

A SYNOPSIS OF THE GENUS *BELOSTOMA*
LATREILLE, OF AMERICA NORTH OF
MEXICO, WITH THE DESCRIPTION
OF A NEW SPECIES
(Hemiptera; Belostomatidae)

By ARNOLD S. MENKE*

The genus *Belostoma* is the largest in number of species in the family Belostomatidæ. It is confined to the Western Hemisphere being found in North America, Central America, South America, and the West Indies. It is the aim of the author to present a key to the United States species and present techniques which will aid further work in the genus and family. The identification of the species in this genus has always been difficult because of the similarity of many of its members. Indeed, the family as a whole is a morphologically monotonous group showing few good characters for separation of the species. Early workers in the group failed to give adequate means of identification, basing their descriptions mainly on color and size. These two characters vary considerably. This fact has not always been readily apparent to workers who, in most cases, had small series of specimens. Misidentifications by some workers have filled the literature with erroneous or questionable records. Study by American workers in this genus, and indeed in the whole family, is complicated by the fact that most of the types are in European museums. Since many of the early original descriptions were very superficial, it will be difficult for workers to establish names correctly until the types are seen.

ACKNOWLEDGEMENTS

The author is especially grateful to Doctor Robert L. Usinger of the University of California for his assistance and constructive criticism. Doctor Usinger also made available the *Belostoma* in his collection for study.

My sincere thanks go also to Doctor Fred S. Truxal of the Los Angeles County Museum for the help he has given me in this problem, and for the encouragement he has given me in the past.

*University of California, Davis, California.

I would like to extend my thanks to Messrs. Jon L. Herring, C. Don MacNeill, Peter Ashlock and Lionel A. Stange for their assistance.

The following institutions lent material for study for which I am very grateful: The California Academy of Science (CAS); The Los Angeles County Museum (LACM); the Department of Entomology of the University of California at Los Angeles (UCLA); and the Department of Entomology at the University of Kansas (KU).

TAXONOMIC CHARACTERS

Color cannot be relied upon without the aid of additional morphological characters. The appearance of the bug is often dependent on the drying effects of the underlying tissues. Specimens kept in alcohol for long periods of time may be atypically colored. Grease and dirt also effect the color of the body. Size is variable in some species and cannot be relied upon without other substantiating characters. The antennæ which have been used in other genera with some success, do not show any differences in the species I have studied. Whether or not the base of the clypeus passes a line drawn between the anterior angles of the eyes, has been used as a character by some. I have found that if the head is in proper position with the rest of the body, that is, the dorso-ventral axis of the head perpendicular to the horizontal axis of the body, the clypeus does not pass the line in any of the United States species. If the longitudinal axis of the head is parallel with the working surface, then the clypeus does appear to pass the line in some of our species. I am of the opinion that the position of the clypeus is an unreliable character to use, at least in our forms. The length of the proboscis compared to the length of the eye is a relatively good character but it must be supported by other distinguishing features as the proportion is not absolutely constant within a species. The comparison of the width and length of the interocular space appears to be of value mainly in South American forms. The shape and proportions of the segments of the beak are very distinctive in many species. This is best shown by illustration (fig. 9). When measuring the segments of the beak it is essential that the method used be stated. Measurements made along the anterior face do not agree with those made along the posterior face. In *B. bakeri* for example, the first segment is shorter than the second if measured on the posterior face but longer than the second if measured on the anterior face. The shape of the whole head as seen from the side is a very good distinguishing character. In some species

the proboscis is very prominent whereas in others, the head slopes rapidly downward and is not at all prominent. The shape of the pronotum is distinctive for some forms. The lateral margins may be straight or sinuate. The shape of the prosternal carina is of value in separating South American species, however, it is similar in all United States species. The form of the metasternum (metaxyphus) has been used in other genera but does not appear to present any distinctive differences in our species. Probably the most important character is the pattern and amount of hair on the ventral connexival plates. Many of the species have their own distinctive pattern of hair. It is interesting to note that the connexival hairs were overlooked by the early workers. A. L. Montandon was the first to mention it. The shape and proportions of the caudal filaments is of some value in separating species. The male genitalia have been examined in all of our species but they offer no distinct differences to separate the species. A study of the genitalia throughout the genus may reveal group characters.

TECHNIQUE

When measuring the length of the specimen, the caudal filaments should be ignored. Males can easily be separated from females. The male genital plate is acuminate at the tip while that of the female is rounded at the tip and usually bears two tufts of setæ. It is important that the specimens be free from dirt and grease, otherwise it is difficult to make out the pattern of hair on the connexivum. The reference to the connexivum here means the mesal two thirds of the ventral connexival plates. The outer third (marginal) of the plate is always glabrous. When measuring or observing the characters of the head, the insect should be held so that the longitudinal axis of the body is parallel to the working surface with the head directed to the left. The dorso-ventral axis of the head should be at right angles to the horizontal axis of the body (fig. 9). Usually the head is tilted down in relation to the body and the bug must be oriented accordingly to view it properly. The length of the proboscis in relation to the length of an eye is measured as indicated in figure 9. If the caudal filaments are not extended enough from the abdomen to discern the shape of the apical half, it will be necessary to relax the specimen and pull them out. After the abdomen has been relaxed in 5% alcohol for a few hours the filaments are

easily pulled out with gentle tugging of forceps. The caudal filaments of specimens that have been recently collected can be pulled out readily for easy observation while the bugs are still relaxed. To measure the proportions of the filaments it is necessary to remove them from the abdomen. First the abdomen must be relaxed. Then holding the bug ventral side up, insert a minuten nadeln (bent into a small hook) under the genital plate until it breaks through the membrane at the base of the plate. Move the needle from one side to the other to tear the membrane. Gently tug at each side of the genital capsule until it is removed. The caudal filaments will accompany the genital capsule when it is withdrawn. The filaments and capsule can be conveniently kept in a small vial of glycerin on the pin beneath the insect.

DESCRIPTION OF THE GENUS *Belostoma*

Belostoma Latreille, 1807, Genera Crustaceorum et Insectorum, vol. 3, p. 144. Type species *testaceo-pallidum*.

Zaitha Amyot et Serville, 1843, Histoire Naturelle des Insectes, Hemipteres, p. 430. Type species *stolli*.

Perthostoma Leidy, 1847, Jour. Acad. Nat. Sci. Phil., second series, 1: 59. Type species *testaceum*.

Oval, flattened bugs. Head triangular, proboscis prominent. Beak of 3 segments; the first two segments nearly equal in length and twice as long as the third. Antennæ four-segmented; the second and third joints with a long finger-like process; the fourth as long as the second and third. Pronotum trapezoidal, anterior margin sinuate. Clavus without veins; corium with network of veins; membrane well developed, wide. Protarsi of two segments terminated with a single claw; meso- and metatarsi three pointed, and terminated with two claws. First segment of tarsus concealed in apex of tibia. Eggs attached to hemelytra of males.

KEY TO UNITED STATES *Belostoma*

1. Size 30 mm. long or more; Texas.....
 Belostoma boscii Le Peletier and Serville 1825.
- Size 26 mm. long or less2.
2. Connexival plates 2-5 completely covered with hair; patch of hair on sixth connexival plate touching genital plate, and reaching one half length of genital plate, triangular in shape (fig. 7).....3.

- Connexival plates 2-5 never completely covered with hair, always separated from abdominal sternites by a glabrous area; patch of hair on sixth connexival plate separated from genital plate by a glabrous area, never reaching one half length of genital plate, shape various (figs. 5-6, 8).....5.
- 3. Lateral margins of pronotum concave, at least at the anterior one third (fig. 1); width of head through eyes usually less than one half width of hemelytra; base of beak arising well beyond anterior margin of eye as seen from side; proboscis equal to or slightly less than length of an eye as seen from the side (fig. 9); throughout U.S.....*Belostoma flumineum* Say 1832.
- Lateral margins of pronotum straight (rarely concave) (fig. 2); width of head through eyes nearly equal to one half width of hemelytra; base of beak arising under anterior margin of eye or slightly beyond; proboscis two thirds to three fourths the length of an eye (fig. 10).....4.
- 4. Shape of apical portion of caudal filament as in figure 4; ratio of length to width of filament within .131-.169, mean equal to .153; typically a light brown species; Louisiana to Calif. and Oregon.....*Belostoma bakeri* Montandon 1913.
- Shape of apical portion of caudal filament as in figure 3; ratio of length to width of filament within .171-.197, mean equal to .186; typically a dark brown species; Saratoga Springs, Death Valley, Calif.....*Belostoma saratogæ* Menke, new species.
- 5. Hair on connexivum wide, covering two thirds or more of connexival plates four and five at widest point (figs. 6, 8); interocular space smooth, evenly convex, without depression mesad of each eye.....6.
- Hair on connexivum narrow, covering only one third of connexival plates four and five at widest point (fig. 5); interocular space with a large shallow depression mesad of each eye; Texas.....*Belostoma fusciventre* (Dufour) 1863.
- 6. Glabrous area separating hair from abdominal sternites very narrow, mesal margin of hair not evidently scalloped in outline (fig. 8); 20 mm. or more in length; Eastern U.S.....*Belostoma lutarium* (Stal) 1856.
- Glabrous area separating hair from abdominal sternites wide, mesal margin of hair scalloped in outline (fig. 6); 19 mm. or less in length; Eastern U.S....*Belostoma testaceum* (Leidy) 1843.

Belostoma boscii Le Peletier and Serville

Belostoma boscii Le Peletier and Serville, 1825, Encyclopedie Methodique, 10: 273; Montandon, 1900, Bul. Soc. Rom. Sci. Buc., 9: 271; Montandon, 1903, Bul. Soc. Rom. Sci. Buc., 12(1-2): 117-120; Kirkaldy, 1906, Trans. Amer. Ent. Soc., 32(2): 151; Kirkaldy and Bueno, 1909, Proc. Ent. Soc. Wash., 10(3-4): 190 (in part);

Barber, 1914, Bull. Amer. Mus. Nat. Hist., 33: 498; Van Duzee, 1917, Univ. Calif. Publ. Ent., 2: 468 (in part); De Carlo, 1930, Rev. Soc. Ent. Arg., 3(13): 112-113, pl. 7, figs. 27-28; De Carlo, 1938, Anal. Mus. Arg. Cienc. Nat., 39: 214, pl. 8, fig. 52; De Carlo, 1939, Rev. Soc. Ent. Arg., 10: 234; Usinger, 1956, Aquat. Ins. Calif., p. 206.

Zaitha boscii Amyot and Serville, 1843, Hist. Nat. Ins., Hemip., p. 430; Herrich-Schaffer, 1853, Die Wanz. Ins., 9: 36; Mayr, 1863, Verhandl. Kais.-Konig. Zool.-Bot. Ges. Wein, 13: 354.

Belostoma dallasi De Carlo, 1930, Rev. Soc. Ent. Arg., 3(13): 114-115, pl. 5, fig. 12.

Diplonychus anurus Herrich-Schaffer, 1848, Die Wanz. Ins., 8: 26, fig. 799.

Zaitha anurus Dufour, 1863, Ann. Soc. Ent. France, 32: 388; Mayr, 1871, Verhandl. Kais.-Konig. Zool.-Bot. Ges. Wein, 21: 408, 412-414; Uhler, 1894, Proc. Calif. Acad. Sci., 4: 191; Uhler, 1894, Proc. Zool. Soc. Lond. for 1894, p. 223; Champion, 1901, Biol. Centr. Amer., Hemip.-Het., vol 2, p. 365, pl. 22, fig. 1; Banks, 1910, Cat. Nearct. Hem. Het., Amer. Ent. Soc., p. 9.

Zaitha cupreo-micans Stal, 1854, Ofv. Svenska Vet.-Ak. Forh., 11: 240; Stal, 1862 Ent. Zeit., 23 (10-12): 461.

*Zaitha subspinos*a Dufour, 1863, Ann. Soc. Ent. France, 32: 387.

*Zaitha stoll*i Dufour, 1863, Ann. Soc. Ent. France, 32: 387-388.

*Zaitha bifo*veatum Haldeman, 1852, Expl. Surv. Vall. Great Salt Lake Utah, App. C, p. 370, pl. 10, fig. 1.

*Zaitha bifo*veata Banks, 1910, Cat. Nearct. Hem. Het., Amer. Ent. Soc., p. 9.

SIZE: length, 31-35 mm.; width, 13.5-15 mm.

COMPARATIVE NOTES: This is the largest species found within our limits. Its size immediately distinguishes it. The pattern of hair on the connexivum is similar to figure 6. The beak is very long and slender. *B. bifo*veatum (Haldeman) appears to be a synonym of *B. bos*cii. Haldeman's description and figure of his species fits *B. bos*cii very well. *B. bifo*veatum was described from a specimen taken at Fort Gates, Texas.

DISTRIBUTION: This typically Central and South American species has been recorded from the United States many times in literature. Many of these citations are probably in error. The occurrence of this species in the United States is probably limited to certain areas of states bordering on Mexico. I have seen only one specimen from the U.S. It is from the extreme southern part of Texas. I have specimens from as far north in Mexico as Hermosillo, Sonora; and San Ignacio, Baja California. It is probable that intensive collecting along the border will produce additional records of this species for the states.

SPECIMEN SEEN (U.S.):

Texas: McAllen, Feb. 20, 1932, L. D. Tuthill, 1 ♂ (UK).

Belostoma flumineum Say

(Figs. 1, 7, 9)

Belostoma fluminea Say, 1832, Descriptions of New Species of Heteropterous Hemiptera of North America, p. 32 (Fitch reprint: 1858, Trans. N. Y. State Agri. Soc., 17: 809); Montandon, 1903, Bul. Soc. Rom. Sci. Buc., 12: 113; Bueno, 1906, Can. Ent., 38: 189-197 (life hist.); Smith, 1910, Ann. Rept. N. J. State Mus., p. 168; Van Duzee, 1916, Checkl. Hem. Amer., N. Y. Ent. Soc., p. 52; Osborn and Drake, 1922, Tech. Publ. N. Y. State Coll. For., no. 16, p. 86, figs. 34, 36.

Zaitha fluminea, Dufour, 1863, Ann. Soc. Ent. France, 32: 388; Mayr, 1871, Verhandl. Kais.-Konig. Zool.-Bot. Ges. Wein, 21: 409, 416; Walker, 1873, Cat. Hem. Het. Brit. Mus., pt. 8, p. 179; Uhler, 1875, Bull. U. S. Geol. Geog. Surv. Terr., (2), 1: 338, pl. 21, fig. 42; Uhler, 1878, Proc. Bost. Soc. Nat. Hist., 19: 441; Uhler, 1884, The Standard Nat. Hist., vol. 2, p. 257; Provancher, 1886, Pet. Faune Ent. Can., vol. 3, p. 198, pl. 4, fig. 6; Uhler, 1886, Checkl. Hem. Het. No. Amer., Brookl. Ent. Soc., p. 28; Van Duzee, 1894, Bull. Buff. Soc. Nat. Sci., 5: 185; Banks, 1910, Cat. Nearct. Hem. Het., Amer. Ent. Soc., p. 9.

Belostoma flumineum Bueno, 1905, Jour. N. Y. Ent. Soc., 13: 44; Bueno and Brimley, 1907, Ent. News, 18: 435; Bueno, 1908, Jour. N. Y. Ent. Soc., 16: 237; Kirkaldy and Bueno, 1909, Proc. Ent. Soc. Wash., 10: 191; Montandon, 1909, Bul. Soc. Rom. Sti. Buc., 18: 187-188; Severin, 1911, Jour. N. Y. Ent. Soc., 19: 99-106 (biol.); Severin, 1911, Behavior Monog., 1: 1-44 (biol.); Bueno, 1912, Can. Ent., 44: 213; Barber, 1914, Bull. Amer. Mus. Nat. Hist., 33: 498 (doubtful loc.); Parshley, 1914, Psyche, 21: 140; Van Duzee, 1917, Cat. Hem. Het., Univ. Cal. Publ. Ent., 2: 467-468; Hussey, 1919, Occ. Pap. Mus. Zool. Univ. Mich., no. 75, p. 21; Hungerford, 1919, Univ. Kans. Sci. Bull., 21: 144-148, col. pl. 2, fig. 9 (biol.); Britton, 1920, Conn. State Geol. Nat. Hist. Surv. Bull., no. 31, p. 66; Hussey, 1922, Occ. Pap. Mus. Zool. Univ. Mich., no. 118, p. 39; Britton, 1923, Ins. Conn., pt. 4, Conn. State Geol. Nat. Hist. Surv. Bull., no. 34, pp. 398-399, pl. 16, fig. 6; Hungerford and Beamer, 1925, Ent. News, 36: 298-299; Hungerford, 1925, Psyche, 32: 91, pl. 2, fig. 1, Blatchley, 1926, Het. East. No. Amer., pp. 1046-1047; Leonard, 1928, Corn. Univ. Agri. Exp. Sta., Mem. 101, p. 140; De Carlo, 1938, Anal. Mus. Arg. Cienc. Nat., 39: 232-233, pl. 7, fig. 71; Brimley, 1938, Insects No. Caro., No. Caro. Dept. Agri., p. 84; Hussey and Herring, 1950, Fla. Ent., 33: 154-156 (var. *immaculata* Leidy); Ellis, 1952, Amer. Midl. Nat., 48: 326-327; Penn, 1952, Proc. Louis. Acad. Sci., 15: 51; Usinger, 1956, Aquat. Ins. Calif., p. 206.

Perthostoma aurantiacum Leidy, 1843, Jour. Acad. Nat. Sci. Phil., (2) 1: 60, 66 (incl. var. *immaculatum*).

Zaitha micrantula Gillette and Baker, 1895, Colo. Agri. Exp. Sta. Bull., no. 31, p. 63 (syn. Kirkaldy and Bueno, 1909).

SIZE: Length, 18-24 mm.; width, 8.75-11 mm.

COMPARATIVE NOTES: This species is closely related to *B. lutarium* but can be easily separated from it by the characters given in the key. Color is light brown or testaceous with darker markings only on the legs. The profemora possess on each side along the posterior margin, three small brown spots. The meso- and metafemora possess two wide brown bands on the apical half. The maculations of the legs may be darker and more pronounced or entirely absent in some specimens. The first two segments of the beak are of the same thickness, long and slender.

DATA ON DISTRIBUTION: This is probably the most common species of the genus in the United States. It is found from coast to coast. Barber's (1914) record of *flumineum* from Florida is doubtful. A misidentification of *lutarium* may have been the cause. Mr. Jon Herring of Berkeley, California, has stated in a personal conversation that his collecting throughout the state has produced no *flumineum*. I have seen specimens from the state of Chihuahua, Mexico. As far as I can determine this is the first record of *flumineum* from Mexico. I have seen specimens from the following localities:

UNITED STATES:

ARIZONA: Little Field, Sept. 6, 1953, P. D. Ashlock, 6 ♂♂, 4 ♀♀ (Ashlock); Gila Bend, Dec. 13, 1945, H. P. Chandler, 1 ♂, 1 ♀ (Usinger); Tucson, Oct. 10, 1955, F. S. Truxal and L. Martin, 1 ♀ (LACM); Phoenix, Dec. 24, 1952, H. Bullock, 1 ♂, 1 ♀ (Ashlock).

CALIFORNIA: 6 mi. S. Calipatria, Oct. 14, 1954, F. S. Truxal and L. Martin, 16 ♂♂, 11 ♀♀ (LACM); Davis, June, 1937, 1 ♂ (CAS); Fresno Co., Aug. 2, 1950, Wysong, 1 ♂ (Usinger); Garner Ranch, July 16, 1954, G. F. Auguston, 2 ♀♀ (LACM); Helm, May 12, 1954, F. S. Truxal and L. Martin, 3 ♂♂, 5 ♀♀ (LACM); Hidden Lake, Pine Canyon, Sept. 11, 1953, A. Menke and L. Stange, 3 ♂♂, 5 ♀♀ (LACM); Imperial Dam, Oct. 16, 1954, F. S. Truxal and L. Martin, 2 ♂♂, 2 ♀♀ (LACM); Los Banos, May 22, 1918, E. P. Van Duzee, 1 ♀ (CAS); Madera, May 13, 1954, F. S. Truxal and L. Martin, 2 ♂♂, 8 ♀♀ (LACM); near Niland, Oct. 14, 1954, F. S. Truxal and L. Martin, 2 ♂♂, 1 ♀ (LACM); Near Planada, May 13, 1954, F. S. Truxal and L. Martin, 1 ♂, 4 ♀♀ (LACM); San Antonio Valley, Aug. 18, 1949, J. E. Gillaspay, 1 ♀ (Usinger); Schwabacker Ranch, 5 mi. N. E. Madera, July 29, 1953, G. F. Auguston, 12 ♂♂, 13 ♀♀ (LACM); Tin Cistern,

Dec. 1936, 1 ♀ (CAS); Waltham Creek, 6.5 mil W. Coalinga, Aug. 29, 1952, H. B. Leech and J. W. Green, 2 ♂♂, 3 ♀♀ (CAS).

INDIANA: Vigo Co., W. S. B., 1 ♀ (CAS).

KANSAS: Douglas Co., Nov. 3, 1922, H. B. Hungerford, 3 ♂♂, 2 ♀♀ (CAS).

MASSACHUSETTS: Forest Hills, June 1, 1915, H. M. Parshley, 2 ♂♂, 1 ♀ (CAS); Framingham, Aug. 18, 1906, C. A. Frost, 1 ♀ (CAS); Goshen, Sept. 22, 1922, H. M. Parshley, 1 ♂ (CAS); Northampton, Oct. 14, 1918, H. M. Parshley, 2 ♂♂ (CAS); Saugus, May 10, 1914, F. W. Dodge, 1 ♂ (CAS).

MAINE: Orono, Sept. 25, 1912, H. M. Parshley, 1 ♀ (CAS); Wales, July 10, 1913, C. A. Frost, 1 ♂ (CAS).

MICHIGAN: Washtenaw Co., April 19, 1944, N. J. Willimovsky, 1 ♀ (CAS).

NEVADA: Ash, 1940, LaR., 1 ♂ (Usinger).

NEW JERSEY: Palisades, Sept. 7, 1 ♀ (CAS); Rahway, R., Cranford, Aug. 4, 1927, 1 ♂ (CAS).

NEW MEXICO: Mesquite, Aug. 17, 1930, F. R. Fosberg, 6 ♂♂, 5 ♀♀ (LACM); Organ Mts., Sept. 2, Townsend, 1 ♀ (Usinger).

NEW YORK: Cold Spring Harbor, Long Island, July 20, 1920, H. M. Parshley, 1 ♀ (CAS); Ithaca, Sept. 18, 1917, E. C. Van Dyke, 1 ♂, 1 ♀ (CAS); Nepera Pk., Oct. 4, 1934, J. E. Hare, 1 ♀ (CAS).

OHIO: Columbus, Aug. 15, 1916, A. J. Basinger, 1 ♂, 1 ♀ (CAS); Hamilton Co., April 1941, 1 ♂ (Usinger); Rockridge, Aug. 30, 1916, A. J. Basinger, 1 ♂ (CAS).

OREGON: Corvallis, June 21, 1952, R. L. Usinger, 1 ♀ (Usinger).

PENNSYLVANIA: Columbia Crossroads, Sept. 1, 1935, R. M. Leonard, 2 ♀♀ (LACM).

TEXAS: Brownsville, Oct. 13, 1944, R. L. Usinger, 1 ♂ (Usinger); Worth Lake, Aug. 20, 1940, N. J. Wilimovsky, 1 ♂ (CAS).

WISCONSIN: Beaver Dam, April 3, 1893, W. E. Snyder, 1 ♂ (CAS); Milwaukee, L. L. Muchmore, 3 ♂♂ (LACM).

CANADA:

MANITOBA: Winnipeg, Sept. 30, 1911, J. B. Wallis, 1 ♀ (CAS).

ONTARIO: Ridgeway, June 8, 1895, E. P. Van Duzee, 1 ♀ (CAS).

Belostoma lutarium (Stal)

(figs. 8, 9)

Zaitha lutaria Stal, 1856, Ofvers. Kongl. Vetenskaps-Akad. Forhandl., 12: 190; Dufour, 1863, Ann. Soc. Ent. France, 32: 400; Mayr, 1871, Verhandl. Kais.-Konig. Zool.-Bot. Ges. Wein, 21: 409, 416.

Belostoma lutaria Van Duzee, 1916, Checkl. Hem. Amer., N. Y. Ent. Soc., p. 53.

Belostoma lutarium Montandon, 1909, Bul. Soc. Rom. Sti. Buc., 18: 187-188; Bueno, 1912, Can. Ent., 64: 213; Van Duzee, 1917, Univ. Calif. Publ. Ent., 2: 468; Britton, 1923, Insects Conn., pt. 4, Conn. State Geol. Nat. Hist. Surv. Bull., no. 34, p. 398, pl. 19, fig. 4; Hungerford and Beamer, 1925, Ent. News, 36: 298-299; Blatchley, 1926, Het. East. No. Amer., pp. 1047-1048; Leonard, 1928, Corn. Univ. Agri. Exp. Sta., Mem. 101, p. 140; De Carlo, 1938, Anal. Mus. Arg. Cienc. Nat., 39: 211, 233; Brimley, 1938, Ins. No. Caro., No Caro. Dept. Agri., p. 84; Britton, 1938, Conn. State Geol. Nat. Hist. Surv. Bull., no. 60, p. 31; Penn and Ellis, 1949, Fla. Ent., 32: 159; Herring, 1951, Fla. Ent., 34: 20-21, 157; Ellis, 1952, Amer. Midl. Nat., 48: 327; Penn, 1952, Proc. Louis. Acad. Sci., 15: 51-52.

Zaitha aurantiaca Walker, 1873, Cat. Hem. Het. Brit. Mus., pt. 8, p. 179 (in part).

Zaitha aurantiacum Uhler, 1886, Checkl. Hem. Het. No. Amer., Brookl. Ent. Soc., p. 28; Banks, 1910, Cat. Nearc. Hem. Het., Amer. Ent. Soc., p. 9.

Belostoma aurantiacum Bueno and Brimley, 1907, Ent. News, 18: 435; Kirkaldy and Bueno, 1909, Proc. Ent. Soc. Wash., 10: 190; Smith, 1910, Ann. Rept. N. J. State Mus., p. 168.

SIZE: Length, 22-25 mm.; width, 10.5-12.2 mm.

COMPARATIVE NOTES: This species resembles *B. flumineum* in shape and color pattern. Its average size is only slightly greater. It can be easily separated from *flumineum* by the characters given in the key. The description of *Belostoma aurantiacum* (Leidy) (as *Perthostoma*) fits *flumineum* or *lutarium* equally well. Montandon in 1909 synonymized *aurantiacum* with *flumineum* and I am following his proposal until the type is seen, if it still exists.

DATA ON DISTRIBUTION: This species ranges from Louisiana to N. E. United States. I have seen material from the following localities:

ARKANSAS: Lawrence Co., 4 ♀♀ (CAS); Poyen, Oct. 25, 1948, O. Bryant, 1 ♂ (CAS).

FLORIDA: Brooksville, Jan. 25, 1940, E. C. Van Dyke, 2 ♀♀ (CAS); Gulfport, A. G. Reynolds, 2 ♂♂ (CAS).

MASSACHUSETTS: Boston, March 29, 1903, 1 ♂ (CAS).

MISSISSIPPI: Agricultural College, April 4, 1915, 1 ♀ (CAS).

NORTH CAROLINA: Raleigh, June 7, 1905, 1 ♂ (CAS).

Belostoma testaceum (Leidy)

(fig. 6)

Perthostoma testaceum Leidy, 1843, Jour. Acad. Nat. Sci. Phil., (2) 1: 60, 66.

Zaita testaceum Mayr, 1863, Verhandl. Kais.-Konig. Zool.-Bot. Wein, 13: 354.

Belostoma testaceum Bueno, 1905, Jour. N. Y. Ent. Soc., 13: 44; Bueno and Brimley, 1907, Ent. News, 18: 435; Kirkaldy and Bueno, 1909, Proc. Ent. Soc. Wash., 10: 192; Smith, 1910, Ann. Rept. N. J. State Mus., p. 168; Barber, 1914, Bull. Amer. Mus. Nat. Hist., 33: 498; Van Duzee, 1916, Checkl. Hem. Amer., N. Y. Ent. Soc., p. 53; Van Duzee, 1917, Univ. Calif. Publ. Ent., 2: 469; Britton, 1923, Ins. Conn., pt. 4, Conn. State Geol. Nat. Hist. Surv. Bull., no. 34, p. 399; Blatchley, 1926, Het. East. No. Amer., p. 1048; Leonard, 1928, Corn. Univ. Agri. Exp. Sta. Bull., Mem. 101, p. 140; De Carlo, 1938, Anal. Mus. Arg. Cienc. Nat., 39: 240; Brimley, 1938, Ins. No. Caro., No. Caro. Dept. Agri., p. 84; Hussey and Herring, 1950, Fla. Ent., 33: 84, 155; Herring, 1951, Fla. Ent., 34: 21, 157; Ellis, 1952, Amer. Midl. Nat., 48: 326; Penn, 1952, Proc. Louis. Acad. Sci., 15: 51.

Zaita testacea Mayr, 1871, Verhandl. Kais.-Konig. Zool.-Bot. Ges. Wein, 21: 409, 417; Walker, 1873, Cat. Hem. Het. Brit. Mus., pt. 8, p. 179; Uhler, 1886, Checkl. Hem. Het. No. Amer., Brookl. Ent. Soc., p. 28; Banks, 1910, Cat. Nearct. Hem. Het., Amer. Ent. Soc., p. 10.

Zaitha reticulata Haldeman, 1852, Explor. Surv. Valley Great Salt Lake Utah, Append. C, p. 370; Mayr, 1863, Verhandl. Kais.-Konig. Zool.-Bot. Ges. Wein, 13: 354.

SIZE: Length, 18-18.5 mm.; width, 9-9.5 mm.

COMPARATIVE NOTES: This species resembles *B. lutarium* and *B. flumineum* most closely but can be easily separated from them by the characteristic pattern of the connexival hair, the smaller size of the bug, and by the fact that the proboscis is not particularly prominent. The shape of the head from the side is approximately like that shown in figure 10. In the few specimens I have seen this species tends to be slightly darker than *lutarium* or *flumineum*.

DATA ON DISTRIBUTION: I have before me only five specimens. According to literature this species has a distribution similar to that of *B. lutarium*. I have seen specimens from the following localities:

GEORGIA: Savannah, Feb. 10, 1944, R. L. Usinger, 1 ♂, 1 ♀ (Usinger).

VIRGINIA: Quantico, Feb. 13, 1919, Carl D. Duncan, (Usinger).

WASHINGTON, D.C.: Licking Banks, Nov. 19, 1905, O. Heide-
mann, 1 ♂ (CAS).

Belostoma fusciventre (Dafour)

(fig. 5)

Zaitha fusciventris Dufour, 1863, Ann. Soc. Ent. France, 32: 329; Mayr, 1871, Verhandl. Kais.-Konig. Zool.-Bot. Ges. Wein, 21: 409, 417; Walker, 1873, Cat. Hem. Het. Brit. Mus., pt. 8, p. 179; Uhler, 1875, Bull. U. S. Geol. Geog. Surv. Terr., (2) 1: 338 (in part); Uhler, 1886, Checkl. Hem. Het. No. Amer., Brookl. Ent. Soc., p. 28 (in part); Uhler, 1894, Proc. Calif. Acad. Sci. (2) 4: 291 (questionable record); Champion, 1901, Biol. Centr. Amer., vol. 2, pp. 365-366, pl. 21, figs. 23, 23a (in part); Barber, 1906, Mus. Brooklyn Inst. Arts Sci., Sci. Bull., 1: 288; Banks, 1910, Cat. Nearc. Hem. Het., Amer. Ent. Soc., p. 9 (in part).

Belostoma fusciventris Bueno, 1906, Ent. News, 18: 55; Snow, 1906, Trans. Kans. Acad. Sci., 20: 180 (questionable record); Kirkaldy and Bueno, 1909, Proc. Ent. Soc. Wash., 10: 191 (in part); Van Duzee, 1916, Checkl. Hem. Amer., N. Y. Ent. Soc., p. 53 (in part); Van Duzee, 1917, Cat. Hem. Het., Univ. Calif. Publ. Ent., 2: 468 (in part).

Belostoma fusciventre De Carlo, 1938, Anal. Mus. Arg. Cienc. Nat., 39: 222, pl. 7, fig. 59 (in part); Usinger, 1956, Aquat. Ins. Calif., p. 206.

SIZE: Length, 18-20.5 mm.; width, 8-9.5 mm.

COMPARATIVE NOTES: This species is not likely to be confused with any other species in our limits except perhaps, *B. bakeri*. Besides the characters given in the key, the following can be used to identify this species: a marginal brown spot in the middle of each connexival plate; terminal hook of transverse suture of pronotum depressed; proboscis not very prominent; head approximately as shown in figure 10; color mainly brown with longitudinal testaceous stripe along thoracic pleura; fore femora nearly all brown but with several small pale spots.

DATA ON DISTRIBUTION: *B. fusciventre* is primarily a Mexican form but has been recorded from Texas to California in the literature. I have seen specimens only from Texas. The records of this species from California are most certainly the result

of misidentifications. It is possible that *B. bakeri* was confused with *fusciventre* by early workers, especially Uhler. Snow's (1906) record for this species was S. E. Arizona and this is within the realm of possibility since *fusciventre* is a Mexican form and can be expected to be found in any of the border states. I have seen specimens from the following locality:

TEXAS: Brownsville, Oct. 13, 1944, R. L. Usinger, 2 ♂♂, 4 ♀♀ (Usinger).

Belostoma bakeri Montandon

(figs. 4, 7, 10)

Belostoma bakeri Montandon, 1913, Bul. Soc. Rom. Sti. Buc., 22: 123-125; Van Duzee, 1917, Univ. Calif. Publ. Ent., 2: 468; De Carlo, 1938, Anal. Mus. Arg. Cienc. Nat., 39: 229-230; Essig, 1938, Ins. West. No. Amer., p. 367; Ellis, 1952, Amer. Midl. Nat., 48: 328; Usinger, 1956, Aquat. Ins. Calif., p. 206, fig. 7:16a (misabeled as *flumineum*).

SIZE: Length, 16.5-22 mm.; width, 8-10 mm.

COMPARATIVE NOTES: The reader is referred to the excellent figure of this species in Usinger's work, *Aquatic Insects of California*. This species is usually light brown dorsally with the venter tending towards a darker brown, especially the abdominal sternites. This species is very closely related to *B. saratogæ* new species, but the latter is much darker in color. The shape of the caudal filaments distinguishes the two immediately. *Belostoma bakeri* is a variable species. Variation in size and shape is particularly noticable. There appears to be a tendency for an increase in body size as the distribution proceeds northward suggesting a cline. More intensive collecting may reveal that *B. bakeri* is a polytypic species.

DATA ON DISTRIBUTION: This species ranges from Louisiana to California and northward into Oregon. I have seen specimens from the states of Durango, Sonora, and Baja del Norte in Mexico. Uhler and others apparently confused this species with *fusciventre*. *B. fusciventre* has often been reported from California, Arizona and New Mexico in the literature.* Most surely these

*Uhler, 1875, Rept. Geog. Geol. Expl. Surv. West One Hundredth Merid., 5: 840; Uhler, 1875, Bull. U. S. Geol. Geog. Surv. Terr., (2) 1: 338; Uhler, 1886, Checkl. Hem. Het. No. Amer., Brookl. Ent. Soc., p. 28; Champion, 1901, Biol. Centr. Amer., vol. 2, p. 365; Kirkaldy and Bueno, 1909, Proc. Ent. Soc. Wash., 10: 191; Banks, 1910, Cat. Nearc. Hem. Het., Amer. Ent. Soc., p. 9; Van Duzee, 1916, Checkl. Hem. Amer., N. Y. Ent. Soc., p. 53; Van Duzee, 1917, Univ. Calif. Publ. Ent., 2: 468; De Carlo, 1938, Anal. Mus. Arg. Cienc. Nat., 39: 222; Essig, 1938, Ins. West. No. Amer., p. 367.

records are erroneous and the specimens referred to were *bakeri* or *flumineum*. Bank's (1910), record of *apache* (as *minor* of Dufour) from California was probably a misidentification also. De Carlo's (1938) record of *apache* from California was probably based on Bank's record. The type locality of *apache* is Brazil. I have seen *bakeri* from the following localities:

ARIZONA: Pomerene, Nov. 8, 1953, F. S. Truxal and L. Martin, 7 ♂♂, 6 ♀♀ (LACM).

CALIFORNIA: Berkeley, Aug. 29, 1936, M. A. Embury, 1 ♂ (Usinger); Bishop, Aug. 4, 1937, R. M. and G. E. Bohart, 1 ♂, 1 ♀ (CAS); Blocksburg, June 21, 1935, E. Daybell, 1 ♂, 1 ♀ (CAS); Camp Pendleton, Oceanside, Oct. 24, 1945, H. P. Chandler, 1 ♀ (Usinger); Carmel, April 15, 1919, L. S. Slevin, 1 ♂, 1 ♀ (CAS); Cloverdale, June 19, 1926, V. S. Brown, 1 ♀ (CAS); Colton, Feb. 1, 1910, C. R. Pilate, 1 ♀ (CAS); Davis, July 9, 1932, R. L. Usinger, 6 ♂♂, 5 ♀♀ (Usinger); Fallen Leaf Lake, June 19, 1930, 1 ♀ (Usinger); Fish Slough near Laws, 1937, Miller, 1 ♀ (CAS); Inverness, Oct. 3, 1950, P. D. Ashlock, 1 ♂ (Ashlock); Laguna Dominguez, Los Angeles, Aug. 22, 1953, Lionel Stange, 1 ♀ (Menke); La Habra, Aug. 4, 1916, L. L. Muchmore, 7 ♂♂, 7 ♀♀ (LACM); Lake Britton, Sept. 17, 1946, H. P. Chandler, 1 ♂ (Usinger); Lake Tahoe, July 20, 1920, M. Marshall, 1 ♀ (CAS); Leona Heights, Oakland, Sept. 1924, G. Linsley, 1 ♀ (Usinger); Los Angeles River, May 1930, G. Grant, 1 ♀ (LACM); near Mather, July 31, 1930, E. Zimmerman, 1 ♀ (Usinger); near Moss Beach, Feb. 4, 1928, A. M. A., 2 ♂♂ (Usinger); Oakland, March 4, 1933, E. S. Ross, 1 ♂, 2 ♀♀ (CAS); Hills back of Oakland, Sept. 5, 1909, E. C. Van Dyke, 1 ♂, 1 ♀ (CAS); Olancho, May 18, 1954, F. S. Truxal and L. Martin, 2 ♀♀ (LACM); 2 mi. S. Olema, April 7, 1957, A. Menke and L. Stange, 9 ♂♂, 11 ♀♀ (Menke); Pacific Grove, Sept. 5, 1920, F. E. Blaisdell, 1 ♀ (CAS); Point Reyes, May 2, 1954, P. D. Ashlock, 1 ♂ (Ashlock); Redding Springs, Aug. 19, 1927, 1 ♂ (Usinger); Riverside, Feb. 27, 1927, Thos. Craig, 1 ♂ (CAS); Saltdale, June 19, 1932, A. T. McClay, 1 ♀ (Usinger); San Francisco, Dec. 1, 1945, H. P. Chandler, 1 ♂ (Usinger); San Gabriel River, Oct. 16, 1949, C. L. Hogue, 1 ♀ (Hogue); San Mateo Co., July 4, 1909, J. A. Kusche, 1 ♂, 1 ♀ (CAS); Santa Ana Canyon, June 25, 1926, C. E. Norland, 1 ♂, 2 ♀♀ (LACM); S. Sonoma Co., Oct. 2, 1910, J. A. Kusche, 1 ♀ (CAS); Stanford

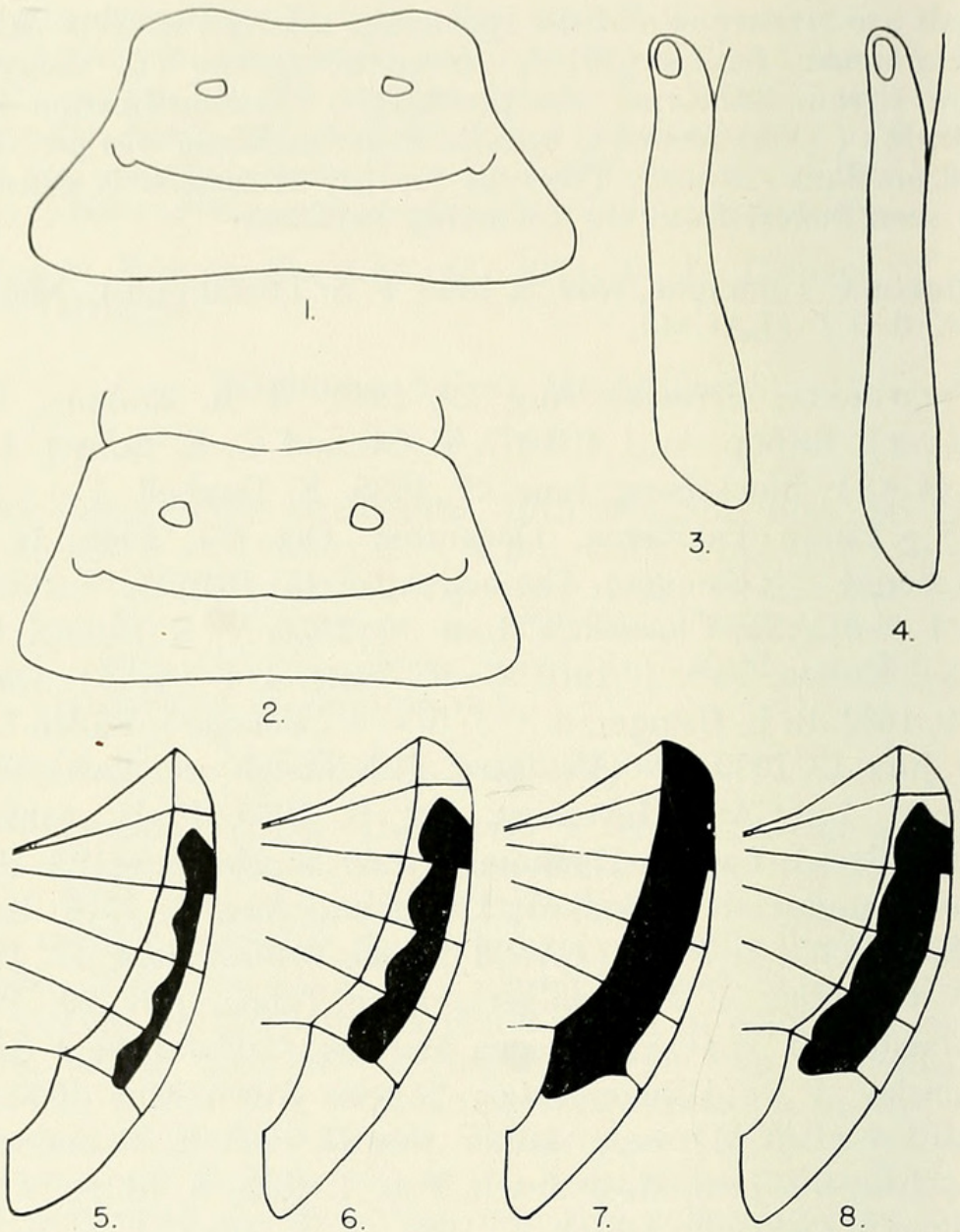


PLATE 47

1. *Belostoma flumineum*: pronotum.
2. *Belostoma bakeri* and *saratogae*: pronotum.
3. *Belostoma saratogae*: ventral aspect of right caudal filament.
4. *Belostoma bakeri*: ventral aspect of right caudal filament.
5. *Belostoma fusciventre*: pattern of hair on connexivum.
6. *Belostoma testaceum*: pattern of hair on connexivum.
7. *Belostoma flumineum*, *bakeri*, and *saratogae*: pattern of hair on connexivum.
8. *Belostoma lutarium*: pattern of hair on connexivum.

Univ., Oct., 1 ♂, 1 ♀ (CAS); Temecula, Oct. 12, 1954, F. S. Truxal and L. Martin, 1 ♂ (LACM); near Truckee, Aug. 8, 1946, H. P. Chandler, 1 ♀ (Usinger); Warm Sulphur Spring, Panamint Valley, Feb. 24, 1957, A. Menke, 15 ♂ ♂, 22 ♀ ♀ (Menke);

Westwood, May 19, 1933, 1 ♂, 1 ♀ (UCLA); Wilmington, July 29, 1936, R. Boland and R. Mathews, 1 ♂ (LACM); Williams, July 1, 1949, C. H. Spitzer, 1 ♀ (CAS).

OREGON: Chandler State Park, June 30, 1951, Borys Malkin, 1 ♂ (CAS).

NEVADA: Soda Lake, 1933, G. D. Hanna, 1 ♀ (CAS)

TEXAS: Dripping Springs, Aug. 9, 1942, W. S. and E. S. Koss, 1 ♂, 3 ♀♀ (CAS); Rosevelt, April 21, 1924, J. O. Martin, 1 ♀ (CAS).

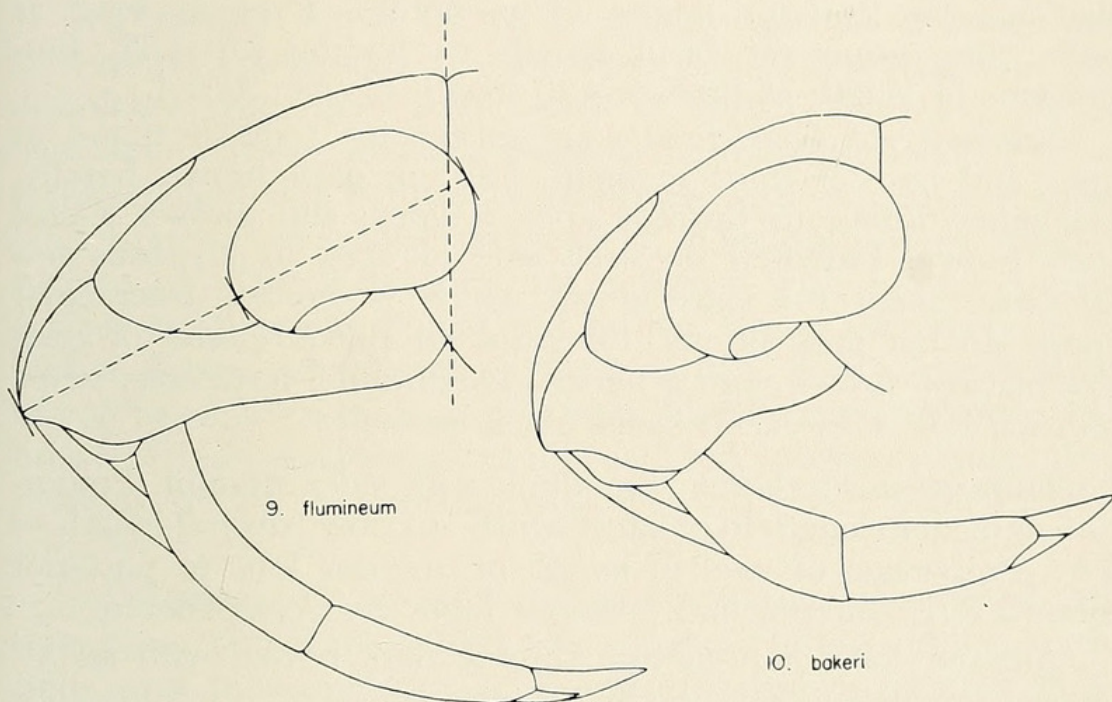


PLATE 48

9. *Belostoma flumineum*: shape of head and beak illustrating method of measuring length of eye to length of proboscis, and the vertical axis of the head.
 10. *Belostoma bakeri*: shape of head and beak.

***Belostoma saratogæ* new species**

(figs. 2, 3, 7, 10)

DESCRIPTION HOLOTYPE MALE:

SIZE: Length 18 mm.; width 8.7 mm.

GENERAL APPEARANCE: Narrow from a dorsal aspect. Dorsum dark brown; thoracic venter dark brown; abdominal venter blackish brown except apex which is testaceous. Legs paler than

rest of bug, light brown with dark brown maculations. Proboscis not particularly prominent, rapidly sloping downward.

HEAD: Base of beak situated at point nearly beneath anterior margin of eye as seen from side. First segment of beak slightly wider than second at apex; proportions of segments as measured on anterior surface: 1.3::1::75. Clypeus prominent as seen from side of head, base just reaching line drawn between anterior angles of eyes. Interocular space at narrowest point wider than an eye. Vertex with scattered punctures. Inner margins of eyes diverging posteriorly. Post ocular space with setæ that overlap anterior angles of pronotum. Eyes as long as wide. Proportions of head length to width: 2.5::4.35. Proportions of length of proboscis to length of eye: 1::1.4.

Segments of beak testaceous except for reddish tinges at apex and base of third segment. Labrum dark brown basally, becoming testaceous towards apex. Clypeus dull brown. Genæ dark brown. Proboscis on each side of apex of clypeous testaceous, except for extreme tip which is brown. Interocular space shining dark brown. Longitudinal sulcus mesad of each eye blackish brown with a narrow longitudinal testaceous stripe on each side. Post ocular space black brown.

THORAX: a. Prothorax: Pronotum with sides straight. Proportion of median length to greatest width: 3.1::6.8 (overall length = 3.4). Proportion of median length of anterior lobe to posterior lobe: 2.1::1. Anterior and posterior lobes coarsely punctate.

Anterior lobe of pronotum shining dark brown with an M-shaped testaceous spot mesally on anterior margin. Posterior lobe lighter brown on anterior two thirds and dark brown on posterior one third, shining. Five small, evenly spaced, testaceous spots along anterior margin of posterior lobe. Lateral margins of pronotum testaceous. Proepimeron blackish brown except for dorsal margin and antero-ventral area which are testaceous. Prosternal carina low, semicircular, blackish brown.

b. Mesothorax: Mesepisternum blackish brown except for a longitudinal testaceous stripe just above middle of plate. Mesepimeron blackish brown except antero-dorsal angle and posterior lobe which are testaceous. Mesosternum blackish brown and covered with short setæ.

c. Metathorax: Metepisternum blackish brown except for a thin longitudinal testaceous stripe; margin at base of metacoxæ tessellate with testaceous spots. Metasternum (metaxyphus) blackish brown, covered with setæ mesially forming a longitudinal row of hairs; sharply pointed posteriorly.

LEGS: a. Prolegs: Coxæ blackish brown with base testaceous. Trochanters testaceous with brown maculations. Femora generally brown but with a faint longitudinal testaceous area mesially, and another such area along the posterior margin, dorsally; ventral surface with two faint testaceous spots on the posterior margin; setæ lining posterior margin brown. Length to width: 4.5::1.5. Tibiæ brown with two equally spaced faint testaceous rings. First tarsal segment testaceous; second segment brown. Claws reddish brown. Proportions of leg including claw: 3.5::1.5::4.5::3::3::5::4.

b. Mesolegs: Coxæ brown except posterior lobes which are testaceous. Trochanters testaceous. Femora testaceous but maculated with three wide bands of brown, ventrally; one at base, one midway, and one subapically, on ventral side. Dorsal surface completely suffused with brown with only faint suggestion of testaceous areas corresponding to ventral surface. Ventral surface of tibiæ testaceous but suffused with brown. Dorsal surface light brown. Spines red brown; dorsal swimming hairs brown. Second tarsal segment light brown; third segment light brown becoming dark brown at apex. Tarsal setæ and spines red brown. Claws testaceous basally and red brown apically. Proportions of leg including one claw: 1.9::1.8::5.25::4.2::7::1.1::75.

c. Metalegs: Coxæ brown except posterior lobes which are testaceous. Tronchanters testaceous. Femora testaceous on ventral sides with faint suffusion of brown; the brown forming three indefinite bands, one sub-basally, one medially, and one sub-apically. Dorsal sides light brown. Ventral sides of tibiæ dark brown mesially, the margins narrowly testaceous. Dorsal surface dark brown, speckled apically with testaceous spots. Spines reddish; dorsal swimming hairs brown. Second segment of tarsus brown; third segment brown basally becoming blackish brown apically. Spines and setæ of tarsi reddish. Claws testaceous basally and red brown apically. Proportions of leg including one claw: 2::2.25::6.5::6::1::1.25::8.

ABDOMINAL VENTER: Visible sternites shining black brown with transverse wrinkling. Genital plate blackish brown basally becoming testaceous at apex. Visible sternal connexival plates black brown where covered with hair; the remainder testaceous. Center of each plate, except last, with a faint brown spot at margin. Margin of last connexival plate with many faint brown spots. Connexival hair black, covering inner two thirds of

connexiva; mesial margin touching sternites. Patch of hair on last connexival plate triangular, touching genital plate, and reaching one half the length of the genital plate.

SCUTELLUM: Black brown. Apical third transversely corrugated. Proportions of the base to lateral margins: 4.25::4.2::4.2. Median length = 3.5.

HEMELYTRA: Clavus without veins; corium with network of veins. Membrane with eleven veins. Color brown to dark brown depending on conditions of drying. Embolium and remainder of margin testaceous.

CAUDAL APPENDAGES: Inner half brown, outer half testaceous. Covered with long hairs. Apex obliquely truncate. Proportions of right filament: 13::69, ratio = .188 left filament: 13::70, ratio = .185.

ALLOTYPE FEMALE: Length 18.5 mm.; width 9 mm. Same appearance as male.

COMPARATIVE NOTES: This species is very close to *B. bakeri*. Except for the shape of the caudal filaments (figs. 3, 4) and darker color it resembles *bakeri* very closely. The lateral margins of the pronotum are more divergent in most specimens of *bakeri*.

VARIATION WITHIN THE SPECIES: Length varies from 17.5 to 19 mm.; width varies from 8 to 9 mm. Teneral specimens are very much lighter in color. The maculations of the legs are not particularly evident in these specimens. Specimens that are darker than average lose many of the testaceous markings of the body. The ratio of the length to width of the caudal appendages varies as given in the key.

ECOLOGICAL NOTES: Saratoga Springs, the only known locality for *saratogæ*, is located in Death Valley National Monument approximately 30 miles north of Baker, San Bernardino Co., California. All the specimens of *saratogæ* have been collected in the main pool or the short stream that flows into it. The reader is referred to a paper by Belkin and McDonald (1956) in which the ecology of the spring and surrounding area is excellently described and illustrated.*

LOCATION OF TYPES: Holotype male, allotype female and 14 paratypes in the Los Angeles County Museum. 37 paratypes in the collection of the Dept. of Entomology, University of

*Belkin and McDonald, 1956, Ann. Ent. Soc. Amer., 49: 105-132.

California at Los Angeles. Additional paratypes in the California Academy of Sciences; Snow Entomological Collections, Univ. of Kansas; California Insect Survey, Univ. of California, Berkeley; Usinger Collection; and the author's collection.

SPECIMENS EXAMINED: Saratoga Springs, Death Valley, California; June 16-19, 1954, Belkin and McDonald, 1 ♀ (UCLA); July 28, 1954, Belkin and McDonald, 1 ♀ (UCLA); July 31, 1954, F. S. Truxal, L. Martin, and A. Menke, 2 ♂♂, 2 ♀♀ (LACM); Dec. 1, 1954, R. W. Sabbot, 2 ♂♂ (LACM); Jan. 10, 1955, F. S. Truxal, 2 ♀♀ (LACM); Feb. 19, 1955, J. Belkin, 1 ♂, 2 ♀♀ (UCLA); March 12, 1955, A. Menke and L. Stange, 3 ♂♂, 3 ♀♀ (LACM); March 20, 1955, J. Belkin, 2 ♂♂ (UCLA); April 23-24, 1955, J. Belkin, 3 ♂♂, 1 ♀ (UCLA); May 27-29, 1955, Belkin et al, 10 ♂♂, 16 ♀♀ (UCLA); Dec. 30-31, 1955, A. Menke and L. Stange, 3 ♂♂, 1 ♀ (Menke); Jan. 27, 1957, A. Menke and L. Stange, 5 ♂♂, 11 ♀♀ (Menke); Feb. 23, 1957, A. Menke, 4 ♂♂, 5 ♀♀ (Menke); May 4, 1957, A. Menke and L. Stange, 6 ♂♂, 3 ♀♀ (holotype and allotype series) (LACM).

A Note on *Belostoma apache* Kirkaldy and Bueno.

Apache was proposed as a new name for *B. minor* of Dufour (1863) by Kirkaldy and Bueno (1909). In 1805 Palisot de Beauvois described a species of *Belostoma* from "Saint-Domingue" (Haiti) as *Nepa minor*. Dufour had specimens from Brazil which he thought were the same as *B. minor* of Palisot de Beauvois. The discrepancy in localities makes it improbable that *B. minor* of Dufour is the same as *B. minor* of Palisot de Beauvois. Although this situation was recognized by several authors, no one proposed a new name for Dufour's species until 1909 when Kirkaldy and Bueno gave it the name *apache*. Since Dufour's specimens came from Brazil this must be considered as the type locality for *apache*, and Dufour's description the original. Kirkaldy and Bueno gave no description. *B. apache* (as *minor* Dufour) has been recorded from Mexico by Mayr (1871). Whether or not this is the same species as *apache* remains to be verified. Montandon (1913) describes *B. apache* without giving any locality for his specimens. I have seen specimens from Mexico that agree with Montandon's description. De Carlo (1938) gives Mexico as the locality for specimens he determined as *apache*.

LITERATURE CITED

- Banks, Nathan
1910. Catalogue of the Nearctic Hemiptera Heteroptera. Philadelphia. American Entomological Society, pp. 1-103.
- Barber, H. G.
1914. Insects of Florida pt. 2. Hemiptera. Bull. Amer. Mus. Nat. Hist. 33(31): 498.
- De Carlo, Jose A.
1938. Los Belostomidos Americanos. Anal. Mus. Arg. Cienc. Nat., 39: 189-252, plates 1-7.
- Dufour, Leon
1863. Essai Monographique sur les Belostomides. Ann. Soc. Ent. France, 32: 373-400.
- Haledman, S. S.
1852. Insects, in: Stansbury, Howard. Exploration and Survey of the Valley of the Great Salt Lake of Utah. Appendix C. Philadelphia. Lippincott, Grambo, and Co., pp. 370-371, pl. 10, fig. 1.
- Kirkaldy, F. E. S., and J. R. de la Torre Bueno
1909. A Catalogue of American Aquatic and Semi-Aquatic Hemiptera. Proc. Ent. Soc. Wash., 10(3-4): 173-215.
- Leidy, Joseph
1847. History and Anatomy of the Hemipterous Genus Belostoma. Jour. Nat. Sci. Phil., sec. ser., 1: 57-67, pl. 10.
- Mayr, Gustav
1871. Die Belostomiden. Verhandl. Kais.-Konig. Zool.-Bot. Ges. Wein, 21: 399-440.
- Montandon, A. L.
1909. Hydrocorises de L'Amerique du Nord. Bule. Soc. Rom. Sti. Buc., 18(5-6): 180-191.
1913. Nepidae et Belostomidae. Bule. Soc. Rom. Sti. Buc., 22(1): 122-125.
- Palisot de Beauvois
1805. Insectes recueillis en Afrique et en Amerique. Paris, p. 236, pl. 20, fig. 3.
- Snow, F. H.
1906. Some Results of the University of Kansas Entomological Expeditions to Arizona in 1904 and 1905. Trans. Kans. Acad. Sci., 20(4): 180.
- Uhler, P. R.
1894. On the Hemiptera Heteroptera of the Island of Grenada, West Indies. Proc. Zool. Soc. Lond. 1894, pp. 167-224.
- Usinger, R. L.
1956. Aquatic Insects of California. Berkeley. University of California Press, pp. ix + 508.



1958. "A synopsis of the genus *Belostoma* Latreille, of America north of Mexico, with the description of a new species (Hemiptera; Belostomatidae)." *Bulletin of the Southern California Academy of Sciences* 57, 154–174.

View This Item Online: <https://www.biodiversitylibrary.org/item/106681>

Permalink: <https://www.biodiversitylibrary.org/partpdf/42494>

Holding Institution

New York Botanical Garden, LuEsther T. Mertz Library

Sponsored by

The LuEsther T Mertz Library, the New York Botanical Garden

Copyright & Reuse

Copyright Status: In copyright. Digitized with the permission of the rights holder.

License: <http://creativecommons.org/licenses/by-nc-sa/3.0/>

Rights: <https://biodiversitylibrary.org/permissions>

This document was created from content at the **Biodiversity Heritage Library**, the world's largest open access digital library for biodiversity literature and archives. Visit BHL at <https://www.biodiversitylibrary.org>.