

THE GENUS *MACROSTEMUM* KOLENATI
(TRICHOPTERA: HYDROPSYCHIDAE) IN SRI LANKA

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Abstract.—Based on the study of types and, mostly, new material collected between 1970 and 1980, nine species of *Macrostemum* Kolenati are recognized on the island of Sri Lanka. The species *Macronema multifarium* (Walker), *M. nebulosum* (Hagen), and *M. sepultum* (Hagen) are redescribed based on the first material collected since the original types in the 1850s, and are formally transferred to *Macrostemum* (all **n. comb.**). *Macrostemum splendidum* (Hagen) and *M. pseudoneura* (Brauer) are redescribed, and *M. ethelda* (Banks) from southern India is reduced to a subspecies of the latter (**n. status**). *Macrostemum indistinctum* (Banks), a species widespread in southeastern Asia, is newly recorded from the island and *M. saowapa* Malicky is placed in its synonymy (**n. syn.**). *Macrostemum barnardi*, *M. krombeini*, and *M. malickyi* are newly described. All species are described, the male genitalia figured (*M. krombeini* and *M. multifarium* are known only from females), and photos of the wing patterns presented. The species *Macronema obliquum* Hagen is transferred to the genus *Marilia* in the Odontoceridae (**n. comb.**).

Key Words: *Macrostemum*, Hydropsychidae, Sri Lanka, new species, descriptions, illustrations, wings

Sri Lanka (previously Ceylon) lies off the southeastern tip of India. Considering its proximity to India, it seems to have a surprising high level of endemism in its insect fauna. This level of endemism may be more due to the comparative lack of study of the south Indian fauna in comparison to the Sinhalese. Of the nine species treated here, only two are known from the continent, one of which is represented by different subspecies on the continent and the island, the other being found throughout southeastern Asia as far south as Sumatra.

The genus *Macrostemum* Kolenati, as presently recognized, is widespread over the World, being known from North and South America, Africa, and Asia. Most species presently placed in *Macrostemum* were

originally described in *Macronema* Pictet. In 1982 Flint & Bueno divided *Macronema* into two generic entities, by resurrecting *Macrostemum*. *Macronema* is restricted to the Neotropical Realm. The Sinhalese species were mostly described in *Macronema*, and all were placed in this genus for most of the 20th century.

Walker (1852) described the first species now in this genus as *Hydropsyche multifaria*, and all subsequent mention of this species has been based on the type. Hagen in 1858 and 1859 described 7 species in *Macronema*, of which three, *M. splendidum*, *M. nebulosum*, and *M. sepultum* now lie in *Macrostemum*. *Macronema ceylanicum* has been transferred to *Pseudoleptonema* Moseley and *M. vitrina* to *Oestropsyche* Brauer,

both in the Hydropsychidae; *M. annulicorne* was moved to *Anisocentropus* McLachlan in the Calamoceratidae; *M. obliquum* has remained in *Macrostemum* till now. I studied the holotype of the latter many years ago and realized that it was not a hydropsychid. During the preparation of this paper I restudied the holotype, including its cleared male genitalia. It is an Odonoceridae, and is here placed in the genus *Marilia* Müller (**n. comb.**), pending further revision of that genus and its possible dismemberment. I have not seen another example of this species in any material available to me. Brauer described *M. pseudo-neura* from Sri Lanka in 1865, a species rediscovered and well characterized subsequently. In 1911 Banks described *M. indistinctum* from eastern India, it is here recorded from Sri Lanka and the recently described *M. saowapa*, is synonymized with it. Three new species have been discovered in the material collected under the auspices of the Smithsonian's "Ceylon Insect Project" directed by Dr. K. V. Krombein, and are described herein.

Several of the old localities and labels need some clarification. Hagen in his 1858 publication listed the types of *M. splendidum* and *M. nebulosum* as from Rainbodde. Further, on p. 487 he stated (translated) that the species labelled Rainbodde are all collected at this spot in the mountains, 3,500 to 4,000 feet above the sea. In his second paper (Hagen 1859) he corrected this spelling to Rambodde for the type of *M. sepulchrum*. This locality is now accepted as Ramboda and is at 7°04'N, 80°42'E in the District of Nuwara Eliya.

The paratype of *M. barnardi* in the Natural History Museum, London bears a handwritten label stating "Ceylon," but on the back a handwritten "N'pitia." This has been interpreted (Barnard 1980, p. 66) as Nawalapitiya, a town in the central highlands at 7°03'N, 80°32'E in the District of Kandy.

A series of *M. nebulosum* was collected at Kabaragala, Nillomalai, by S. & P. B.

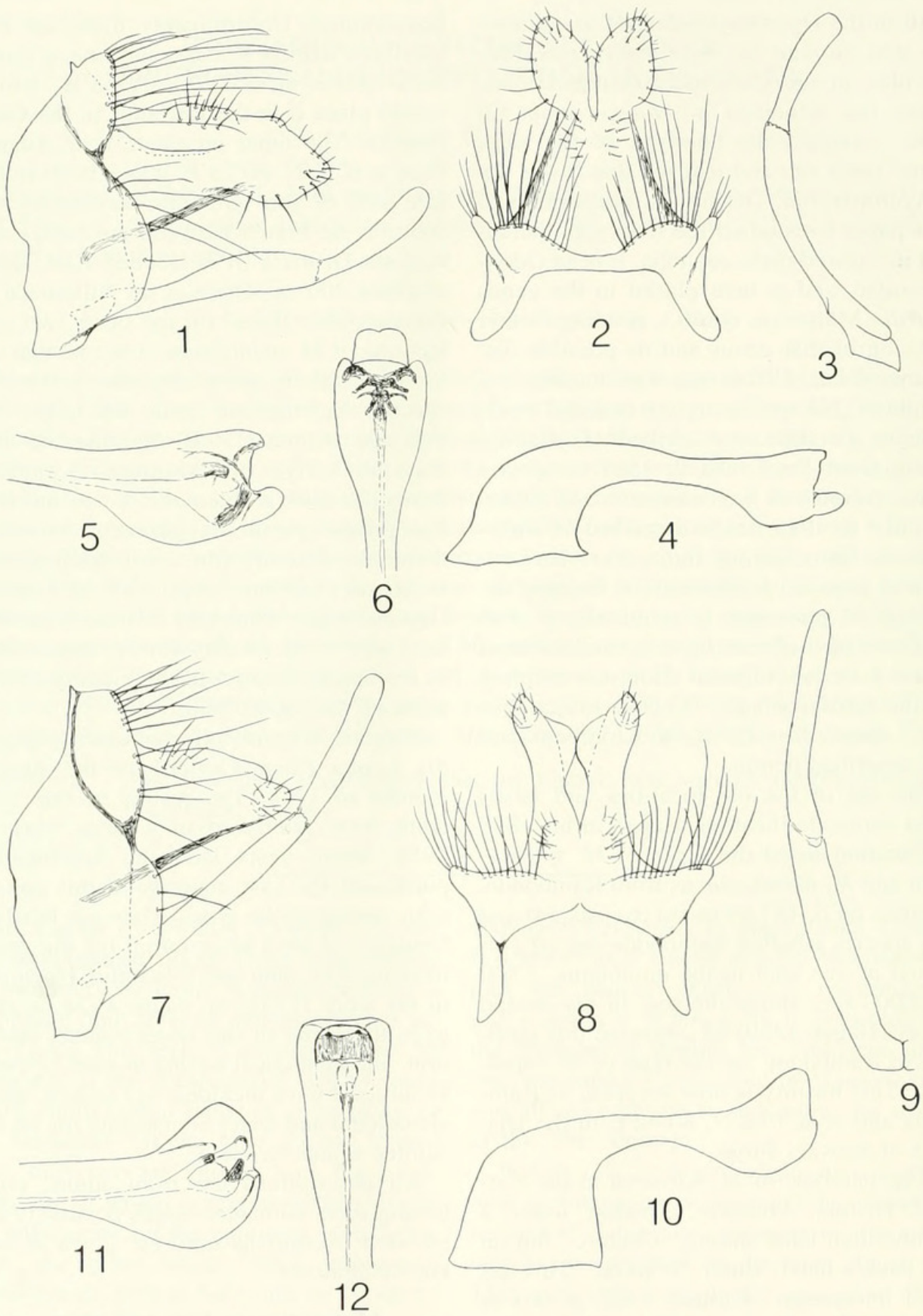
Karunaratne. Unfortunately there are two localities named Kabaragala, one a populated place at 6°03'N, 80°18'E, which would place it in the lowlands in the Galle District. The other an estate near Adam's Peak at 6°56'N, 80°26'E, which is about 6.5 km SSE of the Kitulgala Resthouse and right on the border between the Kandy and Kegalla Districts (it is labelled Kan. Dist.) at about 300 m. There is no Nillomalai in the gazetteer. Based on the other two collections of *M. nebulosum*, it seems that the lowland site is quite improbable for this species, and that the estate site is the one intended. Another P. B. Karunaratne site, Karambaketiya off Memure, Knuckles Range, is also problematic. I can not find Karambaketiya in the gazetteer, however, there is a Mimure (the label, handwritten, is Memure) about 7 km NNE of Corbets Gap and below Knuckles Peak at about 600 m. I place this locality for *M. splendidum* in the Kandy District in the vicinity of Mimure at 7°26'N, 80°50'E.

Fernand Schmid collected extensively on Sri Lanka (then Ceylon) in the first 4 months of 1954. The results of this field work were published in a large work in 1958. Many years later the Smithsonian purchased the vast majority of this collection, including the types. They are labelled Ceylan, a 2 or 3 letter initial for the province, locality, date and F. Schmid. However, in his work (1958) on pages 4–24 he also gave the name of the water course, elevation, and ecological setting at each of these localities. I have included, in brackets, these elevational and water course data for his localities whenever cited.

All descriptions are from adults, none having their immature stages positively associated. Acronyms used are given in Acknowledgments.

***Macrostemum barnardi* Flint,
new species
(Figs. 1–6, 43)**

This species is most similar to *M. pseudo-neura* on the basis of coloration. The two



Figs. 1-12. Male genitalia. 1-6, *Macrostemum barnardi*. 1, Lateral. 2, Dorsal. 3, Inferior appendage, posteroventral. 4, Phallus, lateral. 5, Tip of phallus, lateral. 6, Same, ventral. 7-12, *M. indistinctum*. 7, Lateral. 8, Dorsal. 9, Inferior appendage, posteroventral. 10, Phallus, lateral. 11, Tip of phallus, lateral. 12, Same, ventral.

can be easily distinguished by the complete, transverse, pale band near the base of the forewing and the three, trianguloid, pale marks from the anterior margin beyond in *M. barnardi*. In contrast *M. pseudoneura* has a transverse, pale, band nearer the apex and this band is developed from the innermost of the three, pale, trianguloid marks. In addition there are many more smaller differences in maculation. The male genitalia suggest a closer relationship to *M. nebulosum* and *M. splendidum* based on the similarity in the structure of the tenth tergum and phallic apex. The basolateral ridge of the tenth tergum in *M. barnardi* is unique.

Male.—Length forewing 9–10 mm. Color fuscous, with cream-colored and clear marking. Head golden yellow, cuticle infusate laterally between dorsal warts; maxillary palpus with 4 basal segments infusate, apical segment golden; antenna with scape, pedicel and outer face of first flagellar segment, golden; following 3–4 segments fuscous, then stramineous, becoming infusate apically. Cuticle of meso- and metanota and pleura, black. Legs golden yellow; tibia of foreleg darkened for apical half. Forewing (Fig. 43) with 3 pale-yellow marks from anterior margin, a series of small spots in costal cell basally, and a single, complete, transverse, pale-yellowish band at about $\frac{1}{3}$ length of wing; apex with wash of golden setae anteriorly, posteriorly and apically with extensive pale yellowish or clear marks on a fuscous background; hindwing infusate apically. Abdomen fuscous. Genitalia: Ninth segment with anterolateral margin broadly produced, rounded, posteroventral margin produced, rounded and shelflike above inferior appendage; posterior margin with scattered, elongate setae, becoming numerous dorsolaterally. Tenth tergum with dorsobasal setal wart, with distinct basolateral ridge, apex angulate; in dorsal aspect with apex produced laterad. Inferior appendage elongate, parallel-sided; in posteroventral aspect with apical segments not quite $\frac{1}{3}$ of total length.

Large basal section of phallus $\frac{1}{3}$ of total length of phallus, curving sharply into stem; apex broadly rounded ventrally, dorsally barely elevated; apex nearly vertical with a small dorsal lobe and large ventral, liplike lobe.

Female.—Length forewing 8–9 mm. Coloration as in male. Mid tibia and tarsus flattened, broadened, concave on inner face.

Material examined.—Holotype, ♂: SRI LANKA, Ratnapura Dist., Weddagala, 8–13 Feb 1977, K.V. Krombein et al., collected at light [NMNH]. Paratypes: Same data, 2 ♂, 1 ♀; Gilimale, 17–18 Jun 1976, Krombein et al., light trap, 2 ♂; Gilimale, 17–18 May 1975, Wood & Petty, 1 ♂ (in alcohol); Gilimale, Induruwa Jungle, 5–7 Feb 1977, Krombein et al., blacklight trap, 1 ♀; 2 mi [ca. 3 km] S of Weddagala, Sinharaja Jungle, 8–12 Feb 1977, Krombein et al., 3 ♀. Galle Dist., Kanneliya Section, Sinharaja Jungle, 2–5 Oct 1980, Krombein et al., collected at blacklight, 1 ♂; Hiniduma, 22 Oct 1973, M. & B. Robinson, collected at black light, 1 ♀. Ceylon, N[awala]piti[y]a, McLachlan Coll BM 1938-674, 1 ♀ (BMNH).

Etymology.—I dedicate this species to Dr. Peter C. Barnard of The Natural History Museum, London in gratitude for all his help and friendship during my many visits to that Museum.

Macrostemum indistinctum (Banks)
(Figs. 7–12, 44)

Macronema indistincta Banks 1911:106 [forewing].

Macronema brisi Navás 1930:5 [forewing].—Fischer 1963:178 [catalogue].

Macronema fulvescens Martynov 1935:186 [♂, wings].—Fischer 1963:187 [catalogue].

Macronema indistinctum: Fischer 1963:189 [catalogue].

Macrostemum saowapa Chantaramongkol and Malicky 1986:528 [♂, wings, head].—Malicky 1998:777 [♂, wings].

New synonym.

Macrostemum indistinctum: Malicky 1998:

777 [δ , wings, synonymy of *M. brisi*, and *M. fulvescens*].

Malicky (1998) redescribed the species, placed *M. brisi* and *M. fulvescens* in synonymy, and extended its known distribution. I have studied a male paratype of *M. saowapa* from the Malicky collection, comparing its structures and genitalia with a male from Padukka, and the male type of *M. indistinctum* from Bengal, India. The male genitalia are in very close agreement, offering no notable differences. Unfortunately the wings of the *M. saowapa* paratype are now virtually decolored and offer no clues in terms of pattern; the pattern as originally reconstructed is compatible with *M. indistinctum* in spite of some differences. All the Sri Lankan material here recorded is quite uniform in coloration and agrees perfectly with the type of *M. indistinctum*. In all the material from Sri Lanka before me, there is no other species approaching *M. indistinctum* in structure or appearance; I, therefore, believe that *M. saowapa* is a synonym of it.

The species is known from India, China, Thailand, Laos, Malaysia, Sumatra, and now Sri Lanka (Malicky 1998). Our collection contains numerous captures of the species, but only one contains any males. Most captures were made at night at light traps; perhaps the males are generally active during the day with the females night active. This is a species of low elevations, most recorded elevations being 150 m or less, but one lot was taken at 900 m.

Male.—Length of forewing 11 mm. Color tawny, wings with clear markings. Color of head stramineous, browner dorsally; antenna stramineous. Thoracic cuticle brown; legs stramineous. Forewing (Fig. 44) basically tawny with clear marks, outlines rather indistinct; 3 clear marks from anterior margin, basalmost mark extending along anterior margin to wingbase; with membrane posteriad to clear marks darkened, with various, rather ill defined, pale marks apically and posteriorly. Hindwing clear

with slight apical darkening. Genitalia: Ninth segment with anterolateral margin broadly produced, posteroventral margin produced, shelflike above inferior appendage; posterior margin with scattered, elongate setae, becoming numerous dorsolaterally. Tenth tergum with dorsobasal setal wart, apex rounded; in dorsal aspect with translucent, mesal lobe subapically. Inferior appendage elongate, parallel-sided; in posteroventral aspect with two segments of nearly equal length. Basal section of phallus relatively broad, about 45% of total length of phallus; apex broadly rounded ventrally, sharply, and obliquely elevated dorsally; apex nearly vertical with small indentation at midheight.

Female.—Length of forewing 8–11 mm. Coloration as in male. Midtibia and tarsus strongly flattened, broadened and concave on inner face.

Material examined.—Sri Lanka, δ paratype *M. saowapa* (HMPC). [India], Pusa, Bengal, Oct 07, A. Mujtaba, δ holotype 11765, *M. indistinctum* Banks (MCZ).

SRI LANKA: Colombo Dist., Labugama, 400 ft [ca. 120 m], 24 Aug 1973, G. Ekis, collected at blacklight, 9 ♀; Bayagama, sea level, 28–29 Aug 1973, G. Ekis, collected at black light, 2 ♀; Padukka, 6 Aug 1972, P. B. Karunaratne, at light, 3 ♂, 1 ♀. Galle Dist., Kanneliya Jungle, 11–16 Jan 1975, Krombein et al., blacklight, 11 ♀; Kanneliya, 22–24 May 1975, Wood & Petty, collected in Malaise trap, 2 ♀; Kanneliya, 6–15 Aug 1975, Panawatta, 11 ♀; Kanneliya, 500 ft [ca. 150 m], 21–22 Apr 1973, Baumann & Cross, at blacklight, 1 ♀; Kanneliya Jungle, Udugama, 400 ft [ca. 120 m], 6–12 Oct 1973, Krombein et al., at blacklight, 1 ♀; Kanneliya Jungle, 11 mi. [ca. 18 km] E. Udugama, 11 Oct 1973, Krombein et al., at blacklight, 4 ♀; Sinharaja Jungle, Kanneliya section, 13–16 Jul 1978, Krombein et al., blacklight trap, 1 ♀; Sinharaja, above Enselwatta, 3,000 ft [ca. 900 m], 20 Apr 1973, Baumann & Cross, 1 ♀; Hiniduma, 22 Oct 1973, M. & B. Robinson, collected at black light, 1 ♀. Ham-

bantota Dist., Badagiria Tank, 6.5 mi [ca. 10.5 km] N Hambantota, 75 ft. (ca. 23 m), 27 Oct 1970, O. S. Flint, Jr., 1 ♀. Kalutara Dist., Agalawatta, 24 Jul 1975, Huang et al., light trap, 1 ♀. Kegalle Dist., Kelani Ganga, Kitulgala, 500 ft [ca. 150 m], 12 Mar 1973, Baumann & Cross, at blacklight, 5 ♀. Monaragala Dist., Menik Ganga, Sella Kataragama, 150 ft. (ca. 45 m), 24 Oct 1970, O. S. Flint, Jr., 1 ♀. Ratnapura Dist., Walawe Ganga, Embilipitya, 100 ft. (ca. 30 m), 21 Oct 1970, O. S. Flint, Jr., 2 ♀; dam site, Udawalawe, 250 ft. (ca. 75 m), 19 Oct 1970, O. S. Flint, Jr., 5 ♀; Gilimale, 17–18 Jun 1976, Krombein et al., light trap, 1 ♀; Gilimale, lumber mill, 115 ft [ca. 35 m], 20–25 Oct 1976, Hevel et al., blacklight, 1 ♀; Sinharaja Jungle, 2 mi. [ca. 3 km] S Weddagala, 8–12 Feb 1977, Krombein et al., 2 ♀.

***Macrostemum krombeini* Flint,**
new species
 (Fig. 45)

The holotype of this species was first believed to be a variant of *M. sepultum*, but with the discovery of several new collections unquestionably *M. sepultum*, this now is untenable. The color pattern suggests a relationship to *M. sepultum*, but the pattern is reduced to only a single small spot on the anterior margin of the forewing and an elongate mark from the posterior margin. The apparent black stripes along the front and hind margins of the forewing, so apparent in Fig. 45, are an artifact of poor spreading; they are due to the wing being folded at these spots.

The specimen was collected by net in a heavily forested, bushy area by a very small streamlet. My field note indicates that a red-bodied macronematine was collected, the red now has faded to a tawny color.

Male.—Unknown.

Female.—Length of forewing 10 mm. Color generally fuscous with white marks. Head tawny frontally and dorsally, with frontal cuticle between eyes and central wart with bluish sheen; antenna with scape,

pedicel, and first flagellar segment ventrally tawny, first flagellar segment dorsally and next 4 flagellar segments infusate, remaining segments stramineous (missing beyond segment 15). Thoracic cuticle tawny; legs tawny, tarsi stramineous; midtibia slightly broadened and slightly concave mesally, tarsus unmodified. Forewing (Fig. 45) basically fuscous with creamy-white marks; 1 small spot at midlength from anterior margin, 1 elongate stripe from posterior margin at $\frac{2}{3}$ length. Hindwing infusate, a very small paler spot at stigma.

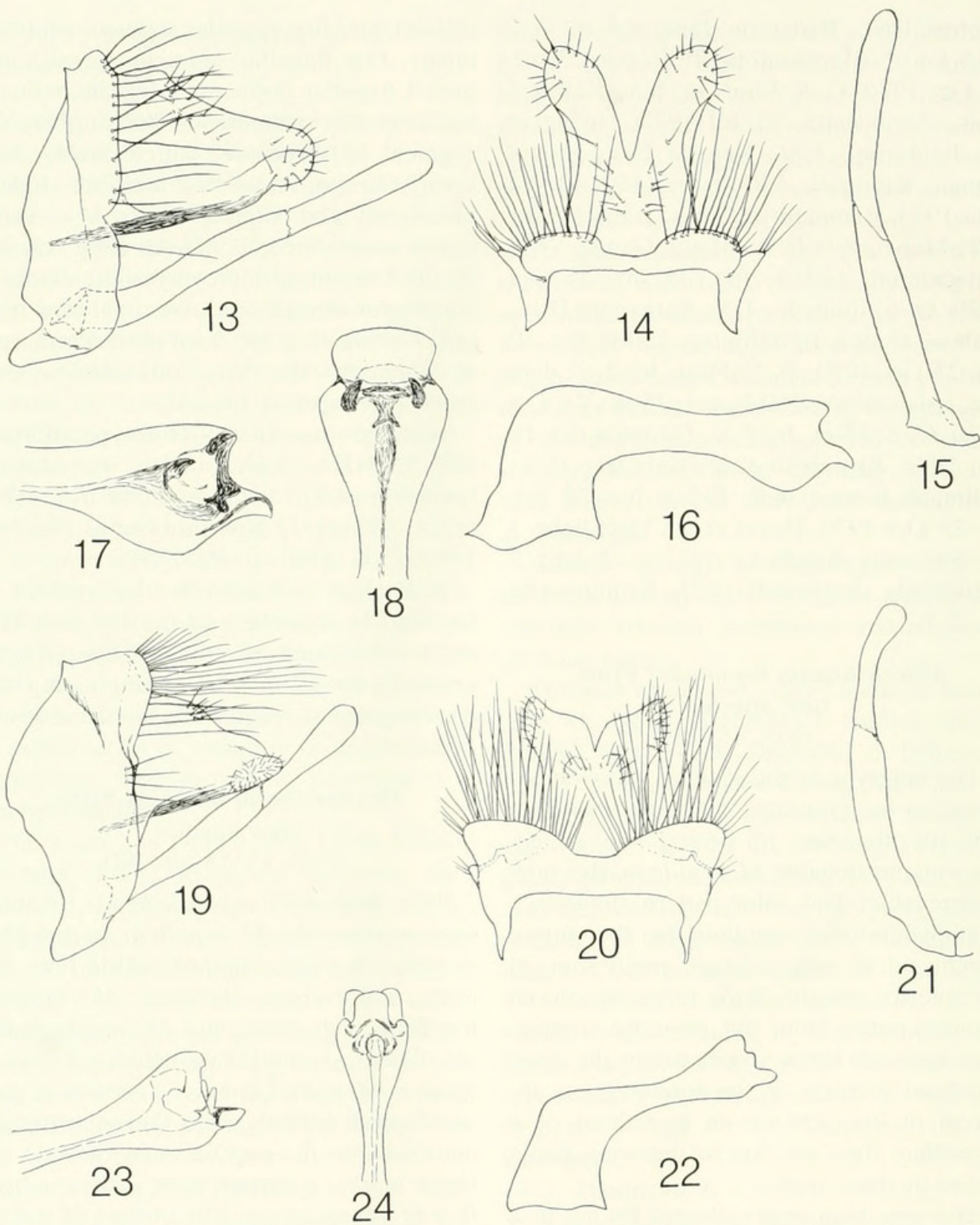
Material examined.—Holotype, female: SRI LANKA, Kandy Dist., Peradeniya [near top of hill behind University], 1,700 ft [ca. 520 m], 13 Nov [not Oct as labelled] 1970, O. S. Flint, Jr. (NMNH).

Etymology.—I dedicate this species to Dr. Karl V. Krombein of the National Museum of Natural History, Washington, in gratitude for all his efforts originating and directing the survey of the Sinhalese insect fauna.

***Macrostemum malickyi* Flint,**
new species
 (Figs. 13–18, 46, 48)

This distinctive new species is, in maculation, most like *M. sepultum*, in that both have black wings, marked with a few, discrete, white spots. However, *M. malickyi* has four such spots, and *M. sepultum* has six. There are only two anterior marginal spots in *M. malickyi* and the outermost posterior mark extends from the wing margin anteriorly into the gap between the two anterior marks, a pattern quite different from that of *M. sepultum*. The outline of the tip of the phallus in *M. malickyi* is also unique among the insular species.

Male.—Length of forewing 8.5 mm. Color fuscous with white marks. Head stramineous; frontal cuticle between eyes and central wart and posteriorly on vertex, darkened; antenna with scape, pedicel and basal third of flagellum, stramineous, apical $\frac{1}{2}$ of flagellum, infusate. Thoracic cuticle shining fuscous; legs stramineous except meta-



Figs. 13-24. Male genitalia. 13-18, *Macrostemum malickyi*. 13, Lateral. 14, Dorsal. 15, Inferior appendage, posteroventral. 16, Phallus, lateral. 17, Tip of phallus, lateral. 18, Same, ventral. 19-24, *M. nebulosum*. 19, Lateral. 20, Dorsal. 21, Inferior appendage, posteroventral. 22, Phallus, lateral. 23, Tip of phallus, lateral. 24, Same, ventral.

tibia darkened. Forewing (Fig. 46) fuscous with 4 white spots, 2 of which extend posteriad from costal margin (posterior segment of outermost narrowly separated from main mark in holotype) and 2 extending an-

teriad from posterior margin with outermost extending between 2 anterior spots, other more basad. Hindwing infusate with anterior margin and stigma white. Genitalia: Ninth segment with anterolateral margin ir-

regularly produced with large, rounded anteroventral lobe, posteroventral margin nearly vertical; posterior margin with scattered, elongate setae, not much denser dorsolaterally. Tenth tergum with dorsobasal setal wart diffuse, apex rounded; in dorsal aspect with apex rounded, slightly curved laterad. Inferior appendage elongate, parallel-sided; in posteroventral aspect with two segments of nearly equal length. Basal section of phallus about $\frac{1}{3}$ total length of phallus, relatively high and at right angle to stem of phallus; apex broadly bulging ventrally before apex, and slightly elevated dorsally; apex with large, lip-like process ventrally.

Female.—Length of forewing 7 mm. Coloration as in male, except posterobasal white mark of forewing much smaller (Fig. 48). Midtibia and tarsus unmodified.

Material examined.—Holotype, male: SRI LANKA, Galle Dist., Udugama, Kanneliya Jungle, 400 ft [ca. 120 m], 6–12 Oct 1973, K.V. Krombein et al., at black light (NMNH). Paratype: Same data, 1 ♀ (NMNH).

Etymology.—I dedicate this species to Dr. Hans Malicky, Lunz am See, Austria, in gratitude for his help with this project and to honor all his work on the South-eastern Asian fauna.

Macrostemum multifarium (Walker),
new combination
 (Fig. 47)

Hydropsyche multifaria Walker 1852:115.

Macronema multifarium: Ulmer 1907b:96 [wings in color].—Betten and Mosely 1940:202 [redescription, wings].—Fischer 1963:191 [catalogue].

This species, as well as several others of its congeners, has not been found since its original description. I have now seen four more examples, one of which has been compared directly with the holotype, and found identical in appearance. The holotype now lacks most of its abdomen, and mine are all females, thus the male genitalia are

unknown. The midlegs of these females are not at all flattened, as in many other species.

The new sites are all in the wet, southwestern corner of the island, at elevations probably between 50 and 150 meters.

Male.—Unknown.

Female.—Length of forewing 10–11 mm. Color generally fuscous with cream colored marks. Head stramineous to tawny frontally, labrum fuscous, shining black dorsally between eyes; antenna with scape, pedicel, and first flagellar segment ventrally stramineous, first flagellar segment dorsally and next 10 flagellar segments infusate, remaining segments tawny. Thoracic cuticle shining fuscous; legs stramineous; midtibia and tarsus unmodified. Forewing (Fig. 47) basically fuscous with cream-colored marks; 3 yellow marks from anterior margin, with various other pale marks apically and posteriorly. Hindwing infusate with white stigma and basally directed streak in costal and subcostal cells. Abdomen apparently orangish dorsally.

Material examined.—Ceylon, William Templeton, holotype (BMNH).

SRI LANKA: Galle Dist., Sinharaja Jungle, Kanneliya section, 2–5 Oct 1980, Krombein et al., collected in Malaise trap, 2 ♀. Ratnapura Dist., Sinharaja Jungle, 8 Sep 1979, P. B. Karunaratne et al., in Malaise trap, 2 ♀.

Macrostemum nebulosum (Hagen),
new combination
 (Figs. 19–24, 49–50)

Macronema nebulosum Hagen 1858:485.—

Ulmer 1907a:61 [redescription, wing tips, wings in color].—Ross 1952:34 [lectotype].—Fischer 1963:192 [catalogue].

This species is very poorly known, being recorded from only the original type series, a female paratype of which was figured in color by Ulmer (1907a). I here present photographs of the wings of the male lectotype and a female paralectotype from the MCZ, figure the male genitalia, and record several new collections. The species appears to be

one limited to higher elevations and consequently to higher rainfall. The types from Ramboda were stated by Hagen (1859, p. 487) to be from 3,500 to 4,000 feet (1,065–1,220 m) above sea level, and the Adam's Peak collection was made at 6,000 ft. (1,825 m.).

Male.—Length of forewing 14–17 mm. Color pale brown with yellowish cast. Head flavescent with black mark between dorsal warts; antenna fuscous; maxillary palpus flavescent. Mesonotum flavescent with fuscous markings anteriorly and laterally, leaving rectangular flavescent area centrally; legs flavescent (Adam's Peak series with most of head dorsally fuscous with pale warts, thoracic notae with cuticle entirely fuscous). Forewing (Fig. 49) with pale spots poorly contrasting with ground color, only dark stigmal spot contrasting (even this spot in series from Adam's Peak is barely noticeable). Hindwing clear. Genitalia: Ninth segment with anterolateral margin produced and angulate, posterolateral margin nearly vertical; posterior margin with few setae laterally, with dense brush of long setae dorsolaterally. Tenth tergum with dorsobasal setal wart small, apex rounded in lateral view; in dorsal aspect with apex slightly flared laterad. Inferior appendage elongate, with each segment slightly constricted near base; in posteroventral aspect with basal segment nearly two-thirds of total length. Basal section of phallus relatively narrow, slightly more than one-third of total length of phallus; apex slightly rounded ventrally, and obliquely elevated dorsally; apex with distinct, lip-like projection.

Female.—Length of forewing 14 mm. Coloration either as in male, or forewing with darker ground color (Fig. 50). Midtibia and tarsus unmodified.

Material examined.—Ceylon, [Ramboda, Nuwara Eliya Dist.], Nietner, ♂ lectotype, ♀ paralectotype (MCZ).

SRI LANKA: Kandy Dist., Kabaragala, Nillomalai, 22–23 Mar 1975, S. & P. B. Karunaratne, 6 ♂. Nuwara Eliya Dist., Adam's

Peak, 6 mi [ca. 9½ km] S Maskeliya, 6,000 ft [ca. 1,825 m], 17 Feb 1970, Davis & Rowe, 6 ♂, 1 ♀.

Macrostemum pseudoneura pseudoneura
(Brauer)

(Figs. 25–30, 51)

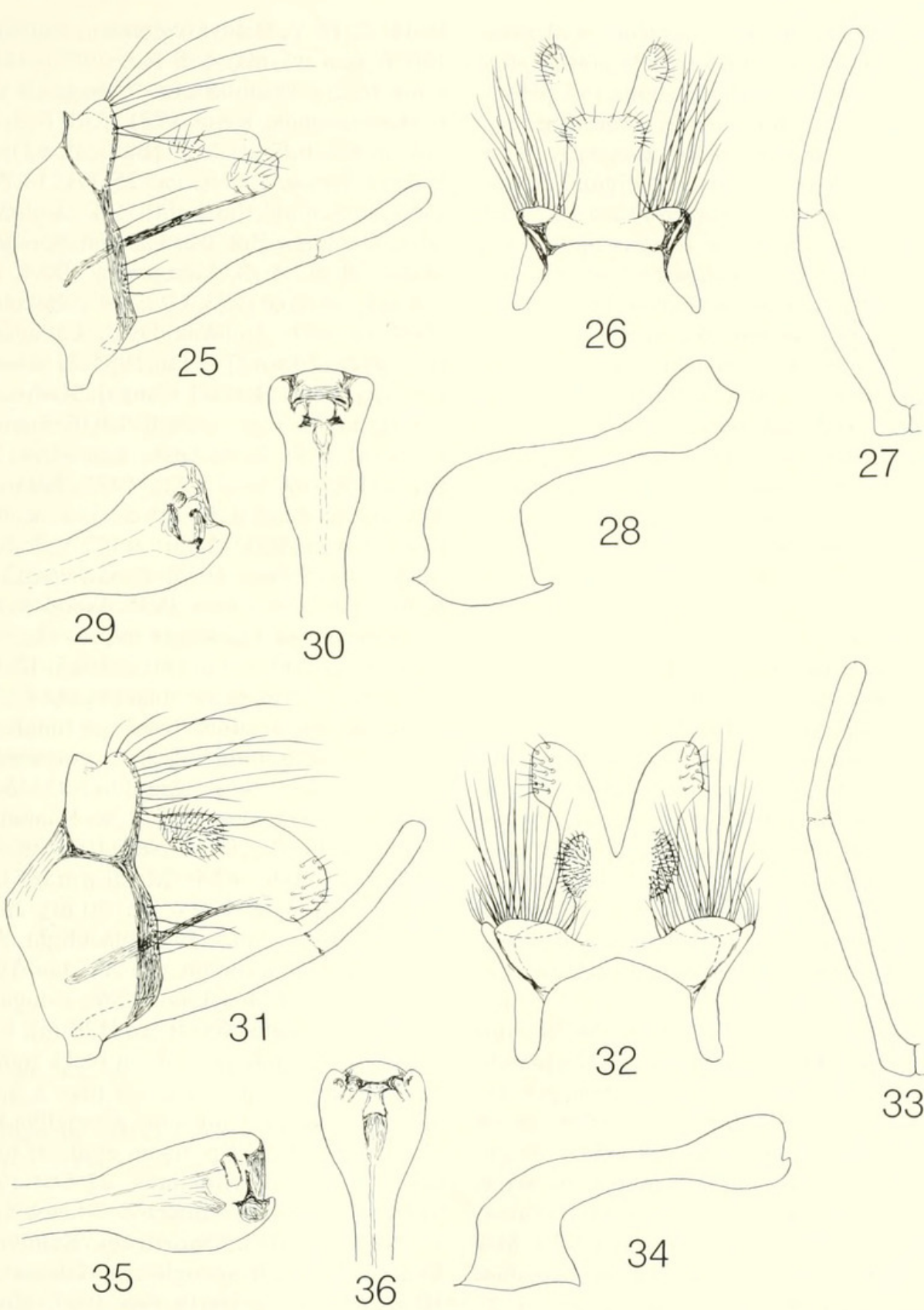
Macronema pseudoneura Brauer 1865: 420.—Ulmer 1907b:95 [redescription, forewing pattern].—Schmid 1958:108 [distribution].—Fischer 1963:194 [catalogue].

Macrostemum pseudoneura: Chantaramongkol and Malicky 1986:528 [♂, forewing pattern, head].—Malicky 1998:778 [♂, forewing pattern].

This has been the most frequently encountered species of the genus in Sri Lanka, and often comes to light in large numbers. The Sri Lankan specimens were captured at lower elevations, most recorded elevations being between 30 and 150 m, only one collection being made at 305 m and another 230 m.

Martynov (1935) recorded this species from Mysore State in southern India and presented a drawing (Fig. 93) of its wing pattern. This pattern agrees with the type of *Macronema ethelda* Banks, also described from Mysore State. I have studied the type of *M. ethelda* and compared it to the material available of *M. pseudoneura* from Sri Lanka. The continental example has a well-marked pale streak in the 2nd R₃ cell. This mark is lacking in the insular material, and in addition there are slight differences in their genitalia, especially the apex of the phallus. Considering the overall similarity in the color pattern between the two regions, it seems best to consider them subspecies, pending further study with more continental material. I therefore recognize *M. ethelda* as *Macrostemum pseudoneura ethelda* (Banks), **new status**.

Male.—Length of forewing 8–9 mm. Head stramineous, infusate dorsally; frontal cuticle between eyes and central wart



Figs. 25–36. Male genitalia. 25–30, *Macrostemum pseudoneura*. 25, Lateral. 26, Dorsal. 27, Inferior appendage, posteroventral. 28, Phallus, lateral. 29, Tip of phallus, lateral. 30, Same, ventral. 31–36, *M. sepultum*. 31, Lateral. 32, Dorsal. 33, Inferior appendage, posteroventral. 34, Phallus, lateral. 35, Tip of phallus, lateral. 36, Same, ventral.

dark with bluish sheen; antenna and maxillary palpus stramineous. Pronotum stramineous; meso- and metanota and pleura, fuscous; legs stramineous. Forewing (fig. 51) with 3 white marks from anterior margin, innermost extending as oblique, transverse, white band completely across wing; series of smaller white marks apically and basally; wash of golden setae between most pale marks, leaving a narrow brown band surrounding most marks; hindwing infusate apically. Abdomen fuscous. Genitalia: Ninth segment with anterolateral margin broadly produced, nearly vertical; posteroventral margin slightly produced and slightly oblique; posterior margin with scattered, elongate setae, becoming more numerous dorsolaterally. Tenth tergum with dorsobasal setal wart small, apex obtusely angulate in lateral view; in dorsal aspect with apex rounded, sides narrow, rodlike. Inferior appendage elongate, parallel-sided; in posteroventral aspect with apical segment only slightly shorter than basal. Basal section of phallus almost $\frac{1}{3}$ of total length of phallus, relatively high and angled almost 90° to stem; apex broadly rounded ventrally, and obliquely elevated dorsally; apex oblique with small apicoventral, protruding angle.

Female.—Length of forewing 8 mm. Coloration as in male. Midtibia and tarsus, strongly flattened, broadened and concave on inner face.

Material examined.—SRI LANKA: Amparai Dist., Ekgal Aru tank, 100 ft [ca. 30 m], 19–23 Feb 1977, Krombein et al., blacklight, 2 ♀; Inginiyagala, 250 ft [ca. 75 m], 21–24 Nov 1976, Krombein et al., black light, 2 ♀. Anuradhapura Dist., Wildlife Society Bungalow, Hunuwilagama, Wilpattu, 200 ft [ca. 60 m], 10–19 Mar 1970, Davis & Rowe, 1 ♂, 8 ♀; Irrigation Bungalow, Padaviya, 180 ft [ca. 55 m], 27 Feb–9 Mar 1970, Davis & Rowe, 9 ♀; Padaviya, 180 ft [ca. 55 m], 2–8 Nov 1970, O. S. Flint, Jr, 11 ♂, 5 ♀; Padaviya, 180 ft [ca. 55 m], 19 May 1976, Krombein et al., blacklight trap, 1 ♀; Sluiceway, Padaviya, 170 ft [ca. 50 m], 3 Nov 1970, O. S. Flint,

Jr, 17 ♂, 17 ♀; Balaya Wewa, nr. Padaviya, 150 ft [ca. 45 m], 4–5 Nov 1970, O. S. Flint, Jr, 2 ♀. Badulla Dist., 5 mi [ca. 8 km] E Mahiyangana, 1 Apr 1971, P. & P. Spangler, at black light, 2 ♀. [Batticaloa Dist.], Rukam Wewa, [90 ft, ca. 25 m], 14 Mar 1954, F. Schmid, [at light], 1 ♀. Colombo Dist., Gampaha Bot. Gardens, 16 Apr 1980, Mathis et al., 1 ♂; Labugama, 400 ft [ca. 120 m], 24 Aug 1973, G. Ekiş, collected at black light, 1 ♂; [Wak Oya], Labugama, [173 ft, ca. 53 m], 7–9 Jan 1954, F. Schmid, [by net], 1 ♂. [Kelani Ganga], Kaduwela, [50 ft, ca. 15 m], 3 Apr 1954, F. Schmid, [at light], 4 ♀. Galle Dist., Kanneliya, 500 ft [ca. 150 m], 21–22 Apr 1973, Baumann & Cross, at blacklight, 24 ♂, 3 ♀; Kanneliya, 27 Apr 1980, Mathis et al., 3 ♂; Kanneliya, 6–15 Aug 1975, Panawatte, 2 ♀; Kanneliya, 22–24 May 1975, Wood & Petty, collected in blacklight trap, 4 ♂, 3 ♀; Kanneliya, 200 ft [ca. 60 m], 15–17 Oct 1976, Krombein et al., blacklight, 4 ♂, 4 ♀; Kanneliya Section, Sinharaja Jungle, 2–5 Oct 1980, Krombein et al., collected at blacklight, 8 ♂, 1 ♀; same, but 13–16 Jul 1978, blacklight trap, 1 ♂, 1 ♀; Kanneliya, Sinharaja Jungle, 9–10 Nov 1977, Krombein et al., collected in Malaise trap, 1 ♂; Kanneliya Jungle, 300 ft [ca. 90 m], 28 Jul 1973, G. Ekiş, collected at blacklight, 8 ♂, 9 ♀; Kanneliya Jungle, 11–16 Jan 1975, Krombein et al., blacklight, 2 ♀; Udugama, Kanneliya Jungle, 400 ft [ca. 120 m], 6–12 Oct 1973, Krombein et al., at black light, 4 ♂, 7 ♀; same, but in Malaise trap, 1 ♀; 11 mi [ca. 18 km] E Udugama, Kanneliya Jungle, 11 Oct 1973, Krombein et al., at black light, 1 ♂, 5 ♀; Hiniduma, 22 Oct 1973, M. & B. Robinson, collected at black light, 1 ♀. Kandy Dist., Roseneath, Kandy, 25 Mar 1971, P. & P. Spangler, in Malaise trap, 10 ♂; Hasalaka, 16–19 Feb 1977, Krombein et al., blacklight trap, 2 ♂, 2 ♀; Aluthnuwara, Hasalaka, 19 Apr 1964, [collector unknown], at light, 1 ♀. Kegalle Dist., Lavant Estate, nr. Yatiyantota, 80 ft [ca. 25 m], 19 Nov 1970, O. S. Flint, Jr, 2 ♂; Kitulgala, 150 ft [ca. 45 m], 30 Sep 1970, O. S. Flint,

Jr, 1 ♂, 2 ♀; Kitulgala, 31 May 1975, Wood & Petty, collected in blacklight trap, 12 ♂, 4 ♀; Kitulgala Resthouse, 150 ft [ca. 45 m], 3–5 Feb 1979, Krombein et al., blacklight trap, 26 ♂, 32 ♀; same, but 24–26 Oct 1977, 12 ♂, 5 ♀; same, but 10–12 Oct 1980, coll. in UV trap, 4 ♂, 8 ♀; Kelani Ganga, Kitulgala, 500 ft [ca. 150 m], 12 Mar 1973, Baumann & Cross, collected at black light, 1 ♂, 1 ♀. [Kelani Ganga], Kitulgala, [750 ft, ca. 230 m], 2 Mar 1954, F. Schmid, [at light], 1 ♀. [Monaragala Dist.], Bibile, 4 May 1974, Gans & Prasanna, 1 ♀. Ratnapura Dist., Panamure, 500 ft [ca. 150 m], 15–21 Oct 1970, O. S. Flint, Jr, 1 ♂; Uda Walawe, 300 ft [ca. 90 m], 1 Aug 1973, G. Ekis, collected at blacklight, 10 ♀; Gilimale, 17–18 Jun 1976, Krombein et al., light trap, 1 ♀; Gilimale, Induruwa Jungle, collected near Kaluganga, 5–7 Feb 1977, Krombein et al., blacklight trap, 2 ♀; Kalu Ganga, Induruwa Jungle, 1,000 ft [ca. 305 m], 23 Mar 1973, Baumann & Cross, 1 ♂. [tributary to Kalu Ganga, near Kiriella], Ratnapura, [80 ft, ca. 25 m], 3 Feb 1954, F. Schmid, [at light], 1 ♀. Vavuniya Dist., Irrigation canal, Parayanalankulam, 25 mi [ca. 40 km] NW Medawachchiya, 100 ft [ca. 30 m], 20–25 Mar 1970, Davis & Rowe, 1 ♀.

Macrostemum sepultum (Hagen),
new combination
 (Figs. 31–36, 52)

Macronema sepultum Hagen 1859:209.—Ulmer 1907a:60 [redescription, wings, wings in color].—Ross 1952:35 [lectotype].—Fischer 1963:197 [catalogue].

As with *M. nebulosum*, this species has been known only from the original type series, a male paratype of which was figured in color by Ulmer (1907a). I here present photographs of the wings of a female paralectotype from the MCZ, figure the male genitalia, and record several new collections. The original series was from the wet, central highlands, at 1,065–1,220 m, the new material was found at elevations of

around 150 m in the wet, southwestern corner of the island.

Male.—Length of forewing 8–8.5 mm. Color fuscous with white marks. Head stramineous frontally, shining black otherwise; frontal cuticle between eyes and central wart with bluish sheen; antenna with scape and pedicel tawny, first 3–5 flagellar segments slightly darkened, remaining segments stramineous. Thoracic cuticle shining fuscous; legs fuscous with tarsi stramineous. Forewing (Fig. 52) fuscous with 6 white spots, 3 lying on the costal margin, and 3 toward posterior margin. Hindwing infusate with anterior margin and stigma white. Genitalia: Ninth segment with anterolateral margin produced and angulate, posteroventral margin produced, slightly oblique; posterior margin with few, elongate setae, becoming denser dorsolaterally. Tenth tergum with dorsobasal setal wart large with many short setae, apex rounded in lateral view; in dorsal aspect with apex produced laterad. Inferior appendage elongate, parallel-sided; in posteroventral aspect with apical segment only about $\frac{2}{5}$ total length. Basal section of phallus relatively narrow, only $\frac{1}{3}$ of total length of phallus; apex broadly rounded ventrally and dorsally; apex nearly vertical with a small lip-like lobe below midheight.

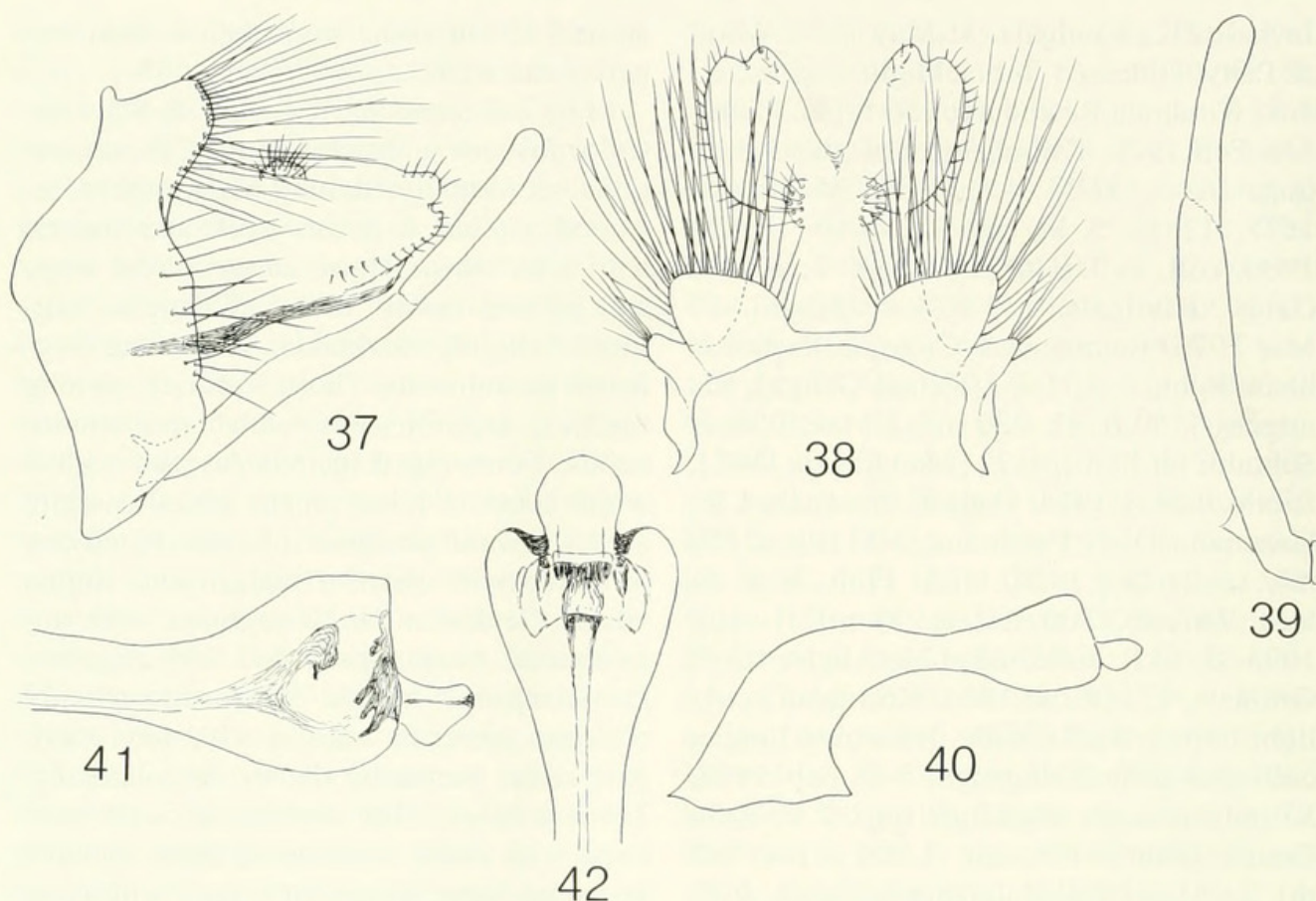
Female.—Length of forewing 8 mm. Coloration as in male. Midtibia and tarsus unmodified.

Material examined.—Ceylon, [Rambo-da], Nietner, ♂ lectotype, ♀ paralectotype (MCZ).

SRI LANKA: Galle Dist., Kanneliya Jungle, Udugama, 400 ft [ca. 120 m], 6–12 Oct 1973, Krombein et al., at blacklight, 3 ♂, 2 ♀; Kanneliya, 22–24 May 1975, Wood & Petty, collected in Malaise trap, 1 ♂.

Macrostemum splendidum (Hagen)
 (Figs. 37–42, 53–54)

Macronema splendidum Hagen 1858:484.—Ulmer 1907b:87 [redescription, forewing, wings in color].—Ross 1952:35 [lectotype].—Schmid 1958:108 [dis-



Figs. 37–42. Male genitalia. *Macrostemum splendidum*. 37, Lateral. 38, Dorsal. 39, Inferior appendage, posteroventral. 40, Phallus, lateral. 41, Tip of phallus, lateral. 42, Same, ventral.

tribution, variation].—Fischer 1963:197 [catalogue].

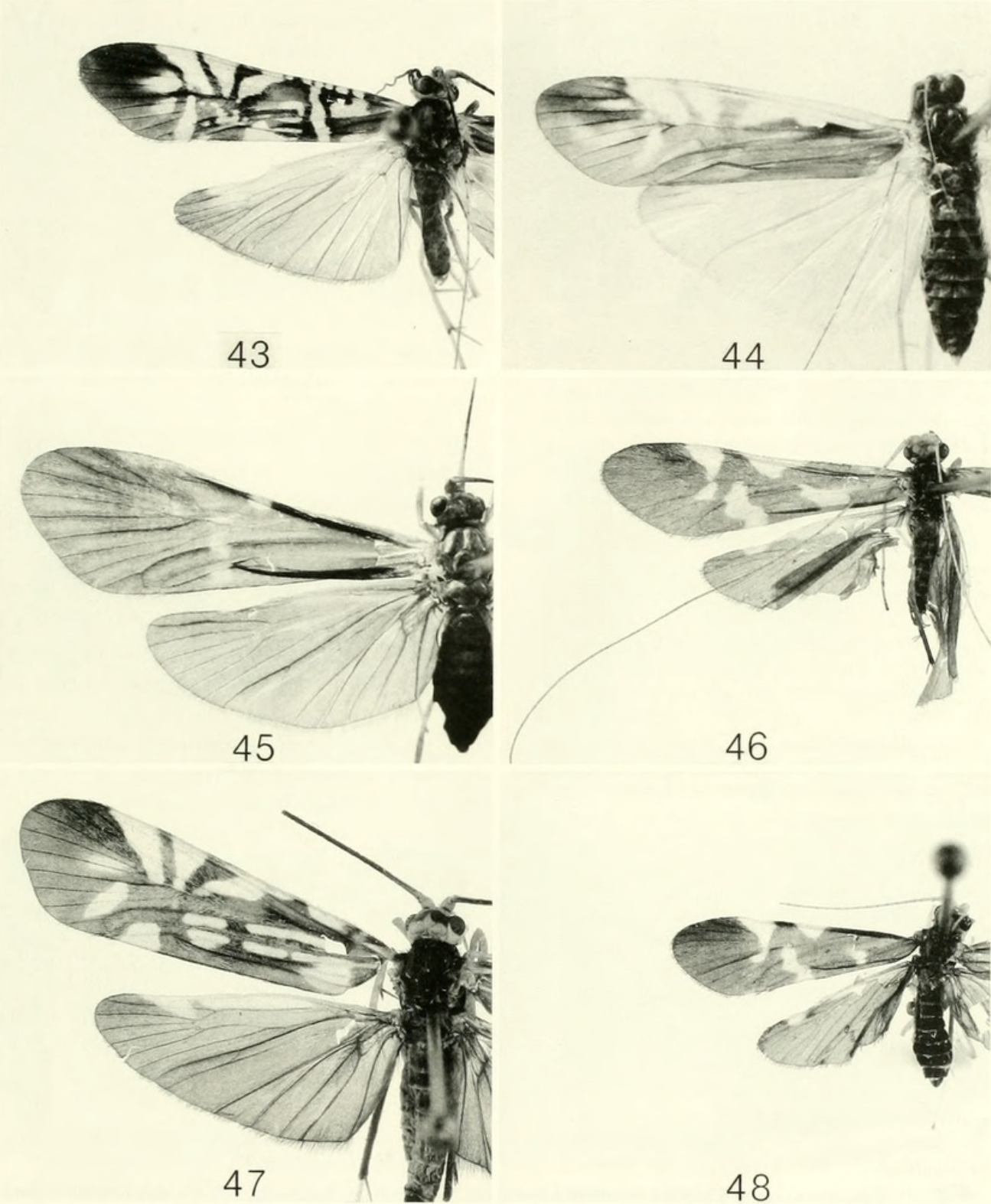
Macrostemum splendidum: Malicky 1998: 778 [♂, wing pattern].

This species has been taken a number of times, but never in a large series. As remarked by Schmid (1958), the species is quite variable in color, no two of the specimens before me appearing exactly the same.

The species is known from the central highlands at elevations approaching 1,000 m, and in the southwestern quadrant of the island at elevations from almost 1,000 m down to 35 m. All of the known sites, however, are in high rainfall areas with precipitation averaging 100 inches (2,500 mm) per year or higher.

Male.—Length of forewing 11–15 mm. Color goldenyellow marked with fuscous. Head goldenyellow, cuticle black between dorsal warts; antenna with scape, pedicel

and outer face of first flagellar segment, golden following ca. 12 segments fuscous, remaining segments pale. Cuticle of meso- and metanota and pleura black; mesoscutellum golden yellow. Legs goldenyellow. Forewing (Fig. 54) with 3 golden-yellow marks from anterior margin, posteriorly and apically with extensive golden-yellow marks on a fuscous background. Hindwing infusate with white stigma and basally directed streak in costal and subcostal cells. Abdomen fuscous, with golden-yellow middorsal stripe. Genitalia: Ninth segment with anterolateral margin broadly produced, rounded, posteroventral margin produced ventrally, oblique; posterior margin with scattered, elongate setae, becoming very numerous dorsolaterally. Tenth tergum with dorsobasal setal wart small, apex with small excision at midheight; in dorsal aspect with apex shallowly emarginate, apicolateral margin produced and rounded. Inferior ap-

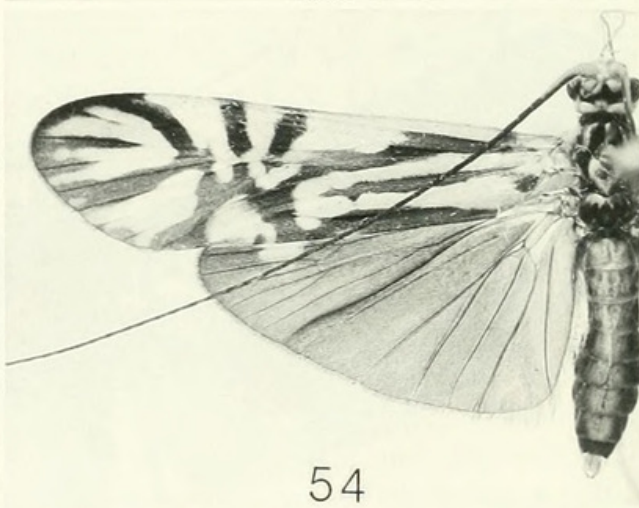
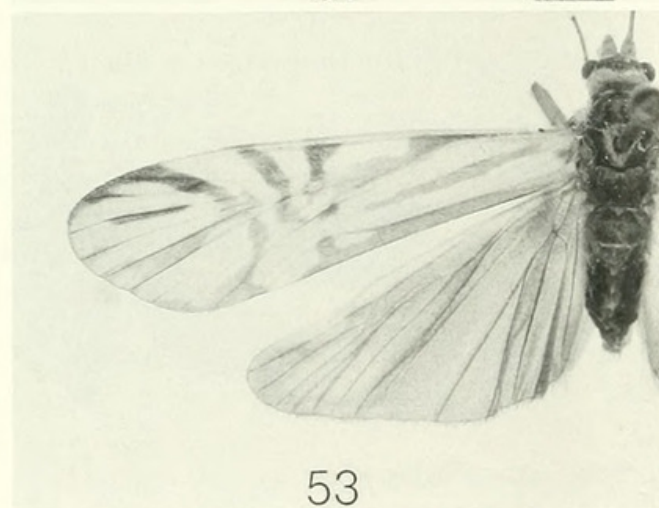
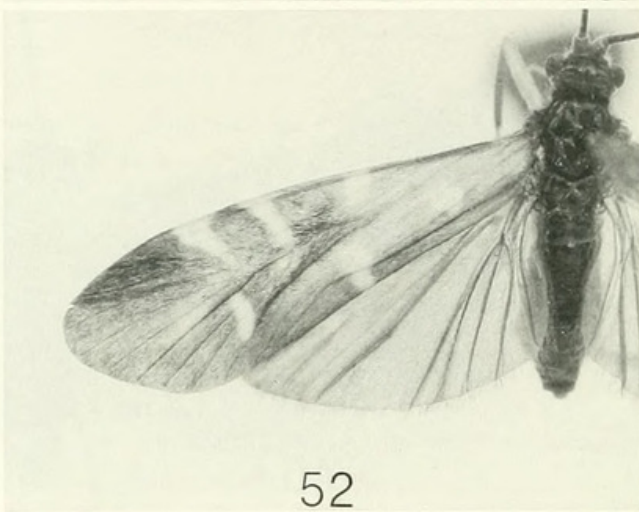
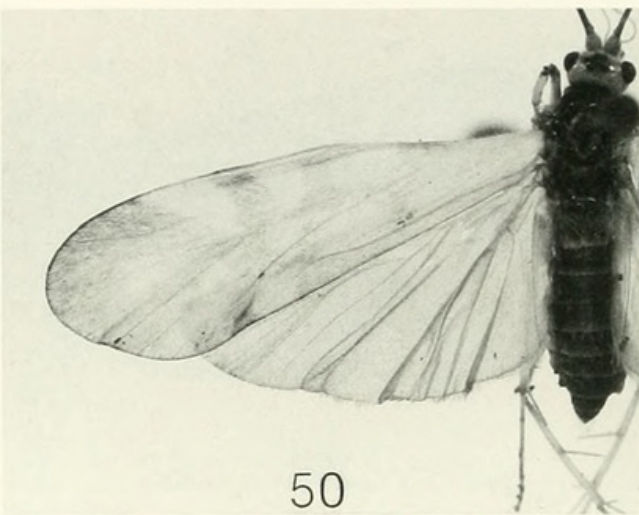
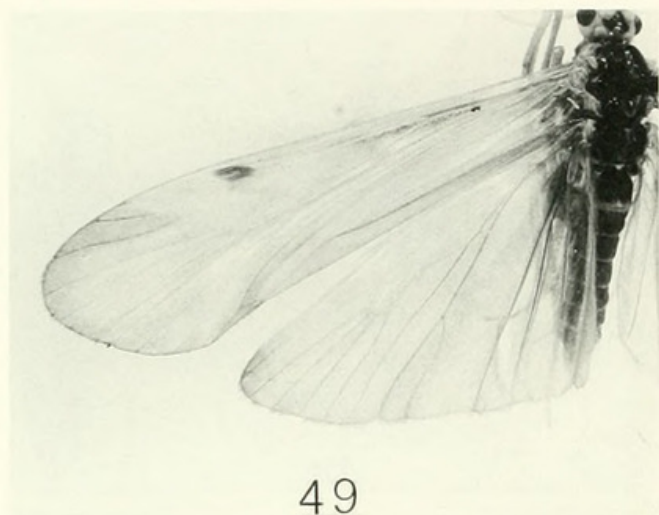


Figs. 43–48. Forewings. 43, *Macrostemum barnardi*, ♂, Kanneliya. 44, *M. indistinctum*, ♀, Udawalawe. 45, *M. krombeini*, ♀ holotype, Peradeniya. 46, *M. malickyi*, ♂ holotype, Udugama. 47, *M. multifarium*, ♀ compared with holotype, Sinharaja. 48, *M. malickyi*, ♂ paratype, Udugama.

pendage elongate, parallel-sided; in posteroventral aspect with apical segment $\frac{1}{3}$ of total length. Basal section of phallus about $\frac{1}{3}$ of total length of phallus; apex broadly

rounded ventrally, and obliquely elevated dorsally; apex nearly vertical with large, ventral, lip-like projection.

Female.—Length of forewing 11–15



Figs. 49–54. Forewings. 49, *Macrostemum nebulosum*, ♂ lectotype, Ramboda. 50, *M. nebulosum*, ♀ paralectotype, Ramboda. 51, *M. pseudoneura*, ♂, Padaviya. 52, *M. sepultum*, ♀ paralectotype, Ramboda. 53, *M. splendidum*, ♀ paralectotype, Ramboda. 54, *M. splendidum*, ♂, Tunmodera.

mm. Coloration as in male (Fig. 54). Mid-tibia and tarsus flattened, broadened, concave on inner face.

Material examined.—Ceylon, [Ramboda], Nietner, ♂ lectotype, ♀ paralectotype (MCZ).

SRI LANKA: Colombo Dist., Tunmodera, 200 ft [ca. 60 m], 17 Nov 1970, O. S. Flint, Jr., 1 ♂, 2 ♀. Galle Dist., Kanneliya, 500 ft [ca. 150 m], 21–22 Apr 1973, Baumann & Cross, at blacklight, 1 ♂. [Kandy Dist.], Karambaketiya off Memure [Mimu-

re], Knuckles Range, 8 Mar 1970, P. B. Karunaratne, at light, 2 ♂. Matale Dist., Hunas Falls, Elkaduwa, 3,000 ft [ca. 915 m], 5 Apr 1973, Baumann & Cross, 1 ♀. Matara Dist., Deniyaya, 1,000 ft [ca. 305 m], 20 Apr 1973, Baumann & Cross, at black light, 1 ♀. Ratnapura Dist., Gilimale, lumber mill, 115 ft [ca. 35 m], 20–25 Oct 1976, Hevel et al., blacklight, 1 ♂. Bultota Pass, 3,000 ft [ca. 915 m], 18–19 Apr 1973, Baumann & Cross, at black light, 1 ♂; [Kirinda Ela], Wattepanguwa, [1,500 ft, ca. 450 m], 18 Feb 1954, F. Schmid, [at light], 1 ♀.

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