

STUDIES OF NEOTROPICAL CADDISFLIES, XXIV.
THE GENUS *MACRONEMA* IN MESOAMERICA
(TRICHOPTERA: HYDROPSYCHIDAE)

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Abstract.—Five species of *Macronema* are reported from Mexico and Central America. Three, *M. burmeisteri* Banks, *M. chalybeoides* Ulmer, and *M. ulmeri* Banks were previously known; but two, *M. luteipenne* and *M. variipenne* are described as new. Distributions and illustrations of the genitalia and wings are given. The Neotropical species of the genus *Macronema* are divided into the *hyalinum* and *percitans* groups.

The genus *Macronema* as presently defined is almost worldwide in distribution. Only the Holarctic Region of Europe and Asia appears to be without any representatives of the genus. Southern Africa, Sundaland, and South America, however, appear to be centers of diversity.

Mexico and Central America do not have either a very large nor diverse fauna in comparison to South America, although it is distinctly more diverse than is the North American fauna. Up to now five species, of which two are herein described as new, have been taken in this area, as compared to three in eastern North America, two in the Greater Antilles, and over three dozen in South America. Two of the Mesoamerican species, *M. ulmeri* and *M. burmeisteri*, appear to be broadly distributed in northern South America, reaching their northernmost limits in southern Central America. The two new species, *M. variipenne* and *M. luteipenne*, appear to be primarily Mesoamerican species, being distributed from Mexico south throughout Central America and into northern South America. The fifth species, *M. chalybeoides*, is known only from a single old collection made in Cuernavaca, Mexico; and thus it may be either narrowly endemic or perhaps follow all or part of the pattern of the last two species.

Adults of the species herein treated only rarely come to lights at night, and most of those that do so are females or teneral specimens. They are

most frequently found on sunny days, resting on foliage over the stream or flying in small groups in the bright sunlight.

We have neither taken nor seen any larvae from Mesoamerica that are assuredly of this genus. We do have a few unassociated larvae of the type described by Marlier (1964:122) under the name *Centromacronema*. However, since there is still no firm association between larval and adult stages for these larvae, there is always the slight chance that these are in fact larvae of species in the *percitans* group of *Macronema*. The larvae of *M. ulmeri* were described by Marlier (1964:136) under the name *M. siolii*. These are typical *Macronema* larvae with a carina around the front of the head. *Macronema ulmeri*, however, belongs to a very distinct section of the genus; and the larvae may appear quite different from larvae of the *percitans* group.

The material here reported upon is from many collections, abbreviated as follows: AMNH—American Museum of Natural History, New York; BM—British Museum (Natural History), London; MCZ—Museum of Comparative Zoology, Cambridge; NMW—Naturhistorisches Museum Wien, Vienna; UCR—University of California, Riverside; UM—University of Michigan, Ann Arbor; UNAM—Universidad Nacional Autonomia de Mexico, Mexico City; and USNM—National Museum of Natural History, Washington, D.C.

KEY TO SPECIES OF *MACRONEMA*

- 1. Forewing membrane with a strongly contrasting pattern of dark brown and hyaline *ulmeri* Banks
- Forewing without a strongly contrasting pattern in membrane, colors generally due to scales 2
- 2. Forewing unicolorous fuscous; head orange *chalybeoides* Ulmer
- Forewing generally with a pattern of marking in apical ½, or, if unicolorous, pale golden; head brown or yellow brown with green and silver hairs 3
- 3. Forewing brown with a transverse whitish band apically *burmeisteri* Banks
- Forewing either almost unicolorous pale golden, or with basal ½ green with apex mottled brown and gold 4
- 4. Male aedeagus with apicolateral processes borne from near ventral margin and pointed apically; forewing generally with apex strongly maculate and contrasting with green base, rarely uniformly golden *variipenne*, new species
- Male aedeagus with apicolateral process borne from near center, rounded apically; forewings with apex only indistinctly maculate and not contrasting with golden basal region *luteipenne*, new species

The *hyalinum* Group

There is a group of species, here called the *hyalinum* group, which are united by the coloration of the forewings and general form of the male genitalia. The coloration of the forewings is due primarily to the strongly contrasting pattern in the wing membrane, and this pattern is rather generally spread over the entire wings rather than limited to the apical half. The male genitalia, of those species whose genitalia are known, tend to be very similar, with a two-segmented clasper, elongate, simple, tenth tergum, and elongate, simple, apically bulbous aedeagus.

To this group the following species belong: *Macronema arcuatum* Erich., *M. braueri* Bks., *M. erichsoni* Bks., *M. hyalinum* (Pict.), *M. maculatum* Perty, *M. negrense* Flint, *M. santaeritae* Ulm., *M. surinamense* Flint, *M. tuberosum* Ulm., *M. ulmeri* Bks., and possibly others too imperfectly known to place with certainty. The majority of species in other regions of the world (certainly the three from eastern North America) appear to belong to this group.

Macronema ulmeri Banks

Figs. 1, 2, 22

Macronema hyalinum Pict., var. *Ulmer*, 1907b:76; 1913:395. Martynov, 1912:20.

Macronema ulmeri Banks, 1913:237. Fischer, 1963:199. Flint, 1967:11; 1974:107; 1978:388.

Macronema siolii Marlier, 1964:136. Flint, 1978:388.

This is a widespread species throughout southern Central America and northern South America. It was recorded by Flint (1978) from Honduras, Costa Rica, and Panama without detailed locality, as well as from Colombia, Ecuador, Peru, Venezuela, Surinam, and Brazil.

The immature stages were described by Marlier (1964) under the name *M. siolii* Marlier.

Material.—HONDURAS, ATLANTIDA: Tela, Dakota Farm, 19 May 1923, T. H. Hubbell, 1 ♀ (UM). COSTA RICA: Pedregoso (Prov. unknown), Feb., 2100 ft, D. L. Rounds, 1 ♀ (MCZ). PUNTARENAS: Esquinas near Golfito, P. & D. Allen, 1 ♀ (MCZ). LIMON: Guapiles, 6 July 67, M. J. Westfall, 3 ♂ (USNM). PANAMA: BOCAS DEL TORO: Rio Changena, 2400 ft, 16 & 20 Sept. 1961, G. B. Fairchild, 2 ♂ (MCZ & USNM). CHIRIQUI: Volcan de Chiriqui, 25–4000 ft, Champion, 7 ♂ (BM & MCZ). COCLE: El Valle, 20 May, G. B. Fairchild, 1 ♂ (MCZ). CANAL ZONE: Barro Colorado Island, 7 Jan. 1929, C. H. Curran, 1 ♂ (AMNH); same, but 18 Jan. 1935, M. Bates, 1 ♂ (MCZ); same, but 12 Mar. 1967, M. E. Irwin, ♂♂, ♀♀ (UCR & USNM); same, but 23 July 1924, N. Banks, 1 ♀ (MCZ).

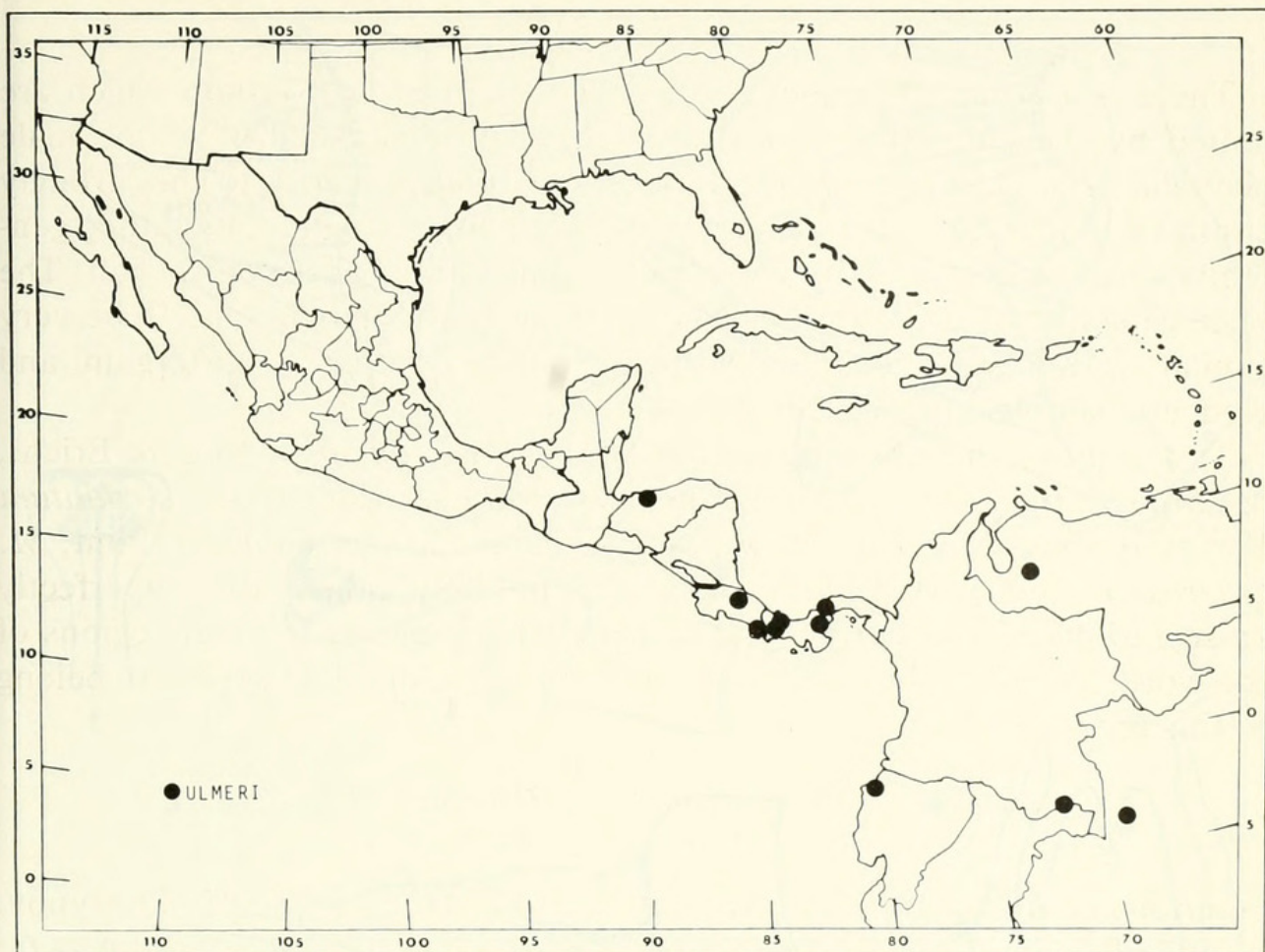


Fig. 1. Partial distribution of *Macronema ulmeri*.

The *percitans* Group

The second major grouping of Neotropical *Macronema* species is hereby called the *percitans* group. In this group the head and thorax dorsally and the basal half or two-thirds of the forewing are covered by small emerald green scales, which region is usually bounded laterally by a band of silvery-white scales. On the forewing the green basal area is bounded outwardly by a band of contrasting color with the apex variously mottled. All of this coloration is due basically to small scales or hairs, with only a minor contribution from the underlying membrane. In this group the male genitalia are quite varied; but the claspers appear to be undivided, the tenth tergum is shorter and often bears lobes and process, as does the apex of the aedeagus.

To this group belong *M. argentilineatum* Ulm., *M. burmeisteri* Bks., *M. exophthalmum* Flint, *M. fragile* Bks., *M. gundlachi* Bks., *M. hageni* Bks., *M. lachlani* Bks., *M. matthewsi* Flint, *M. muelleri* Bks., *M. pennyi* Flint, *M. percitans* Walk., *M. pertyi* Bks., *M. picteli* Bks., *M. reinburgi* Nav., and the two new species described herein, *M. variipenne* and *M. luteipenne*.

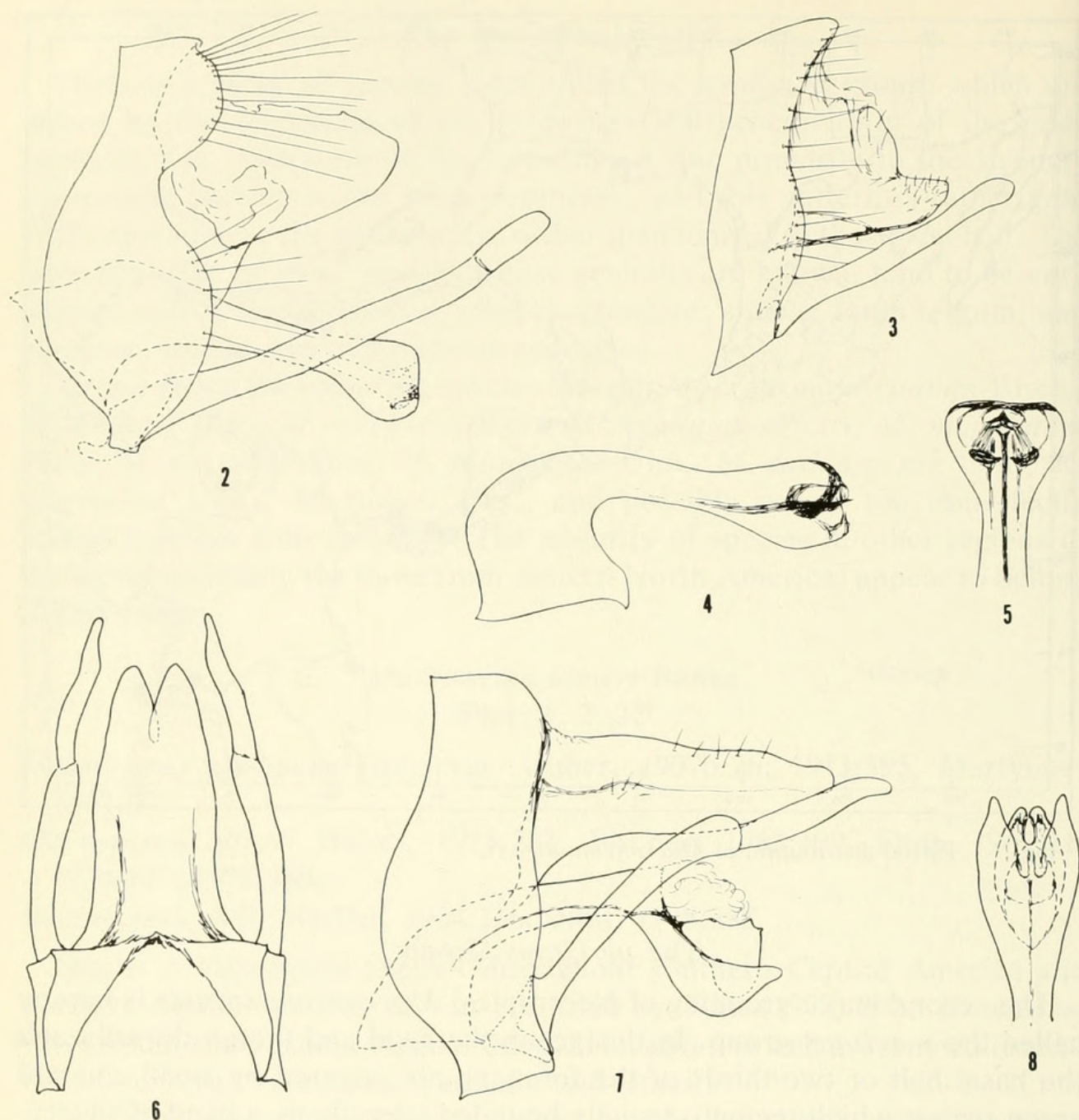


Fig. 2. *Macroneura ulmeri*, male genitalia, lateral. Figs. 3–5. *Macroneura burmeisteri*. 3, Male genitalia, lateral. 4, Aedeagus, lateral. 5, Tip of aedeagus, dorsal. Figs. 6–8. *Macroneura chalybeoides*. 6, Male genitalia, dorsal. 7, Same, lateral. 8, Tip of aedeagus, ventral.

M. amazonense Flint, *M. bifidum* Flint, *M. fraternum* Bks., and *M. paliferum* Flint appear to form a well defined subgroup of the *percitans* group as noted previously (Flint 1978:403). In addition there are a number of other species that will probably have to be placed here when they are better known. In contrast to the *hyalinum* group which appears to have representatives in other regions of the world, there does not appear to be any certain representatives of this group outside of the Neotropical Region.



Fig. 9. Partial distribution of *Macronema burmeisteri*.

Macronema burmeisteri Banks

Figs. 3–5, 9, 23

Macronema burmeisteri Banks, 1924:452. Fischer, 1963:178. Flint, 1967:9; 1978:393.

Macronema burmeisteri is known from Brazil, Ecuador, and Peru. However, we are identifying these few specimens from Central America as *M. burmeisteri*, albeit with some hesitation. The typical *M. burmeisteri* from the Amazon Basin has more darkly colored forewings with the subterminal band a bright golden yellow. These examples have the basal region of the forewing shading from paler to darker brown at the pale subterminal band which is stramineous in color. However, the pattern of spots along the costal margin and the male genitalia apparently are identical in all examples. The photo of the wings and drawing of the male genitalia are from the Panamanian male.

Material.—NICARAGUA, CHONTALES: Puente Quinama, east of Villa Somoza, 29 July 1967, O. S. Flint, Jr., 1 ♀ (USNM). PANAMA, PANAMA: La Chorrera, May 12, August Busck, 1 ♂, 1 ♀ (USNM).

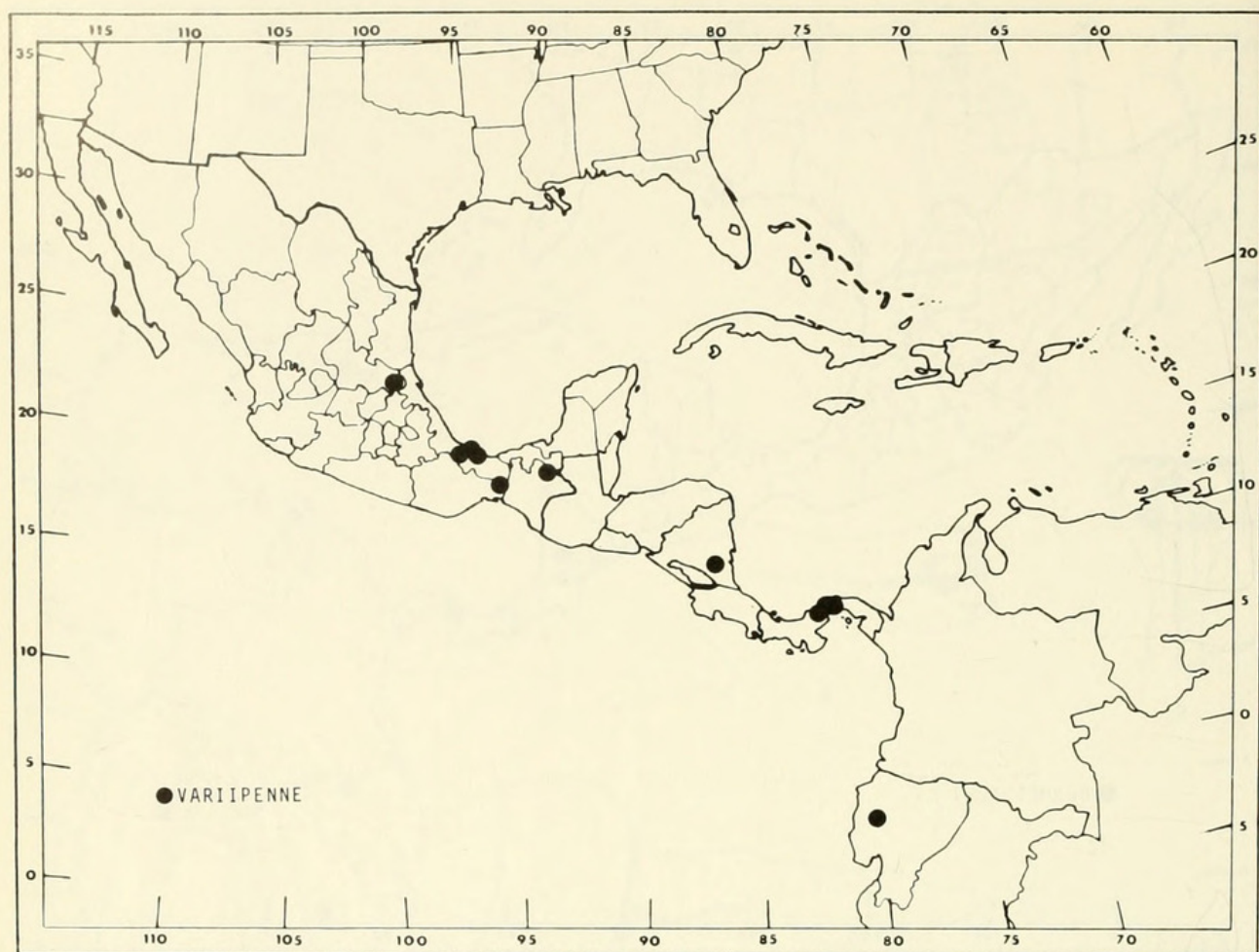


Fig. 10. Distribution of *Macronema variipenne*.

Macronema variipenne Flint and Bueno, NEW SPECIES

Figs. 10, 11–15, 24–27

Macronema fulvum Ulmer, 1905a:80 (in part, example from Chiriqui).

Macronema percitans Walker: Ulmer, 1907b:74 (in part, examples from Chiriqui).

This species is widespread, but seldom abundant, from northeastern Mexico, south through Panama, apparently as far as Ecuador. The coloration of the species is, however, very variable, not only in degree of contrast between the markings, but also between sexes. The material from the Canal Zone is the palest from Central America. However, the Ecuadorian example is totally yellow without pattern and is inseparable by color from *M. luteipenne*.

Figs. 11–15. *Macronema variipenne*. 11, Male genitalia, lateral. 12, Same, dorsal. 13, Tip of aedeagus, lateral. 14, Same, dorsal. 15, Same, ventral. Figs. 16–20. *Macronema luteipenne*. 16, Tip of aedeagus, lateral. 17, Same, dorsal. 18, Same, ventral. 19, Male genitalia, lateral. 20, Same, dorsal.

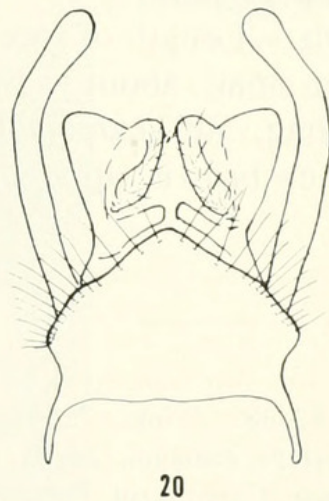
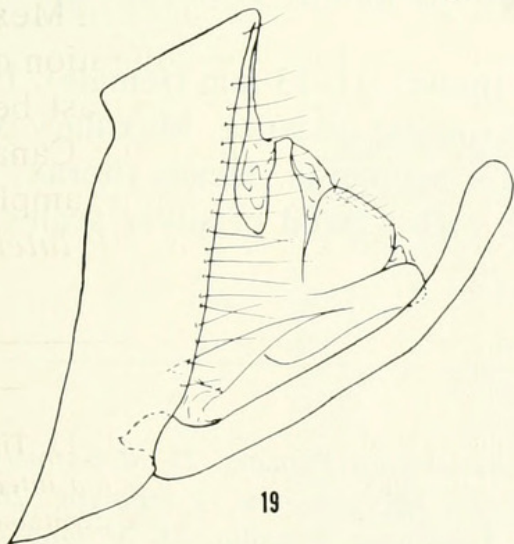
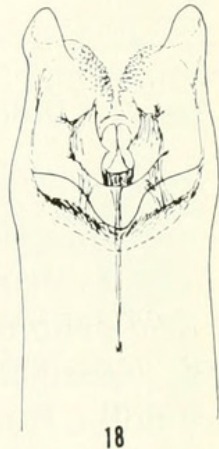
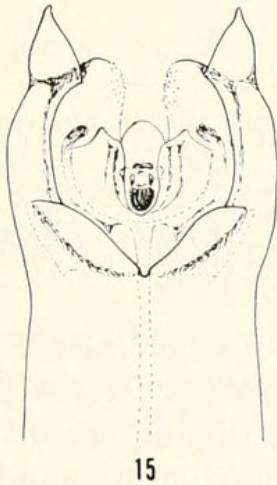
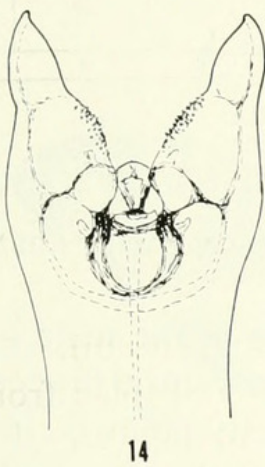
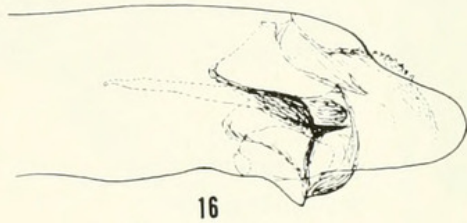
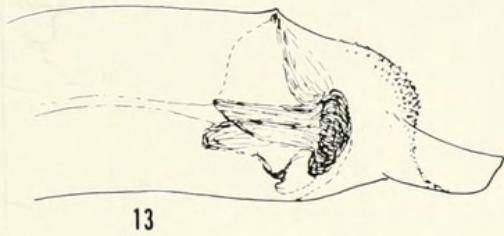
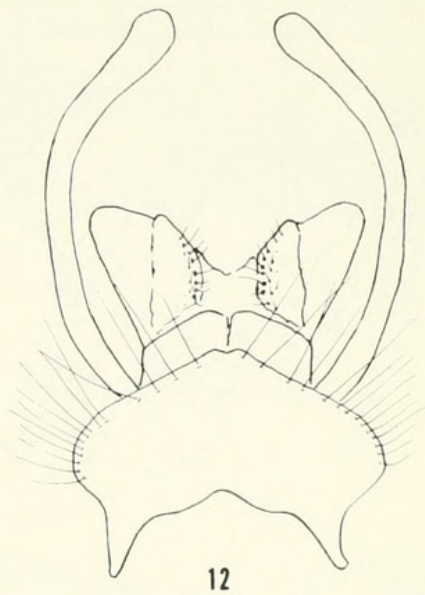
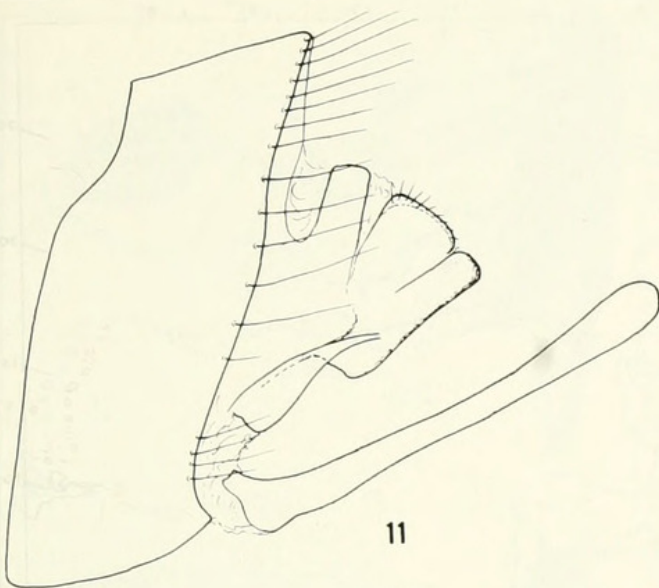




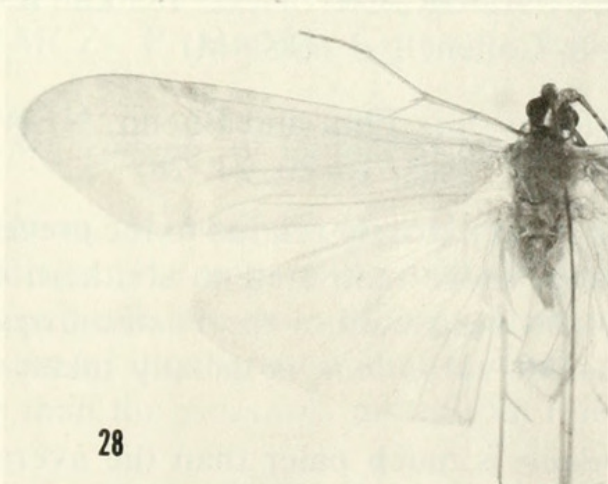
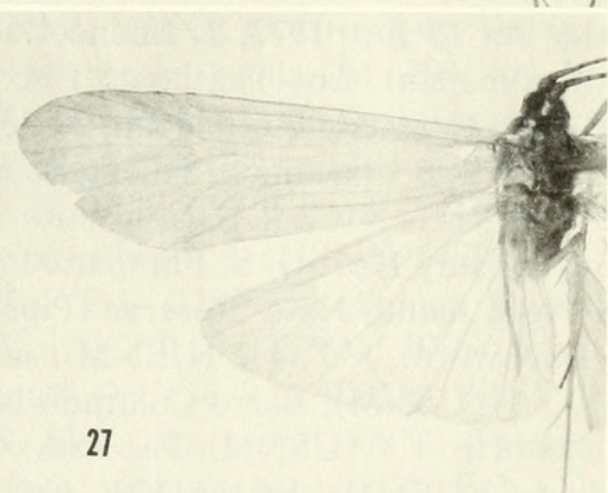
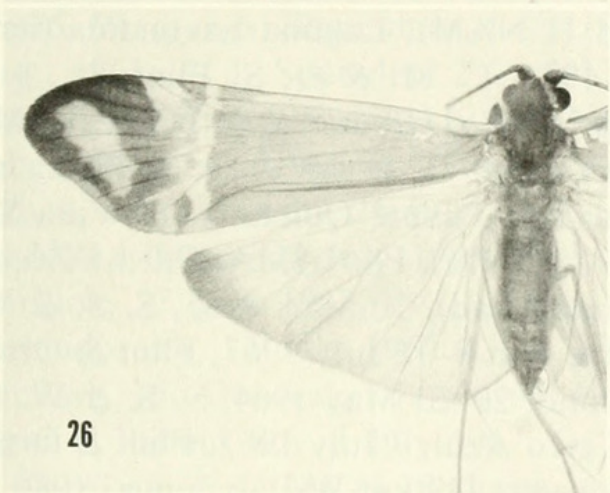
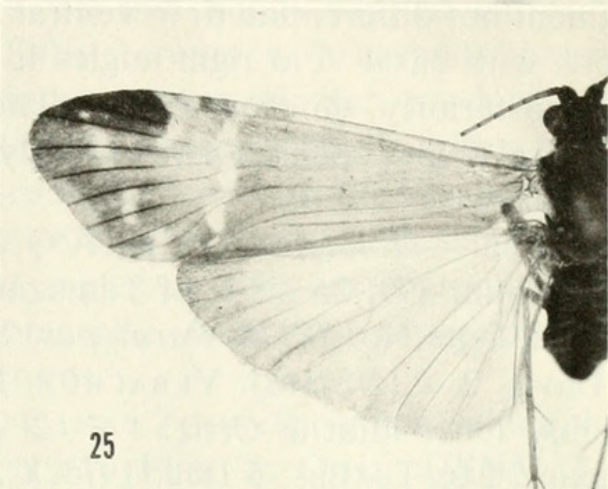
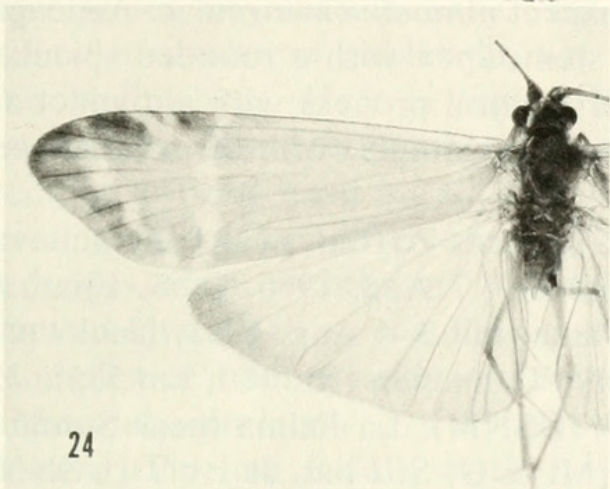
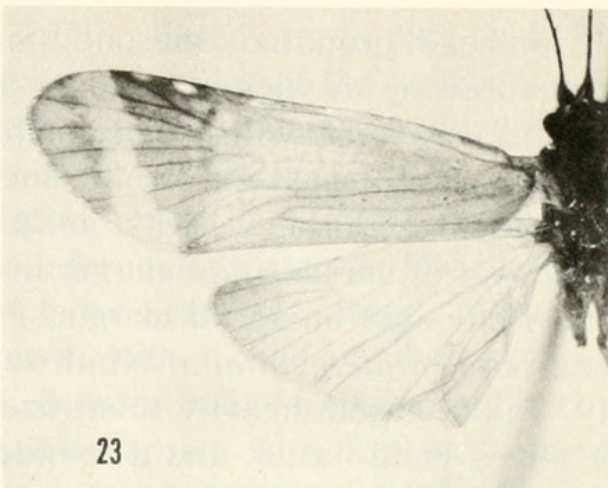
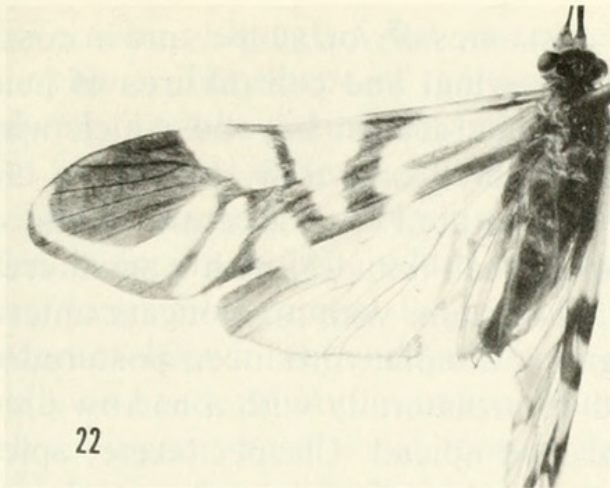
Fig. 21. Distribution of *Macronema luteipenne* and *M. chalybeoides*.

penne. In general, the color of *M. variipenne* is darker and with sharper contrasts than the color of *M. luteipenne*.

The definitive differences between the two species lie in the male genitalia, specifically the aedeagus. In *M. variipenne* the lateroventral processes are borne from the ventral half of the tip and are distinctly pointed. In *M. luteipenne* these lobes are more nearly from the middle of the apex and are rounded apically.

Adult.—Length of forewing, 13–14 mm (male), 11–13 mm (female). Eyes of male small, about $\frac{1}{3}$ width of dorsal interocular distance. Maxillary palpi very long, 5th segment longer than basal 4 segments. Head, thorax, and abdomen brown, appendages pale brown; with a band of silver scales lat-

Figs. 22–28. Wings. 22, *Macronema ulmeri*, Bocas del Toro, Panama. 23, *M. burmeisteri*, La Chorrera, Panama. 24, *M. variipenne*, holotype. 25, *M. variipenne*, ♀ topotype. 26, *M. variipenne*, Cerro Azul, Panama. 27, *M. variipenne*, Latacunga, Ecuador. 28, *M. luteipenne*, Villa Colon, Costa Rica.



erally on head, pronotum, mesonotum, dorsomesally on scape, and in costal cell of forewing to stigma; basal $\frac{2}{3}$ of forewing, and central area of head and thorax covered with small emerald-green scales, beyond which wing bears a narrow transverse white line, bordered outwardly by brown and gold mottled with white spots, apical brown area with a central white or golden spot of variable size (larger in male than female), with a small crescentic white spot on apical margin. Fifth sternum with an elongate anterolateral boss. *Male genitalia*: Ninth segment annular, produced posterodorsally. Tenth tergum heavily sclerotized ventrolaterally with a narrow erect sclerotized band basad, and a rounded lobe apicad. Clasper terete, apical segment not differentiated, in ventral aspect almost semicircular. Aedeagus short, with basal $\frac{1}{2}$ at right angles to stem; apex with a rounded spiculate lobe posteriorly, developed into a lateroventral process with a distinct apicodorsal angle, open posteroventrally with a complex of inner sclerites and structures.

Material.—*Holotype* ♂: MEXICO, SAN LUIS POTOSI, near Huichihuayan (Rt. 85, km 399, 25 mi N of Tamazunchale), 7 Aug. 1966, O. S. Flint, Jr. USNM Type No. 76174. *Paratypes*: Same, but 3–4 Aug. 1963, Duckworth & Davis, 2 ♀ (USNM). VERACRUZ: Rio Tacolapan (Rt. 180, km 551), 25–26 July 1966, Flint & Ortiz, 1 ♂, 2 ♀ (USNM); La Palma (near Sontecomapan), Los Tuxtlas, 5 Dec. 1975, C. M. & O. S. Flint, Jr., 1 ♀ (USNM); same, but 19 July 1977, J. Bueno, 1 ♂ (UNAM); Laguna Escondida (near Sontecomapan), Los Tuxtlas, 5 Dec. 1975, C. M. & O. S. Flint, Jr., 1 ♂ (USNM). OAXACA: Uxpanapan, 29 Sept. 1977, J. Bueno, 2 ♂, 1 ♀ (UNAM). CHIAPAS: Rio Chacamax, Palenque, 6 Dec. 1975, C. M. & O. S. Flint, Jr., 1 ♀ (USNM). NICARAGUA, CHONTALES: Puente Quinama, E. Villa Somoza, 29 July 1967, O. S. Flint, Jr., 1 ♀ (USNM). PANAMA, CANAL ZONE: Rio Agua Salud, Navy Reserve (Pipeline Road), 30 Mar. 1965, S. S. & W. D. Duckworth, 5 ♂, 4 ♀ (USNM); same, but 8–12 July 1967, Flint & Ortiz, 2 ♂, 3 ♀ (USNM); Barro Colorado Island, 20–23 May 1964, S. S. & W. D. Duckworth, 1 ♀ (USNM). PANAMA: Cerro Azul, 7 July 1967, Flint & Ortiz, 4 ♂, 4 ♀ (USNM). ECUADOR, COTOPAXI: 133 km W Latacunga, 1080 ft, 2 July 1975, Langley & Cohen, 1 ♂ (USNM).

Macronema luteipenne Flint and Bueno, NEW SPECIES

Figs. 16–20, 21, 28

This species, which is very closely related to the preceding *M. variipenne*, appears to have a range more restricted to southern Central America. It seems to be more closely restricted to the Pacific Coast area of deciduous scrub forest, whereas *M. variipenne* is usually taken in wetter evergreen forest regions.

Macronema luteipenne is much paler than the average specimen of *M.*

variipenne, although a few examples of the latter are as pale as any *M. luteipenne*. The shape of the apicolateral processes of the aedeagus offers the only certain distinction between the two, these being rounded apically and borne from near the middle of the tip in *M. luteipenne*.

Adult.—Length of forewing, 12–14 mm (male), 10–12 mm (female). Eyes of male small, about $\frac{1}{3}$ width of dorsal interocular distance. Maxillary palpi very long, 5th segment longer than 4 basal segments. Head, thorax, and abdomen brown, appendages pale brown, with a band of silver scales laterally on head, pronotum, mesonotum, dorsomesally on scape, and in costal cell to stigma; basal $\frac{2}{3}$ of forewing golden brown with scattered emerald-green scales, beyond which the wing is very indistinctly mottled with lighter and paler shades of golden brown. Fifth sternum with a small elongate, dorsolateral boss. *Male genitalia*: Ninth segment annular, produced posterodorsally. Tenth tergum heavily sclerotized ventrolaterally with a narrow erect sclerotized band basad, and a rounded lobe apicad. Clasper terete, apical segment not differentiated, in ventral aspect almost semicircular. Aedeagus short, with basal $\frac{1}{2}$ at right angles to stem; apex produced into rounded lateral lobes, spiculate dorsomesally, open posteroventrally with a complex of inner sclerites and structures.

Material.—*Holotype* ♂: PANAMA, CANAL ZONE, Rio Agua Salud, Navy Reserve (Pipeline Road), 8–12 July 1967, Flint & Ortiz. USNM Type 76175. *Paratypes*: Same data, 4 ♂ (USNM). MEXICO, CHIAPAS: Arriaga, 22 Aug. 1965, P. J. Spangler, 2 ♀ (USNM); near Tonalá (Rt. 200, km 46), 9 June 1967, Flint & Ortiz, 1 ♀ (USNM). COSTA RICA, GUANACASTE: Bagaces, Rio de las Piedras, 27 July 1967, O. S. Flint, Jr., 13 ♂ (USNM); Las Canas, Rio Corobici, 26 July 1967, O. S. Flint, Jr., 5 ♂, 3 ♀ (USNM); 10 mi NW Liberia, 25 July 1965, P. J. Spangler, 1 ♀ (USNM); 1.5 mi S Potrerrillos, 27 July 1967, O. S. Flint, Jr., 1 ♀ (USNM); Arenal, Quebrada Tronadorcita, 24 July 1967, O. S. Flint, Jr., 4 ♀ (USNM). PUNTARENAS: Pacuare, Rio General, 1 July 1967, Flint & Ortiz, 6 ♀ (USNM); Villa Colon, 16 mi S Palmar Sur, 3 July 1967, O. S. Flint, Jr., 1 ♂ (USNM); Palmar, P. & D. Allen, 1 ♂ (MCZ). Pedregoso (Prov. unknown), 1200 ft, Feb., D. E. Rounds, 9 ♂, 2 ♀ (MCZ). PANAMA, CHIRIQUI: Lino, Fassel, 1 ♀ (MCZ).

Macronema of Unplaced Grouping

The following species, *M. chalybeoides* Ulm., is quite unusual in both appearance and genitalia. The apparently unmarked dark wings and rather peculiar form of the genitalia are quite different from either group proposed previously. In the sum of its characteristics it would seem to be closer to the *hyalinum* group than the *percitans* group, but it is left unplaced at this point.

Macronema chalybeoides Ulmer

Figs. 6–8, 21

Macronema chalybeum (Ulmer *nec* Hagen): Ulmer, 1905b:83; 1907a:164; 1907b:81; 1913:408.

Macronema chalybeoides Ulmer, 1951:202, 349. Fischer, 1972:158.

For a long time this species was identified as *Macronema chalybeum* Hagen from Cuba. However, recent studies have shown that Hagen's species is a true *Phylloicus* (Ross, 1952; Flint, 1967). Recognizing this fact, Ulmer (1951) proposed the name *chalybeoides* for the species of *Macronema* from Mexico that he had called *M. chalybeum* in earlier works.

The senior author has studied three of the eight reported specimens in the type-series of *M. chalybeoides*, located in the Vienna Museum. The most complete specimen is labelled LECTOTYPE, but the designation has not been published before. This is a reasonably complete example, lacking forelegs and hindwings, but with an abdomen which is now cleared and here illustrated. The descriptions by Ulmer (1905b; 1907b) are good, as are his figures of the venation.

This is a rather puzzling species. In general appearance it looks like a species of *Centromacronema*, but it does not have the enlarged spur apically on the foretibia, although it does have a short spine ventrally from the tibia. The genitalia are distinctly different from all other species of New World *Macronema*.

Material.—*Lectotype* ♂: "Mexico, Cuernavacca, 1871, Bilimek," "chalybeum det. Brauer," "chalybeum det. Ulmer," "Lectotype *Macronema chalybeoides* Ulm. By Flint 1975" (NMW). *Paralectotypes*: Same, but lacking "Cuernavacca," 2 without abdomens; the series reportedly contains an additional 5 specimens, all in the Vienna Museum.

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EDITOR'S NOTE

I have been associated with the *Proceedings* for five years, the last three as Editor. I am tempted to give several suggestions to authors, reviewers, etc.; but I have decided to refrain from such a self-serving undertaking. I will remind contributors that illustrations are kept for one year after they are published. The stack of illustrations in my office will be discarded on December 1, 1979, unless claimed.

To the staff of the Systematic Entomology Laboratory, IIBIII, AR, SEA, USDA, my sincere appreciation for your help, support, understanding, and tolerance during my tenure as Editor. To the staff of Allen Press, Inc., thank you for the help and patience you have shown a novice. To the ESW Publication Committees of 1977, 1978, and 1979, thank you for your ideas and comments on various manuscripts and editorial matters. To the many reviewers who have given unselfishly of their time in order to improve the *Proceedings*, my gratitude. To authors who have submitted manuscripts for publication in the *Proceedings*, I am beholden for copy to fill the issues and from many hours of interesting reading on subjects I might not have otherwise considered. To those authors who have not agreed with nor accepted my decisions and/or actions on their manuscripts, I wish for you the possibility of serving as gratis editors, in your spare time. To those authors who have written to me to express their appreciation for my help with their manuscripts or their delight with the printed product, I am much obliged. Last but not most important, to the members of the Entomological Society of Washington, I will be forever grateful for the opportunity to serve the Society.

Dux femina facti!

Manya B. Stoetzel

Editor

September 11, 1979



Flint, Oliver S. and Bueno-Soria, Joaquín. 1979. "Studies Of Neotropical Caddisflies .24. Genus *Macronema* In Mesoamerica." *Proceedings of the Entomological Society of Washington* 81, 522–535.

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