos ántero-laterales del pronoto muy cortos, romos (fig. 218D); faz superior de la cabeza recta, en su aspecto lateral (fig. 218C); bordes laterales de los lóbulos anterior y posterior del pronoto en línea prácticamente continua (figs. 216, 217, 218D); fémures anteriores y medianos con dos o tres dentículos (fig. 218B) *diasi*
- Angulos ántero-laterales del pronoto alargados, salientes (figs. 222, 223, 224B, E); cabeza con su faz superior convexa, en el aspecto lateral (fig. 224B); fémures anteriores y medianos (fig. 224C, D) con más de tres dentículos cada uno; bordes laterales de los lóbulos anterior y posterior del pronoto formando ángulo nítido (figs. 222, 223, 224E) *guentheri*
9. Jugae romas (fig. 245B); tubérculos del lóbulo anterior del pronoto rojizos; conexivo con mancha aislada oscura en el centro de cada segmento y con angosta faja transversal negra a lo largo del borde anterior del segmento (figs. 243, 244, 245J, K); integumento dorsal del cuerpo con numerosas cerdas doradas acostadas; color general de los hemélitros verde pálido
..... *rufotuberculatus*
- Jugae curvadas en gancho (figs. 226D; 231C; 236E; 242B, C); tubérculos del lóbulo anterior del pronoto no rojizos, o muy raramente con ese color; conexivo con grande mancha oscura sobre la parte anterior de cada segmento, la parte posterior clara (figs. 225, 230, 234, 235, 240, 241); integumento del cuerpo prácticamente desnudo; color general de los hemélitros no verdoso 10
10. Insecto negro con manchas rojizas; tercer seg-
- mento antenal nitidamente menor que el segundo (fig. 242A); lóbulo posterior del pronoto con 2+2 manchas rojas grandes (figs. 240, 241) *megistus*
- Insectos amarilleados o castaño-amarilleados con manchas amarillas complejas (figs. 225, 230, 234, 235); tercer segmento antenal tan largo como el segundo; lóbulo posterior del pronoto de color claro, con una faja negra mediana y 2+2 manchas sublaterales, longitudinales y angostas también negras (figs. 226B; 230, 234, 235) 11
11. Escudete amarilleado, con faja mediana longitudinal negra (fig. 230); proceso posterior del escudete con fuerte giba en su base (fig. 231B); lóbulo anterior del pronoto sin tubérculos sublaterales (fig. 231D)
..... *humeralis*
- Escudete negro, con faja mediana longitudinal amarilla (figs. 226C; 234, 235); proceso posterior del escudete con ligera giba en su base (fig. 236D); lóbulo anterior del pronoto con tubérculos sublaterales, además de los tubérculos discales y laterales (figs. 226B; 236C) 12
12. Tibias negras con manchita amarilla subbasal (figs. 234, 235, 236B); cabeza relativamente corta, la relación largo de la cabeza: largo del pronoto = 1:1,3-1,4 *lignarius*
- Tibias totalmente negras (fig. 225); cabeza relativamente larga, la relación largo de la cabeza : largo del pronoto = 1:1,1 *herreri*

CLAVE PARA LAS ESPECIES DE *Rhodnius*

1. Cabeza y patas con dibujo compuesto de manchitas y puntos no regulares, el insecto conspicuamente jaspeado (figs. 257, 268, 269, 273, 274) 2
2. Cabeza y patas de color más uniforme, los elementos de dibujo sin manchitas, de esta manera los insectos no presentan aspecto jaspeado (figs. 251, 254, 259, 262, 263, 265, 266, 271, 276, 277, 279, 280) 4
2. Todas las tibias con anillo submediano oscuro (figs. 273, 274); ojos más anchos que la distancia interocular dorsal (fig. 275A); mancha rectangular oscura de los segmentos conexivales con conspicua saliente puntiaguda posterior, por lo menos en los segmentos III a V (figs. 273, 274); proceso mediano del pigóforo bifido (fig. 275D) *pictipes*
- Tibias sin el anillo submediano mencionado (figs. 257, 268); ojos no más anchos que la distancia interocular dorsal (figs. 258A;

- 269); manchas oscuras rectangulares del conexivo sin saliente puntiaguda posterior (figs. 257, 268, 269); proceso del pigóforo no bifido (figs. 258C; 270C) 3
3. Especie grande, de alrededor de 22 mm; cabeza relativamente muy alargada, nitidamente más larga que el pronoto (1:0,80-0,85), es decir, tan larga como el pronoto más el escudete sin su proceso apical (figs. 268, 270); región anteocular más de tres veces tan larga como la postocular, en el aspecto dorsal (figs. 269, 270A); manchas rectangulares de los segmentos dorsales del conexivo nítidas (figs. 268, 269) *pallescens*
- Especie menor, de alrededor de 14 mm; cabeza relativamente más corta, solo muy ligeramente más corta que el pronoto (1:0,90-0,95) (figs. 257, 258A); región anteocular menos de tres veces tan larga como la región postocular; en el aspecto dorsal (fig. 258A); manchas oscuras de los segmentos dorsales del conexivo de contornos poco nítidos (fig. 257) *ecuadoriensis*
4. Patas con anillos (figs. 271, 272F); fémures anteriores con menos de cuatro veces de largo en relación a su anchura (fig. 272B); proceso del pigóforo bifido (fig. 272D, E) *paraensis*
- Patas sin anillos; fémures anteriores con más de cuatro veces de largo en relación a su anchura; proceso del pigóforo no bifido 5
5. Pronoto castaño oscuro o negro uniforme, incluso las carinas (figs. 265, 266); manchas del conexivo rojizas, minúsculas, situadas en los ángulos póstero-laterales de los segmentos conexivales III-VI o VII (figs. 265, 266) *neivai*
- Pronoto castaño amarillento, con regiones castaño oscuras o negruzcas (figs. 251, 252, 254, 255, 259, 260, 262, 263, 279, 280); segmentos del conexivo dorsalmente con manchas rectangulares oscuras (figs. 251, 252, 254, 255, 259, 260, 262, 263, 276, 277, 279, 280) 6
6. Cabeza relativamente corta, tan larga o solo ligeramente más larga que el pronoto (1:0,95-1,0) (figs. 254, 255); proceso del pigóforo rectangular (fig. 256C) *domesticus*
- Cabeza relativamente larga, nitidamente más larga que el pronoto (1:0,65-0,80); proceso del pigóforo alargado, puntiagudo o romo (figs. 253D; 261D; 264D, 278D; 281F) .. 7
7. Lóbulo posterior del pronoto uniformemente negro entre las carenas submedianas y entre estas carenas y los bordes laterales (figs. 251, 252); tercer segmento de las antenas más largo que el segundo (figs. 252, 253C); ojos en todos los casos nitidamente más anchos en el aspecto dorsal que la distancia interocular dorsal (figs. 251, 252, 253A) *brethesi*
- Lóbulo posterior del pronoto con el área situada entre las carenas submedianas ocupada por dos bandas oscuras separadas por línea mediana longitudinal clara (figs. 259, 260, 262, 263, 264A; 276, 277); segundo segmento de las antenas más largo que el tercero; ojos en la mayoría de las especies tan anchos o menos anchos que la distancia interocular dorsal 8
8. Ángulos ántero-laterales del pronoto salientes, dirigidos hacia adelante (figs. 261A, C; 264A, C); bandas oscuras del lóbulo posterior del pronoto confluyentes, especialmente aquellas situadas entre las carenas submedianas y los bordes laterales (figs. 260, 262, 263, 264A) 9
- Ángulos ántero-laterales del pronoto redondeados, no muy salientes (figs. 278C; 281B); bandas oscuras del lóbulo posterior del pronoto completamente separadas (fig. 277, 279, 280) 10
9. Color general castaño oscuro; trocánteres muy claros, contrastando fuertemente con los fémures oscuros; segmentos dorsales del conexivo con manchas oscuras bien delimitadas, presentes también en la superficie inferior (figs. 262, 263); porción basal del abdomen ventral a lo largo del centro con mancha clara alargada y continuada al esternón; proceso mediano del pigóforo con base angosta (fig. 264D); tercer segmento antenal con la región basal oscura, la apical clara (fig. 263) *neglectus*
- Color general castaño rojizo; color de los trocánteres no contrastando conspicuamente con el de los fémures; segmentos del conexivo, especialmente en su faz inferior, con manchas oscuras desmayadas (figs. 259, 260); abdomen sin el área clara mencionada; proceso del pigóforo más ancho en su base (fig. 261D); tercer segmento antenal con la porción basal clara y la apical oscura (figs. 260, 261A) *nasutus*
10. Especie menor, largo de los machos 17,5-20 mm, de las hembras 19,5-21,5 mm; región anteocular cerca de tres veces más larga que la postocular (fig. 278A); en la mayoría de los ejemplares, distancia interocular dorsal

mayor que el ancho de un ojo, en el aspecto dorsal; soporte del falosoma como en la fig. 278E; (ninfas del cuarto y quinto estadios con las tibias de color oscuro uniforme) ...
..... *prolixus*
Especie mayor, largo de los machos 20-23,5 mm, de las hembras 23-26 mm; región antecular alrededor de cuatro veces el largo de la postocular (fig. 280); distancia interocular dorsal menor o igual que el ancho del ojo, en el aspecto dorsal; soporte del falosoma como en la fig. 281E; (ninfas del cuarto y quinto estadios con las tibias conspicuamente más claras que los fémures, solamente sus ápices oscuros) *robustus*

No fué posible incluir *Rhodnius dales-sandroi* Carcavallo & Barreto en esta clave.

CLAVE PARA LAS ESPECIES DE *Psammolestes*

1. Cabeza y tórax altamente pulidos; cabeza no estrangulada antes del cuello, en el aspecto dorsal y lateral (fig. 284B); cabeza dorsalmente con ancha faja amarilla longitudinal ocupando todo el espacio interocular (figs. 282, 283); pelos largos en el ápice del segundo y en todo el tercero segmento rostral (fig. 284B); ángulos ántero-laterales del pronoto dirigidos hacia adelante y alcanzando el nivel de los ocelos (figs. 282, 283, 284A); genitalia del macho con el soporte del falosoma grande y constituido de dos estructuras fusionadas (fig. 284C)
..... *arthuri*

Cabeza y tórax hoscos; cabeza estrangulada antes del cuello, en el aspecto lateral (figs. 287B, 290C); cabeza dorsalmente de color castaño amarillento claro, con manchitas oscuras, o oscura con una angosta línea dorsal longitudinal amarilla; pelos largos en todo el segundo y todo el tercero segmento rostral (fig. 290C); ángulos ántero-laterales del pronoto más cortos, no alcanzando el nivel de los ocelos (figs. 287A, 290D); genitalia del macho con el soporte del falosoma menor, constituido de dos estructuras separadas (figs. 23A; 290F)
..... *2*

2. Cabeza tan larga o ligeramente más corta que el ancho a través de los ojos (figs. 285, 286, 287A); cabeza fuertemente inclinada atrás de los ocelos (fig. 287B); región antecular no más de dos veces el largo de la postocular (fig. 287A); ángulos ántero-laterales del pronoto acuminados (figs. 286, 287A); genitalia del macho con el soporte del falosoma muy pequeño, en forma de dos ganchos; es-

clerosación dorsal del falosoma semielíptica (fig. 23A) *coreodes*
Cabeza ligeramente más larga que el ancho a través de los ojos (fig. 290D); cabeza moderadamente inclinada atrás de los ocelos (fig. 290C); región antecular desde dos hasta dos veces y medio el largo de la postocular (fig. 290D); ángulos ántero-laterales del pronoto muy cortos, romos (fig. 290D); genitalia del macho con el soporte del falosoma en forma de dos SS anchos; esclerosación dorsal del falosoma muy redondeado apicalmente (fig. 290E) ..
..... *tertius*

CLAVE PARA LAS ESPECIES DE *Belminius*

1. Pronoto y patas de color negro uniforme
2
Pronoto y patas negros con nítidos elementos de dibujo amarillos (figs. 301, 302B, E) *herreri*
2. Primer segmento del rostro alcanzando el nivel del centro del ojo (fig. 300A); proceso posterior del escudete algo achatado dorso-ventralmente, y surcado longitudinalmente en el dorso (figs. 299, 300D) *costaricensis*
Primer segmento del rostro no alcanzando el nivel del centro del ojo (figs. 305B, 308B, C); proceso posterior del escudete surcado o no dorsalmente en la línea mediana
3
3. Primer segmento del rostro más largo que el segundo, casi alcanzando el nivel del borde anterior del ojo (fig. 308B, C); región postocular de la cabeza con los lados nitidamente convexos, convergindo posteriormente, en el aspecto dorsal (figs. 306, 307, 308A, D); proceso del escudete amarilleado o de color naranja, subcilíndrico y surcado dorsalmente en la línea mediana (fig. 307)
..... *rugulosus*
Primer segmento del rostro no más largo que el segundo, no sobrepasando el nivel del tercio posterior de la región antecular (fig. 305B); región postocular de la cabeza con lados casi rectos, subparalelos, en el aspecto dorsal (figs. 304, 305D); proceso del escudete negro, subcónico y sin surco dorsal (figs. 304, 305E) *peruvianus*

CLAVE PARA LAS ESPECIES DE *Microtriatoma*

1. Membrana de los hemélitros moteada de claro y oscuro (fig. 316A, B); cabeza delgada en el aspecto lateral (fig. 318B, I, N-R, W, X); región postocular de la cabeza, en lo máximo, una vez y media ($\pm 1,6$) tan ancha como larga (fig. 318A, D-H, J-M); tercer

- segmento del rostro mucho más corto que el primero (0,7-0,8:1) (fig. 318I, P, K).....
.....
.....
trinidadensis
Membrana de los hemélitros de color oscuro uniforme (fig. 314); cabeza gruesa en el aspecto lateral; región postocular de la cabeza más de una vez y media (1,8) tan ancha como larga (fig. 315B, C); tercer segmento del rostro tan largo como el primero (fig. 315A)
borbai

KEYS IN PORTUGUESE

CHAVE PARA OS GÊNEROS DE TRIATOMINAE COM BASE EM NINFAS DO PRIMEIRO ESTÁDIO

- Quarto segmento antenal mais longo que o primeiro, o segundo e o terceiro reunidos (fig. 25A); mesonoto com a forma de estreita faixa transversal, mais curto que a metade do comprimento do pronoto (fig. 25D, H); superfície do corpo, antenas e patas com pêlos simples muito longos, eretos ou decumbentes (figs. 25K, H; 26C); fêmures com tricobótrias (fig. 26C)
Cavernicola
Quarto segmento antenal mais curto que o primeiro, o segundo e o terceiro reunidos (figs. 24A-C; 25E); mesonoto mais longo na linha mediana do que dos lados e não mais curto que a metade do comprimento do pronoto (fig. 24A-D); superfície do corpo, na maioria dos casos, somente com pêlos curtos, alguns sendo espinhosos (fig. 24E-G); quando os pêlos são alongados mostram-se invariavelmente espinhosos (fig. 25B, J); fêmures sem tricobótrias
2
- Fossetas esponjosas presentes nos três pares de patas
Parabelminus, *Microtriatoma*¹
Fossetas esponjosas ausentes
3
- Cabeça, tórax e patas pintados de claro e escuro, mosqueados; cerdas dos urotergitos muito curtas e irregularmente esparsas (fig. 24G)
4
Cabeça, tórax e patas de cor uniforme ou escura com anelações claras, porém nunca mosqueados; cerdas dos urotergitos, na maioria dos casos, dispostas em duas fileiras transversais (fig. 24A, F)
5
- Cabeça alongada, conica; o comprimento da região anteocular com cerca do dobro da largura (fig. 24C); rostro delgado (fig. 24Q)
Rhodnius
Cabeça curta e larga, região anteocular aproximadamente tão longa quanto larga (fig.

¹Não visto; caráter deduzido do quinto estádio ninfal.

- 24B); rostro robusto (fig. 25S)
.....
.....
Psammolestes
5. Rostro abreviado, não atingindo o prosterno (fig. 24H)
Linshcosteus
Rostro de comprimento normal, atingindo o prosterno (fig. 24I)
6. Pêlos do corpo e apêndices muito longos, eretos ou decumbentes (fig. 25B, C, E, G); ápice do segmento distal do tarso posterior sem pêlos especializados
Paratriatoma
Pêlos do corpo e apêndices sempre mais curtos do que na fig. 25B, C, E, G.; ápice do segmento distal do tarso posterior com (fig. 26E, F) ou sem (fig. 26A-D) pêlos especializados
7
- Tarso posterior sem pêlos sensoriais especializados (fig. 26A-D)
8
Tarso posterior com pêlos sensoriais especializados (fig. 26E, F)
10
- Cabeça muito curta, não mais longa que larga de lado a lado dos olhos
*Alberprosenia*²
Cabeça mais longa que larga (figs. 24A, D)
9
- Face inferior dos fêmures com dentículos setíferos conspicuos; região pós-ocular da cabeça de lados paralelos e abruptamente constricta adiante do pescoço (fig. 24D)
Belminus
Face inferior dos fêmures com tubérculos setíferos semelhantes aos demais; lados da região pós-ocular da cabeça arredondados e convergindo gradativamente para o pescoço (fig. 24A)
Triatoma (parte)
- Rostro robusto ou delgado; se delgado, o primeiro segmento menor do que a metade do segundo (fig. 24P)
11
Rostro delgado, o primeiro segmento tendo mais do que a metade do segundo (fig. 24M)
Eratyrus
- Terceiro segmento do rostro com um órgão rostral par (fig. 10D); comprimento mais do que 6 mm
Dipetalogaster
Terceiro segmento do rostro com órgão rostral par ausente; comprimento menos do que 6 mm
Panstrongylus; *Triatoma* (parte)

O gênero *Bolbodera* não está incluído por não termos material a nossa disposição.

CHAVE PARA OS GÊNEROS DE TRIATOMINAE COM BASE EM NINFAS DO QUINTO ESTÁDIO

- Corpo e apêndices com numerosos pêlos muito longos, eretos ou decumbentes (figs. 28A; 29F, I); cabeça fortemente convexa dorsal-

²Não visto; caráter deduzido do quinto estádio ninfal.

- mente (fig. 29F, I); tubérculos anteníferos sem processo apical lateral; abdômen sem série de tubérculos no centro dos urotergitos (fig. 28A) 2
- Corpo e apêndices sem pêlos muito longos, eretos ou decumbentes; cabeça fortemente convexa no dorso só em poucos casos (fig. 29J); tubérculos anteníferos com (fig. 27A, B, D) ou sem (figs. 27C; 28B) processo apical lateral; abdômen com ou sem série de tubérculos no meio dos urotergitos 4
2. Todos os pêlos simples (como na figura 25H, K); olhos situados no meio da cabeça, lateralmente (fig. 29F); quarto segmento antenal mais longo que qualquer outro segmento (fig. 29F); terceiro e quarto segmentos antenais com anelações microscópicas; sulco estridulatório ausente; tarsos alongados, o anterior com cerca da metade do comprimento da tibia *Cavernicola*
- Cerdas espinhosas (fig. 25J); olhos situados atrás do meio da cabeça, lateralmente (fig. 29I); quarto segmento antenal subigual no comprimento ao segundo ou terceiro (fig. 29F); somente o quarto segmento antenal com anelações microscópicas; sulco estridulatório presente; tarsos não alongados, o tardo anterior mais curto que a metade do comprimento da tibia 3
3. Patas relativamente compridas e esbeltas (fig. 28A), os fêmures posteriores mais de oito vezes mais longos que largos; primeiro artí culo do rostro com duas vezes o comprimento do último *Panstrongylus* (parte)
- Patas curtas e robustas (como na figura 28B), os fêmures posteriores menos de seis vezes mais longos que largos; primeiro segmento do rostro com menos de duas vezes o comprimento do último (1:0.7) *Paratriatoma*
4. Genas muito salientes, projetadas para diante do nível do ápice do clípeo a uma distância igual à largura do clípeo no ápice (fig. 29H, K); tubérculos anteníferos com processo lateral apical conspícuo (fig. 29K); abdômen sem série de grandes tubérculos ao longo da linha mediana dorsal 5
- Genas não ultrapassando ou somente apenas ultrapassando o nível do ápice do clípeo (fig. 29E, G, J, L-Q); tubérculos anteníferos com ou sem processo apical lateral conspícuo; abdômen com ou sem série de quatro ou cinco tubérculos ao longo da linha mediana dorsal 8
5. Fêmures sem espinhos ou dentículos na face inferior; fosseta esponjosa presente nas tibias de todos os pares de patas; tórax não granuloso, com numerosas cerdas curtas escamas *Microtriatoma*
- Fêmures com processos espiniformes conspícuos na face inferior; tibias com ou sem fosseta esponjosa; tegumento dorsal fortemente granuloso 6
6. Primeiro e segundo segmentos do rostro de comprimento subigual (fig. 29H); tibias sem fosseta esponjosa *Belminus*
- Primeiro segmento do rostro muito mais curto que o segundo; fossetas esponjosas ausentes ou presentes 7
7. Genas espiniformes; fossetas esponjosas ausentes; tarsos alongados, várias vezes mais longos que o diâmetro apical da tibia *Bolbodera*¹
- Genas lameliformes, achatadas lateralmente, o ápice arredondado quando visto de lado; fosseta esponjosa presente em todas as patas; tarsos muito curtos, aproximadamente tão longos quanto o diâmetro apical da tibia *Parabelminus*
8. Comprimento até 5 mm; colorido geral píleo ou preto; cabeça delicadamente granulosa, curta e muito larga (fig. 29P), não mais comprida que larga de lado a lado dos olhos; terceiro segmento do rostro somente com a metade do comprimento do primeiro (como na fig. 320B); fêmures fusiformes, não achatados lateralmente *Alberprosenia*
- Mais de 5 mm de comprimento; cabeça mais longa que larga de lado a lado dos olhos; caracteres restantes variados 9
9. Cabeça, curta e larga, lisa (fig. 29Q); calosidades laterais pós-oculares muito salientes, com cerca de quatro quintos de largura do olho (fig. 29Q); sulco estridulatório tendo de comprido menos do dobro de sua largura (fig. 12D); rostro fortemente achatado dorsoventralmente; pronoto liso; fêmures alongados, achatados lateralmente; abdômen granuloso, mas sem grandes tubérculos ao longo da linha mediana dorsal *Psammolestes*
- Cabeça diferente; calosidade lateral pós-ocular saliente ausente; sulco estridulatório, quando presente, tendo de comprimento mais do dobro da largura (fig. 12A, C, E); caracteres restantes variados 10
10. Cabeça alongada (fig. 29O); tubérculos anteníferos situados no terço ou quarto anterior da região anteocular (fig. 29O); abdômen granuloso no dorso, mas sem a fileira de tubérculos medianos *Rhodnius*
- Cabeça alongada ou curta; tubérculos an-

¹Não visto, caráter deduzido do adulto.

- teníferos situados atrás do quarto anterior da região anteocular (fig. 29D, E, G, J, L-N); abdômen com ou sem série de tubérculos medianos dorsais 11
11. Rostro abreviado, não se prolongando para trás do nível dos olhos (como na figura 24H); sulco estridulatório não desenvolvido *Linchcosteus*
Rostro de comprimento normal, atingindo o prosterno (fig. 29D-J); sulco estridulatório presente 12
12. Rostro com primeiro e segundo segmentos alongados, de comprimento subigual, o terceiro curto (fig. 29G); abdômen com uma série de cinco tubérculos medianos dorsais salientes *Eratyrus*
Rostro com o primeiro segmento invariavelmente mais curto que o segundo (fig. 29D-F, H-J); abdômen com ou sem série de tubérculos medianos dorsais 13
13. Cabeça curta, larga (fig. 29J, M); tubérculos anteníferos situados atrás do meio da região anteocular *Panstrongylus* (parte)
Cabeça longa e estreita; tubérculos anteníferos situados ao nível do meio da região anteocular ou adiante dele (fig. 29D, E, L, N) 14
14. Genas pontudas, ultrapassando nitidamente o nível do ápice do clípeo (fig. 29N); terceiro e quarto segmentos antenais com diminutas anelações; abdômen, no dorso, sem séries de tubérculos medianos; tamanho maior que 25 mm *Dipetalogaster*
Genas afiladas ou arredondadas apicalmente, não ultrapassando ou só ligeiramente ultrapassando o ápice do clípeo (fig. 29L); só o quarto segmento antenal anelado; abdômen, no dorso, com ou sem séries de tubérculos medianos; tamanho 25 mm ou menos *Triatoma*

CHAVE PARA OS TRIBOS E GÊNEROS DE TRIATOMINAE

- Ocelos não elevados, situados ao nível do tegumento, inconspícuos entre os granulos da cabeça (figs. 304, 305B; 310, 311F; 317, 318A), ou situados sobre ou próximo do sulco interocular (figs. 292, 293B) 2
Ocelos situados em nítidas saliências do disco na região pós-ocular da cabeça (figs. 5C; 162B; 205A) 6
- Cabeça na maioria dos casos alongada, subcônica, não fortemente convexa dorsalmente na vista lateral (figs. 297B; 305B; 311F; 318N-R); genas grandes, alongadas,

projetadas para diante do nível do ápice do clípeo a uma distância igual a largura do clípeo (figs. 296, 297A; 304, 305D; 310, 313A; 317, 318D); tubérculos anteníferos implantados adiante do meio da região anteocular da cabeça (figs. 297B; 305B; 313B; 318B) e com projeção lateral apical espinhosa; ocelos situados diretamente sobre o disco da região pós-ocular da cabeça (figs. 297A; 305D; 313A; 318A); sulco interocular obsoleto: cório com nervuras nítidas; tegumento do corpo fortemente rugoso e granuloso [Bolboderini] 3

Cabeça ovóide, fortemente convexa dorsalmente na vista lateral (fig. 293C); genas menos conspícuas, não ultrapassando o nível do ápice do clípeo; tubérculos anteníferos implantados junto ao bordo anterior dos olhos (figs. 292, 293B, C) e sem processo apical lateral setífero; ocelos situados sobre o sulco interocular ou imediatamente atrás dele; sulco inter-ocular fortemente curvado para trás e quase atingindo o nível do bordo posterior da cabeça (figs. 292, 293B, C); cório com nervuras obsoletas (figs. 291, 292); tegumento do corpo liso, mas com pelos longos, numerosos e suberectos (figs. 292, 293B, C); [Cavernicolini] *Cavernicola*

- Rostro com o primeiro segmento maior (fig. 300A) ou tão longo (fig. 302A) quanto o segundo; escutelo, na base, com 1+1 processos sublaterais triangulares (figs. 300D, 302B; 304, 305E); conexivo dorsal com nítida crista longitudinal sublateral (figs. 299, 302B; 304) *Belminus*
Rostro com o primeiro segmento muito mais curto que o segundo (figs. 297B; 311F; 313B; 315A); escutelo sem processos sublaterais na base; conexivo dorsal plano 4
- Escutelo trapezoidal, de bordo posterior reto, sem processo posterior (fig. 310, 311A); primeiro urotergito descoberto (fig. 310) *Parabelminus*
Escutelo triangular, com processo apical posterior bem desenvolvido (figs. 296, 317); primeiro urotergito não exposto 5
- Genas achataadas lateralmente (figs. 315A; 318A, B, I, N-R); fêmures sem espinhos (fig. 315F); tibias com fosseta esponjosa em todas as patas; tarsos com dois segmentos curtos, juntos com cerca de um quinto do comprimento das tibias (fig. 315F) *Microtriatoma*
Genas espiniformes (fig. 297B); fêmures com espinhos (fig. 297C); fosseta esponjosa tibial

- ausente; tarsos com três segmentos, com cerca de um terço do comprimento das tibias (fig. 297C) *Bolbodera*
6. Cabeça com nítida calosidade lateral pós-ocular provida de tubérculos setíferos (figs. 5, 290A, C, D); antenas implantadas em tubérculos inseridos perto do ápice da cabeça (figs. 270, 278A, B; 287, 290B, C) [Rhodniini] 7
- Cabeça sem calosidade lateral pós-ocular provida de tubérculos setíferos; antenas implantadas em tubérculos afastados do ápice da cabeça 8
7. Cabeça subtriangular, algo achatada, de comprimento nitidamente menor que o dobro da sua largura incluindo os olhos (figs. 286, 287A; 289); região pós-ocular muito curta, seu comprimento com um quarto a um terço da largura; segmento apical do rostro profundamente emarginado distalmente (fig. 10G); fêmures conspicuamente dilatados e achatados lateralmente (fig. 284B) *Psammolestes*
- Cabeça subcilíndrica, não achatada dorso-ventralmente, de comprimento com o dobro ou mais do dobro da sua largura incluindo os olhos (figs. 271, 272, 276, 277, 278A); região pós-ocular mais longa, pelo menos com a metade da largura; terceiro segmento do rostro pontudo no ápice (fig. 10F); fêmures alongados na maioria das espécies, subcilíndricos, nunca achatados lateralmente *Rhodnius*
8. Comprimento total até 5 mm; cabeça muito curta e larga, não mais longa que a largura de lado a lado dos olhos (fig. 310A); clípeo mais dilatado antes do meio (fig. 320A); hemélitos com pequeno ramo conectando a porção basal da R+M a Sc (fig. 320C) [Alberproseniini] *Alberprosenia*
- Mais do que 5 mm de comprimento; cabeça mais alongada, mais que a largura de lado a lado dos olhos; sem pequeno ramo conectando a porção basal da R+M a Sc [Triatomini] 9
9. Cabeça muito curta e larga (figs. 240, 241, 242A); tubérculos anteniferos inseridos muito perto, junto, do bordo anterior dos olhos (fig. 242C); cabeça e corpo glabros ou com pêlos achatados curtos. *Panstrongylus*
- Cabeça de forma variada, na maior parte dos casos subcilíndrica (figs. 95A, B; 162A, B); tubérculos anteniferos não inseridos na proximidade dos olhos (figs. 95B; 162B); em raros casos, cabeça comparativamente curta e tubérculos anteniferos relativamente próximos dos olhos (fig. 250B), mas então cabeça e corpo com conspicuos pêlos longos semi-erectos (figs. 250A, B) 10
10. Rostro não ultrapassando, para trás, o nível dos olhos (fig. 200B); prosterno sem sulco estridulatório (fig. 15A) *Linshcosteus*
- Rostro atingindo o prosterno (fig. 4I); sulco estridulatório prosternal presente (fig. 13A) 11
11. Escutelo com processo apical (figs. 195A; 197; 198A) tão ou mais comprido que o corpo principal do escutelo, oblíquo, com a forma de forte espinho aguçado; rosto com o primeiro segmento muito longo, quase tão longo quanto o segundo, terminando ao nível do meio da distância entre o tubérculo antenifero e o bordo anterior do olho (figs. 195B; 198A) *Eratyrus*
- Escutelo com processo apical com aspecto diferente; rosto com o primeiro segmento nitidamente mais curto que o segundo, não ultrapassando o nível da inserção do tubérculo antenifero (fig. 4I) 12
12. Cabeça, corpo e apêndices com abundantes pêlos compridos, curvos, semi-erectos (fig. 250A, B); cabeça fortemente convexa dorsalmente (fig. 250B, C); olhos pequenos (fig. 250A-C, F); tubérculos anteniferos inseridos perto do bordo anterior dos olhos (fig. 250B, C); fêmures anteriores sem dentículos; fossetas esponjosas ausentes; comprimento 12,5 - 14,5 mm *Paratriatoma*
- Cabeça, corpo e apêndices parecendo lisos ou com pêlos curtos, ou somente os apêndices com pêlos compridos (fig. 68), porém menos numerosos que acima; cabeça menos convexa dorsalmente; olhos maiores (figs. 69B; 162A; 211B); tubérculos anteniferos inseridos no meio ou perto do meio da região ante-ocular da cabeça, afastados dos olhos (figs. 162A; 211B); fêmures anteriores na maioria das espécies com dois ou mais dentículos; fossetas esponjosas presentes ou ausentes; comprimento 9,5 - 42 mm 13
13. Espécie muito grande, com 33 - 44 mm de comprimento; fêmures não espinhosos; placas ventrais do conexivo invisíveis (fig. 211A); membrana conspicua, longitudinalmente pregueada, conectando as placas do conexivo aos urosternitos (fig. 210C); processo posterior do pigóforo curto, retangular transversalmente e truncado no ápice (fig.

211F); gênero monotípico e restrito ao sul da Baixa Califórnia (México) . . . *Dipetalogaster*
Espécies raramente com 33 mm ou mais, na maioria dos casos com menos de 30 mm de comprimento; fêmures espinhosos ou não; placas ventrais do conexivo nítidas (figs. 18B; 88), embora algumas vezes estreitas; lados do abdômen raramente membranosos, somente na fêmea micróptera (fig. 177C) de uma espécie com membrana conectando as placas dorsais e ventrais; processo posterior do pigóforo afilado para o ápice (figs. 21D; 162D); gênero com muitas espécies e largamente distribuído geograficamente. *Triatoma*

CHAVE PARA AS ESPÉCIES DE *Triatoma*

1. Adultos micrópteros (figs. 177B, C; 179B); segundo segmento antenal com muitos pêlos conspicuamente maiores do que o diâmetro do segmento (fig. 6G); cor geral castanho-escura ou preta, com o conexivo e as partes laterais adjacentes dos urômeros vermelhas, a área vermelha contínua ou interrompida por manchas negras entre as suturas intersegmentares *spinolai* (parte)
Adultos macrópteros, raramente braquípteros . 2
2. Patas com áreas claras e escuas bem distintas (figs. 44, 60D; 74, 75, 76C; 88, 90B; 106, 119, 120, 166, 174, 175, 176C; 181, 182) 3
Patas com todos os segmentos, exceto os tarsos, de colorido uniforme, que é escuro na maior parte dos casos; muito raramente, os fêmures com mancha muito pequena apical ou anel de colorido claro 11
3. Pronoto preto com os bordos laterais e carenas submedianas vermelhos (figs. 181, 182); tibias amarelas exceto no ápice escuro, contrastando acentuadamente com os fêmures pretos *tibiamaculata*
Pronoto de cor diferente ou inteiramente preto; colorido das patas não como acima 4
4. Espécie grande, 28 mm de comprimento; região ante-ocular quase cinco vezes tão longa quanto a pós-ocular (figs. 106, 107A); pronoto (fig. 106) castanho com 1+1 manchas amareladas junto aos ângulos humerais; fêmures e tibias de colorido castanho-alaranjado claro, os primeiros com anelação subapical castanho-escura; conexivo com marcas transversais estreitas escuas sobre as suturas intersegmentares (fig. 107C, D) *matogrossensis*
5. Espécies de tamanho variado; cor das patas e do pronoto diversa da de acima 5
6. Manchas escuas do conexivo no centro de cada segmento (figs. 119, 120, 166) 6
Manchas escuas do conexivo abrangendo as suturas intersegmentares (figs. 43, 44, 59, 74, 75, 87, 89, 174, 175) 7
7. Fêmures de colorido castanho-alaranjado claro com anel apical escuro; pronoto (fig. 166) sem elementos coloridos conspícuos; hemélitos escuros, somente com a base e o ápice do cório claros (fig. 166); disco dos segmentos conexivais com mancha escuia simples *ryckmani*
Fêmures escuros, com anel apical claro (figs. 119, 120); pronoto e hemélitos com marcas coloridas conspícuas, porém complexas (figs. 119, 120); disco dos segmentos conexivais com mancha escuia central em forma de bigorna ou com duas pequenas manchas escuas (figs. 119, 120) *nigromaculata*
8. Pronoto inteiramente preto; patas pretas, com os trocanteres e a base dos fêmures em contraste amarelo (figs. 60D; 90B) 8
Pronoto inteiramente escuro ou com áreas claras; patas não coloridas como acima 9
9. Marcas escuas transversais do conexivo com a forma aproximada de notas musicais (figs. 59, 60D); cabeça mais longa que o pronoto *deanei*
Marcas transversais escuas do conexivo em forma de faixas largas (figs. 87, 89); cabeça tão longa quanto o pronoto *infestans*
10. Fêmures escuros com anelação clara (figs. 43A; 44); conexivo com manchas transversais escuas quase tão largas quanto os espaços claros intercalados e sem constrição mediana nítida (figs. 43, 44); espécie grande, com cerca de 25 mm *brasiliensis* (parte)
Fêmures com áreas claras disseminadas e com anel escuro nítido subapical (figs. 74, 75, 76C; 174, 175, 176C); conexivo com manchas transversais escuas na maioria dos espécimes, muito estreitas, com nítida constrição mediana em forma de nota musical (figs. 74, 75, 174, 175, 176D-H); espécies menores, com não mais que 20,5 mm de comprimento 10
11. Lobo posterior do pronoto e escutelo uniformemente escuros (figs. 74, 75); coxas escuas (fig. 76C); rostro com o segundo segmento tendo menos do dobro do comprimento do primeiro (fig. 76B) *guasayana*
Lobo posterior do pronoto com 1+1 manchas

- claras na região humeral (figs. 174, 175); ponta do processo apical do escutelo e das coxas claras; rostro com segundo segmento tendo mais do dobro do comprimento do primeiro (fig. 176B) *sordida*
11. Rostro com o terceiro segmento alongado, aproximadamente tão longo quanto o segundo (figs. 55C; 100B) 12
Rostro com o terceiro segmento invariavelmente mais curto que o segundo 13
12. Áreas claras do conexivo vermelhas; olhos levemente menores e cabeça, de perfil, menos elevada posteriormente (fig. 55C) *circummaculata*
Áreas claras do conexivo amarelas; olhos levemente maiores e cabeça, de perfil, mais elevada posteriormente (fig. 100B) *limai*
13. Antenas com primeiro segmento ultrapassando nitidamente o ápice do clípeo (fig. 162B); pronoto fortemente granuloso, de cor pícea ou preta com bordos laterais inteiramente vermelhos (figs. 159, 161) *rubrofasciata*
Antenas com primeiro segmento muito poucas vezes ultrapassando nitidamente o ápice do clípeo, na maioria dos casos atingindo o nível do ápice do clípeo ou sendo mais curto; pronoto diferente do acima indicado 14
14. Rostro com primeiro segmento mais longo que o terceiro (figs. 36B; 93B; 131B; 148E; 180C, D; 188B) (em dúvida usar o item 53)
Rostro com primeiro segmento tão longo ou mais curto que o terceiro (figs. 66A; 79B; 105E; 146B; 158B; 165B) 15
15. Tegumento do corpo e cório dos hemélitros nitidamente piloso, pêlos facilmente perceptíveis no dorso (figs. 16, 93D; 142A, B) 16
Tegumento do corpo e cório praticamente glabros, no máximo com pêlos muito curtos e esparsos 21
16. Cabeça fortemente convexa dorsalmente (fig. 93B); tubérculos anteniferos alongados, mais próximos dos olhos (fig. 93B) *lecticularia*
Cabeça não fortemente convexa dorsalmente (fig. 142B); tubérculos anteniferos curtos, afastados dos olhos (fig. 142B) 17
17. Cório com extensa mancha branco-amarelada e de cor laranja na base, bem como preta no ápice (fig. 130) *pallidipennis*
Cório sem a extensa área branca, acentuadamente de cor preta com manchas amarelas ou vermelho-alaranjadas restritas à base e ao subápice (figs. 101, 109, 140, 141, 143) 18
18. Cório dos hemélitros com pêlos longos, decidos e suberectos, com cerca de 0,5 mm de comprimento 19
Cório com cerdas curtas decumbentes ou deitadas, algumas vezes achatadas, com não mais que 0,3 mm de comprimento (fig. 16A) 20
19. Hemélitros curtos, não ultrapassando o sexto urotergito (figs. 140, 141); conexivo dorsal com manchas vermelho-alaranjadas ocupando parcialmente um sexto a um terço posterior de cada segmento (fig. 142C-E)
..... *phyllosoma*
Hemélitros longos, cobrindo todo ou quase todo o abdômen (fig. 108); conexivo dorsal com manchas vermelho-alaranjadas ocupando de um terço a metade posterior de cada segmento (fig. 109) *mazzottii*
20. Genas atingindo ou ultrapassando o nível do ápice do clípeo (fig. 144A, B); lobo posterior do pronoto extensamente amarelo-alaranjado (fig. 143); na maioria dos espécimes, os segmentos do conexivo dorsal extensamente amarelo-alaranjados e com mancha preta ântero-lateral (fig. 144G); raramente, os segmentos do conexivo dorsal pretos com mancha amarelo-alaranjada póstero-lateral (fig. 144D-F); mesosterno, metasterno e face ventral do abdômen sempre com longos pêlos suberectos *picturata*
Genas em muitos casos não atingindo o nível do ápice do clípeo (fig. 102D); pronoto com lobo posterior inteiramente preto (fig. 101) ou com 1+1 pequenas manchas claras sobre os ângulos humerais (fig. 102D); segmentos do conexivo dorsal pretos com mancha amarela ou amarelo-alaranjada ocupando o terço ou a metade posterior, estendendo-se ou não até a sutura conexival (fig. 102B, C, E); mesosterno com pêlos suberectos longos; metasterno e face ventral do abdômen com pêlos semelhantes ou com pêlos curtos e decumbentes *longipennis*
21. Disco do escutelo, na base, com 1+1 tubérculos proeminentes, dirigidos para diante e atingindo o bordo posterior do pronoto (figs. 70B; 126D); ângulos humerais explanados (figs. 70B; 126D) 22
Disco do escutelo sem os mencionados tubérculos basais; ângulos humerais não explanados 23
22. Cor geral castanho clara (fig. 70A); tubérculos

- discais e laterais do lobo anterior do pronoto muito salientes (fig. 70B); fêmures dos primeiro e segundo pares de patas com dentículos *flavida*
- Cor geral castanho muito escura (fig. 125); tubérculos discais e laterais do lobo anterior do pronoto não salientes (fig. 126D); fêmures anteriores e medianos sem dentículos *obscura*
23. Hemélitos de cor uniformemente castanho enfumaçada (figs. 177A; 179A); segundo segmento antennal com numerosas cerdas algumas vezes tão longas quanto o diâmetro do segmento (fig. 6G); pronoto sem tubérculos discais; processo apical do escutelo extremamente curto (fig. 179A); metasterno carenado mediana e longitudinalmente (figs. 178, 180A); urotergitos inteiros, ausentes as suturas dorsais do conexivo *spinolai* (parte)
- Combinação diferente de caracteres 24
24. Conexivo dorsal uniformemente colorido 25
- Conexivo dorsal com distintas áreas claras e escuras 29
25. Espécies uniformemente claras (figs. 34, 35, 151, 152), castanho-alaranjadas; largura da parte basal da célula externa da membrana dos hemélitos maior do que a da célula interna (figs. 34, 35, 151, 152) 26
- Espécies uniformemente de cor castanha ou preta (figs. 134, 135, 147, 170); largura da parte basal da célula externa da membrana dos hemélitos aproximadamente igual à da célula interna (figs. 135, 147B, C; 170) 27
26. Cabeça fortemente convexa no dorso (fig. 36B); genas atingindo o nível do ápice do clípeo (fig. 36A); olhos muito pequenos; distância interocular dorsal com quatro vezes a largura do olho (fig. 36A); fêmures sem dentículos; espécie pequena, com 15 mm de comprimento *amicitiae*
- Cabeça subcilíndrica (fig. 153B); genas ultrapassando o nível do ápice do clípeo (fig. 153A); olhos maiores; distância interocular dorsal somente com cerca do dobro da largura do olho (fig. 153A); fêmures com dentículos; espécie maior, com cerca de 24 mm de comprimento *pugasi*
27. Cabeça com delicada depressão arqueada atrás do clípeo (fig. 148A, B, C); longa quando vista de perfil; olhos junto ao nível da face inferior da cabeça (fig. 148E); comprimento total 15-22 mm *protracta*
- Cabeça sem depressão arqueada atrás do clípeo (figs. 136A; 171A, C); relativamente muito mais curta quando vista de perfil; olhos afastados do nível da face inferior da cabeça (figs. 136B; 171B); comprimento total 9,5-13 mm 28
28. Colorado geral preto (fig. 134) *peninsularis*
Colorado geral castanho, polido (fig. 170) *sinalensis*
29. Cor geral (fig. 51) amarelo-pálido incluindo as patas; primeiro segmento antennal amarelo-pálido, o segundo enegrecido (figs. 51, 52E); cório amarelo claro, com mancha central escura diminuta ou quase imperceptível; segmentos do conexivo (figs. 51, 52D) com mancha central escura adjacente à sutura interna do conexivo, mas não atingindo a margem externa ou as suturas anterior e posterior dos segmentos do conexivo; superfície da face ventral do abdômen com rugas diminutas *cavernicola*
Combinação diferente de caracteres 30
30. Conexivo dorsal com área clara contínua no bordo externo (figs. 39, 46, 47, 82, 154, 156, 158C); o colorido escuro dos urotergitos continuando-se sobre a parte interna do conexivo, às vezes estendendo-se até o centro de cada segmento 31
- Segmentos do conexivo com regiões transversais claras e escuras alternadas, ambas tomando toda a largura dos segmentos (figs. 63, 94, 113, 115, 122A; 149, 168, 186) 35
31. Lobo anterior do pronoto sem tubérculos discais (fig. 40A); região pós-ocular da cabeça nitidamente arredondada lateralmente, na vista dorsal (figs. 40A, G; 83A; 158A) 32
- Lobo anterior do pronoto com 1+1 tubérculos discais (figs. 47, 155A); região pós-ocular da cabeça com os lados não arredondados, na vista dorsal (figs. 47, 48A; 155A) 34
32. Processo apical do escutelo curto, subconico (figs. 39, 82); primeiro segmento antennal terminando bem antes do nível do ápice do clípeo (figs. 40A-C; 83A) 33
- Processo apical do escutelo alongado, subcilíndrico (fig. 156B, C); primeiro segmento antennal atingindo o nível do ápice do clípeo (fig. 158A) *rubida* (parte)
33. Clípeo com a base fortemente dilatada (fig. 83A), sua superfície superior muito convexa na vista lateral (fig. 83B); superfície inferior da cabeça sinuosa na vista lateral (fig. 83B);

- face ventral do abdômen uniformemente arredondada *incrassata*
- Clípeo menos saliente, sua superfície superior somente muito levemente convexa, quando em vista lateral (fig. 40B, C); superfície inferior da cabeça quase reta na vista lateral (fig. 40B, C); face ventral do abdômen levemente achatada longitudinalmente na linha mediana *barberi* (parte)
34. Antenas com numerosos pêlos muito longos, além dos curtos, no segundo segmento (como na figura 6G); mesosterno limitado posteriormente por carena transversal conspícuia (como nas figuras 178, 180); fêmures inermes; conexivo com áreas amareladas; espiráculos junto ao bordo conexival; comprimento cerca de 21 mm *breyeri* (parte)
- Antenas com segundo segmento só com pêlos curtos; mesosterno contínuo com o metasterno; fêmures com dentículos; conexivo com áreas vermelho-alaranjadas ou amareladas junto ao bordo externo; espiráculos afastados do bordo conexival; comprimento 25-33 mm *recurva*
35. Manchas pretas do conexivo incluindo as suturas intersegmentares (figs. 94, 186) 36
- Manchas pretas do conexivo não incluindo as suturas intersegmentares (figs. 63, 113, 115, 122A; 149, 168) 38
36. Pronoto e, geralmente, cório inteiramente pretos; cabeça mais longa que o pronoto *lenti*
- Pronoto e cório pretos, com manchas avermelhadas ou amareladas; cabeça tão longa ou mais curta que o pronoto 37
37. Preto com marcas vermelhas como a seguir (figs. 186, 187): faixa longitudinal dorsal na cabeça desde atrás do clípeo até o sulco interocular, 3+3 manchas alongadas no lobo posterior do pronoto, sendo 1+1 entre as carenas submedianas e 2+2 entre estas e os bordos laterais, e, sobre a depressão central do escutelo; pleuras e superfície inferior do tórax e abdômen opacos *vitticeps*
- Preto com 1+1 manchas amareladas pequenas no lobo posterior do pronoto situados entre as carenas submedianas e os bordos laterais na parte anterior do lobo; restante do pronoto e escutelo pretos (figs. 110, 111); pleuras e superfície inferior do tórax e abdômen fortemente polidos *melanocephala*
38. Manchas pretas dos segmentos do conexivo situadas anteriormente e adjacentes às suturas intersegmentares (figs. 63, 113, 168); área clara ocupando a parte posterior de cada segmento 39
- Manchas pretas do conexivo situadas no centro de cada segmento (figs. 115, 122A; 149), as partes anteriores e posteriores sendo claras 45
39. Lobo anterior do pronoto sem tubérculos discrais (fig. 140); escutelo com processo apical curto, subcônico (fig. 39); conexivo dorsal com manchas vermelho-alaranjadas de forma irregular situadas de um quarto até a metade posterior de cada segmento (fig. 40E, F) incluindo parcialmente as respectivas suturas intersegmentares; em alguns casos a área vermelha se estende ininterruptamente sobre toda a margem externa do conexivo, ocasionalmente com um ponto escuro nos ângulos ântero-externos dos segmentos (fig. 40D) *barberi* (parte)
- Lobo anterior do pronoto com tubérculos discrais (figs. 64A, D; 73A; 81A; 85A); processo apical do escutelo longo, cilíndrico (figs. 63, 72, 80, 84, 114A; 168) 40
40. Pronoto escuro (fig. 168) com manchas vermelhas ou amareladas em faixa estreita que acompanha o colarinho, os ângulos ântero-laterais, os bordos laterais do pronoto, alargando-se sobre os ângulos humerais e parte do bordo posterior; manchas claras do conexivo (fig. 168) ocupando o terço posterior de cada segmento, dorsal e ventralmente *sanguisuga*
- Pronoto uniformemente escuro, sem manchas, às vezes a área humeral levemente clara 41
41. Angulos humerais do pronoto aguçados (figs. 113, 114A, C) *mexicana*
- Angulos humerais arredondados (figs. 64A, D; 73A; 85A) 42
42. Cório dos hemélitros (fig. 63) preponderantemente amarelo ou amarelo-alaranjado com mancha escura apical e outra central, esta de tamanho variável e em alguns casos ausente; conexivo (fig. 63) dorsal e ventral com mancha amarela ou amarelo-alaranjada em mais da metade posterior de cada segmento *dimidiata*
- Cório preponderantemente castanho-escuro a preto (figs. 72B; 80, 84); manchas claras do conexivo estreitas (figs. 72B; 80, 84) 43
43. Conexivo dorsal e ventral com mancha amarela ou amarelo-alaranjada em faixa transversal irregular estreita no quarto ou terço posterior de cada segmento junto à sutura intersegmentar (fig. 72B); cório com pequena man-

- cha amarela na base e outra subapical (fig. 72B) *gerstaeckeri*
- Conexivo dorsal e ventral quase totalmente escuros, com mancha clara apenas visível como faixa estreita incompleta no limite posterior dos segmentos, também abrangendo as suturas intersegmentares (figs. 80, 84) 44
44. Lados da região pós-ocular da cabeça sub-paralelos, convergindo levemente para trás (fig. 81A); cório com mancha amarela basal e outra transversal subapical (fig. 80); tamanho, cerca de 28 mm *hegneri*
- Lados da região pós-ocular da cabeça nitidamente convexos (fig. 85A, C); cório quase inteiramente escuro, só algumas vezes mais claro junto ao clavo (fig. 84); tamanho, menos do que 20 mm *indictiva*
45. Pronoto e cório inteiramente escuros 46
- Pronoto e cório escuros com manchas claras 48
46. Segundo segmento das antenas com cerdas rígidas, não nitidamente maiores que o diâmetro do segmento; depressão mediana do escutelo triangular, bem definida pelas carenas laterais; segundo segmento do rosto subciliado (fig. 58B) *rubida* (parte)
- Segundo segmento das antenas com cerdas rígidas tendo de comprimento mais do dobro do diâmetro do segmento (figs. 47, 68); depressão mediana do escutelo mal definida ou ausente (figs. 47, 68); segundo segmento do rosto nitidamente achatado no sentido dorso-ventral (figs. 48B; 69A) 47
47. Ângulos humerais arredondados (figs. 46, 47); processo posterior do escutelo tão longo quanto o corpo principal do esclerito (fig. 46); manchas claras do conexivo, na maioria dos espécimes, amarelas e ocupando a maior parte da superfície do conexivo incluindo todo o seu bordo externo (figs. 46, 47) *breyeri* (parte)
- Ângulos humerais agudos ou pontudos (figs. 67, 68); processo posterior do escutelo mais curto do que o corpo principal do esclerito (fig. 68); manchas claras do conexivo de cor amarelo-laranja, raramente amarelo-pálida, alternando com manchas pretas transversais que se estendem em toda a largura das placas conexivais (figs. 67, 68) *eratyrusiformis*
48. Pronoto subquadrado (figs. 117, 118A; 122); genas não ultrapassando o nível do ápice do clípeo (figs. 118A, C; 122B; 124A); ápice do segundo segmento do rosto e quase a totalidade do terceiro segmento com pelos longos e densos (figs. 118B, D; 124C) 49
- 49
- Pronoto nitidamente trapezoidal (figs. 41, 96, 97A; 115, 172); genas ultrapassando o ápice do clípeo; todos os segmentos do rostro somente com pelos dispersos (figs. 42B; 97B; 116B; 173B) 50
49. Insetos maiores, com 19,5 - 22,5 mm de comprimento; cabeça com áreas claras dorsais de tamanho diverso (fig. 122B); região pós-ocular da cabeça suavemente arredondada e com os bordos convergindo nitidamente para trás (figs. 122B; 124A); pronoto preto, amarelado ao longo dos bordos anterior e laterais, sobre os ângulos humerais e em faixas curvas do lobo anterior (fig. 122) *nitida*
- Insetos menores, com 16,5 - 19,5 mm de comprimento; cabeça inteiramente preta dorsalmente (figs. 117, 118A); região pós-ocular da cabeça distintamente arredondada nos lados (fig. 118A, C); pronoto totalmente escuro mas com 1+1 manchas claras sobre os angulos humerais (figs. 117, 118A) *neotomae*
50. Pronoto preto, com os bordos laterais, o bordo anterior e os ângulos ânterolaterais, as elevações do lobo anterior, as carenas submedianas do lobo posterior e uma faixa longitudinal mediana, castanho-amarelada (fig. 172) *sinica*
- Colorido do pronoto diferente 51
51. Ângulos ântero-laterais do pronoto de ponta arredondada (figs. 42A; 115, 116A); pronoto vermelho com 2+2 manchas pretas alongadas no lobo posterior (figs. 41, 115) 52
- Ângulos ântero-laterais do pronoto conicos e com ápice pontiagudo (figs. 96, 97A); pronoto vermelho com 1+1 manchas pretas alongadas no lobo posterior (fig. 96) *leopoldi*
52. Largura do olho com mais da metade da distância interocular dorsal (fig. 116A); ângulos ântero-laterais do pronoto, na maioria dos casos, grandes e digitiformes (fig. 115); espécie grande, com 22-25 mm *migrans*
- Largura do olho com menos da metade da distância interocular dorsal; ângulos ântero-laterais do pronoto curtos, não digitiformes (fig. 42A); espécie menor, com 17-20 mm *bouvieri*
53. Segmentos do conexivo (figs. 156B, C; 158D, E) cada qual com mancha posterior transver-

- sal de colorido avermelhado pálido junto à sutura intersegmentar e, em vários casos, de cor pálida ao longo de toda a margem externa; pronoto não granuloso, castanho-avermelhado a preto, com bordos laterais e áreas humerais de cor laranja avermelhada pálida, raramente totalmente preta; primeiro segmento antenal atingindo ou ultrapassando ligeiramente o nível do ápice do clípeo (fig. 158A) *rubida* (parte)
- Cnexivo diferente; pronoto uniformemente preto ou com manchas no disco; primeiro segmento antenal na maioria das espécies não chegando a atingir o nível do ápice do clípeo, somente muito raramente atingindo o nível do ápice do clípeo (*T. brasiliensis*), caso em que as suturas intersegmentares do conexivo estão incluídas em marcas transversais pretas 54
54. Cabeça de comprimento igual ou menor que o do pronoto 55
- Cabeça de comprimento maior que o do pronoto 60
55. Superfície do corpo, cório e patas com numerosos pelos dourados deitados (figs. 61, 145); patas fortes (figs. 61, 145); células da membrana dos hemélitos castanho-claras com numerosas manchas escuras irregulares (figs. 61, 145) 56
- Superfície do corpo, cório e patas parecendo glabra; patas delgadas; células da membrana dos hemélitos de cor castanho-clara uniforme 57
56. Pêlos das tibias posteriores (fig. 146D) mais curtos que o diâmetro do segmento, não perceptíveis sem aumento; corpo extremamente piloso; escutelo, na base, com 1+1 tubérculos salientes dirigidos para diante e atingindo o bordo posterior do pronoto (fig. 145) *platensis*
- Pêlos das tibias posteriores (fig. 62C) mais longos, tanto quanto o diâmetro do segmento, facilmente visíveis sem aumento; corpo menos piloso, escutelo sem os tubérculos conspícuos mencionados *delpontei*
57. Pronoto com tubérculos discais e laterais no lobo anterior (figs. 103A; 104, 149) 58
- Lobo anterior do pronoto sem tubérculos discais e laterais 59
58. Cabeça, na maioria dos casos, com manchas de colorido alaranjado no dorso, mais ou menos extensas; em muitos exemplares, mancha clara na propleura e na mesopleura (fig. 105E) ou só na mesopleura; cabeça muito alta atrás, quando vista de perfil (fig. 105B); olhos grandes (fig. 105A); rostro com primeiro segmento tão longo ou levemente maior que o terceiro, este com pêlos muito longos (fig. 105B); segundo segmento do rostro, visto de perfil, comparativamente mais grosso (fig. 105B); processo lateral do endosoma com faixas longitudinais largas e mais fortemente esclerosadas, sem dentículos no ápice (fig. 105D) *maculata*
- Cabeça sempre inteiramente preta no dorso; em muitos exemplares com mancha clara ausente ou presente somente na propleura; cabeça menos alta atrás, quando vista de perfil (150B); olhos menores (fig. 150A); rostro com o primeiro segmento levemente mais curto que o terceiro, este com pêlos mais curtos (fig. 150B); segundo segmento do rostro, visto de perfil, mais delgado (fig. 150B); processo lateral do endosoma sem cristas longitudinais largas e com dentículos no ápice (fig. 150D) *pseudomaculata*
59. Pronoto de colorido escuro uniforme (fig. 37); cório e clavo dos hemélitos quase totalmente escuros, excetuados os dois terços apicais do clavo e parte da célula corial adjacente, ambas castanho-enzumaçadas (fig. 37); processos do endosoma do macho fortemente esclerosados, no comprimento com mais da metade do falosoma e com cerca de 100 dentículos no ápice (fig. 38C, D) *arthurneivai*
- Pronoto escuro, com 1+1 manchas avermelhadas nítidas nos ângulos humerais (figs. 192, 193A) e, em alguns espécimes, com larga mancha discal avermelhada entre as carenas, perto do bordo posterior; cório dos hemélitos (figs. 191, 192) com áreas avermelhadas grandes e confluentes; processos do endosoma fracamente esclerosados, no comprimento com não mais de metade do falosoma e somente com cerca de 20 dentículos apicais (fig. 193D) *wygodzinskyi*
60. Elementos de cor escura do conexivo com a forma de faixas transversais largas bem nítidas 62
- Elementos de cor escura do conexivo muito reduzidos, não com a forma de faixas transversais largas 61
61. Cório dos hemélitos (figs. 56, 57) preto, com manchas alaranjadas apicais e também no clavo; conexivo inteiramente preto ao longo de sua parte interna, alaranjado na metade externa e interrompido por estreitas faixas negras sobre as suturas intersegmentares (figs. 56, 57, 58B, C) *costalimai*
- Cório dos hemélitos (fig. 189) inteiramente

- amarelo, exceto as nervuras, a base e o bordo externo do clavo, que são escuros; conexivo totalmente amarelo, exceto pequena mancha preta na margem externa sobre as suturas intersegmentares ou logo atrás delas (figs. 189, 190) *williami*
62. Pronoto preto, com bordos laterais e três faixas longitudinais do lobo posterior avermelhadas (figs. 49, 65A, B; 66C, D; 184, 185C); suturas intersegmentares do conexivo incluídas nas áreas claras 63
 Pronoto com áreas claras diferentes ou inteiramente pretas; conexivo com suturas intersegmentares incluídas nas áreas pretas (figs. 43, 44, 77, 78, 127, 128, 132, 133B, C; 137, 138, 163, 164) 65
63. Corpo com pilosidade dourada conspícuia; membrana dos hemélitros com elementos coloridos matizados (fig. 65); fêmures escuros com nódulos ferrugíneos e mais do que cinco dentículos setíferos na face inferior; conexivo (figs. 65, 66C, D) preto com duas manchas vermelho-alaranjadas em cada segmento, uma situada na parte posterior do segmento incluindo a suture intersegmentar e ocupando toda a largura do segmento, e outra incompleta situada no centro do segmento e perto do bordo *dispar*
 Pilosidade do corpo inconspícuia; membrana dos hemélitros sem elementos matizados; fêmures sem nódulos e com não mais do que três dentículos na face inferior; conexivo de padrão diferente 64
64. Cabeça e patas castanho-avermelhadas; nervuras da membrana (fig. 184) de colorido nitidamente claro e marginadas de claro; ângulos ântero-laterais do pronoto subciliárdicos (fig. 185B); ápice do processo posterior do escutelo truncado arredondado; pleuras com áreas claras extensas *venosa*
 Cabeça e patas castanho-escuas ou pretas; nervuras da membrana menos salientes (fig. 49); ângulos ântero-laterais do pronoto achatados dorso-ventralmente (fig. 50A); ápice do processo posterior do escutelo em forma de colher (fig. 50D); pleuras praticamente de cor escura uniforme *carrioni*
65. Hemélitros (figs. 77, 78, 127, 128) completamente castanho-amarelados claro exceto a base do clavo e as nervuras, que são escuras; cório não mais escuro que a membrana 66
 Hemélitros parcialmente escurecidos, pelo menos parte do cório mais escuro que a membrana 67
66. Pronoto preto (figs. 127, 128), com 1+1 man-
- chas amarelas nos húmeros; hemélitros curtos, pelo menos na fêmea, com o sétimo urotergito completamente exposto (figs. 127, 128); olhos comparativamente pequenos, não atingindo o nível da face ventral da cabeça quando vista de perfil (fig. 119B); distância interocular dorsal com o dobro da largura do olho visto dorsalmente (fig. 129A); a maioria dos pêlos do terceiro segmento do rostro maiores que o diâmetro do segmento (fig. 129B); processo apical do escutelo muito curto, oblíquo (fig. 129C) *oliveirai*
 Pronoto (figs. 177, 178) inteiramente preto; hemélitros normais, cobrindo completamente os sétimo e oitavo urotergitos (figs. 177, 178); olhos comparativamente grandes, ultrapassando o nível da face ventral da cabeça quando vista de perfil (fig. 79B); distância interocular dorsal com menos do dobro da largura do olho visto dorsalmente (fig. 79A); a maioria dos pêlos do terceiro segmento rostral mais curtos que o diâmetro do segmento (fig. 79B); processo apical do escutelo horizontal *guazu*
67. Membrana dos hemélitros uniformemente escura, com nervuras praticamente da mesma cor (figs. 132, 163, 164) 68
 Membrana clara, com áreas mais ou menos extensas distintamente mais escuas; nervuras nitidamente escuras (figs. 44, 137, 138) 69
68. Comprimento 21 mm ou menos; ápice dos fêmures (fig. 133E) com anelação amarela estreita; manchas do conexivo amarelas; pronoto uniformemente preto (fig. 132)
 *patagonica*
 Comprimento 21 mm ou mais; fêmures inteiramente pretos; manchas do conexivo de cor vermelha, laranja ou muito raramente amarela; pronoto raramente completamente preto, na maioria dos exemplares com manchas avermelhadas (fig. 165C, D, F-J)
 *rubrovaria*
69. Antenas com o primeiro segmento quase atingindo o nível do ápice do clípeo (fig. 45A); rostro com pêlos longos abundantes (fig. 45B); pronoto e escutelo inteiramente pretos (figs. 43B) *brasiliensis* (parte)
 Antenas com o primeiro segmento curto, seu ápice consideravelmente afastado do nível do ápice do clípeo (figs. 137-139); rostro (fig. 139B) com pêlos curtos isolados, praticamente glabro; pronoto com manchas amareladas claras mais ou menos nítidas; processo apical do escutelo claro na ponta (fig. 138) *petrochii*

CHAVE PARA AS ESPÉCIES DE *Triatoma* DO BRASIL

1. Antenas com o primeiro segmento ultrapassando consideravelmente o ápice do clípeo (figs. 161, 162B); pronoto de cor pícea ou preta, com os bordos laterais de cor vermelha em toda a extensão (figs. 159, 161); mancha clara do conexivo sobre as suturas intersegmentares e, em faixa estreita, adiante e atrás delas (fig. 161); abdômen nitidamente achatado mediana e longitudinalmente na face ventral *rubrofasciata*
- Antenas com o primeiro segmento não atingindo ou apenas atingindo o nível do ápice do clípeo; pronoto totalmente preto ou com manchas de aspecto diverso; mancha escura do conexivo sobre as suturas intersegmentares ou em faixa larga imediatamente atrás delas; abdômen convexo ventralmente 2
2. Tibias de colorido claro uniforme, exceto o ápice (figs. 106, 181, 182) 3
- Tibias de colorido escuro uniforme ou com anelação clara subapical 4
3. Fêmures predominantemente escuros (figs. 181, 182); mancha escura do conexivo em faixa transversal larga imediatamente atrás das suturas intersegmentares (figs. 181, 182); pronoto escuro com os bordos laterais, o bordo posterior, os ângulos ântero-laterais e 1+1 faixas centrais sobre as carenas e os tubérculos discais, vermelho-alaranjados (figs. 181, 182) *tibiamaculata*
- Fêmures predominantemente claros (fig. 106); conexivo com mancha escura estreita sobre as suturas intersegmentares (figs. 106, 107C, D), daí ampliando-se para os bordos interno e externo; pronoto castanho com 1+1 manchas amareladas na região ad-humeral (fig. 106) *matogrossensis*
4. Fêmures escuros e com áreas de manchas claras (figs. 43, 44, 59, 60D; 88, 90B; 174, 175, 176C); trocanteres claros, amarelados (figs. 60D; 90B; 176C) 5
- Fêmures inteiramente, trocanteres parcialmente ou inteiramente escuros 8
5. Coxas claras (figs. 174, 175, 176C), como a maior parte dos fêmures; fêmures com anel castanho sub-apical e manchas irregulares na superfície dorsal (figs. 174, 175, 176C); pronoto castanho com 1+1 manchas amareladas nas regiões humerais (figs. 174, 175) *sordida*
- Coxas escuras, como a maior parte dos fêmures; fêmures e pronoto também de aspecto diferente para outros detalhes 6
6. Trocanteres e base dos fêmures amarelos (figs. 60D; 88, 90B); pronoto inteiramente preto (figs. 59, 87, 89) 7
- Trocanteres amarelos; fêmures claros na região sub-mediana, frequentemente anelados (figs. 43A; 44); pronoto castanho com 1+1 manchas amareladas sobre as carenas longitudinais, desde seu inicio no lobo anterior até o bordo posterior (figs. 43A; 44) *brasiliensis* (parte)
7. Marcas escuras transversais do conexivo em forma de faixas largas (figs. 87, 89); cabeça tão longa quanto o pronoto *infestans*
- Marcas escuras transversais do conexivo com a forma aproximada de notas musicais (fig. 59); cabeça mais longa que o pronoto *deanei*
8. Cabeça de comprimento maior que o do pronoto 9
- Cabeça de comprimento igual ou menor que o do pronoto 16
9. Rostro com terceiro segmento muito longo, aproximadamente do comprimento do segundo (fig. 55C); espécie pequena, com 16 mm de comprimento aproximadamente e manchas vermelhas *circummaculata*
- Rostro com terceiro segmento sempre menor que o segundo (figs. 45B; 188B); espécies maiores, com manchas de cor amarela, laranja ou vermelha 10
10. Antenas com primeiro segmento curto, bem afastado do nível do ápice do clípeo (figs. 56, 58A, C; 137-139, 189, 190A, B) 11
- Antenas com primeiro segmento atingindo ou quase atingindo o nível do ápice do clípeo (fig. 45A) 13
11. Pronoto escuro com manchas claras (figs. 137, 138); manchas claras e escuras do conexivo em forma de largas faixas transversais ocupando toda a largura do segmento (figs. 137, 138); rostro com cerdas muito curtas, espasas, quase glabro (fig. 139B); membrana com mancha escura sobre a nervura que separa as duas células (figs. 137, 138) *petrochii*
- Pronoto inteiramente escuro (figs. 56, 57, 189); manchas do conexivo diferentes; segundo e terceiro segmentos do rostro com cerdas longas e numerosas (figs. 58A; 190B); membrana sem a mancha referida 12
12. Cório dos hemélitros preto com manchas alaranjadas ou avermelhadas na metade apical (figs. 56, 57); conexivo (fig. 58B, D) preto e de contorno externo alaranjado, fracamente interrompido, ao nível das suturas interseg-

- mentares, por estreita faixa negra, que é mais nítida na face ventral; no limite interno, com o abdômen, o conexivo é todo escuro *costalimai*
- Cório dos hemélitros (fig. 189) quase totalmente amarelado, excetuado o relevo das nervuras, que são pretas; conexivo (figs. 189, 190C) quase totalmente amarelo, excetuado pequena mancha lateral externa preta sobre as suturas intersegmentares, e, dorsal mas não ventralmente com áreas muito reduzidas no limite interno *williami*
13. Hemélitros curtos, deixando visível o sétimo urotergito (figs. 127, 128); escutelo com processo apical curto (fig. 129C), e totalmente preto; cório e membrana totalmente amarelados, com nervuras escuras e membrana sem mancha central sobre as células (figs. 127, 128) *oliveirai*
- Hemélitros atingindo a extremidade abdominal (figs. 43, 44, 94, 163, 164); escutelo com processo apical longo e horizontal (fig. 43); cório e membrana com diferente conjunto de caracteres 14
14. Cório dos hemélitros em geral totalmente preto (fig. 94A, C); pronoto totalmente preto (fig. 94); manchas claras do conexivo amarelo-alaranjadas *lenti*
- Cório dos hemélitros com manchas claras (fig. 43); pronoto totalmente preto ou manchado de vermelho; manchas claras do conexivo vermelhas ou amarelas 15
15. Rosto grosso, segundo e terceiro segmentos com pêlos longos muito abundantes (fig. 45B); pronoto totalmente preto, em alguns casos as carenas do lobo posterior são parcialmente amareladas (fig. 43B); manchas claras do conexivo amarelas; cório dos hemélitros com manchas amarelas *brasiliensis* (parte)
- Rosto delgado, pouca pilosidade nos segundo e terceiro segmentos (fig. 165B); pronoto com o lobo anterior totalmente preto e o posterior manchado de vermelho em extensão variável a totalmente preto; manchas do conexivo vermelhas (figs. 163, 164, 165C, D, F-J); cório dos hemélitros com manchas vermelhas irregulares, às vezes de cor laranja ou amarela *rubrovaria*
16. Genas não ultrapassando o ápice do clípeo (figs. 112, 188) ou apenas atingindo a seu nível; clípeo fortemente alargado sub-basalmente; segundo e terceiro segmentos do rosto com pêlos longos abundantes (figs. 112B; 188B); comprimento total 25 mm ou mais 17
- Genas ultrapassando nitidamente o nível do ápice do clípeo (figs. 38B; 105A; 150A, B; 193A); clípeo muito pouco alargado sub-basalmente; segundo e terceiro segmentos do rosto com pêlos muito curtos ou somente o terceiro com pêlos longos (figs. 38A; 105B; 150B, 193B); comprimento 22 mm ou menos 18
17. Preto com manchas vermelhas (figs. 186, 187): em faixa longitudinal dorsal na cabeça desde atrás do clípeo até o sulco interocular, em 3+3 manchas no lobo posterior do pronoto sendo 1+1 entre as carenas e 2+2 entre elas e os bordos laterais, como ainda na depressão central do escutelo; pleuras e face inferior do tórax e abdômen foscos *vitticeps*
- Preto (figs. 110, 111) com 1+1 manchas amareladas na metade anterior do lobo posterior do pronoto entre as carenas e os bordos laterais, mais próximo daquelas; preto na metade restante do pronoto e no escutelo; pleuras e face inferior do tórax e abdômen muito polidas *melaenocephala*
18. Pronoto com tubérculos discais e laterais no lobo anterior (fig. 104); ângulos ântero-laterais de cor amarela clara (figs. 104, 149) 19
- Pronoto sem tubérculos discais e laterais no lobo anterior; ângulos ânterolaterais de cor preta 20
19. Cabeça com mancha vermelho-alaranjada dorsal mais ou menos extensa em forma de Y (figs. 103A; 104), sobre o clípeo, as genas, as jugas e prolongando-se, às vezes, entre os olhos, muito raramente toda preta; cabeça muito elevada atrás, na vista lateral (fig. 105B); em muitos espécimes, mancha clara na propleura e na mesopleura (fig. 105E) ou só na mesopleura; olhos grandes; rostro (fig. 105B) com primeiro segmento levemente maior que o terceiro, este com pêlos muito longos; segundo segmento do rosto grosso, de perfil (fig. 105B); processo lateral do endosoma com largas faixas longitudinais fortemente esclerosadas e sem dentículos no ápice (fig. 105D) *maculata*
- Cabeça de colorido preto uniforme dorsalmente (fig. 149), sem mancha vermelha dorsal e menos alta atrás, na vista lateral (fig. 150B); manchas claras pleurais ausentes ou só presentes na propleura; olhos menores; rostro (fig. 150B) com primeiro segmento levemente mais curto que o terceiro, este com pêlos mais curtos; segundo segmento do ros-

- tro mais delgado, de perfil; processo lateral do endosoma sem faixas longitudinais e com dentículos no ápice (fig. 150D) *pseudomaculata*
20. Pronoto de colorido escuro uniforme (fig. 37); cório dos hemélitos (fig. 37) quase totalmente escuro, com a metade apical do clavo e parte da célula corial adjacente a ela, enfumaçadas como a membrana; processos do endosoma do macho (fig. 38C, D) fortemente esclerosados, com mais da metade do falso-soma (de comprimento) e com cerca de 100 dentículos no ápice *arthurneivai*
- Pronoto escuro (figs. 191, 192) com 1+1 manchas avermelhadas nítidas nos ângulos humerais e, em alguns espécimes, com uma larga mancha avermelhada entre as carenas, perto do bordo posterior; cório (figs. 191, 192) dos hemélitos com manchas avermelhadas grandes e confluentes; processos do endosoma (fig. 193C, D) fracamente esclerosados, com não mais de metade do comprimento do falso-soma e somente com cerca de 20 dentículos apicais. *wygodzinskyi*
- CHAVE PARA AS ESPECIES DE *Eratyrus***
1. Lobo anterior do pronoto com 1+1 espinhos discais fortes (figs. 197, 198A, E-G); ângulos humerais do pronoto nitidamente espinhosos (figs. 196, 197, 198A, H-N); cório com mancha subapical avermelhada comparativamente pequena, anteriormente não atingindo o nível da nervura transversa m-cu (figs. 196, 197, 198B-D); parte livre da vesica convexa no ápice, na vista lateral (fig. 195H) *mucronatus*
 - Lobo anterior do pronoto com 1+1 tubérculos discais pouco elevados e arredondados no ápice (figs. 195A, B); ângulos humerais do pronoto (fig. 195A, B) apenas aguçados ou pontudos, mas não espinhosos; mancha subapical avermelhada do cório relativamente grande, atingindo ou ultrapassando anteriormente o nível da nervura transversa m-cu (figs. 194, 195F); parte livre da vesica achata ou levemente côncava no ápice, na vista lateral (fig. 195G) *cuspidatus*
- CHAVE PARA AS ESPÉCIES DE *Panstrongylus***
1. Processo apical do escutelo alongado, subcilíndrico, afilando para a ponta (figs. 215C; 217, 220, 223, 228, 238, 246, 247) 2
 - Processo apical do escutelo curto, arredondado, conico ou truncado na ponta (figs. 226C; 231B, 235, 236D; 242D; 244) 9
 2. Espécimes quase totalmente pretos (figs. 213, 214); lobo posterior do pronoto com manchas avermelhadas nos ângulos humerais e submedianamente no bordo posterior (fig. 215B), em alguns casos apenas perceptíveis; segmentos do conexivo dorsal com pequena mancha vermelha nos ângulos póstero-laterais (figs. 213, 214, 215D) *chinai*
 - Espécimes de coloração diferente 3
 3. Abdômen ventralmente de cor clara, com séries longitudinais de manchas pretas (figs. 219, 221E) 4
 - Abdômen de colorido diferente, sem séries de manchas pretas 5
 4. Comprimento maior do que 20 mm; cabeça, de perfil, comparativamente curta e forte (fig. 221B); pronoto com manchas pretas conspicuas (figs. 219A; 220); todos os segmentos do conexivo com manchas pretas e claras intercaladas (figs. 219, 220, 221E) *geniculatus*
 - Comprimento menor do que 20 mm; cabeça mais delgada, de perfil (fig. 233C); pronoto sem manchas pretas distintas (fig. 232); segmentos do conexivo dorsal de cor clara, só o disco dos terceiro e quarto segmentos com pequena mancha preta cada um *lenti*
 5. Rostro com o segundo segmento tão longo ou mais curto que o primeiro (fig. 248D, E) *tupynambai*
 - Rostro com o segundo segmento constantemente maior que o primeiro (figs. 218C; 224B; 229B; 239B) 6
 6. Cório amarelo, exceto na extrema base e subapicalmente (figs. 227, 228), contrastando fortemente com a membrana de cor cinza escuro; abdômen ventral preto, com o conexivo e as partes laterais dos urosternitos contrastando devido ao seu colorido amarelo (fig. 229C); distância interocular dorsal muito menor que o dobro da largura do olho visto dorsalmente (fig. 229A); fêmures com leves saliências subapicais, mas sem dentículos *howardi*
 - Cório tão escuro quanto a membrana, com a base e o ápice de colorido mais claro (figs. 217, 222, 223, 237, 238); abdômen ventral uniformemente castanho-avermelhado; distância interocular dorsal com o dobro da largura do olho visto dorsalmente, ou mais do dobro (figs. 218A; 224A; 238, 239A); fêmures anteriores e medianos com vários

- dentículos conspicuos (figs. 218B; 224C, D; 238C) 7
7. Lobo anterior do pronoto com tubérculos discais bem desenvolvidos (figs. 238, 239) ... *lutzii*
Lobo anterior do pronoto somente com tubérculos discais obsoletos ou sem eles (figs. 217, 218D; 223, 224E) 8
8. Ângulos ântero-laterais do pronoto muito curtos, apenas obtusos (fig. 218D); face superior da cabeça reta, quando vista de perfil (fig. 218C); fêmures anteriores e medianos com dois a três dentículos cada um (fig. 218B); bordos laterais dos lobos anterior e posterior do pronoto constituindo uma linha praticamente contínua (figs. 216, 217, 218D) *diasi*
Ângulos ântero-laterais do pronoto alongados, salientes (figs. 222, 223, 224B, E); cabeça, de perfil, nitidamente convexa em cima (fig. 224B); fêmures anteriores e médios (fig. 224C, D) com mais de três dentículos cada um; bordos laterais dos lobos anterior e posterior do pronoto formando ângulo nítido (figs. 222, 223, 224E) *guentheri*
9. Jugas obtusas (fig. 245B); tubérculos do lobo anterior do pronoto avermelhados; conexivo com mancha escura isolada no centro de cada segmento, bem como faixa transversal escura estreita adjacente ao bordo anterior do segmento (figs. 243, 244, 245J, K); tegumento dorsal do corpo com numerosas cerdas douradas deitadas; colorido geral dos hemélitos verde pálido ... *rufotuberculatus*
Jugas curvadas em forma de gancho (figs. 226D; 231C; 236E; 242B, C); tubérculos do lobo anterior do pronoto não avermelhados ou raramente assim coloridos; conexivo com mancha escura grande na parte anterior de cada segmento, a parte posterior sendo clara (figs. 225, 230, 234, 235, 240, 241); tegumento do corpo praticamente glabro; cor geral dos hemélitos não esverdeada 10
10. Inseto preto com manchas vermelhas; terceiro segmento antennal distintamente menor que o segundo (fig. 242A); lobo posterior do pronoto preto com 2+2 manchas grandes de cor vermelha (figs. 240, 241) *megistus*
Insetos amarelados ou castanho-amarelados com manchas amarelas complexas (figs. 225, 230, 234, 235); terceiro segmento antennal tão longo quanto o segundo; lobo posterior do pronoto de cor clara, com uma faixa mediana preta e 2+2 manchas sublaterais, longitudinais e estreitas, também pretas (figs. 226B; 230, 234, 235) 11
11. Escutelo amarelado, com faixa preta mediana longitudinal (fig. 230); processo posterior do escutelo com forte corcova basal (fig. 231B); lobo anterior do pronoto sem tubérculos sublaterais (fig. 231D) *humeralis*
Escutelo preto com faixa amarela mediana longitudinal (figs. 226C; 234, 235); processo posterior do escutelo com leve corcova basal (fig. 236D); lobo anterior do pronoto sempre com tubérculos sublaterais, além dos tubérculos discais e laterais (figs. 226B; 236C) 12
12. Tíbias pretas com pequena mancha sub-basal amerela (figs. 234, 235, 236B); cabeça relativamente curta; relação comprimento da cabeça para comprimento do pronoto = 1:1,3-1,4 *lignarius*
Tíbias inteiramente pretas (fig. 225); cabeça relativamente longa; relação comprimento da cabeça para comprimento do pronoto = 1:1,1-1,15 *herreri*

CHAVE PARA AS ESPÉCIES DE *Rhodnius*

- Colorido geral da cabeça e das patas constituído de pequenas manchas e pontos irregulares que produzem aspecto sarapintado (figs. 257, 268, 269, 273, 274) 2
Colorido de cabeça e patas mais uniforme, sem as pequenas manchas irregulares causadoras do aspecto sarapintado (figs. 251, 254, 259, 262, 263, 266, 271, 276, 277, 279, 280) 4
- Tíbias de todos os pares de patas com anel submediano escuro (figs. 273, 274); olhos invariavelmente mais largos que a distância interocular dorsal (fig. 255A); conexivo dorsal com manchas retangulares escuras com forte projeção posterior em ponta, pelo menos nos segmentos 3 a 5 (figs. 273, 274); processo mediano do pigóforo profundamente bifurcado em dois espinhos (fig. 275D) *pictipes*
Tíbias sem o anel escuro acima indicado (figs. 257, 268); olhos não mais largos que a distância interocular dorsal (figs. 258A; 269); conexivo dorsal com manchas retangulares escuras sem a projeção posterior em ponta (figs. 257, 268, 269); processo mediano do pigóforo não bifurcado (figs. 258C; 270C). 3
- Espécie de tamanho grande, cerca de 22 mm de comprimento; cabeça proporcionalmente muito alongada, sensivelmente maior do que

- o pronoto (relação = 1:0,80-0,85), tão longa quanto o pronoto mais o escutelo sem seu processo apical (figs. 268, 270); região ante-ocular com mais de três vezes o comprimento da pós-ocular, na vista dorsal (figs. 269, 270A); manchas retangulares do conexivo dorsal bem constituidas (figs. 268, 269) *pallescens*
- Espécie de tamanho pequeno, cerca de 14 mm de comprimento; cabeça proporcionalmente mais curta, somente pouco maior que o pronoto (relação 1:0,90-0,95) (figs. 257, 258A); região ante-ocular com menos de três vezes o comprimento da pós-ocular, na vista dorsal (fig. 258A); manchas escuras do conexivo dorsal difusas (fig. 257) *ecuadoriensis*
4. Patas nitidamente aneladas (figs. 271, 272F); fêmures anteriores com menos de quatro vezes de comprimento em relação à largura (fig. 272B); processo do pigóforo bifido (fig. 272D, E) *paraensis*
- Patas não aneladas; fêmures anteriores com mais de quatro vezes de comprimento em relação à largura; processo do pigóforo não bifido 5
5. Pronoto totalmente castanho escuro ou preto, inclusive as carenas (figs. 265, 266); manchas conexivas avermelhadas, muito pequenas e situadas nos ângulos póstero-laterais dos segmentos 3 a 6 ou 7 (figs. 265, 266) *neivai*
- Pronoto pardo-amarelado com partes castanho-escuras ou enegrecidas (figs. 251, 252, 254, 255, 259, 260, 262, 263, 279, 280); conexivo dorsal com mancha retangular escura em cada segmento (figs. 251, 252, 254, 255, 259, 260, 262, 263, 276, 277, 279, 280) 6
6. Cabeça proporcionalmente curta, tão comprida ou levemente maior que o pronoto (relação = 1:0,95-1,0) (figs. 254, 255); processo mediano do pigóforo retangular (fig. 256C) *domesticus*
- Cabeça proporcionalmente longa, de comprimento sensivelmente maior que o pronoto (relação = 1:0,65-0,80); processo mediano do pigóforo alongado, de ponta afilada ou romba (figs. 253D; 261D; 264D; 278D; 281F) 7
7. Lobo posterior do pronoto uniformemente preto entre as carenas submedianas, que são claras, e entre estas e os bordos laterais, também claros (figs. 251, 252); antenas com o terceiro segmento maior que o segundo (figs. 252, 253C); olhos distintamente mais largos na vista dorsal que a distância interocular (figs. 251, 252, 253A) *brethesii*
- Lobo posterior do pronoto com a área entre as carenas sub-medianas ocupada por duas faixas escuras separadas por linha clara longitudinal do tegumento (figs. 259, 260, 262, 263, 264A; 276; 277); antenas com o terceiro segmento menor que o segundo; olhos, na maioria das espécies, tão largos ou menos largos do que a distância interocular dorsal 8
8. Angulos ântero-laterais do pronoto salientes, dirigidos para diante (figs. 261A, C; 264A, C); faixas escuras do lobo posterior do pronoto confluentes, principalmente as situadas entre as carenas submedianas e os bordos laterais (figs. 260, 262, 263, 264A) 9
- Angulos ântero-laterais do pronoto arredondados, não muito salientes (figs. 278C; 281B); faixas escuras do lobo posterior do pronoto distintamente separadas (figs. 277, 279, 280) 10
9. Colorado geral castanho-escuro; trocanteres muito claros, contrastando fortemente com os fêmures, escuros; conexivo dorsal e ventral com manchas escuras muito bem delimitadas em cada segmento (figs. 262, 263); abdômen na face ventral com mancha longitudinal mediana amarelada que se prolonga ao metasterno; antena com o terceiro segmento com a parte basal escura e a apical clara (fig. 263); processo mediano do pigóforo estreito na base (fig. 264D) *neglectus*
- Colorado geral castanho-avermelhado claro; trocanteres não contrastando nitidamente com o colorido dos fêmures; conexivo dorsal com manchas escuras apenas esboçadas (figs. 259, 260), especialmente na superfície ventral; abdômen na face ventral sem a área clara mencionada; antena com o terceiro segmento com a parte basal clara e a apical escura (figs. 260, 261A); processo mediano do pigóforo largo na base (fig. 261D) *nasutus*
10. Espécie menor, comprimento dos machos 17,5-20 mm, das fêmeas 19,5-21,5 mm; região ante-ocular com pouco mais de três vezes o comprimento da pós-ocular (fig. 278A); distância interocular dorsal maior que a largura dorsal de um olho, na maioria dos espécimes; suporte do falosoma como na fig. 278E (ninfas IV e V com as tibias uniformemente escuras) *prolixus*
- Espécie maior, comprimento dos machos 20-23,5 mm, das fêmeas 23-26 mm; região ante-ocular quatro vezes mais longa que a pós-ocular (fig. 280); distância interocular dorsal menor ou igual a largura de um olho

nesse aspecto; suporte do falosoma como na figura 281E (ninfas IV e V com tibias nitidamente claras, em comparação com os fêmures, somente seus ápices escuros) *robustus*

Rhodnius dalessandroi Carcavallo & Barreto não pôde ser incluído nesta chave.

CHAVE PARA AS ESPÉCIES DE *Psammolestes*

1. Tegumento da cabeça e do tórax muito polido e brilhante; cabeça sem constrição antes do pescoço, quando observada de perfil (fig. 284B); cabeça dorsalmente com larga faixa amarelada ocupando inteiramente a região interocular (figs. 282, 283); rosto com terceiro segmento e ápice do segundo provido de pelos longos (fig. 284B); ângulos ântero-laterais do pronoto muito salientes e projetados até o nível dos ocelos (figs. 282, 283, 284A); genitália do macho com suporte do falosoma grande, constituído de duas estruturas fusionadas (fig. 284C) *arthuri*
Tegumento da cabeça e tórax fosco; cabeça constricta antes do pescoço, quando observada lateralmente (figs. 287B, 290C); cabeça dorsalmente castanho-amarelada clara e pintada de escuro ou escura e com estreita linha longitudinal dorsal amarela; rosto com terceiro e segundo segmentos inteiramente revestidos de pelos longos (fig. 290C); ângulos ântero-laterais do pronoto mais curtos, não atingindo adiante o nível dos ocelos (figs. 287A, 290D); genitália do macho com suporte do falosoma menor, composto de duas estruturas separadas (figs. 23A, 290F) 2
2. Cabeça tão longa ou levemente mais curta que a largura ao nível dos olhos (figs. 285, 286, 287A); região anteocular não mais do que o dobro do comprimento da pós-ocular (fig. 287A); cabeça em declive acentuado atrás dos ocelos (fig. 287B); ângulos ântero-laterais do pronoto acuminados (figs. 286, 287A); genitália do macho com suporte do falosoma muito pequeno e em forma de

ganchos, a esclerosação dorsal do falosoma em forma semi-elística (fig. 23A) *coreodes*
Cabeça de comprimento levemente maior que a largura ao nível dos olhos (fig. 290D); região anteocular com duas a duas e meia vezes o comprimento da pós-ocular (fig. 290D); cabeça em declive moderado atrás dos ocelos (fig. 290C); ângulos ântero-laterais do pronoto muito curtos, rombos (fig. 290D); genitália do macho com suporte do falosoma em forma de dois SS alargados e esclerosação dorsal do falosoma arredondada apicalmente (fig. 290E) *tertius*

CHAVE PARA AS ESPECIES DE *Parabelminus*

1. Cabeça espessada (figs. 309, 310, 311F); largura do olho menor do que a metade da distância interocular dorsal; pronoto com os lados quase constituindo uma linha contínua (figs. 309, 310); ângulos ântero-laterais pontudos (fig. 310) *carioca*
Cabeça delgada (figs. 312, 313A); largura do olho com pouco mais da metade da distância interocular dorsal; pronoto com os lados formando ângulos conspícuos (figs. 312, 313A); ângulos ântero-laterais arredondados (figs. 312, 313A) *yurupucu*

CHAVE PARA AS ESPÉCIES DE *Microtriatoma*

1. Hemélitos com membrana manchada de claro e escuro (fig. 316A, B); cabeça delgada, de perfil (fig. 318B, I, N-R, W, X); cabeça com a região pós-ocular no máximo uma vez e meia (1.6:1) mais larga que longa (fig. 318A, D-H, J-M); terceiro segmento do rostro muito mais curto que o primeiro (0.7-0.8:1) (fig. 318I, P, K) *trinidadensis*
Hemélitos com membrana uniformemente escura (fig. 314); cabeça espessada, de perfil (fig. 315A); cabeça com a região pós-ocular mais que uma vez e meia tão larga quanto longa (1.8:1) (fig. 315C); terceiro segmento do rostro tão longo quanto o primeiro (fig. 315A) *borbai*

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INDEX OF TRIATOMINAE

Valid names are in Roman type, invalid names in *italics*; family group names in CAPS and SMALL CAPS. Page numbers in boldface type refer to main references for valid names.

- africana*, *Triatoma* 392
- africanus*, *Panstrongylus* 392
- Alberprosenia 140, 143, 144, 169, 171, 180, **460**, 464, 465, 467, 483, 484, 486
- ALBERPROSENIINI 135, 158, 178, 180, **460**, 467, 486
- amazonicus*, *Rhodnius* 419, 421
- ambigua*, *Triatoma* 321
- ambigua*, *Triatoma sanguisuga* 321, 324
- amicitiae, *Triatoma* 184, 187, 192, **199**, 470, 489
- apachensis*, *Triatoma incrassata* 243, 244
- arthuri*, *Eutriatoma* 427
- arthuri, *Psammolestes* 137, 142, 146, 147, 149, 164, 165, 166, 167, 170, 173, 174, 264, **427**, 482, 499
- arthurneivai, *Triatoma* 138, 167, 184, 190, 199, **201**, 345, 473, 492, 496
- bahiensis*, *Triatoma* 253, 255
- bahiensis*, *Triatoma pessoai* 253, 254, 255
- barberi, *Triatoma* 136, 147, 164, 165, 167, 183, 188, 195, **203**, 302, 470, 471, 476, 490
- Belminus 142, 163, 169, 171, 174, 179, 437, **440**, 464, 465, 466, 483, 484, 485
- Bolbadea* 438
- Bolbodera 143, 171, 179, 437, **438**, 464, 465, 467, 483, 484, 486
- BOLBODERINI 135, 142, 146, 153, 158, 162, 178, **433**, **437**, 485
- borbai, *Microtriatoma* **457**, 483, 499
- bouvieri*, *Panstrongylus* 204
- bouvieri, *Triatoma* 184, 190, 192, **204**, 472, 491
- brasiliensis*, *Conorhinus* 206
- brasiliensis, *Triatoma* 167, 184, 186, 190, 191, 198, **206**, 291, 292, 468, 474, 487, 492, 493, 494, 495
- brethesi, *Rhodnius* 146, 405, 406, **407**, 481, 498
- breyeri, *Triatoma* 185, 188, 189, 197, **208**, 470, 472, 479, 490, 491
- bruchi*, *Triatoma* 316, 319
- brumpti*, *Rhodnius* 411
- bruneri*, *Nesotriatoma* 232, 234
- Callotriatoma* 438
- capitata*, *Triatoma* 223
- capitata*, *Triatoma dimidiata* 223
- carioca, *Parabelminus* 146, 161, **452**, 499
- carnifex*, *Cenaeus* 352
- carnifex*, *Linshcosteus* **352**
- carrioni*, *Eutriatoma* 211
- carrioni*, *Triatoma* 136, 184, 191, 196, **211**, 474, 478, 493
- Cavernicola 143, 146, 149, 158, 162, 163, 167, 170, 174, 179, **433**, 465, 466, 483, 484, 485
- cavernicola, *Triatoma* 165, 167, 184, 187, 192, **213**, 464, 470, 489
- CAVERNICOLINI 135, 158, 178, 179, **433**, 466, 485
- Cenaeus* 351
- chagasi*, *Triatoma* 339
- chilena*, *Triatoma* 330
- chinai*, *Panstrongylus* 136, 163, 164, 165, 166, 167, 169, 363, **366**, 479, 496
- chinai*, *Triatoma* 366
- chota*, *Linshcosteus* 160, 352, **354**
- circummaculata*, *Neotriatoma* 182, 214
- circummaculata*, *Triatoma* 166, 167, 182, 184, 186, 196, 198, **214**, 258, 259, 469, 478, 488, 494
- circummaculata*, *Triatoma (Neotriatoma)* 214
- circummaculatus*, *Conorhinus* 182, 214
- claviger*, *Cimex* 312
- cochimiensis*, *Triatoma rubida* 309, 312
- confumus*, *Linshcosteus* 352, **355**
- CONORHINARIA 175
- CONORHINIDAE 175
- CONORHININI 175
- Conorhinus* 181, 182
- coreodes, *Psammolestes* 149, 150, 151, 161, 165, 166, 167, 174, 300, **429**, 433, 482, 499
- coreodes, *Psammolestes* 431
- corticalis*, *Conorhinus* 370
- corticalis*, *Lamus* 370
- costalimai, *Triatoma* 184, 190, 198, **216**, 473, 492, 495
- costaricensis, *Belminus* **443**, 482
- costalis, *Linshcosteus* 352, **357**
- coxo-rufa*, *Triatoma* 395
- cubana*, *Callotriatoma* 439
- cuspidatus*, *Eratyrus* 145, **346**, 348, 479, 496
- dallasi*, *Triatoma breyeri* 209
- dalessandroi, *Rhodnius* 407, **408**, 482, 499
- deanei, *Triatoma* 167, 186, 198, **218**, 468, 487, 494
- delpontei, *Triatoma* 132, 137, 140, 152, 155, 167, 184, 190, 197, **220**, 473, 478, 492
- diasi, *Panstrongylus* 366, **368**, 480, 497
- dimidiata, *Triatoma* 136, 146, 156, 167, 168, 185, 189, 194, 195, 196, **222**, 471, 475, 477, 490
- dimidiatus*, *Conorhinus* 222

- dimidiatus*, *Conorhinus* 222
dimidiatus, *Reduvius* 130, 222
diminutus, *Conorhinus* 449
diminutus, *Marlianus* 449
Dipetalogaster 135, 142, 153, 155, 158, 163, 169, 171, 174, 178, 179, 180, 181, 360, 464, 466, 467, 483, 485, 487
dispar, *Triatoma* 167, 184, 191, 195, 196, 225, 474, 477, 478, 493
domesticus, *Rhodnius* 406, 408, 481, 498
dunni, *Rhodnius* 416
- ecuadoriensis*, *Rhodnius* 136, 137, 406, 410, 481, 498
Eratyrus 135, 142, 148, 149, 153, 155, 156, 158, 162, 163, 169, 171, 174, 178, 179, 180, 181, 346, 464, 466, 467, 483, 485, 486
eratyrusiforme, *Eratyrus* 228
eratyrusiforme, *Triatoma* 228
eratyrusiformis, *Triatoma* 138, 148, 155, 165, 166, 167, 182, 185, 189, 197, 228, 472, 479, 491
erythrophthalmus, *Triatoma infestans* 247
erythrozonias, *Cimex* 312
Eutriatoma 181, 182
evandroi, *Triatoma* 313
- flavida*, *Conorhinus* 232
flavida, *Eutriatoma* 232
flavida, *Nesotriatoma* 232
flavida, *Triatoma* 148, 149, 167, 182, 185, 187, 195, 232, 321, 469, 476, 489
flavida, *Triatoma (Eutriatoma)* 232
flavidus, *Meccus* 232
floridana, *Triatoma lecticularius* 250
fluminensis, *Triatoma* 370
- garciabesi*, *Triatoma* 327, 330
geniculata, *Triatoma* 370
geniculatus, *Conorhinus* 370
geniculatus, *Lamus* 370
geniculatus, *Mestor* 370
geniculatus, *Panstrongylus* 132, 136, 138, 139, 167, 168, 365, 370, 479, 496
geniculatus, *Reduvius* 130, 370
gerstaeckeri, *Conorhinus* 234, 471
gerstaeckeri, *Triatoma* 165, 166, 167, 185, 189, 193, 194, 234, 475, 476, 491
gigantii, *Reduvius* 312
gigas, *Cimex* 312
gigas, *Conorhinus* 247, 312, 392
gigas, *Nabis* 312
gigas, *Reduvius* 182, 312
gigas, *Triatoma* 312
gomesi, *Eutriatoma* 316
goyovargasi, *Alberprosenia* 139, 167, 170, 462
gracilipes, *Conorhinus* 247
guasayana, *Triatoma* 136, 137, 165, 167, 184, 186, 197, 236, 288, 468, 478, 487
guazu, *Triatoma* 185, 191, 197, 238, 474, 479, 493
guentheri, *Panstrongylus* 143, 160, 366, 375, 480, 497
güntheri, *Panstrongylus* 375
guentheri, *Triatoma* 375
- hegneri*, *Triatoma* 185, 189, 194, 241, 471, 475, 491
heidemanni, *Conorhinus* 250
heidemanni, *Triatoma* 250
herreri, *Belminus* 443, 445, 482
herreri, *Panstrongylus* 136, 165, 166, 167, 366, 378, 480, 497
hirsuta, *Paratriatoma* 132, 138, 140, 143, 145, 155, 160, 163, 165, 166, 167, 170, 175, 401
hirsuta, *Paratriatoma hirsuta* 401
holmbergi, *Triatoma* 339
holmbergi, *Triatoma chagasi* 339
howardi, *Panstrongylus* 380, 480, 496
howardi, *Triatoma* 380
humeralis, *Mestor* 382
humeralis, *Panstrongylus* 366, 382, 480, 497
- immaculata*, *Conorhinus* 261
incrassata, *Triatoma* 183, 188, 193, 195, 243, 470, 476, 490
incrassata, *Triatoma incrassata* 243, 244
indictiva, *Triatoma* 184, 189, 193, 194, 236, 244, 246, 472, 476, 491
indictiva, *Triatoma sanguisuga* 244
infestans, *Conorhinus* 246
infestans, *Reduvius* 130, 246
infestans, *Triatoma* 130, 132, 136, 137, 139, 164, 165, 166, 167, 168, 172, 175, 184, 186, 196, 197, 198, 219, 238, 246, 300, 319, 468, 477, 478, 487
intermedia, *Triatoma phyllosoma* 259, 261, 295
- jaegeri*, *Triatoma rubida* 309, 312
- kali*, *Linchcosteus* 145, 152, 352, 358
kamiensis, *Paratriatoma hirsuta* 401
- Lamus* 363
larrousei, *Panstrongylus* 375
larrousei, *Triatoma* 375
lateralis, *Conorhinus* 321, 324
leabrusa, *Bolbadea* 435
lecticularia, *Triatoma* 137, 140, 164, 165, 166, 167, 179, 184, 186, 192, 194, 250, 469, 475, 488
lecticularius, *Conorhinus* 250

- lectularius*, *Conorhinus* 250
lenti, *Panstrongylus* 365, **384**, 479, 496
lenti, *Triatoma* 164, 165, 166, 167, 184, 188, 198, **253**, 471, 490, 495
lenticularius, *Conorhinus* 250
leopoldi, *Conorhinus* 255
leopoldi, *Triatoma* 184, 189, 192, **255**, 472, 491
lignarius, *Conorhinus* 386
lignarius, *Conorrhinus* 386
lignarius, *Eratyrus* 386
lignarius, *Lamus* 386
lignarius, *Mestor* 386
lignarius, *Panstrongylus* 167, 170, 176, 366, **386**, 480, 497
lignarius, *Triatoma* 386
limai, *Neotriatoma* 182, 257
limai, *Triatoma* 183, 184, 186, 196, **255**, 478, 488
limai, *Triatoma circummaculata* 257
limai, *Triatoma (Neotriatoma)* 257
limbatus, *Conorhinus* 312
limosus, *Conorhinus* 419, 422
Linschcosteus 135, 142, 149, 153, 155, 156, 163, 167, 169, 171, 178, 179, 180, 181, **351**, 464, 466, 467, 483, 485, 486
longipennis, *Triatoma* 153, 165, 166, 167, 184, 187, 194, **259**, 295, 296, 469, 475, 488
longipennis, *Triatoma phyllosoma* 259, 261
longipes, *Triatoma* 306
lutulentus, *Conorrhinus* 370
lutzi, *Panstrongylus* 143, 167, 366, **389**, 400, 480
lutzi, *Triatoma* 389
macromelasoma, *Triatoma brasiliensis* 206

maculata, *Eutriatoma* 261
maculata, *Triatoma* 136, 144, 145, 147, 154, 160, 165, 166, 167, 172, 184, 190, 196, 199, **261**, 305, 473, 477, 492, 495
maculatus, *Conorhinus* 130, 261
maculatus, *Conorrhinus* 261
maculipennis, *Conorhinus* 222
maculipennis, *Conorhinus dimidiata* 223
maculipennis, *Conorhinus dimidiatus* 222
maculipennis, *Triatoma* 222
mansosotoi, *Microtriatoma* 458
Marlianus 440
matogrossensis, *Triatoma* 167, 170, 184, 186, 197, **264**, 468, 487, 494
matogrossensis, *Triatoma (Eutriatoma)* 264
maxima, *Eutriatoma* 360
maxima, *Triatoma* 360
maximus, *Conorhinus* 360
maximus, *Dipetalogaster* 134, 139, 143, 145, 147, 149, 155, 157, 158, 160, 164, 165, 166, 167, 168, 170, 178, **360**
mazzae, *Triatoma* 247
mazzottii, *Triatoma* 153, 184, 187, 193, **266**, 295, 469, 475, 488
mazzottii, *Triatoma phyllosoma* 266
Meccus 181, 182
megista, *Triatoma* 392
megistus, *Conorhinus* 129, 391
megistus, *Lamus* 392
megistus, *Mestor* 392
megistus, *Panstrongylus* 129, 136, 137, 138, 164, 165, 166, 167, 170, 172, 366, **391**, 480, 497
megistus, *Triatoma* 392
melanica, *Triatoma brasiliensis* 206
melanocephala, *Triatoma* 184, 188, 199, **267**, 471, 490, 495
Mepraia 181
Mestor 363
mexicana, *Conorhinus rubrofasciatus* 309
mexicana, *Eutriatoma* 309
mexicana, *Triatoma* 148, 182, 184, 189, 193, **270**, 471, 474, 490
mexicana, *Triatoma* 309
mexicanus, *Conorhinus* 130, 270
mexicanus, *Meccus* 270
Microtriatoma 140, 149, 155, 162, 167, 171, 179, 437, 452, **454**, 464, 465, 467, 483, 484, 485
migrans, *Triatoma* 156, 184, 190, 192, 206, **271**, 472, 491
mucronatus, *Conorhinus* 349
mucronatus, *Eratyrus* 150, 151, 160, 164, 165, 166, 167, 170, 172, 346, **349**, 479, 496

nahuaiae, *Triatoma protracta* 300, 302, 303
nasutus, *Rhodnius* 406, **411**, 481, 498
navajoensis, *Triatoma protracta* 300, 302
neglectus, *Rhodnius* 137, 166, 406, **413**, 481, 498
neivai, *Rhodnius* 164, 165, 166, 167, 406, **415**, 481, 498
neivai, *Triatoma* 339
neivai, *Triatoma chagasi* 339
neotomae, *Conorhinus* 156, 273
neotomae, *Triatoma* 165, 166, 179, 183, 189, 193, **273**, 279, 280, 472, 491
Nesotriatoma 181
Nesotriatoma 181, 182
nigricollis, *Triatoma longipes* 306
nigricollis, *Triatoma recurva* 306
nigromaculata, *Eutriatoma* 275
nigromaculata, *Triatoma* 167, 185, 186, 196, **275**, 468, 477, 487
nigromaculatus, *Conorhinus* 275
nigrovarius, *Conorhinus* 247
ninioi, *Triatoma* 228
niñoi, *Triatoma* 228
nitida, *Triatoma* 167, 183, 189, 194, 195, **278**, 472, 476, 477, 491
novaeguineae, *Triatoma* 255

obscura, *Nesotriatoma* 280
obscura, *Triatoma* 149, 182, 185, 187, 195, **280**,

- 469, 476, 489
occidentalis, *Triatoma sanguisuga* 244
occulata, *Conorhinus* 250
occulta, *Triatoma* 250
occulta, *Triatoma lecticularius* 250
ocellata, *Triatoma* 309
octotuberculatus, *Conorrhinus* 247
oliveirai, *Eutriatoma* 282
oliveirai, *Triatoma* 185, 191, 198, 282, 474, 493, 495
oliveirai, *Triatoma* (*Eutriatoma*) 282
oswaldoi, *Eutriatoma* 247
oswaldoi, *Triatoma* 247
pallescens, *Rhodnius* 406, 410, 411, 416, 481, 498
pallidipennis, *Meccus* 284
pallidipennis, *Triatoma* 136, 165, 166, 167, 186, 193, 261, 284, 295, 296, 469, 475, 488
pallidipennis, *Triatoma phyllosoma* 284
pallidula, *Triatoma* 271, 273
Panstrongylus 135, 140, 142, 149, 152, 155, 156, 158, 160, 162, 163, 169, 170, 174, 178, 179, 180, 181, 363, 464, 465, 466, 467, 483, 484, 485
papagoensis, *Paratriatoma hirsuta* 401
Parabelminus 154, 155, 158, 162, 163, 167, 171, 174, 179, 437, 438, 451, 454, 464, 465, 466, 483, 484, 485
paraensis, *Rhodnius* 405, 406, 418, 481, 498
parageniculatus, *Panstrongylus* 370
Paratriatoma 142, 158, 162, 169, 170, 174, 178, 180, 181, 401, 433, 464, 465, 467, 484, 486
patagonica, *Eutriatoma* (*Triatoma*) 287
patagonica, *Triatoma* 136, 167, 184, 191, 197, 286, 474, 479, 493
Paulseni, *Conorrhinus* 247
peninsularis, *Triatoma* 167, 169, 175, 183, 187, 195, 288, 302, 324, 470, 476, 489
peninsularis, *Triatoma protracta* 288
peruvianus, *Belminus* 143, 146, 149, 150, 151, 161, 164, 165, 166, 167, 170, 179, 443, 447, 482
pessoai, *Triatoma* 253
petrochii, *Eutriatoma* 290
petrochii, *Triatoma* 184, 191, 198, 290, 474, 493, 494
phyllosoma, *Conorrhinus* 130, 182, 292, 316
phyllosoma, *Meccus* 264, 292
phyllosoma, *Triatoma* 136, 150, 167, 187, 193, 260, 267, 292, 295, 296, 469, 475, 488
phyllodomus, *Meccus* 292
pictipes, *Rhodnius* 137, 142, 143, 146, 147, 165, 167, 406, 411, 419, 480, 497
picturata, *Triatoma* 184, 187, 194, 295, 296, 469, 475, 488
picturata, *Triatoma phyllosoma* 261, 296
pilosa, *Cavernicola* 132, 140, 143, 144, 145, 146, 149, 152, 155, 161, 163, 165, 166, 167, 170, 173, 434
pimae, *Paratriatoma hirsuta* 401
pintoi, *Triatoma* 321
platensis, *Triatoma* 132, 137, 140, 149, 152, 167, 175, 182, 184, 190, 197, 297, 321, 473, 478, 492
porrigens, *Conorrhinus* 392
porteri, *Triatomaptera* 182, 330
probixus, *Rhodusisu* 232
prolixus, *Rhodnius* 136, 139, 149, 151, 161, 165, 166, 167, 170, 173, 232, 407, 413, 422, 482, 498
prolixus, *Rhodurus* 146, 232
protracta, *Triatoma* 137, 139, 160, 165, 166, 167, 174, 178, 183, 187, 193, 195, 290, 300, 470, 476, 489
protracta, *Triatoma protracta* 300
protractus, *Conorrhinus* 300
Psammolestes 135, 140, 146, 152, 153, 162, 169, 171, 179, 426, 464, 465, 467, 483, 484, 486
PSAMMOLESTIINI 403, 404
pseudomaculata, *Triatoma* 160, 167, 184, 190, 199, 264, 303, 473, 492, 496
pugasi, *Triatoma* 184, 187, 305, 470, 489
recurva, *Triatoma* 138, 167, 185, 188, 193, 194, 306, 471, 475, 490
recurvus, *Conorrhinus* 306
renggeri, *Conorrhinus* 247
RHODNIINI 135, 146, 158, 162, 163, 178, 179, 403, 433, 467, 486
Rhodnius 135, 140, 143, 146, 152, 153, 155, 158, 162, 163, 169, 171, 174, 180, 404, 464, 466, 467, 483, 484, 486
robustus, *Rhodnius* 165, 166, 167, 407, 424, 482
rosenbuschi, *Triatoma* 297
rubida, *Triatoma* 136, 156, 165, 166, 167, 184, 188, 189, 190, 192, 194, 309, 470, 472, 475, 489, 491, 492
rubidus, *Conorrhinus* 309
rubrofasciata, *Triatoma* 135, 140, 141, 143, 145, 148, 149, 150, 155, 156, 159, 163, 165, 166, 167, 170, 177, 179, 184, 186, 192, 195, 196, 197, 312, 469, 476, 477, 478, 488, 494
rubrofasciatus, *Cimex* 130, 182, 312
rubrofasciatus, *Conorrhinus* 312
rubrofasciatus, *Conorrhinus* 309
rubroniger, *Conorrhinus* 316, 319
rubrovaria, *Eutriatoma* 316
rubrovaria, *Triatoma* 139, 165, 184, 191, 197, 198, 216, 316, 474, 479, 493, 495
rubrovaria, *Triatoma* (*Eutriatoma*) 316
rubro-varius, *Conorrhinus* 130, 316
rufofasciata, *Triatoma* 313
rufotuberculata, *Triatoma* 395
rufotuberculatus, *Lamus* 395
rufotuberculatus, *Mestor* 395
rufotuberculatus, *Panstrongylus* 136, 139, 145, 147, 149, 151, 167, 366, 395, 480, 497
rugolusus, *Belminus* 443

- rugulosa*, *Triatoma* 443
rugulosus, *Belminius* 443, **449**, 482
rugulosus, *Belminius* 443
ryckmani, *Triatoma* 182, 185, 186, 195, **319**, 468, 477, 487
- sanguisuga*, *Conorhinus* 321
sanguisuga, *Triatoma* 137, 165, 166, 167, 184, 193, 246, 250, **321**, 324, 471, 490
sanguisugus, *Conorhinus* 130
scabrosa, *Bolbodera* **439**
seai, *Panstrongylus* 375
seai, *Triatoma* 375
sex-tuberculatus, *Conorhinus* 247
sinaloensis, *Triatoma* 175, 183, 195, 290, 302, **324**, 470, 476, 489
sinica, *Triatoma* 189, 192, **325**, 472, 491
sonoriana, *Triatoma* 309
sonoriana, *Triatoma rubida* 309, 312
sordelli, *Triatoma* 247
sordida, *Eutriatoma* 327
sordida, *Triatoma* 136, 165, 166, 167, 184, 186, 197, 198, 238, 288, 300, **326**, 468, 478, 488, 494
sordidus, *Conorhinus* 326
spinolai, *Mepraia* 330
spinolai, *Triatoma* 134, 139, 143, 145, 149, 150, 157, 158, 160, 165, 167, 178, 182, 185, 187, 196, 197, **330**, 468, 470, 478, 479, 489
stalii, *Conorhinus* 312
- tenuis*, *Triatoma* 370
tertius, *Psammolestes* 165, 166, 167, 427, **431**, 482, 499
texana, *Triatoma sanguisuga* 321
tibiamaculata, *Eutriatoma* 182, 335
tibiamaculata, *Triatoma* 167, 184, 185, 197, **335**, 468, 487, 494
tibia-maculata, *Triatoma (Eutriatoma)* 335
Triatoma 130, 140, 142, 156, 158, 162, 163, 169, 171, 178, 179, 180, **181**, 183, 464, 466, 468, 483, 485, 487
Triatoma (Eutriatoma) 181
Triatoma (Neotriatoma) 181
- Triatoma (Paratriatoma)* 401
Triatoma (Triatoma) 181
Triatomaptera 181, 182
Triatomidae 175
TRIATOMINAE 175, **178**, 179, 180
TRIATOMINI 135, 142, 146, 162, 179, **180**, 467, 486
trinidadensis, *Microtriatoma* 146, 161, 167, 457, **458**, 483, 499
tupynambai, *Panstrongylus* **398**, 479, 496
- uhleri*, *Conorhinus* 309
uhleri, *Eutriatoma* 309
uhleri, *Triatoma* 309
uhleri, *Triatoma rubida* 309, 312
usingeri, *Triatoma phyllosoma* 259, 261, 284, 286, 295
- variegata*, *Triatoma* 312
variegatus, *Cimex* 312
variegatus, *Conorhinus* 250, 275, 312, 321
variegatus, *Reduvius (Conorhinus)* 312
venosa, *Eutriatoma* 336
venosa, *Triatoma* 152, 184, 191, 195, 196, 225, **336**, 474, 477, 493
venosus, *Conorhinus* 225, 336
vitticeps, *Conorhinus* 339
vitticeps, *Triatoma* 145, 165, 166, 167, 184, 188, 199, **339**, 471, 490, 495
- wernickei*, *Triatoma* 392
Wernickei, *Triatoma megista* 392
williami, *Triatoma* 167, 184, 191, 198, 218, **342**, 473, 493, 495
woodi, *Triatoma protracta* 300, 303
wygodzinskyi, *Triatoma* 184, 190, 199, **343**, 473, 492, 496
- yumanensis*, *Paratriatoma hirsuta* 401
yurupucu, *Parabelminus* 161, 164, 166, 167, 452, **454**, 499
- zacatecensis*, *Triatoma protracta* 300, 302, 303

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