

THE BELOSTOMATIDAE OF THE WESTERN HEMISPHERE  
"  
(HEMIPTERA)

by

D. Warren Greik  
B. S., Juniata College, 1936  
M. A., University of Kansas, 1938

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Entomology -

## PREFACE

The principal objective of this paper is to provide a better understanding of the natural relationships of the genera and species of the family in the Western Hemisphere and to produce usable keys for the identification of the species. The Belostomatidae of the Western Hemisphere is represented by 5 genera embracing 78 species, 5 of which are described as new in this paper.

M. Leon Dufour (1863: 373-400) attempted the first monographic study of the Belostomatidae; only three of the fifteen species which he described as new from the New World are recognized to-day. Dr. Gustav Mayr (1871: 399-440) published "Die Belostomiden". Seven of his New World species are accepted to-day. Professor A. L. Montandon (1895-1913) was one of the most prolific writers on the Belostomatidae, having described two new genera and fourteen new species. Professor José A. De Carlo (1938: 189-252) published "Los Belostómidos Americanos", the best monograph to date. His accounts are complete and his illustrations good to excellent. His descriptions are especially helpful because of their logical arrangement and his reliance on good morphological characters. He did not, however, present keys, although he arranged the species in what he regarded as natural groups.

Doctor H. B. Hungerford pointed out to me that there was need for a monograph on the New World Belostomatidae that provided keys that would be useful in the ready determination of species and that a study of the extensive material in the Francis Huntington Snow Collections and other museums in this country might disclose new species and add materially to our knowledge of the distribution of the known species. It was therefore at his suggestion, and under his supervision, that this study was undertaken. I wish to express my appreciation to him for his helpful suggestions and generous assistance which have, in a large measure, made this work possible. The author wishes to thank also Professor Raymond H. Beamer of the Department of Entomology for his timely advice, and Professor E. Raymond Hall of the Department of Zoölogy for critical suggestions.

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The Family Belostomatidae of the Western Hemisphere  
(Hemiptera)

by

D. Warren Craik, Department of Entomology  
University of Kansas

ABSTRACT: The aquatic family Belostomatidae contains seventy-eight species in five genera in the Western Hemisphere. Seventy-three species are redescribed and five species are described as new. These are Belostoma penabedum, B. acutum, B. willi, B. decarloi, and B. minutum. All species except seven are illustrated with natural sized photographs. Besides the photographs, there are five plates illustrating important structural parts and eight distributional maps of the species. Keys to Belostoma Latreille, Benacus Stål and Lethocerus Mayr, and Abedus Stål are presented. Palisot de Beauvois' species Belostoma minor and Belostoma subspinosum and Guérin Méneville's species Lethocerus medius and Lethocerus curtus were not included in the keys due to inadequate descriptions.

## INTRODUCTION

The family Belostomatidae contains the largest and most powerful members of the order Hemiptera. Most members of this family are large, flat, aquatic bugs with leather-like integument which is usually brownish. They vary in length from Belostoma micantulum (Stål) which is only 9-13 mm. to Lethocerus maximus De Carlo which is 90-106 mm. in length.

The five genera found in the Western Hemisphere are divided into two groups: one including the large species of the genera Lethocerus Mayr and Benacus Stål known as "giant water bugs", "electric light bugs, or "fish killers"; and the other one consisting of somewhat smaller forms of the genera Belostoma Latreille, Abedus Stål, and Horvathinia Montandon which are termed "toe biters".

Veritable fiends in their fresh water habitat, they feed on any aquatic animal they can overcome -- insects, snails, fish, tadpoles, small frogs, toads, or salamanders. Kenneth Rankin (1935: 482-483), a former graduate student in entomology at the University of Kansas, reports that Lethocerus americanus seems to prefer tadpoles and small frogs as food. Belostomatids subdue their prey with a paralyzing fluid injected by the two maxillary setae of the beak. They are strong swimmers. When at rest in the water, they usually lie just beneath the surface with the caudal

filaments piercing the surface film. At night the adult giant water bugs, in the temperate zone, take wing, are lured to electric lights, and are often found helpless on the sidewalks and streets beneath the lights. In the tropics, they become a nuisance in light houses, aboard ships, around hotels and residences where they have been attracted at night by the lights.

In identifying specimens, the following information will be useful. The length of a specimen, as given in the following accounts, is from the front of the eye to the tip of the abdomen. All measurements on all parts of the body were taken by an eyepiece micrometer scale with the part to be measured in as nearly as horizontal a position as possible.

Males and females of this family are readily separated by referring to the genital operculum situated ventrally on the median line near the posterior tip of the abdomen. In the genera Belostoma Latreille and Abedus Stål, the genital operculum of the male is longer than wide; that of the female has the width as great as, or greater than, its length. The operculum of the female often has two small tufts of hair near its apex. The genital operculum of the females in the genera Lethocerus Mayr and Benaous Stål is either indentate or sulcate at the apex, often possessing two minute, sharp points apically. The operculum of the male is rounded at the apex and does not possess terminal points.



The antennae are recessed in pockets beneath the eyes. They are four-segmented in all American genera except Abedus where they are either three- or four-segmented. The number and shape of the segments of antennae furnish good taxonomic characters in all genera of the Belostomatidae of the Western Hemisphere except Belostoma. The following procedure is useful in dissecting the antennae. Moisten the head of the belostomatid in a warm five per cent solution of alcohol to relax it. Lay the bug on its back under a binocular microscope and, by means of a dissecting needle bent at the tip, pull the antenna upwards until it rests outside of its pocket. Cut the antenna where the first segment joins the head and remove it. A small scalpel made from a narrow portion of safety razor blade is useful in the last operation.

Caudal filaments are useful characters in the genus Abedus Stål since the presence or absence of a pouch on the dorsal side of each is used in identifying certain closely related species. The following procedure is useful in dissecting the caudal filaments. Moisten the entire insect in a warm five per cent solution of alcohol to relax it. After a couple of minutes hold the insect between the thumb and finger of one hand and with the other, by means of a dissecting needle bent at the tip, reach in directly under the wings, loosen, and bring out the two caudal filaments with the attached genital capsule between them.

Antennae and caudal filaments should be relaxed in warm water, transferred to glycerine, put in a small glass

vial with a cork stopper, and pinned beneath the insect for future reference. The author prefers not to clear the antennae and caudal filaments in caustic potash since it makes them flabby and often causes fading of important details. Temporary mounts of Belostomatidae are more satisfactory than permanent mounts since it is then possible to examine dissected structures in any desired position.

All references to data on distribution refer to the Francis Huntington Snow Entomological Collections, University of Kansas, Lawrence, Kansas, unless otherwise specified.

## PALEONTOLOGY

All the main orders of insects, except the Lepidoptera, had come into existence before the termination of the Jurassic Period, and the family Belostomatidae existed during this period. Dr. Anton Handlirsch (1908: 1248) has published natural size photographs of the fossil Mesobelostomum deperditum (Germar) which came from the Jurassic. This specimen, 55 mm. long and 20 mm. wide, resembles Lethocerus camposi (Montandon) and L. collosicus (Stål) in the broad, thin, lateral margins of its pronotum but differs in a more reduced membrane of the hemelytra and smaller size. This fossil, taken from the oölite of Solenhofen, Germany, is now in the Teyler Museum, Haarlem, Netherlands, Cat. No. 6392.

The Tertiary deposits yielded nearly three-fourths of the known fossil insects. As a whole, the fauna of these times did not differ markedly in composition from that of to-day, even during the Oligocene, which is relatively early in the Tertiary period. Belostomatid bugs have been found in the Tertiary rocks of Europe and known since 1837, when Germar described Belostoma goldfussi from the Upper Oligocene in the vicinity of Bonn, in Rhenish Prussia. Belostoma speciosum Heer, from the Upper Miocene in Oeningen, Baden, is said to be one of the largest and finest insect fossils from that famous locality. The above species

actually belong to the genus Lethocerus Mayr. For a number of years the genus Lethocerus was incorrectly called Belostoma. Although the author has seen a couple dozen photographs of fossil Belostomatidae, he has not been able definitely to identify any of them with species living to-day.

The large size of these giant water bugs may have hastened their decomposition in the deposits of coal, lignite and peat, or in ancient fresh-water basins. We know that many insects preserved in amber are retained in a wonderfully perfect state of preservation. The natural medium, resin, enveloped and impregnated them before they had a chance to free themselves. A number of insects preserved in this medium have been easily identified to species. The author knows of no record of a belostomatid found in Baltic amber.

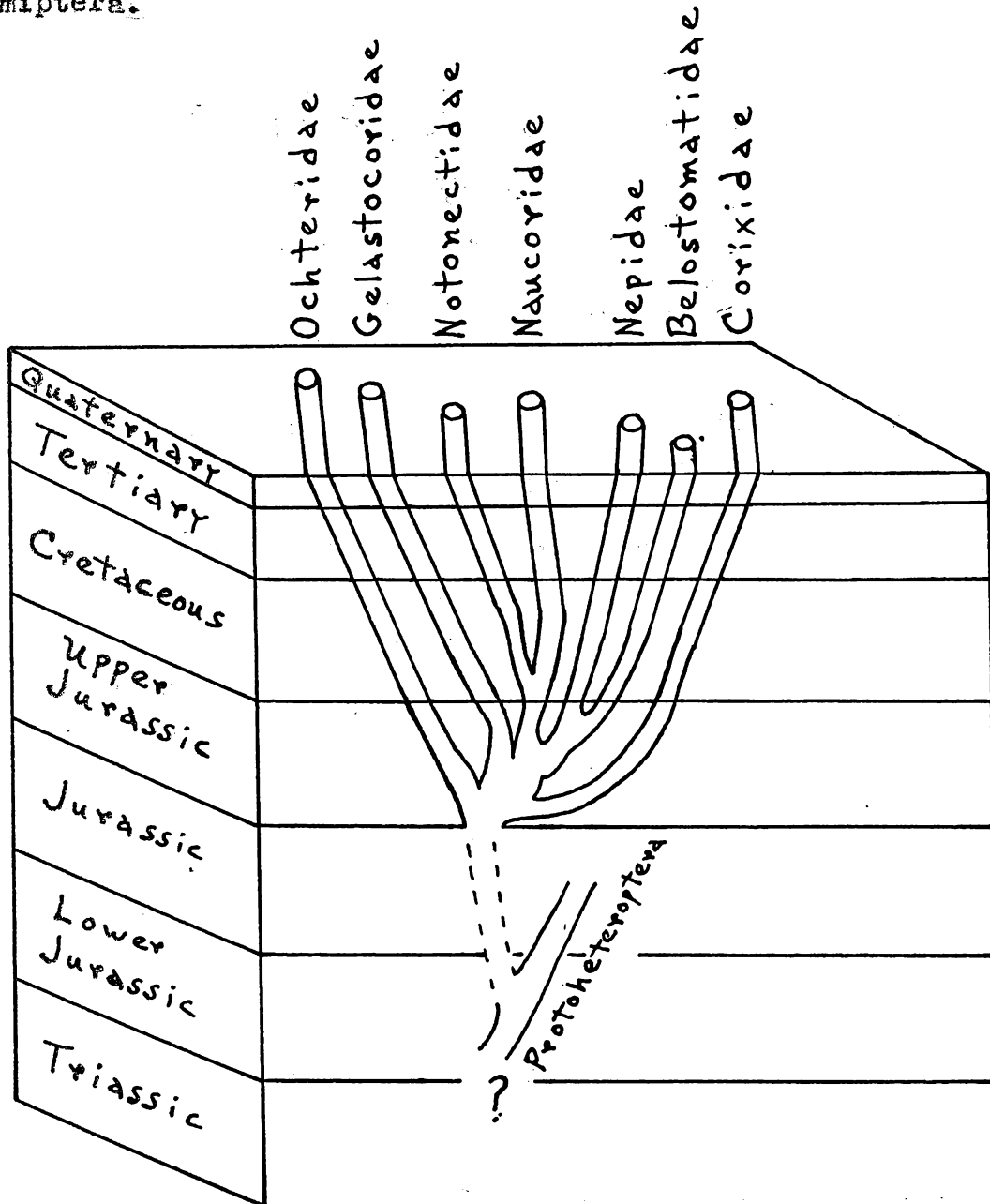
## PHYLOGENY

The Belostomatidae are regarded by several workers as having originated from some member of the extinct order Protoheteroptera. Handlirsch (1908: 1248) thought that the origin was by way of the still living family Naucoridae. China (1933: 195) thought that they originated from the semi-aquatic Hemiptera of the family Ochteridae. At any rate, he, like Handlirsch, regarded the Notonectidae and Corixidae as having a common origin and as being more closely related to each other than either is to any other major family.

Doctor Hungerford thinks the Notonectidae are more nearly related to the Naucoridae than to the Corixidae. The two new genera he described in the Naucoridae show a relationship with the Pleidae and Helotrephidae. He thinks the Notonectidae left the Naucorid stem after that which produced the Nepidae and Belostomatidae. The phylogenetic chart (text fig. 1) is offered as indicating my ideas as to probable relationships of the Belostomatidae to other aquatic and closely related semi-aquatic families of the order.

The writer judges that the still living family of semi-aquatic Hemiptera, the Ochteridae, are possible ancestors of the closely related family Gelastocoridae and of the five major families of the aquatic Hemiptera. The

Ochteridae, or shore bugs, are more adapted for a semi-aquatic, than for a purely aquatic, existence due to the possession of exposed antennae, two ocelli, and forelegs slender and fitted for running. Their moist habitat and short antennae suggest a near relationship to the aquatic Hemiptera.



Text Figure 1. Possible phylogeny of certain aquatic and semi-aquatic families of Hemiptera in the New World

Gelastocoridae, or toad-shaped bugs, possess ocelli, but the antennae are nearly, or quite, concealed. The latter is a character of all the aquatic Hemiptera. Their habitat is more aquatic than that of the Ochteridae since they dig burrows into the sand and muddy margins of streams. It is reasonable that this family, Gelastocoridae, is a connecting link between the semi-aquatic and aquatic Hemiptera (see text fig. 1).

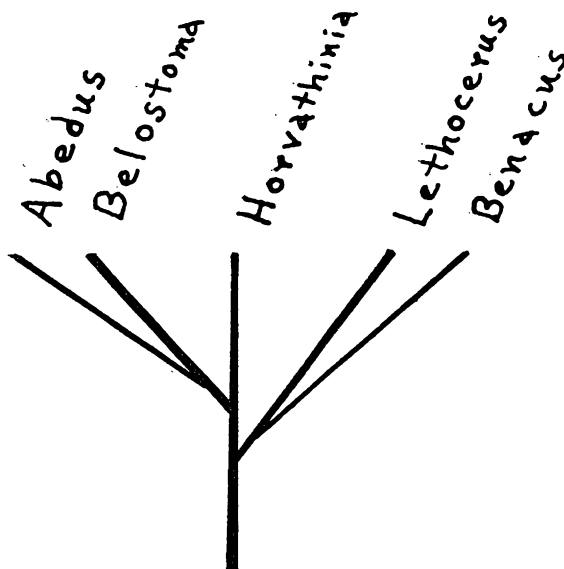
The writer considers the Naucoridae as the most primitive family of the aquatic Hemiptera since they are less fitted for an aquatic life than any other family. These aquatic bugs have middle and hind legs fitted more for crawling than swimming. They have no terminal respiratory appendages on the abdomen. Comstock (1933: 367) stated that "they carry air beneath their wings and obtain this air by pushing the tip of the abdomen above the surface of the water". The Naucoridae resemble the bugs of the truly aquatic families, except one, in their predaceous habits. (The Corixidae are the only plant feeders.) The front legs are raptorial and well suited for seizing their prey. Naucoridae have also short antennae, each antenna partially concealed in a depression under each eye. This concealment is important since exposed antennae would interfere with movements of the insects in aquatic surroundings. Incidentally, the Naucoridae lack ocelli as do all families of the aquatic Hemiptera, where ocelli would be of little or no use in the water. An exception exists in the Corixidae where two

genera, Corixanecta Walton and Diaprepocoris Kirkaldy have ocelli.

The Nepidae, or "water scorpions", have two, short or long anal respiratory filaments which form an air-breathing tube. These respiratory siphons indicate an incomplete dissociation from the terrestrial life. The forelegs are raptorial, with the tibia and tarsus folding back into a groove in each femur when not in use. The second and third pair of legs are fitted for walking rather than for swimming and are used awkwardly in performing the latter function. This family shows an extreme difference in appearance between the narrow, elongate, subcylindrical genus Ranatra and the broad, flat Nepa. The latter genus, in size and shape, resembles certain species of the Belostomatidae more than it does those of any other family of the aquatic Hemiptera, this in spite of its longer respiratory filaments.

The writer considers the family Belostomatidae a possible descendent of the family Nepidae, through, say, the genus Nepa. The former family has two, flat, retractile, spiracular appendages near the tip of the abdomen, and middle and hind legs flattened for swimming. The possession of a broad, oval or elliptical flattened body with a mid-ventral keel, in addition to the above characters, admirably fit the Belostomatidae for an aquatic life. From most primitive to most specialized (see text fig. 2), the author would list the five genera of Belostomatidae in the following order:





Text Figure 2. Possible phylogeny of the New World genera of Belostomatidae

(1) Horvathinia Montandon is considered by the author as the most primitive genus of Belostomatidae in this hemisphere. The shape of its body resembles that of Pelocoris, a genus of the family Naucoridae. The possession of two claws on the one-segmented anterior tarsus is reminiscent of the nymphal instars of the genera Lethocerus and Belostoma. Species of this genus have been found only in Brazil and Argentina, South America.

(2) Lethocerus Mayr is the only genus in this family occurring in both hemispheres. Since it resembles the fossil Mesobelostomum deperditum (Germar), which came from the Jurassic, we consider Lethocerus an old genus. Lethocerus and its closely related genus Benaacus have large, well-developed wings which enable individuals of

each genus to fly readily from one body of water to another.

(3) Benaous Stål is abundant in the eastern states but has been observed in Kansas, Texas, Florida and Cuba. Although its distribution is not nearly so extensive as that of Lethocerus, these two genera are "first cousins" to each other. Benaous differs mainly from Lethocerus in possessing anterior femora not sulcate for the reception of the tibiae.

In the genera (4) Belostoma Latreille and (5) Abedus Stål, the females lay their eggs on the backs of the males. This specialized character might have evolved when the females could not find sufficient aquatic plants for oviposition. Males have been observed greedily eating egg-masses that occasionally slip from their backs. The female may lay her eggs on the back of the male in order to protect them from her mate. Harvey observed that the male of Abedus macronyx (Mayr) aerated the eggs by gently raising and lowering the wings, and detected a soft, chirping sound like a subdued cricket song. According to Harvey (1907: 74), a rhythmical contraction and relaxation of the rectal spiracles "could be distinctly observed with every note of the song, which was produced much more slowly than that of our cricket". The author considers that the reduced membrane of the hemelytra and the song of Abedus, which he has never seen recorded for Belostoma, makes Abedus Stål a more specialized genus than Belostoma Latreille.

The Notonectidae with their linear bodies, rounded

above and flat beneath, oarlike hind legs, and method of swimming on their backs, show a high degree of specialization for an aquatic life. Although the legs of the Notonectidae are not as broad as those of the Belostomatidae, the comparatively thicker and longer fringe of hair makes these legs of the Notonectidae very effective, and the folding back of the hairs on the return stroke tends to facilitate their use and, by a kind of feathering motion avoids the retardation of the forceful back stroke. Males, of a number of species in this family, possess stridulatory organs which produce a chirping sound as the males approach the females.

The Corixidae are the only aquatic Hemiptera that are not predaceous; they feed on plants. China states that "their specialized habit is reflected in the extraordinary modifications (of the mouth-parts and fore legs, etc.) which effectively isolate them from the rest of the Heteroptera. The presence, however, of three pairs of abdominal scent glands in the larvae would seem to indicate a relatively recent origin from some terrestrial group rather than an origin from a predaceous littoral ancestor."<sup>1</sup> The presence of ocelli in the genera Corixanecta Walton and Diaprepocoris Kirkaldy also indicates a possible origin from a terrestrial form.

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<sup>1</sup>W. E. China, Notes on the phylogeny of the Heteroptera. An. Mag. Nat. Hist. ser. 10, (1933), XII: 192.

## BIOLOGY

The American giant water bugs, Lethocerus americanus (Leidy) and Benacus griseus (Say), place their egg clusters on reeds above the surface of the water, on logs, and under boards on the shore. Mr. Kenneth Rankin (1935: 485-486) found the average developmental period of the former, from egg to adult, when using tadpoles for food, to be 33.4 days for field-reared specimens and 58.9 days for laboratory-reared specimens. There are five nymphal instars, each possessing only one-segmented tarsi with two claws. (Each anterior tarsus in the adult has two segments and only one claw.) Mr. Rankin observed the emergence of several nymphs under the binocular microscope. His eye-witness account follows: "A few minutes later several of the caps on the eggs popped open. At first the head was gradually pushed through the opening and then with rather weak heaves the rest of the body was drawn out, with the exception of the legs, which were still held pressed to the body and were still in the opening of the shell. Finally, with a last effort, the little bug broke through the membrane that had still surrounded him, and with the help of his legs, pulled on out and fell to the water below (normally five or six inches), where he lay quietly on the surface for a moment and then feebly swam away. This hatching process takes between six and eight minutes."<sup>1</sup>

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<sup>1</sup>Kenneth Rankin, Life history of Lethocerus americanus (Leidy). Univ. of Kansas Sci. Buñ., XXII:483-484.

A brief description of each nymphal instar of Lethocerus americanus (Leidy) follows:<sup>1</sup>

First Instar.--10 mm. long, 5 mm. at its greatest width.

The shape is similar to that of the adult but the inter-ocular space is relatively wider than an eye.

Second Instar.--15 mm. long, 8 mm. at its greatest width.

The nymph is comparatively broader than in the first instar.

Claws of each tarsus are of equal length.

Third Instar.--22 mm. long, 11 mm. at its greatest width.

Wing pads are more than one-half total marginal length of the meso- and meta-thorax.

Fourth Instar.--31 mm. long, 14.5 mm. at its greatest width.

The length is a little greater in comparison to the width than in the former nymphal instars. Wing pads are approximately four-fifths of the total marginal length of the meso- and meta-thorax.

Fifth Instar.--Length: male, 39 mm.; female, 43 mm. Width:

male, 18 mm.; female 21 mm. Length, in comparison to width, is still greater than in the fourth instar. Tarsi are still one-segmented, each tarsus having two claws of equal length.

The straplike, respiratory, caudal filaments are fairly well-developed.

On the genus Horvathinia Montandon, no biological observations have been recorded.

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<sup>1</sup>Kenneth Rankin, Life history of Lethocerus americanus (Leidy). Univ. of Kansas Sci. Bul., (1935), XXII: 484-485.

In the genera Abedus Stål and Belostoma Latreille, the females glue their eggs on the backs of the males. (Males belonging to the genera Diplonychus Laporte and Sphaerodema Laporte of the Eastern Hemisphere also carry the eggs of the females on their backs.) Many early writers thought that the females carried the eggs.

Miss Florence Wells Slater (1899: 931-933) was the first person in this country to record the egg-carrying habit of Belostoma. In her study of the reproductive organs and genital armature of Belostoma in the entomological laboratory of Cornell University, she dissected many egg-bearing individuals; every individual was a male. The egg-laying season in Ithaca, New York, lasts from June until late August. The female captures the male and usually lays seventy-five to eighty-five eggs in regular diagonal rows on the upper surface of the hemelytra. If attacked by an enemy, the male egg-bearer suffers injury and even death without resorting to combat.

Professor José A. De Carlo (1939: 233) of Argentina reports a developmental period for Belostoma elegans (Mayr) of 36 days from egg to adult.

## HISTORICAL REVIEW OF THE FAMILY

Latreille (1807: 144-145) founded the genus Belostoma for his species Belostoma testaceo-pallidum. Laporte (1832: 83) added the genera Diplonychus and Sphaerodema from the Eastern Hemisphere. Amyot and Serville (1843: 429-430) gave us the name Zaitha for their species Zaitha stollii. The term Zaitha was erroneously applied to most of the smaller belostomatids for fifty years. Later, Zaitha stollii Amyot and Serville was found to be a species of Belostoma; so we no longer speak of Zaitha. Leidy (1847: 60, 66) defined the genus Perthostoma for his species Perthostoma testaceum. Herrich-Schaffer (1848: 26) used the generic name Diplonychus for his species Diplonychus anurus. Later, it was discovered that the latter two species actually belonged to the genus Belostoma Latreille. Mayr (1852: 17) defined the genera Limnogeton and Lethocerus. The former genus, found only in the Eastern Hemisphere, has as its genotype Limnogeton fieberi Mayr. Stål (1854: 240) described the genus Eorborotrepes, a synonym of Limnogeton Mayr. Mayr described Lethocerus from a nymph of his species Lethocerus cordofanus. Stål (1865: 178-180) defined the genus Amorgius, a synonym of Lethocerus Mayr. For at least fifty years Lethocerus was incorrectly known as Belostoma. Stål (1861: 205-206) founded the genus Benacus for a single species, Benacus griseus (Say). It is separated from the

similar genus Lethocerus Mayr by the anterior femora not being grooved for the reception of the tibiae. Stål (1862: 461-462) established the genus Abedus for his species Abedus ovatus. He erected the genus Serphus in the same paper. Mayr (1863: 343-349) described the genera Stenoscytus and Pedinocoris. Kirkaldy (1897: 258) established the genus Deinostoma. Professor J. A. De Carlo (1932: 121) considered Serphus Stål 1862, Stenoscytus Mayr 1863, Pedinocoris Mayr 1863, and Deinostoma Kirkaldy 1897, congeneric with Abedus Stål. Mayr (1871: 432) described the genus Nectocoris for his Old World species Nectocoris Ståli. Montandon (1909: 137-138) established the genus Kirkaldyia for his species Kirkaldyia Boutareli which had formerly been called Belostoma Boutareli. In 1911 (pp. 244-246), Montandon described the genus Horvathinia for his species Horvathinia pelocoroides. The adults of this New World genus possess two minute claws on the anterior tarsi. This genus resembles Pelocoris, a genus of the family Naucoridae.



## DIAGNOSIS OF THE FAMILY

Flat, brownish, aquatic bugs, 9-115 mm. long with middle and hind legs flattened for swimming; forelegs raptorial, femora being enlarged and usually grooved for reception of tibiae. In American forms, tarsi all two-segmented except in genus Horvathinia where anterior tarsi one-segmented and each tarsus bearing two minute claws. All other New World genera possess one claw on anterior tarsi and two on middle and hind tarsi. Beak three-segmented and usually stout; head broad and somewhat extended between eyes; eyes large, occupying much of head; ocelli absent. Antennae short and inconspicuous, three or four-segmented; each antenna hidden in pocket under eye. Pronotum trapezoidal with transverse impressed line separating anterior and posterior lobes; posterior lobe followed by large, flat, triangular scutellum with acute apex; hemelytra covering all or most of abdomen. These bugs bear short, flat, straplike, retractile, respiratory appendages at tip of abdomen.

KEY TO THE GENERA

(Based on Cummings, Carl. Univ. of Kansas Sci. Bul., 1933,  
Vol. XXI, p. 198, with minor changes by the author)

- A. Anterior femora sulcate.
    - B. Anterior tarsi with two claws.
      - C. Claws of anterior tarsi of equal length, minute.
        - D. Anterior femora more or less incrassate,  
much larger than tibiae.
          - E. Species with two sulci between the eyes.
            - F. Species never as long as 15 mm.
              - Nectocoris Mayr
      - FF. Species 25-32 mm. long
        - Horvathinia Montandon  
(See p. 22)
      - EE. Species without such sulci
        - Sphaerodema Laporte
    - DD. Anterior femora scarcely incrassate, but  
little larger than tibiae
      - Limnogeton Mayr
  - CC. Claws of anterior tarsi of equal or unequal  
length, but elongate
    - Diplonychus Laporte
- BB. Anterior tarsi with one claw.
  - C. Head conically produced, rostrum long, thin.
    - D. Membrane of hemelytra large
      - Belostoma Latreille  
(See p. 93)
  - DD. Membrane of hemelytra much reduced
    - Abedus Stål  
(See p. 218)
- CC. Head not conically produced, rostrum short,  
stout.
  - D. Front femur with two unequal sulci for  
reception of tibia
    - Kirkaldyia Montandon
- DD. Front femur with two equal sulci for  
reception of tibia
  - Lethocerus Mayr  
(See p. 33)
- AA. Anterior femora not sulcate ----- Benacus Stål  
(See p. 87)

GENUS HORVATHINIA MONTANDON, 1911

1911. Montandon, A. L. Ann. Mus. Nat. Hungary, IX: 244-245.  
1930. De Carlo, J. A. Rev. Soc. Entom. Argentina, No. 13:  
120-123.  
1938. De Carlo, J. A. An. del Mus. Argentina de C. Nat.,  
XXXIX: 247-252.

Genotype. Horvathinia pelocoroides Montandon.

Generic Characters. The following information is taken from Professor A. L. Montandon's original description of Horvathinia pelocoroides and the descriptions of species by Professor José A. De Carlo:

Oval-shaped species, 25.5-30 mm. long, 14-15.5 mm. wide. Head wide, the portion anterior to the eyes forming an obtuse triangle; eyes large, smooth, in line with the outline of the body; antennae four-segmented, the third segment produced into a definite lobe; beak short and robust, three-segmented, the first segment shorter than the second. Scutellum wide, with a median longitudinal carina. Hemelytra covering abdomen except for a small portion of connexivum on the last segment; membrane well-developed. Anterior femur greatly dilated; anterior tibia robust, a one-segmented tarsus with two minute claws.

Horvathinia Montandon is the only genus of Belostomatidae in the Western Hemisphere that possesses two claws on the anterior tarsus in the adult state. These very minute claws are not readily observed.

Horvathinia Montandon includes five species, all found in South America. Professor A. L. Montandon described this genus in 1911 for the species Horvathinia pelocoroides.

Horvathinia pelocoroides Montandon, 1911

1911. Horvathinia pelocoroides Montandon, A. L. Ann. Mus. Nat. Hungarici, IX: 245-246.  
1938. Horvathinia pelocoroides, De Carlo, J. A. An. del Mus. Argentina de C. Nat., XXXIX: 248.

The following information is a translation from portions of Professor Montandon's original description of H. pelocoroides.

Length - 25.5-29 mm.; greatest width 13.5-15.5 mm.

Vertex very convex. Greatest width of pronotum nearly twice its length on median line. Disk of anterior lobe of pronotum covered with superficial, scattered, small dots. Posterior lobe of pronotum strongly punctated and corrugated on its surface.

Posterior portion of scutellum lightly compressed, corrugated, and punctated on each costa by a light median carina.

Disk of the corium with three longitudinal veins. The membrane of hemelytra well developed.

Montandon made his description on the basis of two specimens, one from Rio Grande, Brazil which is in the National Museum of Hungary. The other from Minas Gerais, Brazil is in the Stockholm Museum. Doctor Hungerford examined the specimen in Stockholm. His notes state that it has a label 'Type 1910' and "looks like a large cockroach at first glance. The head and thorax are joined more like a Pelocoris." The specimen is a female, 32 mm. long.

Horvathinia pelleranoi De Carlo, 1930

(Plate VIII, fig. 8)

1930. Horvathinia pelleranoi De Carlo, J. A. Rev. Soc. Entom. Argentina, No. 13: 122-123, pl. VI, fig. 20.  
1938. Horvathinia pelleranoi De Carlo, J. A. An. del Mus. Argentina de C. Nat., XXXIX: 249-250, pl. II, figs. 11 & 18, pl. VI, fig. 81.

The following information is a translation from portions of Professor De Carlo's original description of H. pelleranoi.

Characteristics of the holotype specimen:

Sex: male.

Length--30 mm.; greatest width--15.5 mm.

Part of the head between the eyes with two depressions on each side of its lateral borders. Width of interocular space at the level of the posterior margins of eyes, 3 mm.; width of interocular space including eyes, 6.9 mm. Eyes longer than wide. Second segment of antenna with a convexity clearly pronounced on the lower portion, the third with the lobe greatly extended and the fourth prolonged and pointed, not broadly joined to the third, pl. II, fig. 14. Pronotum convex, length on its median line, 5.7 mm.; width of posterior border, 13 mm. Scutellum prominent with a well-marked, longitudinal smooth carina. Surface of the scutellum wrinkled, completely lacking bristles. Hemelytra with small bristles of medium size, others long and fine. Disk of corium on left side with five longitudinal veins, only four exist on the right side. Membrane well-developed, nine veins in the small part of the lower portion. Feet not

spotted. Anterior femora very robust, one-third wider than posterior femora. Prosternal keel high with the anterior edge projecting upward to a great extent.

The holotype male, the only specimen known, is in the Argentina Museum of Natural Science, Buenos Aires, Cat. no. 25,613.

This specimen was caught by Senor Glorinaldo Pellerano in Santo Tome, Province of Corrientes, Argentina.

Horvathinia doello-juradoi De Carlo, 1930

(Plate VIII, fig. 9)

1930. Horvathinia doello-juradoi De Carlo, J. A. Rev. Soc. Entom. Argentina, No. 13: 122-123, pl. VI, fig. 19.  
 1938. Horvathinia doello-juradoi De Carlo, J. A. An. del Mus. Argentina de C. Nat., XXXIX: 248-249, pl. II, figs. 16, 17, & 30, pl. VI, fig. 80.

The following information is a translation from portions of Professor De Carlo's original description.

Characteristics of the holotype specimen:

Sex: male.

Length--27 mm.; greatest width--14 mm.

Width of interocular space at the level of posterior margins of eyes, 3.4 mm.; width of interocular space with eyes, 6.8 mm. Eyes as long as wide. Second segment of antenna rounding on lower part, the third with the lobe medianly lengthened and the fourth broadly joined to the third, pl. II, fig. 16. Pronotum convex, length on its median line 5.3 mm., width of posterior border 11.3 mm. Scutellum not prominent, a smooth, well-marked carina covering median line. Two other very short carinae on posterior portion of scutellum parallel to the first. Hemelytra covered with small, thick bristles and others that are long and fine. Disk of the corium on the left with four longitudinal veins, only three well marked veins on the right. Membrane of hemelytra with four large veins and two small ones on its greater area. Feet not spotted. Anterior femora very robust, one-third wider than posterior femora. Prosternal keel reduced, with two sloping lateral sides,



anterior border in a straight line.

This species differs from the others by the shape of the prosternal keel and the narrower membrane with its small veins.

The holotype, the only specimen known, is in the Museo de La Plata, Argentina. Its type locality is Gobernacion de Chubut, Argentina.

Horvathinia castilloi De Carlo, 1938

(Plate VIII, fig. 6)

1938. Horvathinia castilloi De Carlo, J. A. An. del Mus. Argentina de C. Nat., XXXIX: 251-252, pl. II, figs. 15 & 20, pl. VI, fig. 83.

The following information is a translation from portions of Professor De Carlo's original description of H. castilloi.

Sex: female.

Length - 26 mm.; maximum width - 14 mm.

Part of the head between the eyes with two depressions on each side of its lateral borders. Width of interocular space at the level of posterior margins of eyes 3 mm.; width of interocular space including eyes 6.5 mm. Eyes scarcely longer than wide. Second segment of antenna rounded on lower portion, the third with the lobe rather extended, and the fourth prolonged and not broadly joined to the third segment, pl. II, fig. 17. Pronotum convex, length on its median line 5.2 mm.; width of posterior border, 11.8 mm. Scutellum not prominent, with a smooth longitudinal carina. Surface of scutellum not completely covered with bristles. Hemelytra with small bristles of medium size, others long and fine. Disk of corium on the right with three longitudinal veins, on the left side one observes two large branches on the upper portion. Membrane well-developed, eight veins in the small part of the lower portion. Feet not spotted. Anterior femora very robust, one-third wider than posterior femora. Prosternal keel high, the anterior edge almost straight.

This species differs chiefly from H. meyeri De Carlo by the shape of the antennal segments and prosternal keel.

The holotype female, the only specimen known, is in the Argentina Museum of Natural Science, Buenos Aires, Cat. no. 39,372.

The type locality is Apostoles, Gobernación de Misiones, Argentina.

Horvathinia meyeri De Carlo, 1938

(Plate VIII, fig. 7)

1938. Horvathinia meyeri De Carlo, J. A. An. del Mus. Argentina de C. Nat., XXXIX: 250-251, pl. II, figs. 14 & 19, pl. VI, fig. 82.

The following information is a translation from portions of Professor De Carlo's original description of Horvathinia meyeri.

Sex: female.

Length--26.5 mm.; maximum width--14.5 mm.

Part of the head between the eyes with two depressions on each side of its lateral borders. Width of interocular space at the level of the posterior margins of eyes, 3 mm.; width of interocular space including eyes, 6.6 mm. Eyes longer than wide. Second segment of antenna with a rather pronounced convexity on lower portion, the third with a rather enlarged lobe and the fourth not broadly joined to the third, pl. II, fig. 15. Pronotum convex, length on its median line, 5.5 mm.; width of posterior border, 11.8 mm. Scutellum not prominent, a smooth carina and a marked depression on the extreme posterior portion. Surface of scutellum not completely covered with bristles. Hemelytra with small bristles of medium size, others long and fine. Disk of corium on left and right side with three longitudinal veins. Membrane well-developed, ten veins in the small part of the lower portion. Feet not spotted. Anterior femora very robust, one-third wider than posterior femora. Prosternal keel high, the anterior edge projecting slightly

upward.

This species differs chiefly from H. pelleranoi De Carlo by the form of the third and fourth segments of the antenna, prosternal keel, and smaller size.

The holotype female, the only specimen known, is in the Argentina Museum of Natural Science, Buenos Aires, Cat. no. 35,697.

This specimen was caught by Sr. Teodora Meyer in Fontana, Gobernación de Chaco, Argentina.

GENUS LETHOCERUS MAYR, 1852.

1852. Mayr, G. L. Verh. Zool.-Bot. Ges. Wien, II: 17.  
1909. Montandon, A. L. Bul. Soc. Sci. Bucarest, XVIII,  
No. 5: 137-138.  
1909. Kirkaldy, G. W. and Torre-Bueno, J. R. de la. Proc.  
Entom. Soc. Washington, X: 188-189.  
1919. Hungerford, H. B. Univ. of Kansas Sci. Bul. XI: 148.  
1930. De Carlo, J. A. Rev. Soc. Entom. Argentina, No. 13:  
103-105.  
1933. Cummings, G. Univ. of Kansas Sci. Bul., XXI: 198-  
199, 201-219.  
1938. De Carlo, J. A. An. del Mus. Argentina de C. Nat.,  
XXXIX: 191-194, 196-210.

Referring to this genus also:

1758. Nepa Linnaeus, C. Syst. Nat., X, p. 440 (in part).  
1835. Belostomum Burmeister, H. G. Handb. Entom., II: 195.  
Belostoma auct. in part. (nec Latreille)  
1843. Amyot, C. J. B. and Serville, A. Hist. Nat. Ins.  
Hem., pp. 427-429.  
1856. Guérin-Méneville, F. E., Sagra's Hist. de Cuba,  
VII:175.  
1863. Mayr, G. L. Verh. Zool.-Bot. Ges. Wien, XIII: 357.  
1863. Dufour, L. Ann. Soc. Entom. France, ser. 4, III:  
379-380.  
1865. Stål, C. Hem. Africana, III: 179.  
1871. Mayr, G. L. Verh. Zool.-Bot. Ges. Wien, XXI: 400,  
402, 422.  
1901. Champion, G. C. Biol. Centr. Amer., Hem.-Het.,  
II: 367.

Amorgius Stal.

1865. Stål, C. Hem. Africana, III:179.  
1906. Kirkaldy, G. W. Trans. Am. Entom. Soc., XXXII: 151.  
1907. Torre-Bueno, J. R. de la. Can. Entom., XXXIX: 335-  
336.  
1909. Montandon, A. L. Bul. Soc. Sci. Bucarest, XVIII,  
No. 5: 137-138.

Genotype. Lethocerus cordofanus Mayr.

Generic Characters. Elongate-elliptical species, 40-105 mm. long, 14.5-38.5 mm. wide. Antecular portion of head shorter than length of eye; beak three-segmented, the first segment shorter than the second; eyes wider than interocular space; antennae four-segmented, the last three segments with curved prolongations; jugae contiguous in front of clypeus. Anterior femur with two equal sulci for reception of tibia; anterior femur wider than posterior femur, one tarsal claw on anterior tarsus. Hemelytra covering abdomen except for a small portion of connexivum on the last segment; membrane well-developed. Tip of genital operculum of female incised, usually with two small prongs, operculum of male not incised at tip.

Distribution. Lethocerus Mayr includes sixteen species in the Western Hemisphere. The species L. annulipes (Herrich-Schäffer) and L. delpontei De Carlo have the greatest distribution, each found from the southern part of the United States to Paraguay, South America.

Historical Review. Dr. Mayr, 1852, gave us the genus Lethocerus, his genotype being Lethocerus cordofanus. For a number of years Lethocerus was incorrectly called Belostoma.

Key to Species of Lethocerus Mayr and Benacus Stål

1. Anterior femora with two equal sulci for reception of tibiae ..... Lethocerus Mayr 2  
 Anterior femora not sulcate ..... Benacus Stål  
 ..... Benacus griseus (Say)  
 (See p. 89)
- \* 2.(1) Interocular space nearly equal to width of an eye  
 ..... L. americanus (Leidy)  
 (See p. 38)  
 Interocular space decidedly narrower than width of an eye ..... 3
- 3.(2) Metaxyphus not sharply pointed posteriorly ..... 4  
 Metaxyphus sharply pointed posteriorly ..... 5
- 4.(3) No evidence of a posterior point .....  
 ..... L. truncatus Cummings  
 (See p. 46)  
 Posterior point short, very obtuse .....  
 ..... L. bruchi De Carlo  
 (See p. 49)
- 5.(3) Interocular space less than width of hind tarsus .. 6  
 Interocular space as great as, or greater than, width of hind tarsus ..... 8
- 6.(5) Outer margin of hind tibia decidedly more curved than inner margin ..... L. delpontei De Carlo  
 (See p. 51)  
 Outer margin of hind tibia not decidedly more curved than inner margin ..... 7
- 7.(6) Anterior tarsi the same color as anterior tibiae ..  
 ..... L. mello-leitaoi De Carlo  
 (See p. 55)

\* when

= narrowest width between the eyes.



- Anterior tarsi a different color than anterior  
tibiae ..... L. dilatus Cummings  
(See p. 58)
8. (5) Under side of posterior tibia with inner apical  
angle produced into a sharp point ..... 9  
Under side of posterior tibia with inner apical  
angle not produced into a sharp point ..... 13
9. (8) Upper margin of eye straight as viewed from the  
front ..... L. collosicus (Stål)  
(See p. 61)  
Upper margin of eye rounded as viewed from the  
front ..... 10
10. (9) Front femur not over 1.3 times width of hind  
femur ..... L. maximus De Carlo  
(See p. 64)  
Front femur at least 1.5 times width of hind  
femur ..... 11
11. (10) Front of head with median longitudinal carina ....  
..... L. camposi (Montandon)  
(See p. 67)  
Front of head with no median longitudinal carina . 12
12. (11) Posterior tibia not more than one-half width  
of front femur ..... L. angustipes (Mayr)  
(See p. 70)  
Posterior tibia at least two-thirds width of  
front femur ..... L. grandis (Linnaeus)  
(See p. 73)
13. (8) Fuscous stripe on each side of abdominal venter  
less than one-half mesal area of connexivum .....  
..... L. annulipes (Herrich-Schäffer)  
(See p. 76)

- Not as above ..... 14
14. (13) Hind tarsus nearly equal to interocular space ..  
 ..... L. mello-leitaoi De Carlo  
 (See p. 55)
- Hind tarsus about one-fifth narrower than inter-  
 ocular space ..... L. uhleri (Montandon)  
 (See p. 79)

Note. This key does not include Guérin-Méneville's species Lethocerus medius and L. curtus due to lack of sufficient information.

Lethocerus americanus (Leidy), 1847

(Plate X, fig. 3)

1847. Belostoma americanum Leidy, J. Jour. Acad. Nat. Sci. Philadelphia, VI: 58, 66.
1853. Belostoma impressum Haldeman, S. S. Proc. Acad. Nat. Sci. Philadelphia, VI: 364.
1861. Belostoma griseum Stål, G. Of. Vet. Akad. Forh., XVIII: 206.
1863. Belostoma litigiosum Dufour, L. Ann. Soc. Entom. France, ser. 4, III: 383.
1871. Belostoma griseum, Mayr, G. L. (nec Say). Verh. Zool.-Bot. Ges. Wien, XXI: 427-428.
1876. Belostoma americanum, Uhler, P. R. Bul. U. S. Geol. Surv., I: 337.
1878. Belostoma americanum, Uhler, P. R. Proc. Boston Soc. Nat. Hist., XIX: 441-442.
1884. Belostoma americanum, Uhler, P. R. Stand. Nat. Hist., II: 256.
1894. Belostoma americanum, Van Duzee, E. P. Bul. Buffalo Soc. Nat. Sci., V: 185.
1895. Belostoma americanum, Riley, G. V. Proc. Entom. Soc. Washington, III: 85-87.
1895. Belostoma americanum, Gillette, G. P. and Baker, C. Hemip. Colorado; p. 63.
1896. Belostoma americanum, Montandon, A. L. Ann. Soc. Entom. Belgium, XL: 510-512.
1905. Amorgius americanus Torre-Bueno, J. R. de la. Jour. New York Entom. Soc., XIII: 44.
1905. Benacus griseus, Howard, L. O. (nec Say). Insect Book, p. 266, pl. XXIX, fig. 36.
1908. Lethocerus americanus, Torre-Bueno, J. R. de la. Jour. New York Entom. Soc., XVI: 237.
1909. Lethocerus americanus, Kirkaldy, G. W. and Torre-Bueno, J. R. de la. Proc. Entom. Soc. Washington, X: 188.
1914. Lethocerus americanus, Barber, H. G. Bul. Amer. Mus. Nat. Hist., XXXIII: 498.
1914. Lethocerus americanus, Parshley, H. M. Psyche, XXI: 140.
1917. Lethocerus americanus, Van Duzee, E. P. Cat. of Hemip. of America North of Mexico, pp. 465-466.
1925. Lethocerus americanus, Hungerford, H. B. Psyche, XXXII: 88-91.
1926. Lethocerus americanus, Blatchley, W. S. Het. of East. North America, p. 1043.
1928. Lethocerus americanus, Metcalf, C. L. and Flint, W. P. Dest. Use. Insects, p. 190, fig. 114.
1933. Lethocerus americanus, Comstock, J. H. Intr. to Entom., p. 366.

1933. Lethocerus americanus, Cummings, C. Univ. of Kansas Sci. Bul., XXI: 201-202, pl. XIX, fig. 1.

1938. Lethocerus americanus, De Carlo, J. A. An. del Mus. Argentina de C. Nat., XXXIX: 197-198, pl. IV, fig. 35.

Size. Length from front of eyes to tip of abdomen 39-58 mm.; greatest width 17-23.5 mm.

Shape. Body elongate-elliptical with lateral margin of hemelytra slightly dilated. Pronotum extremely convex, lateral margin convex.

Color. Dorsal surface: medium-brown; a medium pair of yellowish lines on anterior lobe of pronotum extending back about one-third the length of anterior lobe; scutellum with a large, rectangular fuscous area. Ventral surface: median and posterior femora crossed by three transverse fuscous bands; markings on tibiae often varied and indistinct.

Structural Characteristics. Antecular portion of head shorter than width of interocular space, one-half the greatest length of an eye; head less than four-fifths length of pronotum on its median line; anterior interocular space almost as great as length of posterior lobe of pronotum on its median line. Eye as wide as, or slightly wider than, width of interocular space, two-thirds as wide as long; eyes broadly rounded on upper surface. An indistinct carina on head. Antennae four-segmented; each of last three segments with a long, curved prolongation, pl. III, fig. 2. Length of pronotum on median line over half its greatest width. Clavus of hemelytra without distinct veins. Under side of posterior tibia with inner apical angle not produced into a sharp point. Posterior femora nearly three-fourths width of

anterior femora. First segment of anterior tarsus four-fifths as long as second segment. Posterior tibia and eye almost same width. Prosternal keel high, semi-elliptical, not pointed at apex. Metaxyphus wider than an eye, sharply pointed posteriorly. Hind tarsus with first segment a trifle longer than the second. Operculum of female with two sharp points at apex; that of the male without points.

Comparative Notes. This species differs from all other species of Lethocerus in having the interocular space at the narrowest place nearly equal to the width of the eye.

Location of Types. Since the type is lost, I have set up a neotype. It is a male specimen measuring 51 mm. from front of eyes to tip of abdomen, 20 mm. at its greatest width. The neotype bears the label: Lawrence, Kansas, May 9, 1920, H. B. Hungerford. It is in the F. H. Snow Entomological Collections at the University of Kansas.

Data on Distribution.

Specimens Observed:

Connecticut: New Haven, 8-23-34, C. O. Dunbar, 1 male, 1 female.

Wisconsin: Chippewa Co., Jim Falls, 8-29-28, Creaser-Jones, 1 male, (Univ. of Mich.).

Michigan: Chickering, May 3, 1930, 2 males; Douglas Lake, Bryant Bog, Aug. 17, 1923, H. B. Hungerford, 3 males; Douglas Lake, Sedge Point Pool, 1932, July 3, 1923, H. B. Hungerford, 1 male; Douglas Lake, July 20, 1926, H. B. Hungerford, 1

female; Cheboygan Co., 7-7-42, E. L. Todd, 1 male; Mt. Morancy Co., T 29 N. R. 2 E., from Leonard, 14 males, 15 females, (Univ. of Kansas).

Cheboygan, Wesley Clanton, 1 male; Ann Arbor, Wesley Clanton, 1 male, 1 female; Benton Harbor, II-29-1925, J. Metzelner, 1 male; Houghton Co., IX-13-1935, J. Metzelner, 1 male; Washenaw Co., Ann Arbor, V-24-33, F. E. Lyman, 1 female, (Univ. of Mich.).

New York: White Plains, May 14, 1907, 1 male; West Point, Sept. 11, 1926, W. Robinson, 1 male; Queens, L. I., F. M. Schott, 1 male, (Univ. of Kansas).

Washing, R. L. I., VII-VIII-1929, 1 male, (Car. Mus.).

Pennsylvania: All'y Co., VI, 1 male, (Car. Mus.).

Ohio: Geauga County, 1 male.

Kansas: Douglas Co., 900 ft., F. H. Snow, 1 female; Harvey Co., Aug. 27, 1917, 1 female; Lawrence, May 9, 1920, H. B. Hungerford, 1 male; Lawrence, W. Hoffman, 1 male.

Utah: Logan, Aug. 15, 1910, 1 male, May 6, 1910, 1 female, Nov. 1, 1922, 1 female, Oct. 11, 1909, 1 female, all of these specimens taken by G. F. Knowlton; Lehi, May 27, 1930, G. F. Knowlton, 1 male, (Univ. of Kansas).

Farr West, C. J. D. Brown, 1 female, (Univ. of Mich.).

Oregon: Lake Co., Quartz Cr., Aug. 9, 1934, C. L. Hubbs, 2 males, (Univ. of Mich.).

California: Sacramento, April 29, 1908, E. D. Ball, 1 male; (Univ. of Kansas).

Inyo Co., VII-26-1938, C. L. Hubbs, 1 male, (Univ. of Mich.).

Nevada: Moapa, April 24, 1923, G. F. Knowlton, 1 male,  
(Univ. of Kansas).

Elko Co., Goaninte Valley, VIII-25-1938, C. L. Hubbs, (Univ.  
of Mich.).

Recorded from the Literature:

De Carlo records this species from Kansas and Maine.

Lethocerus obscurus (Dufour), 1863

1863. Belostoma obscurum Dufour, L. Ann. Soc. Entom. France, ser. 4, III: 383.  
 1896. Belostoma obscurum, Montandon, A. L. Ann. Soc. Entom. Belgium, XL: 512-513.  
 1905. Amorgius obscurus, Torre-Bueno, J. R. de la. Jour. New York Entom. Soc., XIII: 44.  
 1915. Lethocerus obscurus, Torre-Bueno, J. R. de la. Psyche, XXII: 17.  
 1926. Lethocerus obscurus, Blatchley, W. S. Het. of East. North America, p. 1044.

The status of this species can not be settled at present. It was first considered a synonym of L. americanus (Leidy) by Mr. P. R. Uhler in 1886. This synonymy has been accepted by Uhler 1886, Riley 1895, Cummings 1933, and De Carlo, 1938.

M. Leon Dufour's original description is as follows:

"Ovatum, obscure nigro piceum; prothorax nigro luteoque irroratus; margo lateralis depressus; fascia postica medio carinulata; scutelli anguli lutescentes; elytri area major apice vage reticulata; membranae nervi simplices, furcati, intersecti; pedes obscure nigri inferne maculati; femora antica medio criter incrassata; operculi genitalis rima dorsalis et apex rotundatus -- Long. 41 mill. -- Hab. <sup>Water from</sup> <sup>Nov 20-47 camp</sup> <sup>up to 37 mm long</sup> <sup>in a jar</sup> Etats-Unis (coll. Signoret, 1 exempl.)."

The following is my translation of Montandon's (1896: 512-513) notes on Lethocerus obscurus (Dufour):

"This species, the smallest in the genus, is a very close neighbor of B. americanum Leidy: it differs, however, by a thinner form and is a little shorter; eyes less prominent, very obviously longer than wide, the interocular space



as wide, or nearly as wide in front, as the transverse diameter of an eye ... It will be difficult to separate this species from B. americanum Leidy; however I believe we ought to keep the species of Dufour up to the time when one will be able to state the existence of intermediate examples making up the transition between the two forms."

"The type of Dufour, named afterwards B. griseum by M. Mayr, coll. Signoret, K. K. Hof-Museum of Vienna, labeled North America, measures 40 mm. long and 18 mm. wide. Another specimen from N. A., also in the above museum named B. griseum Mayr, has a length of 42 mm. and a width of 17.5 mm."

"My collection contains 3 specimens from Massachusetts, two from Lowell (F. Blanchard), from 38-39 mm. long and 16.75-17 mm. wide; the third received from M. W. H. Ashmead is 40 mm. long and 17 mm. wide."

Until I know whether Dufour's type of L. obscurus is a male or a female and can learn certain facts about it, I can not decide whether it is a synonym of L. americanus (Leidy) or not.

Dr. Hungerford studied and made drawings of the specimens labeled L. americanus and L. obscurus by Montandon in the Vienna Museum. His drawings show the anterior claw as long or slightly longer than the tarsus in L. americanus but decidedly longer than the tarsus in L. obscurus. However the study of both large and small specimens of L. americanus in the University of Kansas Collections shows a

great variation in the relative length of the anterior tarsal claw so this character is not, taken by itself, a reliable character.

The few specimens I have seen from American Museums labeled L. obscurus (Dufour) are, with one exception, simply small specimens of L. americanus (Leidy). The exception is a pair of specimens belonging to the Illinois Natural History Survey Museum and simply labeled "Peabody Collection". The female is not L. americanus but we have nothing like it in any other collection and unfortunately we do not know where it was collected. Until we learn more about the L. obscurus type, we are unable to determine whether these specimens are Dufour's species or not.

Lethocerus truncatus Cummings, 1933

(Plate XI, fig. 2)

1933. Lethocerus truncatus Cummings, C. Univ. of Kansas Sci. Bul., XXI: 212, pl. XVIII, fig. 4, pl. XIX, fig. 8.  
 1938. Lethocerus truncatus, De Carlo, J. A. An. del Mus. Argentina de C. Nat., XXXIX: 204, pl. I, figs. 8 & 10, pl. IV, fig. 42.  
 1938. Lethocerus truncatus, De Carlo, J. A. Rev. Soc. Entom. Argentina, X, No. 1: 45.

Size. Length from front of eyes to tip of abdomen 67-72 mm.; greatest width 26.5-28 mm.

Shape. Body elongate elliptical with a slight dilation on lateral margin of hemelytra. Pronotum extremely convex, lateral margin convex.

Color. Dorsal surface: usually a medium-brown with anterior lobe of pronotum fuscous. Scutellum with a large, raised, rectangular area, often fuscous. Ventral surface: abdominal venter, genital operculum, and connexivum a maroon or tan color, the latter covered with darker splotches of various size. Median and posterior femora with three transverse fuscous bands, tibiae with fuscous marks.

Structural Characteristics. Antecular portion of head shorter than width of interocular space, less than one-half the greatest length of an eye; head seven-twelfths length of pronotum on median line; anterior interocular space less than length of posterior lobe of pronotum on median line. Eye three-fourths as wide as long; interocular space over three-fourths width of an eye; length of eye not twice width of interocular space; eyes broadly rounded on upper surface. Head with no median longitudinal carina. Antennae

four-segmented, each of the last three segments with a long, curved prolongation, pl. III, fig. 4. Length of pronotum on median line three-fifths its greatest width. Lateral margin of pronotum not broadly foliaceous. Clavus of hemelytra with veins not distinct. Underside of posterior tibia with inner apical angle not produced into a sharp point. Posterior femora three-fifths width of anterior femora. First segment of anterior tarsus one-half length of second segment. Width of posterior tibia at least half that of anterior femur and less than width of an eye. Prosternal keel high, apex pointed, posterior margin semi-elliptical in shape. Metaxyphus slightly narrower than an eye; no evidence of a posterior point. (Professor De Carlo has noted that some specimens from the Province of Cordoba, Argentina have a metaxyphus with the trace of a posterior point). First segment of hind tarsus appreciably longer than the second. Operculum of female minutely bidentate at apex; that of the male not bidentate.

Comparative Notes. This species differs from all other species of Lethocerus in having the median posterior portion of the metaxyphus not pointed.

Location of Types. A holotype female, single specimen, in the F. H. Snow Entomological Collections at the University of Kansas bears the label: Fives Lille, Santa Fe, Argentina, X-30-1923, A. Bruch.

Data on Distribution.

Specimens Observed:

Argentina: Fives Lille, Santa Fe, X-30-1923, A. Bruch,  
holotype female; Alta Gracia, Prov. de Cordoba, II-1935,  
A. Bruch, 1 male; Calamuchita, Cordoba, XII-1938, A. Viana,  
1 male.

Recorded from the Literature:

De Carlo records this species from Santa Fe and  
Cordoba, Argentina.

Lethocerus bruchi De Carlo, 1931

(Plate VIII, fig. 10)

1931. Lethocerus bruchi De Carlo, J. A. Rev. Soc. Entom. Argentina, III, No. 4: 217-218, pl. VI.  
1938. Lethocerus bruchi De Carlo, J. A. An. del Mus. Argentina de C. Nat., XXXIX: 203, pl. I, fig. 7, pl. VI, fig. 41.

The following is a translation from Professor De Carlo's original description of Lethocerus bruchi.

Length--67 mm., maximum width--26 mm.

Sex--male.

Color--grayish, fairly uniform.

Interocular space wide with maximum width a little less than greatest width of an eye, its lateral margins nearly parallel; part of the interocular space compressed between the vertex and the base of the clypeus thinly carinated and somewhat darkened owing to the blackened zones which alternate with others of clear grayish color; narrow eyes, longer than wide, extruding very little.

Pronotum very convex; disk fairly convex, with two clear yellow stripes, short on anterior half, and two convergent depressions on each side of the longitudinal furrow, the lower one being longer and less marked; length of portion of pronotum compressed between transverse furrow and posterior border less than half of the total length of disk on median line.

Clavus with visible veins on lower portion; disk of corium with thickened veins, well marked.

Anterior femora twice the width of median femora; claw

of anterior tarsus visibly longer than the two segments together; tibiae of posterior legs of ordinary width, very little more than greatest width of interocular space. Median and posterior tibiae and femora with three dark indistinctly marked bands; the anterior tibiae without visible bands.

Abdomen of grayish color with a reddish luster seen with a little light.

Locality, Brazil (State of Parana).

Holotype in the Museum of Buenos Aires, Number of Cat. 26,722.

This species is differentiated from L. annulipes (Herrich-Schaffer) in lacking the dark longitudinal band which borders the abdominal disk; from L. delpontei De Carlo, because this species has the hind tibiae wider, the interocular space narrow, almost half the greatest width of posterior tibiae, wider eyes and a dark gray color.

Professor De Carlo (1938: 203) says that the metaxyphus has a slightly pronounced point, pl. I, fig. 1.

Another specimen, taken later by O. Montes in Minas Gerais, Brazil is Cat. No. 39,289 in the Argentina Museum of Natural Science, Buenos Aires.

*I got a ♀ from Exchange - 2/2/46*

Lethocerus delpontei De Carlo, 1930

(Plate XII, fig. 2)

1876. Belostoma annulipes, Uhler, P. R. Bul. U. S. Geol. Geog. Surv., I: 337.
1894. Belostoma annulipes, Uhler, P. R. Proc. Calif. Acad. Sci., ser. 2, IV: 291.
1895. Belostoma annulipes, Gillette, C. P. and Baker, C. Hemiptera Colorado, p. 63.
1896. Belostoma annulipes, Montandon, A. L. Ann. Soc. Entom. Belgium, XL: 516.
1901. Belostoma annulipes, Champion, G. C. Biol. Centr.-Amer. Hem.-Het., II: 367-368, pl. 22, figs. 3, 3a.
1906. Amorgius annulipes, Torre-Bueno, J. R. de la. Entom. News, XVII: 55.
1930. Lethocerus del pontei De Carlo, J. A. Rev. Soc. Entom. Argentina, No. 13: 108, pl. VII, fig. 24.
1931. Lethocerus delpontei De Carlo, J. A. Rev. Soc. Entom. Argentina, No. 4: 217.
1933. Lethocerus del pontei, Cummings, C. Univ. of Kansas Sol. Bul., XXI: 206-207, pl. XVIII, fig. 1, pl. XIX, fig. 2.
1938. Lethocerus delpontei De Carlo, J. A. An. del Mus. Argentina de C. Nat., XXXIX: 200-201, pl. III, fig. 38.

Size. Length from front of eyes to tip of abdomen 50-69 mm.; greatest width 21-27 mm.

Shape. Body elongate elliptical with lateral margin of hemelytra slightly dilated. Pronotum extremely convex, lateral margin slightly convex.

Color. Dorsal surface: generally a medium-brown. A median pair of light-brown or yellowish lines arising on anterior margin of pronotum and extending back one-third length of anterior lobe. Scutellum with a large, rectangular, fuscous area. Ventral surface: abdominal venter light-brown, medium-brown, or reddish-brown, speckled with fuscous spots. Tibiae and femora usually with three transverse bands.

Structural Characteristics. Antecocular portion of head



shorter than width of interocular space, one-third the length of an eye; head two-thirds length of pronotum on median line; anterior interocular space less than length of posterior lobe of pronotum on median line. Eye seven-tenths as wide as long; interocular space five-ninths width of an eye; length of eye at least two and one-half times width of interocular space; eyes broadly rounded on upper surface. Head with, or without, indication of median longitudinal carina. Antennae four-segmented, each of the last three segments with a long, curved prolongation, pl. III, fig. 11. Length of pronotum on median line over one-half its greatest width. Lateral margin of pronotum not foliaceous. Clavus of hemelytra without prominent veins. Underside of posterior tibia with inner apical angle not produced into a sharp point. Posterior femora three-fifths width of anterior femora. First segment of anterior tarsus one-half length of second on outer margin. Width of posterior tibia greater than half that of anterior femur, and as wide as an eye. Outer margin of hind tibia curved more than inner margin. Prosternal keel high, apex blunt; posterior margin convex. Metaxyphus elevated; narrower than an eye; sharply pointed posteriorly. First segment of hind tarsus longer than second. Operculum of female with two sharp apical points; that of the male without points.

Comparative Notes. This species differs from L. annulipes (Herrich-Schaffer) by not having a fuscous stripe on each

side of the abdominal venter narrow, and from L. mello-leitaoi De Carlo in having outer margin of hind tibia curved more than inner margin.

Location of Types. Holotype male, allotype female and one paratype male are in the Argentina Museum of Natural Science, Buenos Aires. These types have the cat. nos. 39,290, 26,720, and 26,721 respectively. The type locality is Iguazu, Gobernacion de Misiones, Argentina.

Data on Distribution.

Specimens Observed:

Arizona: Santa Cruz Co., 8-4-1927, L. D. Anderson, 2 males, R. H. Beemer, 2 males, 2 females; Patagonia, 8-4-27, R. H. Beemer, 2 females; Chiricahua Mts., 7-8-32, R. H. Beemer, 1 female; S. W. edge Tucson, 7-20-32, R. H. Beemer, 1 male; Sabino Canyon, H. B. Hungerford, 1 male.

Texas: Jim Wells Co., 7-24-28, R. H. Beemer, 1 female; Valentine, 7-13-27, R. H. Beemer, 1 female; Progreso, R. I. Sailer, 1 female.

Cuba: Rio Almendares, Marinao Prov. Havana, May 24, 1932, P. J. Bermudez, 2 females; Havana, Palmer and Riley, 2 males, 1 female.

Mexico: Yucatan, G. F. Gaumer, 1 male, 2 females; 50 mi. S. Victorias, San Luis Potosi, 6-10-32, Hobart Smith, 2 females; Colima, Encero Vera Cruz, S. of Jalapa, 7-17-32, H. Smith, 3 males, 1 female; Chiapas, 1937, H. D. Thomas, 1 male, 1 female; Taxco Gro., 7-15-1937, H. D. Thomas, 1 male, 2 females; Oaxaca, Oaxaca, 8-25-37, H. D. Thomas,

Missouri? St. Louis Mo. U.S.D.A. Light Traps Aug 1938. 1 ♀

4 males, 10 females; Guerrero, Kil. 444 S. of Mex. City, 10-7-36, H. D. Thomas, 6 males, 3 females.

Peru: Vio San Pedro, 900 m.a.s.l., Muddy pools, May 15-29, 1935, F. Woytkowski, 3 males, 2 females; Vio San Beni, 3 males, 7 females.

Brazil: Ypirango, S. Paulo, 1-20-26, R. Spitz, 5 males, 4 females; Blumenau, Espirt Santo, 1 female; Bahia, Dr. Bondar, 2 males.

Paraguay: Villarica, 1-6-24, 4-11-23, Fran. Schade, 1 male, 1 female.

Recorded from the Literature:

De Carlo records this species from Misiones and

Jujuy, Argentina; Parana, Brazil; Puerto Guarani, Paraguay.

B.W.I. Jamaica (No Data) Set. Mus. Inst. of Jamaica, Kingston, Jamaica  
B.W.I.

Lethocerus mello-leitaoi De Carlo, 1933.

(Plate XII, fig. 1)

1933. Lethocerus mello-leitaoi De Carlo, J. A. Bol. do Mus. Nac., IX, No. 1: 93-95, figs. 1-2.
1933. Lethocerus mello-leitaoi, Cummings, C. Univ. of Kansas Sci. Bul., XXI: 211.
1938. Lethocerus mello-leitaoi De Carlo, J. A. An. del Mus. Argentina de C. Nat., XXXIX: 198-199, pl. I, fig. 6, pl. III, fig. 36.

Size. Length from front of eyes to tip of abdomen 57-68 mm.; greatest width 21.5-26 mm.

Shape. Body elongate elliptical with lateral margins of hemelytra nearly parallel. Pronotum extremely convex; lateral margin slightly convex.

Color. Dorsal surface: pronotum brown with a median pair of yellowish lines arising on anterior margin and extending back one-third the length of anterior lobe. Pronotal pits outlined in light-brown. Scutellum with a large, rectangular, fuscous area. Ventral surface: median and posterior femora crossed by three prominent, transverse, fuscous bands; tibiae usually fuscous.

Structural Characteristics. Anteoocular portion of head shorter than width of interocular space, less than one-half the length of eye; head seven-tenths length of pronotum on its median line; anterior interocular space not quite as great as length of posterior lobe of pronotum on its median line. Eye three-fourths as wide as long; interocular space three-fifths width of an eye; length of eye over twice the width of interocular space; eyes broadly rounded

on upper surface. Head with trace of a median, longitudinal carina. Antennae four-segmented, each of the last three segments with a long, curved prolongation, pl. III, fig. 13. Length of pronotum on median line over one-half its greatest width. Clavus of hemelytra with visible, but not distinct, veins. Under side of posterior tibia with inner apical angle not produced into a sharp point. Posterior femora three-fifths width of anterior femora. First segment of anterior tarsus one-half length of second segment. Width of posterior tibia over one-half that of anterior femur and less than width of an eye. Outer margin of hind tibia no more curved than inner margin. Prosternal keel high, pointed, thicker on anterior margin. Metaxyphus narrower than an eye, sharply pointed posteriorly. First segment of hind tarsus longer than the second. Operculum of female with two sharp points at apex; that of the male without points.

Comparative Notes. This species differs from L. delpontei De Carlo in having the outer margin of the hind tibia no more curved than the inner margin. It differs from L. americanus (Leidy) in having the interocular space no greater than three-fourths the width of an eye.

Location of Types. Holotype male and allotype female in F. H. Snow Entomological Collections, University of Kansas, Lawrence, Kansas. One paratype is in the Argentina Museum of Natural Science, Buenos Aires. Type locality is Blumenau, Santa Catarina, Brazil.

Data on Distribution.

Specimens Observed:

Brazil: Blumenau, Santa Catarina, 1 male, 2 females.

Paraguay: Villarica, 3-1931, Fr. Schade, 1 female.

Recorded from the Literature:

De Carlo records this species from Rio de Janeiro,  
Brazil.

Lethocerus dilatus Cummings, 1933

(Plate XI, fig. 1)

1933. Lethocerus dilatus Cummings, G. Univ. of Kansas  
 Sci. Bul., XI: 208.  
 1938. Lethocerus dilatus, De Carlo, J. A. An. del Mus.  
 Argentina de C. Nat., XXXIX: 202-203, pl. IV, fig. 40.

Size. Length from front of eyes to tip of abdomen 72-79  
 mm., greatest width 29-31 mm.

Shape. Body elongate elliptical with dilated lateral margin  
 of hemelytra. Pronotum extremely convex, lateral margin  
 slightly convex.

Color. Dorsal surface: generally a medium-brown with anter-  
 ior lobe of pronotum darker than posterior lobe. Scutellum  
 with a large, rectangular, fuscous area. Ventral surface:  
 abdominal venter medium-brown, outer portion of connexivum  
 fuscous. Anterior tibiae fuscous with tarsi a cream color,  
 median and posterior tibiae and femora with three transverse  
 fuscous bands.

Structural Characteristics. Antecular portion of head  
 shorter than width of interocular space, one-third the  
 length of an eye; head about two-thirds length of pronotum  
 on median line; anterior interocular space less than length  
 of posterior lobe of pronotum on median line. Eye four-  
 fifths as wide as long; interocular space not over three-  
 fifths width of an eye; length of eye over twice the width  
 of interocular space; eyes broadly rounded on upper surface.  
 Head with a trace of a median longitudinal carina. Antennae  
 four-segmented; each of the last three segments with a long,

curved prolongation, pl. III, fig. 14. Length of pronotum on median line over half its greatest length. Lateral margin of pronotum not broadly foliaceous. Clavus of hemelytra with veins indistinct. Underside of posterior tibia with inner apical angle not produced into a sharp point. Posterior femora about three-fifths width of anterior femora. First segment of anterior tarsus one-half the length of second segment on outer margin. Width of posterior tibia greater than half that of anterior femur, and as wide as an eye. Prosternal keel high, blunt; anterior margin in a straight line, posterior margin convex. Metaxyphus narrower than an eye, sharply pointed posteriorly. Second segment of hind tarsus only two-thirds length of first segment. Operculum of female minutely bidentate at apex, that of the male not bidentate.

Comparative Notes. This species differs from L. melloleitaoi De Carlo and L. delpontei De Carlo in having the anterior tarsi a cream color and the outer margin of the connexivum fuscous.

Location of Types. A holotype female and one paratype female are in the F. H. Snow Entomological Collections, the University of Kansas. Both of these types bear the label "Buena Vista, Dept. Santa Cruz, Bolivia, 9-24-1924, R. T. Steinbach."

Data on Distribution.

Specimens Observed:

Bolivia: Buena Vista, Dept. Santa Cruz, 9-24-1924, R. T.



Steinbach, 2 females.

Peru: Leonpampa, Dep't. of Huanuco, Jungle ca. 800 m.a.s.l.,

Felix Woytkowski, 1 female.

Lethocerus collosicus (Stål), 1854

(Plate XII, fig. 4)

1854. Belostoma collosicus Stål, C. Ofv. Vet.-Akad. Forh., XI: 240.
1861. Belostoma colossicum Stål, C. Ofv. Vet.-Akad. Forh., XVIII: 205.
1863. Belostoma colossicum, Dufour, L. Ann. Soc. Entom. France, ser. 4, III: 381.
1865. Belostoma colossicum, Mayr, G. L. Hemiptera, p. 184.
1871. Belostoma colossicum, Mayr, G. L. Verh. Zool.-Bot. Ges. Wien, XXI: 423, 425.
1884. Belostoma collosicus, Uhler, P. R. Stand. Nat. Hist., II: 256.
1895. Belostoma colossicum, Montandon, A. L. Ann. Soc. Entom., Belgium, XXXIX: 472, 477, fig. 2.
1901. Belostoma colossicum, Champion, G. C. Biol. Centr.-Amer., Hem.-Het., II: 367, pl. 22, fig. 4.
1906. Amorgius colossicum, Torre-Bueno, J. R. de la. Entom. News, Feb., p. 55.
1909. Lethocerus collosicus, Kirkaldy, G. W. and Torre-Bueno, J. R. de la. Proc. Entom. Soc. Washington, X: 188.
1933. Lethocerus collosicus, Cummings, C. Univ. of Kansas Sci. Bul., XXI: 205, 206, pl. XIX, fig. 9.
1938. Lethocerus collosicus, De Carlo, J. A. An. del Mus. Argentina de C. Nat., XXXIX: 204-205, pl. III, fig. 43.

Size. Length from front of eyes to tip of abdomen 67-82 mm.; greatest width 28-33.5 mm.

Shape. Body elongate elliptical with some dilation to lateral margin of hemelytra. Head in or near a vertical position. Pronotum extremely convex; lateral margin with a very convex curve.

Color. Dorsal surface: light-brown, medium-brown, or nearly black. Scutellum with a large, rectangular area, usually fuscous. Ventral surface: two narrow, transverse, light-brown stripes on median and posterior tibiae and femora.

Structural Characteristics. Antecocular portion of head in a vertical or near vertical position, half the greatest length of an eye; its length two-thirds the width of inter-

ocular space; head over three-fifths length of pronotum on median line; anterior interocular space as great as length of posterior lobe of pronotum on median line. Eye over four-fifths as wide as long; interocular space four-fifths width of an eye; width of interocular space seven-tenths length of an eye; eyes with upper margins straight, triangular shaped from a front view. Head and scutellum with a median longitudinal carina. Antennae four-segmented; each of the last three segments with a long, curved prolongation, pl. III, fig. 6. Length of pronotum on median line very slightly over one-half its greatest width. Pronotum rugose, lateral margins broadly foliaceous or thin. Clavus of hemelytra with prominent veins. Underside of posterior tibia with inner apical angle produced into a sharp point. Posterior femora three-fifths width of anterior femora. First segment of anterior tarsus one-half length of second on outer margin. Width of posterior tibia less than half that of anterior femur and less than width of an eye. Proster-nal keel high; apex blunt; anterior margin in a straight line; posterior margin convex. Metaxyphus broad, about as wide as an eye, sharply pointed posteriorly. First segment of hind tarsus longer than second. Operculum of female bidentate at apex; that of male not bidentate.

Comparative Notes. This species differs from all other species of Lethocerus in having all the following characters: the upper margin of the eye straight, the clavus of hemelytra with prominent veins, usually a blackish color, and the

lateral margin of pronotum broadly foliaceous.

Location of Types. In the collection of Signoret coming from Mexico.

Data on Distribution.

Specimens Observed:

Mexico: Campeche, Champoton, 7-12-32, E. P. Creaser, 1 male;

Pan. Am. Highway, kil. 736 north of Mex. City, 11-5-36,

H. D. Thomas, 1 female.

Cuba: Central San Antonio, Madruga, Prov. Havana, 6-8-32,

P. J. Bermudez, 1 male, 2 females; Verga Alta, Prov. S.

Clara, March 28, 1933, P. J. Bermudez, 2 males, 1 female.

Jamaica: Santa Cruz, 4-15-1937, Chester Roys, 1 female.

Recorded from the Literature:

De Carlo records this species from Oaxaca, Mexico; Havana, Cuba.

Lethocerus maximus De Carlo, 1938

(Plate X, fig. 2)

1840. Belostoma grande Blanchard, E. (nec Nepa grandis Linnaeus, 1758), Hist. Nat. Anim. Art., p. 91, pl. I, fig. 4.
1843. Belostoma grande, Amyot, C. J. B. and Serville, A. Hist. Nat. Ins. Hem., pp. 429-430.
1856. Belostoma grande, Guérin-Ménéville, M. F. E. Hist. de Cuba, Sagra, VII: 175.
1863. Belostoma grande, Dufour, L. Ann. Soc. Entom. France, ser. 4, III: 380.
1930. Lethocerus grandis, De Carlo, J. A. Rev. Soc. Entom. Argentina, No. 13: 105-107, pl. VI, fig. 23.
1933. Lethocerus grandis, Cummings, C. Univ. of Kansas Sci. Bul., XXI: 208-209, pl. XIX, fig. 10.
1938. Lethocerus maximus De Carlo, J. A. An. del Mus. Argentina de C. Nat., XXXIX: 209-210, pl. V, fig. 47.

Size. Length from front of eyes to tip of abdomen 90-106 mm.; greatest width 32-38 mm.

Shape. Body elongate elliptical with lateral margins of hemelytra nearly parallel. Pronotum usually extremely convex, lateral margin convex.

Color. Dorsal surface: a medium-brown. A fuscous stripe narrowed from vertex of head to base of clypeus. Anterior lobe of pronotum fuscous; a median pair of light-brown lines arise on anterior margin and diverge on anterior third of lobe. Pronotal pits outlined in light brown. Scutellum with large, fuscous, rectangular area. Ventral surface: abdominal venter and most of connexivum fuscous. All tibiae and femora with three transverse fuscous bands.

Structural Characteristics. Antecular portion of head shorter than width of interocular space, less than one-half the length of an eye; head three-fifths length of pronotum

on median line; anterior interocular space shorter than length of posterior lobe of pronotum on median line. Eye a trifle greater than two-thirds as wide as long; interocular space two-thirds width of an eye; length of eye twice the width of interocular space; eyes broadly rounded on upper surface. Head with no median longitudinal carina. Antennae four-segmented; each of the last three segments with a long, curved prolongation, pl. III, fig. 9. Length of pronotum on median line slightly greater than one-half its greatest width. Clavus of hemelytra without visible veins. Underside of posterior tibia with inner apical angle produced into a sharp point. Posterior femora three-fourths width of anterior femora. Anterior and posterior femur equal in length. First segment of anterior tarsus more than one-half length of second segment. Anterior tarsal claw not as long on outer margin as combined length of its respective tarsal segments. Width of posterior tibia three-fourths that of anterior femur and wider than an eye. Prosternal keel high; anterior margin straight, posterior margin convex; apex drawn to a sharp point. Metaxyphus flat, about as wide as an eye, sharply pointed posteriorly. First segment of hind tarsus longer than second. Operculum of female with two sharp points at apex; that of male without points.

Comparative Notes. This species differs from L. grandis (Linnaeus) in having the anterior and posterior femora equal in length and the prosternal keel with a pointed apex.

Location of Types. A male holotype and female allotype are in the Argentina Museum of Natural Science, Buenos Aires, Cat. Nos. 33,269 and 33,267 respectively. These specimens are from Santa Cruz de la Sierra, Bolivia. There are two paratypes in the above museum, one from Venezuela, Cat. No. 33,268 and the other from Puerto Bertoni, Paraguay, Cat. No. 39,295. Three paratypes from Curumba, Brazil are in the collection of Sr. Pellerano; a paratype from Rio Grande, Brazil in the Museum of La Plata, and a paratype in the collection of Dr. Pennington, from Tucuman, Argentina.

Data on Distribution.

Specimens Observed:

Colombia: Villavicencio, Ost. Colombia, 400 m, coll. Fassi, 1 female; Apolinar Maria, 1935, 1 male.

Brazil: Igarape Assu, 1912, 1 female.

Bolivia: Prov. del Sara, XII-1912, Steinbach, 3 females, (Car. Mus.).

Paraguay: Villarica, 8-31, Fr. Schade, 1 male.

Recorded from the Literature:

De Carlo records this species from Paraguay: Santa Cruz de la Sierra, Bolivia; Venezuela; Curumba, Brazil; Rio Grande, Brazil.

Lethocerus camposi (Montandon), 1900

(Plate XII, fig. 3)

1900. Amorgilus camposi Montandon, A. L. Bul. Soc. Sci. Bucarest, IX: 561-562.
1909. Lethocerus camposi, Kirkaldy, G. W. and Torre-Bueno, J. R. de la. Proc. Entom. Soc. Washington, X: 188.
1933. Lethocerus camposi, Cummings, C. Univ. of Kansas Sci. Bul., XXI: 204-205, pl. XIX, fig. 7.
1938. Lethocerus camposi, De Carlo, J. A. An. del Mus. Argentina de C. Nat., XXXIX: 205-206, pl. III, fig. 44.

Size. Length from front of eyes to tip of abdomen 75-78 mm.; greatest width 29.5-30 mm.

Shape. Body elongate elliptical with lateral margins of hemelytra almost parallel. Pronotum extremely convex, lateral margin convex.

Color. Dorsal surface: usually a medium-brown with anterior lobe of pronotum fuscous. A median pair of light-brown lines arise on anterior margin of anterior lobe and extend back one-third the length of lobe. Pronotal pits a conspicuous light-brown color. Scutellum with a large, rectangular, fuscous area. Ventral surface: median and posterior femora with three prominent transverse fuscous bands.

Structural Characteristics. Antecular portion of head shorter than width of interocular space, less than one-half the length of an eye; head less than two-thirds length of pronotum on its median line; anterior interocular space almost as great as length of posterior lobe of pronotum on median line. Eye three-fourths as wide as long; interocular space two-thirds width of an eye; length of eye over twice the width of interocular space; eyes broadly



rounded on upper surface. Head with a median longitudinal carina. Antennae four-segmented, each of the last three segments with a long, curved prolongation, pl. III, fig. 12, Length of pronotum on median line over half its greatest width. Lateral margin of pronotum broadly foliaceous. Clavus of hemelytra covered with distinct veins. Underside of posterior tibia with inner apical angle produced into a sharp point. Posterior femora not over three-fifths width of anterior femora. First segment of anterior tarsus not more than half length of second segment. Width of posterior tibia less than half that of anterior femur and less than width of an eye. Prosternal keel high, very thin; apex blunt; anterior margin in a straight line. Metaxyphus as wide as an eye, sharply pointed posteriorly. First segment of hind tarsus longer than the second. Operculum of female only slightly bidentate at apex; that of male not bidentate.

Comparative Notes. This species differs from L. collosicus (Stål) in having the upper margin of the eye rounded; L. angustipes (Mayr) in having the lateral margin of the pronotum broadly foliaceous.

Location of Types. In Montandon's collection in Bucharest. Type locality is Guayaquil, Ecuador.

Data on Distribution.

Specimens Observed:

Ecuador: Guayaquil, Duran, F. Campos, 1 male, (Specimen compared with cotype): Guayaquil, 1 female.

(Univ. of Kansas).

X-28-35, 8 males, 7 females, (Amer. Mus. Nat. Hist.).

Recorded from the Literature:

De Carlo records this species from Guayaquil,  
Ecuador.

Lethocerus angustipes (Mayr), 1871

(Plate XI, fig. 4)

1871. Belostoma angustipes Mayr, G. L. Verh. Zool.-Bot. Ges. Wien, XXI: 423, 427.
1896. Belostoma angustipes, Montandon, A. L. Ann. Soc. Entom. Belgium, XL: 511.
1901. Belostoma angustipes, Champion, G. C. Biol. Centr. Amer., Hem.-Het., II: 368, pl. 22, figs. 5, 5a
1909. Lethocerus angustipes, Kirkaldy, G. W. and Torre-Bueno, J. R. de la. Proc. Entom. Soc. Washington, X: 188.
1917. Lethocerus angustipes, Van Duzee, E. P. Cat. of Hemip. of America North of Mexico, p. 466.
1933. Lethocerus angustipes, Cummings, C. Univ. of Kansas Sol. Bul., XXI: 202-203, pl. XVIII, figs. 5 & 6, pl. XIX, fig. 5.
1938. Lethocerus angustipes, De Carlo, J. A. An. del Mus. Argentina de C. Nat., XXXIX: 206-207, pl. II, fig. 27, pl. VI, fig. 45.

Size. Length from front of eyes to tip of abdomen 55-63 mm.; greatest width 22-24.5 mm.

Shape. Body elongate elliptical with lateral margins of hemelytra nearly parallel. Pronotum extremely convex, lateral margin slightly convex.

Color. Dorsal surface: usually a medium-brown with anterior lobe of pronotum fuscous. A median pair of yellowish lines arise on anterior margin of anterior lobe and extend back one-third the length of lobe. Scutellum with a large, rectangular, fuscous area. Ventral surface: abdominal venter and connexivum fuscous. Anterior femora usually not spotted. Median and posterior femora with fuscous transverse bands.

Structural Characteristics. Antecular portion of head shorter than width of interocular space, less than one-half the greatest length of an eye; head three-fifths length of

pronotum on median line; anterior interocular space not as great as length of posterior lobe of pronotum on median line. Eye four-fifths as wide as long; interocular space two-thirds width of an eye; length of eye not twice the width of interocular space, eyes broadly rounded on upper surface. Some specimens with a slight indication of a median longitudinal carina on head. Antennae four-segmented; each of the last three segments with a long, curved prolongation, pl. III, fig. 7. Length of pronotum on median line only slightly more than half its greatest width. Clavus of hemelytra with visible, but not prominent, veins. Underside of posterior tibia with inner apical angle produced into a sharp point. Posterior femora almost three-fifths width of anterior femora. First segment of anterior tarsus greater than half length of second segment on outer margin. Width of posterior tibia equal to one-half that of anterior femur and equal to width of interocular space. Posterior tibia narrower than an eye, inner margin almost in a straight line. Prosternal keel high; apex blunt; posterior margin convex. Metaxyphus elevated, as wide as an eye, sharply pointed posteriorly. First segment of hind tarsus longer than the second. Operculum of female very slightly bidentate at apex; that of male not bidentate.

Comparative Notes. This species differs from L. collosicus (Stål) in not having the upper margin of the eye straight as viewed from the front, and from L. campoel (Montandon) in not having the lateral margin of the pronotum broadly foliaceous.

Location of Types. Dr. Mayr did not designate types.

Specimens in the Museum of Vienna, supposedly studied by Mayr, came from Mexico.

Data on Distribution.

Specimens Observed:

Mexico: Zitacuaro, Michoacan, 8-5-1932, Hobart Smith, 1 male; Dist. Fed., por Ancona, 1 female; Colima, 1 female.

Recorded from the Literature:

De Carlo records this species from Lerma and Zinacantanpec, Mexico.

Lethocerus grandis (Linnaeus), 1758

(Plate X, fig. 1)

1758. Nepa grandis Linnaeus, C. Syst. Nat., Ed. X: 440.  
 1794. Nepa grandis, Fabricius, J. C. Ent. Syst. IV: 61.  
 1835. Belostoma grande, Burmeister, H. C. Handb. der Entom.,  
 II: 195.  
 1847. Belostoma grande, Leidy, J. Jour. Acad. Nat. Sci.  
 Philadelphia, VI: 58, 66.  
 1865. Belostoma grande, Mayr, G. L. Hemiptera, p. 184.  
 1871. Belostoma grandis, Mayr, G. L. Verh. Zool.-Bot. Ges.  
 Wien, XXI: 423, 425.  
 1884. Belostoma grandis, Uhler, P. R. Stand. Nat. Hist.,  
 II: 256.  
 1909. Lethocerus grandis, Kirkaldy, G. W. and Torre- Bueno,  
 J. R. de la. Proc. Entom. Soc. Washington, X: 188.  
 1933. Lethocerus largus Cummings, C. Univ. of Kansas  
 Sci. Bul., XXI: 210, pl. XIX, fig. 6.  
 1938. Lethocerus grandis, De Carlo, J. A. An. del Mus.  
 Argentina de C. Nat., XXXIX; 208, pl. V, fig. 46.

Size. Length from front of eyes to tip of abdomen 80-91  
 mm.; greatest width 29.5-33 mm.

Shape. Body elongate elliptical with lateral margins of  
 hemelytra almost parallel. Pronotum extremely convex,  
 lateral margin with a convex curve.

Color. Dorsal surface: generally a medium-brown. A broad  
 fuscous stripe from vertex of head to base of clypeus.  
 Anterior lobe of pronotum fuscous, a pair of light brown  
 lines arising on anterior margin, diverging near the median  
 portion. Prominent light-brown oval markings cover the  
 pronotal pits. Scutellum with large, fuscous rectangular  
 area. Ventral surface: most of abdominal venter and con-  
 nexivum fuscous, outer portion of connexivum a light-brown.  
 Median and posterior tibiae and femora each with three  
 transverse fuscous bands.

Structural Characteristics. Antecular portion of head at least three-fourths the width of interocular space, less than one-half the length of an eye; head two-thirds length of pronotum on median line; anterior interocular space less than length of posterior lobe of pronotum on median line. Eye seven-tenths as wide as long; interocular space three-fifths width of an eye; length of eye twice the width of interocular space; eyes broadly rounded on upper surface. Head without a median longitudinal carina. Antennae four-segmented; each of the last three segments with a long, curved prolongation, pl. III, fig. 10. Length of pronotum on median line a trifle over half its greatest width, surface of pronotum smooth. Clavus of hemelytra without visible veins. Underside of posterior tibia with inner apical angle produced into a sharp point. Posterior femora two-thirds width of anterior femora. Anterior femur longer than posterior femur. First segment of anterior tarsus more than one-half the length of second segment. Anterior tarsal claw as long as combined tarsal segments on outer margin. Width of posterior tibia two-thirds that of anterior femur and slightly wider than an eye. Prosternal keel high; anterior margin straight; posterior margin convex. Metaxyphus nearly as wide as an eye, sharply pointed posteriorly. First segment of hind tarsus longer than second. Operculum of female with two sharp points at apex; that of male without points.

Comparative Notes. This species differs from L. maximus

De Carlo in having the anterior femur longer than the posterior femur and a broad fuscous stripe from the vertex of head to the base of the clypeus.

Location of Types. The type is in the Museum of Upsala, Sweden. Doctor Hungerford, in 1928, saw this specimen, said it was 83 mm. long, and bore the labels "Mus. Gust. Adolphi", "Typus", "Nepa grandis".

Data on Distribution.

Specimens Observed:

Brazil: Ypirango, S. Paulo, 2-7-24, R. Spitz, 1 male; Sao Paulo, 1922, Alfredo Faz, 2 males; S. Paulo, 1 female. (Univ. of Kansas).

Mogydas Cruzes, Rio Tiete, Sao Paulo, 2 females, (Car. Mus.).

Recorded from the Literature:

De Carlo records this species from Rio de Janeiro, and San Pablo, Brazil.



Lethocerus annulipes (Herrich-Schäffer), 1848

(Plate XI, fig. 3)

1848. Belostoma annulipes Herrich-Schäffer, G. A. W. Wenz. Ins., VIII: 28, pl. 258, figs. 803, 804.
1856. Belostoma capitatum Guérin-Méneville, M. F. E. Hist. de Cuba, Sagra, VII: 175-176.
1863. Belostoma distinctum Dufour, L. Ann. Soc. Entom. France, ser. 4, III: 382.
1863. Belostoma ruficeps Dufour, L. Ann. Soc. Entom. France, ser. 4, III: 382.
1863. Belostoma signoreti Dufour, L. Ann. Soc. Entom. France, ser. 4, III: 382.
1865. Belostoma annulipes, Mayr, G. L. Hemip., pp. 185-186.
1871. Belostoma annulipes, Mayr, G. L. Verh. Zool.-Bot. Ges. Wien, XXI: 424, 427.
1896. Belostoma mayri Montandon, A. L. Ann. Soc. Entom. Belgium, XL: 514.
1909. Lethocerus annulipes, Kirkaldy, G. W. and Torre-Bueno, J. R. de la. Proc. Entom. Soc. Washington, X: 188.
1930. Lethocerus annulipes, De Carlo, J. A. Rev. Soc. Entom. Argentina, No. 13: 107-108, pl. VI, figs. 21, 23.
1933. Lethocerus annulipes, Cummings, C. Univ. of Kansas Sci. Bul., XXI: 203-204, pl. XIX, fig. 3.
1938. Lethocerus annulipes, De Carlo, J. A. An. del Mus. Argentina de C. Nat., XXXIX: 201-202, pl. I, fig. 9, pl. II, figs. 13, 25, 26; pl. IV, fig. 39.

Size. Length from front of eyes to tip of abdomen 51-74 mm.; greatest width 21.5-24 mm.

Shape. Body elongate elliptical with lateral margins of hemelytra nearly parallel. Pronotum extremely convex; lateral margin slightly convex.

Color. Dorsal surface: generally a medium-brown. Anterior lobe of pronotum fuscous; a median pair of yellowish lines arising on anterior margin and extending back about one-third the length of lobe. Scutellum with a large, rectangular, fuscous area. Ventral surface: abdominal venter light brown, mesal area of connexivum with longitudinal

fuscous stripe less than one-half its width. Median and posterior tibiae and femora each with three transverse fuscous bands.

Structural Characteristics. Antecocular portion of head almost as great as width of interocular space, less than one-half greatest length of an eye; head seven-tenths length of pronotum on median line; anterior interocular space not as great as length of posterior lobe on median line. Eye three-fourths as wide as long; interocular space about two-thirds width of an eye; length of eye twice the width of interocular space; eyes broadly rounded on upper surface. Head with no median longitudinal carina. Antennae four-segmented; each of the last three segments with a long, curved prolongation, pl. III, fig. 8. Length of pronotum on median line a trifle greater than one-half its greatest width. Clavus of hemelytra without visible veins. Under-side of posterior tibia with inner apical angle not produced into a sharp point. Anterior femora almost twice width of posterior femora. First segment of anterior tarsus one-half that of second on outer margin. Width of posterior tibia more than half that of anterior femur and almost the width of an eye. Prosternal keel high; anterior margin in a straight line; posterior margin convex. Metaxyphus elevated, not as wide as an eye, sharply pointed posteriorly. First segment of hind tarsus longer than second. Operculum of female minutely bidentate at apex; that of male not bidentate.

Location of Types. Location unknown. They were described from specimens from South America.

Data on Distribution.

Specimens Observed:

British Guiana: Plantation Eccles, E. Bank Demerara River, 4-4-32, S. Harris, 8 males, 4 females; Botanic Gardens, Georgetown, 11-25-37, S. Harris, 20 males, 6 females.

French Guiana: St. Laurent, Guyana, 1 female.

Brazil: Ypirango, S. Paulo, 1-20-26, 1-27-24, Rbt. Spitz, 25 males, 11 females; St. Catharina, 1921, Alfredo Faz, 1 male, 1 female.

Argentina: Ioano-Rio Salado, Santiago del Estero, 1 male; Fives Lille, Santa Fe, 1923, A. Bruch, 1 female; Bs. Aires, C. S. Reed, 1 male; Buenos Aires, Argentine Republic, H. T. Martin, 1 male.

Paraguay: Villarica, 10-29-29, 9-10-23, Fran. Schade, 4 females.

Recorded from the Literature:

De Carlo records this species from Cap. Federal, Entre Rios, Chaco, and Formosa, Argentina; Mato Grosso, Brazil.

Lethocerus uhleri (Montandon), 1896

(Plate X, fig. 5)

1876. Belostoma americanum Uhler, P. R. Bul. U. S. Geol. Geog. Surv., I: 71, pl. 21, fig. 38.
1896. Belostoma uhleri Montandon, A. L. Ann. Soc. Entom. Belgium, XL: 513-514.
1905. Belostoma uhleri, Howard, L. O. Insect Book, pl. 29, fig. 25.
1907. Belostoma uhleri, Torre-Bueno, J. R. de la and Brimley, C. S. Entom. News, XVIII: 434.
1909. Amorgius uhleri, Van Duzee, E. P. Bul. Buffalo Soc. Nat. Sci., IX: 184.
1909. Lethocerus uhleri, Kirkaldy, G. W. and Torre-Bueno, J. R. de la. Proc. Entom. Soc. Washington, X: 189.
1914. Amorgius uhleri, Barber, H. G. Bul. Amer. Mus. Nat. Hist., XXXIII: 498.
1917. Lethocerus uhleri, Van Duzee, E. P. Cat. of Hemip. of America North of Mexico, p. 466.
1926. Lethocerus uhleri, Blatchley, W. S. Het. of East. North America, p. 1043.
1933. Lethocerus uhleri, Cummings, C. Univ. of Kansas Sci. Bul. XXI: 213, pl. XIX, fig. 4.
1938. Lethocerus uhleri, De Carlo, J. A. An. del Mus. Argentina de C. Nat., XXXIX: 199-200, pl. IV, fig. 37.

Size. Length from front of eyes to tip of abdomen 39-52 mm.; greatest width 14-19 mm.

Shape. Body elongate elliptical, lateral margins of hemelytra almost parallel. Pronotum extremely convex, lateral margin convex.

Color. Dorsal surface: generally a medium-brown with a median pair of yellowish lines arising on anterior margin of anterior lobe and extending back one-third the length of lobe. Scutellum with a large, rectangular fuscous area.

Ventral surface. abdominal venter and connexivum tan, medium-brown, or maroon with fuscous markings. Median posterior tibiae and femora each with three transverse fuscous bands.

Structural Characteristics. Antecocular portion of head two-thirds the width of interocular space, less than one-half the greatest length of an eye; head at least two-thirds length of pronotum on median line; anterior interocular space as great as, or greater than, length of posterior lobe of pronotum on median line. Eye three-fourths as wide as long; interocular space two-thirds width of an eye; length of eye nearly twice the width of interocular space; eyes broadly rounded on upper surface. Head with a trace of a median longitudinal carina. Antennae four-segmented; each of the last three segments with a long, curved prolongation, pl. III, fig. 5. Length of pronotum on median line over half its greatest width. Lateral margins of pronotum not foliaceous. Clavus of hemelytra without visible veins. Underside of posterior tibia with inner apical angle not produced into a sharp point. Anterior femora nearly twice width of posterior femora. First segment of anterior tarsus half length of second on outer margin. Width of posterior tibia less than half that of anterior femur and less than width of an eye. Prosternal keel high; anterior margin in a straight line; posterior margin convex. Metaxyphus almost as wide as an eye, sharply pointed posteriorly. First segment of hind tarsus longer than second. Operculum of female with two sharp points at apex; that of male without points.

Comparative Notes. This species is smaller than L. americanus (Leidy) and has the interocular space much narrower than an eye.

Location of Types. Professor Montandon did not designate types. His description is based on five specimens coming from Kansas, Florida, and Pennsylvania. These specimens were in his collection.

Data on Distribution.

Specimens Observed:

Wisconsin: Chippewa Co., Jim Falls, 8-29-28, Creaser-Jones, 1 male, (Univ. of Mich.).

Pennsylvania: All'y Co., Holland Collection, 1 male, (Car. Mus.).

Kansas: Douglas Co., May 21, 1920, H. B. Hungerford, 6 males, 1 female; Douglas Co., May 21, 1919, W. Hoffman, 1 male; Riley Co., 1 male.

Texas: Colorado Co., 5-6-1922, Mrs. Grace Wiley, 1 female; Galveston, May, F. H. Snow, 1 female.

Louisiana: New Orleans, Chickering, 4-30-28, 2 males, 1938, W. Benedict, 1 female, (Univ. of Kansas).

Claiborne, 1 male, (Car. Mus.).

Georgia: Waycross, 11-9-09, 2 females; Okefenokee Swamp, 8-3-34, P. A. McKinstry, 1 female, (Univ. of Kansas).

Thomasville, 1 female, (Amer. Mus. Nat. Hist.).

Florida: Archer, 7-31-30, R. H. Beamer, 1 male, 1 female; Vero Beach, Sept. 26, 1927, E. M. Beeton, 2 males, (Univ. of Kansas).

Stemper, 1 male; Miami, VII-1930, 2 males, (Car. Mus.).

Port Sewell, 11-24-38, 5 males, 2 females, (Amer. Mus. Nat. Hist.).

Alachua Co., Gatesville, 3 males, 2 females; Hendy Co.,  
Moore Haven, VI-29-35, I. J. Cantrall, 1 male; Volusia Co.,  
VIII-31-38, Hubbel-Friauf, 1 male, (Univ. of Mich.).  
Nevada: Elko Co., Goanite Valley, VIII-25-38, C. L. Hubbs  
family, 3 males, (Univ. of Mich.).

Recorded from the Literature:

De Carlo records this species from Arkansas.

Lethocerus medius (Guérin-Méneville), 1857

1857. Belostoma medium Guérin-Méneville, M. F. E. Hist. de Cuba, Sagra, pt. 2, VII, p. 175.  
 1909. Lethocerus medius, Kirkaldy, G. W. and Torre-Bueno, J. R. de la. Proc. Entom. Soc. Washington, X: 189.  
 1938. Lethocerus medius, De Carlo, J. A. An. del Mus. Argentina, de C. Nat., XXXIX: 210.

Original Description:

Belostoma medium Guérin-Méneville.

"Flavo-fuscum, elongatum; prothorace inaequale, fusco-maculato; scutello in medio carinato, nigro corpore subtus pedibusque immaculatis, tibiis anticis supra nigro annulatis. Length 65 mm.; width 24 mm."<sup>1</sup>

Translation of Original Description.

Yellow fuscous, elongated; prothorax uneven, dark-spotted; scutellum with a median carina, lower surface of body dark with feet not spotted, upper surface of anterior tibiae with dark rings. Length 65 mm.; width 24 mm.

A translation of comments in French, by the author, follows:

This species is intermediate between B. grande and caudata, Perch. (Genera of insects), but it is separated from both by its uniformly colored legs and by other characters. We have found a specimen of it in the collection of Mr. Ramon de la Sagra.<sup>2</sup>

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<sup>1</sup>M. F. E. Guérin-Méneville, Hemiptera - Belostoma, [nec Latreille]. Hist. de Cuba, Sagra, pt. 2, VII (1857) p. 175.

<sup>2</sup>Ibid, trans. the author.



Location of Types. The author does not specify location of types.

Data on Distribution. Cuba, according to the author.

Lethocerus curtus (Guérin-Méneville), 1857

1857. Belostoma curtum Guérin-Méneville, M. F. E. Hist. de Cuba, Sagra, pt. 2, VII, p. 175.  
 1909. Lethocerus curtus, Kirkaldy, G. W. and Torre-Bueno, J. R. de la. Proc. Entom. Soc. Washington, X: 188.  
 1938. Lethocerus curtus, De Carlo, J. A. An. del Mus. Argentina de C. Nat., XXXIX: 210.

Original Description:

Belostoma curtum Guérin-Méneville.

"Flavo-ferrugineum abbreviatum; prothorace inaequale, lato, fusco-maculato; scutello subcarinato, rugoso; disco nigro; corpore subtus pedibusque immaculatis; tibiis anticis supra nigro annulatis. Length 50 mm; width 22 mm."<sup>1</sup>

Translation of Original Description.

Tawny, iron-gray, shortened; prothorax uneven, broad, dark-spotted; scutellum slightly carinated, rough; darkened disk; lower surface of body with feet not spotted; upper surface of anterior tibiae with black rings. Length 50 mm.; width 22 mm.

A translation of comments in French, by the author, follows:

This insect is not a variety or of the other sex of the preceding one, it is recognized at first glance by the proportions of its whole body, as wide and much shorter. We have received a single specimen of it from Mr. Poey.<sup>2</sup>

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<sup>1</sup>M. F. E. Guérin-Méneville, Hemiptera - Belostoma, [nec Latreille]. Hist. de Cuba, Sagra, pt. 2, VII (1857) p. 175.

<sup>2</sup>Ibid, trans. the author.

Location of Types. The author does not specify location of types.

Data on Distribution. Cuba, according to the author.

GENUS BENACUS STÅL, 1861

Belostoma auct. in part (nec Latreille)

1861. Stål, C. Ofv. Vet. Akad. Forh., XVIII: 205.  
1871. Mayr, G. L. Verh. Zool.-Bot. Ges. Wien, XXI: 402,  
428.  
1875. Stål, C. Hem. Africana, III: 179.  
1907. Torre-Bueno, J. R. de la. Can. Entom., XXXIX:  
335-336.  
1909. Kirkaldy, G. W. and Torre-Bueno, J. R. de la. Proc.  
Entom. Soc. Washington, X: 187.  
1917. Van Duzee, E. P. Cat. of Hemip. of America North of  
Mexico, p. 464.  
1919. Hungerford, H. B. Univ. of Kansas Sci. Bul., XI: 150.  
1926. Blatchley, W. S. Het. of East. North America, p. 1042.  
1933. Cummings, C. Univ. of Kansas Sci. Bul., XXI: 198,  
200-201.  
1938. De Carlo, J. A. An. del Mus. Argentina de C. Nat.,  
XXXIX: 195-196.

Genotype. Benacus griseus (Say)

Generic Characters. Elongate-elliptical species, 45-62 mm.  
long, 18-24 mm. wide. Antecular portion of head shorter  
than length of eye; beak three-segmented, the first segment  
shorter than the second; eyes wider than interocular space;  
antennae four-segmented, the last three segments with  
curved prolongations; jugae contiguous in front of clypeus.  
Anterior femur not sulcate, one tarsal claw on anterior  
tarsus; anterior femur wider than posterior femur. Hemelytra  
covering abdomen except for a small portion of connexivum on  
the last segment; membrane well-developed. Tip of genital  
operculum of female incised and bidentate, that of male  
not incised.

Benacus Stål was described by Stål in 1861. It is  
separated from the similar genus Lethocerus Mayr by the

anterior femora not grooved for the reception of the tibiae. The single species in this genus, Benacus griseus (Say), was originally known as Belostoma griseum Say.

Benacus griseus (Say) is numerous in the eastern states, particularly Pennsylvania. I have also seen specimens from Kansas, Texas, Florida, several other states, Mexico, and Cuba.

Benacus griseus (Say), 1832

(Plate X, fig. 4)

1832. Belostoma grisea Say, T. Heter. New Harmony, p. 37.  
(Fitch reprint, p. 809).
1847. Belostoma haldemanum Leidy, J. Jour. Acad. Nat. Sci. Philadelphia, ser. 2, I: 59, 66.
1854. Belostoma harpax Stal, C. Ofv. Vet. Akad. Forh., XI: 240.
1857. Belostoma angustatum Guérin-Méneville, M. F. E. Sagra, Hist. de Cuba, VII: 176.
1861. Benacus haldemanus, Stål, C. Ofv. Vet. Akad. Forh., XVIII: 205.
1863. Belostoma grisea, Dufour, L. Ann. Soc. Entom. France, ser. 4, III: 400.
1863. Belostoma haldemanum, Dufour, L. Ann. Soc. Entom. France, ser. 4, III: 383.
1871. Benacus haldemanus, Mayr, G. L. Verh. Zool.-Bot. Ges. Wien, XXI: 428-429.
1876. Benacus griseus, Uhler, P. R. Bul. U. S. Geol. Geog. Surv., I: 337.
1878. Benacus griseus, Uhler, P. R. Proc. Boston Soc. Nat. Hist., XIX: 441.
1884. Benacus griseus, Uhler, P. R. Stand. Nat. Hist., II: 256.
1894. Benacus griseus, Van Duzee, E. P. Bul. Buffalo Soc. Nat. Sci., V: 185.
1895. Benacus griseus, Riley, C. V. Proc. Entom. Soc. Washington, III: 83-87.
1905. Benacus griseus, Howard, L. O. Insect Book, p. 248, fig. 4.
1905. Benacus griseus, Torre-Bueno, J. R. de la. Jour. New York Entom. Soc., XIII: 44.
1907. Benacus griseus, Torre-Bueno, J. R. de la and Brimley, C. S. Entom. News, XVIII: 434.
1908. Benacus griseus, Torre-Bueno, J. R. de la. Journ. New York Entom. Soc., XVI: 237.
1909. Benacus griseus, Van Duzee, E. P. Bul. Buffalo Soc. Nat. Sci., IX: 184.
1909. Benacus griseus, Kirkaldy, G. W. and Torre-Bueno, J. R. de la. Proc. Entom. Soc. Washington, X: 187.
1914. Benacus griseus, Barber, H. G. Bul. Amer. Mus. Nat. Hist., XXXIII: 498.
1919. Benacus griseus, Hungerford, H. B. Univ. of Kansas Sci. Bul., XI: 150-151, col. pl. II, fig. 5.
1926. Benacus griseus, Blatchley, W. S. Het. of East. North America, pp. 1042-1043.
1933. Benacus griseus, Cummings, C. Univ. of Kansas Sci. Bul., XXI: 200-201.
1938. Benacus griseus, De Carlo, J. A. An. del Mus. Argentina de C. Nat., XXXIX: 195-196, pl. III, fig. 34.

Size. Length from front of eyes to tip of abdomen 45-63 mm.; greatest width 18-24 mm.

Shape. Body elongate-elliptical with a slight dilation of lateral margins of abdomen. Pronotum smooth, extremely convex, lateral margins slightly convex or straight.

Color. Dorsal surface: usually a medium-brown; a broad fuscous band on each side of anterior lobe of pronotum. Scutellum with a large, rectangular, fuscous area. Ventral surface: abdominal venter medium- to dark-brown. No definite markings on legs.

Structural Characteristics. Antecular portion of head shorter than width of interocular space; less than half length of an eye; head three-fourths of greatest length of pronotum on median line; anterior interocular space about same length as posterior lobe of pronotum on median line. Eye three-fourths as wide as long; interocular space nearly three-fifths width of an eye; length of eye more than twice width of interocular space; eyes broadly rounded on upper surface. Head with no median, longitudinal carina but a slight indication of a carina on scutellum. Antennae four-segmented; each of the last three segments with a long, curved prolongation, pl. III, fig. 1. Length of pronotum on median line more than half its greatest width. Clavus of hemelytra without distinct veins. Underside of posterior tibia with inner apical angle not produced into a sharp point. Posterior femur at least four-fifths width of anterior femur. First segment of anterior tarsus equal to second

on outer margin. Width of posterior tibia at least four-fifths that of anterior femur and almost the width of an eye. Hind tarsus wider than an eye. Prosternal keel high, triangular, apex of medium sharpness. Metaxyphus not quite as wide as an eye, sharply pointed posteriorly. First segment of hind tarsus longer than second. Operculum of female slightly bidentate at apex; that of the male not bidentate.

Comparative Notes. This species differs from all species of the genus Lethocerus in not possessing grooves in anterior femora for the reception of tibiae.

Types. Not known.

Data on Distribution.

Specimens Observed:

Michigan: Oakland Co., Rochester, June 10, 1934, S. Moore, 1 female; Hillsdale Co., Camden, May 27, 1935, 1 male, (Univ. of Mich.).

New York: New York City, 1 female, (Amer. Mus. Nat. Hist.).

New Jersey: Paterson, V-19, 1 male, (Amer. Mus. Nat. Hist.).

Pennsylvania: Pittsburg, July 20, 1910, IX-6-1905, 10 males, 16 females; Jeanette, VI-27, H. G. Klages, 2 females; Washington, VIII-1929, H. W. Swart, 1 male; All'y C., 1 male, 1 female; Erie Co., June 3, 1908, 1 female; Wilkinsburg, VI-1920, Geo. Duff, 1 male; Laughlintown, VII-1928, 2 females, (Car. Mus.).

Ohio: Summit Co., 7-15-37, L. J. Lipovsky, 1 male, 1 female, (Univ. of Kansas).



Sandusky, VIII-8-1899, 2 males, (Univ. of Mich.).

Indiana: Columbia City, IX-5-1937, G. E. Wallace, 1 female,  
(Car. Mus.).

Illinois: N. Chicago, 1900, 1 male, (Univ. of Mich.).

Missouri: *H. R. Starr, Aug 22, 1935; Columbia, Mo*

Kansas: Douglas Co., July 8, 1920, May 24, 1918, William  
Hoffman, 6 males, 9 females, H. B. Hungerford, 1 female;  
Lawrence, 5-23-33, L. S. Henderson, 1 male.

Texas: Galveston, May, F. H. Snow, 1 female; Sutton Co.,  
7-16-28, R. H. Besmer, 1 female.

Arizona: Oro Blanco Mts., near Nogales, July 1937, Peter  
Steckler, 1 male, 1 female, (Amer. Mus. Nat. Hist.).

Louisiana: New Orleans, 1938, W. Benedict, 1 male, (Univ.  
of Kansas).

Claiborne, 1 female, (Car. Mus.).

North Carolina: Beaufort, 7-25-1934, A. S. Pearse, 1 female.

Florida: Inverness, 8-1-30, Paul W. Oman, 1 female; Orlando,  
6-21-45, 1 male; 25 mi. W. Miami, 7-22-34, P. McKinstry, 1  
male, (Univ. of Kansas).

Miami, VII-1930, 1 female, Oct. 8, 1928, 1 male; Dade Co.,  
VI-1930, 1 female, (Car. Mus.).

Port Sewall, XI-24-38, 5 males, 5 females, (Amer. Mus. Nat.  
Hist.).

Cuba: Rio Almendares, Marinao Prov., Havana, Nov. 1932,  
P. J. Bermudez, 1 male.

Mexico: Ciudad del Carmen, Campeche, 9-18-36, H. D. Thomas,  
1 female.

*S.W.S. Lomaxia (No Data) 1 ♂ (R.H.)*

GENUS BELOSTOMA LATREILLE, 1807

1807. Latreille, P. Gen. Crust. et Ins., III, p. 144.  
1825. Lepeletier, A. L. M. and Serville, A. Encycl. Meth., X, pp. 272-273.  
1831. Say, T. Het. Hem. New Harmony, p. 809.  
1900. Montandon, A. L. Bul. Soc. Sci. Bucarest, IX, p. 270.  
1908. Kirkaldy, G. W. Can. Entom., XL, p. 164.  
1919. Hungerford, H. B. Univ. of Kansas Sci. Bul., XI, pp. 144-148.  
1930. De Carlo, J. A. Rev. Soc. Entom. Argentina, No. 13, pp. 109-120.  
1938. De Carlo, J. A. An. del Mus. Argentina de C. Nat., XXXIX, pp. 210-241.

Referring to this genus also:

Zaitha Amyot and Serville.

1843. Amyot, C. J. B. and Serville, A. Hist. Nat. Ins. Hem., p. 430.  
1863. Dufour, L. Ann. Soc. Entom. Fr., (4), III, pp. 379, 386-392.  
1863. Mayr, G. L. Verh. Zool.-Bot. Ges. Wien, XIII, pp. 340-342, 352-357.  
1865. Stål, C. Hem. Africana, III, p. 179.  
1871. Mayr, G. L. Verh. Zool.-Bot. Ges. Wien, XXI, pp. 400, 406-422.  
1879. Berg, C. Hem. Argentina, p. 189.  
1901. Champion, G. C. Biol. Centr. Amer., Hem. Het., II, p. 364.  
1847. Perthostoma Leidy, J. Jour. Acad. Nat. Sci. Philadelphia, (2), I, p. 60.  
1848. Diplonychus Herrich-Schäffer, G. A. W. Wanzen Ins., VIII, p. 26.

Genotype. Belostoma testaceo-pallidum Latreille.

Generic Characters. Head triangular, quite narrow anteriorly; eyes usually prominent, convex, rather triangular; ocelli absent; vertex between eyes sloping on each side to form a slight furrow; antennae four-segmented, lodged in pockets under the eyes, second and third segments each with

a long, curved prolongation, B. penabedum n. sp. the only exception, Plate II, fig. 12; beak three-segmented, third segment shortest. Pronotum convex, trapezoid in shape; a shallow pronotal pit on anterior lobe on each side of median line; a transverse furrow separating these pits from posterior pronotal lobe; scutellum in shape of equilateral triangle. Abdomen flattened, wider than pronotum; a longitudinal band of hairs always covering a portion of mesal area of connexivum; nearly one third of the species of the genus Belostoma with hair covering entire mesal area of connexivum. Legs very robust; anterior femora usually wider than median and posterior femora; anterior tibia bent, curved into the hairy groove of anterior femur; tarsi two-segmented, second segment usually longer than first; median and posterior femora moderately flattened; one tarsal claw on anterior tarsus; two on median and posterior tarsi.

Specific Characters. Most of the early descriptions of species in this genus were very brief, mentioning length and width of the species, color, number of veins in the hemelytral membrane, type locality, and location of types.

Professor A. L. Montandon made extensive use of the hair pattern on the mesal area of the connexivum and the length of first segment of the beak in relation to the length of the second as characters. He differentiated between species in which the hair covered only a part of the mesal area of the connexivum and those with hair covering the entire mesal area. In some species the

length of the first segment of the beak equals or exceeds that of the second segment, and in others the first segment is shorter than the second. Professor José A. De Carlo, also, has used the above mentioned characters extensively in describing species. Montandon, 1903, used the term pro-sternal keel in describing the species B. denticolle. The keel in this species is in the shape of a tooth; it is narrow and high. This character is used to-day in separating B. denticolle Montandon from B. plebejum (Stål) and B. micantulum (Stål). Montandon provided comparisons as well as descriptions in most of his accounts.

Caudal filaments do not show group-characters in this genus. Claspers between the caudal filaments on the genital capsule of the male also do not show group-characters. The author has found that the metaxyphus provides helpful characters when its greatest width is compared with the width of an eye.

Distribution. Belostoma Latreille has a total of forty-four species in the new world. B. boscii (Lepelletier and Serville) has the most extensive geographic distribution, occurring in North, South, and Central America. The majority of the species of Belostoma occur in South America. Those found in the United States are B. apache Kirkaldy, B. bakeri Montandon, B. boscii (Lepelletier and Serville), B. ellipticum Latreille, B. flumineum Say, B. fusciventre (Dufour), B. lutarium (Stål), and B. testaceum (Leidy). The writer adds B. penabedum n. sp. to the list found in

the United States, B. minutum n. sp. found in Mexico, and B. acutum n. sp., B. willi n. sp. and B. decarloi n. sp. found in South America.

Historical Review. The genus Belostoma was defined by Latreille in 1807, his genotype being Belostoma testaceo-pallidum. Amyot and Serville, 1843, gave us the name Zaitha for their species Zaitha stollii. Zaitha comes from the Greek "zaith" meaning "olive" and was generally applied to most of the smaller Belostomatids for fifty years. Later, Zaitha stollii Amyot and Serville was found to be a species of the genus Belostoma. We no longer speak of Zaitha. Leidy, 1847, proposed the generic name Perthostoma for his species Perthostoma testaceum, and Herrich-Schäffer, 1848, proposed the generic name Diplonychus for his species Diplonychus anurus. Each of these generic names now are placed in the synonymy of Belostoma.

*add B. saratoga Mont.  
2 have 2 specimens*

Key to Species of Belostoma Latreille

- 1. Hair not covering entire mesal area of connexivum . 2  
 Hair covering entire mesal area of connexivum .... 30
- 2. (1) 25 mm. or more in length ..... 3  
 Less than 25 mm. in length ..... 14
- 3. (2) First segment of beak longer than, or equal to,  
 second<sup>1</sup> ..... 4 *not true for*  
 First segment of beak shorter than second ..... 12
- 4. (3) Antecular portion of head longer than length of  
 eye<sup>2</sup> ..... 5  
 Antecular portion of head not longer than length  
 of eye ..... 6
- 5. (4) Outer margin of eye almost semi-circular (pl. I,  
 fig. 7) ..... B. dentatum (Mayr)  
 (See p. 104)  
 Outer margin of eye approaching a straight line  
 (pl. 2, fig. 5) ..... B. gestroi (Mont.)  
 (See p. 108)
- 6. (4) Band of hair on mesal area of connexivum touching  
 genital operculum ..... B. cummingsi De Carlo  
 (See p. 111)  
 Band of hair on mesal area of connexivum not  
 touching genital operculum ..... 7

<sup>1</sup>The first segment is measured along its ventral line in an extended position. The second segment is measured along its dorsal line and includes the remnants of the labial palpi, with the beak extended forward.

<sup>2</sup>Length of eye, as I use it, is the distance between two parallel, transverse lines tangent to anterior inner angle and posterior outer angle of eye.

*Not constant*

7. (6) Body at least two and one-third times as long as greatest width ..... B. elongatum Mont. (See p. 113)

Body about two and one-fourth times as long as greatest width ..... 8

8. (7) Hind femur no more than 67% width of front femur. 9  
Hind femur at least 70% width of front femur .... 10

9. (8) Not more than 35 mm. in length  
..... B. boscii (Lep. et Serv.) (See p. 115)

37 mm. or more in length ... B. foveolatum (Mayr) (See p. 120)

10. (8) Never over 28 mm. long, base of clypeus at least reaching transverse line drawn between interior angles of eyes ..... B. asiaticum (Mayr) (See p. 122)

*measured with forceps to head length*

*Not constant - anterior*

At least 32 mm. long, base of clypeus not quite reaching transverse line drawn between interior angles of eyes ..... 11

11. (10) Length appreciably greater than twice the greatest width ..... B. ellipticum Latr. (See p. 124)

*see if more exact figures can be used*

Greatest length barely twice the greatest width  
..... B. porteri De Carlo (See p. 127)

12. (3) Head without longitudinal carina  
B. discretum Mont. (See p. 130)

Head with longitudinal carina ..... 13

13. (12) Greatest length twice the greatest width, medium-brown species . B. stollii (Amyot et Serv.)  
(See p. 133)
- Greatest length not twice the greatest width, chocolate-colored species . B. decarloi n. sp.  
(See p. 136)
14. (2) Outer margin of eye approaching a straight line .15  
Outer margin of eye almost semi-circular .....17
15. (14) At least twice as long as broad ..... 16  
Not twice as long as broad .. B. acutum n. sp.  
(See p. 138)
16. (15) Head with indication of a carina ..... B. bosqi De Carlo  
(See p. 140)
- Head with no indication of a carina .....  
..... B. bergi (Mont.)  
(See p. 142)
17. (14) Greatest length not over twice greatest width .. 18  
Greatest length over twice greatest width ..... 21
18. (17) Not over 8 mm. wide .....B. sanctulum Mont.  
(See p. 144)
- Over 8 mm. wide ..... 19
19. (18) Apex of prosternal keel short, broad, and blunt  
..... B. testaceum (Leidy)  
(See p. 146)
- Apex of prosternal keel not short, broad, or blunt ..... 20
20. (19) Length of head as long or longer than length of pronotum on median line B. candidulum Mont.  
(See p. 149)
- Length of head shorter than length of pronotum on median line ..... B. willi n. sp.  
(See p. 151)

not a good character

all same? k. 15. 2-16 14. 7. 2-8

? same of sub esp.

B. straticol is smaller & narrower



- 21.(17) At least 18 mm. long and 8 mm. wide ..... 22  
 Less than 18 mm. long and 8 mm. wide ..... 25
- 22.(21) 23-27<sup>\*</sup> mm. long, prosternal keel long, uniformly  
 tapering on anterior and posterior margins .....  
 ..... B. discretum Mont.  
 (See p. 130)
- Never over 20 mm. long, prosternal keel not as  
 above ..... 23
- 23.(22) Head depressed <sup>at least slightly</sup> near anterior inner margin of eye  
 ..... B. fusciventre (Dufour)  
 (See p. 153)
- Head without depression as above ..... 24
- 24.(23) Prosternal keel short, apex with a convex curve .  
 ..... B. apache Kirkaldy  
 (See p. 156)
- Prosternal keel longer, the apex almost a right  
 angle ..... B. horvathi Mont.  
 (See p. 159)
- 25.(21) At least 17 mm. long with a prosternal keel ap-  
 proaching a triangle in shape B. horvathi Mont.  
 (See p. 159)
- Not longer than 16 mm. .... 26
- 26.(25) Prosternal keel narrow, the apex resembling a  
 sharp tooth ..... B. denticolle Mont.  
 (See p. 161)
- Prosternal keel much broader, almost semi-cir-  
 cular ..... 27
- 27.(26) 10-13 mm. long ..... 28  
 14-16 mm. long ..... 29
- 28.(27) Length of eye shorter than width of interocular  
 space ..... B. minutum n. sp.  
 (See p. 163)

OK

by key this  
must be less  
than 25mm  
(also name it  
under 25 or more)

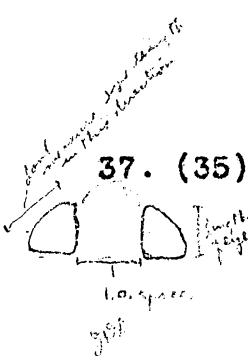
- Length of eye as long or longer than width of  
interocular space ..... B. micantulum (Stål)  
(See p. 165)
29. (27) Anterior femora at least one and three-fifths  
times width of posterior femora B. oxyurum (Duf.)  
(See p. 169)
- Anterior femora no more than one and one-half  
times width of posterior femora B. plebejum (Stål)  
(See p. 171)
30. (1) Genital operculum bare <sup>or with short hair</sup> ~~or with short hair~~ ..... 31  
Genital operculum covered with hair ..... 42
31. (30) Outer margin of eye approaching a straight line . 32  
Outer margin of eye almost <sup>convexly rounded to eye</sup> semi-circular ..... 34
32. (31) At least 35 mm. long ..... 33  
Not more than 30 mm. long B. costa-limai De Carlo  
<sup>not greatly elevated, truncate in profile</sup> (See p. 174)
33. (32) Prosternal keel) ~~blunt and broad~~ B. martini (Mont.)  
<sup>elevated U shaped in profile</sup> (See p. 176)  
Prosternal keel) ~~long, sharp, triangular~~ .....  
..... B. dilatatum (Dufour)  
(See p. 178)
34. (31) At least 32 mm. long, carina on the head .....  
..... B. aurivillianum (Mont.)  
(See p. 180)
- Not over 27 mm. long, no carina on head ..... 35
35. (34) 17 mm. long or shorter ..... 36  
At least 18 mm. long ..... 37
36. (35) Membrane of wing normal, species 16-17 mm. long .  
..... B. horvathi Mont.  
(See p. 159)



Membrane of wing reduced, species no more than 14

mm. long ..... B. penabedum n. sp. (See p. 183)

*afidius-  
microbedus  
unsculptus  
(Say)  
as this sp. (?)*



37. (35) Length of eye at least 85% width of interocular space ..... 38

Length of eye less than 75% width of interocular space ..... 39

38. (37) Length of eye equal to width of interocular space ..... B. elegans (Mayr) (See p. 186)

Length of eye not equal to width of interocular space ..... B. horvathi Mont. (See p. 159)

39. (37) Band of hair on connexivum not touching genital operculum ..... B. lutarium (Stål) (See p. 189)

Band of hair on connexivum touching genital operculum ..... 40

40. (39) First segment of beak shorter than second ..... B. bakeri Mont. (See p. 194)

First segment of beak as long as, or longer than, second ..... 41

41. (40) Lateral margin of pronotum with a noticeable concave curve, triangular part of metaxyphus bare ..... B. flumineum Say (See p. 197)

*Empoasca...  
straight...  
dominant*

Lateral margin of pronotum with a very slight concave curve, triangular part of metaxyphus with short hairs ..... B. bifoveolatum Spinola (See p. 202)

*Typical... ventrally*

42. (30) First segment of beak longer than second<sup>1</sup> .....  
 ..... B. noualhierii Mont.  
 (See p. 205)
- First segment of beak shorter than second ..... 43
43. (42) Eye wider than long .. B. grandicollum De Carlo  
 (See p. 206)
- Eye as wide as long ..... 44
44. (43) Antecular portion of head greater than length  
 of eye ..... B. testaceo-pallidum Latreille  
 (See p. 208)
- Antecular portion of head shorter than length  
 of eye ..... 45
45. (44) First segment of beak decidedly shorter than  
 second ..... B. longirostrum De Carlo  
 (See p. 210)
- First segment of beak almost as long as  
 second ..... B. ribeiroi De Carlo  
 (See p. 212)

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<sup>1</sup>I have not seen the last five species of Belostoma in this key. I have relied on original descriptions for the necessary information.

Note. This key does not include Palisot de Beauvois' species Belostoma subepinosum and B. minor due to lack of sufficient information.

Belostoma dentatum (Mayr), 1863

(Plate VII, fig. 10)

1863. Zaitha dentata Mayr, G. L. Verh. Zool.-Bot. Ges. Wien, XIII, pp. 356-357.
1863. Zaitha eumorpha Dufour, L. Ann. Soc. Entom. Fr., ser. 4, III, pp. 386-387.
1871. Zaitha eumorpha, Mayr, G. L. Verh. Zool.-Bot. Ges. Wien, XXI, pp. 408, 411-412.
1903. Belostoma dentatum, Montandon, A. L. Bul. Soc. Sci. Bucarest, XXI, p. 116.
1903. Belostoma dentatum var. major, Montandon, A. L. Bul. Soc. Sci. Bucarest, XXI, p. 116.
1909. Belostoma dentatum, Kirkaldy, G. W. and Torre-Bueno, J. R. de la. Proc. Entom. Soc. Wash., X, pp. 190-191.
1930. Belostoma mayri, De Carlo, J. A. Rev. Soc. Entom. Argentina, No. 13, p. 110, pl. VI, fig. 16.
1935. Belostoma dentatum, De Carlo, J. A. Rev. Soc. Entom. Argentina, VII, pp. 204-205.
1938. Belostoma dentatum, De Carlo, J. A. An. del Mus. Argentina de C. Nat., XXXIX, p. 212, pl. I, fig. 4; pl. II, fig. 12; pl. VIII, fig. 48.

Size. Length from front of eyes to tip of abdomen 35-51 mm.; greatest width 16.5-21 mm.

Shape. Body elliptical with lateral margin of hemelytra noticeably curved. Pronotum convex with lateral margin slightly concave.

Color. Dorsal surface: medium-to dark-brown. Scutellum with large, fuscous, rectangular area. Ventral surface: darker brown with blackish-brown splotches on abdomen; each median abdominal segment with a roundish yellow spot on each side of median line. Anterior and median tibiae, median and posterior femora crossed by three indistinct blackish-brown bands.

Structural Characteristics. Antecular portion of head as long as interocular space, longer than greatest length of eye; head shorter than median line of pronotum; anterior

interocular space slightly greater than length of posterior lobe of pronotum on median line; first segment of beak longer than second; jugae not contiguous in front of clypeus; base of clypeus not reaching transverse line drawn between anterior inner angles of eyes. Eye four-fifths width of interocular space, and longer than wide, its outer margin being convex; length of eye less than width of interocular space; antennae four-segmented, second and third segments each with a long, curved prolongation. Anterior femora one-fourth to one-third wider than posterior femora. Metaxyphus as wide as, or wider than, eye. First segment of hind tarsus longer than second. Operculum of the female as wide as, or wider than, long; that of male longer than wide. Hairs on connexivum not uniform in length; conspicuous long hairs concentrated along outer edge of mesal plate.

Comparative Notes. The antecocular portion of the head is longer than the length of the eye in B. dentatum (Mayr). In B. foveolatum (Mayr) the mentioned part of the head is less than the length of the eye. The base of the clypeus does not reach a transverse line drawn between the anterior inner angles of the eyes in B. dentatum (Mayr) but nearly does so in B. foveolatum (Mayr).

Location of Types. Mayr does not designate the location of his types. He states that this species was sent to him by Herrn Tischbein from San Leopoldo, Brazil. Mayr's types are in the Vienna Museum.

Data on Distribution.Specimens Observed:

British Guiana: Plantation Ecceles, E. Bank Demerara River, 4-4-32, 1 male, 2 females; Plantation Ogle, E. Coast Demerara, 4-14-32, 2 females; Vreeden, Hoop West bank, Demerara River, 3-29-32, 1 male, 2 females; Sururani Creek, Aug. 23, 1937, S. Harris, 2 males, 1 female; Botanic Gardens, Georgetown, 11-25-37, S. Harris, 2 males, 4 females; Aback of Pin. Ogle, E. Coast, Lamaha Conservancy, S. Harris, 7 males, 3 females.

Surinam: Moengo, Boven, Cottica R., May 17, 1927, 1 male; Paramaribo, Jan. 9, 1939, D. C. Geiskes, 1 male.

Brazil: Sao Palo, E. D. Townsend, 1 male, 1 female; Manacapuru, Manaus, Amaz., March 1928, 3 males, e females; Vic. Joao Pessoa (SanPhelipe) River Jurua, No. 3796, 7-10-36, 1 female; R. Amazonas (Lur) Region de Lago Tapaiuna, Jan.-Apr. 1936, No. 9, A. M. Olalla, 1 female; Ozorio, R. G. do Sul, 11-21-41, H. Kleerekoper, 1 female, (Univ. of Kansas). Porto Velho de S. Antonio, 2 females, (U. S. M. N. H.). Hyutanahan, Rio Purus, S. M. Klages, 1 male, 1 female; Santarem, 1 male; Bahia, X-27-1907-Haseman, 1 female; Jacarehy, Rio Parahyba, 1 male, 1 female, (Car. Mus.)

Peru: Iquitos, Feb. 1932, 1 male, 1 female; Dep't. Huanuco, Loc. Shapajilla Jungle, 630 M, 7-29 to 8-10-38, Number 3832, F. Woytkowski, 1 female, (Univ. of Kansas).

Rio Ucaylli, V-27, 1 female; Upper Rio Huallaga, XI-19-30, 2 males, (Amer. Mus. Nat. Hist.).

Bolivia: Buenavista, Dept. Santa Cruz, 9-24-1923, R. T. Steinbach, 1 male; Cochabamba, March 1938, A. M. Olalla, 1 male.

Paraguay: Villarica, 4-14-22, estero grande, Fran. Schade, 1 male.

Trinidad Island: Fyzabad, 12-29-30, 1 male, 3 females.

Recorded from the Literature:

De Carlo records this species from Minas Gerais, Brazil; Asuncion, Paraguay; Entre Rios, Santa Fe, Salta, and Chaco, Argentina.

Kirkaldy and Torre-Bueno report Venezuela, Bolivia, Brazil, and Argentina.



Belostoma gestroi Montandon, 1900

(Plate VII, fig. 11)

1900. Belostoma gestroi Montandon, A. L. Ann. Mus. Civ. Stor. Nat. Genova, Ser. 2a, Vol. XX, (XL), p. 537.  
 1909. Belostoma gestroi, Kirkaldy, G. W. and Torre-Bueno, J. R. de la. Proc. Entom. Soc. Wash., X, p. 191.  
 1930. Belostoma gestroi, De Carlo, J. A. Rev. Soc. Entom. Argentina, No. 13, pp. 110-111, pl. V, fig. 15.  
 1938. Belostoma gestroi, De Carlo, J. A. An. del Mus. Argentina de C. Nat., XXXIX, pp. 218-219, pl. VIII, fig. 54.

Size. Length from front of eyes to tip of abdomen 33-43 mm.; greatest width 18-24.5 mm.

Shape. Body broadly elliptical to oval with lateral margin of hemelytra noticeably curved. Pronotum convex, lateral margin usually in a straight line.

Color. Dorsal surface: light- to medium-brown. Scutellum usually with a large, rectangular area, often fuscous. Ventral surface: abdomen medium- to dark-brown; each median abdominal segment with a roundish yellow spot on each side of median line. Anterior tibiae, median and posterior femora crossed by two or three indistinct blackish-brown bands.

Structural Characteristics. Antecular portion of head shorter than interocular space, longer than greatest length of eye; head shorter than broad, longer than median line of pronotum; anterior interocular space much greater than length of posterior lobe of pronotum on median line; first segment of beak shorter than second; jugae not contiguous in front of clypeus; base of clypeus not reaching transverse line drawn between anterior inner angles of eyes.

then how  
abundant  
page 97

Eye slightly more than one-half width of interocular space, and longer than wide, its outer margin approaching a straight line; length of eye appreciably less than width of interocular space; antennae four-segmented, second and third segments each with a long, curved prolongation. Anterior femora only slightly wider than posterior femora. Metaxypus wider than eye. First segment of hind tarsus longer than second. Operculum of female wider than long; that of male longer than wide. Hairs on connexivum not uniform in length, covering only outer portion of mesal area.

Comparative Notes. This species is smaller than B. dilatatum (Dufour) and the mesal area of the connexivum is not uniformly covered with medium length hairs.

Location of Types. The type in the Musee Civique de Genes coming from Balzan, Argentina, is a male, 39 mm. long, 21 mm. wide. Another specimen in the Museum of Paris coming from Coquelet, Paraguay, is a female, 42 mm. long, 23 mm. wide.

Data on Distribution.

Specimens observed:

Brazil: Vic. Jose Pessoa (San Phelipe) River Jurua, No. 3796, 7-10-36, A. M. Olalla, 1 female; Terrt Chaca, Tet Arga, 1921, Alfredo Faz, 1 male; Rio Purus, Lago Berury Region, Sept. 1935, A. M. Olalla, 1 male.

Bolivia: Buenavista, Dept. Santa Cruz, 9-21-192\_, R. T. Steinbach, 1 female.

Paraguay: Villarica, 9-14-1922, Fran. Schade, 1 male,

1 female; Molinasque, Nov. 1925, F. Schade, 1 male, 1 female.

Recorded from the Literature:

De Carlo records this species from Entre Rios, Concordia, Argentina; Chaco, Fontana, Argentina; and Chaco, Resistencia, Argentina.

Montandon reports Paraguay and Argentina.

Belostoma cummingsi De Carlo, 1935

(Plate VII, fig. 2)

1930. Belostoma foveolatum, De Carlo, J. A. Rev. Soc. Entom. Argentina, No. 13, p. 113.  
1935. Belostoma cummingsi De Carlo, J. A. Rev. Soc. Entom. Argentina, VII, pp. 203-204, pl. XVI, fig. 1.  
1938. Belostoma cummingsi De Carlo, J. A. An. del Mus. Argentina de C. Nat., XXXIX, pp. 213-214, pl. II, fig. 24a, pl. VIII, fig. 50.

Size. Length from front of eyes to tip of abdomen 33-37 mm., greatest width 14.5-17 mm.

Shape. Body elliptical with lateral margin of hemelytra noticeably curved. Pronotum very convex with lateral margin slightly concave.

Color. Dorsal surface: light- to dark-brown. Scutellum with large, fuscous, rectangular area. Ventral surface: abdomen yellowish-orange to light-brown, often covered with dark-brown splotches. Median and posterior femora crossed by three indistinct dark-brown bands.

Structural Characteristics. Antecular portion of head shorter than interocular space, shorter than greatest length of eye; head shorter than median line of pronotum; anterior interocular space greater than length of posterior lobe of pronotum on its median line; first segment of beak as long or a trifle longer than second; jugae not contiguous in front of clypeus; base of clypeus nearly reaching transverse line drawn between anterior inner angles of eyes. Eye at least seven-tenths width of interocular space, and longer than wide, its outer margin being convex; length of eye equal to width of interocular space; antennae four-segmented,

second and third segments with a long, curved prolongation. Anterior femora nearly one-third wider than posterior femora. Metaxyphus wider than an eye. First and second segments of hind tarsi of equal length. Operculum of female wider than long; that of male longer than wide. Hairs on connexivum uniform in length, covering outer two-thirds of mesal plate, extending to apical third of genital operculum.

Comparative Notes. This species is very similar to B. foveolatum (Mayr) but differs in having the longitudinal band of hairs on connexivum extending to the apical third of the genital operculum.

Location of Types. In the Museo Argentino de Ciencias Naturales, Buenos Aires, Argentina. The catalogue number is 26,584. Type locality is Concordia, Prov. de Entre Rios, Argentina. The F. H. Snow Entomological Collections has one female paratype sent by Prof. De Carlo. The label reads: Tigre, I-1936, Prov. Buenos Aires, Argentina.

Data on Distribution.

Specimens Observed:

Brazil: Sao, Bernade Sao, 2-28-1921, Roberto Spitz, 1 male; Sao Paulo, 1924, 2 males, 2 females; Ypirango, S. Paulo, Rbt. Spitz, 2 males, 4 females.

Argentina: Tigre, I-1936, Prov. Buenos Aires, 1 female.

Recorded from the Literature:

Prof. De Carlo gives the following distribution:

Argentina: Buenos Aires, Entre Rios, Chaco.

Brazil: San Pablo, Minas Gerais.

Belostoma elongatum Montandon, 1908

(Plate VII, fig. 5)

1908. Belostoma elongatum Montandon, A. L. Ann. Hist. Nat. Mus. Nat. Hungary, VI, p. 299.
1930. Belostoma elongatum, De Carlo, J. A. Rev. Soc. Entom. Argentina, No. 13, p. 112, pl. V, fig. 10.
1938. Belostoma elongatum, De Carlo, J. A. An. del Mus. Argentina de C. Nat., XXXIX, pp. 214-215, pl. II, figs. 28 & 29, pl. VII, fig. 51.

Size. Length from front of eyes to tip of abdomen 32-35 mm., greatest width 14-16 mm.

Shape. Body oblong to very narrowly elliptical with slight curve on lateral margin of hemelytra. Pronotum very convex, lateral margin slightly concave.

Color. Dorsal surface: golden-yellow to a medium-brown. Anterior portion of pronotum with two wide, brownish bands on each side of median line. Scutellum with a darker, raised, rectangular area. Ventral surface: abdominal venter yellowish- to medium-brown, usually with a fuscous stripe on each side of median line. Two yellowish spots present on each abdominal segment. Femora, anterior and median tibiae crossed by three indistinct darkish-brown bands.

Structural Characteristics. Antecular portion of head almost as great as interocular space, nearly as long as greatest length of eye; head shorter than median line of pronotum; anterior interocular space slightly greater than length of posterior lobe of pronotum on its median line; first segment of beak longer than second; jugae not contiguous in front of clypeus; base of clypeus not quite reaching transverse line drawn between anterior inner angles

of eyes. Eye at least three-fourths width of interocular space, and longer than wide, its outer margin being convex; length of eye equal to width of interocular space. Antennae four-segmented, second and third segments each with a long, curved prolongation. Posterior femora a trifle over two-thirds width of anterior femora. Anterior tarsal segments nearly equal in length. Prosternal keel high, arched. Metaxyphus as wide as an eye. Posterior tarsal segments nearly equal in length. Operculum of female as wide as long, that of male longer than wide. Hairs covering outer half of mesal area of connexivum.

Comparative Notes. This species resembles B. aurivillianum (Montandon) in size and shape but has a much smoother pronotum and less protuberant eyes.

Location of Types. Montandon did not designate any type. He made his description on the basis of specimens from Asuncion and Rio Apa, Paraguay. Those coming from Asuncion are in the Museum of Natural History, Hungary; those from Rio Apa, in the Zoological Museum of Turin and the collection of Montandon, (De Carlo, 1938:214-215)

Data on Distribution.

Specimens observed:

Brazil: Buenos Ar. Rep. Arja, 1921, Alfredo Faz, 1 female.

Paraguay: Asuncion, 1 male; Villarica, 3-31, 12-29, F. Schade, 4 males, 1 female.

Recorded from the Literature:

De Carlo gives Entre Rios, Corrientes, Chaco, Catamarca, in Argentina; Asuncion, Rio Apa, in Paraguay.

Belostoma boscii (Lepeletier et Serville), 1825

(Plate VI, fig. 24)

1825. Zaitha boscii Lepeletier, A. L. M. et Serville, A. Enc. Meth., X; 273.
1843. Zaitha boscii, Amyot, C. J. B. et Serville, A. Hist. Nat. Ins. Hem., p. 430.
1848. Diplonychus anurus Herrich-Schäffer, G. A. W. Wanz. Ins., VIII; p. 26, pl. 257, fig. 799.
1849. Zaitha boscii, Herrich-Schäffer, G. A. W. Wanz. Ins., IX: 36.
1854. Zaitha cupreomicans Stal, C. Ofv. Vet.-Ak. Forh., XI: 240.
1863. Zaitha boscii, Mayr, G. L. Verh. Zool.-Bot. Ges. Wien, XIII: 354.
1863. Zaitha anurus, Dufour, L. Ann. Soc. Entom. France, (4), III: 388.
1863. Zaitha subspinosa, Dufour, L. Ann. Soc. Entom. France, (4), III: 387.
1863. Zaitha stollii, Dufour, L. Ann. Soc. Entom. France, (4), III: 387.
1871. Zaitha anurus, Mayr, G. L. Verh. Zool.-Bot. Ges. Wien, XXI: 408, 412-414.
1900. Belostoma boscii, Montandon, A. L. Bul. Soc. Sci. Bucarest, IX, No. 2-3: 10.
1901. Zaitha anura, Champion, G. C. Biol. Cent. Am., Hem.-Het., II: 365, tab. XXII, fig. 1.
1903. Belostoma boscii, Montandon, A. L. Bul. Soc. Sci. Bucarest, XII, No. 1-2: 117.
1909. Belostoma boscii, Kirkaldy, G. W. and Torre-Bueno, J. R. de la. Proc. Entom. Soc. Washington, X: 190.
1930. Belostoma dallasi De Carlo, J. A. Rev. Soc. Entom. Argentina, No. 13: 114-115, pl. V, fig. 12, pl. VII, fig. 26.
1938. Belostoma boscii, De Carlo, J. A. An. del Mus. Argentina de C. Nat., XXXIX: 215-216, pl. I, fig. 3, pl. II, fig. 24, pl. VIII, fig. 52.

Size. Length from front of eyes to tip of abdomen 28-35 mm., greatest width 13-16.5 mm.

Shape. Body elliptical with lateral margin of hemelytra noticeably curved. Pronotum very convex with lateral margin slightly concave.

Color. Dorsal surface: light- to dark-brown. Scutellum with large, fuscous, rectangular area. Ventral surface: yellowish-orange to medium-brown abdomen covered with black



ish-brown splotches. Anterior and median tibiae, median and posterior femora crossed by three indistinct brown bands.

Structural Characteristics. Antecular portion of head shorter than interocular space, shorter than greatest length of eye; head shorter than median line of pronotum; anterior interocular space as great or slightly greater than length of posterior lobe of pronotum on median line; first segment of beak longer than second; jugae not contiguous in front of clypeus; base of clypeus very nearly reaching transverse line drawn between anterior inner angles of eyes. Eye at least three-fourths width of interocular space, and longer than wide, its outer margin being convex; length of eye at least the width of interocular space; antennae four-segmented, second and third segments each with a long, curved prolongation. Anterior femora one-third wider than posterior femora. Metaxyphus narrower to wider than eye. First segment of hind tarsus as long as, or longer than, second segment. Operculum of female as wide as, or wider than, long; that of male longer than wide. Medium length hairs cover only outer part of mesal area of connexivum.

Comparative Notes. This species is not as drawn out and as elongated as B. elongatum Montandon.

Location of Types. No types are designated. Montandon thought the locality label "Carolinas" was probably false.

Data on Distribution.

Specimens Observed:

Texas: McAllen, 11-20-32, L. D. Tuthill, 1 male, (U. of Kans.).

Cameron Co., Jan. 23, 1938, L. Giovannoli, 1 female; Brownsville, Jan. 23, 1936, L. Giovannoli, 1 female, (Univ. of Mich.)

Mexico: Guerrero, Rio Agua, Kil. 437 S. Mexico City, 10-31-36, H. D. Thomas, 1 male, 4 females; Ciudad Victoria, Tamaulipas, 11-5-36, 9 males, 3 females; Ciudad del Carmen, Campeche, 9-14-16-36, 8 males, 3 females; Hda. La Libertad Chiapas, Sept. 1, 1937, H. D. Thomas, 4 males, 2 females; Lake Tepancuapan, Chiapas, Aug. 29, 1937, H. D. Thomas, 2 males, 3 females; Pan. Am. Highway, Kil. 736 North of Mexico City, 11-5-36, H. D. Thomas, 1 female; Los Mochis, Sinaloa, 6-13-1922, C. T. Dodds, 1 male; Tampico, 6 & 7-28, W. F. Lynn, 2 males, 3 females; Colima, March 1929, A. Bang Haas, purchased from Dr. O. Staudinger, 2 males; Mexico D.F., Texoco Sea, Jan. 31, 1926, Alf. Dampf, 1 male; Zamora, Michoacan, Sept. 8, 1938, H. D. Thomas, 2 males; Acapulco, Guerrero, Aug. 20, 1938, H. D. Thomas, 1 female; Tehuacan, March 1929, A. Bang Haas, purchased from Dr. O. Staudinger, 1 male, (Univ. of Kansas).

Colima, Vulcano, L. Conrad, 3 males, 1 female; Federal District, Feb. 10, 1 male, (U. S. M. N. H.).

Cordoba, 1 female; Guerravaca Mov., W. L. Tower, 1 male, (Amer. Mus. Nat. Hist.)

Cuba: Arroyo Los Gansos, San Juan de los Yeras, Santa Clara Prov., Jan. 22, 1932, purchased from Collector P. J. Bermudez, 1 male; Nov. 1932, P. J. Bermudez, 1 female.

Jamaica: Santa Cruz, 4-15-1937, Chester Roys, 3 males, 2

females; B. W. I., Baros Lill, 11-1912, L. G. Perkins, 1 male, 1 female.

Haiti: Port-au-Prince, gift from R. G. Smith, 2 males, 1 female.

Porto Rico: Barranquitas, 2-16-1935, R. Martin, 1 male; Arecibo, 3-20-1935, R. Cintror, 1 male, 1 female.

Guatemala: Cayrigo, XI- '15, Wm. Schaus, 2 males, (U.S.M.N.H.).

Honduras: Copan, 2-7-1937, Chester Roys, 1 female.

Panama: Chiriqui, Feb. 1932, purchased from Dr. O. Staudinger, 1 female, (Univ. of Kansas).

Panama, 1 female, (U. S. M. N. H.).

Columbia: La Mesa, Via Apolinar Maria, 1 male, 1 female, (Univ. of Kansas).

Gallego, 1937, 2 females, (U. S. M. N. H.).

Venezuela: Acosta-Falc., 1929, Kugler, 1 male, (Univ. of Kansas).

Turmero, Jan. 6, 1933, L. F. Martorell, 1 male, (U.S.M.N.H.).

British Guiana: Botanic Gardens, Georgetown, 11-25-37,

S. Harris, 5 males, 13 females; Aback Pin ogle, E. Coast,

Lamaha Conservancy, 11-18-37, S. Harris, 26 males, 23 females;

Plantation Ecceles, E. Bank Demerara River, 4-4-32, S.

Harris, 1 male, 5 females; Supurani Creek, Aug. 23, 1937,

S. Harris, 6 males, 4 females; Canal Polder No. 2, W. Bank

Demerara River, 6-18-32, S. Harris, 2 males; Vreeden, Hoop

West Bank, Demerara River, 2-28-32, S. Harris, 37 males,

48 females; Honey Camp Creek, Oct. 22, 1937, S. Harris,

1 female.

Brazil: Bahia, Dr. Bondar, 12 males, 2 females, (Univ. of Kansas).

Entre Rios, June 1908, 2 males; Chapada, August, 2 males; Munez Freire, Esperito Santo, 1 female; Rio de Janeiro, June 30, 1908, 1 female; Santarem, 1 female; Corumba, 1 female, (Car. Mus.).

Ecuador: Guayquil, F. Campos, 1 male, (U. S. M. N. H.).

Peru: Iquitos, III-21-30, 1 male, (Amer. Mus. Nat. Hist.).

Recorded from the Literature:

De Carlo records this species from Salta, Argentina; Espiritu Santo, Bahia, and Rio de Janeiro, Brazil; and Zinacantepec, Mexico.

Kirkaldy and Torre-Bueno report United States, Mexico, Guatemela, Costa Rica, Panama, Cuba, Colombia, Guayanas, Brazil, Paraguay, and Argentina.

Belostoma foveolatum (Mayr), 1863

(Plate VII, fig. 3)

1863. Zaitha foveolata Mayr, G. L. Verh. Zool.-Bot. Ges. Wien, XII: 355-356.  
 1871. Zaitha foveolata Mayr, G. L. Verh. Zool.-Bot. Ges. Wien, XXI: 408, 411.  
 1909. Belostoma foveolatum, Kirkaldy, G. W. and Torre-Bueno, J. R. de la. Proc. Entom. Soc. Washington, X: 191.  
 1930. Belostoma foveolatum, De Carlo, J. A. Rev. Soc. Entom. Argentina, No. 13: 113, pl. V, fig. 13.  
 1938. Belostoma foveolatum, De Carlo, J. A. An. del Mus. Argentina de C. Nat., XXXIX: 213, pl. VIII, fig. 49.

Size. Length from front of eyes to tip of abdomen 37-45 mm., greatest width 15-18 mm.

Shape. Body elliptical with lateral margin of hemelytra noticeably curved. Pronotum convex with lateral margin slightly concave.

Color. Dorsal surface: medium- to dark-brown. Scutellum with large, fuscous, rectangular area. Ventral surface: darker brown with blackish-brown splotches on abdomen. Anterior and median tibiae, median and posterior femora crossed by three indistinct blackish-brown bands.

Structural Characteristics. Antecular portion of head as long as interocular space, shorter than greatest length of eye; head shorter than median line of pronotum; anterior interocular space as great as length of posterior lobe of pronotum on median line; first segment of beak longer than second; jugae not contiguous in front of clypeus; base of clypeus nearly reaching transverse line drawn between anterior inner angles of eyes. Eye at least three-fourths width of interocular space, and longer than wide, its outer

margin being convex; length of eye as great as, or greater than, width of interocular space; antennae four-segmented, second and third segments each with a long, curved prolongation. Anterior femora about one-third wider than posterior femora. Metaxyphus as wide as, or wider than, eye. Second segment of hind tarsus as long as first. Operculum of female as wide as long; that of male longer than wide. Longer hairs on connexivum covering only part of mesal area.

Comparative Notes. The antecular portion of the head is shorter than the length of eye in B. foveolatum (Mayr) but longer than length of eye in B. dentatum (Mayr).

Location of Types. In the Vienna Museum without a locality label.

Data on Distribution.

Specimens Observed:

Brazil: S. Paula; State of Para, Lago Grande, Feb.-39, A. M. Olalla, 1 male, 1 female..

Recorded from the Literature:

De Carlo records this species from San Pablo, Minas Gerais, and Rio de Janeiro, Brazil.

Kirkaldy and Torre-Bueno report Brazil, Paraguay, and Argentina.

Belostoma asiaticum (Mayr), 1863

(Plate VI, fig. 23)

1863. Zaitha asiatica Mayr, G. L. Verh. Zool.-Bot. Ges. Wien, XIII: 354-355.  
 1863. Zaitha boops, Dufour, L. Ann. Soc. Entom. France, (4), III, p. 388.  
 1871. Zaitha boops, Mayr, G. L. Verh. Zool.-Bot. Ges. Wien, XXI: 408, 414-415.  
 1903. Belostoma asiaticum, Montandon, A. L. Bul. Soc. Sci. Bucarest, XII, No. 1-2: 119-120.  
 1909. Belostoma asiaticum, Kirkaldy, G. W. and Torre-Bueno, J. R. de la. Proc. Entom. Soc. Washington, X:190.  
 1938. Belostoma asiaticum, De Carlo, J. A. An. del Mus. Argentina de C. Nat., XXXIX: 217.

Size. Length from front of eyes to tip of abdomen 25-27 mm., greatest width 11.5-13 mm.

Shape. Body elliptical with slight curve on lateral margin of hemelytra. Pronotum very convex, lateral margin in a straight line or with a slightly concave curve.

Color. Dorsal surface: light to dark-brown. Scutellum with large, fuscous, rectangular area. Ventral surface: abdominal venter light-brown to yellowish-orange covered with dark-brown splotches. Anterior tibiae crossed by three indistinct blackish-brown bands.

Structural Characteristics. Antecular portion of head shorter than interocular space, longer than greatest length of eye; head shorter than median line of pronotum; anterior interocular space as great as, or slightly greater than, length of posterior lobe of pronotum on median line; first segment of beak longer than second; jugae not contiguous in front of clypeus; base of clypeus a trifle above transverse line drawn between anterior inner angles of eyes.

Eye at least four-fifths width of interocular space, and longer than wide, its outer margin being convex; length of eye equals width of interocular space; antennae four-segmented, second and third segments each with a long, curved prolongation. Anterior femora one-fourth wider than posterior femora. Metaxyphus as wide as an eye. First and second segments of hind tarsi nearly equal in length. Operculum of female as wide as, or wider than, long; that of male longer than wide. Mesal area of connexivum only partly covered with median length hairs.

Comparative Notes. This species closely resembles B. boscii (Lepelletier et Serville) and B. discretum Montandon. It is smaller than the former, the base of the clypeus surpassing a transverse line drawn between the anterior inner angles of the eyes. It differs from the latter by having the first segment of the beak longer ~~longer~~ than the second.

Location of Types. In the Vienna Museum labeled "Borneo", sent by Frau Ida Pfeiffer. Mayr states that it was later agreed that this locality was erroneous.

Data on Distribution.

Specimens Observed:

Peru: Vic. Pacasmayo, Marshy pools, near Pacific Ocean, May 19-20-36, N. 3656, 3 males, 8 females; Lagunas Villa, Dept. Lima, June 8- July 1, 1934, F. Woytkowski, 3 females.

Recorded from the Literature:

Kirkaldy and Torre-Bueno report Mexico, Peru, Brazil, and Argentina.



Belostoma ellipticum Latreille, 1833

(Plate VI, fig. 25)

1833. Belostoma ellipticum Latreille, P. A. Humboldt et Bonpland, II: 105, pl. 39, fig. 4.
1871. Zaitha elliptica, Mayr, G. L. Verh. Zool.-Bot. Ges. Wien, XXI: 408, 415.
1901. Zaitha elliptica, Champion, G. C. Biol. Centr. Amer., Mem. Het. II: 365.
1903. Belostoma ellipticum, Montandon, A. L. Bul. Soc. Sci. Bucarest, XII, Nos. 1-2: 117-119.
1909. Belostoma ellipticum, Kirkaldy, G. W. and Torre-Bueno, J. R. de la. Proc. Entom. Soc. Washington, X: 191.
1918. Belostoma impavidum, Torre-Bueno, J. R. de la. Univ. Iowa Stud., X, No. 71: 32-34, pl. I, figs. 1-2.
1938. Belostoma impavidum, De Carlo, J. A. An. del Mus. Argentina de C. Nat., XXXIX: 239-240.
1938. Belostoma ellipticum, De Carlo, J. A. An. del Mus. Argentina de C. Nat., XXXIX: 216, pl. VII, fig. 53.
1939. Belostoma ellipticum, De Carlo, J. A. Rev. Soc. Entom. Argentina, X, No. 2: 234.

Size. Length from front of eyes to tip of abdomen 32-33 mm., greatest width 14.5-15.5 mm.

Shape. Body elliptical with noticeable curve on lateral margin of hemelytra. Pronotum convex, lateral margin slightly concave.

Color: Dorsal surface: light- to medium-brown. Membrane of hemelytra darker brown. Scutellum with a fuscous, rectangular area. Ventral surface: abdominal venter yellowish-brown, often a blackish stripe on each side of median line. Anterior tibiae, median and posterior femora covered with three indistinct dark-brown bands.

Structural Characteristics. Antecular portion of head nearly as great as width of interocular space, as long as greatest length of eye; head a trifle shorter than, or as long as, median line of pronotum; anterior interocular

space greater than length of posterior lobe of pronotum on its median line; first segment of beak longer than second; jugae not contiguous in front of clypeus; base of clypeus very nearly reaching transverse line drawn between anterior inner angles of eyes. Eye slightly over two-thirds width of interocular space, and longer than wide, its outer margin being convex; length of eye almost equal to width of interocular space; antennae four-segmented, second and third segments each with a long, curved prolongation. Posterior femora nearly four-fifths width of anterior femora. First segment of anterior tarsus shorter than second. Prosternal carina high, elliptical, thickened on margin. Metaxyphus wider than an eye. Hind tarsal segments about the same length. Operculum of female as wide as, or wider than, long; that of male longer than wide. Hairs on connexivum covering only outer half of mesal area.

Comparative Notes. Champion (1901: 365) states that this species is "very like Z. anura but more narrowed anteriorly". The width of an eye is over four-fifths the width of the interocular space for E. boscii (Lepeletier and Serville). The width of an eye is about two-thirds the width of the interocular space for E. ellipticum Latreille. The head of this species is nearly as long, or as long, as the length of the median line of the pronotum. Professor Montandon (1903: 117-119) said that in extreme limits it is very easy to confuse large members of this species with E. boscii (Lepeletier and Serville) and small members of this

species with B. asiaticum (Mayr). Champion (1901) figures a male from "Mexico" belonging to the Vienna Museum in plate XXII, fig. 2. The writer has examined one specimen from the U. S. N. M. labeled Belostoma ellipticum Latreille and determined by Montandon in 1908. This specimen bears the locality label Guantanamo, Cuba.

Location of Types. The author did not designate location of types, Dr. Mayr said that two specimens in Signoret's collection came from Mexico.

Data on Distribution.

Specimens Observed:

Cuba: Rio Almendares, Marinao, Prov. Havana, May 24, 1932, P. J. Bermudez, 1 male, 2 females; Palpite Cienago de Zapata S. Clara Prov., Nov. 6, 1933, 2 males; Laguna en el Valle de Yumuri Matanzas, Dec. 9, 1933, 1 male, 1 female, P. J. Bermudez, (Univ. of Kansas).  
Guantanamo, 1 male, (U. S. N. M.).

Recorded from the Literature:

De Carlo records this species from the District of Columbia, United States.

Kirkaldy and Torre-Bueno report Mexico and Texas, United States.

Belostoma porteri De Carlo, 1942

(Plate VII, fig. 7)

1884. Zaitha mayri, Berg, C. Add. et emend. Hem. Argentina, pp. 120-121.  
 1903. Belostoma mayri, Montandon, A. L. Bul. Soc. Sci. Bucarest, XII: 116-117.  
 1942. Belostoma porteri De Carlo, J. A. Rev. Soc. Entom. Argentina, XI: 212-213, pl. XIII, figs. 1 & 3.

Size. Length from front of eyes to tip of abdomen 35-38 mm., greatest width 17.5-18.5 mm.

Shape. Body elliptical with noticeable curve on lateral margin of hemelytra. Pronotum very convex, lateral margin with a concave curve.

Color. Dorsal surface: medium- to dark-brown. Scutellum with a darker, rectangular area. Membrane of hemelytra dark-brown. Ventral surface: abdominal venter light-to dark-brown spotted with brown. A brownish stripe usually present on each side of median line on abdomen. Anterior and median tibiae covered with three blackish rings, median and posterior femora with three indistinct blackish bands.

Structural Characteristics. Antecular portion of head a trifle shorter than width of interocular space, shorter than greatest length of eye; head shorter than median line of pronotum; anterior interocular space greater than length of posterior lobe of pronotum on its median line; first segment of beak appreciably longer than second; jugae not contiguous in front of clypeus; base of clypeus nearly reaching transverse line drawn between anterior inner angles of eyes. eye at least four-fifths width of interocular space, and

longer than wide, its outer and upper margins being convex; length of eye as great as, or slightly greater than, width of interocular space; antennae four-segmented, second and third segments each with a long, curved prolongation. Posterior femora three-fourths width of anterior femora. First and second segments of anterior tarsus nearly the same length. Prosternal keel high, bearded on posterior margin, elliptical in shape, apical portion blunt and thickened. Metaxyphus as wide as an eye. First segment of hind tarsus longer than second. Operculum of female wider than long; that of male longer than wide. Hairs on connexivum covering outer half of mesal area. Short, very fine hair sparsely covering entire abdominal venter.

Comparative Notes. This species closely resembles B. dentatum (Mayr) in having the first segment of the beak appreciably longer than the second, similarity of the prosternal keel, and silky hairs covering the outer half of the mesal area of the connexivum. It differs from B. dentatum (Mayr) by having the width of the interocular space a trifle greater than the antecular portion of the head and the base of the clypeus nearly reaching a transverse line drawn between the anterior inner angles of the eyes. B. porteri De Carlo may be confused with B. foveolatum (Mayr) but shows greater differences in lengths of the first and second segments of the beak.

Montandon (1903a: 116-117) considered this species to belong to B. mayri Berg.

Location of Types. Holotype male, Cat. no. 46,737, Panama, Canal Zone; allotype female, Cat. no. 46,738, Las Guacas, Peru; paratype (one male), Cat. no. 46,739, Merida, Venezuela. These types collected by Juan Velar, are in the Museo Argentino de Ciencias Naturales, Buenos Aires.

A female paratype and a male paratype from the Panama Canal Zone are in the Dept. of Zoology of Iowa State College.

Data on Distribution.

Specimens Observed:

Republic of Panama: Panama City, 1931, L. H. Dunn, 1 female, Geo. Ryan, 1 male.

Venezuela: 7-1927, M. L. Krueger, 1 male..

Belostoma discretum Montandon, 1903

(Plate VI, fig. 22)

1903. Belostoma discretum Montandon, A. L. Bul. Mus. Hist. Nat. Paris, No. 1: 22-23.  
 1909. Belostoma discretum, Kirkaldy, G. W. and Torre-Bueno, J. R. de la. Proc. Entom. Soc. Washington, X: 191.  
 1930. Belostoma discretum, De Carlo, J. A. Rev. Soc. Entom. Argentina, No. 13: 116, pl. V, fig. 9.  
 1938. Belostoma discretum, De Carlo, J. A. An. del Mus. Argentina de C. Nat., XXXIX: 221-222, pl. VII, fig. 58.

Size. Length from front of eyes to tip of abdomen 23-26 mm., greatest width 10.5-12.5 mm.

Shape. Body elliptical with a noticeable curve on lateral margin of hemelytra. Pronotum very convex, lateral margin with a concave curve.

Color. Dorsal surface: yellowish-orange to medium-brown. Ventral surface: light-brown to yellowish-brown. Anterior and median tibiae, median and posterior femora usually crossed by three indistinct brownish bands.

Structural Characteristics. Antecular portion of head shorter than interocular space, shorter than greatest length of eye; head shorter than median line of pronotum; anterior interocular space greater than length of posterior lobe of pronotum on its median line; first segment of beak shorter than second; jugae not contiguous in front of clypeus; base of clypeus nearly reaching transverse line drawn between anterior inner angles of eyes. Eye seven-tenths width of interocular space, and longer than wide, its outer margin being convex; length of eye equal to width of interocular space; antennae four-segmented, second and

third segments each with a long, curved prolongation. Posterior femora at least three-fourths width of anterior femora. First segment of anterior tarsus shorter than second. Prosternal keel high, slightly sharpened at its apex. Metaxyphus narrower to as wide as an eye. First segment of hind tarsus shorter than second. Operculum of female as wide as, or wider than, long; that of male longer than wide. Hairs on connexivum long, concentrated on outer half of mesal area.

Comparative Notes. This species has the general shape of B. bifoveolatum Spinola, but the longitudinal band of hair covers only outer half of mesal area of connexivum. B. boscii (Lepelletier and Serville) is larger and the eyes are more globular than those of B. discretum Montandon.

Location of Types. Montandon did not designate a type. His description is based on specimens in the Paris Museum from Amazonas and Manaus, Brazil, and Corrientes, Argentina, and two specimens in his collection coming from Amazonas, Brazil, and Rio Apa, Paraguay.

Data on Distribution.

Specimens Observed:

Brazil: Manacapuru, Amazonas, Solimoes River, 6-26, S. M. Klages, 203 males, 263 females; Rio Negro, Manaus Region, Oct. 1935, A. M. Olalla, 2 males, 3 females; Rio Purus, Lago Berury Region, Sept. 1935, A. M. Olalla, 2 males; R. Amazonas (Lur) Region de Lago Tapaiuna, Jan.-Apr. 1936, No. 9, A. M. Olalla, 9 males, 14 females; R. Amazonas



(Nrte) Region de Itacoatiara, Jan.-Apr. 1936, No. 2, A. M. Olalla, 52 males, 19 females; Vic. Santo Antonio, River Eiru, No. 3711, 9-25, A. M. Olalla, 1 female.

Recorded from the Literature:

De Carlo records this species from Corrientes, and Chaco, Argentina; San Pablo, Mato Grosso, and Amazonas, Brazil.

Montandon reports Brazil, Paraguay, and Corrientes, Argentina.

Belostoma stollii (Amyot and Serville), 1843

(Plate VII, fig. 4)

1843. Zaitha stollii Amyot, C. J. B. et Serville, A. Hist. Nat. Ins., Hem., p. 430.  
 1871. Zaitha stollii, Mayr, G. L. Zool.-Bot. Ges. Wien, XXI; 406, 410.  
 1903. Belostoma stollii, Montandon, A. L. Bul. Soc. Sci. Bucarest, XII, Nos. 1-2: 114.  
 1909. Belostoma stollii, Kirkaldy, G. W. and Torre-Bueno, J. R. de la. Proc. Entom. Soc. Washington, X: 192.  
 1938. Belostoma stollii, De Carlo, J. A. An. del Mus. Argentina de C. Nat., XXXIX: 240.

Size. Length from front of eyes to tip of abdomen 34-35 mm.; greatest width 17-18 mm.

Shape. Body broadly elliptical to oval with a pronounced curve on lateral margin of hemelytra. Pronotum slightly convex, lateral margin slightly concave.

Color. Dorsal surface: medium-brown. Carina on head and posterior portions of pronotum and scutellum light-brown in color. Ventral surface: abdominal venter medium-brown covered with blackish splotches. Anterior tibiae, median and posterior femora crossed by three dark-brown bands of varying widths.

Structural Characteristics. Antecular portion of head shorter than width of interocular space, shorter than greatest length of eye; head not quite as long as median line of pronotum; anterior interocular space twice as great as length of posterior lobe of pronotum on its median line; first segment of beak shorter than second; jugae almost contiguous in front of clypeus; base of clypeus very nearly reaching transverse line drawn between anterior inner

angles of eyes; longitudinal carina on head and posterior portions of pronotum and scutellum. Pronotum quite rough; two prominent irregular pits on its anterior portion. A raised hour-glass shaped figure on scutellum. Eye three-fifths width of interocular space, and longer than wide, its outer margin being slightly convex; length of eye not equal to width of interocular space; antennae four-segmented, second and third segments each with long, curved prolongation. Posterior femora five-eighths width of anterior femora. First segment of anterior tarsus shorter than second. Prosternal keel semicircular; apical portion directed anteriorly. Metaxyphus wider than eye. First segment of hind tarsus shorter than second. Hairs on connexivum covering only the outer half of mesal area.

Comparative Notes. This species is a trifle broader than B. martini (Montandon). Dorsal surface of the body is more flattened and the hairs on the connexivum cover only the outer half of the mesal area.

I have examined a male specimen from the United States National Museum determined "Bel. Stolli A. S." by Montandon in 1909.

Location of Types. In Signoret's collection.

Data on Distribution.

Specimens Observed:

French Guiana: Pariacabo, Riviere de Kourou, collector Le Moul, Cayenne, 1 male, (U. S. N. M.).

Peru: Dept. Huanuco, Loc. Shapajilla, 630 m.a.s.l., 11 km.

N. E. Tingo Moria, No. 398, 3-8-1939, F. Woytkowski, 1 male,  
1 female.

Recorded from the Literature:

Kirkaldy and Torre-Bueno report this species from  
Guatemala, and Brazil.

Belostoma decarloi, n. sp.

(Plate VII, fig. 1)

Size. Length from front of eyes to tip of abdomen 32-35 mm., greatest width 17.0-18.5 mm..

Shape. Body broadly elliptical to oval with lateral margin of hemelytra noticeably curved. Pronotum convex, lateral margin slightly concave.

Color. Dorsal surface: grayish-brown to a light chocolate-brown. Ventral surface: abdominal venter medium- to dark-brown, covered with short, light-brown hairs. Anterior and median tibiae, median and posterior femora crossed by three indistinct blackish bands.

Structural Characteristics. Antecular portion of head shorter than interocular space, as long as, or longer than, greatest length of eye; head a trifle shorter than, or as long as, median line of pronotum; anterior interocular space nearly twice length of posterior lobe of pronotum on its median line; first segment of beak shorter than second; jugae nearly contiguous to contiguous in front of clypeus; base of clypeus reaching transverse line drawn between anterior inner angles of eyes. A longitudinal carina on head and posterior lobe of pronotum and scutellum; definite depressions between eyes; two prominent irregular pits on anterior portion of pronotum. Raised hour-glass shaped figure on scutellum. Eye about two-thirds width of interocular space, and longer than wide, its outer margin being convex; length of eye not equal to width of interocular

space; antennae four-segmented, second and third segments each with a long, curved prolongation. Posterior femora about five-eighths width of anterior femora. First segment of anterior tarsus shorter than second. Prosternal keel blunt, of medium height. Metaxyphus wider than eye. First segment of hind tarsus shorter than second. Operculum of female wider than long, that of male longer than wide. Hairs on connexivum not uniform in length, covering only outer half of mesal area.

Comparative Notes. This species differs from B. grandicollum De Carlo and B. testaceo-pallidum Latreille by having the eyes longer than wide and in not possessing hair covering the entire mesal area of the connexivum.

Location of Types. The following types are in the F. H. Snow Entomological Collections at the University of Kansas. Holotype male, R. Amazonas (Lur) Region de Lago Tapaiuna, Brazil, Jan.-Apr. 1936, A. M. Olalla; allotype female, same data; one male and two female paratypes, same data; one female paratype, Supurani Creek, British Guiana, Aug. 23, 1937, S. Harris.

Data on Distribution.

Specimens Observed:

Brazil: R. Amazonas (Lur) Region de Lago Tapaiuna, Jan.-Apr. 1936, A. M. Olalla, 2 males, 3 females.

British Guiana: Supurani Creek, Aug. 23, 1937, S. Harris, 1 female.

Belostoma acutum, n. sp.

(Plate VI, fig. 13)

Size. Length from front of eyes to tip of abdomen 20-22 mm.; greatest width 12-12.5 mm.

Shape. Body broadly elliptical to oval with lateral margin of hemelytra noticeably curved. Hemelytra not completely covering last three abdominal segments on outer connexival margin. Pronotum convex, lateral margin almost in a straight line.

Color. Dorsal surface: tarnished golden- to medium-brown. Membrane of hemelytra dark-brown. Ventral surface: abdominal venter brownish-yellow to medium-brown. Anterior tibiae, median and posterior femora crossed by three indistinct dark-brown bands.

Structural Characteristics. Antecular portion of head nearly as long as interocular space, as long as greatest length of eye; head longer than median line of pronotum; anterior interocular space greater than length of posterior lobe of pronotum on its median line; first segment of beak longer than second; jugae not contiguous in front of clypeus; base of clypeus not reaching transverse line drawn between anterior inner angles of eyes. Eye nearly three-fourths width of interocular space, and longer than wide, its outer margin approaching a straight line; length of eye equal to width of interocular space; antennae four-segmented, second and third segments each with a long, curved prolongation. Anterior and posterior femora of equal width.

Metaxyphus as wide as an eye. First segment of hind tarsus longer than second. Operculum of female wider than long, that of male longer than wide. Hairs on connexivum covering only outer edge of mesal area.

Comparative Notes. This species resembles B. candidulum Montandon in shape but is larger and does not possess a triangular shaped prosternal keel. Its body is more oval-shaped than that of B. bergi (Montandon).

Location of Types. The following types are in the F. H. Snow Entomological Collections. Holotype male, Rio Purus, Lago Berury Region, Brazil, Sept. 1935, A. M. Olalla; allotype female, same data; five male paratypes and eleven female paratypes, same data.

Data on Distribution.

Specimens Observed:

Brazil: Rio Purus, Lago Berury Region, Sept. 1935, A. M. Olalla, 6 males, 12 females.



Belostoma bosqi De Carlo, 1932

(Plate VI, fig. 14)

1930. Belostoma bergi, De Carlo, J. A. Rev. Soc. Entom. Argentina, No. 13: 117, pl. V, fig. 4.  
1932. Belostoma bosqi De Carlo, J. A. Rev. Soc. Entom. Argentina, No. 22: 125-126.  
1938. Belostoma bosqi De Carlo, J. A. An. del Mus. Argentina de C. Nat., XXXIX: 220, pl. VII, fig. 56.

Size. Length from front of eyes to tip of abdomen 20-21 mm., greatest width 9.5-10.5 mm..

Shape. Body narrowly elliptical with lateral margin of hemelytra noticeably curved. Pronotum convex with lateral margin in straight line..

Color. Dorsal surface: hemelytra covered with irregular light- and dark-brown lines. Median portion of head and pronotum covered with yellowish stripe. Ventral surface: light-brown to orange abdominal venter covered with dark splotches. Median and posterior femora crossed by indistinct brownish bands.

Structural Characteristics. Antsocular portion of head nearly equal to interocular space, shorter than greatest length of eye; head longer than median line of pronotum; anterior interocular space greater than length of posterior lobe of pronotum on its median line; first segment of beak equal to, or longer than, second; jugae not contiguous in front of clypeus; base of clypeus reaching transverse line drawn between anterior inner angles of eyes. Eye at least three-fourths width of interocular space, and longer than wide, its outer margin being nearly a straight line; length

of eye greater than width of interocular space; antennae four-segmented, second and third segments with long, curved prolongation. Anterior and posterior femora of equal width. Metaxyphus nearly as wide as an eye. First and second segments of hind tarsi of equal length. Operculum of female wider than long; that of male longer than wide. Hairs on connexivum not uniform in length; conspicuous long hairs concentrated along outer edge of mesal plate.

Comparative Notes. This species differs from B. bergi (Montandon) by being more elongate and by having the length of the eye greater than the interocular space.

Location of Types. Located in the Museo Argentino de Ciencias Naturales, Cat. No. 30457. Type locality is Chaco, Argentina. The F. H. Snow Entomological Collections have two female paratypes from San Cosme, Corrientes, Argentina. These were sent by Prof. Jose A. De Carlo of Argentina.

Data on Distribution.

Specimens Observed:

Argentina: San Cosme, Corrientes, 2 female paratypes; Misiones, 1915, 1 male.

Surinam: Moengo, Boven Cottica R., May 21, 1927, 3 males, 1 female.

Recorded from the Literature:

De Carlo records this species from Curumba, Brazil; Paraguay; Misiones and Chaco, Argentina.

Belostoma bergi (Montandon), 1899

(Plate VI, fig. 15)

1899. Zaitha bergi Montandon, A. L. Bul. Mus. Hist. Nat. Paris, No. 4: 172-173.  
 1909. Belostoma bergi, Kirkaldy, G. W. and Torre-Bueno, J. R. de la. Proc. Entom. Soc. Washington, X: 190.  
 1930. Belostoma asiaticum, De Carlo, J. A. Rev. Soc. Entom. Argentina, No. 13: 116-117, pl. V, fig. 5.  
 1938. Belostoma bergi, De Carlo, J. A. An. del Mus. Argentina de C. Nat., XXXIX: 219-220, pl. VII, fig. 55.

Size. Length from front of eyes to tip of abdomen 20-23 mm., greatest width 10-12 mm.

Shape. Body broadly elliptical to oval with lateral margin of hemelytra noticeably curved. Pronotum convex, lateral margin in straight line. Dorsal surface of thorax and abdomen flattened.

Color. Dorsal surface: medium- to dark-brown. Two broad, blackish stripes on anterior lobe of pronotum. Scutellum with large, fuscous, rectangular area. Ventral surface: abdominal venter medium- to dark-brown and crossed by two black, longitudinal stripes. Tibiae and femora not crossed by brownish bands.

Structural Characteristics. Antecular portion of head equal, or nearly equal, to interocular space, as long as greatest length of eye; head longer than median line of pronotum; anterior interocular space greater than length of posterior lobe of pronotum on its median line; first segment of beak as long as, or longer than, second; jugae not contiguous in front of clypeus; base of clypeus very nearly reaching transverse line drawn between anterior inner angles

of eyes. Eye three-fourths as wide as interocular space, and longer than wide, its outer margin approaching a straight line. Length of eye nearly equal to width of interocular space. Antennae four-segmented, second and third segments each with a long, curved prolongation. Prosternal keel high; outer margin semicircular in appearance. Anterior and posterior femora nearly the same width. Metaxyphus as wide as, or wider than, eye. First and second segments of hind tarsus equal in length. Operculum of female as wide as, or wider than, long; that of male longer than wide. Hairs on connexivum covering only outer portion of mesal area.

Comparative Notes. This species is proportionately wider and less elongate than B. bosqi De Carlo.

Location of Types. Dr. Hungerford examined Montandon's type in the British Museum, London, England. The type, about 28 mm. long, came from Buenos Aires, Argentina.

Data on Distribution.

Specimens Observed:

Paraguay: Villarica, 11-20-29, 1 male, 2 females, 11-29-29, 1 male, 3 females, 12-29-29, 1 male, 1 female, F. Schade; Asuncion, 1 male.

Argentina: Mendoza, 1914, 1 male; Villa Ana. F. C. S. F., 11-30-1923, K. J. Hayward, 1 female.

Recorded from the Literature:

De Carlo records this species from Buenos Aires, Cap. Federsl, Entre Rios, Corrientes, and Chaco, Argentina.

Belostoma sanctulum Montandon, 1903

(Plate VIII, fig. 2)

1903. Belostoma sanctulum Montandon, A. L. Ann. Mus. Nat. Hungary, I, 1a part: 362-363.  
 1938. Belostoma sanctulum, De Carlo, J. A. An. del Mus. Argentina de C. Nat., XXXIX: 225-226, pl. VII, fig. 63.

The following information is taken from descriptions by Professors Montandon and De Carlo and a photograph of this species by the latter.

Size. 15.2-16.0 mm. long, maximum width 7.2-8.0 mm.

Shape. Body broadly elliptical with lateral margin of hemelytra noticeably curved. Pronotum convex, lateral margin approaching straight line.

Color. Anterior and median tibiae crossed by three faint rings; median and posterior femora crossed by three faint bands on lower surface.

Structural Characteristics. Antecular portion of head appreciably less than width of interocular space; first segment of beak shorter than second; base of clypeus surpassing transverse line drawn between anterior inner angles of eyes. Eyes large, globular, rather dilated. Anterior femora moderately dilated, slightly greater than posterior femora. Prosternal keel high; quite wide and a trifle sharpened on upper portion. Longitudinal band of hairs covering external half of abdominal margin.

Comparative Notes. This species greatly resembles B. oxyurum (Dufour) but it differs in having a less robust anterior femora, the eyes a greater width and greater

projection and having the posterior portion of the body more blunt.

Location of Types. A cotype exists in the National Museum of Budapest, Hungary, coming from Espirito Santo, Brazil.

(Dr. Hungerford).

Data on Distribution.

Brazil: Espirito Santo, Santa Catarina.

Belostoma testaceum (Leidy), 1847

(Plate VI, fig. 21)

1847. Perthostoma testaceum Leidy, J. Jour. Acad. Nat. Sci. Philadelphia, n. s., I: 60, 66.
1852. Zaitha reticulata Haldeman, S. S. Stansb. Exped., p. 370.
1871. Zaitha testacea, Mayr, G. L. Verh. Zool.-Bot. Ges. Wien, XXI: 409, 417.
1907. Belostoma testaceum, Torre-Bueno, J. R. de la, and Brimley, C. S. Entom. News, XVIII: 435.
1909. Belostoma testaceum, Kirkaldy, G. W. and Torre-Bueno, J. R. de la. Proc. Entom. Soc. Washington, X: 192.
1926. Belostoma testaceum, Blatchley, W. S. Het. East. North America, pp. 1046, 1048.
1938. Belostoma testaceum, De Carlo, J. A. An. del Mus. Argentina de C. Nat., XXXIX: 240-241.

Size. Length from front of eyes to tip of abdomen 15-18 mm., greatest width 8-10.5 mm.

Shape. Body broadly elliptical to oval with lateral margin of hemelytra noticeably curved. Pronotum convex, lateral margin straight or slightly concave.

Color. Dorsal surface: light to dark-brown. Ventral surface: medium- to dark-brown. Anterior and median tibiae, median and posterior femora crossed by two or three indistinct brownish to brownish-black bands.

Structural Characteristics. Antecular portion of head shorter than interocular space, shorter than greatest length of eye; head nearly as long as, or as long as, median line of pronotum; anterior interocular space much greater than length of posterior lobe of pronotum on its median line; first segment of beak shorter than, or as long as, second; jugae not contiguous in front of clypeus; base of clypeus surpassing transverse line drawn between anterior inner

angles of eyes. Eye two-thirds width of interocular space, and as long as wide, its outer margin being convex; length of eye not equal to width of interocular space; antennae four-segmented, second and third segments each with a long, curved prolongation. Posterior femora two-thirds width of anterior femora. Metaxyphus narrower than width of eye. First segment of hind tarsus shorter than second. Operculum of female wider than long; that of male longer than wide. Hairs on connexivum of uniform length, not completely covering mesal area.

Comparative Notes. This species is similar in shape to B. sanctulum Montandon but has broader hemelytra and is usually larger.

Location of Types. There is no designation of types.

Data on Distribution.

Specimens Observed:

Maryland: Annapolis on U. S. 50, 9-18-1932, P. W. Oman, 1 female.

Washington, D. C.: Lick Banks- XI-19-05, D. H. Clemons, 2 males, 1 female, (U. S. N. M.).

Virginia: Dismal Swamp, 8-13-34, M. E. Griffith, 2 males, 3 females, R. H. Beamer, 1 male, 3 females, (Univ. of Kans.).  
Valley Beach, Fred Knab, 1 female; Virginia Beach, Sept. 4, '10, 1 male, 1 female, (U. S. N. M.)

North Carolina: Beaufort, 6-18-1934, A. S. Pearse, 1 male, 2 females; Raleigh, April 1900, G. S. Brimley, 1 female.

Georgia: St. Simons Island, 4-21-31, P. W. Fattig, 1 female,



(U. S. N. M.).

Florida: Archer, 7-31-30, J. Nottingham, 1 female; Ft. Mead, 8-13-30, R. H. Beamer, 2 females, Paul W. Oman, 1 female; Tampa, 3-27-27, G. O. Bare, 1 female; Inverness, 8-1-30, Paul W. Oman, 1 male; Hilliard, 8-31-30, R. H. Beamer, 1 female, (Univ. of Kansas).

Alachua Co., 4-6-24, 2 males; Hillsbough Co., Plant City, March 16, 1925, F. M. Gaige, 1 female, (Univ. of Mich.)

Alabama: Mt. Meige, 7-21-30, Paul W. Oman, 3 males, 6 females, Macon, 7-25-30, Paul W. Oman, 1 male, 2 females; Mobile, 1-25-1911, H. P. Loding, 1 female.

Mississippi: Waveland, 7-9-34, P. McKinstry, 1 female.

Louisiana: Caddo Parrish, 8-19-28, J. G. Shaw, 1 male.

Texas: Bowie Co., 8-16-28, A. M. James, 1 male, (Univ. of Kansas).

Galv. Isl., 3 males; Victoria, VI-8-13, 1 female, (U. S. N. M.)

Recorded from the Literature:

Kirkaldy and Torre-Bueno record this species from New York, New Jersey, Pennsylvania, Michigan, Texas.

Belostoma candidulum Montandon, 1903

(Plate VI, fig. 12)

1903. Belostoma candidulum Montandon, A. L. Ann. Mus. Nat. Hungary, I, 1a part; 363.  
 1938. Belostoma candidulum, De Carlo, J. A. An. del Mus. Argentina de C. Nat., XXXIX: 217-218.

Size. Length from front of eyes to tip of abdomen 18-19 mm.; greatest width 9.5-10.5 mm.

Shape. Body broadly elliptical to oval with lateral margin of hemelytra noticeably curved. Hemelytra not completely covering last three abdominal segments on outer connexival margin. Pronotum convex, lateral margin slightly concave.

Color. Dorsal surface: tarnished golden- to medium-brown. Membrane of hemelytra usually a darker brown. Ventral surface: abdominal venter yellowish-orange to medium-brown. Anterior and median tibiae, median and posterior femora crossed by three indistinct medium-brown to blackish-brown bands.

Structural Characteristics. Antecular portion of head much shorter than interocular space, as long as greatest length of eye; head as long as median line of pronotum; anterior interocular space greater than length of posterior portion of pronotum on its median line; first segment of beak shorter than second; jugae almost contiguous to contiguous in front of clypeus; base of clypeus reaching transverse line drawn between anterior inner angles of eyes. Interocular space nearly twice width of eye, and longer than wide, its outer margin being convex; length of eye

less than width of interocular space; antennae four-segmented, second and third segments each with long, curved prolongation. Anterior femora wider than posterior femora. Metaxypus as wide as eye. First and second segments of hind tarsus nearly equal in length. Operculum of female wider than long; that of male longer than wide. Hairs on connexivum covering only outer edge of mesal area.

Comparative Notes. This species greatly resembles B. acutum n. sp. but is smaller and possesses eyes that are convex on outer margin.

Location of Types. Two cotypes exist in the National Museum of Budapest, Hungary, coming from Rio Grande do Sul, Brazil. (Dr. Hungerford).

Data on Distribution.

Specimens Observed:

Brazil: Rio Purus, Lago Berury Region, Sept. 1935, A. M. Olalla, 5 males, 2 females; Manacapuru, Amazonas, Solimoes River, 4-26, S. M. Klages, 1 male, 1 female.

Recorded from the Literature:

Montandon reported this species from Rio Grande do Sul, Brazil.

Belostoma willi n. sp.

(Plate VI, fig. 20)

Size. Length from front of eyes to tip of abdomen 18-19 mm.; greatest width 10.5-12 mm.

Shape. Body broadly elliptical to oval with pronounced curve on lateral margin of hemelytra. Pronotum convex, lateral margin almost in a straight line.

Color. Dorsal surface: medium- to dark-brown. Scutellum usually with darker, rectangular area. Ventral surface: abdominal venter medium- to dark-brown, sometimes mottled in brown and yellow. Anterior tibiae crossed by three brownish bands. Median and posterior femora usually crossed by three indistinct brownish bands.

Structural Characteristics. Antecular portion of head not over three-fifths width of interocular space, shorter than greatest length of eye; head shorter than median line of pronotum; first segment of beak shorter than second; jugae not contiguous to nearly contiguous in front of clypeus; base of clypeus reaching transverse line drawn between anterior inner angles of eyes. Eye about three-fifths width of interocular space, and longer than wide, its outer margin being convex; length of eye not equal to width of interocular space; antennae four-segmented, second and third segments each with long, curved prolongation. Posterior femora two-thirds width of anterior femora. First and second segments of anterior tarsus almost equal in length. Prosternal keel high, semicircular in shape. Metaxyphus

as wide as eye. First and second segments of hind tarsus nearly of equal length. Operculum of female wider than long; that of male longer than wide. Hairs on connexivum concentrated on outer third of mesal area.

Comparative Notes. This species resembles B. testaceum (Leidy). The eyes are three-fifths width of interocular space and the first segment of the beak is shorter than the second. In B. testaceum (Leidy) the eyes are three-fourths the width of the interocular space and the first and second segments of the beak are the same length.

Location of Types. The following types are in the F. H. Snow Entomological Collections, Univ. of Kansas. Holotype male, Department Huanuco, Vic. Leonpampa, Jungle 800 m.a.s.l., No. 3811, Dec. 11-30-1937, Peru, S. A., F. Woytkowski; allotype female, same data; one female paratype, same data; two male paratypes and two female paratypes, same locality and collector, Dec. 12-14-1937.

Note: This species is named for Dr. H. C. Will, a specialist in Tenthredinidae, who first interested the writer in the study of entomology.

Data on Distribution.

Specimens Observed:

Peru: Department Huanuco, Vic. Leonpampa., Jungle 800 m. a.s.l., No. 3811, Dec. 11-30-1937, Dec. 12-14-1937, F. Woytkowski, 3 males, 4 females; Dept. Huanuco, Loc Shapajilla, Jungle 630 M., Number 3832, 7-29 to 8-10-38, F. Woytkowski, 3 males, 2 females.

Belostoma fusciventre (Dufour), 1863

(Plate VI, fig. 8)

1863. Zaitha fusciventris Dufour, L. Ann. Soc. Entom. France, (4), III: 389.
1871. Zaitha fusciventris, Mayr, G. L. Verh. Zool.-Bot. Ges. Wien, XXI: 409, 417.
1901. Zaitha fusciventris, Champion, G. C. Biol. Centr. Amer., Hem. Het., II: 365-366, pl. 21, figs. 23 & 23a.
1906. Belostoma fusciventris, Torre-Bueno, J. R. de la. Entom. News, XVIII: 55.
1909. Belostoma fusciventris, Kirkaldy, G. W. and Torre-Bueno, J. R. de la. Proc. Entom. Soc. Washington, X: 191.
1938. Belostoma fusciventre, De Carlo, J. A. An. del Mus. Argentina de C. Nat., XXXIX: 222-223, pl. VII, fig. 59.

Size. Length from front of eyes to tip of abdomen 19-21 mm.; greatest width 9-10 mm.

Shape. Body oblong or slightly elliptical, lateral margin of hemelytra nearly parallel-sided. Pronotum convex, lateral margin nearly in straight line or slightly concave.

Color. Dorsal surface: light- to dark-brown. Scutellum with darker, rectangular area. Ventral surface: abdominal venter light-brown to a blackish color. Anterior and median tibiae, median and posterior femora crossed by three dark-brown bands.

Structural Characteristics. Antecular portion of head much shorter than width of interocular space, shorter than greatest length of eye; interocular space appreciably wider than long; head shorter than median line of pronotum; anterior interocular space greater than length of posterior lobe of pronotum on its median line; first segment of beak shorter than second; jugae not contiguous to nearly contiguous in front of clypeus; base of clypeus slightly surpassing trans-

verse line drawn between anterior inner angles of eyes. Slight depression on anterior inner margin of each eye; eye two-thirds width of interocular space, and longer than wide, its outer margin being convex; length of eye not equal to width of interocular space; antennae four-segmented, second and third segments each with long, curved prolongation. Posterior femora almost three-fourths width of anterior femora. First segment of anterior tarsus shorter than second. Prosternal keel reduced, semi-circular in shape. Metaxyphus as wide as eye. First segment of hind tarsus shorter than second. Operculum of female as wide as long; that of male longer than wide. Hairs on connexivum covering only outer half of mesal area.

Comparative Notes. This species is very similar to B. apache Kirkaldy. It differs by having a slight depression on the anterior inner margin of each eye, darker color and more robust in appearance. Champion (1901: 365-366) figures a male Mexican specimen, determined by Mayr, from the Vienna Museum. Champion states that "Z. fusciventris is extremely like Z. minor, but it differs from it in having the head depressed or foveate on each side between the eyes in front."

Note: Zaitha minor Dufour is now known as Belostoma apache Kirkaldy.

Location of Types. Dufour did not designate a type. He took his description from three specimens in Signoret's collection which came from Mexico.

Data on Distribution.Specimens Observed:

Texas: Brooks Co., 7-25-28, R. H. Beamer, 2 males, 3 females; Sutton Co., 8-20-28, L. D. Beamer, 1 female; Sabinal, 7-6-36, L. D. Beamer, 1 female; Colorado Co., 4-11-1922, Mrs. Grace Wiley, 1 female.

Mexico: Rio Balsas jct. Ocapulca, Hwy. Guerrero, 6-24-32, Hobart Smith, 1 female; betw. Cajones & Rincon S. of Chilpancingo, Guerrero, 7-1-32, Hobart Smith, 1 male; 15 mi. down Actlan Rd. Jalisco, 9-14-38, H. D. Thomas, 1 female; Hacienda La Clementins Tamalipas, No. 46, Sept. 28, 1938, 1 female; Union de Tula, Jalisco, 9-16-38, H. D. Thomas, 2 males; Cuernavaca Morelos, Temporary pool, 10-6-36, H. D. Thomas, 42 males, 53 females; Oaxaca Posita, H. D. Thomas, 10 males, 30 females; Iguala Guerrero, 10-7-36, H. D. Thomas, 2 males; Puente de Ixtla Gro., 7-12-37, H. D. Thomas, 3 males, 9 females; Oaxaca, Oaxaca, Aug. 25, 1937, H. D. Thomas, 2 females.

Recorded from the Literature.

De Carlo records this species from Zinacantepec, Mexico.

Kirkaldy and Torre-Bueno report Texas, Arizona, and California, U. S. A; Mexico; Honduras; Costa Rica; Guatemala.



Belostoma apache Kirkaldy, 1909

(Plate VI, fig. 9)

1863. Zaitha minor Dufour, L. Ann. Soc. Entom. France, (4), III: 391.  
 1871. Zaitha minor, Mayr, G. L. Verh. Zool.-Bot. Ges. Wien, XXI: 409, 417.  
 1901. Zaitha minor, Champion G. C. Biol. Centr. Amer., Hem. Het., II: 366, pl. 21, figs. 24 & 24a.  
 1909. Belostoma apache Kirkaldy, G. W. and Torre-Bueno, J. R. de la. Proc. Entom. Soc. Washington, X: 190.  
 1913. Belostoma minor, Montandon, A. L. Bul. Soc. Sci. Bucarest, XXII: 125.  
 1938. Belostoma apache, De Carlo, J. A. An. del Mus. Argentina de C. Nat., XXXIX: 223-224, pl. VII, fig. 60.

Size. Length from front of eyes to tip of abdomen 18-19 mm.; greatest width 8-9 mm.

Shape. Body oblong to slightly elliptical, slight curve on lateral margin of hemelytra. Pronotum quite convex, lateral margin nearly in straight line or slightly concave.

Color. Dorsal surface: light- to medium-brown. Scutellum with a darker, rectangular area. Ventral surface: abdominal venter light- to dark-brown. Connexivum yellow to light-brown, often spotted with brown. Anterior tibiae crossed by three brownish rings. No definite brownish spots or bands on median and posterior femora.

Structural Characteristics. Antecular portion of head much shorter than width of interocular space, shorter than greatest length of eye; interocular space scarcely wider than long; head shorter than median line of pronotum; anterior interocular space greater than length of posterior lobe of pronotum on its median line; first segment of beak shorter than second; jugae not contiguous or almost con-

tiguous in front of clypeus; base of clypeus slightly above transverse line drawn between anterior inner angles of eyes. Eye about three-fourths width of interocular space, and slightly longer than wide, its outer margin being convex; length of eye not equal to width of interocular space; antennae four-segmented, second and third segments each with a long, curved prolongation. Posterior femora at least two-thirds width of anterior femora. First segment of anterior tarsus slightly shorter than second. Prosternal keel reduced, semicircular in shape. Metaxyphus narrower than, to as wide as, an eye. First segment of hind tarsus shorter than second. Operculum of female as wide as, or wider than, long; that of male longer than wide. Hairs on connexivum covering only outer half of mesal area.

Comparative Notes. This species does not possess a slight depression on anterior inner margin of each eye and is usually lighter in color than B. fusciventre (Dufour). The interocular space is scarcely wider than long. Champion. (Plate 21, figs. 24 & 24a) figures a male specimen from Mexico. He had seen two males and three females from Mexico and four other specimens from the Vienna Museum, one of the latter being labeled "California". Champion (1901: 366) has the following to say about this species, now known as B. apache Kirkaldy: "It has the head more regularly convex between the eyes than in Z. fusciventris."

Location of Types. Dufour, who studied the species, made the description on the basis of two specimens in Signoret's

collection. He determined these specimens from Brazil  
Z. minor Palisot de Beauvois. Later, Kirkaldy and Torre-  
 Bueno came to the conclusion that Dufour was referring to  
 a new species and gave it the new name of Belostoma apache.

Data on Distribution.

Specimens Observed:

Mexico: D. F., Texaco Sea, Jan. 31, 1926, Alf. Dampf, 5  
 females; Zacapu, Michoacan, 9-1-38, H. D. Thomas, 4 females;  
 Hda. La Libertad, Chiapas, Sept. 1, 1937, H. D. Thomas, 1  
 female; Tlalpan D. F., 11-3-36, H. D. Thomas, 46 males, 72  
 females; Oaxaca, Oaxaca, Aug. 25, 1937, H. D. Thomas, 3  
 males, 5 females; Oaxaca Posita, 8-24-37, H. D. Thomas, 5  
 males, 6 females; Ciudad del Carmen, Campeche, 9-14 to 16-36,  
 H. D. Thomas, 4 males, 12 females; Lake Texaco, D. F.,  
 7-26-37, H. D. Thomas, 8 males, 8 females.

Recorded from the Literature:

De Carlo records this species from Zinacantepec and  
 Lerma, Mexico.

Kirkaldy and Torre-Bueno report California, U. S. A.;  
 Mexico; Cuba; Brazil.

Belostoma horvathi Montandon, 1903

(Plate VI, fig. 7)

1903. Belostoma horvathi Montandon, A. L. Ann. Mus. Nat. Hungary, I, 1a part; 359.

1938. Belostoma horvathi, De Carlo, J. A. An. del Mus. Argentina de C. Nat., XXXIX: 224, pl. VII, fig. 61.

Size. Length from front of eyes to tip of abdomen 17-19 mm.; greatest width 7.5-9.0 mm.

Shape. Body elliptical with lateral margin of hemelytra nearly parallel. Pronotum very convex, lateral margin slightly concave.

Color. Dorsal surface: uniform light- to medium-brown. Ventral surface: abdominal venter yellowish-brown. Anterior and median tibiae, median and posterior femora crossed by brownish bands.

Structural Characteristics. Antecular portion of head shorter than interocular space, shorter than greatest length of eye; head shorter than median line of pronotum; anterior interocular space greater than length of posterior lobe of pronotum on its median line; first segment of beak shorter than second; jugae nearly contiguous to contiguous in front of clypeus; base of clypeus barely surpassing line drawn between anterior inner angles of eyes. Eye at least three-fourths width of interocular space, and longer than wide, its outer margin being convex; length of eye less than width of interocular space; antennae four-segmented, second and third segments each with a long, curved prolongation. Anterior femora much wider than posterior femora. Metaxyphus

no wider than eye. First segment of hind tarsus longer than second. Operculum of female as wide as, or wider than, long; that of male longer than wide. Hairs on connexivum covering outer two-thirds of mesal area.

Comparative Notes. This species differs from B. apache Kirkaldy by having a more elevated prosternal keel and anterior femora much wider than posterior femora.

Location of Types. A single type in the National Museum of Budapest, Hungary, came from Santa Catharina, Brazil.

Data on Distribution.

Specimens Observed:

Brazil: Sao Paulo, Rbto. Spitz, 3 males, 6 females: Ypirango, S. Paulo, R. Spitz, 1 male.

Peru: Dept. Amazonas Vic. Guayabamba Andes, 1300 m.a.s.l., Muddy stream, bogs and pools, no. 3665, Aug. 14-19, 1936, 2 males, 5 females; Vic. Sani Beni, 890 m.a.s.l., Small pool, Field note 3553a, Oct. 17, 1935, F. Woytkowski, 1 male, 1 female.

Recorded from the Literature:

De Carlo records this species from Chaco, Argentina; Santa Catalina, San Pablo, Rio Grande, and Minas Gerais, Brazil.

Belostoma denticolle Montandon, 1903

(Plate VI, fig. 3)

1903. Belostoma denticolle Montandon, A. L. Ann. Mus. Nat. Hungary, I, la part: 362.

1938. Belostoma denticolle, De Carlo, J. A. An. del Mus. Argentina de C. Nat., XXXIX: 226-227, pl. VII, fig. 64.

Size. Length from front of eyes to tip of abdomen 14-15 mm.; greatest width 6-6.5 mm.

Shape. Body narrowly elliptical with slight curve on margin of hemelytra. Pronotum convex, very slightly concave on lateral margin.

Color. Dorsal surface: light- to medium brown. Some specimens with yellowish stripe covering median line of pronotum and scutellum. Ventral surface: yellowish-orange to light-brown abdomen covered with dark-brown splotches.

Structural Characteristics. Antecular portion of head shorter than interocular space, shorter than greatest length of eye; head shorter than median line of pronotum; anterior interocular space greater than length of posterior lobe of pronotum on median line; first segment of beak shorter than second; jugae nearly contiguous to contiguous in front of clypeus; base of clypeus surpassing transverse line drawn between anterior inner angles of eyes. Eye nearly equal to width of interocular space, and slightly longer than wide, its outer margin being convex; length of eye equals width of interocular space; antennae four-segmented, second and third segments each with long, curved prolongation. Anterior femora one-half wider than posterior femora. Metaxyphus

narrower than width of eye. First segment of hind tarsus shorter than second segment. Operculum of female as wide as, or wider than, long; that of male longer than wide. Yellowish hairs covering only part of mesal area of connexivum.

Comparative Notes. The prosternal keel is elevated and tooth-shaped in B. denticolle Montandon, not so in B. plebejum (Stål) and B. micantulum (Stål).

Location of Types. Montandon did not designate any types. He based his original description on specimens from French Guiana and Dutch Guiana. Those coming from Surinam (Dutch Guiana) are in the National Museum of Hungary and the collection of Gustav Breddin. The Breddin collection is now in the Deutsche Entomological Institute, Berlin-Dahlem, Germany. Those specimens from Cayenne, French Guiana, are in the collection of Montandon.

Data on Distribution.

Specimens Observed:

Brazil: Manacapuru, Amazonas, Solimoes River, June 1926, S. M. Klages, 19 males, 31 females; Rio Negro, Manaus Region, Oct. 1935, A. M. Olalla, 1 male.

Recorded from the Literature:

De Carlo records this species from French Guiana; and Amazonas, Brazil.

Belostoma minutum n. sp.

(Plate VI, fig. 6)

Size. Length from front of eyes to tip of abdomen 12-13 mm.; greatest width 6.0-6.5 mm.

Shape. Body elliptical with lateral margin of hemelytra noticeably curved. Pronotum very convex, lateral margin slightly concave.

Color. Dorsal surface: yellowish covered with irregular, medium-brown splotches. A broad yellowish band may cross head, pronotum, and scutellum on median line. Ventral surface: abdominal venter yellowish- or light-brown often covered with brownish splotches. Tibiae and femora usually crossed by three irregular dark-brown bands.

Structural Characteristics. Anteocular portion of head one-half interocular space, shorter than greatest length of eye; head shorter than median line of pronotum; anterior interocular space twice the length of posterior lobe of pronotum on its median line; first segment of beak shorter than second; jugae not contiguous in front of clypeus; base of clypeus surpassing transverse line drawn between anterior inner angles of eyes. Eye three-fourths width of interocular space, and longer than wide, its outer margin being convex; length of eye nearly equal to width of interocular space; antennae four-segmented, second and third segments each with long, curved prolongation. Posterior femora a trifle over two-thirds width of anterior femora. First and second segments of anterior tarsus equal in length. Prosternal keel re-



duced, semicircular in shape. Metaxyphus narrower than eye. First segment of hind tarsus shorter than second. Operculum of female wider than long; that of male longer than wide. Hairs on connexivum covering at least half but never all of mesal area.

Comparative Notes. Only two species of Belostoma, B. micantulum (Stål) and B. penabedum n. sp. are as small as B. minutum n. sp. This species is not as broad or as flat as B. penabedum n. sp. It is broader and more convex dorsally than B. micantulum (Stål). It is quite robust for its size.

Location of Types. The following types are in the F. H. Snow Entomological Collections at the University of Kansas. Holotype male, Lake Tepancuapan, Chiapas, Mexico, Aug. 28, 1937, H. D. Thomas; allotype female, same data; four male and four female paratypes, same data.

Data on Distribution.

Specimens Observed:

Mexico: Lake Tepancuapan, Chiapas, Aug. 28, 1937, H. D. Thomas, 5 males, 9 females.

Belostoma micantulum (Stål), 1858

(Plate VI, fig. 1)

1858. Zaitha micantula Stål, C. Kong. Svensk. Vet.-Akad. Handl., II, no. 7:84.
1863. Zaitha pygmaea Dufour, L. Ann. Soc. Entom. France, (4), III: 391-392.
1871. Zaitha micantula, Mayr, G. L. Verh. Zool.-Bot. Ges. Wien, XXI: 410, 420-421.
1879. Zaitha micantula, Berg, C. Hem. Argentina, p. 190.
1879. Zaitha zelotypus White, F. B. Trans. Entom. Soc. London, p. 270.
1884. Zaitha minuscula Uhler, P. R. Stand. Nat. Hist., II: 258.
1901. Zaitha micantula, Champion, G. C. Biol. Centr. Amer., Hem. Het., II: 366.
1909. Belostoma micantulum, Kirkaldy, G. W. and Torre-Bueno, J. R. de la. Proc. Entom. Soc. Washington, X:191-192.
1930. Belostoma micantulum, De Carlo, J. A. Rev. Soc. Entom. Argentina, No. 13: 119-120, pl. V, fig. 1.
1938. Belostoma micantulum, De Carlo, J. A. An. del Mus. Argentina de C. Nat., XXXIX; 228, pl. VII, fig. 66.

Size. Length from front of eyes to tip of abdomen 9-13 mm.; greatest width 4.5-6.5 mm.

Shape. Body elliptical with lateral margin of hemelytra noticeably curved. Pronotum very convex, lateral margin slightly concave.

Color. Dorsal surface: light- to dark-brown. A yellowish longitudinal stripe covering median line of pronotum and scutellum on some specimens. Ventral surface: abdominal venter light- to dark-brown. Brownish bands usually present on tibiae and femora.

Structural Characteristics. Antecular portion of head shorter than interocular space, shorter than greatest length of eye; head as long as median line of pronotum; anterior interocular space twice length of posterior lobe of pronotum on its median line; first segment of beak shorter than

second; jugae contiguous to nearly contiguous in front of clypeus; base of clypeus surpassing transverse line drawn between anterior inner angles of eyes. Eye over two-thirds width of interocular space, and longer than wide, its outer margin being convex; length of eye equal to width of interocular space; antennae four-segmented, second and third segments each with long, curved prolongation. Posterior femora no more than two-thirds width of anterior femora. First segment of anterior tarsus shorter than second. Prosternal keel reduced, semicircular in shape. Metaxyphus narrower than eye. First segment of hind tarsus shorter than second. Operculum of female as wide as, or wider than, long; that of male longer than wide. Hairs on connexivum concentrated on outer half of mesal area.

Comparative Notes. This species is smaller than B. plebejum (Stål) and its anterior interocular space is twice the length of posterior lobe of pronotum on median line. It does not have the elevated, tooth-shaped prosternal keel so characteristic of B. denticolle Montandon.

Location of Types. Professor De Carlo (1938: 228) says that types are in the Stockholm Museum coming from Rio de Janeiro, Brazil.

Data on Distribution.

Specimens Observed:

Mexico: Hda. Encarnacion, 12 m., S. Pital Mex. Campeche, 10-15-36, H. M. Smith, 4 males, 1 female.

Canal Zone: Barro Colo. Is., V-13-37, S. W. Frost, 4 females,

1 male; La Chorrena, V-12-12- Aug. Busch, 2 males, 4 females;  
Rio Grande, A. Busch, 1 female; Trinidad Rio, VI-6-12, A.  
Busch, 1 male, 3 females, (U. S. N. M.).

Trinidad: St. Helena, Nov. 24, 1931, W. E. Broadway, 2 males,  
2 females.

British Guiana: Money Camp Creek, Oct. 22, 1937, S. Harris,  
14 males, 13 females; Canal Polder No. 2, W. Bank Demerara,  
8-18-32, S. Harris, 13 males, 10 females; (\*Supuruni Creek, <sup>+ have printed</sup>  
Aug. 20-1937, S. Harris, 32 males, 33 females) <sup>provisionally</sup>  
Hoop West (except 2 (♂♂))  
Bank, Demerara River, 3-29-32, S. Harris, 1 male, 1 female;  
Lemaha Conservancy, E. Coast Demerara, 7-29-32, S. Harris, 2  
males, 2 females.

Dutch Guiana (Surinam): Moengo, Soven Cottica R. May 15,  
1927, Cornel Univ. Lot 760, Sub. 58, 1 male; near New  
Amsterdam, July 1923, F. X. Williams, 1 female.

Brazil: Manacupuru, Manos Amaz., March 1928, S. M. Klages,  
9 males, 10 females; Rio Purus, Lago Berury Region, Sept.  
1935, A. M. Olalla, 2 males, 4 females; Vic. Joao Pessoa  
(Sao Phelipe) River Jurua No. 375, 7-10-36, A. M. Olalla,  
1 male; Vic. Santo Antonio, River Eiru No. 3711, 9-25,  
10-17-36, A. M. Olalla, 1 male; R. Amazonas (Nrte) Region  
de Itacoatiara, Jan.-Apr. 1936, A. M. Olalla, 2 males,  
3 females, (Univ. of Kansas).

Santarem, 4 males, 2 females; Corumba, 1 female, (Car. Mus.).

Bolivia: Santa Cruz, J. Steinbach, 2 males, 3 females, (Univ.  
of Kansas).

Puerto Suarez, 150 m., J. Steinbach, 12 males, 13 females;

Prov. del Sara, Steinbach, Feb. and Nov. 1912, 2 males, 4 females; Sta. Cruz de la Sierra, 450 m., J. Steinbach, Nov. 1912, 3 males, 2 females, (Car. Mus.)

Paraguay: Molinesque, Oct. 1925, 24 males, 28 females; Caruga, 12-1925, F. Schade, 1 female; Villarica, 11-20-29, 4 males, 19 females.

Recorded from the Literature:

De Carlo records this species from Entre Rios, Santa Fe, Corrientes, Salta, and Chaco, Argentina; Puerto Guarani, Paraguay.

Stål reports Rio de Janeiro, Brazil.

Belostoma oxyurum (Dufour), 1863

(Plate VI, fig. 4)

1863. Zaitha oxyura Dufour, L. Ann. Soc. Entom. France, (4), III: 390.  
 1871. Zaitha oxyura, Mayr, G. L. Verh. Zool.-Bot. Ges. Wien, XXI: 409, 417.  
 1903. Belostoma oxyurum, Montandon, A. L. Ann. Mus. Nat. Hungary, I, la part: 360-361.  
 1909. Belostoma oxyurum, Kirkaldy, G. W. and Torre-Bueno, J. R. de la. Proc. Entom. Soc. Washington, X: 192.  
 1930. Belostoma oxyurum, De Carlo, J. A. Rev. Soc. Entom. Argentina, No. 13: 118, pl. V, fig. 3.  
 1938. Belostoma oxyurum, De Carlo, J. A. An. del Mus. Argentina de C. Nat., XXXIX: 225, pl. I, fig. 5, pl. VII, fig. 62.

Size. Length from front of eyes to tip of abdomen 14-16 mm.; greatest width 7.0-7.5 mm.

Shape. Body elliptical with lateral margin of hemelytra noticeably curved. Pronotum very convex, lateral margin straight or very slightly concave.

Color. Dorsal surface: light- to medium-brown. Ventral surface: abdomen light- to medium-brown. Anterior and median tibiae, median and posterior femora usually crossed by three indistinct brownish bands.

Structural Characteristics. Antecular portion of head shorter than interocular space, shorter than greatest length of eye; head shorter than median line of pronotum; anterior interocular space greater than length of posterior lobe of pronotum on its median line; first segment of beak a trifle shorter than second; jugae not contiguous in front of clypeus; base of clypeus surpassing transverse line drawn between anterior inner angles of eyes. Eye at least three-fourths width of interocular space, and slightly longer than

wide, its outer margin being convex; length of eye not equal to width of interocular space; antennae four-segmented, second and third segments each with long, curved prolongation. Anterior femora not quite twice width of posterior femora. Metaxyphus as wide as eye. First segment of hind tarsi a trifle shorter than second. Operculum of male longer than wide. Hairs on connexivum of uniform length, covering outer portion of mesal plate.

Comparative Notes. This species is smaller than E. horvathi Montandon. It resembles E. plebejum (Stål) in size but differs by having a sharp-pointed abdomen.

Location of Types. A female type in the Vienna Museum from Montevideo, Uruguay. Montandon examined the type of E. oxyurum (Dufour) in the Vienna Museum and redescribed it. He found the type was 15.5 mm. long instead of 19 mm. as described by Dufour.

Data on Distribution.

Specimens Observed:

Ecuador: Oriente E. Rio Napo water shed, Jatun Yacu 700 meters, March 29, 1937, Clark MacIntyre, 1 male.

Peru: Vic. San Pedro, 900 m.a.s.l., Muddy ponds, May 15-29, 1935, F. Woytkowski, 1 male.

Argentina: Buenos Aires, 1 male.

Recorded from the Literature:

De Carlo records this species from Entre Rios and Buenos Aires, Argentina.

Kirkaldy and Torre-Bueno report Brazil, Uruguay, and Argentina.

Belostoma plebejum (Stal), 1858

(Plate VI, fig. 2)

1858. Zaitha plebeja Stal, C. Kong. Sven. Vet. Akad. Handl., II: 83.
1863. Zaitha plebeja, Mayr, G. L. Verh. Zool.-Bot. Ges. Wien, XIII: 353-354.
1863. Zaitha maculosa Dufour, L. Ann. Soc. Entom. France, (4), III: 389.
1863. Zaitha limbata Dufour, L. Ann. Soc. Entom. France, (4), III: 390.
1863. Zaitha adusta Dufour, L. Ann. Soc. Entom. France, (4), III: 390.
1863. Zaitha difficilis Dufour, L. Ann. Soc. Entom. France, (4), III: 391.
1871. Zaitha plebeja, Mayr, G. L. Verh. Zool.-Bot. Ges. Wien, XXI: 410, 418-420.
1879. Zaitha plebeja, Berg, C. Hem. Argentina, p. 190.
1909. Belostoma plebejum, Kirkaldy, G. W. and Torre-Bueno, J. R. de la. Proc. Entom. Soc. Washington, X: 192.
1930. Belostoma plebejum, De Carlo, J. A. Rev. Soc. Entom. Argentina, No. 13: 118-119, pl. V, fig. 2.
1938. Belostoma plebejum, De Carlo, J. A. An. del Mus. Argentina de C. Nat., XXXIX: 227-228, pl. VII, fig. 65.

Size. Length from front of eyes to tip of abdomen 13-16 mm.; greatest width 6.5-8.0 mm.

Shape. Body elliptical with lateral margin of hemelytra noticeably curved. Pronotum very convex with concave curve on lateral margin.

Color. Dorsal surface: light- to dark-brown. Ventral surface: yellowish- or medium-brown, abdomen sometimes covered with dark-brown splotches. Anterior and median tibiae crossed by three indistinct brownish bands.

Structural Characteristics: Antecular portion of head much shorter than interocular space, longer than greatest length of eye; head shorter than median line of pronotum; anterior interocular space greater than length of posterior lobe of pronotum on median line; first segment of beak shorter than



second; jugae almost contiguous to contiguous in front of clypeus; base of clypeus surpassing transverse line drawn between anterior inner angles of eyes. Eye nearly as wide as interocular space, and slightly longer than wide, its outer margin being convex; length of eye as great as width of interocular space; antennae four-segmented, second and third segments each with long, curved prolongation. Prosternal keel reduced, semicircular in shape. Posterior femora slightly more than two-thirds width of anterior femora. Metaxyphus narrower than width of eye. First segment of hind tarsus shorter than second. Operculum of female wider than long; that of male longer than wide. Hairs covering only outer half of mesal area of connexivum.

Comparative Notes. This species greatly resembles B. denticolle Montandon in size and shape but differs by having a noticeably lower prosternal keel. It is larger than B. micantulum (Stal).

Location of Types. In the Stockholm Museum coming from Rio de Janeiro, Brazil.

Data on Distribution.

Specimens Observed:

Brazil: Rio Negro, Manaus Region, Aug. 1935, A. M. Olalla, 16 males, 10 females; R. Amazonas (Nrte) Region de Itacoatiara, Jan.-Apr. 1936, A. M. Olalla, 10 males, 11 females, R. Amazonas (Lur) Region de Lago Tapaiuna, Jan.-Apr. 1936, A. M. Olalla, 2 males, 3 females; Vic. Joao Pessoa (San Phelipe) River Jurua, No. 3796, 7-10-36, A. M. Olalla, 6 males.

Peru: Vic. San Pedro, 900 m.a.s.l., Muddy ponds, May 15-29-1935, F. Woytkowski, 6 males, 4 females; Vic. San Beni, 840 m.a.s.l. River S. Beni and adj. pools, Aug. 5, 1935, Field note 3553d, F. Woytkowski, 1 male, 2 females; Dept. Huanuca, Vic. of Afilador, Jungle brooks, 800 m.a.s.l. June 8-9-1937, No. 3767, F. Woytkowski, 1 male, 1 female.

Paraguay: Villarrica Coraveni, 9-11-23, 3 males, 3 females, 9-18-23, 1 female, 12-6-23, 2 males, 11-19-23, 1 female, Fran. Schade; Albovena Srojoguasi, 12-26, Fran. Schade, 1 female.

Recorded from the Literature:

De Carlo records this species from Buenos Aires and Entre Rios, Argentina; Minas Gerais and Santa Catalina, Brazil.

Belostoma costa-limai De Carlo, 1938

(Plate VI, fig. 16)

1938. Belostoma costa-limai De Carlo, J. A. An. del Mus. Argentina de C. Nat., XXXIX: 234-235, pl. VI, fig. 72.  
1938. Belostoma costa-limai De Carlo, J. A. Rev. Soc. Entom. Argentina, X, No. 1: 45, pl. IV, fig. 10.

Size. Length from front of eyes to tip of abdomen 25 mm.; greatest width 13.5-14 mm.

Shape. Body broadly elliptical with lateral margin of hemelytra noticeably curved. Pronotum convex with lateral margin in straight line.

Color. Dorsal surface: medium- to dark-brown. Ventral surface: abdomen medium- to dark-brown and covered with blackish-brown splotches. Median and posterior femora crossed by three indistinct brownish bands.

Structural Characteristics. Antecular portion of head shorter than interocular space, shorter than greatest length of eye; head as long as median line of pronotum; anterior interocular space greater than length of posterior lobe of pronotum on median line; first segment of beak as long as second segment; jugae not contiguous in front of clypeus; base of clypeus reaching transverse line drawn between anterior inner angles of eyes. Eye at least two-thirds width of interocular space, and longer than wide, its outer margin approaching a straight line; length of eye as great as width of interocular space; antennae four-segmented, second and third segments with a long, curved prolongation. Anterior and posterior femora of equal width. Metaxyphus about, as

wide as an eye. First segment of hind tarsi longer than second. Operculum of male longer than wide. Hairs on connexivum of uniform length, covering mesal area and abdominal venter.

Comparative Notes. This species possesses hair entirely covering mesal area of connexivum. B. bergi (Montandon) and B. bosqi De Carlo possess hair covering only outer portion of mesal area of connexivum.

Location of Types. Holotype and allotype, Cat. Nos. 39,547 and 39,548 are in the Museo Argentino de Ciencias Naturales, Buenos Aires, Argentina. One paratype is in the Institute Osvaldo Cruz in Brazil; another paratype is in the collection of Dr. Aleixo de Vasconcelos, Rio de Janeiro, Brazil. The holotype and paratypes come from Rio de Janeiro, the allotype from San Pablo, Brazil.

Data on Distribution.

Specimens Observed:

Brazil: Sao Paulo, E. D. Townsend, 1 male, Rbto. Spitz, 1 male.

Recorded from the Literature:

De Carlo records this species from Rio de Janeiro and San Pablo, Brazil.

Belostoma martini (Montandon), 1899

(Plate VII, fig. 8)

1899. Zaitha martini Montandon, A. L. Bul. Mus. Hist. Nat. Paris, No. 4; 170-171.  
 1909. Belostoma martini, Kirkaldy, G. W. and Torre-Bueno, J. R. de la. Proc. Entom Soc. Washington, X: 191.  
 1930. Belostoma martini, De Carlo, J. A. Rev. Soc. Entom. Argentina, No. 13: 111, pl. V, fig. 14.  
 1938. Belostoma martini, De Carlo, J. A. An. del Mus. Argentina de C. Nat., XXXIX; 230-231, pl. II, fig. 22, pl. VIII, fig. 68.

Size. A loaned specimen from Mr. John C. Lutz, has the following measurements: length from front of eyes to tip of abdomen 37 mm., greatest width 18 mm. Professor Montandon's original description gives the total length as 35-39 mm., the greatest width as 16-17.5 mm.

Shape. Body elongated elliptical with a noticeable curve on lateral margin of hemelytra. Pronotum convex, lateral margin almost in a straight line.

Color. Dorsal surface: medium-brown. Ventral surface: anterior tibiae crossed by three or four blackish bands. Blackish bands near the extremities of posterior femora. Medium-brown abdominal venter spotted with black on each side of keel.

Structural Characteristics. Antecular portion of head greater than width of interocular space, greater than greatest length of eye; head longer than median line of pronotum; anterior interocular space greater than length of posterior lobe of pronotum on its median line; first and second segments of beak of equal length; jugae not contiguous in front of clypeus; base of clypeus not reaching transverse

line drawn between anterior inner angles of eyes. A definite depression near anterior inner margin of each eye; eye nearly two-thirds width of interocular space, and longer than wide, its outer margin approaching a straight line; length of eye not equal to width of interocular space; antennae four-segmented, second and third segments each with long, curved prolongation. Posterior femora as wide as anterior femora. First segment of anterior tarsus almost as long as second. Prosternal keel hing, in the shape of X <sup>see key</sup> sharp tooth. Metaxyphus as wide as eye. First segment of hind tarsus longer than second segment. Operculum of male longer than wide. Hairs on connexivum uniform in length, covering entire width of mesal area.

Comparative Notes. This species is very similar to B. dilatatum (Dufour). It differs in having the prosternal keel in the shape of a sharp ~~tooth~~, the first and second segments of the beak of equal length and a smaller size than B. dilatatum (Dufour). ? <sup>see key</sup>

Location of Types. Montandon did not designate a type. Specimens in the Museum of Natural History, Paris, France, came from Patagonia, South America.

Data on Distribution.

Specimens Observed:

Paraguay: Horqueta, 45 miles E., Paraguay Riv., IV-27-1935, Alberto Schulze, (Mr. John C. Lutz of Philadelphia, Pa.).

Recorded from the Literature:

De Carlo gives Paraguay and Buenos Aires, Argentina.

Belostoma dilatatum (Dufour), 1863

(Plate VII, fig. 9)

1863. Zaitha dilatata Dufour, L. Ann. Soc. Entom. France, (4), III: 387.  
 1871. Zaitha dilatata, Mayr, G. L. Verh. Zool.-Bot. Ges. Wien, XXI: 407, 411.  
 1899. Belostoma dilatatum, Montandon, A. L. Ann. Mus. Civ. Genova, (2), XX, (XL): 537.  
 1909. Belostoma dilatatum, Kirkaldy, G. W. and Torre-Bueno, J. R. de la. Proc. Entom. Soc. Washington, X: 191.  
 1930. Belostoma dilatatum, De Carlo, J. A. Rev. Soc. Entom. Argentina, No. 13: 109-110, 124, pl. VI, fig. 17.  
 1938. Belostoma dilatatum, De Carlo, J. A. An. del Mus. Argentina de C. Nat., XXXIX: 229, pl. VIII, fig. 67.

Size. Length from front of eyes to tip of abdomen 38-48 mm.; greatest width 21-26 mm.

Shape. Body flat and broadly elliptical with lateral margin of hemelytra noticeably curved. Pronotum convex, straight or very slightly concave on lateral margin.

Color. Dorsal surface: light- to medium-brown. Scutellum with large, fuscous, rectangular area. Ventral surface: much darker brown with blackish-brown splotches on abdomen. Anterior tibiae, median and posterior femora crossed by three indistinct blackish-brown bands.

Structural Characteristics. Antecular portion of head as great as, or greater than, interocular space, longer than greatest length of eye; head longer than median line of pronotum; anterior interocular space much greater than length of posterior lobe of pronotum on median line; first segment of beak shorter than second; jugae not contiguous in front of clypeus; base of clypeus not reaching transverse line drawn between anterior inner angles of eyes. Eye about

three-fifths width of interocular space, and longer than wide, its outer margin being nearly a straight line; length of eye less than width of interocular space; antennae four-segmented, second and third segments each with a long, curved prolongation. Anterior and posterior femora about same width. Metaxyphus much wider than eye. First segment of hind tarsus longer than second segment. Operculum of female wider than long; that of male longer than wide. Mesal area of connexivum uniformly covered with medium length hairs.

Comparative Notes. This species is larger than B. gestroi Montandon. The interocular space is not twice the width of an eye as in B. gestroi Montandon.

Location of Types. One specimen in Signoret's collection in the Stockholm Museum. Dufour treated this species as though he were redescribing Abedus dilatatus (Say). He makes the correction in his February 24, 1864, lecture to the French Academy of Science.

Data on Distribution.

Specimens Observed:

Brazil: Terrt Chaco Tet. Arga, 1921, 1 male, Alfredo Faz.

Argentina: La Gran Ja Altagracia Cordoba, 1923, 1 male, A. Bruch.

Paraguay: Villarica, 11-21-1929, 1 male, F. Schade.

Recorded from the Literature:

De Carlo records this species from Buenos Aires, Entre Rios, and Corrientes, Argentina; Brazil.



Belostoma aurivillianum (Montandon), 1899

(Plate VII, fig. 6)

1899. Zaitha aurivilliana Montandon, A. L. Bul. Mus. Hist. Nat. Paris, No. 4: 171-172.  
 1909. Belostoma aurivillianum, Kirkaldy, G. E. and Torre-Bueno, J. R. de la. Proc. Entom. Soc. Washington, X: 190.  
 1938. Belostoma aurivillianum, De Carlo, J. A. An. del Mus. Argentina de C. Nat., XXXIX: 220-221, pl. VII, fig. 57.

Size. Length from front of eyes to tip of abdomen 33-37 mm.; greatest width 15-16 mm.

Shape. Body oblong or slightly elliptical with slight curve on lateral margin of hemelytra. Pronotum very convex, lateral margin slightly concave.

Color. Dorsal surface: medium- to dark-brown. Longitudinal median carina on posterior portions of pronotum and scutellum of a yellowish color. Hemelytral sutural margin thickened, pale-yellow in color. Ventral surface: abdomen dark-brown with long, orange streak running along median abdominal keel. Each abdominal segment marked by two or more orange spots. Anterior tibiae, median and posterior femora crossed by three indistinct blackish bands.

Structural Characteristics. Antecular portion of head shorter than interocular space, shorter than greatest length of eye; head shorter than median line of pronotum; anterior interocular space greater than length of posterior lobe of pronotum on its median line; first segment of beak shorter than second; jugae nearly contiguous to contiguous in front of clypeus; base of clypeus reaching transverse line drawn between anterior inner angles of eyes. A longitudinal carina

on head and posterior portions of pronotum and scutellum; definite depressions between eyes and two prominent irregular pits on anterior portion of pronotum. Eye about two-thirds width of interocular space, and longer than wide, its outer and upper margin being very convex; length of eye not equal to width of interocular space; antennae four-segmented, second and third segments each with long, curved prolongation. Posterior femora three-fifths width of anterior femora. First segment of anterior tarsus shorter than second. Prosternal keel high, approaching the shape of a triangle. Metaxypus wider than an eye. First segment of hind tarsus decidedly shorter than second. Operculum of female wider than long; that of male longer than wide. Hairs on connexivum uniform in length, covering either the outer half of mesal area or entire mesal area, and bordering the upper half of genital operculum.

Comparative Notes. This species has a much rougher pronotum, and the eyes project upward more than those of B. elongatum Montandon.

Location of Types. Montandon did not designate a type. He made his description on the basis of three specimens, one found in the Museum of Paris coming from Colombia; another from the Stockholm Museum coming from Brazil; and the third from Venezuela which is in the collection of Montandon.

Data on Distribution.

Specimens Observed:

Brazil: Ypirango, S. Paulo, 11-27-23, 1 female, R. Spitz;

Sao Paulo, 1924, 1 female, (Univ. of Kansas).

Chapada, 1 female; Santaren, Dec., 1 male, 1 female, (Car. Mus.).

Bolivia: Buenavista, Dept. Santa Cruz, 9-24-24, 1 male, R. T. Steinbach, (Univ. of Kansas).

Prov. del Sara, Steinbach, Nov. 1912, 1 female, April 1913, 1 female; Sta. Cruz de la Sierra, 450 m., J. Steinbach, 1 female, (Car. Mus.).

Recorded from the Literature:

De Carlo records this species from San Pablo, Brazil.

Montandon reports Venezuela, Colombia, and Brazil.

Belostoma penabedum n. sp.

(Plate VI, fig. 5)

Size. Length from front of eyes to tip of abdomen 12-13.5 mm.; greatest width 6-7 mm.

Shape. Body broadly elliptical to oval with lateral margin of hemelytra noticeably curved. Pronotum convex, lateral margin straight or very slightly concave.

Color. Dorsal surface: light- to dark-brown, some specimens with a yellowish stripe along median line. Ventral surface: light- to dark-brown. Anterior tibiae usually crossed by three indistinct dark-brown bands.

Structural Characteristics. Interocular space much greater than antecular portion of head; antecular portion of head longer than greatest length of eye; head as long as median line of pronotum; anterior interocular space over twice length of posterior lobe of pronotum on median line; first segment of beak shorter than second; jugae contiguous in front of clypeus; base of clypeus reaching transverse line drawn between anterior inner angles of eyes. Eye less than one-half width of interocular space, and slightly longer than wide, its outer margin being convex; length of eye one-half width of interocular space; antennae four-segmented, basal segment rectangular, second segment wider than long, third slightly produced laterally, fourth wider than first segment. Anterior femora one-third wider than posterior femora. Metaxyphus as wide as, or wider than, eye. First segment of hind tarsus longer than second. Operculum of

female as wide as long; that of male longer than wide. Hairs on connexivum of uniform length, entirely covering mesal area.

Comparative Notes. This species resembles Abedus in shape and Belostoma in size. The membrane of the hemelytron is reduced and the shape of the pronotum is reminiscent of Abedus Stal.

Since the known distribution of this species is quite distant from that of the nearest Abedus and since this species is much smaller than any described Abedus, it seems logical to place it in the genus Belostoma Latreille. Only one species of Belostoma, Belostoma micantulum (Stal) is shorter.

Location of Types. The following types are in the F. H. Snow Entomological Collections at the University of Kansas. Holotype male, Okefenokee Swamp, Georgia, 8-3-34, R. H. Beamer; allotype female, same data; fourteen paratypes, same data; two paratypes, same locality, and date, P. A. McKinstry; four paratypes, same locality, 7-30-34, R. H. Beamer; four paratypes, same locality and date, M. E. Griffith; two paratypes, Lake Jovita, Florida, 7-20-34, R. H. Beamer, P. A. McKinstry; one paratype, Ponce de Leon, Florida, 7-13-34, R. H. Beamer; one paratype, Childs, Florida, 8-6-30, P. W. Oman; one paratype, Orlando, Florida, Jan. 10, 1938, H. B. Hungerford.

Data on Distribution.

Specimens Observed:

Georgia: Okefenokee Swamp, 7-30-34, R. H. Beamer, 2 males, 2 females, M. E. Griffith, 3 males, 1 female, 8-3-34, R. H. Beamer 10 males, 6 females, P. A. McKinstry, 2 males, 7-27-39, J. D. Beamer, 9 males, 11 females, E. G. Wegenek, 2 males, P. B. Lawson, 1 female.

Florida: Childs, 8-6-30, P. W. Oman, 1 male; Lake Jovita, 7-20-34, P. A. McKinstry, 1 male, R. H. Beamer, 1 male; Ponce de Leon, 7-13-34, R. H. Beamer, 1 male; Orlando, Jan. 10, 1938, H. B. Hungerford, 1 female; De Land, 8-8-39, J. D. Beamer, 1 male; Lamont, 8-8-47, L. D. Beamer, 1 male..

Belostoma elegans (Mayr), 1871

(Plate VI, fig. 10)

1871. Zaitha elegans Mayr, G. L. Verh. Zool.-Bot. Ges. wien, XXI: 408, 415-416.  
 1879. Zaitha elegans, Berg, C. Hem. Argentina, p. 191.  
 1909. Belostoma elegans, Kirkaldy, G. W. and Torre-Bueno, J. R. de la. Proc. Entom. Soc. Wash., X: 191.  
 1930. Belostoma elegans, De Carlo, J. A. Rev. Soc. Entom. Argentina, No. 13: 117-118, pl. V, fig. 6.  
 1938. Belostoma elegans, De Carlo, J. A. An. del Mus. Argentina de C. Nat., XXXIX: 231-232, pl. VII, fig. 70.  
 1939. Belostoma elegans, De Carlo, J. A. Rev. Soc. Entom. Argentina, X, No. 2: 231-234, pl. I, figs. 1-9.

Size. Length from front of eyes to tip of abdomen 18-22 mm.; greatest width 8.5-10 mm.

Shape. Body narrowly elliptical with slight curve on lateral margin of hemelytra. Pronotum very convex with lateral margin slightly concave.

Color. Dorsal surface: light- to medium-brown. A yellowish stripe on median line and lateral margin of pronotum.

Ventral surface: abdomen and margins of connexivum covered with yellowish and dark-brown splotches. Anterior tibiae crossed by three indistinct blackish-brown bands. Brownish spots on lower surface of median and posterior femora.

Structural Characteristics. Antecocular portion of head shorter than interocular space, shorter than length of eye; head shorter than median line of pronotum; anterior interocular space greater than length of posterior lobe of pronotum on median line; first and second segments of beak of equal length; jugae not contiguous in front of clypeus; base of clypeus reaching transverse line drawn between anterior inner angles of eyes. Eye at least three-fourths width of

interocular space, and longer than wide, its outer margin being convex; length of eye equal to width of interocular space; antennae four-segmented, second and third segments with long, curved prolongation. Posterior femora three-fourths width of anterior femora. Metaxyphus about same width as eye. Second segment of hind tarsus longer than first. Operculum of female as wide as, or wider than, long; that of male longer than wide. Mesal area of connexivum uniformly covered with medium length hairs which extend to apical third of operculum.

Comparative Notes. This species is smaller than B. bifoveolatum Spinola. It also differs in having the length of the eye equal to the width of the interocular space.

Location of Types. Mayr did not designate the type location. Specimens in the museums at Vienna and Stockholm came from Mendoza and Buenos Aires, Argentina; and Uruguay. The F. H. Snow Entomological Collections, through an exchange, obtained one cotype from a long series in the Mayr collection. This bears the label Prov. Cordoba, Rep. Argentina.

Data on Distribution.

Specimens Observed:

Argentina: McKinley Warren's boy, 1925, 1 male, 2 females; Prov. de Corrientes, 1 female; Buenos Aires, 1 female; Prov. Cordoba, 1 female; Icano-Rio Salado, Santiago del Estero, 1 male, 1 female; Alrededores de la Rioja, 2 males, 1 female. Corcarana, Argentina (J.D.L.) <sup>June 1951</sup> (from U. of Neb.)

Paraguay: Villarica, Jan. 7, 1923, F. Schade, 1 female;



Molinesque, June 20, 1935, F. Schade, 1 male, 3 females.

Two specimens, one from Esquina Prov. de Corrientes, Rep. Argentina, Museo de Buenos Aires, were determined by Prof. José A. De Carlo. M. S. Pennington determined one specimen from Icano-Rio Salado Santiago del Estero. A specimen determined by Montandon in 1908 bears the label "Argentinien". Dr. Hungerford compared one specimen with types in Vienna in 1928 and determined it as B. elegans (Mayr).

Recorded from the Literature:

De Carlo records this species from Buenos Aires, Cap. Federal, Entre Rios, La Rioja, Mendoza, Chaco, Santiago del Estero, and La Pampa, Argentina; Santa Catalina, Brazil.

Kirkaldy and Torre-Bueno report Uruguay, Paraguay, and Argentina.

Belostoma lutarium (Stal)<sup>o</sup>, 1855

(Plate VI, fig. 17)

1855. Zaitha lutaria Stal, G. Ofv. Vet.-Akad. Forh., XII: 190.
1871. Zaitha lutaria, Mayr, G. L. Verh. Zool.-Bot. Ges. Wien, XXI: 409, 416.
1907. Belostoma surantiacum Torre-Bueno, J. R. de la and Brimley, C. S. Entom. News, XVIII: 435.
1910. Belostoma lutarium, Montandon, A. L. Bul Soc. Sci. Bucarest, XIX: 187-188.
1917. Belostoma lutarium, Van Duzee, E. P. Cat. of Hem. of North America North of Mexico, p. 468
1926. Belostoma lutarium, Blatchley, W. S. Het. East. North America, pp. 1046-1048.
1938. Belostoma lutarium, De Carlo, J. A. An. del Mus. Argentina de C. Nat., XXXIX: 233-234.

Size. Length from front of eyes to tip of abdomen 22-23.5 mm.; greatest width 11.2-12 mm.

Shape. Body broadly elliptical to oval with pronounced curve on lateral margin of hemelytra. Pronotum convex, lateral margin with a concave curve.

Color. Dorsal surface: light- to dark-brown. Posterior third of pronotum usually a lighter color than anterior two-thirds. Ventral surface: testaceous to dark-brown. Anterior tibiae crossed by three faint blackish bands, all femora with two or three blackish-brown splotches or bands present.

Structural Characteristics. Antecular portion of head shorter than interocular space, as long as, or longer than, length of eye; head as long as, or longer than, median line of pronotum; anterior interocular space nearly twice length of posterior lobe of pronotum on its median line; first segment of beak as long as second; jugae not contiguous in front of clypeus; base of clypeus very nearly reaching

transverse line drawn between anterior inner angles of eyes. Eye two-thirds width of interocular space, longer than wide, outer margin convex. Length of eye not equal to width of interocular space. Antennae four-segmented, second and third segments each with long, curved prolongation. Posterior femora at least three-fourths width of anterior femora. First segment of anterior tarsus shorter than second. Prosternal keel low, semicircular in shape. Metaxypus no wider than eye. First segment of hind tarsus usually shorter than second. Operculum of female as wide as, or wider than, long; that of male longer than wide. Hairs on connexivum uniform in length, covering entire width of mesal area.

Comparative Notes. This species greatly resembles B. flumineum Say. A typical specimen of B. lutarium (Stal<sup>o</sup>) has the following characteristics: anterior portion of head as long as, or longer than, length of eye; body broadly elliptical to oval; length of head almost equal to length of pronotum on median line and pronotum with pronounced curve on lateral margin. A typical specimen of B. flumineum Say has the following characteristics: anterior portion of head shorter than length of eye, body elliptical in shape, length of head not equal to length of pronotum on median line and lateral margin of pronotum straight or only slightly concave. The writer has examined over five hundred specimens of B. flumineum Say from twenty different states and over one hundred twenty-five specimens of B. lutarium (Stal<sup>o</sup>) from sixteen different states. These two species have some

over-lapping in distribution. Some representatives of each of the above two species are so similar that it is exceedingly difficult to tell them apart. There may be several races of the same species. We know that they had the same origin.

Location of Types. Dr. Gustav Mayr (1871: 416) stated that Stål's type is in the Stockholm Museum without a locality label. Two other specimens came from Texas.

Dr. Hungerford, in 1928, observed quite a series of specimens determined as Belostoma lutaria (Stål) in the Stockholm Museum. He stated that these specimens labeled "Belfrages, Illinois" looked like B. flumineum Say.

Data on Distribution.

Specimens Observed:

Massachusetts: P. R. Uhler Collection, 1 female, (U.S.N.M.).

New York: West Point, Aug. 30, 1907, W. Robinson, 1 female, (U.S.N.M.).

Virginia: Dismal Swamp, 8-13-34, R. H. Beamer, 2 females; Norfolk, 9-20-1928, Geo. E. Gould, 1 female.

South Carolina: P. R. Uhler Collection, 2 females, 1 male, (U.S.N.M.)

Georgia: Okefenokee Swamp, 7-30-34, R. H. Beamer, 3 males, 2 females, P. McKinstry, 2 males, 2 females, 8-3-34, R. H. Beamer Jr., 2 males, M. E. Griffith, 1 female, P. A. McKinstry, 3 males, (Univ. of Kansas).

Bainbridge, 6-18-33, P. W. Fattig, 1 female, (U.S.N.M.).

Florida: Orange Co., Rock Springs, Jan. 11, 1938, 1 male,

2 females; Harris L. near Leesburg, Dec. 15, 1937, H. B. Hungerford, 1 male; Fruitvale, 8-11-30, Paul W. Oman, 1 male; Bradford, 7-16-34, R. H. Beamer, 1 male; Ft. Pierce, 8-7-30, Paul W. Oman, 1 male; Pinellas Co., 1-7-27, C. O. Bare, 1 female; Inverness, 8-1-30, Paul W. Oman, 1 female; Nr. Leesburg, 12-15-37, H. B. Hungerford, 1 male; Gainesville, Dec. 14, 1937, H. B. Hungerford, 1 male, (Univ. of Kansas).

Citrus Co., Geo. M. Greene Collection, 1 female, 1 male, (U.S.N.M.).

Sanford, April 1907, 1 female, (Car. Mus.).

Alachua Co., Gainesville, 10-10-1923, 1 female, (Univ. of Mich.)

Michigan: Washtenaw Co., Half-moon Lake, V-21-1934, I. J. Cantrell, 1 male, 1 female, (Univ. of Mich.).

Illinois: Zeigler, V-10-1930, 1 male, (U.S.N.M.).

Tennessee: Memphis, 1 female, (U.S.N.M.).

Missouri: Butler Co., Black R., May 27, 1932, 1 male, (Univ. of Mich.).

Kansas: Cherokee Co., 12-28-23, w males, 2 females, Dec. 27, 1922, R. H. Beamer, 15 males, 10 females, Hungerford and Beamer, 1 male; Pratt Co., 4-12-1925, R. H. Beamer, 1 female.

Arkansas: Fayetteville, Aug. 1923, 1 male, 3 females.

Oklahoma: Ardmore, April 14, 1923, H. B. Hungerford, 4 females.

Alabama: Wilson Dam, July 7, 1939, A. D. Hess, 1 male; Florence, Collier's Slough, June 16, 1939, A. D. Hess, 1 female.

Louisiana: New Orleans, Mch. 1917, H. E. Hubert, 1 male,  
(U.S.N.M.).

Texas: Colorado Co., June 24, 1922, Mrs. Grace Wiley, 1 male,  
(Univ. of Kansas).

Victoria, 4-9-17, 1 male, 1 female, (U.S.N.M.).

Sumner 1931, J. K. G. Silvez, 1 male, (Univ. of Mich.).

Recorded from the Literature:

Kirkaldy and Torre-Bueno record this species from  
Texas, Florida, Louisiana, and New Jersey.

Belostoma bakeri Montandon, 1913

(Plate VI, fig. 19)

1913. Belostoma bakeri Montandon, A. L. Bul. Soc. Sci. Bucarest, XXII, No. 1: 123-125.  
1938. Belostoma bakeri, De Carlo, J. A. An. del Mus. Argentina de C. Nat., XXXIX: 229-230.

Size. Length from front of eyes to tip of abdomen 16-20 mm.; greatest width 8-10 mm.

Shape. Body oblong to elliptical with slight to noticeably curved hemelytral margin. Pronotum very convex, lateral margin with a concave curve or nearly in a straight line.

Color. Dorsal surface: light- to dark-brown. Scutellum usually with darker, rectangular area. Ventral surface: abdominal venter light- to dark-brown. Connexivum yellow to light-brown; entire width of mesal area covered with uniform yellowish or orange hairs. Anterior tibiae crossed by three faint brownish bands. Median and posterior femora often crossed by two or three indistinct brownish bands.

Structural Characteristics. Antecular portion of head shorter than greatest length of eye; head shorter than median line of pronotum; anterior interocular space greater than length of posterior lobe of pronotum on its median line; first segment of beak slightly shorter than second; jugae not contiguous in front of clypeus; base of clypeus reaching transverse line drawn between anterior inner angles of eyes. Eye at least three-fifths width of interocular space, and longer than wide, its outer margin being convex; length of eye not equal to width of interocular space; antennae four-

segmented, second and third segments each with a long, curved prolongation. Posterior femora at least three-fifths width of anterior femora. First segment of anterior tarsus slightly shorter than second. Prosternal keel of medium height, semicircular in shape and slightly thickened on anterior portion. Metaxyphus as wide as eye. First segment of hind tarsus shorter than second. Operculum of female as wide~~s~~, or wider than, long; that of male longer than wide. Hairs on connexivum uniform in length, covering entire mesal area and bordering upper half of genital operculum.

Comparative Notes. This species resembles B. fusciventris (Dufour) and B. apache Kirkaldy in size and shape but differs by having the entire mesal area of the connexivum covered with hairs.

Location of Types. In the Berlin Museum coming from California.

Data on Distribution.

Specimens Observed:

California: Lake Tahoe, 8-2-40, L. C. Kuitert, 1 male, 2 females; Lone Pine, 7-28-40, L. C. Kuitert, 4 males, 5 females; La Jolla, 7-13-41, Burt Hodgden, 1 female; Three Rivers, 7-5-40, E. E. Kenaga, 1 female; Warner Springs, 7-28-38, R. I. Sailer, 1 male; Laguna, Aug. 17, 1922, J. G. Needham, 1 female; Miramar, 7-28-38, D. W. Craik, 4 males, 2 females; Laguna Beach, 7-25-33, R. H. Beamer, 1 male, 3 females; Campo, Laguna Mts., 8-25-32, H. W. Capps, 1 male; Oakland, 5-3-21, C. T. Dodds, 1 female; Perris, 8-3-35, Jack



Beamer, 1 female, R. H. Beamer, 1 female; Marin Co., 8-3-29, L. D. Anderson, 1 male; Milpetas, 5-1911, R. J. Smith, 1 male; Piedmont, 2-22-21, C. T. Dodds, 1 male.

Oregon: Umatilla, 7-14-31, L. D. Anderson, 1 male, 1 female.

Utah: Spanish Fork, 8-15-40, L. C. Kuitert, E. E. Kenega, 1 male; Logan, G. F. Knowlton, 1 male; Saratoga, 4-4-30; G. F. Knowlton, 1 female.

Nevada: Reno, Oct. 1939, La. R., k female; Ash, Jan. 1940, la R., 1 male, 1 female; Cortez, Hot Springs Exped., 1930, C. T. Brues, Gift from C. T. Brues, e females; Fallon, 8-9-29, L. D. Anderson, 1 male.

Arizona: Cochise Co., 7-20-27, L. D. Anderson, 1 male, 2 females, R. H. Beamer, 3 males, 7-29-27, P. A. Radio, 3 females; Douglas, Aug., F. H. Snow, 2 males; San Bernardino Ranch, Cochise Co., 3750 ft., Aug., F. H. Snow, 1 male, 2 females.

New Mexico: Eddy Co., 7-12-27, R. H. Beamer, 2 males, 4 females, L. D. Anderson, w males; Blue Sprs., Carlsbad, 7-10-27, R. H. Beamer, 1 female.

Texas: Menard Co., 7-19-28, R. H. Beamer, 1 male; Cameron Co., 8-3-28, Jack Beamer, 1 female; Davis Mts., 7-12-38, R. I. Sailer, 1 female.

Belostoma flumineum Say, 1832

(Plate VI, fig. 18)

1832. Belostoma fluminea Say, T. Het. New Harmony, p. 809.  
 1847. Perthostoma aurantiacum Leidy, J. Jour. Acad. Nat. Sci. Philadelphia, I: 60.  
 1863. Zaitha fluminea, Dufour, L. Ann. Soc. Entom. France, (4), III:388.  
 1871. Zaitha fluminea, Mayr, G. L. Verh. Zool.-Bot. Ges. Wien, XXI: 409, 416.  
 1878. Zaitha fluminea, Uhler, P. R. Proc. Boston Soc. Nat. Hist., XIX: 441.  
 1895. Zaitha micrantula Uhler, Gillette, C. P. and Baker, C. Hem. Colorado Bul. 31, Colorado Arg. Exp. Sta., p. 63.  
 1909. Belostoma flumineum, Kirkaldy, G. W. and Torre-Bueno, J. R. de la. Proc. Entom. Soc. Washington, X: 191.  
 1917. Belostoma flumineum, Van Duzee, E. P. Cat. of Hem. of North America North of Mexico, p. 467.  
 1919. Belostoma flumineum, Hungerford, H. B. Univ. of Kansas Sci. Bul., XI: 144, color plate, fig. 9.  
 1926. Belostoma fluminea, Blatchley, W. S. Het. East. North A., pp. 1046-1047, fig. 211.  
 1938. Belostoma flumineum, De Carlo, J. A. An. del Mus. Argentina de C. Nat., XXXIX: 232-233, pl. VII, fig. 71.

Size. Length from front of eyes to tip of abdomen 19-22 mm.; greatest width 9.0-10.4 mm.

Shape. Body elliptical with noticeable curve on lateral margin of hemelytra. Pronotum very convex, lateral margin concave.

Color. Dorsal surface: light- to dark-brown. Scutellum often with fuscous, rectangular area. Ventral surface: abdominal venter yellowish-orange to dark-brown. Anterior tibiae with three faint brownish bands; brownish spots more prominent on apical half of median and posterior femora.

Structural Characteristics. Antecular portion of head shorter than interocular space, shorter than length of eye; head almost as long as median line of pronotum; anterior interocular space greater than length of posterior lobe of

pronotum on its median line; first segment of beak as long as second; jugae not contiguous in front of clypeus; base of clypeus reaching transverse line drawn between anterior inner angles of eyes. Eye about five-eighths width of interocular space, and longer than wide, its outer margin being convex. Length of eye not equal to width of interocular space. Antennae four-segmented, second and third segments each with a long, curved prolongation. Posterior femora seven-ninths width of anterior femora. First segment of anterior tarsus shorter than second. Prosternal keel low, semicircular in shape. Metaxyphus narrower than, to as wide as, eye. First segment of hind tarsus shorter than second. Operculum of female as wide as, or wider than, long; that of male longer than wide. Hairs on connexivum uniform in length, covering entire width of mesal area and bordering basal two-thirds of genital operculum.

Comparative Notes. This species closely resembles B. lularium (Stal) but is usually smaller and more elliptical in shape.

Location of Types. Say did not give the location of types. They were possibly destroyed. I have set up a neotype. It is a male specimen measuring 20 mm. from front of eyes to tip of abdomen, 10.5 mm. at its greatest width. The neotype bears the label Bath, New Hampshire, August 21, 1934, P. A. McKinstry. It is in the F. H. Snow Entomological Collections at the University of Kansas.

Data on Distribution.Specimens Observed:

Maine: Fryeburg, 8-20-34, P. McKinstry, 1 male.

New Hampshire: Bath, 8-21-34, P. McKinstry, 8 males, 3 females;

Mt. Washington, 7-7-34, M. W. Sanderson, 1 male.

Connecticut: New Haven, 8-23-34, P. McKinstry, 2 males, 2 females.

New York: West Point, May 5, 1909, W. Robinson, 1 female, (U.S.N.M.).

Pennsylvania: New Galilee, IX-9-1909, Hugo, Kahl, 3 males, 3 females; Carnot, All'y Co., 1 male; Pittsburgh, VII-14, 3 males, 3 females, (Car. Mus.).

Maryland: Plummers Id., 1 male, (U.S.N.M.).

Washington, D. C.: Rock Creek, 1 male, (U.S.N.M.).

Virginia: Alexandria-V-27-35, S. Abraham, 1 male, (U.S.N.M.).

Illinois: Urbana, 8-1-1911, 1 male, 2 females, (U.S.N.M.).

Urbana, May 10, 1932, 1 female, (Car. Mus.).

Michigan: Douglas Lake, 7-31-1924, H. B. Hungerford, 1 female;

Smith's Bog, June 11, 1923, H. B. Hungerford, 4 males, 1

female; Sedge Point Pool, July 3 & 7, 1923, H. B. Hungerford,

5 males, 3 females; Bessey Creek, July 18, 1923, H. B.

Hungerford, 1 male, 1 female; Cheboygan Co., 7-14-1932,

J. O. Nottingham, 1 female, July 1933, H. B. Hungerford, 1 m

male, 1 female, (Univ. of Kansas).

Big Cedar Cr., Nelson Twp. Kent Co., III-26-1925, J. Metz-

elner, 8 males, 12 females; Keystone, Grand Traverse Co.,

IX-14-1923, T. L. Mankinson, 5 females; Ann. Arbor,

5-10-28, Wesley Clanton, 2 males, 1 female; Cheboygan Co., Douglas Lake, VII-27-1936, C. D. Lyman, 2 males, 2 females, VII-12-1925, C. F. Byers, 1 female; Washtenaw Co., Ann Arbor, 5-34-36, J. A. Oliver, 1 male, IV-28-32, R. M. Bailey, 1 female, (Univ. of Mich.).

Wisconsin: Cranmoor, X-30-09, G. W. Hooker, 1 female, (U.S.N.M.).

Dodge Co., Rock R., Aug. 27, 1929, Greene-Stuart, 1 male, 1 female; Washburn Co., IX-8-1928, E. P. Creaser, 1 female, (Univ. of Mich.).

Minnesota: St. Paul, Golf Club Pond, July 28, 1921, H. B. Hungerford, 13 males, 25 females.

Missouri: Overland Park, 8-14-38, B. H. Fichel, 1 female, (U.S.N.M.).

Kansas: Cherokee Co., Aug. 1920, Hungerford and Beamer, 9 males, 3 females; Dec. 1922, 4 females; 12-28-23, 5 males, R. H. Beamer; Butler Co., 1285 ft., 1916, R. H. Beamer, 7 males, 5 females; Doniphan Co., Aug. 23, 1921, Robert Guntert, 4 males, 2 females; Pratt Co., 4-12-1925, R. H. Beamer, 1 male, 2 females; Coldwater, April 1925, Beamer and Bare, 2 males, 2 females, Sept. 7, 1923, Clarence Bare, 1 male, 1 female; Atchinson Co., 7-11-24, E. P. Breakey, 2 males, 1 female; Cheyenne Co., 8300 ft., F. X. Williams, 3 males, 1 female; Doniphan Co., Aug. 25, 1921, W. J. Brown, 1 female; Lawrence, Nov. 5, 1932, 1 female.

Oklahoma: Ardmore, April 14, 1923, H. B. Hungerford, 2 females.

Arkansas: Fayetteville, Aug. 1923, April 26, 1930, H. H. Schwardt, 2 males.

Texas: Colorado Co., June 24, 1922, Mrs. Grace Wiley, 1 female; McAllen, 11-20-32, L. D. Tuthill, 1 male, 4 females; Cameron Co., 8-13-28, A. M. James, 1 male; Aransas Co., 8-6-28, A. M. James, 6 males, 3 females, J. G. Shaw, 2 males, 1 female; Valentine, July 23, 1927, R. H. Beamer, 2 males, 1 female; Starr Col, 7-30-28, J. G. Shaw, 8 females; Brooks Co., 7-25-28, J. G. Shaw, 1 male; Hidalgo, 11-22-32, L. D. Tuthill, 1 male, 1 female; Del Rio, 7-8-38, R. I. Sailer, 5 males, 5 females, D. W. Craik, 2 males; Progreso, 7-1-38, D. W. Craik, 2 females, R. I. Sailer, 2 males, 4 females; Victoria, Mustang Creek, 11-8-32, L. D. Tuthill, 2 males, 2 females; Pinto, 7-7-38, D. W. Craik, 3 males, 1 female, (Univ. of Kansas).

Cameron Co., Brownsville, Jan. 29, 1936, L. Giovannoli, 11 males, 9 females, (Univ. of Mich.).

New Mexico: Messilla Park, 7-18-1927, R. H. Beamer, 1 female.

Arizona: Arlington, Aug. 13, 1935, Jean Russell, 3 males, 2 females; Gila Co., 8-5-1927, R. H. Beamer, 1 male, 1 female.

California: Winters, Aug. 6, 1929, L. D. Anderson, 1 male, 2 females.

Recorded from the Literature:

De Carlo records this species from Michigan.

Kirkaldy and Torre-Bueno report Quebec, Canada; Michigan, Wisconsin, New York, New Jersey, Colorado, Arizona, Ohio, Louisiana, and Tennessee, U. S. A.

Belostoma bifoveolatum Spinola, 1852

(Plate VI, fig. 11)

1852. Belostoma bifoveolatum Spinola, M. Gay's Chille, Zool., VII: 227-231.
1863. Zaitha bifoveolata, Dufour, L. Ann. Soc. Entom. France, (4), III: 389.
1871. Zaitha bifoveolata, Mayr, G. L. Verh. Zool.-Bot. Ges. Wien, XXI: 409, 416.
1903. Belostoma bifoveolatum, Montandon, A. L. Bul. Mus. Hist. Nat. Paris, IX: 23.
1909. Belostoma bifoveolatum, Kirkaldy, G. W. and Torre-Bueno, J. R. de la. Proc. Entom. Soc. Washington, X: 190.
1930. Belostoma bifoveolatum, De Carlo, J. A. Rev. Soc. Entom. Argentina, No. 13: 115, pl. V, figs. 7 & 8, pl. VII, fig. 29.
1938. Belostoma bifoveolatum, De Carlo, J. A. An. del Mus. Argentina de C. Nat., XXXIX: 231, pl. VII, fig. 69.

Size. Length from front of eyes to tip of abdomen 20-26 mm., greatest width 10-12.5 mm.

Shape. Body elliptical with lateral margin of hemelytra noticeably curved. Pronotum convex with lateral margin slightly concave.

Color. Dorsal surface: light- to medium-brown. A yellowish stripe usually present on median line and lateral margin of pronotum. Ventral surface: abdominal venter a yellowish-orange with dark-brown splotches. Lateral margins of connexivum usually a lemon-yellow color. Anterior and median tibiae, median and posterior femora usually crossed by indistinct brownish bands.

Structural Characteristics. Antecular portion of head shorter than interocular space, shorter than length of eye; head shorter than median line of pronotum; anterior interocular space greater than length of posterior lobe of pronotum

on median line; first and second segments of beak of equal length; jugae not contiguous in front of clypeus; base of clypeus reaching transverse line drawn between anterior inner angles of eyes. Eye no more than two-thirds width of interocular space, and longer than wide, its outer margin being convex; length of eye less than width of interocular space; antennae four-segmented, second and third segments with a long, curved prolongation. Posterior femora nearly three-fourths width of anterior femora. Metaxyphus not as wide as eye. Second segment of hind tarsus as long as, or longer than first. Operculum of female as wide as, or wider than, long; that of male longer than wide. Mesal area of connexivum uniformly covered with medium length hairs which extend to apical third of operculum.

Comparative Notes. This species is larger than B. elegans (Mayr) and the width of its interocular space is greater than the length of an eye.

Location of Types. Spinola did not designate location of types. Dr. Hungerford states that the Zaitha bifoveolata specimens in the Vienna Museum came from Chile.

Data on Distribution.

Specimens Observed:

Chile: Vjna, 1922, 18 males, 9 females; Miramar, Sept. 15, 1922, 22 males, 7 females; Vina Del Mare, 11-23, 9-12-23, 1 male, 2 females; Limache, 1921, 6 males, 7 females; Montane, 1921, 4 males, 10 females; Santiago, 2 males; Termas Cauquenes, Dec. 15, 1922, 1 female. All of the above



specimens were collected by Alfredo Faz.

Brazil: Buenos Ar. Rep. Arja, 1921, Alfredo Faz, 2 males.

Argentina: La Granja Alta Gracia Cordoba, 1923, A. Bruch,  
4 males, 3 females.

Recorded from the Literature:

De Carlo records this species from Chile; Buenos Aires, Cordoba, La Rioja, Gemignani, Salta, and La Pampa, Argentina.

Kirkaldy and Torre-Bueno report Brazil, Paraguay, and Chile.

Belostoma noualhieri Montandon, 1903

1903. Belostoma noualhieri Montandon, A. L. Bul. Mus. Hist. Nat. Paris, No. 1: 21-22.  
 1909. Belostoma noualhieri, Kirkaldy, G. W. and Torre-Bueno, J. R. de la. Proc. Entom Soc. Washington, X: 192.  
 1938. Belostoma noualhieri, De Carlo, J. A. An. del Mus. Argentina de C. Nat., XXXIX : 235.

The following is taken from Professor Montandon's original description.

Size. 20.5 mm. long, maximum width 9.5 mm.

Shape. Pronotum convex, length on median line greater than half of width on posterior border.

Color. Connexivum with a small dark spot around the posterior angle of third, fourth, and fifth segments.

Structural Characteristics. Antecular portion of head a trifle smaller than width of interocular space. First segment of beak scarcely longer than second. Base of clypeus reaching transverse line drawn between anterior inner angles of eyes. Eyes are globular. Prosternal keel an elevated steet, almost triangular, pointed and slightly inclined toward head. Posterior margin of prosternal keel arching; anterior margin straight. A band of hair completely covering width of abdominal margin and abdominal lobe.

Comparative Notes. This species differs from all other species of Belostoma by having both the following characters: Abdominal margin and abdominal lobe completely covered with hair, and the first segment of beak greater than the second.

Location of Types. In the Museum of Natural History of Paris, the type locality being Rio Grande, Brazil.

Data on Distribution: Montandon gives Rio Grande, Brazil.

Belostoma grandicollum De Carlo, 1934

(Plate VIII, fig. 1)

1934. Belostoma grandicollum De Carlo, J. A. Bul. Mus. Nac. de Rio de Janeiro, X: 109-110.  
1938. Belostoma grandicollum De Carlo, J. A. An. del Mus. Argentina de C. Nat., XXXIX: 236-237, pl. VI, fig. 74.

The following information is taken from Professor De Carlo's description and photograph of Belostoma grandicollum De Carlo.

Size. 32 mm. long, maximum width 16 mm.

Shape. Body oval with lateral margin of hemelytra noticeably curved. Pronotum slightly convex, lateral margin in straight line.

Color. Anterior tibiae, median and posterior femora crossed by three faint bands.

Structural Characteristics. Beak of medium thickness with first segment shorter than second; base of clypeus reaching line drawn between anterior inner angles of eyes; eyes large, globular, wider than long; interocular space greater than width of eye; interocular space somewhat roughened and 3 mm. wide at the level of posterior margin of eyes. Pronotum large, anterior border 7 mm. wide with two blackish spots on median part; posterior border 10.7 mm. wide. Pronotum 5.5 mm. long on median line, wrinkled and somewhat depressed between pronotal pits. Anterior femora one-third wider than posterior femora. Prosternal keel high, wide at its base, narrowed at its upper portion but not forming a point. As a whole, it presents a triangular appearance. Membrane of

hemelytron regularly developed, 3.6 mm. at its greatest width. Margins of abdomen and abdominal lobe entirely covered with silky hair.

Comparative Notes. This species differs from B. testaceo-pallidum Latreille by its greater size, eyes wider than long, and by the large pronotum.

Location of Types. A holotype is in the Museo Nacional de Rio de Janeiro, Brazil.

Data on Distribution. Professor De Carlo reports the type locality as Mato Grosso, Brazil.

Belostoma testaceo-pallidum Latreille, 1807

(Plate VIII, fig. 4)

1807. Belostoma testaceo-pallidum Latreille, P. A. Gen. Crust. Ins., III: 145.
1863. Zaitha margineguttata Dufour, L. Ann. Soc. Entom. France, (4), III: 387.
1863. Zaitha carbonaria Dufour, L. Ann. Soc. Entom. France, (4), III: 388.
1863. Zaitha stollii, Mayr, G. L. Verh. Zool.-Bot. Ges. Wien, XIII: 352-353.
1871. Zaitha margineguttata, Mayr, G. L. Verh. Zool.-Bot. Ges. Wien, XXI: 407, 410-411.
1903. Belostoma testaceo-pallidum, Montandon, A. L. Bul. Soc. Sci. Bucarest, XII, Nos. 1-2: 114-116.
1909. Belostoma testaceo-pallidum, Kirkaldy, G. W. and Torre-Bueno, J. R. de la. Proc. Entom. Soc. Washington, X: 192.
1930. Belostoma testaceo-pallidum, De Carlo, J. A. Rev. Soc. Entom. Argentina, No. 13: 113-114, pl. VII, fig. 25.
1938. Belostoma testaceo-pallidum, De Carlo, J. A. An. del Mus. Argentina de C. Nat., XXXIX: 236, pl. II, fig. 23, pl. VII, fig. 73.

The following information was obtained from Professor Montandon's comments on Latreille's original description and Professor De Carlo's description and photograph of B. testaceo-pallidum Latreille.

Size. 15.5-16.0 mm. long, maximum width 31-31.5 mm.

Shape. Body broadly elliptical to oval with lateral margin of hemelytra noticeably curved. Pronotum slightly convex, lateral margin approaching straight line.

Color. Anterior tibiae with three dark rings. Median and posterior femora crossed by three dark bands on lower surface. Connexivum with two yellow spots on each side of last four abdominal segments, the first spot being larger on the first three segments.

Structural Characteristics. Antecular portion of head

greater than length of interocular space; interocular space wider than long; beak very robust with first segment shorter than second; base of clypeus very nearly reaching transverse line drawn between anterior inner angles of eyes; eyes of moderate size, globular, as wide as long. Anterior femora very slightly dilated, a little greater than posterior femora. Prosternal keel high, not very wide, pointed tip. Scutellum with a light carina on its posterior median part. Margins of abdomen and abdominal lobe entirely covered with dark hair.

Comparative Notes. This species is similar in shape to B. longirostrum De Carlo. Professor De Carlo (1938: 236) states that the anterior femora are very slightly dilated, a little greater than posterior femora. Those of B. longirostrum De Carlo are one-third more dilated than posterior femora.

Location of Types. Latreille did not indicate location of types.

Data on Distribution. The Museo Argentino de Ciencias Naturales has a specimen from Misiones, Argentina, col. Venturi, X-1899, No. 5653. Kirkaldy and Torre-Bueno give Brazil as distribution for this species.

Belostoma longirostrum De Carlo, 1934

(Plate VIII, fig. 5)

1934. Belostoma longirostrum De Carlo, J. A. Bol. do Mus. Nac. de Rio De Janeiro, X: 110-111.  
 1938. Belostoma longirostrum De Carlo, J. A. An. del Mus. Argentina de C. Nat., XXXIX: 238, pl. VII, fig. 76.

The following information is taken from Professor De Carlo's description and photograph of Belostoma longirostrum.

Size. 29-30 mm. long, maximum width 14.5-15.0 mm.

Shape. Body broadly elliptical to oval with lateral margin of hemelytra noticeably curved. Pronotum slightly convex, lateral margin approaching straight line.

Color. Anterior tibiae with three faint rings. Three faint bands on lower surface of median and posterior femora.

Structural Characteristics. Antecular portion of head shorter than length of interocular space; beak long and very slender, first segment appreciably shorter than second; base of clypeus very nearly reaching transverse line drawn between anterior inner angles of eyes; eyes of moderate size, globular, as long as wide. Anterior lobe of pronotum with light ridges and some depressions between pronotal pits. Anterior femora one-third more dilated than posterior femora. Prosternal keel high with appearance of pointed arch. Margins of abdomen and abdominal lobe entirely covered with silky hair.

Comparative Notes. This species differs from B. ribeiroi De Carlo by its greater width and having a beak appreciably

longer. In this species the first segment of the beak is markedly shorter than the second. B. ribeiroi De Carlo has the first segment of the beak scarcely shorter than the second.

Location of Types. In the Museo Nacional de Rio de Janeiro, Brazil. The types came from Rio de Janeiro.

Data on Distribution. Professor De Carlo lists the following localities in Brazil: San Pablo, Minas Gerais, and Rio de Janeiro. Specimens from the above localities are found in the Museo Argentino de Ciencias Naturales, Buenos Aires, numbered: 39,308, 39,309, and 39,310.



Belostoma ribeiroi De Carlo, 1933

(Plate VIII, fig. 3)

1933. Belostoma ribeiroi De Carlo, J. A. Bol. Mus. Nac. de Rio de Janeiro, IX:95-96.  
 1933. Belostoma dufouri De Carlo, J. A. Bol. Mus. Nac. de Rio de Janeiro, IX: 96-98.  
 1935. Belostoma ribeiroi De Carlo, J. A. Rev. Soc. Entom. Argentina, VII; 205.  
 1938. Belostoma ribeiroi De Carlo, J. A. An. del Mus. Arg. de C. Nat., XXXIX: 237-238, pl. VI, fig. 75.

The following information is taken from Professor De Carlo's description and photograph of Belostoma ribeiroi.

Size. 27.5-32.0 mm. long, maximum width 13-15 mm.

Shape. Body elliptical with lateral margin of hemelytra noticeably curved. Pronotum slightly convex, lateral margin approaching a straight line.

Color. Anterior tibiae with three faint rings. Two faint bands, well-marked, on lower surface of median and posterior femora.

Structural Characteristics. Antecular portion of head shorter than length of interocular space; first segment of beak a trifle shorter than second; base of clypeus reaching transverse line drawn between anterior inner angles of eyes; eyes of regular size, globular, and as wide as long. Anterior lobe of pronotum with light ridges and some depressions between pronotal pits. Anterior femora slightly dilated, one-third greater than posterior femora. Prosternal keel high with appearance of pointed arch. Margins of abdomen and abdominal lobe entirely covered with silky hair.

Comparative Notes. This species differs from B. grandis

collum De Carlo by the size of the eyes and the pronotum. It differs from B. testaceo-pallidum Latreille by its more robust femora and less width to the body.

Location of Types. In the Museo Nacional de Rio de Janeiro, Brazil.

Data on Distribution. Professor De Carlo reports the type locality as Mato Grosso, Brazil.

Belostoma subspinosum (Palisot de Beauvois), 1805

1805. Nepa subspinosus Palisot de Beauvois, A. M. F. J. Ins. Rec. Afr. et Amerique, Paris, p. 236, pl. XX, figs. 2 a and 2 b.
1909. Belostoma subspinosum, Kirkaldy, G. W. and Torre-Bueno, J. R. de la. Proc. Entom. Soc. Washington, X: 192.
1938. Belostoma subspinosum, De Carlo, J. A. An. del Mus. Argentina de C. Nat., XXXIX: 239.

Original description.

"Nepa presque epineuse. D'un vert sale, bruni apres la mort; deux petites epines a l'extremite du dernier anneau de l'abdomen. (Fig. 2, a, b.)

"Nepa subspinosus. Obscure vividis, post mortem fusca; segmento abdominis ultimo bispinoso, spinis brevibus. (Fig. 2, a, b.)

"Saint Domingue.

"Obs. Cette espee ne me parait decrite par aucun entomologiste.

"Elle est assez commune dans les eaux a Saint-Domingue. Les femelles portent leurs oeufs sur le dos, ainsi qu'il est figure 2, a." <sup>1</sup>

Translation of Original Description.<sup>2</sup>

Nepa almost spiny. Of a dirty green color, brownish after death; two small spines at the extremity of the last segment of the abdomen. (Fig. 2, a, b.)

Nepa subspinosus. Dusky in living state, brown after death; tip of last abdominal segment bispinose, short spines.

<sup>1</sup>A. M. F. J. Palisot de Beauvois, Nepa, Ins. Rec. Afr. et Amerique (Paris, 1805), p. 236.

<sup>2</sup>Trans., the author.

San Domingo.

Obs. This species does not appear to me to have been described by any entomologist.

It is quite common in the water at San Domingo. The females carry their eggs on the back as in figure 2, a.

Note: The color plate of this species clearly distinguishes it as a species of Belostoma Latreille. It is now well known that only the males of Belostoma Latreille carry eggs on their back. Many of the earlier workers thought that this responsibility was assumed by the female.

The author named this species from the "two small spines at the tip of the last segment of the abdomen". These two "spines" are merely strap-like, retractile, respiratory appendages that are present in all the Belostomatidae.

Belostoma minor (Palisot de Beauvois), 1805

1805. Nepa minor Palisot de Beauvois, A. M. F. J. Ins. Rec. Afr. et Amerique, Paris, p. 236, pl. XX, fig. 3.  
 1909. Belostoma minor, Kirkaldy, G. W. and Torre-Bueno, J. R. de la. Proc. Entom. Soc. Washington, X: 192.  
 1938. Belostoma minor, De Carlo, J. A. An. del Mus. Argentina de C. Nat., XXXIX: 239.

Original Description.

"Nepa petite. Cette espece ne differe de la precedente que par les proportions de son corps de moitie plus petit. (Fig. 3).

"Nepa minor. Corpore, pedibus, spinis, etc., praeedente dimidio soltem brevioribus. (Fig. 3).

"Memes lieux.

"Obs. Peut-etre cet insecte n'est-il que le male de l'espece precedente."<sup>1</sup>

Translation of Original Description.<sup>2</sup>

Nepa small. This species differs from the preceding one by the proportions of its body being only one-half the size (Fig. 3).

Nepa minor. Body, feet, spines, etc. are at least one-half the size of the preceding one. (Fig. 3).

Same place.

Obs. Perhaps this insect is only the male of the preceding species.

The writer notes that the figures of B. subspinosum

<sup>1</sup>A. M. F. J. Palisot de Beauvois, Nepa, Ins. Rec. Afr. et Amerique, (Paris, 1805), p. 236.

<sup>2</sup>Trans., the author.

(Palisot de Beauvois) and B. minor (Palisot de Beauvois) (1805: 236, pl. XX, figs. 2a, 2b, and 3) are the same size. They look identical. Both are 14 mm. wide and 31 mm. long. To the right of Figure 3 is a vertical line 20 mm. long. This must indicate the actual length of B. minor (Palisot de Beauvois) as 20 mm. If this is one-half the size of the former species, B. subspinosum (Palisot de Beauvois) must be 40 mm. long. The drawings of the above two species appear identical to Belostoma boscii (Lepelletier and Serville).

GENUS ABEDUS STÅL, 1862

1862. Stål, C. Stett. Entom. Zeit., XXIII: 461.  
 1871. Mayr, G. L. Verh. Zool.-Bot. Ges. Wien, XXI: 403-405.  
 1900. Montandon, A. L. Bul. Soc. Sci. Bucarest, IX: 11-12  
 1901. Champion, G. C. Biol. Centr. Amer., Hem. Het., II:  
 363.  
 1903. Montandon, A. L. Bul. Soc. Sci. Bucarest, XII: 110-  
 113.  
 1917. Van Duzee, E. P. Cat. of Hem. of America North of  
 Mexico, p. 469.  
 1932. De Carlo, J. A. Rev. Soc. Entom. Argentina, No. 22:  
 121.  
 1935. Hidalgo, J. Univ. of Kansas Sci. Bul., XXII: 493-519.  
 1938. De Carlo, J. A. An. del Mus. Argentina de C. Nat.,  
 XXXIX: 241-247.

Referring to this genus also:

Serphus Stål.

1862. Stål, C. Stett. Entom. Zeit., XXIII: 462.  
 1871. Mayr, G. L. Verh. Zool.-Bot. Ges. Wien, XXI: 401, 403.  
 1863. Stenoscytus Mayr, G. L. Verh. Zool.-Bot. Ges. Wien,  
 XIII: 343-347.

Pedinocoris Mayr, G. L.

1863. Mayr, G. L. Verh. Zool.-Bot. Ges. Wien, XIII: 347-349.  
 1871. Mayr, G. L. Verh. Zool.-Bot. Ges. Wien, XXI: 402  
 1901. Champion, G. C. Biol. Centr. Amer., Hem. Het., II:  
 364.

Deinostoma Kirkaldy.

1897. Kirkaldy, G. W. Entom., XXX: 258.  
 1901. Champion, G. C. Biol. Centr. Amer., Hem. Het., II:  
 362.

Genotype. Abedus ovatus Stål.

Generic Characters. Oval to broadly-oval species, 24-37 mm.  
 long, 12-22 mm. wide. Antecular portion of head shorter  
 than length of eye; beak three-segmented, first segment  
 being shorter than second; eyes narrower than width of

interocular space. Antennae three or four-segmented; if three-segmented, a short prolongation or no prolongation from second segment; if four-segmented, a prolongation from the second and third segments. Anterior femur wider than posterior femur; one tarsal claw on anterior tarsus. Hemelytra covering abdomen in some species; a small portion of connexivum on last segment not covered; in others membrane reduced; closed cells usually present. Metaxyphus keeled or not keeled; greatest width of metaxyphus narrower, to wider, than an eye. Abdominal venter generally entirely pubescent; variations from this character seen in the species A. signoreti Mayr, A. ovatus Stål, and A. breviceps Stål. Genital operculum entirely pubescent except in the three above mentioned species; female genital operculum wider than long with two tufts of hair at apex; that of the male longer than wide and no tufts of hair at apex.

Distribution. The genus Abedus Stål comprises twelve species which are generally distributed in the southern states from California to Texas, Mexico, and Central America.

Historical Review. Abedus Stål was founded by Stål in 1862 to include two new species of Belostomatidae, Abedus breviceps Stål and Abedus ovatus Stål. He gave the following characteristics for this genus: metasternum strongly keeled, antennae four-segmented with a long prolongation from the second and third segments, and mid-ventral abdominal region not possessing long hairs.

Stål, 1862, erected the genus Serphus in the same



paper. He characterized this new genus as having three-segmented antennae and an entirely pubescent abdominal venter. He put Belostoma dilatatus Say in the genus Serphus.

Mayr, 1863, established the genus Stenoscytus for the species Stenoscytus mexicanus Mayr. He characterized this genus as having the first segment of beak longer than the second, the metaxyphus keeled, and only the third segment of the antenna with a prolongation.

Mayr, 1863, described in the same paper another genus, Pedinocoris, which he characterized by the first segment of the beak shorter than the second, a prolongation from the second and third segments of the antennae, and the metaxyphus not keeled. He described Pedinocoris macronyx Mayr and P. brachonyx Mayr in this genus. In 1871, Mayr placed the genus Stenoscytus in synonymy with Abedus Stal.

Kirkaldy, in 1897, established the genus Deinostoma. He placed Belostoma dilatatus Say, 1832, and Stål's designation, in 1862, of Serphus dilatatus, in the new genus Deinostoma Kirkaldy. Kirkaldy described this genus using the following characters: a three-segmented antenna, an entirely pubescent abdominal venter, and metaxyphus keeled.

Professor J. A. De Carlo, 1932, considers Serphus Stål, 1862, Stenoscytus Mayr, 1863, Pedinocoris Mayr, 1863, and Deinostoma Kirkaldy, 1897, congeneric with Abedus Stål.

Key to Species of Abedus Stål

1. Genital operculum entirely pubescent ..... 2  
 Genital operculum bare except at basal angles.... 10
2. (1) Metaxyphus with a definite keel<sup>1</sup> ..... 3  
 Metaxyphus with no definite keel ..... 4
3. (2) Medium to dark-brown species, each caudal fila-  
 ment with no swollen pouch-like structure on  
 dorsal side ..... A. anconai De Carlo  
 (See p. 223)
- Light-brown to grayish-brown species, each caudal  
 filament with a swollen pouch-like structure on  
 dorsal side ..... A. dilatatus (Say)  
 (See p. 225)
4. (2) Fore-tarsal claw no more than two-thirds length  
 of first tarsal segment ... A. indentatus (Haldeman)  
 (See p. 228)
- Fore-tarsal claw four-fifths as long as, or longer  
 than, first tarsal segment ..... 5
5. (4) Metaxyphus not wider than an eye ..... 6  
 Metaxyphus wider than an eye ..... 7
6. (5) Anterior interocular depressions deep, metaxyphus  
 with no indication of a keel ... A. drakei De Carlo  
 (See p. 230)
- Anterior interocular depressions not deep, meta-  
 xyphus with a slight indication of a keel .....  
A. montandoni De Carlo  
 (See p. 232)

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<sup>1</sup>If the metaxyphus has a narrowed longitudinal ridge sufficiently distinct that its width can be accurately measured, it has a definite keel.

7. (5) Prosternal keel with apex uniformly drawn to a point, apex of metaxyphus not tapered to a sharp point ..... A. macronyx (Mayr)  
(See p. 234)
- Not as above ..... 8
8. (7) Very slight indication of a longitudinal carina on head ..... A. mayri De Carlo  
(See p. 237)
- No slight indication of a longitudinal carina on head ..... 9
9. (8) Yellowish-brown, never over 31 mm. long, antennae 3-segmented ..... A. herberti Hidalgo  
(See p. 239)
- Medium or dark-brown, at least 34 mm. long, antennae 4-segmented ..... A. hungerfordi De Carlo  
(See p. 241)
10. (1) Abdominal venter entirely glabrous, or pubescent only along pleural border ..... A. signoreti Mayr  
(See p. 244)
- Abdominal venter pubescent over most of its area. 11
- 11.(10) Narrow, elongated, inverted V-shaped glabrous area on median ridge of abdominal venter.. A. ovatus Stål  
(See p. 248)
- An irregular, broader glabrous area on median ridge of abdominal venter ..... A. breviceps Stål  
(See p. 251)

Abedus anconai De Carlo, 1938

(Plate IX, fig. 2)

1938. Abedus anconai De Carlo, J. A. Rev. Soc. Entom. Argentina, X, No. 1: 43-45, pl. IV, fig. 4, pl. V, figs. 5 & 6.

Size. Length from front of eyes to tip of abdomen 29 mm.; greatest width 16 mm. According to Professor De Carlo, in his original description, total length 30-31 mm.; greatest width 15.7-16.5 mm.

Shape. Body oval with a pronounced curve on lateral margin of hemelytra. Pronotum convex, lateral margin in a straight line.

Color. Dorsal surface: medium-brown. Ventral surface: anterior tibiae crossed by three blackish bands. Abdominal venter, genital operculum, and mesal area of connexivum covered with reddish, medium, or dark-brown hairs.

Structural Characteristics. Antecular portion of head one-half width of interocular space, shorter than greatest length of eye; head slightly longer than median line of pronotum; anterior interocular space over twice as great as length of posterior lobe of pronotum on its median line; jugae almost contiguous in front of clypeus. A depression near anterior inner margin of each eye; eye five-eighths width of interocular space, and slightly longer than wide, its outer and upper margins being convex; length of eye not equal to width of interocular space; antennae three-segmented, second segment with short prolongation. Length of pronotum on median line less than one-half its greatest width.

Posterior femora three-fourths width of anterior femora. First segment of anterior tarsus three-fourths length of second segment. Prosternal keel of medium height, semi-elliptical in shape. Metaxyphus keeled, no wider than eye. Velvety hairs of uniform length completely covering abdominal venter, genital operculum, and mesal area of connexivum. Membrane of hemelytra with several closed cells. No swollen pouch-like structures on dorsal side of each caudal filament.

Comparative Notes. This species greatly resembles A. montandoni De Carlo. It is distinguished by its browner color, larger size, keeled metaxyphus, and head slightly longer than median line of pronotum.

Location of Types. A holotype male, allotype female, and two female paratypes are in the Museo Argentino de Ciencias Naturales in Buenos Aires. The catalogue number is 43,090. These types were collected by Professor Leopoldo Ancona in Zinacantepec, Mexico.

Data on Distribution.

Specimens Observed:

Mexico: Zinacantepec, collector Leopoldo Ancona, 1 female.

Recorded from the Literature:

De Carlo records this species from Zinacantepec, Mexico.

Abedus dilatatus (Say), 1832

(Plate IX, fig. 1)

1832. Belostoma dilatatus Say, T. Heter. New Harmony, p. 38; Fitch Reprint, p. 810, Compl. Writ., I, p. 366.
1849. Zaitha stollii, Herrich-Schäffer, G. A. W. Wanz. Ins., IX: 35-36, pl. CCXCII, figs. 897 & 898.
1862. Serphus dilatatus, Stål, C. Stett. Entom. Zeit., XXIII: 462.
1871. Serphus dilatatus, Mayr, G. L. Verh. Zool.-Bot. Ges. Wien, XXI: 403.
1897. Deinostoma dilatatus, Kirkaldy, G. W. Entomologist, XXX: 258-259.
1901. Deinostoma dilatatus, Champion, G. C. Biol. Centr. Amer., Hem. Het., II: 362, pl. XXI, figs. 18-18a.
1909. Abedus dilatatus, Kirkaldy, G. W. and Torre-Bueno, J. R. de la. Proc. Entom. Soc. Washington, X: 189.
1935. Abedus dilatatus, Hidalgo, J. Univ. of Kansas Sci. Bul., XXII: 502-503, pl. L, fig. 6, pl. LI, fig. 8.
1938. Abedus dilatatus, De Carlo, J. A. An. del Mus. Argentina de C. Nat., XXXIX: 244.

Size. Length from front of eyes to tip of abdomen 28 mm.; greatest width 16 mm.

Shape. Body broadly elliptical to oval with a pronounced curve on lateral margin of hemelytra. Pronotum convex, lateral margin with slightly concave curve or in a straight line.

Color. Dorsal surface: light-brown to dark, grayish-brown. Ventral surface: anterior tibiae crossed by three blackish transverse bands. Abdominal venter, genital operculum and mesal area of connexivum covered with reddish-brown, dark-brown, or yellowish hairs.

Structural Characteristics. Antecular portion of head not greater than five-eighths width of interocular space, shorter than greatest length of eye; head as long as median line of pronotum; anterior interocular space over twice as great as

length of posterior lobe of pronotum on its median line; jugae usually contiguous in front of clypeus. A depression near anterior inner margin of each eye; eye not over two-thirds width of interocular space, and slightly longer than wide, its outer and upper margins being convex; length of eye not equal to width of interocular space. Antennae three-segmented, with or without a definite prolongation from second segment, none from third. Length of median line of pronotum less than one-half its greatest width. Posterior femora at least three-fourths width of anterior femora. First segment of anterior tarsus two-thirds length of second segment. Prosternal keel of medium height, triangular, apex not pointed. Metaxyphus keeled, no wider than an eye. First and second segments of hind tarsus nearly equal in length. Caudal filaments with a swollen-pouch-like structure on dorsal side of each filament. Operculum of female wider than long; that of male longer than wide. Velvety hairs of uniform length covering abdominal venter, genital operculum, and mesal area of connexivum. Closed cells in membrane of hemelytra.

Comparative Notes. This species is a trifle larger than A. signoreti Mayr, A. ovatus Stål, and A. breviceps Stål, but it can be separated from them by the three-segmented antennae with or without a prolongation from the second segment (pl. IV, fig. 1); and the entirely pubescent venter. It differs from A. montandoni De Carlo in having a keeled metaxyphus.

Location of Types. Say, 1832, did not mention types or their

location in his original description of Belostoma dilatatus. Stål, 1862, gave the Stockholm Museum as the location of some specimens of Serphus dilatatus (Say). Mayr, 1871, said six males and five females of this species were in the Stockholm Museum and others were in the Vienna Museum.

Data on Distribution.

Specimens Observed:

Mexico: near Zitacuacuaró, Michoacan, 8-5-1932, Hobart Smith, 1 male; Puebla, Puebla, July 24, 1937, H. D. Thomas, 1 male.

Recorded from the Literature:

Champion records this species from California, and Arizona, U. S. A.; Lower California; Tacubaya, San Bartolo, Puebla, and between Vera Cruz and Jalapa, Mexico.



Abedus indentatus (Haldeman), 1853

(Plate IX, fig. 3)

1853. Zaitha indentata Haldeman, S. S. Proc. Acad. Sci. Philadelphia, VI: 364.
1863. Pedinocoris brachonyx Mayr, G. L. Verh. Zool.-Bot. Ges. Wien, XIII: 351-352, pl. XI, fig. 5.
1871. Pedinocoris brachonyx Mayr, G. L. Verh. Zool.-Bot. Ges. Wien, XXI: 405.
1877. Abedus indentatus, Uhler, P. R. Wheeler's Rept. Chief Eng., p. 1331.
1909. Abedus indentatus, Kirkaldy, G. W. and Torre-Bueno, J. R. de la. Proc. Entom. Soc. Washington, X: 189.
1935. Abedus indentatus, Hidalgo, J. Univ. of Kansas Sci. Bul., XXII: 506-507, pl. L, fig. 3, pl. LI, fig. 3.
1938. Abedus indentatus, De Carlo, J. A. An. del Mus. Argentina de C. Nat., XXXIX: 246.

Size. Length from front of eyes to tip of abdomen 35 mm.; greatest width 20 mm.

Shape. Body oval with pronounced curve on lateral margin of hemelytra. Pronotum convex, lateral margin in a straight line.

Color. Dorsal surface: yellowish-brown. Membrane of hemelytra medium-brown. Ventral surface: anterior tibiae crossed by three blackish transverse bands. Abdominal venter covered with dark-brown, reddish hairs.

Structural Characteristics. Antecular portion of head about three-fifths width of interocular space, shorter than greatest length of eye; head as long as median line of pronotum; jugae not contiguous in front of clypeus. A slight depression on anterior inner margin of each eye; eye two-thirds width of interocular space, and longer than wide, its outer and upper margins being very convex; length of eye not equal to width of interocular space. Antennae

long and broad, a short prolongation from second and third segments. Length of pronotum on median line no more than three-eighths its greatest width. Posterior femora seven-eighths width of anterior femora. First segment of anterior tarsus not over two-thirds length of second segment. Prosternal keel high; its tip blunt. Metaxyphus slightly elevated, wider than eye. First segment of hind tarsus shorter than second segment. Operculum of female wider than long. Abdominal venter, genital operculum, and entire mesal area of connexivum covered with velvety hairs. Membrane of hemelytra with closed cells. No swollen pouch-like structure on dorsal side of each caudal filament.

Comparative Notes. This species differs from A. macronyx (Mayr) and A. hungerfordi De Carlo in having the fore-tarsal claw no more than two-thirds the length of the first tarsal segment of the anterior tarsus. It differs also by the antennal characters, (pl. IV, fig. 3).

Location of Types. The type Abedus indentatus (Haldeman) is well preserved in the Philadelphia Academy of Natural Science Collection, Philadelphia, Pa. The type is No. 9002 in the collection, bears the label Calif. 102" and has no date. I am indebted to Mr. John C. Lutz of Philadelphia, Pa., for the above information.

Data on Distribution. The writer has seen only one specimen, a female, in the F. H. Snow Entomological Collections, It bears the label Ft. Grant, Arizona; 7-18-17.

Abedus drakei De Carlo, 1938

(Plate IX, fig. 9)

1938. Abedus drakei De Carlo, J. A. Rev. Soc. Entom. Argentina, X, No. 1: 41-43, pl. IV, fig. 1, pl. V, figs. 2 & 3.

Size. Greatest length 33.5-34.5 mm.; greatest width 18.6-19 mm.

Shape. Body oval with a pronounced curve on lateral margin of hemelytra. Pronotum slightly convex, lateral margin nearly in a straight line.

Color. Dorsal surface: medium-brown. Scutellum a darker brown. Head, pronotum, and scutellum covered with many dark-brown splotches. Ventral surface: anterior tibiae crossed by three blackish transverse bands. Abdominal venter, genital operculum, and mesal area of connexivum covered with dark-brown, velvety hairs.

Structural Characteristics. Antecular portion of head less than five-eighths width of interocular space, shorter than greatest length of eye; head as long as median line of pronotum; anterior interocular space greater than twice the length of posterior lobe of pronotum on its median line; jugae not contiguous in front of clypeus. A depression near anterior inner margin of each eye; eye three-fifths width of interocular space, and slightly longer than wide, its outer and upper margins being very convex; length of eye not equal to width of interocular space. Antennae three-segmented, a short prolongation from second segment. Length of pronotum on median line less than one-half its greatest

width. Posterior femora over four-fifths width of anterior femora. First segment of anterior tarsus three-fifths length of second segment. Prosternal keel of medium height and blunt at its apex. Metaxyphus very convex and raised, as wide as eye. First segment of hind tarsus shorter than second segment. Visible veins on clavus and corium. Membrane of hemelytra with several closed cells.

Comparative Notes. This species is larger than A. dilatatus (Mayr) and does not possess a keeled metaxyphus. It is smaller than A. macronyx (Mayr), larger than A. montandoni De Carlo, and has second segment of antennae with a different shape. It differs from A. herberti Hidalgo, A. ovatus Stål and A. indentatus (Haldeman) in not having the third segment of antennae divided at the base.

Location of Types. A holotype male, allotype female, and one paratype male are in the Argentina Museum of Natural Science, Buenos Aires, Argentina. Their catalogue number is 43,068. A male paratype is in the F. H. Snow Entomological Collections, University of Kansas, Lawrence, Kansas.

Data on Distribution. The type specimens were caught in one locality, Huachua Mts., Arizona, August 1934, by Carl J. Drake.

Abedus montandoni De Carlo, 1932

(Plate IX, fig. 7)

1932. Abedus montandoni, De Carlo, J. A. Rev. Soc. Entom. Argentina, No. 22: 121-123, pl. V, figs. 5-6.  
 1935. Abedus montandoni, Hidalgo, J. Univ. of Kansas Sci. Bul., XXII: 504-505, pl. L, fig. 5, pl. LI, fig. 5.  
 1938. Abedus montandoni, De Carlo, J. A. An. del Mus. Argentina de C. Nat., XXXIX: 245, pl. II, fig. 32, pl. VIII, fig. 78.

Size. Length from front of eyes to tip of abdomen 27 mm., greatest width 15.5 mm. According to Professor De Carlo, greatest length 27-29 mm., greatest width 15-16 mm.

Shape. Body oval with pronounced curve on lateral margin of hemelytra. Pronotum convex, lateral margin slightly concave.

Color. Dorsal surface: grayish-brown. Ventral surface: anterior tibiae crossed by three blackish transverse bands. Abdominal venter, genital operculum, and mesal area of connexivum covered with dark-brown or reddish, velvety hairs.

Structural Characteristics. Antecular portion of head one-half width of interocular space, shorter than greatest length of eye; head nearly as long as median line of pronotum; anterior interocular space over twice as great as length of posterior lobe of pronotum on its median line; jugae not contiguous in front of clypeus. A depression near anterior inner margin of each eye; eye five-eighths width of interocular space, and slightly longer than wide, its outer and upper margins being convex. Length of eye not equal to width of interocular space. Antennae three-segmented, second segment with short prolongation. Length

of pronotum on median line less than one-half its greatest width. Posterior femora three-fourths width of anterior femora. First segment of anterior tarsus two-thirds length of second segment. Prosternal keel of medium height, apex almost pointed. Metaxyphus elevated and a trace of a keel, no wider than an eye. Velvety hairs of uniform length completely covering abdominal venter, genital operculum, and mesal area of connexivum. Membrane of hemelytra with closed cells. Caudal filaments without swollen pouch-like structure on dorsal side of each.

Comparative Notes. This species is similar in size to A. breviceps Stål, A. ovatus Stål, and A. signoreti Mayr but it can be separated from them by its metaxyphus which is not strongly keeled and its entirely pubescent abdominal venter.

Location of Types. Holotype male, allotype female, eight paratypes; Zinacantepec, Mexico, A. Spegazzini, collector. The holotype, allotype, and seven paratypes are in the Natural Science Museum of Buenos Aires, Argentina with the catalogue no. 30432. One male paratype is in the F. H. Snow Entomological Collections, University of Kansas, Lawrence, Kansas.

Data on Distribution.

Mexico: Zinacantepec, A. Spegazzini, collector, 1 male.

Abedus macronyx (Mayr), 1863

(Plate IX, fig. 4)

1863. Pedinocoris macronyx Mayr, G. L. Verh. Zool.-Bot. Ges. Wien, XIII: 350-351, pl. XI, figs. 1-4.  
 1871. Pedinocoris macronyx Mayr, G. L. Verh. Zool.-Bot. Ges. Wien, XXI: 405.  
 1901. Pedinocoris macronyx, Champion, G. C. Biol. Centr. Amer., Hem. Het., II: 364, pl. 21, fig. 22.  
 1909. Abedus macronyx, Kirkaldy, G. W. and Torre-Bueno, J. R. de la. Proc. Entom. Soc. Washington, X: 189.  
 1935. Abedus macronyx, Hidalgo, J. Univ. of Kansas Sci. Bul., XXII: 503-504, pl. L, fig. 2.  
 1938. Abedus macronyx, De Carlo, J. A. An. del Mus. Argentina de C. Nat., XXXIX: 244-245.

Size. Length from front of eyes to tip of abdomen 36-37 mm.; greatest width 21.5-22.0 mm.

Shape. Body broadly oval with a pronounced curve on lateral margin of hemelytra. Pronotum convex, lateral margin nearly in a straight line.

Color. Dorsal surface: yellowish-brown, with head, pronotum, and scutellum a darker brown. Ventral surface: anterior tibiae crossed by three blackish transverse bands. Abdominal venter, genital operculum, and mesal area of connexivum covered with reddish-brown hairs.

Structural Characteristics. Antecular portion of head not quite three-fifths width of interocular space, nearly as long as greatest length of eye; head nearly as long as median line of pronotum; anterior interocular space over twice length of posterior lobe of pronotum on its median line; jugae not contiguous or contiguous in front of clypeus. A definite depression on anterior inner margin of each eye; eye not over three-fifths width of interocular space, and

longer than wide, its outer and upper margins being very convex; length of eye not equal to width of interocular space. Antennae three-segmented, long, broad, no prolongation from any segment, or a short prolongation from the second segment. Length of pronotum on median line less than one-half its greatest width. Posterior femora four-fifths width of anterior femora. First segment of anterior tarsus two-thirds length of second segment. Prosternal keel high, triangular, pointed apex. Metaxyphus elevated but not keeled; wider than eye; apical portion approaching a ninety degree angle. First segment of hind tarsus shorter than second segment. Operculum of female wider than long; that of male longer than wide. Uniform length hairs covering abdominal venter, genital operculum, and entire mesal area of connexivum. Membrane of hemelytra with several closed cells.

Comparative Notes. This largest species of the genus can be separated from the other large species, A. indentatus (Haldeman) and A. hungerfordi De Carlo, by antennal and fore-tarsal characters, pl. IV, fig. 4.

Location of Types. In the Museum of Vienna. Type locality is California.

Data on Distribution.

Specimens Observed:

Arizona: Aug. 1902, F. H. Snow, 1 male; Oak Cr. Canyon, 7-9-41, Burt Hodgden, 1 female, (Univ. of Kansas).

Prescott, 1 female, (Amer. Mus. Nat. Hist.).

New Mexico: Silver City, 7-22-36, M. B. Jackson, 1 male.



Recorded from the Literature:

Mayr. records this species from California.

Champion lists Rio Mescales, Cuesta de Miscantla,  
and Jalapa, Mexico; Lower California.

Hidalgo reports Arizona.

Abedus mayri De Carlo, 1947

(Plate IX, fig. 8)

The original description had not been printed at the date of this writing.

Size. Length from front of eyes to tip of abdomen 31 mm., greatest width 17 mm. (I have examined one specimen, the male holotype.)

Shape. Body oval with a pronounced curve on lateral margin of hemelytra. Pronotum slightly convex, lateral margin slightly concave.

Color. Dorsal surface: head, pronotum, and scutellum dark-brown; remaining portion medium-brown. Ventral surface: anterior tibiae crossed by three blackish transverse bands. Abdominal venter, genital operculum, and mesal area of connexivum covered with dark-brown, velvety hairs.

Structural Characteristics. Antecular portion of head about five-eighths width of interocular space, shorter than greatest length of eye; head almost as long as median line of pronotum; anterior interocular space twice as great as length of posterior lobe of pronotum on its median line; slight indication of a longitudinal carina on head and anterior portion of pronotum; jugae not contiguous in front of clypeus. A depression near anterior inner margin of each eye; eye three-fifths width of interocular space, and longer than wide, its outer and upper margins being convex; length of eye not equal to width of interocular space. Antennae four-segmented, second and third segments with long, curved.

prolongation. Length of pronotum on median line less than one-half its greatest width. Posterior femora eleven-twelfths, or nearly the same width, as anterior femora. First segment of anterior tarsus two-thirds length of second segment. Prosternal keel high, apex rounded. Metaxyphus elevated but not keeled, wider than an eye. First segment of hind tarsus shorter than second segment. Operculum of male longer than wide. Velvety hairs of uniform length completely covering abdominal venter, genital operculum, and mesal area of connexivum. Membrane of hemelytra with a number of closed cells.

Comparative Notes. This species resembles A. drakei De Carlo but is smaller and has four-segmented antennae.

Location of Types. The F. H. Snow Entomological Collections is indebted to Professor José A. De Carlo for the male holotype specimen.

Data on Distribution. The holotype specimen bears the label Riverside, Cal., Aug. 16, 1937, Drake & Andre.

Abedus herberti Hidalgo, 1935

(Plate IX, fig. 5)

1935. Abedus herberti Hidalgo, J. Univ. of Kansas Sci. Bul., XXII: 507-508, pl. L, fig. 1, pl. LI, fig. 1.  
 1938. Abedus herberti, De Carlo, J. A. An. del Mus. Argentina de C. Nat., XXXIX: 247, pl. II, fig. 33.

Size. Length from front of eyes to tip of abdomen 28-29 mm.; greatest width 16 mm.

Shape. Body broadly elliptical to oval with a pronounced curve on lateral margin of hemelytra. Pronotum convex, lateral margin slightly concave.

Color. Dorsal surface: yellowish-brown. Ventral surface: anterior tibiae crossed by three dark-brown, transverse bands. Abdominal venter, genital operculum, and mesal area of connexivum covered with brownish or reddish, velvety hairs.

Structural Characteristics. Antecular portion of head not greater than five-eighths width of interocular space, shorter than greatest length of eye; head shorter than median line of pronotum; anterior interocular space twice as great as length of posterior lobe of pronotum on its median line; jugae almost contiguous to contiguous in front of clypeus. A depression near anterior inner margin of each eye; eye three-fifths width of interocular space, and slightly longer than wide, its outer and upper margins being convex; length of eye not equal to width of interocular space. Antennae three-segmented; a short, straight prolongation from second and third segments. Length of median line of pronotum less

than one-half its greatest width. Posterior femora three-fourths width of anterior femora. First segment of anterior tarsus two-thirds length of second segment. Prosternal keel of medium height, apex blunt. Metaxyphus elevated but not keeled, as wide as eye. First segment of hind tarsus shorter than second segment. Operculum of female wider than long; that of male longer than wide. Velvety hairs of uniform length completely covering abdominal venter, genital operculum, and mesal area of connexivum. Membrane of hemelytra with closed cells. A swollen pouch-like membrane on dorsal side of each caudal filament.

Comparative Notes. This species may be separated from A. ovatus Stål, A. signoreti Mayr, and A. brevicens Stål by the antennae, pl. IV, fig. 5, and by not having a metaxyphus with a keel.

Location of Types. Holotype male; allotype female; five paratypes, Tucson, Arizona, F. H. Snow, collector. These types are located in the Francis Huntington Snow Entomological Collections, the University of Kansas, Lawrence, Kansas.

Data on Distribution.

Specimens Observed:

Arizona: Tucson, F. H. Snow, collector, 3 males, 9 females; Bill Wms. Fork, Sept. F. H. Snow, 2 females, (Univ. of Kansas). Pima Co., Santa Rita Mts., Madera Canyon, VI-20-1936, P. M. Blossom, one male, (Univ. of Mich.)

Abedus hungerfordi De Carlo, 1932

(Plate IX, fig. 6)

1932. Abedus hungerfordi De Carlo, J. A. Rev. Soc. Entom. Argentina, No. 22: 123-124, pl. V, figs. 3 & 4.  
1935. Abedus hungerfordi, Hidalgo, J. Univ. of Kansas Sci. Bul., XXII: 505-506, pl. L, fig. 9, pl. LI, fig. 6.  
1938. Abedus hungerfordi De Carlo, J. A. An. del Mus. Argentina de C. Nat., XXXIX: 245-246, pl. II, fig. 31, pl. VIII, fig. 79.

Size. Length from front of eyes to tip of abdomen 32-35 mm.; greatest width 18.5-19.5 mm.

Shape. Body oval with a pronounced curve on lateral margin of hemelytra. Pronotum convex, lateral margin slightly concave.

Color. Dorsal surface: light-brown, dark-brown, or grayish-brown. Pronotum and scutellum a dark-brown color. Ventral surface: anterior tibiae crossed by three blackish transverse bands. Abdominal venter, genital operculum, and mesal area of connexivum covered with velvety dark-brown or reddish hairs.

Structural Characteristics. Antecular portion of head much shorter than width of interocular space, shorter than greatest length of eye; head not quite as long as median line of pronotum; anterior interocular space over twice the length of posterior lobe of pronotum on its median line; Jugae almost contiguous in front of clypeus. A depression near anterior inner margin of each eye; eye a trifle over one-half width of interocular space, and longer than wide, its outer and upper margins being very convex; length of eye not equal to width of interocular space. Antennae four-

segmented; second and third segments each with a long, curved prolongation. Length of pronotum on median line less than one-half its greatest width. Posterior femora at least three-fourths width of anterior femora. First segment of anterior tarsus two-thirds length of second segment. Prosternal keel of medium height; apex blunt and curved anteriorly. Metaxyphus broadly elevated but not keeled, wider than an eye. First segment of hind tarsus shorter than second. Operculum of female wider than long; that of male longer than wide. Hairs of uniform length covering abdominal venter, genital operculum, and mesal area of connexivum. Membrane of hemelytra with many closed cells. No swollen pouch-like structure on dorsal side of each caudal filament.

Comparative Notes. This species is separated from A. macronyx (Mayr) and A. indentatus (Haldeman) by the four-segmented antennae, width of interocular space 1.5 times length of eye, and metaxyphus with sharp, tapering tip.

Location of Types. Holotype male; allotype female; seven paratypes; Alpine, California, July 7, 1929, L. D. Anderson, collector. A holotype, an allotype, and four female paratypes are located in the Francis Huntington Snow Entomological Collections, University of Kansas, Lawrence, Kansas. Three other paratypes, at least one of them a male, are located in the Museum of Natural Science of Buenos Aires, Argentina, catalogued under number 30433.

Data on Distribution.Specimens Observed:

California: Alpine, July 7, 1929, L. D. Anderson, 4 males, 7 females, R. H. Beamer, 1 male, 2 females; Laguna Mts., 1929, L. D. Anderson, 1 female; San Diego Co., 1929, R. H. Beamer, 2 males, 1 female; Campo, 1932, H. W. Capps, 1 male, 2 females; Indio, 1929, P. W. Oman, 1 male, 1 female; Boulevard, 7-26-38, D. W. Craik, R. I. Sailer, 1 male, 1 female; Warner Springs, 7-28-38, D. W. Craik, 1 male; Juncumba, 7-17-40, L. C. Kuitert, 5 males, 6 females.

Arizona: Santa Rita Mts., F. H. Snow, 7 males, 1 female; 1932, R. H. Beamer, 5 males, 9 females; 1929, L. D. Anderson, 2 males, 7 females; 8-1-44, Burt Hodgden, w males, 3 females; Huachuca Mts., 1927, R. H. Beamer, 1 male; Yavapai Co., 1927, P. A. Readio, 2 males, 3 females; Chiricahua Mts., 1932, R. H. Beamer, 2 males, 2 females; Pima Co., 1927, P. A. Readio, 1 male; Gila Co., 1927, P. A. Readio, 1 female; Madera Canyon, 1932, Painter, 3 males.

Recorded from the Literature.

De Carlo records this species from California.



Abedus signoreti Mayr, 1871

(Plate IX, fig. 10)

1871. Abedus signoreti Mayr, G. L. Verh. Zool.-Bot. Ges. Wien, XXI: 404-405.
1871. Abedus vicinus Mayr, G. L. Verh. Zool.-Bot. Ges. Wien, XXI: 405.
1901. Abedus signoreti, Champion, G. C. Biol. Centr. Amer., Hem. Net., II: 363, pl. 21, fig. 21. (Says A. vicinus Mayr is a synonym.)
1909. Abedus signoreti, Kirkaldy, G. W. and Torre-Bueno, J. R. de la. Proc. Entom. Soc. Washington, X: 190.
1935. Abedus signoreti, Hidalgo, J. Univ. of Kansas Sci. Bul., XXII: 498-499, pl. XLIX, fig. 2, pl. L, fig. 7, pl. LI, fig. 4.
1938. Abedus signoreti, De Carlo, J. A. An. del Mus. Argentina de C. Nat., XXXIX: 242.

Size. Length from front of eyes to tip of abdomen 22.0-25.5 mm.; greatest width 12-14 mm.

Shape. Body broadly elliptical to oval with a pronounced curve on lateral margin of hemelytra. Pronotum usually very convex, lateral margin concave.

Color. Dorsal surface: light- to dark-brown, membrane as dark as any other part of body. Ventral surface: anterior tibiae crossed by three faint, dark-brown, transverse bands. Abdominal venter yellow to medium-brown, often spotted with brown. Mesal area of connexivum with light- to dark-brown hairs.

Structural Characteristics. Antecular portion of head much shorter than width of interocular space, shorter than greatest length of eye; head shorter than median line of pronotum; anterior interocular space greater than length of posterior lobe of pronotum on its median line; jugae not contiguous to contiguous in front of clypeus. A definite

depression on anterior inner margin of each eye; eye three-fourths width of interocular space, and slightly longer than wide, its outer and upper margins being very convex; length of eye not equal to width of interocular space. Antennae usually four-segmented; second and third segments each with a long, curved prolongation. Length of pronotum on median line less than one-half its greatest width. Posterior femora three-fourths width of anterior femora. First segment of anterior tarsus two-thirds length of second segment. Prosternal keel high, narrow, pointed at tip. Metaxyphus strongly keeled and about the same width as eye. First segment of hind tarsus shorter than second segment. Operculum of female wider than long; that of male longer than wide. Hairs of uniform length covering entire mesal area of connexivum and bordering basal two-thirds of genital operculum. Abdominal venter glabrous. Membrane of hemelytra with several closed cells.

Comparative Notes. This species is similar in size to A. ovatus Stål and A. breviceps Stål. It can be separated from them by the glabrous abdominal venter and antennal characters shown in plate IV, figs. 10 & 13.

Location of Types. Mayr (1871: 405) did not designate any types in his original description. He stated that two specimens from Mexico were in the Stockholm Museum and one from Guatemala was in the collection of Signoret. Champion (1901: 363) said: "With types of A. signoreti and A. vicinus before me, I am unable to distinguish more than one species.

The slight differences mentioned by Mayr are probably sexual; in the male the lateral portions of the sixth ventral segment (as well as the median) are longer than in the female, and this would account for the somewhat different position of the spiracles."

Dr. H. B. Hungerford examined material in entomological museums in Europe in 1928. He agrees with Champion, 1901, that A. vicinus Mayr and A. signoreti Mayr are the same species.

Data on Distribution.

Specimens Observed:

Mexico: Rio de las Balsas, Guerrero, 6-24-32, Hobart Smith, 2 males, 2 females; Colima, 1929, Dr. O. Staudinger, 1 female; El Sabino, Uruapan, Mich., 7-20-36, H. D. Thomas, 18 males, 24 females; Tecolotlan, Jalisco, Sept. 15-38, H. D. Thomas, 6 males, 10 females; Palmar District, Alamos Sonora, 10-27-34, H. S. Gentry, 1 male; Corriente, 8-24-37, H. D. Thomas, 7 males, 11 females; Cuernavaca, Morelas, 10-5-36, H. D. Thomas, 1 male, 2 females; Guerrero, Tierra Colo., kil. 377 S. Mex. City, 10-31-36, H. D. Thomas, 1 male; Oaxaca, St. of Oaxaca, 5000 ft. semi-desert, Irrig. ld., Semitrop., Aug. 20, 1937, Meldon Embury, 2 females, (Univ. of Kansas). La Esperanza, Chiapas, April-May 1940, H. M. Smith, 1 male; Cuernavaca, Morelos; XI-6-1944, 1 male, (U. S. N. M.). Sonora, 2 males; Cordoba, 1 female, (Amer. Mus. Nat. Hist.). Nogales Nacimiento, Rio Sabines, Mar. 30, 1938, E. G. Marsh, Jr., 1 male, (Univ. of Mich.).

Guatemala: El Salto Escuintla, 1934, F. X. Williams, 2 males,  
1 female.

Costa Rica: San Jose, Aug. 7, 1931, H. Schmidt, 10 males,  
19 females; Rio Virilla, 1931, H. Schmidt, 11 males, 19  
females.

Panama: Chiriqua, 1912, Staudinger, 6 males, 1 female.

Abedus ovatus Stål, 1862

(Plate IX, fig. 11)

1862. Abedus ovatus Stål, C. Stett. Entom. Zeit., XXIII: 461.
1863. Stenoscytus mexicanus Mayr, G. L. Verh. Zool.-Bot. Ges. Wien, XIII: 347, pl. XI, figs. 6-10.
1871. Abedus ovatus, Mayr, G. L. Verh. Zool.-Bot. Ges. Wien, XXI: 404. (Puts S. mexicanus Mayr in synonymy.)
1901. Abedus ovatus, Champion, G. C. Biol. Centr. Amer., Hem. Het., II: 363, pl. 21, fig. 19.
1909. Abedus ovatus, Kirkaldy, G. W. and Torre-Bueno, J. R. de la. Proc. Entom. Soc. Washington, X: 189.
1935. Abedus ovatus, Hidalgo, J. Univ. of Kansas Sci. Bul., XXII: 499-500, pl. XLIX, fig. 1, pl. L, fig. 4, pl. LI, fig. 7.
1938. Abedus ovatus, De Carlo, J. A. An. del Mus. Argentina de C. Nat., XXXIX: 243.

Size. Length from front of eyes to tip of abdomen 21.5-25.0 mm.; greatest width 13-15 mm.

Shape. Body oval with a pronounced curve on lateral margin of hemelytra. Pronotum convex, lateral margin straight or slightly concave.

Color. Dorsal surface: light- to dark-brown, some specimens approaching a gray or yellowish color. Ventral surface: anterior tibiae crossed by three dark-brown, transverse bands; similar bands often seen on median and posterior tibiae.

Structural Characteristics. Antecular portion of head one-half width of interocular space, shorter than greatest length of eye; head nearly as long as, or as long as, length of median line of pronotum; anterior interocular space twice as great as length of posterior lobe of pronotum on its median line; jugae not contiguous in front of clypeus. A definite depression on anterior inner margin of

each eye; eye about three-fourths width of interocular space, and as wide as long, its outer and upper margins being very convex; length of eye not equal to width of interocular space. Antennae three or four-segmented; a short, straight prolongation from second and third segments. Length of pronotum on median line less than one-half its greatest width. Posterior femora at least four-fifths width of anterior femora. First segment of anterior tarsus at least two-thirds length of second segment. Prosternal keel high; posterior side in a straight line; tip blunt or sharp. Metaxyphus strongly keeled, less than width of eye. First segment of hind tarsus shorter than second segment. Operculum of female wider than long; that of male longer than wide. Only an inverted V-shaped area along median ridge of abdominal venter and genital operculum devoid of hairs. Membrane of hemelytra with no closed cells. A swollen pouch-like membrane on dorsal side of each filament.

Comparative Notes. This species is similar in size to A. signoreti Mayr and A. breviceps Stål. It differs in having a narrow, elongated, inverted V-shaped glabrous area along median ridge of abdominal venter and a short, straight, prolongation from second and third antennal segments.

Location of Types. Stål (1862: 461) did not designate types in his original description. He stated that the specimens are in the Stockholm Museum and in the collection of Signoret. Mayr (1871: 404) said that specimens of Abedus ovatus Stål from Mexico are in the Museums of Stockholm

and Vienna in the collections of Signoret, Fleber, and Mayr. Dr. H. B. Hungerford has the following to say about a specimen in the Stockholm Museum: "The specimen has an old paper label 'ovatus Stål' 'Mexico' 'Sigt.' It must be the type."

Data on Distribution.

Specimens Observed:

Mexico: San Cristobal, 3-7-1929, 2 males; Real de Arriva District of Temascaltepec, Alt. 1960 meters, May-June 1933, H. E. Hinton, 4 males, 7 females; San Cristobal, Chiapas, Sept. 2, 1937, H. D. Thomas, 10 males, 17 females; Chiapas Mt. Obando, Quiet pool of small swift stream, Elev. 3000 ft., April 15, 1940, No. 418, H. M. Smith, 1 female.

Recorded from the Literature:

Champion lists Arizona and Texas, U. S. A.; Lower California; Guerrero and Jalapa, Mexico.

Abedus breviceps Stål, 1862

(Plate IX, fig. 12)

1862. Abedus breviceps Stål, C. Stett. Entom. Zeit., XXIII: 462.
1871. Abedus breviceps, Mayr, G. L. Verh. Zool.-Bot. Ges. Wien, XXI; 404.
1901. Abedus breviceps, Champion, G. C. Biol. Centr. Amer., Hem. Het., II: 363, pl. 21, figs. 20, 20a.
1909. Abedus breviceps, Kirkaldy, G. W. and Torre-Bueno, J. R. de la. Proc. Entom. Soc. Washington, X: 189.
1935. Abedus breviceps, Hidalgo, J. Univ. of Kansas Sci. Bul., XXII: 501-502, pl. XLIX, fig. 3, pl. L, fig. 8, pl. LI, fig. 2.
1938. Abedus breviceps, De Carlo, J. A. An. del Mus. Argentina de C. Nat., XXXIX: 242-243, pl. II, fig. 21, pl. VIII, fig. 77.

Size. Length from front of eyes to tip of abdomen 25-27 mm., greatest width 14-16.5 mm.

Shape. Body broadly elliptical to oval with a pronounced curve on lateral margin of hemelytra. Pronotum quite convex, slightly concave on lateral margin.

Color. Dorsal surface: light- to dark-brown; scutellum usually a reddish-brown. Ventral surface: anterior tibiae crossed by three dark-brown, transverse bands. Reddish-yellow to reddish-brown hairs cover outer margin of abdominal venter and entire mesal area of connexivum.

Structural Characteristics. Antecular portion of head less than one-half width of interocular space, shorter than greatest length of eye; head shorter than median line of pronotum; anterior interocular space greater than length of posterior lobe of pronotum on its median line; jugae not contiguous in front of clypeus. A definite depression on anterior inner margin of each eye; eye at least five-sixths



width of interocular space, as wide as long, outer and upper margins very convex; length of eye not equal to width of interocular space. Antennae three or four-segmented; a long, curved prolongation from second and third segments. Length of pronotum on median line less than one-half its greatest width. Posterior femora nearly as wide as anterior femora. First segment of anterior tarsus three-fifths length of second segment. Prosternal keel high, triangular, tip blunt. Metaxyphus strongly keeled, narrower than eye. First segment of hind tarsus shorter than second segment. Operculum of female wider than long, that of male longer than wide. Hairs of uniform length on outer portion of abdominal venter, mesal area of connexivum, and bordering basal two-thirds of genital operculum. A glabrous area present along median ridge of abdominal venter. Membrane of hemelytra with a few closed cells. Caudal filaments with no swollen pouch-like membrane on dorsal side of each.

Comparative Notes. This species is similar in size to A. signoreti Mayr and A. ovatus Stål but differs in having the abdominal venter glabrous only along the median ridge and antennae as shown in plate IV, figs. 12 & 15.

Location of Types. Stål (1862: 462) did not designate types in his original description. He stated that the specimens were in the Stockholm Museum and in the collection of Signoret. Mayr (1871: 404) said that specimens of Abedus breviceps Stål from Mexico were in the Stockholm Museum in the collection of Signoret and in the Vienna

Museum. Dr. Hungerford, 1928, compared specimens of A. breviceps Stål from the F. H. Snow Entomological Collections with specimens in the museums at Stockholm and Vienna.

Data on Distribution.

Specimens Observed:

United States. Arizona: Cochise Co., 7-29-1927, L. D.

Anderson, 1 male, (Univ. of Kansas).

Yavapai Co., Camp Verde, IX-2-1938, C. L. Hubbs Family, 1 male, 1 female; Tonto Creek, 8-15-1926, Hubbs-Schultz, 1 female, (Univ. of Mich.).

Texas: Valentino, July 13, 1927, L. D. Anderson, 1 male, 3 females, R. H. Beamer, 1 male, 2 females, (Univ. of Kansas).

Brewster Co., Chisos Mts., VII-13-1930, Leonora K. Gloyd, 1 male, (Univ. of Mich.).

Mexico: Tejupilo, May-June, 1933, H. E. Hinton, 4 males, 14 females; Tarandacua, 8-26-1932, Hobart Smith, 1 male; San Antonio, 7-15-27, P. A. Readio, 2 males, 2 females, L. D. Anderson, 3 males, 2 females, L. Stevenson, 2 females; Real de Arriva District of Tema-scaltepec, May-June, 1933, H. E. Hinton, 1 male, 2 females; Saltillo, H. D. Thomas, 3 females; 20 m. E. of Zitacuaro, 9-19-38, H. D. Thomas, 1 male, 2 females; Morelos, 7-14-36, H. D. Thomas, 1 male, 1 female; Morelian Michoacan, 9-6-38, H. D. Thomas, 6 males, 3 females.

Recorded from the Literature:

De Carlo records this species from San Antonio, Mex.

Champion lists Cuernavaca, Mexico.

## DISTRIBUTION OF SPECIES

Species of the family Belostomatidae are found in both the Western and Eastern Hemispheres. Only one genus, Lethocerus Mayr, is found in both hemispheres. The known ranges of the genera in the Western Hemisphere are shown on the distributional maps which follow. The letters on these maps indicate the locations where material has been collected. Many more data are needed, in some species, to determine the extreme limits of the range. Published records are indeed scanty for the genus Horvathinia Montandon; only six specimens of five species have been collected. All of these came from South America, Horvathinia pelocoroides Montandon from Minas Gerais in Brazil to Horvathinia doello-juradoi De Carlo in Gobernacion de Chubut, Argentina, Distribution Map 1.

Lethocerus Mayr, in the Western Hemisphere, ranges from Connecticut, U. S. A. to Buenos Aires, Argentina. L. delpontei De Carlo has the largest geographic range, being found from the southern part of the United States to Paraguay, South America. L. americanus (Leidy) and L. uhleri (Montandon) are the only species of Lethocerus restricted to the United States. L. collosicus (Stål) is found in Mexico and the West Indies, L. angustipes (Mayr) in Mexico only. L. medius (Guérin-Méneville) and L. curtus (Guérin-Méneville) were reported from Cuba. L. annulipes

(Herrich-Schäffer), L. truncatus Cummings, L. mello-leitaoi De Carlo, L. maximus De Carlo, L. grandis (Linnaeus), L. bruchi De Carlo, L. dilatatus Cummings, and L. camposi (Montandon) are found only in South America.

Benacus griseus (Say), the only species of its genus, is numerous in the eastern states, particularly Pennsylvania. It is found in twelve other states, also Mexico, and Cuba.

Belostoma Latreille has been collected from Maine, U. S. A. to Buenos Aires, Argentina. B. boscii (Le Peletier and Serville) has the most extensive geographic distribution, being found in North, Central, and South America; B. micantulum (Stal) is found in Mexico and South America; B. porterii in Panama and Venezuela; B. ellipticum Latreille, B. minor (Palisot de Beauvois), and B. subspinosum (Palisot de Beauvois) in Cuba; B. apache Kirkaldy and B. minutum n. sp. in Mexico; B. fusciventre (Dufour) in Mexico and the United States; B. bakeri Montandon, B. flumineum Say, B. lutarium (Stal), B. testaceum (Leidy), and B. penabedum n. sp. in the United States only. The remaining thirty species of Belostoma are found only in South America.

Abedus Stål is generally distributed in the southwestern states, Mexico, and Central America.

## DISTRIBUTIONAL MAP 1

Map showing localities in which the species of  
Horvathinia Montandon have been collected.

- A Horvathinia pelocoroides Montandon
- B Horvathinia pelleranoi De Carlo
- C Horvathinia doello-juradoi De Carlo
- D Horvathinia castilloi De Carlo
- E. Horvathinia meyeri De Carlo

# DISTRIBUTIONAL MAP 1



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## DISTRIBUTIONAL MAP 2

Map showing localities in which the species of Benacus Stal and the following species of Lethocerus Mayr have been collected.

- A Benacus griseus (Say)
- B Lethocerus americanus (Leidy)
- C Lethocerus delpontei De Carlo (See Map 3)
- D Lethocerus collosicus (Stål)
- E Lethocerus angustipes (Mayr)
- F Lethocerus uhleri (Montandon)
- G Lethocerus medius (Guérin-Méneville)
- H Lethocerus curtus (Guérin-Méneville)

# DISTRIBUTIONAL MAP 2





## DISTRIBUTIONAL MAP 3

Map showing localities in which the following species of Lethocerus Mayr have been collected.

- A. Lethocerus truncatus Cummings
- B. Lethocerus bruchi De Carlo
- C. Lethocerus delponteii De Carlo (See Map 2)
- D. Lethocerus mello-leitaoi De Carlo
- E. Lethocerus dilatatus Cummings
- F. Lethocerus annulipes (Herrich-Schäffer)
- G. Lethocerus maximus De Carlo
- H. Lethocerus camposi (Montandon)
- I. Lethocerus grandis (Linnaeus)

# DISTRIBUTIONAL MAP 3



## DISTRIBUTIONAL MAP 4

Map showing localities in which the following species of Belostoma Latreille have been collected.

- A Belostoma testaceum (Leidy)
- B Belostoma penabedum n. sp.
- C Belostoma lutarium (Stål)
- D Belostoma bakeri Montandon
- E Belostoma flumineum Say
- F Belostoma boscii (Lepelletier and Serville)  
(See Map 5)
- G Belostoma ellipticum Latreille
- H Belostoma fusciventre (Dufour)
- I Belostoma apache Kirkaldy
- J Belostoma minutum n. sp.
- K Belostoma micantulum (Stål)
- L Belostoma minor (Palisot de Beauvois)
- M Belostoma subspinosum (Palisot de Beauvois)



## DISTRIBUTIONAL MAP 5

Map showing localities in which the following species of Belostoma Latreille have been collected.

- A Belostoma dentatum (Mayr)
- B Belostoma gestroi Montandon
- C Belostoma cummingsi De Carlo
- D Belostoma elongatum Montandon
- E Belostoma foveolatum (Mayr)
- F. Belostoma bosci (Lepelletier and Serville)  
(See Map 4)
- G Belostoma asiaticum (Mayr)
- H Belostoma porteri De Carlo
- I Belostoma discretum Montandon
- J Belostoma stollii (Amyot and Serville)
- K Belostoma decarloi n. sp.

# DISTRIBUTIONAL MAP 5



## DISTRIBUTIONAL MAP 6

Map showing localities in which the following species  
of Belostoma Latreille have been collected.

- A Belostoma bosci De Carlo
- B Belostoma bergi (Montandon)
- C Belostoma acutum n. sp.
- D Belostoma sanctulum Montandon
- E Belostoma candidulum Montandon
- F Belostoma willi n. sp.
- G Belostoma horvathi Montandon
- H Belostoma denticolle Montandon
- I Belostoma plebejum (Stål)
- J Belostoma oxyurum (Dufour)
- K Belostoma micantulum (Stål)  
(See Map 4)

# DISTRIBUTION MAP 6





## DISTRIBUTIONAL MAP 7

Map showing localities in which the following species of Belostoma Latreille have been collected.

- A Belostoma martini (Montandon)
- B Belostoma dilatatum (Dufour)
- C Belostoma costa-limai De Carlo
- D Belostoma aurivillianum (Montandon)
- E Belostoma elegans (Mayr)
- F Belostoma bifoveolatum Spinola
- G Belostoma noualhieri Montandon
- H Belostoma grandicollum De Carlo
- I Belostoma testaceo-pallidum Latreille
- J Belostoma longirostrum De Carlo
- K Belostoma ribeiroi De Carlo

# DISTRIBUTION MAP 7



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## DISTRIBUTIONAL MAP 8

Map showing localities in which the following species  
of Abedus Stål have been collected.

- A Abedus anconai De Carlo
- B Abedus dilatatus (Say)
- C Abedus indentatus (Haldeman)
- D Abedus drakei De Carlo
- E Abedus montandoni De Carlo
- F Abedus macronyx (Mayr)
- G Abedus mayri De Carlo
- H Abedus herberti Hidalgo
- I Abedus hungerfordi De Carlo
- J Abedus signoreti Mayr
- K Abedus ovatus Stål
- L Abedus breviceps Stål

# DISTRIBUTIONAL MAP 8



## SUMMARY

In this monograph seventy-eight species are recognized as valid in the family Belostomatidae of the Western Hemisphere. Keys for the species in the genera Lethocerus Mayr and Benacus Stål, Belostoma Latreille, and Abedus Stål are presented. No key for the genus Horvathinia Montandon is included because the writer has not seen any specimens.

Four questionable species are Lethocerus medius (Guérin-Méneville), Lethocerus curtus (Guérin-Méneville), Belostoma minor (Palisot de Beauvois), and Belostoma subspinosum (Palisot de Beauvois). No illustrations or information on types are available for the species of Lethocerus. The drawings which were published of the two species of Belostoma are almost identical. Also, no data on location of types, if any, are available, and the descriptions, themselves, are regrettably meager.

The known range of all the species in this family are shown on the distributional maps. The limits of the ranges of many species, however, will probably be extended when more extensive collecting is done.

Certain specimens of Belostoma flumineum Say and Belostoma lutarium (Stål) closely resemble one another. Torre-Bueno speaks of the former as a northern species and the latter as a southern species. Distributional Map 4 shows that they occur together in a large area.

A provisional phylogeny of the five main families of the aquatic Hemiptera is presented and their possible relation to closely related families of the semi-aquatic Hemiptera is discussed. The Belostomatidae are more closely related to the Nepidae than to any other family. Phylogenetic relations of the genera of the Belostomatidae likewise are suggested. The genus Belostoma is more nearly related to Abedus than to any other genus.

At many places in America there are two species closely resembling one another in structure. Only in South America are there places where as many as three pairs of apparently closely related species occur together -- if we may trust the data on locality of capture that accompany the specimens. One of these places is Villarica, Paraguay, where ten species of the genus Belostoma have been collected. Eleven species of this same genus are labeled as taken in Buenos Aires, Argentina. The occurrence at each of these two places, in south-central South America, in the drainage of the Rio La Plata, is noteworthy. Since fewer species, and fewer pairs of closely related species occur in other parts of the Americas, studies aimed at revealing the geographic area of origin or center of proliferation and dispersal of species would logically give first attention to south-central South America.

## APPENDIX

### Terms used in Descriptions and Keys

- Anteocular -- In front of the eye.
- Carina -- An elevated ridge on dorsal surface of the body.
- Connexivum -- The prominent lateral margin of the abdominal segments of Hemiptera which forms a flat, reflexed, or vertical border to the abdomen.
- Clavus -- The narrow, thickened basal portion of the front wings of Hemiptera that is next to the scutellum when folded.
- Clypeus -- That part of the head, of the insect, to which the labrum is attached anteriorly.
- Femur -- The thigh, usually the stoutest segment of the leg.
- Genital Operculum -- The lid covering the genital capsule, situated on ventral surface on posterior portion of abdomen.
- Hemelytra -- Anterior wings in the Hemiptera; the basal half of each is thickened, and the apical portion membranous.
- Interocular -- Between the eyes.
- Jugae -- Lateral anterior lobes of the head; situated on each side of the clypeus.
- Keel -- An elevated ridge on the ventral surface of the body.
- Metaxyphus -- A spinous or triangular process of the metasternum.
- Pronotum-- Upper or dorsal surface of the prothorax.
- Scutellum -- Triangular part of mesothorax, placed between the bases of the hemelytra.
- Tibia -- The shank: that part of the leg articulated to the femur basally and which bears the tarsus at the distal end.

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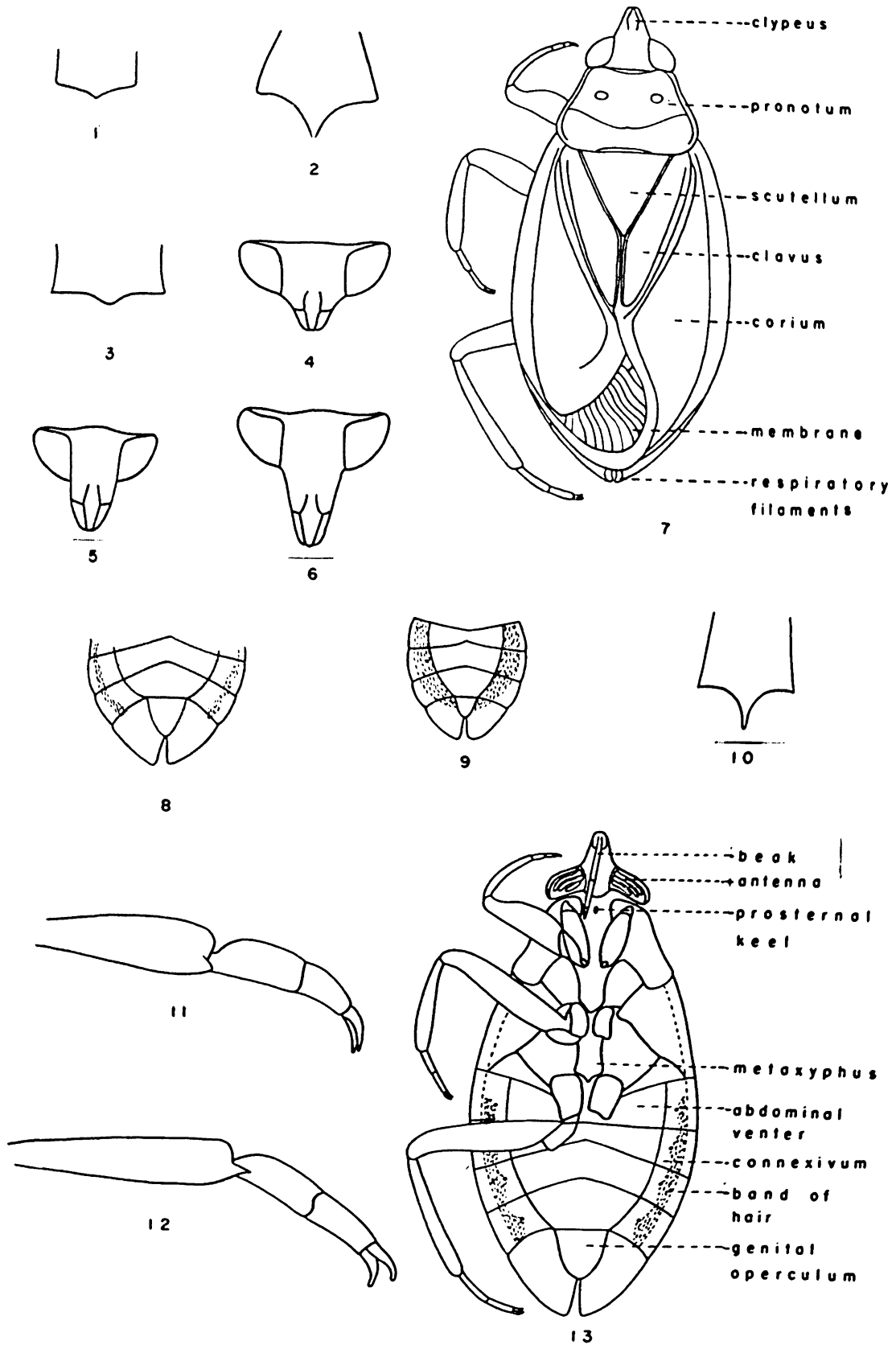
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Plate I

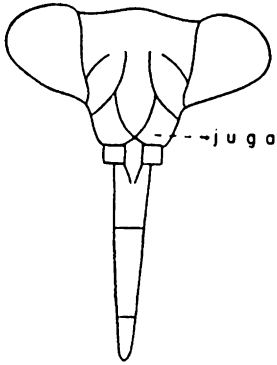


## Plate II

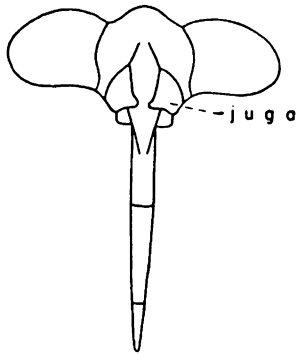
## Figure

1. Head of Belostoma aurivillianum (Montandon). x 5.0
2. Head of Belostoma discretum (Montandon). x 7.4
3. Head of Belostoma decarloi n. sp. x 7.5
4. Head of Belostoma boscii (Lepelletier and Serville). x 5.0
5. Head of Belostoma bosqi De Carlo. x 7.0
6. Male genital operculum of Belostoma decarloi n. sp. x 7.5
7. Female genital operculum of Belostoma decarloi n. sp. x 7.4
8. Antenna of Belostoma boscii (Lepelletier and Serville). x 27
9. Antenna of Belostoma acutum n. sp. x 40
10. Antenna of Belostoma willi n. sp. x 35
11. Antenna of Belostoma minutum n. sp. x 45
12. Antenna of Belostoma penabedum n. sp. x 45
13. Antenna of Belostoma decarloi n. sp. x 18
14. Antenna of Horvathinia pelleranoi De Carlo. x 25
15. Antenna of Horvathinia meyeri De Carlo. x 25
16. Antenna of Horvathinia doello-juradoi De Carlo. x 25
17. Antenna of Horvathinia castilloi De Carlo. x 25

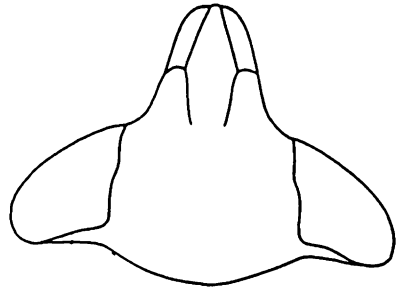
Plate II



1



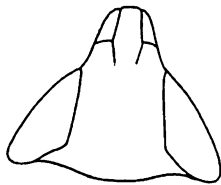
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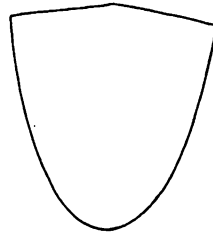
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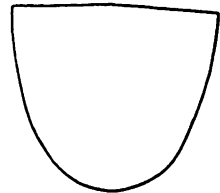
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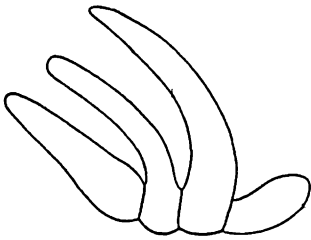
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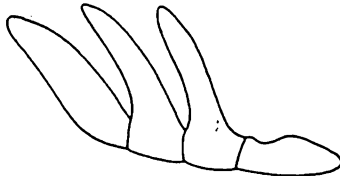
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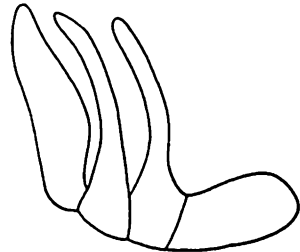
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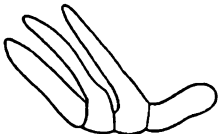
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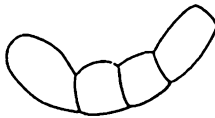
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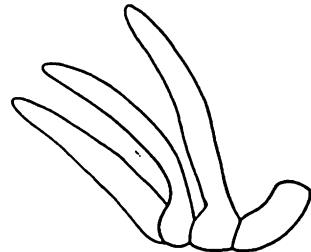
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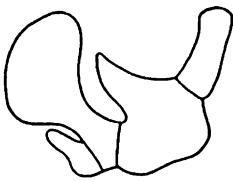
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12



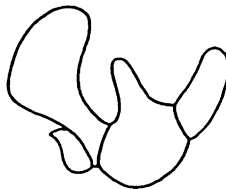
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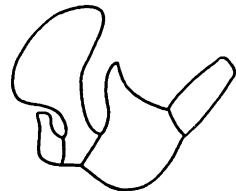
14



15



16



17

## Plate III

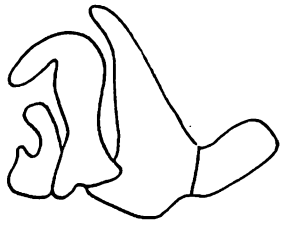
Antennae of Benacus and Lethocerus

## Figure

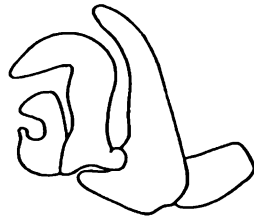
1. Benacus griseus (Say).  $\times 14$
2. Lethocerus americanus (Leidy).  $\times 17$
3. Lethocerus obscurus (Dufour). ?  $\times 15$
4. Lethocerus truncatus Cummings.  $\times 14$
5. Lethocerus uhleri (Montandon).  $\times 13$
6. Lethocerus collosicus (Stål).  $\times 10$
7. Lethocerus angustipes (Mayr).  $\times 10$
8. Lethocerus annulipes (Herrich-Schäffer).  $\times 10$
9. Lethocerus maximus De Carlo.  $\times 11$
10. Lethocerus grandis (Linnaeus).  $\times 10$
11. Lethocerus delpontei De Carlo.  $\times 15$
12. Lethocerus camposi (Montandon).  $\times 13$
13. Lethocerus mello-leitaoi De Carlo.  $\times 13$
14. Lethocerus dilatatus Cummings.  $\times 12$



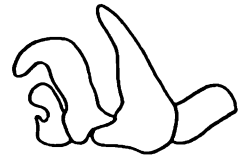
Plate III



1



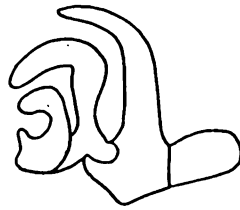
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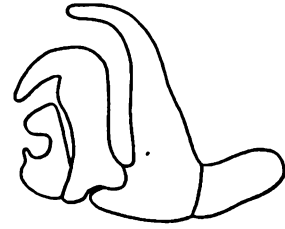
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4



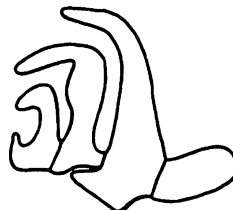
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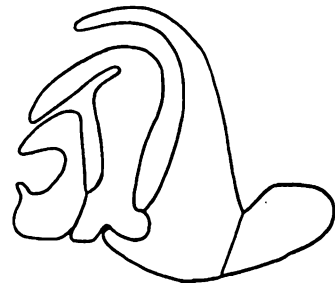
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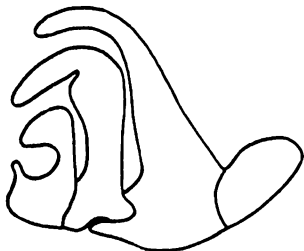
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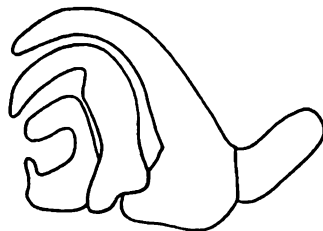
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9



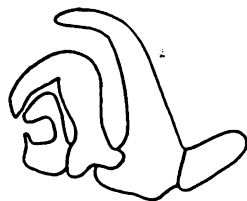
10



11



12



13



14

Plate IV  
Abedus Stal

Figure

1. Antenna of A. dilatatus (Say) x 30
2. Antenna of A. anconai De Carlo. x 30
3. Antenna of A. indentatus (Haldeman). x 32
4. Antenna of A. macronyx (Mayr). x 30
5. Antenna of A. herberti Hidalgo. x 30
6. Antenna of A. hungerfordi De Carlo. x 30
7. Antenna of A. montandoni De Carlo. x 30
8. Antenna of A. mayri De Carlo x 28
9. Antenna of A. drakei De Carlo. x 30
10. Antenna of A. signoreti Mayr. x 30
11. Antenna of A. ovatus Stål. x 35
12. Antenna of A. brevicens Stål. x 35
13. Abdominal venter of A. signoreti Mayr. x 2.0
14. Abdominal venter of A. ovatus Stål. x 2.7
15. Abdominal venter of A. brevicens Stål. x 2.3

Plate IV



1



2



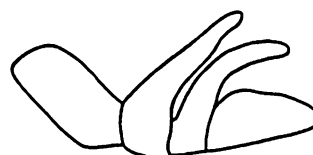
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4



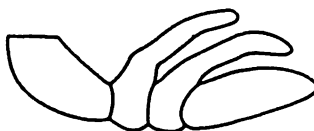
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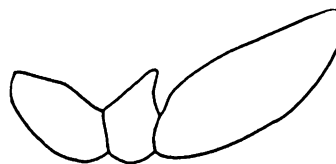
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7



8



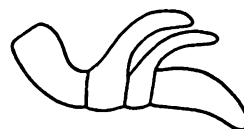
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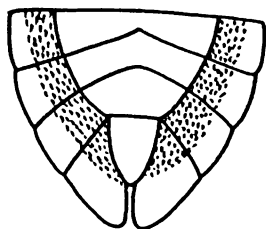
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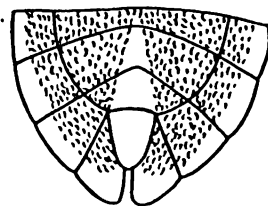
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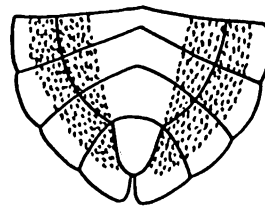
12



13



14



15

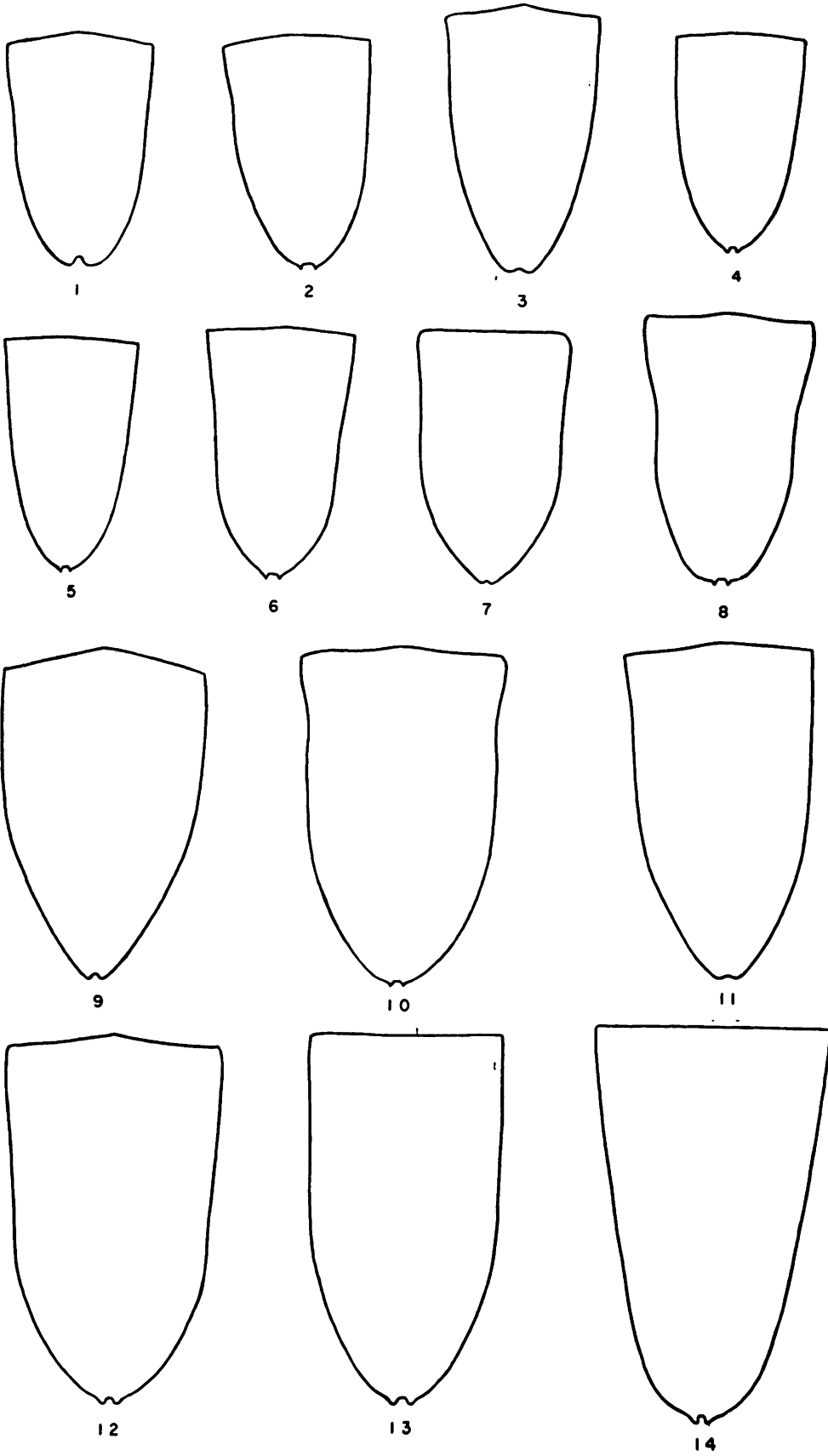
## Plate V

Shape of last ventral abdominal  
segment of females of Benacus and Lethocerus

## Figure

1. Benacus griseus (Say). x 4.5
2. Lethocerus americanus (Leidy). x 5.5
3. Lethocerus obscurus (Dufour). ? x 5.0
4. Lethocerus uhleri (Montandon). x 5.0
5. Lethocerus delnontei De Carlo. x 5.3
6. Lethocerus annulipes (Herrich-Schäffer). x 5.0
7. Lethocerus angustipes (Mayr). x 5.0
8. Lethocerus mello-leitaoi De Carlo. x 5.0
9. Lethocerus truncatus Cummings. x 4.33
10. Lethocerus collosicus (Stål). x 5.3
11. Lethocerus camposi (Montandon). x 5.3
12. Lethocerus dilatatus Cummings. x 5.33
13. Lethocerus grandis (Linnaeus). x 5.0
14. Lethocerus maximus De Carlo. x 4.9

Plate V

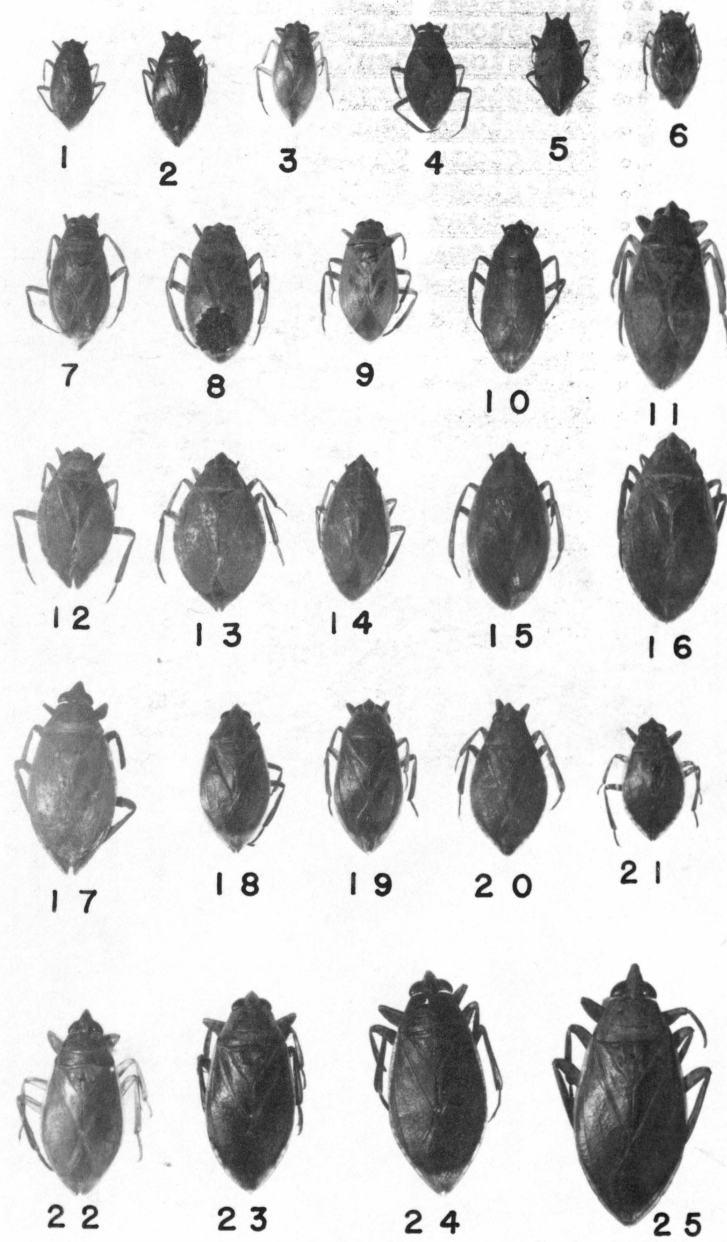


## Plate VI

## Figure

1. Belostoma micantulum (Stål)
2. Belostoma plebejum (Stål)
3. Belostoma denticolle Montandon
4. Belostoma oxyurum (Dufour)
5. Belostoma penabedum n. sp.
6. Belostoma minutum n. sp.
7. Belostoma hervathi Montandon
8. Belostoma fusciventre (Dufour)
9. Belostoma apache Kirkaldy
10. Belostoma elegans (Mayr)
11. Belostoma bifoveolatum Spinola
12. Belostoma candidulum Montandon
13. Belostoma acutum n. sp.
14. Belostoma bosqi De Carlo
15. Belostoma bergi (Montandon)
16. Belostoma costa-limai De Carlo
17. Belostoma lutarium (Stål)
18. Belostoma flumineum Say
19. Belostoma bakeri Montandon
20. Belostoma willi n. sp.
21. Belostoma testaceum Leidy
22. Belostoma discretum Montandon
23. Belostoma asiaticum (Mayr)
24. Belostoma boscii (Lepelletier and Serville)
25. Belostoma ellipticum Latreille

Plate VI



Nat. size

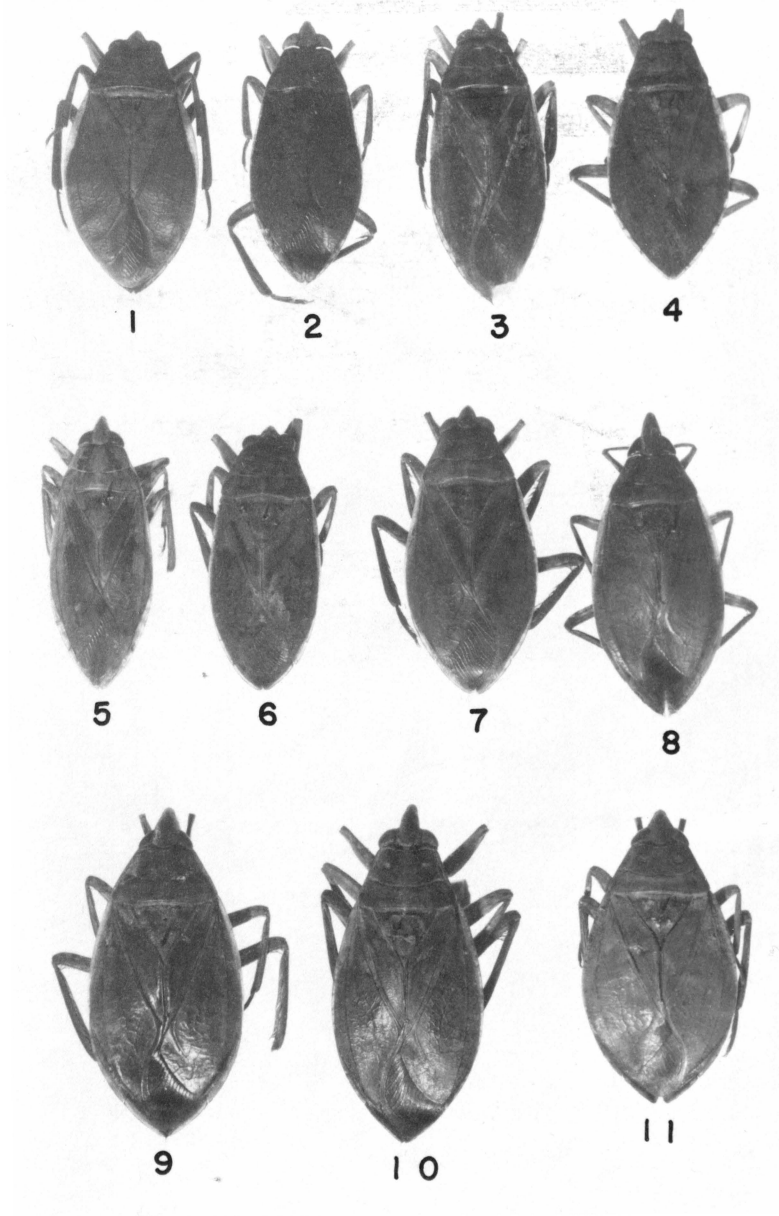
## Plate VII

## Figure

1. Belostoma decarloi n. sp.
2. Belostoma cummingsi De Carlo
3. Belostoma foveolatum (Mayr)
4. Belostoma stollii (Amyot and Serville)
5. Belostoma elongatum Montandon
6. Belostoma aurivillianum Montandon
7. Belostoma porteri De Carlo
8. Belostoma martini (Montandon)
9. Belostoma dilatatum (Dufour)
10. Belostoma dentatum (Mayr)
11. Belostoma gestroi Montandon



Plate VII



Nat. size

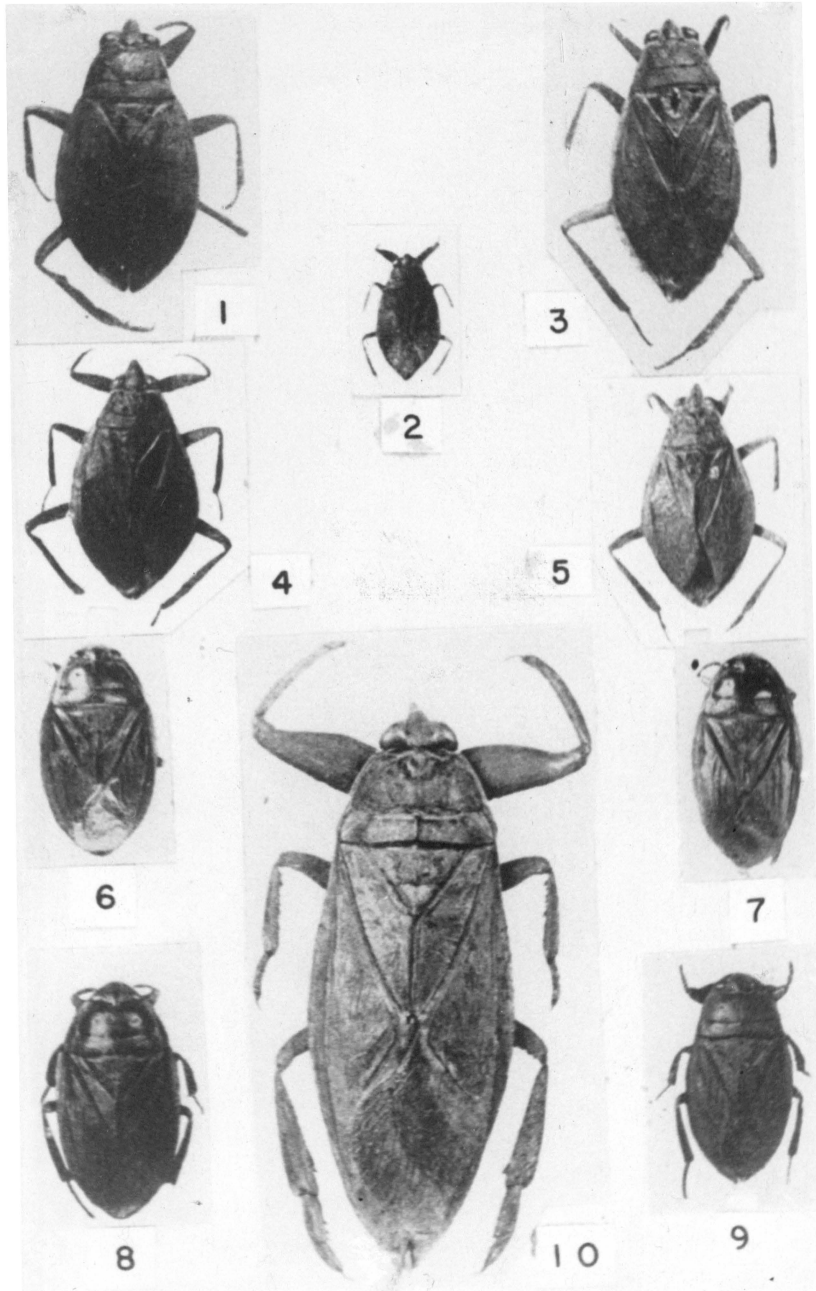
## Plate VIII

## Figure

1. Belostoma grandicellum De Carlo
2. Belostoma sanctulum Montandon
3. Belostoma ribeiroi De Carlo
4. Belostoma testaceo-pallidum Latreille
5. Belostoma longirostrum De Carlo
6. Horvathinia castilloi De Carlo
7. Horvathinia meyeri De Carlo
8. Horvathinia pelleranoi De Carlo
9. Horvathinia doello-juradoi De Carlo
10. Lethocerus bruchi De Carlo

Note: I am indebted to Professor José A. De Carlo of Argentina, South America for the use of the photographs appearing in this plate.

Plate VIII



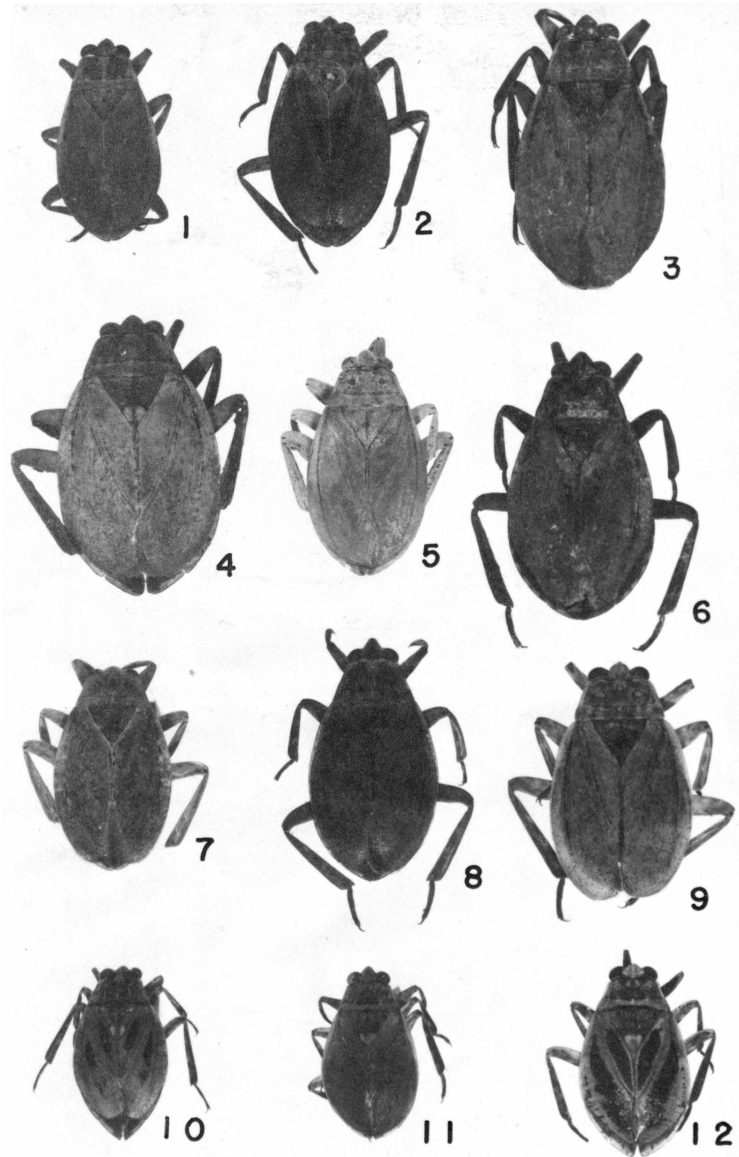
Nat. size

## Plate IX

## Figure

1. Abedus dilatatus (Say)
2. Abedus anconai De Carlo
3. Abedus indentatus (Haldeman)
4. Abedus macronyx (Mayr)
5. Abedus herberti Hidalgo
6. Abedus hungerfordi De Carlo
7. Abedus montandoni De Carlo
8. Abedus mayri De Carlo
9. Abedus drakei De Carlo
10. Abedus signoreti Mayr
11. Abedus ovatus Stål
12. Abedus breviceps Stål

Plate IX



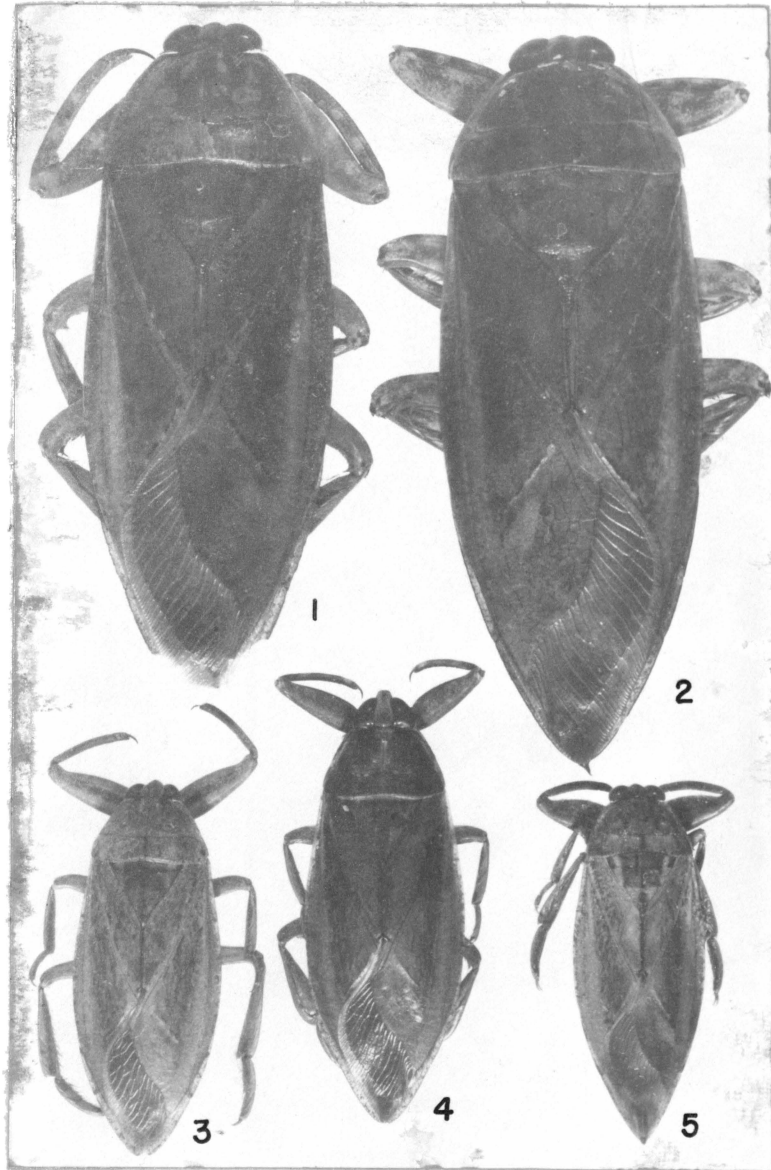
Nat. size

## Plate X

## Figure

1. Lethocerus grandis Linnaeus
2. Lethocerus maximus De Carlo
3. Lethocerus americanus (Leidy)
4. Benacus griseus (Say)
5. Lethocerus uhleri (Montandon)

Plate X



Nat. size

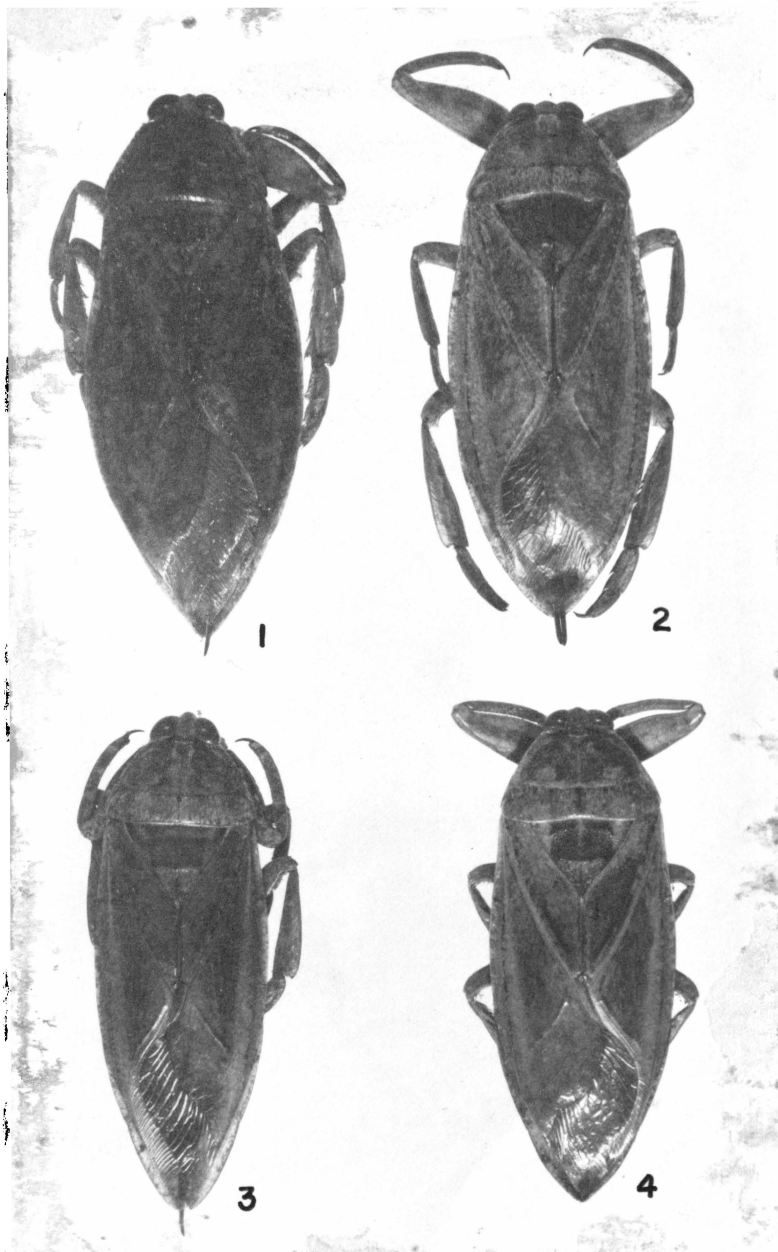
## Plate XI

## Figure

1. Lethocerus dilatus Cummings
2. Lethocerus truncatus Cummings
3. Lethocerus annulipes (Herrich-Schäffer)
4. Lethocerus angustipes (Mayr)



Plate XI



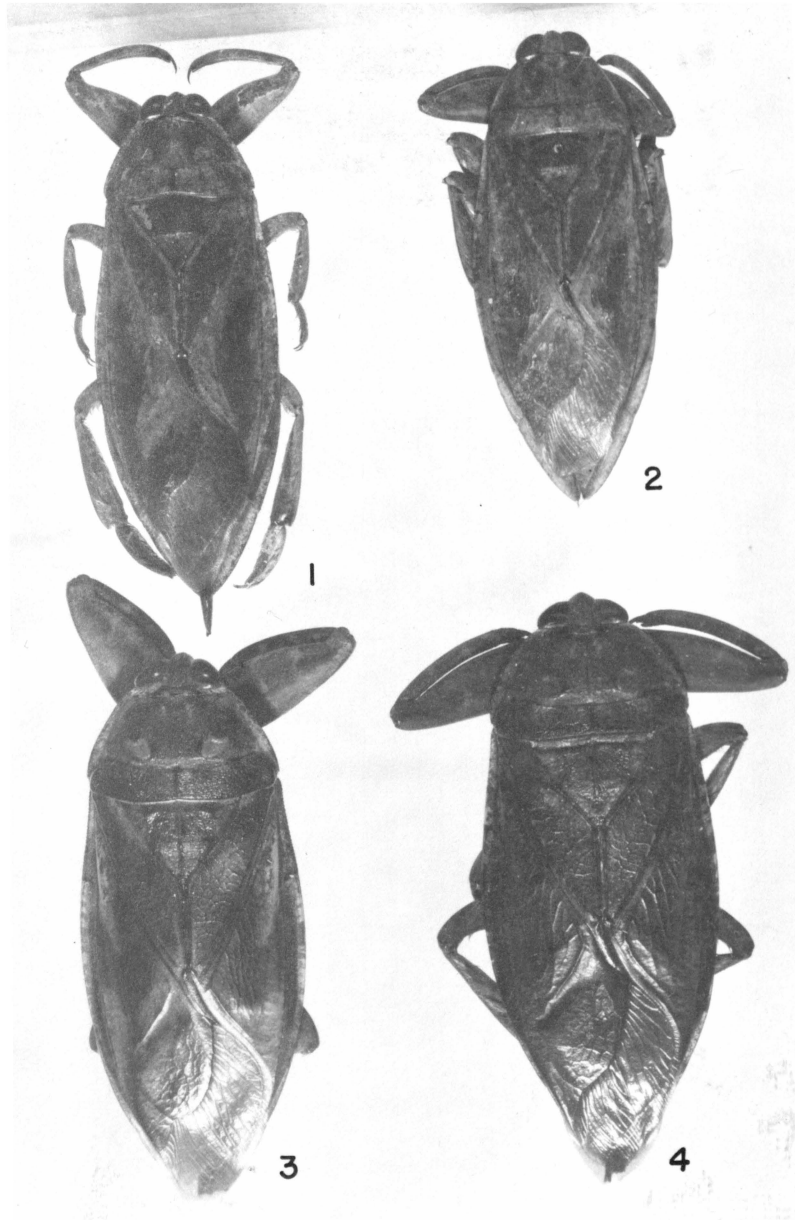
Nat. size

## Plate XII

## Figure

1. Lethocerus nello-leitaoi De Carlo
2. Lethocerus delpontei De Carlo
3. Lethocerus camposi (Montandon)
4. Lethocerus collosicus (Stål)

Plate XII



Nat. size