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A MONOGRAPH OF THE GENUS *BELOSTOMA*
(HEMIPTERA)

PART I. INTRODUCTION AND *B. DENTATUM* AND
SUBSPINOSUM GROUPS

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INTRODUCTION

During the early stages of preparing a survey of the aquatic Hemiptera of Illinois, I became especially interested in the members of the family Belostomatidae. While studying the two species of *Belostoma*, *B. lutarium* (Stål) and *B. flumineum* Say, I discovered striking differences in the structure of the male genitalia. The value of this character for segregating species became even more apparent when applied to other species and, consequently, the promising results from this comparative study of the male genitalia initiated the following monograph.

In 1955 an extensive collecting trip to several of the islands of the Antilles, and in 1957 another to Central America and Mexico, netted numerous specimens of *Belostoma*. Originally, I had planned a revision of the *Belostoma* of North and Central America, but soon realized that the identity of many South American species was needed because of their close affinities to the Central American fauna. After examining the excellent series of specimens from South America in the Snow Museum at the University of Kansas, early in 1959, I decided to include the South American species.

This monograph is based largely on specimens in the Snow Museum at the University of Kansas, the Los Angeles County Museum in California, the United States National Museum, the Drake Collection in the U. S. National Museum, and my own collection. However, all other museums listed in the acknowledgments made substantial contributions of specimens.

Even though 10,000 specimens of *Belostoma* were examined, the distribution of many species is inadequately known and still others probably remain to be discovered. Hence, additional collecting, especially in many regions of South

America, will be required, and such acquisitions will undoubtedly alter some of the conclusions stated herein.

Nevertheless, I feel that this monograph gives a more valid interpretation of the taxonomy than has been possible heretofore. The latitude of variations between and within species is better known by the study of long series of specimens. Since types were examined for 16 of the previously described species and eight neotypes were established, names have been more correctly applied to specimens. The use of the male genitalia as a new taxonomic character has facilitated the identification of closely related species, which heretofore were difficult to separate. Also, primarily based on the structures of the male genitalia, the species have been segregated into distinct groups. As a consequence of the above facts, more consideration of distribution and phylogeny has been possible therefore, a section has been devoted to these phases.

Recent students of the Belostomatidae often assigned names to species with little regard to distribution or validity of original descriptions. Synonyms were frequently the names of species that were unknown to them. Authors apparently worked on the basis that they had before them all the species that were described.

This monograph differs from previous studies in the methods used in assigning names to species previously described. I have adopted the following policies in naming a species in this monograph :

1. In cases of poorly defined species, types, if available, were used in determining their identity.
 2. Poorly defined species whose types could not be located are considered as *nomina dubia*, unless the species have subsequently been well defined and consistently recognized under the same names in at least the more important publications.
 3. Previously used names for which types are unknown have been applied to species only when the original description clearly defines the species or when the name has been consistently applied to the same species.
 4. Species not included in the above three categories have been described as new.
- The following designations of types have been made in

order to insure a more stabilized classification :

1. Neotypes have been designated for recognized species in which the original specimens used as the basis of descriptions have been lost.
2. As far as possible, lectotypes and syntypes have been selected where no types were designated from specimens used for the original description.
3. Holotypes, allotypes, and paratypes have been established in accordance with the rules of nomenclature for new species.

Many may feel that the application of these guiding policies unjustly eliminates many of the older names. However, it is my opinion, that the designation of some of these older names as *nomina dubia* is the only way to clarify the position of certain species within this group. For example the name *Belostoma boscii* Lep. & Serv. could be recognized only from the inadequate original description and a few sketchy notes from subsequent authors who presumably also examined the types. The description fits equally several of the species of the *subspinosum* group. The type is lost and the type locality is recorded as "Carolina", although Dufour says that the type also bears a label designating Brazil as the type locality. The locality is certainly questionable and the description vague. The name *B. boscii* has been applied to numerous species by various authors. Thus instead of randomly designating any one species to represent *B. boscii*, the name is considered as a *nomen dubium*. Fortunately most of the species of the *subspinosum* group are readily identifiable by the types or descriptions, and the remaining species are described as new with valid holotypes, allotypes, and paratypes.

Similarly the names of species of unknown identity are not placed in synonymy. For example, *Zaitba maculosa*, *Z. limbata*, *Z. adusta*, and *Z. difficilis*, all of Dufour, have been considered as synonyms of *Belostoma plebejum* (Stål) by some authors. Little is known about these species except their length, locality, and a few minor details. All of them could be different species or might be the same species. They could be any one of several species in different groups, or there might be species which I have not had the opportunity to examine. For these reasons some names have been considered *nomina*

dubia rather than synonyms.

It is sincerely hoped that the following classification based on the above scheme for establishing names will form a more solid foundation for the nomenclature of the *Belostoma*.

ACKNOWLEDGMENTS

The writing of this monograph would have been impossible without the aid of many individuals and the fine cooperation received from museums in both this country and abroad. Members of the European museums were especially helpful for their assistance with type specimens, which proved invaluable in determining species. The associates of museums to whom I am indebted are the following : P. O. Ashlock, O. L. Cartwright, C. J. Drake, and R. I. Sailer, U. S. National Museum ; M. Beier, Naturhistorisches Museum, Wien ; G. W. Byers, H. B. Hungerford, R. Matsuda, University of Kansas ; J. A. DeCarlo, Buenos Aires ; H. Dietrich, Cornell University ; H. S. Dybas and R. L. Wenzel, Chicago Natural History Museum ; R. Fischer and T. W. Porter, Michigan State University ; W. Forster and H. Freude, Zoologische Sammlung des Bayerischen Staates, Munich ; R. F. Hussey, University of Florida ; Z. Kaszab and S. A. Soós, Hungarian National Museum, Budapest ; E. Kiellander, Naturhistoriska Risksmuseum, Stockholm ; J. L. Laffoon, Iowa State College ; A. S. Menke, University of California, Davis ; T. E. Moore, University of Michigan ; J. R. Rohner, State University of Iowa ; H. H. Ross, L. J. Stannard, and M. W. Sanderson, Illinois Natural History Survey ; H. Ruckes, American Museum of Natural History ; H. Sachtleben, Deutsches Entomologisches Institut, Berlin ; G. G. Scudder, University of British Columbia ; J. A. Slater, University of Connecticut ; F. S. Truxal, Los Angeles County Museum ; R. E. Usinger, California Academy of Sciences ; D. L. Wray, North Carolina Department of Agriculture.

Special appreciation is due Professor R. E. Selander, University of Illinois, with whom many taxonomic details were discussed, and Jose A. DeCarlo, Buenos Aires, who furnished drawings of the genitalia of several species he had described. My greatest debt of gratitude is to Professor Walter V. Balduf who directed the entire preparation of the monograph.

The work was completed in part while in tenure of a University of Illinois Summer Fellowship for 1958 and a National Science Foundation Summer Fellowship for 1959. This paper was submitted as partial fulfillment of the requirements for the degree of Doctor of Philosophy in Entomology at the University of Illinois.

HISTORY

TAXONOMY

The large size of many of the species of *Belostoma* attracted early attention. Under the generic name *Nepa*, Linnaeus included the members of this family with the Nepidae. In 1807, Latreille differentiated the two groups, and established the genus *Belostoma* for his species, *B. testaceopallidum*. In the addenda of his next volume, published in 1809, he also included *Belostoma indicum* (Linnaeus) which is now considered a separate genus, *Lethocerus*. However, since the addenda did not appear until two years later, *B. testaceopallidum* clearly remains the type of the genus *Belostoma*.

In 1863, Mayr contributed the first monograph of the family Belostomatidae and included 10 species of *Belostoma* under the generic name *Zaitba*. *Zaitba* was established in 1843 by Amyot and Serville, for *Zaitba stollii*. These authors were apparently unaware of Latreille's description of the genus *Belostoma*. Mayr and subsequent authors continued to perpetuate this error until corrected by Montandon (1900). During the same year that Mayr's monograph appeared, Dufour (1863) independently published a monograph of the family, including 21 species of *Belostoma*. In 1871, Mayr again monographed the family and examined and compared the specimens used by Dufour as well as those studied by Stab who had subsequently described four species of *Belostoma*.

Although Montandon never monographed the *Belostoma*, he vividly described 12 new species. As can be attested by the numerous specimens identified by Montandon scattered throughout the European and U. S. Museums, he attained a thorough knowledge of the group, and it is not surprising that his new species remain valid.

More recently, Jose A. DeCarlo has made numerous contributions to the taxonomy of the family Belostomatidae, cli-

maxed by his "Los Belostómides Americanos" published in 1938. In addition, he has described several new species of *Belostoma* since his monograph.

Even more recently, Arnold Menke (1958) published a synopsis of North American species of *Belostoma*, including an excellent account of the species in this area, and Lauck (1959) described three new species from Mexico and Central America.

BIONOMICS

Little is known concerning the bionomics of the *Belostoma*. Life histories are known sketchily for only two species. Bueno (1906) provided information concerning the stadia and in-stars of *Belostoma flumineum*, and Hungerford (1920) added observations on its feeding habits, habitat, and tropisms.

Severin and Severin (1911) give information about over-wintering, and experimented with the tropisms of *Belostoma*.

Although the species of *Belostoma* are primarily tropical and semitropical, almost all material gathered concerning their bionomics deals with the North American species. The only publications dealing with the life history of a South American species is that by DeCarlo (1939) for *B. elegans* (Mayr).

The life histories, respiration, feeding, oviposition, and mating of *Belostoma* are reviewed by Lauck (unpublished Master's thesis).

TAXONOMIC TERMS AND CHARACTERS

The characters used to distinguish the species of *Belostoma* are relatively few compared to those employed in other groups of aquatic Hemiptera. More perplexing is the fact that most of these characters are extremely variable and often inter-grade in closely related species. The characters of no one single structure can be used throughout the genus for distinguishing species. Even the form and shape of the male genitalia are variable and intergrade in a few groups containing very closely related species. The characters used in this monograph and their usefulness in determining species are evaluated below.

Size. Although size becomes a most helpful aid in determining the species for one who is well acquainted with them, its value for the beginner is relatively insignificant. The

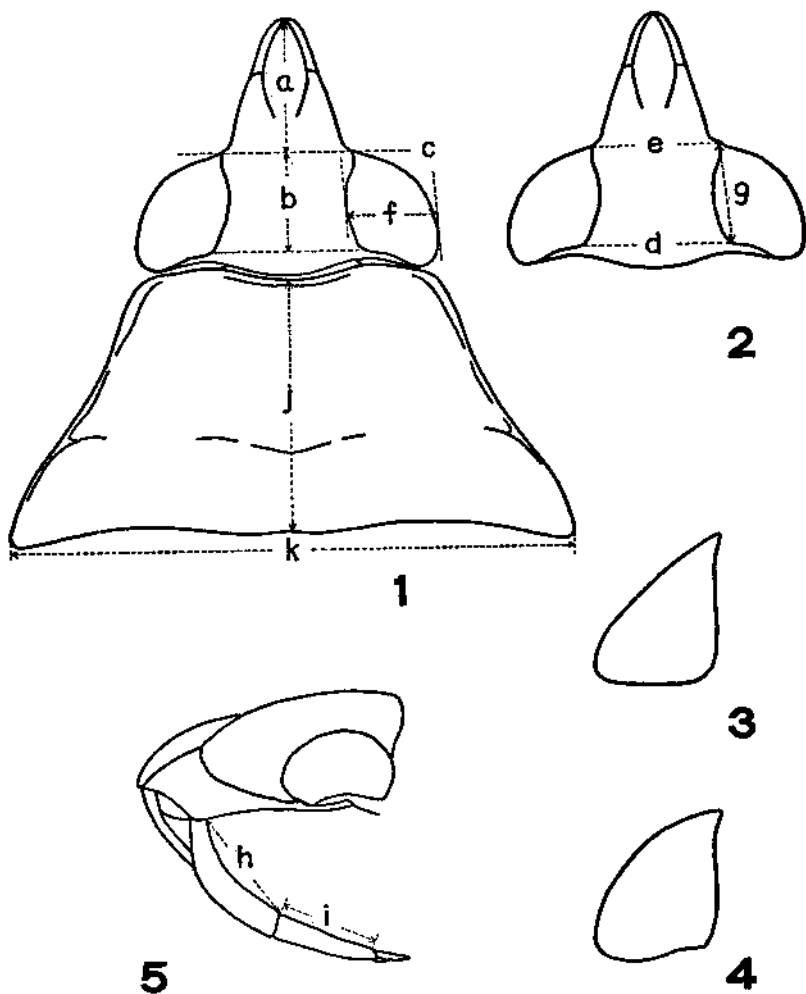
range is completely intergrading and overlapping from the smallest to the largest species. Likewise, some vary considerably in size from population to population and sometimes even within the same population. The smaller species tend to vary less in size, but almost proportionally to the larger ones. A range of six or seven millimeters is not uncommon for the larger species, while the smaller ones usually vary only a few millimeters in length. In general, size becomes a more important criterion in helping to recognize the various groups of species. For example, members of the *dentatum*, *subspinosum* and *testaceopallidum* groups are all moderately large to large species, while those of the *plebejum*, *denticolle* and *oxyurum* groups are moderately small to small species.

Shape. The shape can be most useful in recognizing species after one has already become relatively familiar with them ; however, here again for the novice, shape is of minor importance mainly due to inadequate means of expression. Even dorsal views of whole specimens are not adequate because of variations. Despite this, shape is one of the more valuable characters for distinguishing some of the species of different groups but can be fully utilized only when large numbers and adequate series of specimens are available.

THE CHARACTERISTICS OF THE HEAD

The characters of the head are those most frequently used in keys and descriptions for determining species. These characters vary and one will sometimes encounter specimens that are intermediate between the two conditions of a character utilized. In some cases where variations extend beyond these limits, a special comment will be found in the descriptions. Similarly these characters may vary according to the angle viewed ; thus, for the purpose of this monograph, all characters of the dorsal surface of the head are viewed from an angle perpendicular to the horizontal plane of the eyes. The terms and characters referring to the head are as follows.

Anteoculus. The length of that part extending beyond the anterior margin of the eyes (a, *fig. 1*) . This character is often compared with the length or width of other structures. This seems to be one of the more stable characters used for the various species.



Figures 1 through 5

1. Dorsal aspect of head and pronotum of *Belostoma*. 2. Dorsal aspect of head of *Belostoma*. 3. Triangular-shaped eye of *Belostoma*. 4. Globular-shaped eye of *Belostoma*. 5. Lateral aspect of head of *Belostoma*. a) anteculus; b) interoculus; c) ocular line; d) interocular width; e) anterior interocular width; f) width of an eye; g) length of an eye; h) length of segment I of the beak; i) length of segment II of beak.

Interoculus. The length of that portion of the head between the eyes (b, fig. 1).
 Actually this should be referred

to as the "length of the interoculus" but has been shortened to just "interoculus" for brevity. This structure is most frequently correlated with the anteculus, and it is a relatively stable character.

Ocular line. The line extending between the anterior apices of the eyes. This line is an indicator of the degree of development of the clypeus which may extend to the line, beyond the line, or not reach the ocular line (c, *fig. 1*).

Interocular width. Unless otherwise designated, this is the maximum width between the eyes (d, *fig. 2*). On other occasions the distance between the anterior or posterior apices of the eyes is compared with the length of other structures, and is thus referred to as the anterior (e, *fig. 2*) or the posterior interocular width (d, *fig. 2*), respectively.

Width of an eye. Maximum width of an eye as measured perpendicular to the inner margin of the eye (f, *fig. 1*). The width of the right eye is often larger than that of the left eye, so, for the purpose of this monograph, the measurement of the right eye is always specified.

Length of an eye. The length of the inner margin of the eye (g, *fig. 2*).

Shape of the eye. The shape of the eyes is determined largely by the outer margin, which may be nearly straight (*fig. 3*) to globular (*fig. 4*). This character is intergrading and therefore only of minor importance. Also the eyes may be wide or occasionally even longer than wide.

Length of the beak. The length of the individual segments of the beak is always measured along the ventral margin for the purpose of this monograph. The length of the first segment will often vary with reference to the position of the beak. The length is somewhat greater in specimens that have the beak extending anteriorly, and shorter in those that have the beak extending posteriorly. The length of the first (h, *fig. 5*) and second (i, *fig. 5*) segments is usually compared and therefore the differences obtained by variations in the position of the beak are of no great consequence. The most favorable position for measuring the segments is shown in figure 5.

Length of the pronotum. The length of the pronotum is measured along the middorsal line, viewed perpendicular to

the horizontal plane (j, *fig. 1*) .

Width of the pronotum. The maximum width of the pronotum as measured through the humeral angles (k, *fig. 1*) .

Lateral margins of the pronotum. The lateral margins of the pronotum may vary in the degree of concavity from nearly straight to prominently concave. This character is of minor importance unless the different species are available for comparison.

Prosternal keel. The prosternal keel may assume various shapes which are often diagnostic. However the shape varies more among individuals than has been indicated by previous authors. One should not rely alone on the shape of the pro-sternal keel for determination.

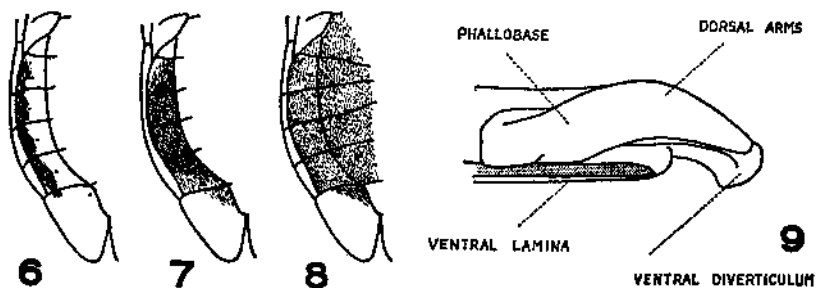
Nodal line. The nodal line extends between the lateral-most points of the nodal furrows. This line is used in reference to the caudal extension of the scutellum, which may extend to, beyond, or not quite to the nodal line.

Connexival band of hairs. This is a dense pilosity covering part of the abdominal connexivum. The band of hairs never covers the outer margin of the connexivum and may cover varying portions of the remainder. In the descriptions, it is taken for granted that the hairs do not cover the outer margin. The band of hairs may be constricted between the spiracles and may extend along the genital operculum. This character is very constant. The mesal area of the connexivum and abdominal sternum may be covered with short stout hairs which should not be confused with the connexival band of long silky hairs. Figures 6-7 illustrate the progressive development of this silky band of hairs.

In reality the connexivum is an underfolding of the tergites, hence is equivalent to the ventral laterotergites. However, the term "connexivum" has been used so frequently in the taxonomic literature of this order that I have retained it.

Genitalia. The male genitalia are among the most important structures used for determining the species, and in some cases the species groups cannot be distinguished without reference to them. Thus, it is often impossible to identify the females of certain species.

Several authors have stated that the characters of the male genitalia are not useful in determining the species of



Figures 6 through 9

6. Connexivum not completely covered with pilosity. 7. Connexivum completely covered with pilosity. 8. Connexivum and sternites covered with pilosity. 9. Genitalia of *Belostoma*.

Belostoma. Most of these authors must have been referring to the genital capsule rather than the genitalia. The classification of the groups treated in this monograph is dependent largely on the characters of the male genitalia. Their structures and terminology are shown in figure 9.

The following method has been used in removing the genitalia of *Belostoma*. If the specimen is dry, the tip of the abdomen must first be softened. The specimen may be softened in a solution of dilute alcohol. The time needed for softening varies from an hour to nearly a day, depending on the size of the insect. Recently, a method used by Dr. Carl Drake has been more successful. The insect is softened in a solution of eye-glass wash with the trade name "Lenzo". This fluid softens the insect in a much shorter period of time than alcohol.

After the insect has been softened, a number one insect pin (a number two or even three pin may be used for very large specimens) with the end bent into a sharp hook is placed beneath the genital operculum and inserted until it reaches the anterior margin of the genital capsule. The pin is then rotated until the hook catches the capsule. The pin is then slowly removed with the entire capsule. The genitalia are removed or withdrawn from the genital capsule in a similar manner. A convenient way of handling the genitalia, if completely removed, is to place them on the end of an insect pin; thus the pin, when resting on another pin perpendicular to it,

can be rotated to any desired angle. This method is especially desirable for viewing the lateral aspect. The removed parts are placed in a microvial and kept with the specimen for storage. Since the genitalia of some of the smaller species may be quite small, *the contents of a microvial should be removed only when placed over or in an appropriate container such as a watch glass: this should be done under the low power of a binocular microscope.*

Although the male genitalia are rather stable structures, specimens within the same species do vary. Hence, the male genitalia are of little value in distinguishing the members of some groups.

TAXONOMY

Genus *Belostoma* Latreille

Belostoma Latreille, 1807, Gen. Crust. Insect., vol. 3, p. 144.

Type : *Belostoma testaceopallidum* Latreille, 1807.

Nepa, Palisot de Beauvois, 1820, Insect. Rec. Afrique et
Amerique, p. 236.

Zaitba Amyot and Serville, 1843, Hist. Nat. Insect. Hemiptera, p. 430. Type : *Zaitba stollii*
Amyot and Serville, 1843, designated by Kirkaldy, 1906.

Pertbostoma Leidy, 1847, Jour. Acad. Nat. Sci. Philadelphia,
(2) 1 :59. Type : *Pertbostoma testaceum* Leidy, 1847.

Diplonychus, Herrich-Schaffer, 1848, Wanz, Insect., vol. 8,
p. 28.

Small to large, ovate, elliptical, or elongate bugs, ranging, from 9 to 50 mm. in length. Anteculus well developed, about as long as, or longer than, interoculus ; interoculus about one-and-a-half times wider than the eye, convex ; eye about as long as wide, external margin strongly convex to somewhat flattened, posterolateral angle somewhat acutely to broadly rounded ; beak moderately short to long, slender, segments I and II subequal or variable, II short ; antenna with segments II and III bearing long curved finger-like prolongations dorsally, IV similar to prolongation of II and III ; lateral margin of pronotum straight to concave, anterior margin more than half as wide as posterior margin ; median prosternal projections a semicircle or a long acute process ; legs shiny and spinulose or tomentose ; profemur slightly to strongly dilated, bearing two grooves for reception of tibia ; protibia and

tarsus with rows of setigerous punctures ; protarsus two-segmented and terminated by a single claw (true segment I apparently completely fused with II), segments subequal, short rectangular or rhomboidal ; clavus without veins, smooth ; corium with a network of veins ; membrane of hemelytron large, with few veins, mostly unbranched and without cross-veins. Pubescence of connexivum variable, plates II and VIII glabrous or partially to completely pubescent, intervening plates completely pubescent or glabrous along mesal margins, III pubescent to external margin ; abdominal sternites commonly with only minute spicules or more rarely pubescent, female genital plate bearing two tufts of setae apically ; air straps not contiguous or forming an air channel ; phallobase bifurcate dorsally, arms extending nearly to apex ; ventral diverticulum usually expanded, often with lateral flanges and special sensory areas at apex.

The taxonomic relationship of the *Belostoma* to the other genera of the family is discussed by Lauck and Menke (1961) and keys are furnished to identify the seven genera. There are 62 species of *Belostoma* treated in this monograph. The species included may be determined by the following keys.

Key to the groups of *Belostoma*

1. Pilosity covering entire margin of connexivum
 (*figs. 7, 8*) -----
2.
 Pilosity not covering entire margin of
 connexivum (*fig. 6*) ----- 6.
2. North American ----- *flumineum* group.
- South American ----- 3.
3. Pilosity covering part or all of sternites (*fig. 8*) ----- 4.
- Pilosity not on sternites (*fig. 7*) -----
- 5.
4. Eyes triangular (*fig. 3*) ----- *B. costalimai, bergi* group.
- Eyes globular (*fig. 4*) ----- *testaceopallidum* group.
5. Large dilated species, more than 30 mm.
- long ----- *dilatatum* group.
- Less than 30 mm. long ----- *bifoveolatum* group.
6. Pronotum and scutellum with a distinct
 median carina -----
- aurivillianum* group.
- Pronotum and scutellum without a median carina ----- 7.
7. Outer margin of eye straight, eye triangular
 (*fig. 3*) ----- 8.

- Outer margin of eye rounded, eye more globose (*fig. 4*)..... 9.
- 8. Segment I of beak longer than II..... *bergi* group.
- Segment I of beak shorter than II..... *discretum* group.
- 9. Small species, less than 24 mm. long ; segment I of beak usually shorter than II..... 10.
- Larger species, more than 28 mm. long ; segment I of beak longer or equal to II..15.
- 10. Ventral diverticulum of male genitalia with prominent thickenings along laterodorsal margins (*fig. 50*) ----- *pygmeum* group.
- Ventral diverticulum of male genitalia without thickenings on laterodorsal margins.....11.
- 11. Ventral diverticulum flat, spatulate or disk-shaped (*fig. 56*) 12.
- Ventral diverticulum not flattened..... 13.
- 12. Anterior anteocular space about one-and-a-fourth times the width of an eye, ventral diverticulum spatulate *denticolle* group.
- Anterior anteocular space about one-and-a-half times the width of an eye, ventral diverticulum more circular..... *oxyurum* group.
- 13. Interocular space nearly twice the width of an eye ; prosternal keel triangular with pointed apex *triangulum* group.
- Interocular space one-and-a-half or less the width of an eye ; prosternal keel semicircular 14.
- 14. Medium sized, 16 mm. or more ; ventral diverticulum usually with lateral wings, without ventroapical protuberance ; North American ----- *minor* group.
- Smaller, less than 16 mm. ; ventral diverticulum with ventroapical protuberance ; mostly South American *plebejum* group.
- 15. Vertex with prominent carina ; scutellum not reaching nodal line 16.
- Vertex without a median carina ; scutellum reaching nodal line17.
- 16. Clypeus reaching the ocular line..... *stollii* group.
- Clypeus not reaching ocular line..... *dilatatum* group.

17. Ventral diverticulum of male genitalia with

a very large distinct apicoventral protuberance

(fig. 14) *dentatum* group.

Ventral diverticulum of male genitalia with

moderately developed apicoventral protuberance

(fig. 42) ----- *subspinosum* group.

Belostoma dentatum group

Large elliptical, elongate, or ovate species ranging from 38 to 50 mm. long.

All species nearly a uniform dark brown, occasionally olive-brown, suffused with creamy yellow. Each femur with very broad, sometimes coalescing dark bands ; each pro- and mesofemur with three regular dark bands ; metatibiae dark ; protarsi light brown with dark tip, meso- and metatarsi dark. Abdominal venter dark mahogany-brown with a single light yellow spot on the inner margin and two marginal crescent-shaped spots on each segmental margin of the connexivum.

Anteoculus slightly to considerably longer than the interoculus ; mesal margins of eyes parallel ; eyes approximately as long as wide ; segment I of beak distinctly longer than II. Prosternal keel prominent ; scutellum reaching the nodal line. Pilosity covering about one-third the connexivum, extending only slightly beyond the penultimate segment, greatly constricted between spiracles. Ventral diverticulum of genitalia with a large, prominent conical protuberance and an apical prominence.

This group is represented by five very closely related species. The members are very similar to the *B. subspinosum* group but differ from them by the pronounced conical protuberance of the ventral diverticulum and their larger size. The species are all South American and reach their northern limits in Panama. The species may be distinguished by the following key :

Key to the species of the *dentatum* group

1. Interoculus distinctly narrower than the length of the anteoculus -- 2. Interoculus distinctly broader than the length of the anteoculus ----- 3.
2. Anteoculus more than one-and-a-half times the

interoculus ; prosternal keel pointed apically

----- *B. dentatum* (Mayr).

Anteoculus less than one-and-a-half times the interoculus ; prosternal keel rounded apically

----- *B. malkini* n. sp.

3. Anteoculus only slightly longer than interoculus, nearly subequal ; clypeus reaching or nearly reaching the ocular line - -4. Anteoculus distinctly longer than interoculus ;

clypeus not reaching the ocular line ----- *B. barrisi* n. sp.

4. Body elongate ; prosternal keel pointed

apically ----- *B. foveolatum* (Mayr) .

Body ovate ; prosternal keel broadly rounded

----- *B. porteri* DeCarlo.

Belostoma dentatum (Mayr)

Figures 10, 14, 18

Zaitha dentata Mayr, 1863, Verh. zool.-bot. Ges. Wien, 13: 356-357.

Zaitha eumorpha Dufour, 1863, Ann. Ent. Soc. France, (4)3: 386.

Zaitha eumorpha, Mayr, 1871, Verh. zool.-bot. Ges. Wien, 21: 411-412 (probably only in part) .

Zaitha eumorpha, Walker, 1873, Cat. Hem. Het. Brit. Mus., 8: 178 (probably only in part) .

Zaitha eumorpha, Berg, 1879, Hem. arg., p. 193 (questionable) .

Zaitha eumorpha, Berg, 1884, Add. et emend. Hem. Arg., p. 120.

Zaitha mayri Berg, Add. et emend. Hem. Arg., p. 120-121 (questionable) .

Zaitha eumorpha, Montandon, 1895, Mus. Zool. Anat. Comp., Torino, 10: 10.

Belostoma dentatum, Montandon, 1903, Bul. Soc. Sci. Bucarest, 12 : 116-117 (including var. *major* and *mayri*, *mayri* questionable) .

Belostoma dentatum, Kirkaldy and Bueno, 1909, Proc. Ent. Soc. Wash., 10 : 190-191 (including var. *mayri* which is questionable, probably only in part) .

Belostoma mayri, DeCarlo, 1930, Rev. Soc. Ent. Arg., no. 13 : 110, pl. 6, *fig.* 16 (possibly only in part) .

Belostoma dentatum, DeCarlo, 1935, Rev. Soc. Ent. Arg., 7:

204-205, pl. 16, *figs.* 2, 4 (possibly only in part) . *Belostoma dentatum*,
DeCarlo, 1938, An. Mus. Arg. Cien. Nat.,

39 : 212, pl. 8, *fig.* 48 (possibly only in part) .

Belostoma dentatum, DeCarlo, 1942, Rev. Soc. Ent. Arg., 11: *fig.* 2 and 4.

Other species referred to as *dentatum*.

Belostoma dentatum, Hungerford, 1944, Zoologica, 29 : 129. (= *B. malkini* n. sp.)

Size and shape. Body dilated, ovate. Length : a, 45.0-49.0 mm. ; ? ? , 46.0 mm. Width : r, 20.0-23.5 mm. ; ? ? , 20 mm. Width of head, 7.4-8.5 mm. ; width of pronotum, 13.015.3 mm. ; length of pronotum, 7.2-8.4 mm.

Color and markings. As described for the species group. Specimens from Peru do not have yellow spots on the venter-of the connexivum.

Structural characteristics. Interocular space 1.4 to 1.6 times the width of an eye ; anteoculus about two-thirds longer than the interoculus ; clypeus remote from ocular line ; inter-ocular space distinctly narrower than the anteoculus ; eye globose ; segment I of the beak two-thirds longer than II. Prosternal keel pointed apically. Genitalia as shown in figures 10 and 14.

Comparative notes. *B. dentatum* differs from the other species in this group by the longer anteoculus, pointed prosternal keel, and the larger size. This is the largest member of the *dentatum* group and is exceeded in size only by *B. dilatatum* (Dufour).

Types. The holotype is in the Vienna Museum. This specimen has not been examined.

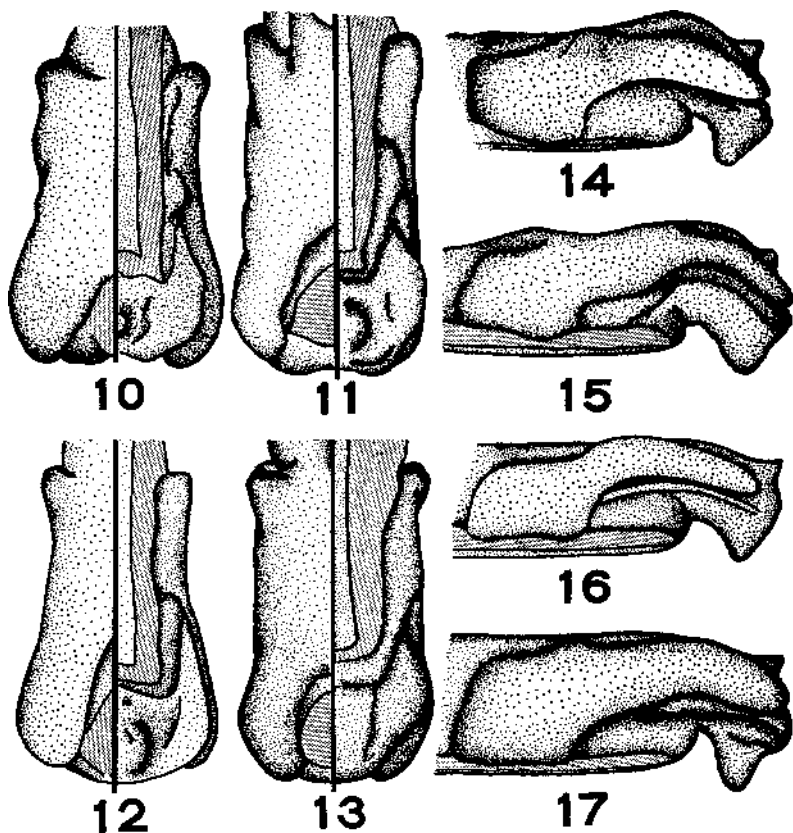
Nomenclature. There can be little question that this large species is that described by Mayr. However, there is some question concerning the status of *Zaitha mayri* Berg, 1884. I have seen no specimens of *B. dentatum* as small as those described by Berg. DeCarlo has examined the specimens studied by Berg and considers them to be *B. dentatum*. Since DeCarlo has examined better series of this complex than I have been able to obtain, I shall concede to his judgment concerning the synonymy of this species. Additional specimens from Brazil may shed more light for future studies. All of

the specimens that I have examined are very large and dilated. DeCarlo (1938) gives the range in size from 40-50 mm. long and 16.5-21.0 mm. wide.

Distribution. DeCarlo reports specimens from Argentina, Brazil, and Paraguay. I have identified specimens from the following localities:

BRAZIL. Rio Grande do Sul, *e* (FU).

PERU. LORETO : Rio Ucayali, *e* (AMNH) ; Iquitos, (USNM). SAN MARTIN: Upper Rio Huallaga, 2 *cr* (AMNH).



Figures 10 through 17

Dorsal and ventral aspect of genitalia. 10, *B. dentatum*; 11, *B. malkini*; 12, *B. harrisi*; 13, *B. porteri*; 14-17, Lateral aspect of genitalia. 14, *B. dentatum*; 15, *B. malkini*; 16, *B. harrisi*; 17, *B. porteri*.

Belostoma malkini n. sp.

Figures 11, 15, 20

Belostoma dantatum, Hungerford, 1944, *Zoologica*, 29 : 129.

Size and shape. Moderately dilated to elongate or ovate body. Length : a ♂, 40.0-44.0 mm. ; ♀, 41.0-45.0 mm. Width : c² e, 17.0-19.0 mm. ; ♀♀ . 16.5-19.5 mm. Width of head, 7.58.3 mm.; width of pronotum, 12.6-14.0 mm. ; length of pronotum, 6.8-7.6 mm.

Color and markings. As indicated for the species group.

Structural characteristics. Interocular space 1.3 to 1.4 times the width of an eye ; anteoculus about one-half longer than the interoculus ; clypeus remote from ocular line ; inter-ocular space distinctly narrower than the anteoculus ; eyes globose ; segment I of the beak about one-fourth longer than II. Prosternal keel rounded apically. Genitalia as shown in figures 11 and 15.

Comparative notes. This species seems to be structurally intermediate between *B. dentatum* and *B. porteri*. The anteoculus is quite long, but not as long as that of *B. dentatum*. The prosternal keel is very prominent but somewhat rounded similar to *B. porteri*.

Types. Holotype , allotype (♀), and 40 ♂ and 30 ♀♀ paratypes from " Guanare, estado Portuguesa, IX-10 to 13-1957". These specimens were collected by Borys Malkin. The holotype measures 44 mm. long and 19 mm. wide, while the allotype is 44.5 mm. long and 18 mm. wide. The type series is from the California Academy of Sciences.

Etymology. This species was named in honor of the collector, Borys Malkin.

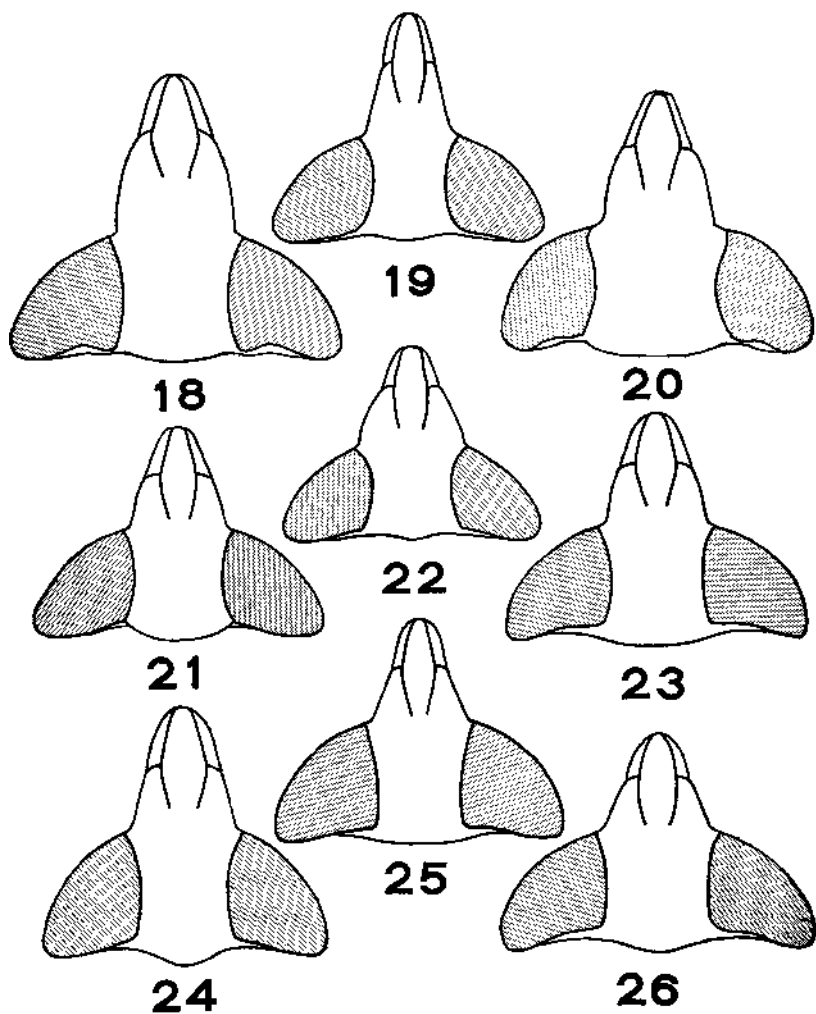
Distribution. *B. malkini* n. sp. is apparently restricted to the northern portion of South America. Specimens from the following localities have been identified :

BOLIVIA. SANTA CRUZ : Roboré, 2 ♂ e (BM).

BRITISH GUIANA. Georgetown, ♀ (USNM) .

TRINIDAD. Fyzabad, 2 ♂ a, 3 ♀♀ (KU) .

VENEZUELA. e (KU) ; ♂ , ♀ (USNM). BOLIVAR Tumeremo, a (USNM) . MONAGAS Quiriquire, ♂ (CU) ; Caripito, a (AMNH) . PORTUGUESA : see type series. ZULIA : Rosano, ♀ (USNM).



Figures 18 through 26

Dorsal aspect of head. 18, *B. dentatum*; 19, *B. harrisi*; 20, *B. malkini*; 21, *B. porteri*; 22, *B. foveolatum*; 23, *B. columbiae*; 24, *B. ellipticum*; 25, *B. subspinosum*; 26, *B. asiaticum*.

Belostoma harrisi n. sp.

Figures 12, 16, 19

Size and shape. Body ovate. Length: ? c^p, 37.0-41.5 mm.; ??, 37.5-41.5 mm. Width: ♂ cs', 17.5-19.5 mm.; 9?, 17.5-

20.0 mm. Width of head, 7.0-8.1 mm. ; width of pronotum, 13.1-14.4 mm. ; length of pronotum, 6.7-7.1 mm.

Color and markings. As given for the species group.

Structural characteristics. Interocular space 1.3 to 1.4 times the width of an eye ; anteoculus about one-fourth longer than the interoculus ; clypeus not quite reaching the ocular line ; interocular space greater than the length of the anteoculus ; eye somewhat triangular ; segment I of the beak about one-third longer than II. Prosternal keel bluntly rounded. Genitalia as shown in figures 12 and 16.

Comparative notes. *B. harrisi* is very similar to *B. porteri*, but differs from this species by the longer anteoculus.

Types. Holotype (d), allotype () , and a a paratype labelled "Aback of Pln. Ogle, E. Coast B. guiana, S. Harris, 11-13-37, Lamaha Conservancy." In addition, 22 *dd* and 20 ? ? paratypes are from Surpurui Creek and Honey Camp Creek, British Guiana. The holotype measures 38.0 mm. long and 18.5 mm. wide, while the allotype is 39.0 mm. long and 19.0 mm. wide.

Distribution. This species is known from the Guianas and Brazil. Specimens from the following localities have been identified :

BRAZIL. PARR : *cr* (MC) .

BRITISH GUIANA. see type series ; Georgetown, e (CU).

DUTCH GUIANA. *a* (USNM) ; Paramaribo, 3 *a d* , (DC).

Belostoma porteri DeCarlo

Figures 13, 17, 21

Belostoma porteri DeCarlo, 1942, Rev. Soc. Ent. Arg., 11: 212-213, *fig* 1, 3.

Size and shape. Body ovoid. Length : *d a*, 37.5-43.5 mm. ;

, 39.0-41.0 mm. Width : *d cr*, 18.0-19.6 mm. ; , 18.5-19.4 mm. Width of head, 7.5-8.2 mm. ; width of pronotum, 12.3-13.3 mm. ; length of pronotum, 6.5-7.2 mm.

Color and markings. As indicated for the species group.

Structural characteristics. Interocular space 1.3 to 1.4 times the width of an eye ; anteoculus nearly subequal to interoculus or slightly longer ; clypeus reaching or nearly

reaching the ocular line ; interocular space wider than the anteculus ; eye somewhat triangular ; segment I of the beak about one-third longer than II. Prosternal keel bluntly pointed or rounded apically. Genitalia as shown in figures 13 and 17.

Comparative notes. Very similar to *B. harrisi* but differs from this species by the clypeus, which reaches or nearly reaches the ocular line.

Types. DeCarlo (1942) gives the following data for the types : "holotipo, zona del canal de Panama ; alotipo, Las Guacas Peru ; paratipo, Merida, Venezuela, col. por Juan Velar.

Un paratipo hembra y un paratipo macho de zona del canal de Panamá . . ."

I have examined the latter types which are in the collection of Carl Drake (USNM) and are from the same locality as the holotype.

Distribution. This species seems to be restricted to the northwestern part of South America. In addition to the type localities I have identified specimens from the following localities :

PANAMA. ϕ (KU) ; Trinidad Rio, e (USNM) . PANAMA :
Panama City, γ (KU) , 2 d' d' , 3 (USNM) .
VENEZUELA. d' (USNM) .

Belostoma foveolatum (Mayr

Figure 22

Zaitha foveolata Mayr, 1863, Verh. zool.-bot. Ges. Wien, 13 : 355-356.

Zaitha foveolata, Mayr, 1871, Verh. zool.-bot. Ges. Wien, 21: 411.

Zaitha foveolata, Walker, 1873, Cat. Hem. Het. Brit. Mus., 8 : 178.

Zaitha foveolatum, Berg, 1879, Hem. Arg., p. 192-193.

Zaitha foveolata, Montandon, 1895, Mus. Zool. Anat. Comp., Torino, 10: 10.

Belostoma foveolatum, Kirkaldy and Bueno, 1909, Proc. Ent. Soc. Wash., 10 : 191 (probably only in part) .

Belostoma foveolatum, DeCarlo, 1938, An. Mus. Arg. Cien. Nat., 39: 213, pl. 8, *fig.* 49.

Size and shape. Body elongate, rather narrow. Due to unavailability, the measurements of the males are not given. The three females examined have the following dimensions :

length, 38.0-39.0 mm. ; width, 16.0-17.2 mm. ; width of head, 7.2-7.5 mm. ; width of pronotum, 11.2-12.5 mm. ; length of pronotum, 6.4-7.3 mm.

Color and markings. As indicated for the species group.

Structural characteristics. Interocular space 1.3 to 1.4 times the width of an eye ; anteoculus about subequal to the interoculus ; clypeus reaching or nearly reaching the ocular line ; interocular space distinctly wider than the length of the anteoculus ; eye globose, slightly triangular ; segment I of the beak slightly longer than II. Prosternal keel prominent, somewhat pointed apically. Since no males of this species were available, the genitalia are not illustrated.

Comparative notes. Very similar to *B. porteri* but differs from this species by the narrower body form, more pointed prosternal keel and the ratio of the first two segments of the beak.

Types. *B. foveolatum* was described from a single specimen of unknown origin. The type is in the Vienna Museum of Natural History and has not been examined.

Distribution. DeCarlo (1938) records specimens from Brazil. I have identified specimens from the following localities.

BRAZIL. Para, 29 (KU) . SÃO PAULO : Sao Paulo, 9 (KU) .

Belostoma subspinosum group

Moderately large to large, elongate, ovate, or oblong species, ranging from 26 to 40 mm. long.

Anteoculus from slightly less to considerably longer than interoculus ; clypeus remote from, or occasionally reaching or nearly reaching, the ocular line ; beak long, slender, segment I usually longer than II, sometimes subequal. Prosternal keel elongate, prominent, bluntly pointed ; scutellum reaching the nodal line. Pilosity covering about half the connexivum, constricted between spiracles, extending only slightly beyond penultimate segment except for *B. cummingsi* which has pilosity bordering the genital operculum. Genitalia with caudal and ventral apical protuberances ; caudal protuberance sometimes not prominent.

This group is very closely related to the *dentatum* group. Members of the *dentatum* group have the ventral protuber-

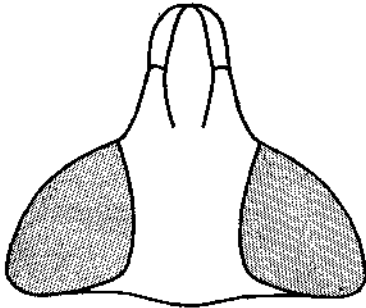
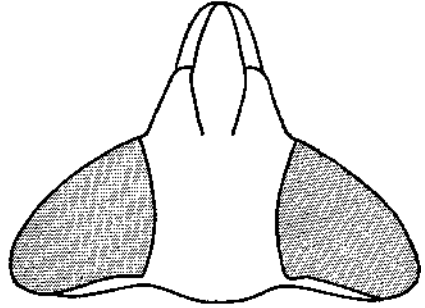
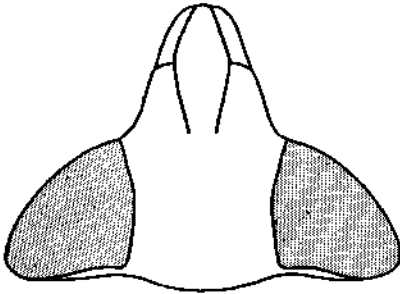
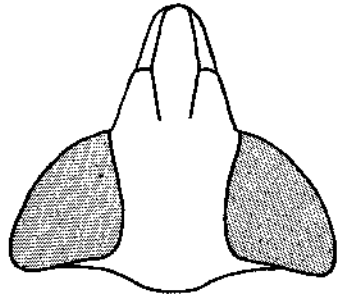
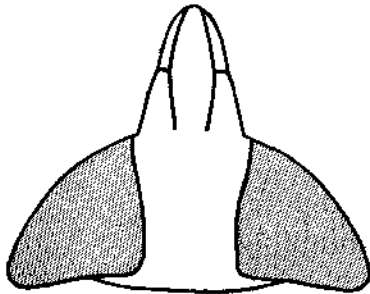
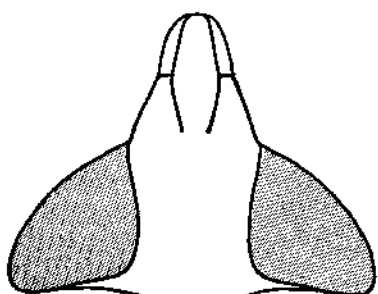
ance highly developed and very prominent. Perhaps the *dentatum* group should actually be considered a part of this group, yet its members seem to form a distinct unit of their own.

Many of the species of this group have distinctive genitalia by which they may be identified. Other than the genitalia, the characters are few and confined mainly to the dimensions of the head and their comparison. Since the genital characters are difficult to describe, the following key is based primarily on the structures of the head, but for positive identification the genitalia should be compared with the drawings. The key does not fit a few apparently atypical specimens that are noted in the discussions of the individual species. However the following key is valid for the majority of the specimens studied :

Key to the species of the *subspinosum* group

1. Pilosity of the connexivum extending along the margins of the genital operculum *B. cummingsi* DeCarlo.
 - Pilosity of the connexivum extending only slightly beyond penultimate segment ----- 2.
2. Anteoculus subequal or shorter than interoculus ----- 3.
 - Anteoculus longer than interoculus ----- 8.
3. Clypeus clearly reaching the ocular line ----- 4.
 - Clypeus nearly reaching or remote from the ocular line ----- 5.
4. Segment I of beak subequal to II *B. venezuelae* n. sp. Segment I of beak one-fifth longer than II ----- *B. asiaticum* (Mayr) .
5. Elongate species, two-and-a-half times as long as wide ----- *B. elongatum* Montandon.
 - Ovate species, not more than two-and-one-fourth times as long as wide ----- 6.
6. Segment I of beak subequal to II ----- *B. guianae* n. sp.
 - Segment I of beak distinctly longer than II ----- 7.
7. Anteoculus subequal to anterior interocular space, South American *B. dallasi* DeCarlo.
 - Anteoculus slightly shorter than anterior interocular space, North American ----- *B. subspinosum* Palisot de Beauvois.
8. Lateral foveae of head very distinct, forming conspicuous grooves at anterior apices of eyes ; anteoculus equal to

anterior interocular *anurum* (Herrich-Schaffer) . — Lateral foveae moderately developed, anteoculus slightly

**27****28****29****30****31****32**

Figures 27 through 32

Dorsal aspect of head. 27, *B. anurum*; 28, *B. guianae*; 29, *B. venezuelae*; 30, *B. elongatum*; 31, *B. dallasi*; 32, *B. cummingsi*.

- longer than width of anterior interocular space..... 9.
 9. Anteoeculus equal to the length of an eye as viewed laterally
 *B. ellipticum* Latreille.
 — Anteoeculus shorter than eye as viewed laterally
 ----- *B. columbiae* n. sp.

Belostoma columbiae n. sp.

Figures 23, 33, 39

Size and shape. Broadly elliptical-ovate body. Holotype,
 : length, 35 mm. ; width, 16.5 mm. ; width of head, 7.0 mm. ; width of pronotum, 11.0
 mm. ; length of pronotum, 5.8 mm. Allotype, 9 : length, 33.5 mm. ; width, 17.8
 mm. ; width of head, 7.3 mm. ; width of pronotum, 12.5 mm. ; length of pronotum, 7.
 5 mm.

Color and markings. Uniformly dark mahogany. Each femur and tibia with
 three black, obscure bands. Other than banding of legs, without distinct markings.

Structural characteristics. Interocular space 1.1 to 1.2 times the width of an
 eye ; clypeus not reaching the ocular line, anteoeculus slightly longer than interocular ;
 anterior interocular space subequal to the anteoeculus ; segment I of the beak about
 one-and-a-half times as long as II. Genitalia as shown in figures 33 and 39.

Comparative notes. This species is distinctly more ovate than the other
 members of this group. It is structurally similar to *B. ellipticum* but differs by the
 genitalia and the comparatively shorter anteoeculus and narrower interocular space.

Types. Both the e holotype and the 9 allotype are labelled, "Columbia,
 S. A., Felipe Ovalle, Q." The holotype has the hind tibiae and tarsi missing. A
 third specimen, designated as a paratype, has most of the legs missing and the
 caudal tip of the abdomen has been chewed or bitten off. The type series is in the
 collection of the American Museum of Natural History.

Distribution. This species is known only from Colombia. Other than the
 type series, a specimen from the following locality has been identified :

COLOMBIA. MAGDALENA : Santa Maria, r (MC).

Belostoma ellipticum Latreille

Figures 24, 34, 40

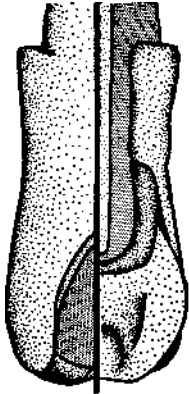
Belostoma ellipticum Latreille, 1833, in Humboldt at Bomp-

land, Obs. Zool., 2: 105, pl. 39, fig. 4.

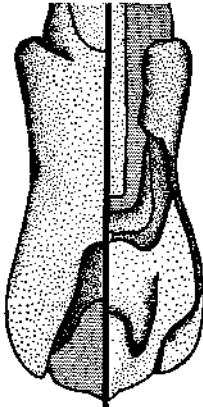
Zaitba elliptica, Mayr, 1871, Verh. zool.-bot. Ges. Wien, 21: 415 (possibly).

Zaitba anurus, Mayr, 1871, Verh. zool.-bot. Ges. Wien, 21: 412-413 (in part).

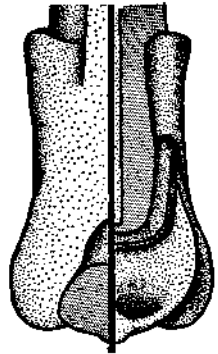
Zaitba ellipticum, Walker, 1873, Cat. Hem. Het. Brit. Mus., 8: 178 (possibly).



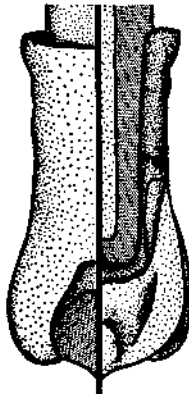
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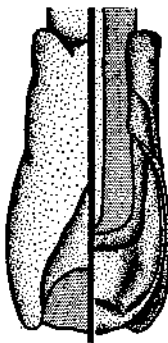
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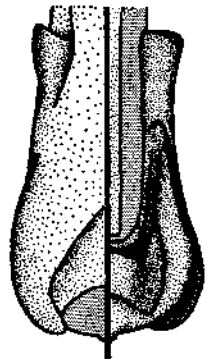
35



36



37



38

Figures 33 through 38

Dorsal and ventral aspect of genitalia. 33, *B. columbiae*; 34, *B. ellipticum*; 35, *B. subspinosum cupreomicans*; 36, *B. subspinosum subspinosum*; 37, *B. asiaticum*; 38, *B. cummingsi*.

Zaitba anurus, Walker, 1873, Cat. Hem. Het. Brit. Mus., 8: 178 (in part) .

Zaitba anurus, Berg, 1879, Hem. Arg., p. 192 (probably in part) .

Zaitba elliptica, Uhler, 1886, Checkl. Hem. Het. N. Amer., p. 28 (possibly in part) .

Zaitba elliptica, Champion, 1901, Biol. Centr. Amer., Hem. Het., 2 : 365, pl. 22, *fig.* 21 (probably in part) .

Belostoma ellipticum, Montandon, 1903, Bul. Soc. Sci. Bucarest, 12 : 117-119 (probably in part) .

Belostoma ellipticum, Kirkaldy and Bueno, 1909, Proc. Ent. Soc. Wash., 10 : 191 (probably in part) .

Belostoma ellipticum, Van Duzee, 1916, Checkl. Hem. Amer., p. 53 (probably in part) .

Belostoma ellipticum, Van Duzee, 1917, Univ. Calif. Publ. Ent., 2 : 463 (probably in part) .

Belostoma ellipticum, DeCarlo, 1938, An. Mus. Arg. Cien.

Nat., 39 : 216-217, pl. 7, *fig.* 53 (probably in part) . *Belostoma ellipticum*, Lauck, 1959, Bull. Chicago Acad. Sci., 11 (1) : 9.

Other species referred to as *ellipticum*.

Belostoma ellipticum, DeCarlo, 1939, Rev. Soc. Ent. Arg., 10: 234 (= *B. subspinosum subspinosum*).

Size and shape. Body elongate-elliptical. Length : $d d$, 31.5-41.5 mm. ; $9 9$, 31.5-41.0 mm. Width : $d se$ 14.0-19.5 mm. ; $9 9$ 14.5-18.2 mm. Width of head, 6.1-7.7 mm. ; width of pronotum, 9.9-13.6 mm. ; length of pronotum, 5.2-6.7 mm.

Color and markings. Light yellow-brown to chocolate brown. Anterior portion of scutellum usually darker than caudal part ; thoracic venter yellow to red-brown. Profemur indistinctly marked, each meso- and metafemur with two or three faint, often obscure, zigzag or irregular dark bands ; each pro- and mesotibia with three dark bands, metatibia dark ; tarsi dark. Abdominal venter yellowish-brown, marked with dark irregular patches ; each segmental margin of the connexivum with three dark stripes.

Structural characteristics. Interocular space 1.3 to 1.5 times the width of an eye ; clypeus not reaching the ocular line ; anteoculus about one-fifth longer than interoculus ; anterior interocular space slightly wider than anteoculus ; seg-

ment I of beak about 1.2 times longer than II. Genitalia as shown in figures 34 and 40.

Comparative notes. This species is very similar to its Mexican counterpart, *B. subspinosum cupreomicans*. It differs from this subspecies by the longer anteculus and the very distinct ventral diverticulum.

Nomenclature. Attempts to secure the original description of *B. ellipticum* Latreille in American libraries have been fruitless. Until it can be obtained, final disposition of the status of the name cannot be made, although present evidence indicates it should probably be considered a *nomen dubium*. Latreille gave no type locality and did not designate a type. Application of this name was based on the work of authors who have cited Mexico and Cuba as the distribution. There is no consistency in the previous determination of this species, primarily because the characters used for separating *B. ellipticum* Latreille from *B. subspinosum* (= *B. boscii* of most authors) were unreliable. For example, I have seen nearly identical specimens from Cuba determined as both *B. ellipticum* and *B. boscii*. However, the genitalia as well as the external characters cited above clearly show the specimens in question are *B. ellipticum*. I have seen many similar mistakes in identification of the mainland specimens by several American authors. Thus, one cannot accept all published records of *B. ellipticum* as correct. The name *B. ellipticum* Latreille, which is without a type or type locality, should probably be considered a *nomen dubium*, but this action would be unjustified without first studying the original description and figures.

Types. There are no known types for this species.

Special variations. The mainland specimens are much larger and more varicolored than the Cuban specimens. I have seen several large specimens from Honduras that are more than 40 mm. long, while the Cuban specimens do not exceed 35.5 mm. in length.

Distribution. This species occurs in Cuba and along the eastern coast of Texas, Mexico, and Central America to Honduras. Specimens from the following localities have been identified :

- BAHAMA ISLANDS. ANDROS: Straniard Creek Lake, 9 (USNM).
 CUBA. *a*, 9 (KU); 9 (USNM). LA HABANA: Cayamas, 2 *d' d*, 9 (USNM); Rio Almendares, *d*, 2 9 9 (KU). ORIENTE: Guantánamo, *d* (AMNH), *d* (USNM). LAS VILLAS: Palpite Cienaga de Zapita, *d* (AMNH), 2 *di d* (KU);
 St. Clara, 2 *d' d*, 9 (ISU). MATANZAS: *d* 9 (KU).
 GUATEMALA. Conchas River, *d'*, 9 (L).
 HONDURAS. ATLANTIDA: La Ceiba, 2 *d d*, (USNM).
 MEXICO. CAMPECHE: Escárcega Campe, *d* (AMNH). YUCATAN: Chichén Itzá, *d*, 9 (AMNH); Chuminopolis, 3 (AMNH); Colonia, 6 *d' d*. 16 9 9 (AMNH). VERA CRUZ: 9 (MC), 5 *d d*, 4 9 (PC); Córdoba, 9 (USNM).
 UNITED STATES. TEXAS: Cameron Co., Harlingen, *di* 9 (USNM).

Belostoma subspinosum cupreomicans (Stål)

Figures 25, 35, 41

- Zaitba cupreomicans* Stål, 1854, Ofv. Svenska Vet.-Ak. Förh., 11: 240.
Zaitba bifoveata Haldeman, 1855, Explor. Surv. Valley Great Salt Lake Utah, Append. C., p. 370-371, pl. 10, fig. 1. *Zaitba cupreomicans*, Stål, 1862, Ent. Zeit., 23: 461.
Zaitba (in part). Mayr, 1863, Verh. zool.-bot. Ges. Wien, 13: 354
Zaitba anurus, Mayr, 1871, Verh. zool.-bot. Ges. Wien, 21: 412-414 (in part).
Zaitba anurus, Walker, 1873, Cat. Hem. Het. Brit. Mus., 8: 178 (in part).
Zaitba anurus, Berg, 1879, Hem. Arg., p. 192 (probably in part).
Belostoma Montandon, 1900, Bul. Soc. Rom. Sci. Bucarest, 9: 271 (in part).
Zaitba anurus, Uhler, 1886, Checkl. Hem. Het. N. Amer., p. 28. *Zaitba anurus*, Uhler, 1894, Proc. Calif. Acad. Sci., 4: 191. *Zaitba anurus*, Champion, 1901, Biol. Centr. Amer., Hem.
 Het., 2: 365, pl. 22, fig. 1 (in part).
Belostoma boscii, Montandon, 1903, Bul. Soc. Rom. Sci. Bucarest, 12: 117-120 (in part).
Belostoma Kirkaldy and Bueno, 1909, Proc. Ent. Soc.

Wash., 10 : 190 (in part) .

Zaitba éoveata, Banks, 1910, Cat. Nearct. Hem. Het., p. 9 (at least in part) .

Belostoma boscii, Van Duzee, 1917, Univ. Calif. Publ. Ent., 2 : 468 (in part).

Belostoma bifoveatum, Millspaugh, 1939, Field Lab., 7 (2) : 82

Belostoma boscii, Usinger, 1956, Aquatic Insects Calif., p. 206.

Belostoma boscii, Menke, 1958, Bull. So. Calif. Acad. Sci. 57 (3) : 158-160 (in part).

Belostoma subspinosum cupreomicans, Lauck, 1959, Bull. Chicago Acad. Sci., 11(1) : 9.

Belostoma bosci, DeCarlo, 1960, Rev. Soc. Ent. Arg., 22 : 5455 (in part) .

Size and shape. Body elongate-ovoid. Length : $d' d'$, 29.035.0 mm. ; . 30.5-35.0 mm.

Width : 13.0-15.5 mm. ;

, 13.3-15.4 mm. Width of head, 5.6-6.6 mm. ; width of pronotum, 9.2-11.5 mm. ; length of pronotum, 4.8-5.8 mm.

Color and markings. Almost uniformly brown to greenish-brown, sometimes mottled with yellow. Anterior portion of scutellum usually darker than caudal part ; thoracic venter light brown to red-brown. Each femur with three dark zigzag or irregular, sometimes obscure bands ; each pro- and mesotibia with three dark bands, metatibia dark ; tarsi dark. Abdominal venter yellow to orange-brown, with dark spots ; each segmental margin of the connexivum with three, often indistinct, transverse stripes.

Structural characteristics. Interocular space 1.2 to 1.4 times the width of an eye ; clypeus nearly reaching the ocular line ; anteoculus subequal to the interoculus ; anterior inter-ocular space slightly more or subequal to the anteoculus ; segment I of the beak about 1.2 times as long as II. Genitalia as shown in figures 35 and 41.

Comparative notes. This subspecies differs from the island form by its larger size and more distinct color pattern. In other features it is structurally identical with *B. subspinosum subspinosum*.

Nomenclature. This species along with several others in the *subspinosum* group has been considered as *B. boscii* by many authors. The type locality of *B. boscii* is unknown and

the description could refer to several species of this group. Thus *Belostoma boscii* Le Peletier and Serville is considered a *nomen dubium*, giving way to the more precisely defined *Zaitba cupreomicans* Stål for the subspecific name. The citation for *Zaitba bifoveatum* is given as 1852 by several authors. However, appendix C of Stanbury's book was not published until 1855 thus giving priority to Stål (1854).

Type. The holotype of *Zaitba cupreomicans* is in the museum at Stockholm and is labelled "Mexico". The specimen measures 33.0 mm. long and 16.2 mm. wide.

Distribution. This species occurs throughout Central America, Mexico, and is occasionally found in the southwestern United States. Specimens from the following localities have been identified:

GUATEMALA. IZABEL : Cayuga, 2 e e (USNM). JUTIAPA : Asunción, *d* (L) ; Jutiapa, *d*, 9 (L) ; Monogoy, 4 *d*, 4 9 9 (L) ; Progreso, e, 3 9 9 (L).

EL SALVADOR. LA UNION : San Antonio, 8 *d* e, 5 ? ? (L) ; Santa Rosa, *d*, 2 9 9 (L) ; San Miguel, 9 (L) ; Sirama, 9 *cr d*, 5 9 9 (L). San Vicente, *d* (L). HONDURAS.

CHIQUIMULA : Copán, 9 (KU). ATLANTIDA : Tela, *d'* (MU). TEGUCIGALPA : Tegucigalpa, *d'* (L).

NICARAGUA. ESTELÍ: Congega, *d* (L). MANAGUA : San Benito, e, 3 9 9 (L). MADRÍZ : Somoto, nymphs (L). RIVAS: Belem, 2 *d d*, 4 9 9 (L) ; Rivas, nymphs (L).

COSTA RICA. GUANACASTE: Bagaces, 18 *d*, 5 9 9 (L) ; Liberia, 9 (L).

PANAMA. *cr* (USNM). CHIRIQUÍ: El Volcán, (AMNH).

MEXICO. See type locality. BAJA CALIFORNIA : e, 3 9 9 (USNM) ; Comondu, e (MC). San Luis Gonzaga, *d* (MC). CAMPECHE: Champotón Yalú Aquada, *d* (MU) ; Ciudad de Carmen, 3 e e, 2 9 9 (KU). CHIAPAS : La Libertad, 5

d, 4 ? ? (KU) ; Lake Tepancuapan, 2 *d d*, 3 9 9 (KU) ; San Vicente, e (KU). COLIMA : (USNM) ; Colima, e (AMNH), 2 e *cr* (KU), e (USNM) ; Vulcano, 2 *d*, 9 (USNM). DISTRITO FEDERAL: Texcoco, *or* (KU) ; Xochimilco (AMNH). GUANAJUATO: Acámbaro, 9 (CNHM) ; Guanajuato, 8 *d* e, 6 9 9 (MC). GUERRERO: Acapulco, 2 9 9

(KU) ; Rio Agua, *e*, 3 9 9 (KU). JALISCO: Chapala, *e*, 2 9 9 (MC) ; Concha, *e* (AMNH) ; Guadalajara, 5 *ee*, 10 9 9 (AMNH), 2 *ea* (CNHM), *e*, 9 (CU), 9 (KU), 8 *a e*, 5 9 9 (PC) ; La Quemada, 2 *di e*, 2 9 9 (MC). MICHOACÁN : El Sabino Uruapán, *di* (KU) ; Quiroga, 2 *a d*, 9 (L) ; Morelia, 2 *di*, 2 9 9 (AMNH) ; Zamora, 3 *di*, 9 (MC), *e*, 9 (KU). MORELOS : Cuernavaca, *d'* (AMNH). NAYARIT : Tepic, *e* (MC), *di* (USNM) ; Puerta de la Lima,

(AMNH). NUEVO LEON: Monterrey, 2 *ea* (CNHM) ; Rio Ramos near Allende, 9 (FU). OAXACA : La Ventosa, *e* (ISU) ; Tehuantepec, *c5'* (AMNH), *d* (ISU) ; Zanatepec,

(ISU). PUEBLA : Tehuacán, *c?'* (KU). QUERETARO, 2 *di d* (USNM). SAN LUIS POTOSI: Tamazunchale, 9 (AMNH) ; Valles, 4 *di e*, 9 (MU). SINALOA : Culiacán, 9 (ISU) Ma-

zatlán, *d* (AMNH) ; Verdura, *a* (USNM) ; Hermosillo, *a* (MC) ; Obregon, *d*, 9 (ISU). TAMAULIPAS : Tampico, 9 (AMNH), , 5 9 9 (KU) ; Victoria, 9 (AMNH), 6 *ea*, 3 9 9 (KU). VERA CRUZ : Cordoba, 9 (USNM) ; Jalapa, 9 (PC) ; Jesus Carranza, *d*, 9 (AMNH) ; La Gloria, 9 (USNM) ; Minatitlán, 9 (AMNH) ; Napacayan, 9 (AMNH) ; Pao de Ovejas,

3 *di d*, 4 9 9 (MC) ; Vera Cruz, *a* (CU), 9 (ISU), 9 (MC), 13 *ee*, 8 9 9 (PC). YUCATAN : Chichén Itzá, (CNHM), 9 (KU), *di* (MU) ; Piste Choch

Cenote,

9 (MU).

UNITED STATES. ARIZONA: *Pima Co.*, 9 (FU), 9 (MU). CALIFORNIA : 9 (CU). TEXAS : *Cameron Co.*, Brownsville, 9 (MU) ; Harlingen, 9 (USNM) ; *Hidalgo Co.*, McAllen, (KU) ; Weslaco, *e* (USNM) ; *Kleberg Co.*, Kingsville, 3 *a d'*, 9 (CU), 9 (PC).

Belostoma subspinosum subspinosum (Palisot de Beauvois)

Figures 25, 36, 42

Nepa subspinosa Palisot de Beauvois, 1920, Ins. Rec. Afr. et Amérique, Paris, p. 236, pl. 20, figs. 2a, b.

Zaitba subspinosa, Dufour, 1863, Ann. Soc. Ent. France, (4) 3 : 387 (in part).

Nepa subspinosa, Mayr, 1871, Verh. zool.-bot. Ges. Wien, 21: 414.

Zaitba anura, Uhler, 1886, Checkl. Hem. Het. N. Amer., p. 28 (in part).

Zaitba anura, Uhler, 1894, Proc. Zool. Soc. London, 1894: 223. *Zaitba anura*, Gundlach, 1894, Fauna Puerto-Riquena, p. 600. *Zaitba anura*, Champion, 1901, Biol. Centr. Amer., Hem. Het.,

2 : 365 (in part) .

Belostoma subspinosum, Kirkaldy and Bueno, 1909, Proc. Ent. Soc. Wash., 10: 192.

Belostoma boscii, Van Duzee, 1916, Checkl. Hem. Amer., p. 53.

Belostoma boscii, Van Duzee, 1917, Univ. of Calif. Publ. Ent., 2 : 468 (in part) .

Belostoma impavidum Bueno, 1918, Univ. Iowa Std., 10: 3234, pl. 1, figs. 1-2.

Belostoma boscii, Barber, 1923, Amer. Mus. Novit., 75: 13.

Belostoma subspinosum, DeCarlo, 1938, An. Mus. Arg. Cien. Nat., 39: 239.

Belostoma impavidum, DeCarlo, 1938, An. Mus. Arg. Cien. Nat., 39: 239.

Belostoma boscii, Barber, 1939, Ins. Porto Rico, Hem. Het., p. 429.

Belostoma ellipticum, DeCarlo, 1939, Rev. Soc. Ent. Arg., 10: 234.

Belostoma boscii, Menke, 1958, Bull. So. Calif. Acad. Sci., 57 (3) : 158-159 (in part) .

Belostoma subspinosum subspinosum, Lauck, 1959, Bull. Chicago Acad. Sci., 11(1) : 9.

Size and shape. Body elongate-ovoid. Length : , 27.5-31.5 mm. ; ^y , 26.0-31.5 mm. Width : , 12.7-14.0 mm. ; ^y , 12.2-13.8 mm. Width of head, 5.4-6.4 mm. ; width of pronotum, 8.6-10.0 mm. ; length of pronotum, 4.5-5.3 mm.

Color and markings. The markings of *B. subspinosum subspinosum* are nearly identical with those of *B. subspinosum cupreomicans*, except that the markings of the legs and abdomen tend to become more or less effaced. The color is generally lighter than the mainland counterpart and usually quite yellowish.

Structural characteristics. Identical with those of *B. subspinosum cupreomicans*.

Types. The specimens used for the original description have been lost and a neotype from "Boca Caica, Dominican Republic" is proposed. This specimen was collected from a small grass pond with two females and numerous nymphs.

The neotype is a male and is to be placed in the Francis Huntington Snow Entomological Museum at the University of Kansas. The specimen is 30.0 mm. long and 13.3 mm. wide.

Nomenclature. Although the original description could fit almost any of the species in the family, the figure and locality clearly establishes the identity of *B. subspinosum*. The type of *B. impavidum* Bueno from Antigua has been examined and found to be identical with *B. subspinosum* and not *B. ellipticum* as stated by DeCarlo, 1939. Additional specimens from Antigua were also collected and examined.

Distribution. *B. subspinosum subspinosum* has been found on all of the islands of the Greater Antilles except Cuba, and also occurs on several of the Lesser Antilles. Specimens from the following localities have been identified:

ANTIGUA. 9 (DC) ; east side, 4 c₃, e, 7 9 9 (L).

DOMINICAN REPUBLIC. ESPAILLAT: Moca, 9 (USNM).

PUERTO PLATA : Puerto Plata, 2 e e, 9 (AMNH). SAMANA : Sanchez, d, 5 9 9 (AMNH). SAN PEDRO DE MACORÍS : Boca Caica, 2 9 (L), also see neotype; San Pedro de Macoris (USNM).

GUADÉLOUPE. Pointe-à-Pitre, 4 d d (USNM). HAITI. 9 (USNM). OUEST : Port-au-Prince, 2 e e (USNM) ; Attelye, e (USNM).

JAMAICA. 9 (CU) ; Constant Spring, St. Andrews, e,

9 (AMNH). CORNWALL : Santa Cruz, d (AMNH). SURREY : Kingston, 9 (USNM).

PUERTO RICO. AQUADILLA : Aceituna, 2 cr a, 9 (L). ARECIBO : Arecibo, 2 e e, 4 9 9 (L). GUAYANA : Cayey, d' (AMNH) ; Guayana, 2 9 9 (CU). MAYAGUEZ : Lajas, cr (L) ; Mayagüez, 2 d' a (AMNH), c?' (L), (USNM). PONCE : Coamo Springs, 5 a, 5 9 9 (AMNH), d(CU) ; Villalba,

(L). SAN JUAN : Corozal, 3', 9 (AMNH) ; Gurabo, 2 d di, 2 9 9 (L) ; Rio Piedros, a (DC) ; San Juan, e, 9 (L), (USNM).

GRENADA. Worburn, a, 9 (USNM).

ST. CROIS. 9 (AMNH), 9 (USNM).

Belostoma asiaticum (Mayr)

Figures 26, 37, 43

Zaitba asiatica Mayr, 1863, Verh. zool.-bot. Ges. Wien, 13: 354.

Zaitba boops Dufour, 1863, Ann. Soc. Ent. France, (4) 3 : 338 (in part) .

Zaitba stollii, Dufour, 1863, Ann. Soc. Ent. France, (4) 3 : 387-388 (possibly in part) .

Zaitba carbonaria Dufour, 1863, Ann. Soc. Ent. France, (4) 3 : 388 (possibly) .

Zaitba boops, Mayr, 1871, Verh. zool.-bot. Ges. Wien, 21: 414-415.

Zaitba boops, Berg, Hem. Arg., p. 191-192.

Belostoma asiaticum, Montandon, 1903, Bul. Soc. Rom. Sci. Bucarest, 9 : 119-120 (in part) .

Belostoma asiaticum, Kirkaldy and Bueno, 1909, Proc. Ent. Soc. Wash., 10 : 190 (in part) .

Belostoma asiaticum, DeCarlo, 1932, Rev. Soc. Ent. Arg., no. 22: 126.

Belostoma asiaticum, DeCarlo, 1938, An. Mus. Arg. Cien. Nat., 39 : 217 (in part) .

Belostoma asiaticum, Hungerford, 1944, Zoologica, 29: 129 (probably only in part) .

Other species referred to as *asiaticum*.

Belostoma asiaticum, DeCarlo, 1930, Rev. Soc. Ent. Arg., no. 13 : 116-117, pl. 5, fig. 5 (= *B. bergi* Montandon) .

Size and shape. Medium sized, broad, nearly oblong body. Length : ♂ 6, 26.5-27.5 mm. ; ♀ 9, 25.0-27.5 mm. Width : ♂ 6, 11.8-13.9 mm. ; ♀ 9, 11.7-12.8 mm. Width of head, 5.35-5.8 mm. ; width of pronotum, 8.4-9.7 mm. ; length of pronotum, 4.3-4.6 mm.

Color and markings. Light yellowish-brown to dark brown, sometimes mottled with yellow. Scutellum orange-brown ; thoracic venter light to dark brown. Each femur with three, often indistinct and obscure, irregular dark bands ; protibia with three dark bands, mesotibia dark or with three faint irregular bands, metatibia dark ; tarsi dark. Abdominal venter yellow-brown to orange ; each segmental margin of connexivum with three, often obscure, faint dark transverse stripes.

Structural characteristics. Interocular space 1.2 to 1.3 times the width of an eye ; clypeus extending to the ocular line ; anteoculus slightly shorter than interoculus ; anterior interocular space wider than anteoculus ; segment I of beak

approximately subequal to II. Genitalia as shown in figures 37 and 43.

Comparative notes. This species is one of the smallest of the *subspinosum* group. It is similar to *B. venezuelae* in size, but is much more elliptical in shape and has segment I of the beak subequal to II.

Types. I have seen a male and female from the Vienna Museum that were identified and labelled by Mayr. I have designated the male as a lectotype, while the female has been designated a syntype. The lectotype measures 26.5 mm. long and 11.8 mm. wide, while the female is 25.0 mm. long and 11.9 mm. wide. The locality of these specimens is unknown.

Distribution. This species is strictly South American. Many of the localities cited in the literature are questionable for this species. Specimens from the following localities have been identified:

CHILE. SANTIAGO: Maipú 9 (USNM).

ECUADOR. *c*₃, (USNM). GUAYAS : Guayaquil, (*β'* (FU), 4 *d'*, 5 9 (USNM) . Los Rios: Quevedo, (USNM) .

PICHINCHA : Santo Domingo de los Colorados, 3 *d d* (USNM).

PERU. LA LIBERTAD: Pacasmayo, 3 *a* (*β'*, 8 9 9 (KU) . LIMA: Laguna Villa, 3 9 9 (KU). LORETO: Iquito, (AMNH) .

Belostoma cummingsi DeCarlo

Figures 32, 38, 44

Belostoma foveolatum, DeCarlo, 1930, Rev. Soc. Ent. Arg., no. 13: 113, pl. 5, fig. 13.

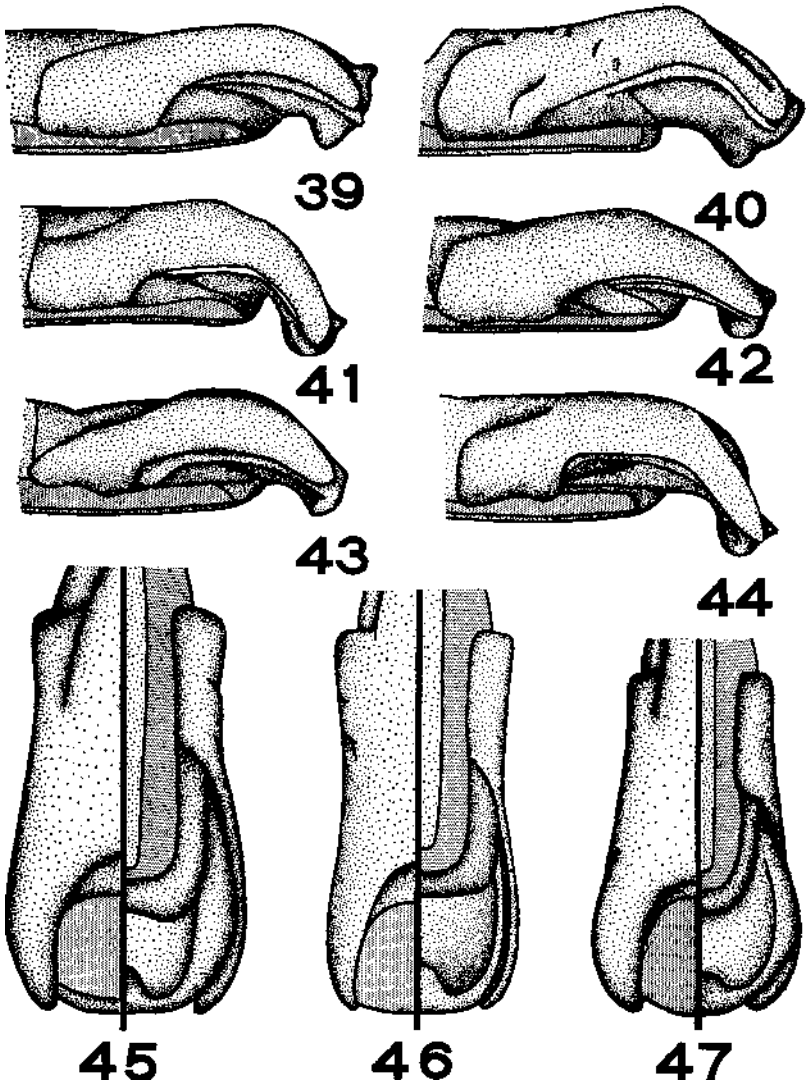
Belostoma cummingsi DeCarlo, 1935, Rev. Soc. Ent. Arg., 7: 203-204, fig. 1, 5.

Belostoma cummingsi, DeCarlo, 1938, An. Mus. Arg. Cien. Nat., 39: 213-214, pl. 2, fig. 24a, pl. 8, fig. 5.

Size and shape. Body elongate-elliptical. Length : *d d* 34.5-35.0 mm. ; , 35.0-35.5 mm. Width : , 14.8-15.0 mm. ; , 15.0-15.5 mm. Width of head, 6.7-6.8 mm. ; width of pronotum, 10.9-11.3 mm. ; length of pronotum, 5.6-6.3 mm.

Color and markings. Nearly uniformly brown. Scutellum with two dark spots on anterior portion ; thoracic venter yellowish-brown. Each femur with three dark irregular bands ;

protibia with three dark bands, meso- and metatibiae dark ; tarsi dark. Abdominal venter yellow with two dark, broken,



Figures 39 through 47

39-44, Lateral aspect of genitalia. 39, *B. columbiae*; 40, *B. ellipticum*; 41, *B. subspinosum cupreomicans*; 42, *B. subspinosum subspinosum*; 43, *B. asiaticum*; 44, *B. cummingsi*. 45-47, Dorsal and ventral aspect of genitalia. 45, *B. anurum*; 46, *B. guianae*; 47, *B. venezuelae*.

longitudinal stripes ; each segmental margin of connexivum with three, often indistinct, transverse stripes.

Structural characteristics. Interocular space 1.4 to 1.6 times the width of an eye ; clypeus nearly reaching the ocular line ; anteoculus slightly wider than anteocular length ; segment I of the beak about one-and-a-fourth times the length of II. Genitalia as shown in figures 38 and 44.

Comparative notes. This species is easily distinguished from the other members of this group by the pilosity along the margins of the genital operculum.

Types. The holotype (d) is from "Argentina (Concordia, Prov. Entre Rios) ", the allotype and four paratypes are from "São Paulo, Brazil", and two paratypes from "Gob. del Chaco". The above types were not examined but several specimens determined by DeCarlo have been examined.

Distribution. This species is known only from Argentina and Brazil. Specimens from the following localities have been identified :

ARGENTINA : BUENOS AIRES : Buenos Aires, 2 ♀ (KU).

BRAZIL. Nova Teutonia, 9 (MC) ; Organ Mt., G. M., d
(USNM) ; Sao Begrado, 9 (KU) . SÃO PAULO : Sao Paulo,
3 (3♂ d , (KU) ; Ypirango, 2 ♂ 6 , 2 ♀ 9 (KU) . Rio
GRANDE DO SUL : Pelotas, 3 ♂ a (KU), 2 ♀ 9 (L), (3♂, 9

(MC) .

Belostoma anurum (Herrich-Schäffer)

Figures 27, 45, 51

Diplonychus anurus Herrich-Schäffer, 1848, Wanz. Insecten, p. 26, fig. 799.

Zaitba anurus, Dohr, 1895, Cat. Hem., p. 24.

Zaitba anurus, Mayr, 1871, Verh. zool.-bot. Ges. Wien, 21: 412-414 (probably only in part) .

Zaitba anurus, Walker, 1873, Cat. Hem. Het. Brit. Mus., 8: 178 (probably only in part) .

Zaitba anurus, Berg, 1879, Hem. Arg., p. 192 (in part) .

Zaitba anurus, Montandon, 1895, Mus. Zool. Anat. Comp. Torino, 10: 10.

Zaitba anura, Champion, 1901, Biol. Centr. Amer., Hem. Het., 2: 365.

Belostoma boscii, Montandon, 1903, Bul. Soc. Rom. Sci. Bucarest, 12 : 117-120 (in part) .

Belostoma boscii, Kirkaldy and Bueno, 1909, Proc. Ent. Soc. Wash., 10 : 190 (in part) .

Belostoma boscii, Van Duzee, 1916, Checkl. Hem. Amer., p. 53 (in part) .

Belostoma boscii, Van Duzee, 1917, Univ. Calif. Publ. Ent., 2: 468 (in part) .

Belostoma boscii, DeCarlo, 1930, Rev. Soc. Ent. Arg., no. 13: 112 (cites *D. anurus* H.-S. as synonym, but treatment actually refers to *B. elongatum* Montandon) .

Belostoma boscii, DeCarlo, 1938, An. Mus. Arg. Cien. Nat., 39 : 215-216 (in part) .

Belostoma boscii, Menke, 1958, Bull. So. Calif. Acad. Sci., 57: 158-160 (in part) .

Size and shape. Body elongate-ovoid. Length : , 27.5-33.0 mm. ; y y , 30.5-32.5 mm. Width : , 12.7-15.0 mm. ; y y 14.2-14.9 mm. Width of head, 5.8-6.2 mm. ; width of pronotum, 9.1-10.6 mm. ; length of pronotum, 5.0-5.4 mm.

Color and markings. Light yellowish-brown to dark brown, lighter specimens mottled with darker brown. Scutellum with brown anterior part and dark caudal portion ; thoracic venter brown and yellow, mottled. Each femur with three irregular dark bands, distal band often H-shaped ; each pro- and mesotibia with three dark bands, metatibiae dark ; tarsi dark. Abdominal venter orange-brown to mahogany-brown, mottled with dark ; each segmental margin of the connexivum with three faint, irregular, dark markings.

Structural characteristics. Interocular space 1.1 to 1.3 times the width of an eye ; clypeus not reaching the ocular line ; anteoculus about one-fourth longer than interoculus ; anterior interocular space subequal to length of anteoculus ; segment I of beak about 1.2 times length of II. Genitalia as shown in figures 45 and 51.

Comparative notes. *B. anurum* is similar to *B. ellipticum* and *B. columbine* in that the anteoculus is longer than the interoculus. *B. anurum* is a smaller species than the latter two and the anterior interocular space is subequal to the length of the anteoculus.

Types. The specimens used for the basis of the original

description have been lost and thus a neotype is proposed here. The original description and also the figure closely fit a series of specimens from "Brazil, S. A., Bahia, . . .". A male 31 mm. long and 13.7 mm. wide has been selected for the neotype (KU).

Distribution. *B. anurum* is found along the eastern coast of Brazil. Specimens from the following localities have been identified:

BRAZIL. e (USNM) . BAHIA : 12 e a, 2 9 9 (KU), a (MC) .
 CEARA : 9 (CU) . DISTRITO FEDERAL: Rio de Janeiro, e3', 9 (USNM) .
 Minas GERAES : Belo Horizonte, 9 (KU) . RIO GRANDE DO NORTE : 3 a e (USNM) . RIO DE JANEIRO :
 (KU). SANTA CATARINA : 9 (KU) .

***Belostoma guianae* n. sp.**

Figures 28, 46, 52

Size and shape. Body broadly ovate. Length : 29.5-35.5 mm. ; y 9 , 31.0-35.0 mm. Width : , 13.8-17.0 mm. ; 9 9 , 14.3-17.0 mm. Width of head, 6.1-6.8 mm. ; width of pronotum, 10.1-11.9 mm. ; length of pronotum, 5.1-6.0 mm.

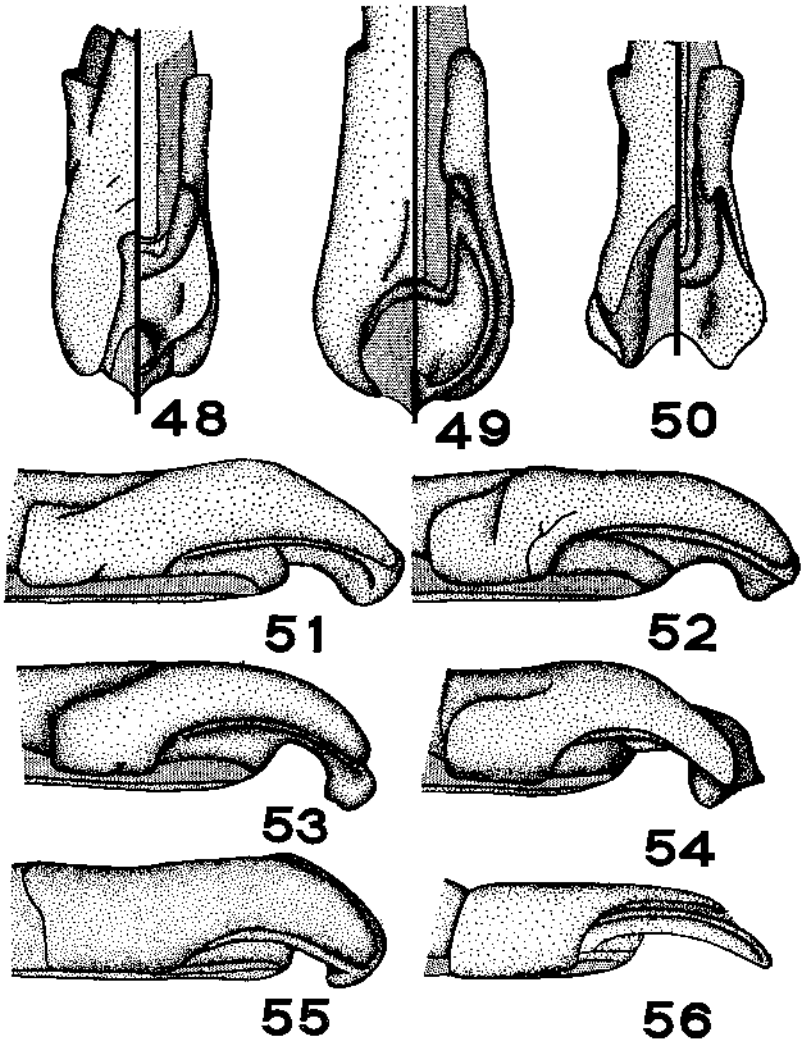
Color and markings. Dark chocolate-brown, tinged with yellow. Scutellum dark, mottled with yellowish-brown, thoracic venter with many patches, although sometimes completely dark. Each femur with three, usually distinct, zigzag dark bands ; each pro- and mesotibia with three dark bands, metatibiae dark ; protarsi tipped with dark ; meso- and metatarsi entirely dark. Abdominal venter orange-yellow to mahogany, with two longitudinal stripes, and frequently mottled with dark markings, sometimes merging to form a large caudal patch and small anterior band on each segmental margin.

Structural characteristics. Interocular space 1.4 to 1.6 times the width of an eye ; clypeus not reaching the ocular line ; anteoculus subequal to interoculus, anterior interocular space distinctly wider than length of anteoculus ; segment I of beak subequal to II. Genitalia as shown in figures 46 and 52.

Comparative notes. *B. guianae* is similar to *B. venezuelae* in that segment I of the beak is subequal to II. *B. venezuelae* is a relatively narrow and slender species while *B. guianae* is broad and dilated.

Types. Holotype (e), allotype (9), and 23 e d' and 35 y 9 paratypes labelled : " Aback of Pln. Ogle, E. Coast B.

Guiana, Lamaha Conservancy, 11-18-37, S. Harris". An additional 60 se c? and 74 ♀ paratypes, also from British Guiana, are from Vreeden Hoop, West Bank Demerara River;



Figures 48 through 56

48-50, Dorsal and ventral aspect of genitalia. 48, *B. elongatum*; 49, *B. dallasi*; 50, *B. pygmeum*; 51-56, Lateral aspect of genitalia. 51, *B. anurum*; 52, *B. guianae*; 53, *B. venezuelae*; 54, *B. elongatum*; 55, *B. dallasi*; 56, *B. aztecum*.

Plantation Ogle and Eccles, East Bank Demerara River ; Honey Camp Creek ; Supuruni Creek ; Cacal Polder ; and Georgetown. All of the above specimens are in the Francis Huntington Snow Entomological Collections at the University of Kansas. The holotype is 32.8 mm. long and 16.5 mm. wide, while the allotype is 30.2 mm. long and 15.0 mm. wide.

Distribution. *B. guianae* is known only from the type series from British Guiana.

Belostoma venezuelae n. sp.

Figures 29, 47, 53

Belostoma asiaticum, Hungerford, 1944, Zoologica, 29: 129 (probably in part) .

Size and shape. Body relatively narrow, elongate-ovoid. Length : ♂, 27.0-31.5 mm. ; ♀, 28.0-31.5 mm. Width : ee, 12.6-14.0 mm. ; ♀, 12.3-14.4 mm. Width of head, 5.763 mm. ; width of pronotum, 9.0-9.9 mm. ; length of pronotum, 4.9-5.5 mm.

Color and markings. Yellow or greenish-brown. Scutellum with anterior or anterolateral portion dark, caudal part yellow or light brown ; thoracic venter uniformly brown. Prof emur with three irregular dark bands, each meso- and metafemur with two or three, often obscure, irregular, dark bands ; pro-tibia with three dark bands, mesotibia with three irregular, somewhat indistinct, dark bands, metatibiae dark ; pretarsi light, meso- and metatarsi dark. Abdominal venter yellowish-brown, mottled with dark ; each segmental margin of the connexivum with three irregular, dark transverse stripes, anterior and caudal stripes merging with those of the adjacent segments.

Structural characteristics. Interocular space 1.2 to 1.3 times the width of an eye ; clypeus reaching or nearly reaching the ocular line ; anterior interocular space subequal to anteoculus ; segments I and II of the beak subequal. Genitalia as shown in figures 47 and 53.

Comparative notes. *B. venezuelae* has the first two segments of the beak subequal, similar to *B. guianae*, but differs from the latter by the more slender form and size of the body.

Types. Holotype (e), allotype (), and 15 *di cr* and 30 ♀ paratypes from "SE. Matarin, Monagas, Venezuela".

The above types are in the Los Angeles County Museum and were collected by Arnold Menke. The holotype measures 27.8 mm. long and 12.7 mm. wide, while the allotype is 29.0 mm. long and 13.3 mm. wide.

Distribution. *B. venezuelae* is restricted to the northern part of South America and except for a few scattered records is mainly confined to Venezuela. Specimens from the following localities have been identified:

CURAÇAO ISLAND. St. Martha, *d'*, 3 ♀♀ (DC) . ECUADOR.

GUAYAS : Guayaquil, ♂ (CAS).

PERU. LIMA : Callao, ♀ (CAS).

VENEZUELA. 6 (KU) ; *cr* (USNM). AMAZONAS : Puerto Ayacucho, 6 (USNM). ARAGUA : Roca del Rio, *d* (USNM). BOLÍVAR : Tumeremo, *d* (USNM) . DISTRITO FEDERAL : ? (DC) . MONAGAS : see type series. PORTUGUESA : Guanare, 2 *d* , 3 ♀♀ (CAS).

Belostoma elongatum Montandon

Figures 30, 48, 54

Belostoma elongatum Montandon, 1908, Ann. Hist. Nat. Mus. Hung., 7: 299.

Belostoma elongatum, DeCarlo, 1930, Rev. Soc. Ent. Arg., no. 13: 112, pl. 5, *fig.* 10.

Belostoma boscii, DeCarlo, 1930, Rev. Soc. Ent. Arg., no. 13: 112-113, pl. 5, *fig.* 11, pl. 7, *figs.* 27, 28.

Belostoma elongatum, DeCarlo, 1938, An. Mus. Arg. Cien. Nat., 39: 214-215, pl. 7, *fig.* 51.

Size and shape. Body narrow, elongate. Length : *d* a, 35.0-38.0 mm.; ♀♀, 35.5-38.5 mm. Width : , 13.5-15.0 mm. ; 9, 14.0-15.8 mm. Width of head, 6.3-7.1 mm.; width of pronotum, 10.6-11.9 mm. ; length of pronotum, 5.7-6.6 mm.

Color and markings. Brown, suffused with yellow. Scutellum with darker markings on anterior portion ; thoracic venter dark chocolate-brown to nearly black, marked with brown or yellow patches. Each femur with three broad, sometimes coalescing, dark bands, apical ones of meso- and meta-femora often H-shaped ; each pro- and mesotibia with three or four regular, narrow, dark bands ; metatibiae dark ; pro-tarsi light, tipped with dark ; meso- and metatarsi dark. Abdominal venter brown to orange-brown, marked with two

longitudinal stripes mesad of keel; each segmental margin of the connexivum with three, frequently faint, transverse stripes.

Structural characteristics. Interocular space 1.3 to 1.4 times the width of an eye; nearly reaching the ocular line; anteculus subequal to, or slightly longer than, the interoculus; anterior interocular space subequal to slightly wider than anteculus. Genitalia as shown in figures 48 and 54.

Comparative notes. *B. elongatum* is easily separated from the other members of this group by the extremely elongate body form.

Types. The types are cited by Montandon as follows: "Paraguay: Asuncion (Mus. Nat. Hung.), R. Apa (Mus. Zool. Turin) et ma collection." The specimens in his collection are probably now in the Hungarian National Museum. These types have not been examined.

Distribution. *B. elongatum* is distributed in the south and central portions of South America. Specimens from the following localities have been identified:

ARGENTINA. BUENOS AIRES : Buenos Aires, 2 ♀♀ (DC), 9 (KU) .
CHACO: Fonta, ♀ (DC). CORRIENTES : Corrientes, 2 ♀♀ (DC).
MENDOZA : Mendoza, ? (DC). MISIONES : Misiones, 9 (DC). SANTA
FE : Reconquista, 9 (USNM). Santiago del Estero, Icaño-Rio Salado, *d* (DC).

BOLIVIA. SANTA CRUZ : Chiquitos, Roboré, 9 (BM).

PARAGUAY. 9 (KU). CENTRAL : Asunción, *e* (DC). GUIARÁ :
Villarica, 4 ♀♀, 3 ♀♀ (KU). PARAGUARI: Supucay, 9 (CU).

PERU. JUNIN : Satipo, 17 ♀♀, 13 ♀♀ (DC).

URUGUAY. MONTEVIDEO: Pocitos Montevideo, *e* (USNM). SAN
Jost: Sierra de Mahoma, San Jose, 6 (USNM).

***Belostoma dallasi* DeCarlo**

Figures 31, 49, 55

Zaitba anurus, Berg, 1879, Hem. Argentina, p. 192 (probably in part).

Belostoma

Kirkaldy and Bueno, 1909, Proc. Ent. Soc.

Wash., 10: 190 (in part).

Belostoma dallasi DeCarlo, 1930, Rev. Soc. Ent. Arg., no. 13: 114-115, pl. 7, *fig.* 26.

Belostoma boscii, DeCarlo, 1938, *Mus. Arg. Cien. Nat.*, 39:

215-216, pl. 1, *fig.* 3, pl. 2, *fig.* 24, pl. 8, *fig.* 52 (in part) .

Belostoma boscii, DeCarlo, 1960, *Rev. Soc. Ent. Arg.*, 22: 54-

55 (in part) .

Size and shape. Body elliptical. DeCarlo (1930) gives the size as "32-34 mm. long ; 14.5-15 mm. wide". I have seen two males that are 24.5-25.0 mm. long and 15.4-16.0 mm. wide.

Color and markings. Brown tinged with yellow. Scutellum with a few dark brown patches ; thoracic venter creamy-yellow, marked with brown spots. Each femur with three irregular, somewhat obscure, dark transverse bands, apical bands often H-shaped ; each tibia with three regular, transverse, dark bands, becoming more obscure and unicolored on metatibiae ; each tarsus light brown with apical dark band. Abdominal venter yellow to orange with dark brown speckles and larger rows of dots on each side of keel ; each segmental margin of connexivum with three dark marginal dots.

Structural characteristics. Interocular space 1.2 to 1.3 times the width of an eye ; clypeus nearly reaching the ocular line ; anteculus subequal to interoculus, anterior interocular space subequal to anteculus ; segment I of the beak about 1.2 times as long as II. Genitalia as shown in figures 49 and 55.

Comparative notes. This species is similar to *B. subspinosum* but differs from it by the longer anteculus which is sub-equal to the anterior interocular space. *B. dallasi* is found in southern South America while *B. subspinosum* is more northern in distribution.

Types. The holotype and allotype are in the Museo de la Plata, Argentina. Paratypes are in the Museum of Buenos Aires, and the collection of Lizz and Trelles. The above types have not been examined.

Nomenclature. DeCarlo (1930) based *B. dallasi* on the above specimens because he had misidentified *B. elongatum* as *B. boscii*. Later (1938) he placed *B. dallasi* in synonymy with *B. boscii* and correctly identified *B. elongatum*. However, as already indicated, the name *B. boscii* can not be applied correctly to any one of the species in the *subspinosum* group. Thus *B. dallasi* remains a valid name for the members of this group occurring in Argentina and northward into Brazil.

Distribution. DeCarlo lists "Argentina (Prov. de Salta) "

for the types. In addition, I have seen two specimens from "Alianca Go., Brazil", collected on the Machris Brazilian Expedition by F. S. Truxal.

ABBREVIATIONS OF COLLECTIONS CITED

- AMNH—American Museum of Natural History, N. Y.
 BM—Zoologische Staatssammlung, Munich.
 CAS—California Academy of Sciences, San Francisco.
 CNHM—Chicago Natural History Museum, Illinois. CU—Cornell University, Ithaca, N. Y.
 DC—Collection of Dr. Carl J. Drake (USNM) FU—University of Florida, Gainesville.
 ISU—Iowa State University, Ames.
 KU—University of Kansas, Lawrence.
 L—Collection of David R. Lauck, Chicago Academy of Sciences.
 MC—Collection of Arnold S. Menke, University of California, Davis.
 MU—University of Michigan, Ann Arbor.
 PC—Pomona College, Pomona, California.
 USNM—United States National Museum, Washington, D. C.

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