

# Micro-caddisflies in the tribe Hydroptilini (Trichoptera: Hydroptilidae: Hydroptilinae) from Malaysia and Brunei

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Twenty-two new species of Hydroptilidae in six genera are described from Malaysia and Brunei: *Ugandatrichia* Mosely (1), *Macrostactobia* Schmid (1), *Hydroptila* Dalman (16), *Oxyethira* Eaton (1), and *Hellyethira* Neboiss (3). In addition, new distributional records of previously described species of *Ugandatrichia* (1), *Hydroptila* (2), *Oxyethira* (2) and *Tricholeiochiton* Kloet & Hincks (1) are given, and immatures of *Macrostactobia* are figured and described for the first time. Species check lists of Hydroptilini are included for West Malaysia, East Malaysia (Sabah, Sarawak) and Brunei.

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## Introduction

Malaysian and Bruneian Hydroptilidae (Trichoptera) have received scant attention before now. In her review of hydroptilid genera, Marshall (1979) mentioned undescribed Stactobiini from Sarawak, and Dudgeon (1987), when comparing trichopteran faunas of Hong Kong and other parts of Asia, listed two genera and four species (unspecified) from peninsular Malaysia. Wells (1991b) presented preliminary data on the generic composition of the hydroptilid fauna from peninsular Malaysia and Borneo but her assessment is based on only part of the collections considered in the present paper. The description of a single species from West Malaysia is currently in press (O'Connor, pers. comm.; O'Connor & Ashe, in press), and this will be the first hydroptilid to be described from the Malay Peninsula. Until now, none has been described from Borneo.

Field work by both authors in these countries has resulted in accumulation of so diverse a collection of hydroptilids that sections of the family are being treated separately. Only Hydroptilinae is represented in this region, and within this subfamily, the tribe Hydroptilini alone is covered in this paper. The two other tribes occurring in the region, Stactobiini and Orthotrichiini, will be dealt with later.

Well's (1991b) preliminary report listed six Hydroptilini genera from Malaysia (including *Macrostactobia* Schmid, which she predicted would be placed in this tribe) and 18 species. While the generic representation still stands at six, 28 species are now reported. Included are newly described species in *Ugandatrichia* Mosely (1), *Macrostactobia* Schmid (1), *Hydroptila* Dalman (16), *Oxyethira* Eaton (1), and *Hellyethira* Neboiss (3). Newly recorded are species in *Ugandatrichia* (1), *Hydroptila* (2), *Oxyethira* (2) and *Tricholeiochiton* Kloet & Hincks (1). In addition, immatures of *Macrostactobia* are

figured and described for the first time and arguments are advanced for referral to the tribe Hydroptilini of this aberrant genus.

Representation of the tribe Hydroptilini in the study area by the above-mentioned six genera compares favourably with reports for other parts of Asia (Dudgeon, 1987; Wells, 1991b) and the generic composition is similar. However, two genera, *Vietrichia* Oláh from Vietnam (Oláh, 1989) and *Microptila* Ris from both Vietnam and Sri Lanka, were not collected, although they could be expected in West Malaysia.

Species check lists of Hydroptilini are presented for West Malaysia, East Malaysia (Sabah and Sarawak) and Brunei. No keys are supplied as they could be misleading at this stage: we believe that the representation (species level) in the region, especially in Borneo, is actually far higher than indicated by this study. Unfortunately, the rapid increase of pollution of aquatic systems resulting from logging and disposal of domestic and industrial waste, may prevent verification of this prediction.

### Methods

The specimens were collected and prepared for study using the methods of Wells (1990). Generally, light-trapping (on the labels indicated as "Lt") was successful for collecting nocturnal *Hydroptila*, *Oxyethira*, *Hellyethira* and *Tricholeiochiton* species, while sweep-netting yielded diurnal *Macrostactobia* and *Ugandatrichia* species.

Depositories of the material mentioned in the following text are abbreviated as follows:

- ANIC - Australian National Insect Collection, Canberra.
- BMNH - Natural History Museum, London.
- BPBM - B. P. Bishop Museum, Honolulu, Hawaii.
- NHMH - Natural History Museum of Hungary, Budapest.
- NMV - Museum of Victoria, Melbourne.
- NTM - Northern Territory Museum of the Arts and Sciences, Darwin.
- RMNH - National Museum of Natural History, Leiden.
- USNM - National Museum of Natural History, Washington, DC.
- ZMA - Zoological Museum, University of Amsterdam, Amsterdam.

### Systematic part

#### Tribe Hydroptilini Stephens, 1836

Hydroptilidae Stephens, 1836: 151; Marshall, 1979: 191-193. Type genus: *Hydroptila* Dalman, 1819.

Members of the tribe Hydroptilini, although a rather "heterogenous" assemblage (Marshall, 1979), are united by shared features of the head and thorax and the association of their larvae with filamentous green algae. Marshall (1979) recognised three subgroups within the tribe, all of which occur in Malaysia. The *Hydroptila*-group is represented by *Hydroptila* and *Jabitrachia* Wells (O'Connor & Ashe, in press.), the *Oxyethira*-group by *Hellyethira*, *Oxyethira*, and *Tricholeiochiton* and the *Agraylea*-group by *Ugandatrichia*. The genus *Macrostactobia* is here placed in the tribe Hydroptilini,

although its position within the tribe is uncertain.

Schmid (1958) originally placed *Macrostactobia* in the tribe Stactobiini, grouping it with the more primitive genera near the base of the tribe on the grounds of having reduced venation and relatively large size. Marshall (1979) removed the genus from that tribe, as adults lack the characteristic rectangular stactobiine metascutellum; they also lack the suture on the mesoscutellum. She left *Macrostactobia* as a genus incertae sedis.

Several specialised features unite *Macrostactobia* with Hydroptilini genera. In adults, the antennal segments have a basal whorl of protective hair, and scattered sensilla placodea; the meso- and meta-scutellae are more or less triangular, and the anterior margin of the mesoscutellum is convex. In the female, abdominal segment VIII is sclerotised, short and stout, without setae apically. Larvae have the pre-episternite free on the prothorax, fused on meso- and meta-thorax; they feed on filamentous green algae. The pupal hook plates are relatively small, with few spinules. The resemblance of the male genitalia of *Macrostactobia* to some Stactobiini is now considered to be homoplaseous.

Determination of the position of *Macrostactobia* within the tribe Hydroptilini is difficult. Larvae are relatively unspecialised, save for the habit of feeding on green filamentous algae. Several features they share with *Hydroptila*- and *Agraylea*-group larvae are probably plesiomorphous (e.g., discrete post-mental sclerites on head, legs sub-equal, anal claw simple), while others, such as poorly defined epicranial sutures, may be synapomorphous. The female genitalia of all three are closely similar in form, with rather short, sclerotised and conical abdominal segment VIII. *Macrostactobia* appears to lack the ventral gland found on sternite VIII in *Agraylea* and *Hydroptila*, and *Hydroptila* and *Macrostactobia* lack the apical ring of setae on segment VIII seen in *Agraylea*. The arrangement of hair and sensilla on the antennae is similar in *Macrostactobia* and *Hydroptila*.

#### Genus *Macrostactobia* Schmid, 1958

*Macrostactobia* Schmid, 1958: 16. Type species: *Macrostactobia elawalikanda* Schmid, 1958, by monotypy.

The new taxonomic arrangement for *Macrostactobia* does little to aid interpretation of its highly modified male genitalia. Difficulties persist for attempts to homologise structures, and the terms used here differ slightly from those of Schmid (1958). For uniformity in this work, the structure lying beneath the aedeagus and referred to by Schmid as the ventral portion of segment X, is here termed "subgenital plate".

Larvae and their cases closely resemble those of *Hydroptila*, but the habitat of a small trickle, with thick filamentous algal growth (*Spirogyra* spec.), is quite distinct from the riverine algal growths with which most *Hydroptila* species are associated. Schmid (1958) describes the adults of *M. elawalikanda* running around on rocks beside rivers at high and medium altitudes; resting adults of the new species were netted from vegetation beside streams at medium altitudes.

**Macrostactobia runcing spec. nov.**  
(figs. 1-12)

**Material.**— Holotype: (NTM), ♂, West Malaysia, Cameron Highlands, falls at "40 mile", on road between Tapah and Tanah Rata, 19.vi.1988, A. Wells, net. Paratypes: (NTM), 9 ♂♂, same data as holotype; 1 ♀, West Malaysia, Genting Highlands, Bukit Rengit, 21.vii.1988, A. Wells, net; 1 ♂, West Malaysia, Fraser's Hill, soaks nr. falls, 14.vi.1988, A. Wells, net; 3 ♂♂, West Malaysia, Templer's Park, 20 km N Kuala Lumpur, 28.vii.1988, A. Wells, net. Other material: (NTM): larvae, pupae, same data as for holotype.

**Male.**— Dark, medium sized; head with tentorium complete (fig. 1); antennae 18-segmented, with a basal whorl of clothing hairs below scattered sensilla placodea on flagellar segments. Wing venation (fig. 2) relatively complete; anterior wing with small jugal lobe; posterior wing with R and M anastomosing medially. Anterior wing length 2.6-2.9 mm. For genitalia, see figs. 4-6. Abdominal segments VII and VIII short, VII with mid-ventral tuft of stout black setae, VIII overlain ventrally by elongate forward extension of sternite IX. Sternite IX narrowly rounded anteriorly, in ventral view truncate posteriorly. Dorsal plate (tergite X) narrow, concave apically, lateral margins reinforced by sclerotised bands. Inferior appendages united basally and overlapping posterior of sternite IX, discrete and tapered distally, in lateral view downturned posteriorly. Subgenital plate broad-based, membranous, slender and elongate in distal two-thirds, with a row of long stout setae apically. Aedeagus simple, slender, spine-like, without titillator.

**Female.**— Antennae 18-segmented. Wings unmodified; forewing length 2.2 mm. For genitalia, see fig. 3: a simple oviscapt. Segment VIII conical, sclerotised, devoid of setae.

**Mature larva (figs. 7-9).**— Body slightly compressed laterally; legs subequal, sclerotised plates dark brown. Head with dorsal ecdysial sutures indistinct; cuticle covered with microtrichia; antenna with a discrete terminal sensillum. On thorax prepisternite free on prothorax, fused on meso- and meta-thorax; setation on nota unmodified; no sternites evident. On abdomen dorsal chloride epithelia on segments II to VI; a short faint sclerite dorsally on segment I; tergite on segment IX well-developed; anal claws simple, without subsidiary hooks.

**Pupa (figs. 10-12).**— Labrum (fig. 12) with anterior margin angular, not rounded. Mandibles (fig. 11) less clearly notched and more finely serrate on inner margin than in *Hydroptila*. Hookplates (fig. 10) as in *Hydroptila*.

**Case (fig. 7).**— Ovoid, constructed with filaments of green algae.

**Remarks.**— This species can be distinguished from the Sri Lankan *M. elawalikanda* Schmid (1958: 47-8) by the shape of its inferior appendages and the absence of the wing-like postero-lateral extensions on the subgenital plate. The behaviour of adult *Macrostactobia* is similar to that of members of Stactobiini, and so is the larval habitat, yet feeding on filamentous green algae is unknown in any stactobiine species.

**Distribution.**— West Malaysia.

**Etymology.**— Malay - *runcing* - tapering, for the shape of the inferior appendages.

**Genus Ugandatrichia Mosely, 1939**

*Ugandatrichia* Mosely, 1939: 36. Type species: *Ugandatrichia minor* Mosely, 1939, by original designation.

*Moselyella* Kimmins, 1951: 195. Type species: *Ithytrichia violacea* Morton, 1902 by original designation and monotypy. [Synonymised by Schmid, 1960].

Wells (1991a) discusses Schmid's (1960) and Marshall's (1979) rearrangements of *Ugandatrichia* and *Microptila* and problems, still unresolved, with Marshall's (1979) *Ugandatrichia* species groups. The two Malaysian species are assigned to the *violacea*-group since their general features conform with those of other members. The first species, *Ugandatrichia hairanga* Oláh, described from Vietnam (Oláh, 1989), is re-figured here for completeness and ease of comparison, and new records are given. The second species is newly described.

***Ugandatrichia hairanga* Oláh, 1989**  
(figs. 13-16)

*Ugandatrichia hairanga* Oláh, 1989: 274. Type: Holotype (NHMH), ♂, Vietnam, Tamdao.

Material.— (NTM), 4 ♂♂, 2 ♀♀, West Malaysia, Maxwell's Hill, near Taiping, 17.vii.1988, A. Wells, net.

Remarks.— As noted by Oláh (1989), this distinctive species has iridescent blue-green wings. The male has eversible scent-organs situated laterally on abdominal segment II; the forewings are highly modified, with a pouch of androconia between R and M and there are scales on many veins (fig. 13). The genitalia (figs. 14-16) show close resemblance to those of *U. lampai* spec. nov. and the New Guinean *U. cathyae* Wells (1991a). Females of this species have distinctive patches of stout setae (androconia ?) apico-laterally on abdominal segment VIII.

The adults were netted from vegetation beside small, shaded, fast-flowing streams.

Distribution.— Vietnam; West Malaysia.

***Ugandatrichia lampai* spec. nov.**  
(figs. 17-20)

Material.— Holotype: (NTM), ♂, East Malaysia, Sarawak, Lambir National Park, E of Miri, 11.vii.1988, A. Wells, net. Paratypes: (NTM), 8 ♂♂, 8 ♀♀ (including allotype), same data as holotype.

Adults.— Dark brown.

Male.— Antennae 23-25-segmented. Wings unmodified; anterior wing length 2.2-2.6 mm. Abdomen with eversible scent glands laterally on segment II. For genitalia, see figs. 17-19. Abdominal segment IX far shorter than wide. Dorsal plate short, rectangular. Inferior appendages stout, each with a dark spur dorsally on apico-mesal angle. Subgenital plate broad-based, slender and elongate in distal two-thirds.

Female.— Antennae damaged. Anterior wing length 2.2-2.3 mm. For genitalia, see fig. 20. Segment VIII slightly conical, lightly sclerotised, with sparse setae on apical margin; terminal segments slender.

Remarks.— *U. lampai* spec. nov. resembles *U. hairanga* but the wings are not iridescent. The males lack androconial pouches on their forewings, the subgenital

plate is more elongate, and the inferior appendages have only a single black spur. Females differ in lacking the tufts of setae apico-laterally on segment VIII.

Adults were netted from vegetation overhanging shallow water flowing swiftly across granitic cascades.

Distribution.— East Malaysia, Sarawak.

Etymology.— Malay - *lampai* - slender, referring to the shape of the subgenital plate.

### Genus *Hydroptila* Dalman, 1819

*Hydroptila* Dalman, 1819: 125. Type species: *Hydroptila tineoides* Dalman, 1819, by monotypy.

Sixteen new species are described in *Hydroptila*, and all but three are assigned to diverse species groups. In addition, an established Oriental - northern Australian species is recorded from the region. The species groups recognised by Marshall (1979) are far from satisfactory, however, until a much needed revision of the genus is undertaken, they give some indication of affinities of congeners.

Three of the new species, *H. segitiga*, *H. sudip*, and *H. batang* conform with members of the Australian/SE Asian *H. losida*-group, having relatively simple, unmodified male genitalia. Two others, *H. tumpul* and *H. dayung*, have similar basic male genitalic structures, but both lack lateral lobes on segment IX and the titillator on the aedeagus. Together with an enigmatic species, *H. sabit* spec. nov., they are left in incertae sedis. *H. sederhana* spec. nov., probably a member of the Palaearctic *H. uncinata*-group, also lacks the titillator on the aedeagus. This may be a modification which accompanies a reduction in size, as individuals of all three species are tiny.

Other species groups represented are the Oriental *H. dirikilagoda*-group, two Palaearctic groups, the *H. vectis*- and *H. forcipata*-group, the Palaearctic/Oriental *H. occulta*-group and the European *H. tigurina*-group, males of which have highly modified genitalia, well-developed post-occipital scent organs, and only a distal ring of sensilla placodea on the antennal flagellar segments.

This species group representation contrasts strongly with that for N Sulawesi where only the *H. losida*- and *H. occulta*-groups are recorded.

New records are given for an established *H. losida*-group species, *H. obscura* Wells.

### The *Hydroptila losida*-group

Marshall (1979) used this name for a group of several Australasian species, and, although her reasons for separating its members from those of the *H. sparsa*-group are unclear, the name has persisted and the group now includes many more Australian, New Guinean and Sulawesian species. Members are characterised by males with simple, probably architypal, genitalia comprising elongate, rod-shaped to spatulate inferior appendages, more or less triangular subgenital plate, one- or three-lobed dorsal plate, and, if present, only small post-occipital glands on the head; females have a well-developed ventral gland on sternite VIII.

**Hydroptila obscura** Wells, 1979

*Hydroptila obscura* Wells, 1979: 758-759. Holotype: (ANIC), ♂, Queensland, Palmer River.

Material.— (RMNH), East Malaysia, Sabah: 2 ♂♂, 9 ♀♀, 60 km W Lahad Datu, DVFC, Sg. Palum Tambun, 04°58'N 117°48'E, 150 m, 9.ix.1986, J. Huisman; 1 ♂, 11 km NNE Ranau, Sg. Montokungon, 06°02'N 116°43'E, 450 m, 25.xi.1986, J. Huisman; 3 ♂♂, 7 ♀♀, Kg Kiau, Sg. Kadamaian, 06°02'N 116°30'E, 700 m, 21.i.1987, J. Huisman; 2 ♂♂, 20 km NNE Ranau, Kg Takutan, Sg. Mokodou, 06°06'N 116°45'E, 325 m, 4.ii.1987, J. Huisman; 3 ♂♂, 20 ♀♀, 10 km SE Ranau, Kg Nalapak, Sg. Kananapun, 05°58'N 116°47'E, 350 m, 7.ii.1987, J. Huisman; 1 ♂, 60 km W Lahad Datu, DVFC, confluence Sg. Segama - Sg. Palum Tambun, 04°58'N 117°48'E, 150 m, 17.iii.1987, J. Huisman; 1 ♂, 7 ♀♀, same locality, 18.iii.1987, J. Huisman; 1 ♀, 60 km W Lahad Datu, DVFC, bridge Sg. Segama, 04°58'N 117°48'E, 150 m, 21.iii.1987, J. Huisman; 3 ♀♀, same locality 20.x.1987, J. Huisman & R. de Jong; 3 ♂♂, 21 ♀♀, Long Pa Sia, confluence Sg. Pa Sia - Sg. Matang, 04°24'N 115°43'E, 1000 m, 1.iv.1987, J. Huisman & J. van Tol; 1 ♂, 11 ♀♀, same locality, 3.iv.1987, J. Huisman & J. van Tol; 4 ♀♀, same locality, 9.iv.1987, J. Huisman & J. van Tol; 1 ♂, 4 ♀♀, Kg Sapulut, Sg. Sapulut, 04°42'N 116°29'E, 290 m, 4.iii.1987, J. Huisman; 1 ♂, 2 ♀♀, 75 km W Lahad Datu, confluence Sg. Danum - Sg. Sabran, 04°57'N 117°41'E, 200 m, 23.x.1987, J. Huisman & R. de Jong; 1 ♂, 65 km W Lahad Datu, Sg. Purut, 04°57'N 117°45'E, 200 m, 26.x.1987, J. Huisman & R. de Jong.

Remarks.— This is a widespread and distinctive species for which figures are available in several publications (e.g., Wells, 1979; 1990). Larvae and pupa have neat ovoid cases constructed of filamentous green algae, generally *Spirogyra* species (Wells, 1985, fig. 20).

Distribution.— East Malaysia, Sabah; Philippines; Sulawesi; New Guinea; NE Australia.

**Hydroptila sudip** spec. nov.

(figs. 21, 22, 24, 25)

Material.— Holotype: (NTM), ♂, East Malaysia, Sarawak, Bako National Park, Sungai Delima, 9.vii.1988, A. Wells.

Male.— Post-occipital scent organs on head small; antennae 21-segmented with three distal segments pale, six dark, four pale, rest dark; flagellar segments with scattered sensilla placodea. Anterior wing length 1.5 mm. Wing colour and pattern typical; venation as in fig. 25. For genitalia, see figs. 21, 22, 24. Lateral lobes on abdominal segment IX well-developed, apically acute. Dorsal plate slender, tapering to divided distal half. Inferior appendages elongate, rounded apically, in ventral view rod-shaped, in lateral view spatulate, without spurs. Subgenital plate narrowly tapered to attenuate apex, slightly shorter than dorsal plate. Aedeagus slender throughout length.

Female and immatures.— Unknown.

Remarks.— This species is known only from a single male collected from a small, shaded coastal stream. It most closely resembles *H. segitiga* spec. nov., the Sulawesi *H. terbeli* Wells, 1990 (pp. 384-385) and the widespread *H. obscura*, but differs mainly in the shape of the inferior appendages.

Distribution.— East Malaysia, Sarawak.

Etymology.— Malay - *sudip* - spatula, for the shape of the inferior appendages.

**Hydroptila segitiga** spec. nov.  
(figs. 23, 26)

Material.— Holotype: (NTM), ♂, West Malaysia, Genting Highlands, tributary Sg. Gombak, 9.vi.1988, A. Wells. Paratypes: (NTM), 2 ♂♂, same data as holotype.

Male.— Post-occipital glands on head small. Antennae 21-segmented; flagellar segments quadrate, with scattered sensilla placodea. Anterior wing length 1.3 mm, venation as for *H. sudip* spec. nov. For genitalia, see figs. 23, 26. Abdominal segment IX with well-developed, apically acute, lateral lobes. Dorsal plate triangular. Inferior appendages elongate, in ventral view narrowly rounded apically, with a small sclerotised lateral spur subapically; in lateral view apex broadly rounded. Subgenital plate tapered to shallowly cleft apex. Aedeagus slender with a fine, sinuous apical process.

Female and immatures.— Unknown.

Remarks.— Males of this species resemble those of *H. sudip* in general form but they are distinguished by the small dark subapical spurs on the inferior appendages.

Distribution.— West Malaysia, Genting Highlands.

Etymology.— Malay - *segitiga* - triangular, for the shape of the dorsal plate.

**Hydroptila batang** spec. nov.  
(figs. 27, 28, 30)

Material.— Holotype: (RMNH), ♂, Brunei, Sg. Temburong, 140 m, 4.iv.1990, M.J.E. Coode. Paratype: (RMNH), ♂, East Malaysia, Sabah, 10 km NW Long Pa Sia, confluence Sg. Maga - Sg. Pa Sia, 04°26'N 115°40'E, 1210 m, 4.xii.1989, J. Huisman.

Male.— Antennae damaged. Anterior wing length 1.8-2.2 mm. For genitalia, see figs. 27, 28, 30. Abdominal segment IX with elongate lateral lobes, their apices almost obliquely truncate. Dorsal plate trilobed: median lobe truncate and serrate apically; lateral lobes slender, acuminate apically. Inferior appendages rod-shaped in ventral view, with an apical, and a subapical black spur. Subgenital plate triangular, with apex acute. Aedeagus slender, straight.

Female and immatures.— Unknown.

Remarks.— *H. batang* spec. nov. is an inconspicuous member of the lineage that has a tripartite dorsal plate and more or less rod-shaped inferior appendages. It is distinguished by two black spurs on each inferior appendage.

Distribution.— Brunei; East Malaysia, Sabah.

Etymology.— Malay - *batang* - rod, for the shape of the inferior appendages.

**The *Hydroptila uncinata*-group**

Members of this small Palaearctic group have male genitalic structures inserted deeply into the distal portion of abdominal segment IX. In other respects they resemble *H. sparsa*-group members. Only one new member is recognised.

**Hydroptila sederhana** spec. nov.  
(fig. 29)

Material.— Holotype: (RMNH), ♂, East Malaysia, Sabah, 60 km W Lahad Datu, DVFC, Sg. Segama, 04°58'N 117°48'E, 150 m, 21.iii.1987, J. Huisman. Paratype: (RMNH), 1 ♂, same data as holotype.

Male.— Head with post-occipital glands well-developed; antennae 22-segmented, with few scattered sensilla placodea on flagellar segments. Anterior wing length 1.6 mm; venation as for *H. sudip* spec. nov. For genitalia, see fig. 29. In ventral view, genitalic structures set well into abdominal segment IX which is produced into lateral processes. Dorsal plate broad, rounded. Inferior appendages irregular in shape, apically truncate, with inner apical setae. Subgenital plate bifid distally, forming narrow processes tipped by setae. Aedeagus slender, spine-like, without titillator.

Female and immatures.— Unknown.

Remarks.— This *H. uncinata*-group member has male genitalia similar to those of the Hong Kong *H. quinaria* Wells & Dudgeon (1990: 167-8) and the Vietnamese *H. thisa* Oláh (1989: 279-280) but is distinguished by the absence of the titillator on the aedeagus.

Distribution— East Malaysia, Sabah.

Etymology.— Malay - *sederhana* - simple, in reference to the form of the male genitalia.

**The *Hydroptila dirikilagoda* -group**

Marshall (1979) placed three Sri Lankan species in this group and Oláh (1989) has recently added a Vietnamese species. Member species are united by similarities in male genitalia.

**Hydroptila pintal** spec. nov.  
(figs. 31-34)

Material.— Holotype: (NTM), ♂, East Malaysia, Sabah, Tenom, 30.vii.1988, A. Wells, Lt. Paratypes: (NTM), 3 ♂♂, 3 ♀♀ (including allotype), same data as holotype. (RMNH), East Malaysia, Sabah: 4 ♂♂, 14 ♀♀, 60 km W Lahad Datu, DVFC, Sg. Palum Tambun, 04°58'N 117°48'E, 150 m, 9.x.1986, J. Huisman; 6 ♂♂, 11 km NNE Ranau, Sg. Montokungon, 06°02'N 116°43'E, 450 m, 25.xi.1986, J. Huisman; 1 ♂, same locality, 28.i.1987, J. Huisman; 2 ♂♂, 20 km NNE Ranau, Kg Takutan, Sg. Mokodou, 06°05'N 116°45'E, 325 m, 4.ii.1987, J. Huisman; 9 ♂♂, 10 km SE Ranau, Kg Nalapak, Sg. Kananapun, 05°58'N 116°47'E, 350 m, 7.ii.1987, J. Huisman; 1 ♂, 60 km W Lahad Datu, DVFC, confluence Sg. Segama - Sg. Palum Tambun, 04°58'N 117°48'E, 150 m, 16.iii.1987, J. Huisman & J. van Tol; 1 ♂, 3 ♀♀, 60 km W Lahad Datu, DVFC, Sg. Segama bridge, 04°58'N 117°48'E, 150 m, 20.x.1987, J. Huisman & R. de Jong.

Male.— Head with well-developed post-occipital scent organs; antennae 33-segmented; terminal nine segments dark, rest pale; flagellar segments with diameter greater than length, with dense sensilla placodea on distal two-thirds. Anterior wing length 1.8-1.9 mm; venation as for *H. sudip* spec. nov. For genitalia, see figs. 31-33. Well-developed lateral lobes on abdominal segment IX; apices rounded in ventral view, acute in lateral view. Dorsal plate with a short, rounded median lobe to each

side of which are longer, apically-rounded, membranous lobes. Inferior appendages stout throughout length, without darkened setae or spurs, but with two stout setae sub-apically on the inner margin. Subgenital plate comprised of a pair of tapering divergent spines. Aedeagus sharply twisted apically.

Female.— Antennae 25-segmented. Anterior wing length 1.6-1.7 mm. For genitalia, see fig. 34. Abdominal segment VIII with shallow apical concavity ventrally, more deeply excavated dorsally; a prominent sub-triangular gland ventrally, its distal margin shallowly concave.

Immatures.— Unknown.

Remarks.— The general form of the male genitalia and the antennae of *H. pinal* spec. nov. most closely resemble those of the Vietnamese *H. ngaythibaya* Oláh (1989: 283-4) differing mainly in the shape of the dorsal plate and the inferior appendages.

Distribution.— East Malaysia, Sabah.

Etymology.— Malay - *pinal* - twisted, referring to the tip of the aedeagus.

### The *Hydroptila vectis*-group

Two Palaearctic species were assigned to this group by Marshall (1979). The new species shares similarities, particularly with *H. vectis* Curtis, 1934, in the form of the inferior appendages and the ventral bifid structure which appears to be the modified subgenital plate.

### *Hydroptila rumpun* spec. nov.

(fig. 35)

Material.— Holotype: (NTM), ♂, West Malaysia, Genting Highlands, Gombak, tributary Sg. Gombak, 9.vi.1988, A. Wells.

Male.— Head with well-developed post-occipital scent organs; antennae damaged. Anterior wing length 1.5 mm; venation as for *H. sudip* spec. nov. For genitalia, see fig. 35. Irregular-shaped lateral lobes on segment IX. Dorsal plate stout, membranous; apex shallowly concave, with tufts of fine bristles apico-laterally. Inferior appendages as in fig. 35. Subgenital plate comprising paired, curved processes, with sclerotised lateral margins subapically. Aedeagus simple, slender and straight.

Female and immatures.— Unknown.

Remarks.— Readily distinguished from other Malaysian *Hydroptila* by the shape of the inferior appendages and subgenital plate.

Distribution.— West Malaysia, Genting Highlands.

Etymology.— Malay - *rumpun* - cluster, for the tufts of bristles on the dorsal plate.

### The *Hydroptila occulta*-group

This is a wide-ranging and species rich Palaearctic/Oriental group, showing a considerable variety in form. The inferior appendages of the new species are similar

to those of *H. adana* Mosely (1948: 81), while a similar mid-ventral structure is also present in *H. hirra* Mosely (1948: 81-82).

***Hydroptila berkait* spec. nov.**  
(figs. 36-38)

Material.— Holotype: (RMNH), ♂, East Malaysia, Sabah, 8.5 km S Long Pa Sia, Sg. Malabit, 04°21'N 115°41'E, 1180 m, 18.xii.1986, J. Huisman.

Male.— Head with well-developed post-occipital scent organs; antennae 22-segmented; flagellar segments quadrate, each with a small sensory pit and scattered sensilla placodea. Anterior wing length 1.7 mm; wing venation as for *H. sudip* spec. nov. For genitalia, see figs. 36-38. Abdominal segment IX with elongate, sclerotised postero-lateral processes tipped by groups of short, strong, dark setae. Dorsal plate with a V-shaped excision distally. Inferior appendages stout, S-shaped in ventral view, with heavily sclerotised apico-ventral spurs below truncated membranous processes. Between inferior appendages, a median sclerotised process. Paired sclerotised rods with inner spurs subapically above inferior appendages probably represent the subgenital plate. Aedeagus simple, straight.

Female and immatures.— Unknown.

Remarks.— This species is distinguished from *H. lidah* spec. nov. by shorter, stouter male genital parts.

Distribution.— East Malaysia, Sabah.

Etymology.— Malay - *berkait* - hooked, describing the inferior appendages.

***Hydroptila lidah* spec. nov.**  
(figs. 39-41)

Material.— Holotype: (RMNH), ♂, East Malaysia, Sabah, 12 km NNE Ranau, Poring Hot Springs, Sg. Langanan, 06°03'N 116°43'E, 450 m, 29.i.1987, J. Huisman. Paratype: (RMNH), 1 ♂, same locality as holotype, 8.xii.1986, J. Huisman; East Malaysia, Sabah: 1 ♂, 12 km NNE Ranau, Sg. Montokungon, 06° 02'N 116°42'E, 525 m, 30.i.1987, J. Huisman; 1 ♂, 20 km NNE Ranau, Kg Takutan, Sg. Mokodou, 06° 05'N 116°45'E, 325 m, 4.ii.1987, J. Huisman.

Male.— Antennae damaged. Anterior wing length 1.8-2.1 mm; venation as in *H. sudip* spec. nov. For genitalia, see figs. 39-41. Abdominal segment IX with long, stout, sclerotised processes tipped by strong setae. Dorsal plate trilobed in distal  $\frac{1}{3}$ , expanded medially; lobes rounded apically. Inferior appendages out-turned apically, a flap of membrane in the curve formed by the apical spur. A small median lobe between inferior appendages flanked by paired bracts. Paired lobes above inferior appendages may represent subgenital plate. Aedeagus slender, elongate, straight.

Female and immatures.— Unknown.

Remarks.— This new species is closely allied to *H. berkait* spec. nov., the males differing only in proportions of their genital parts.

Distribution.— East Malaysia, Sabah.

Etymology.— Malay - *lidah* - tongue, describing the median lobe of the dorsal plate.

### The *Hydroptila forcipata*-group

A small Palaearctic group with highly modified male genitalia.

#### *Hydroptila begap* spec. nov. (figs. 42-44)

**Material.**— Holotype: (NTM), ♂, East Malaysia, Sabah, Tenom, 30.vi.1988, A. Wells. Lt. Paratypes: (RMNH), East Malaysia, Sabah: 1 ♂, 1 ♀ (allotype), 18 km NE Tenom, Agricultural Research Station, 05°11'N, 115°59'E, 180 m, 28.vi.1986, J. Huisman; 1 ♂, same locality, 3.x.1986, J. Huisman; 4 ♂♂, 2 ♀♀, same locality, 20.x.1986, J. Huisman; 1 ♂, 60 km W Lahad Datu, DVFC, Sg. Segama, 04°58'N 117°48'E, 150 m, 1.x.1987, J. Huisman; 8 ♂♂, 20 km NNW Ranau, Kg Takutan, Sg. Mokodou, 06°05'N 116°45'E, 325 m, 4.ii.1987, J. Huisman; 27 ♂♂, 10 km NNE Ranau, Kg Randagung baru, Sg. Pangatan, 06°02'N 116°44'E, 350 m, 6.ii.1987, J. Huisman; 7 ♂♂, 10 km SE Ranau, Kg Nalapak, Sg. Kananapun, 05°58'N 116°47'E, 350 m, 7.ii.1987, J. Huisman.

**Male.**— Head with well-developed post-occipital scent organs; antennae 27-segmented, flagellar segments each with one large sensory pit and scattered sensilla placodea. Anterior wing length 1.8-2.1 mm; venation as for *H. sudip* spec. nov. For genitalia, see figs. 42, 43. Abdominal segment IX broad, extending laterally into broad lobes around genital parts. Dorsal plate stout, extended apico-laterally into a pair of stout, inturned hooks. Inferior appendages probably represented by paired irregular ventral lobes on each side of a median process which is probably derived from the subgenital plate. Aedeagus stout, hooked subapically.

**Female.**—Antennae damaged. Anterior wing length 1.9-2.5 mm. For genitalia, see fig. 44. Terminalia slender, pale. Abdominal segment VIII short, an elongate glandular structure ventrally.

**Immatures.**— Unknown.

**Remarks.**— This species shows resemblance to *H. bifurcata* Mosely (1930: 178-80) and *H. unicata* Morton (1893: 77-8) from Corsica, but lacks their elongate lateral lobes on abdominal segment IX. Females are distinctive, having a ventral elongate glandular structure on segment VIII, rather than the usual T- or Y-shaped gland.

**Distribution.**— East Malaysia, Sabah.

**Etymology.**— Malay - *begap* - compact, referring to the appearance of male genitalia.

### The *Hydroptila figurina*-group

This small European/Oriental group is distinctive in its strongly modified male genitalia and in the arrangement of sensilla placodea in a distal ring on male antennal segments.

#### *Hydroptila bibir* spec. nov. (figs. 45-48)

**Material.**— Holotypes: (NTM), ♂, East Malaysia, Sabah, Kinabalu National Park, Liwagu River, 25.vi.1988, A. Wells. Lt. Paratypes: (NTM), 1 ♀, (allotype), same data as holotype. (RMNH), East Malaysia, Sabah: Kinabalu National Park, confluence Sg. Liwagu - Sg. Silau-Silau, 06°00'N 116°33'E,

1450 m, 22.viii.1986, J. Huisman; 10 ♂♂, 25 ♀♀, 10 km NW Long Pa Sia, confluence Sg. Maga - Sg. Pa Sia, 04°26'N 115°40'E, 1210 m, 16-19.x.1986, J. Huisman; 4 ♂♂, 9 ♀♀, same locality, 2.vi.1987, J. Huisman; 4 ♂♂, same locality, 3.iv.1987, J. Huisman; 1 ♂, 5 ♀♀, same locality, 7.iv.1987, J. Huisman; 9 ♂♂, 12 ♀♀, same locality, 8.iv.1987, J. Huisman; 1 ♀, Long Pa Sia, airstrip, Sg. Pa Sia, 04°25'N 115°43'E, 1000 m, 14-26.x.1986, J. Huisman; 1 ♂, 13 ♀♀, 8.5 km S Long Pa Sia, Sg. Malabit, 04°21'N 115°41'E, 1180 m, 18.xii.1986, J. Huisman; 3 ♂♂, 2 ♀♀, same locality, 19.xii.1986, J. Huisman; 1 ♂, same locality, 4.xii.1987, J. Huisman; 1 ♂, 1 ♀, Kinabalu National Park, Sg. Liwagu x Silau-Silau trail, 06°00'N 116°33'E, 1470 m, 22.i.1987, J. Huisman; 1 ♂, 1 ♀, Kinabalu National Park, Sg. Silau-Silau on old bridge, 06°00'N 116°53'E, 1480 m, 9.ii.1987, J. Huisman; 3 ♂♂, 5 ♀♀, Kinabalu National Park, Sg. Liwagu, 06°01'N 116°32'E, 1500 m, 11.ii.1987, J. Huisman; 1 ♂, 5 ♀♀, 10.5 km, NNW Kundassang, Sg. Kijuhutan, 06°04'N 116°30'E, 1350 m, 10.iii.1987, J. Huisman; 7 ♂♂, 13 ♀♀, 3.5 km SW Long Pa Sia, Sg. Ritan, 04°24'N 115°42'E, 1160 m, 9.iv.1987, J. Huisman; 2 ♂♂, 1 ♀, Kg Long Pa Sia, confluence Sg. Pa Sia - Sg. Matang, 04°24'N 115°43'E, 1000 m, 10.iv.1987, J. Huisman; 1 ♂, 2 ♀♀, Kinabalu National Park, Sg. Silau-Silau, 06°00'N 116°32'E, 1490 m, 27.iv.1987, J. Huisman; 1 ♀, 2 km SW Long Pa Sia, confluence Sg. Ritan-Sg. Rurun, 04°23'N 115°42'E, 1040 m, 5.xii.1987, J. Huisman & C. v. Achterberg. East Malaysia, Sarawak: 2 ♂♂, 4 ♀♀, 16 km N Bario, Long Rapun, Sg. Dapur, 03°57'N 115°35'E, 1200 m, 24.ii.1987, J. Huisman.

Adults.— Dark brown, without usual pattern on wings, anterior wing with an extra cross-vein between  $M_1$  and R.

Male.— Head with poorly developed post-occipital scent organs; antennae 32-segmented. Anterior wing length 1.6 mm. For genitalia, see figs. 45-47. Abdominal segment IX rectangular, retracted well into segment VIII which is broad with densely hairy apico-lateral lobes. Dorsal plate short, broad, extended apico-laterally into lobulate processes. Inferior appendages almost certainly represented by the broad, short, ventral structure with sclerotised median, down-turned process. Subgenital plate absent or possibly modified to form paired membranous structures associated with the two slender lateral parameres. Aedeagus stout medially, tapering distally, slender in terminal quarter.

Female.— Antennae, 27-segmented. Anterior wing length 2.6-2.7 mm. For genitalia, see fig. 48. Abdominal segment X shorter than wide, segment VIII short, rounded, sternite sclerotised medially, cleft apically, with a U-shaped gland proximally.

Immatures.—Unknown.

Remarks.— Males of this species closely resemble those of *H. kebawa* spec. nov., *H. daun* spec. nov., and *H. halus* spec. nov., but are distinguished by the fused apices of their inferior appendages.

Distribution.— East Malaysia, Sabah.

Etymology.— Malay - *bibir* - lip, describing appearance of inferior appendages.

### *Hydroptila daun* spec. nov.

(figs. 49, 50)

Material.— Holotype: (RMNH), ♂, East Malaysia, Sabah, Bundu Tuhan, Sg. Laidan, 05°58'N 116°31'E, 950 m, 23.i.1987, J. Huisman.

Male.— Head with well-developed post-occipital scent organs; antennae damaged. Anterior wing length 2.0 mm; venation as for *H. bibir* spec. nov. For genitalia, see figs. 49, 50. Abdominal segment VIII broad, with dense, long setae apico-mesally. Segment IX elongate, narrow, retracted into VIII. Dorsal plate short, membranous, rounded. Inferior appendages forming a short rounded plate with paired sclerotised

spurs medially, downturned in lateral view. Parameres elongate, slender, appear to be jointed, with paired membranous lobes dorsally (derived from subgenital plate?). Aedeagus stout, slightly curved.

Female and immatures.— Unknown.

Remarks.— *H. daun* spec. nov. is closest to *H. halus* spec. nov. in form of male genitalia, but is distinguished by the smaller, rounder ventral plate. The specimen was collected beside the river in a strip of secondary forest surrounded by pastures.

Distribution.— East Malaysia, Sabah.

Etymology.— Malay - *daun* - leaf, being descriptive of the paired membranous dorsal lobes.

### ***Hydroptila kebawah* spec. nov.**

(figs. 51, 52)

Material.— Holotype: (RMNH), male, East Malaysia, Sabah, 20 km NE Ranau, Kg Nalumad, Sg. Mokodou, 06°06'N 116°43'E, 400 m, 5.xii.1986, J. Huisman. Paratypes: (RMNH), East Malaysia, Sabah, 4 ♂♂, 12 km NNE Ranau, Sg. Montokungon, 06°02'N 116°42'E, 525 m, 30.i.1987, J. Huisman; 1 ♂, Bundu Tuhan, Sg. Laidan, 05°58'N 116°31'E, 950 m, 23.i.1987, J. Huisman; 15 ♂♂, 20 km NNE Ranau, Kg Takutan, Sg. Mokodou, 06°05'N 116°45'E, 325 m, 4.ii.1987, J. Huisman; 2 ♂♂, 10 km NNE Ranau, Kg. Randagung baru, Sg. Pangatan, 06°02'N 116°44'E, 350 m, 6.ii.1987, J. Huisman. East Malaysia, Sarawak, 1 ♂, 16 km N Bario, Long Rapun, Sg. Dapur, 03°53'N 115°35'E, 1200 m, 22.ii.1987, J. Huisman.

Male.— Head with well-developed post-occipital scent organs; antennae 25-segmented. Anterior wing length 1.6 mm; venation as for *H. bibir* spec. nov. For genitalia, see figs. 51, 52. Abdominal segment IX elongate, retracted into VIII, with lateral lobes elongate, truncate in lateral view. Dorsal plate rounded, membranous. Inferior appendages fused to form a wide plate with medial, down-turned spurs. Parameres slender, curved inwards distally, the membranous lobes above (subgenital plate?) stouter than in previous two species. Aedeagus stout, with a sub-apical spur.

Female and immatures.— Unknown.

Remarks.— This species closely resembles *H. bibir*, from which it is distinguished by the elongate lateral lobes of segment IX, and shape of the ventral plate derived from the inferior appendages.

Distribution.— East Malaysia, Sabah, Sarawak.

Etymology.— Malay - *kebawah* - downward, descriptive of the deflected inferior appendages.

### ***Hydroptila halus* spec. nov.**

(figs. 53-55)

Material.— Holotype: (RMNH), ♂, East Malaysia, Sabah, Bundu Tuhan, Sg. Laidan, 05°58'N 116°31'E, 950 m, 23.i.1987, J. Huisman. Paratype: (RMNH) 1 ♂, 12 km NNE Ranau, Poring Hot Springs, Sg. Kipogoh, 06°03'N 116°42'E, 550 m, 25.i.1987, J. Huisman.

Male.— Head with well-developed post-occipital scent organs; antennae damaged. Anterior wing length 8.5 mm; venation as for *H. sudip* spec. nov. For genitalia, see figs. 53-55. Abdominal segment IX elongate, retracted into VIII, without lateral

lobes but with dense long setae laterally. Dorsal plate short, truncate. Inferior appendages fused, forming a broad plate with median sclerotised down-turned spurs and a rounded process medially. Parameres slender filaments ventral to elongate hairy lobes, probably derived from the subgenital plate. Aedeagus slender, spine-like.

Female and immatures.—Unknown.

Remarks.— This species shows similarities to *H. daun* in the form of male genital parts, differing in the hairy processes (subgenital plate ?) above the filamentous parameres.

Distribution.—East Malaysia, Sabah.

Etymology.— Malay - *halus* - slender, describing the fine parameres.

### Species incertae sedis

Three species, *H. tumpul* spec. nov., *H. dayung* spec. nov. and *H. sabit* spec. nov., cannot be assigned to any of Marshall's (1979) species groups. Their males have very simple genitalia, which in *H. tumpul* and *H. dayung* may be a consequence of reduction in size. The genital structures of *H. sabit* are unusual in shape. All show reductions on the pattern in the *H. losida*-group which we consider to be quite basic.

### *Hydroptila tumpul* spec. nov.

(figs. 56-58)

Material.— Holotype: (NTM), ♂, West Malaysia, Genting Highlands, Bukit Rengit, 21.vii.1988, A. Wells, net. Paratype: (NTM), 1 ♂, same data as holotype.

Male.— Head with post-occipital scent organs well-developed; antennae 19-segmented, flagellar segments quadrate with scattered, large sensilla placodea. Anterior wing length 1.4 mm; venation as for *H. sudip* spec. nov. For genitalia, see figs. 56-58. Abdominal segment IX without lateral lobes or processes. Dorsal plate simple, tapered to truncate apex. Inferior appendages elongate, without spurs or specialised setae, apices out-turned in ventral view. Subgenital plate shallowly concave in ventral view. Aedeagus slender, elongate, without titillator.

Female and immatures.—Unknown.

Remarks.— This species shows some similarities to the Vietnamese *H. gadpoi* Oláh, 1989 (p. 283), but lacks the titillator seen in that species and has abdominal segment IX well retracted into segment VIII.

Distribution.— West Malaysia, Genting Highlands.

Etymology.— Malay - *tumpul* - blunt, referring to the apex of dorsal plate.

### *Hydroptila dayung* spec. nov.

(fig. 59)

Material.— Holotype: (RMNH), ♂, East Malaysia, Sabah, 60 km W Lahad Datu, DVFC, confluence Sg. Segama - Sg. Palum Tambun, 04°58'N 117°48'E, 150 m, 18.iii.1987, J. Huisman & J. van Tol.

Male.— Head with post-occipital scent organs comprised of black androconia; antennae 19-segmented; flagellar segments with scattered large sensilla placodea. Anterior wing length 1.5 mm; venation as for *H. sudip*. For genitalia, see fig. 59. Abdominal segment IX broad, short, without lateral lobes or processes. Dorsal plate short, truncate apically. Inferior appendages irregular in shape, without spurs or specialised setae. Subgenital plate rounded with paired setae apically at sides of a shallow concavity. Aedeagus twisted, notched apically, without titillator.

Female and immatures.— Unknown.

Remarks.— The male of this species is distinctive with simple, stout genital structures.

Distribution.— East Malaysia, Sabah.

Etymology.— Malay - *dayung* - paddle, referring to the inferior appendages.

### *Hydroptila sabit* spec. nov.

(figs. 60, 61)

Material.— Holotype: (NTM), ♂, West Malaysia, Genting Highlands, Gombak, tributary Sg. Gombak, 8.vi.1988, A. Wells, net.

Male.— Head with well-developed post-occipital scent organs; antennae 23-segmented; flagellar segments quadrate, each with a large sensory pit and numerous scattered sensilla placodea. Anterior wing length 1.6 mm; venation as for *H. sudip* spec. nov. For genitalia, see figs. 60, 61. Abdominal tergite VIII with groups of long, stout setae postero-laterally. Lateral lobes of abdominal segment IX short. Dorsal plate constricted mesally, expanded distally, with sclerotised margins postero-laterally, otherwise membranous. Inferior appendages broad-based, abruptly constricted mesally, with acute processes apico-laterally. Subgenital plate tapering narrowly towards cleft apex. Aedeagus slender, straight.

Female and immatures.— Unknown.

Remarks.— For the present this species is not assigned to a species group. It is readily recognised by the distinctive apex on the dorsal plate and the setae distally on tergite VIII.

Distribution.— West Malaysia, Genting Highlands.

Etymology.— Malay - *sabit* - sickle, referring to the tip of the dorsal plate.

### Genus *Oxyethira* Eaton, 1873

*Oxyethira* Eaton, 1873: 143. Type species: *Hydroptila costalis* Curtis sensu Eaton, by original designation. [For generic synonymies see Kelley (1984).]

*Oxyethira* is poorly represented in the Oriental region (Wells, 1987) with only two subgenera and relatively few species. Several species are extremely widespread, including *O. (Oxyethira) bogambara* Schmid, 1959. The latter species ranges from Sri Lanka (Schmid, 1959) to China and N Australia (Wells, 1991a), and is in this paper recorded from East Malaysia and Brunei. Another species, *O. (Oxyethira) campanula* Botosaneanu, 1970, described from Korea, was subsequently reported from Hong

Kong (Wells & Dudgeon, 1990) and now from Malaysia. A third Malaysian species, newly described, is placed in the *Oxyethira minima*-group, subgenus *Dampftrichia*.

### *Oxyethira (Oxyethira) bogambara* Schmid, 1958

*Oxyethira bogambara* Schmid, 1958: 67. Holotype: (USNM), ♂, Sri Lanka (Ceylon), Kandapola.

Material.— (RMNH), East Malaysia, Sabah, 1 ♂, 11 km NNE Ranau, Sg. Montokungon, 06°02'N 116°43'E, 450 m, 25.xi.1986, J. Huisman; 1 ♀, 2 km SW Long Pa Sia, confluence Sg. Ritan - Sg. Rurun, 04°23'N 115°42'E, 1040 m, 1.xii.1989, J. Huisman; 1 ♀, Long Pa Sia, airstrip, 04°24'N 115°43'E, 1000 m, 3.xii.1989, J. Huisman.

Remarks.— Males of this species are easily recognised by the form of their genitalia, with a slender encircling titillator on the aedeagus. Figures are available in several recent publications, e. g., Oláh (1989: 286) and Wells (1991a: 492).

Distribution.— Sri Lanka; Vietnam; Hong Kong; East Malaysia, Sabah; New Guinea; NE Australia.

### *Oxyethira (Oxyethira) campanula* Botosaneanu, 1970

*Oxyethira campanula* Botosaneanu, 1970: 291. Holotype: (ZMA), ♂, Korea, Mts Mjohjang-san district Hjangsan, Hjangam-ri.

Material.— (RMNH), East Malaysia, Sabah: 1 ♀, 8.5 km S Long Pa Sia, Sg. Malabit, 04°21'N 115°41'E, 1180m, 18.xii.1986, J. Huisman; 1 ♂, same locality, 19.xii.1986, J. Huisman; 1 ♂, same locality, 2.xii.1987, J. Huisman & C. van Achterberg; 1 ♂, same locality, 4.xii.1987, J. Huisman & C. van Achterberg; 1 ♂, 1 ♀, Kinabalu National Park, Sg. Liwagu x Silau-Silau trail, 06°00'N 116°33'E, 1470 m, 10.ii.1987, J. Huisman; 1 ♂, 3.5 km SW Long Pa Sia, Sg. Ritan, 04°26'N 115°42'E, 1160 m, 7.iv.1987, J. Huisman & J. van Tol; 1 ♂, same locality, 8.iv.1987, J. Huisman & J. van Tol; 1 ♂, 1 ♀, 2 km E Long Pa Sia, Paya Kalaba, 04°24'N 115°44'E, 1000 m, 13.iv.1987, J. Huisman. (NTM), West Malaysia: 1 ♂, Bukit Rengit, 21.vii.1988, A. Wells.

Remarks.— Males of *O. campanula* are distinguished from *O. bogambara* by the shape of the aedeagus and ventral plates of the genitalia (see Botosaneanu, 1970: 334).

Distribution.— Korea; Hong Kong; East Malaysia, Sabah.

### *Oxyethira (Dampftrichia) ikal* spec. nov.

(figs. 62, 63)

Material.— Holotype: (NTM), ♂, West Malaysia, Bukit Rengit, 21.vii.1988, A. Wells. Paratype: (NTM), 1 ♂, same data as holotype.

Male.— Antennae 28-segmented. Anterior wing length 1.5-1.7 mm. For genitalia, see figs. 62, 63. Abdominal segment IX well retracted in VIII, rounded anteriorly; tergite with a deep V-shaped excision apically. Dorsal plate rounded apically, with paired sclerotised processes laterally. A broad sclerotised apico-mesal band with

stout dark lateral processes and membranous, setate digitiform processes, may represent inferior appendages and subgenital plate. Aedeagus with a stout, sinuous strap terminating in a strongly curved spine.

Female and immatures.— Unknown.

Remarks.— This new species closely resembles *O. rachanee* Chantamarangkol & Malicky, 1986 (p. 516) from Sri Lanka, but it differs in the shape and proportions of the genital parts. The specimens were collected at light near a small waterfall in dense primary forest.

Distribution.— West Malaysia.

Etymology.— Malay - *ikal* - curl, for the shape of the aedeagus.

### Genus *Tricholeiochiton* Kloet & Hincks, 1944

*Leiochiton* Guinard 1879:139. Type species: *Leiochiton fagesii* Guinard, by monotypy. [Preoccupied by *Leiochiton* Curtis, 1831 in Coleoptera].

*Tricholeiochiton* Kloet & Hincks, 1944: 97. [Replacement name for *Leiochiton* Guinard].

*Synagotrichia* Ulmer, 1951: 81. Type species: *Synagotrichia fortensis* Ulmer, by original designation and monotypy. [Synonymised by Marshall 1979: 210].

*Tricholeiochiton* is known from the Palearctic, southern and southeastern Asian regions, and N Australia.

### *Tricholeiochiton fortensis* (Ulmer, 1951)

(fig. 64)

*Synagotrichia fortensis* Ulmer, 1951: 82.

*Tricholeiochiton fortensis*; Marshall, 1979: 210. Holotype: (ZMH), ♂, Sumatra, Fort de Kock, 1913.

Material.— (NTM), ♂, West Malaysia, Tanah Ratah, stream above Robinson Falls, 18.vi.1988, A. Wells.

Remarks.— *T. fortensis* closely resembles *T. fidelis* Wells, 1982 (pp. 253-256) from N Australia but the form of the aedeagus and subgenital plate are distinct. Fig. 64 is based on the genitalia of the West Malaysian specimen.

Distribution.— Sumatra; West Malaysia.

### Genus *Hellyethira* Neboiss, 1977

*Hellyethira* Neboiss, 1977: 42. Type species: *Xuthotrichia simplex* Mosely 1934, by original designation.

Three new species in *Hellyethira* establish the genus firmly in SE Asia. Hitherto, it was known there only from *H. litita* Wells, 1990, described from N Sulawesi, and a Japanese species, *H. acuta* (Kobayashi, 1977) which is more probably a species of *Tricholeiochiton*. The new species are allied to *H. litita*, all representing a lineage distinct from the New Guinean and Australian groups. Considerable numbers of

females were collected at some localities but most cannot be associated with any certainty with males. Some cased larvae resembling those of *H. litita* were collected, but since no pupae were found, they could not be associated with adults.

***Hellyethira selaput* spec. nov.**

(figs. 65-67)

Material.— Holotype: (RMNH), ♂, Brunei, Sg. Temburong, 140 m, 4.iv.1990, M.J.E. Coode. Paratypes: (RMNH), 8 ♂♂, same data as holotype; 14 ♂♂, Brunei, Sg. Temburong, upstream from Wong Nua falls, 8.iv.1990, M.J.E. Coode.

Male.— Antennae damaged. Anterior wing length 2.1 mm. For genitalia, see figs. 65-67. Abdominal segment IX with short lateral lobes. Dorsal plate membranous. Inferior appendages in ventral view with ventral lobe elongate, tapering distally; a dorsal plate on mesal margin sclerotised apically. Dorsal to inferior appendages are paired processes, one slender with crook-shaped seta apically. Subgenital plate not evident. Aedeagus strongly hooked at tip.

Female and immatures.— Unknown.

Remarks.— This species shows similarities to *H. piala* spec. nov. in general appearance and in the hooked setate processes, but differs particularly in the shape of the inferior appendages.

Distribution.— Brunei.

Etymology.— Malay - *selaput* - membrane, referring to the texture of the dorsal plate.

***Hellyethira piala* spec. nov.**

(figs. 68, 69)

Material.— Holotype: (RMNH), ♂, Brunei, 45 km on Labir road, Sg. Madoram, 50 m, 8.i.1990, J. Huisman. Paratypes: (RMNH), 39 ♂♂, same data as holotype.

Male.— Antennae damaged. Anterior wing length 1.8-1.9 mm. For genitalia, see figs. 68, 69. Abdominal segment IX with short lateral lobes. Dorsal plate narrowly constricted basally, expanded distally, with small spinules on each side sub-apically. Inferior appendages with outer margins almost parallel in ventral view, apically bifid. Subgenital plate not evident. Paired processes above inferior appendages with stout crook-shaped setae about equal in length to process. Aedeagus hooked apically.

Female and immatures.— Unknown.

Remarks.— *H. piala* spec. nov. resembles *H. selaput* spec. nov. in having the crook-shaped seta on the process above the inferior appendages, but differs in the shape of the inferior appendages. The specimens were collected at light, beside a stream in wet, mixed dipterocarp forest.

Distribution.— Brunei.

Etymology.— Malay - *piala* - goblet, referring to the shape of the dorsal plate.

**Helyethira bulat spec. nov.**  
(figs. 70-72)

**Material.**— Holotype: (RMNH), ♂, East Malaysia, Sabah, Long Pa Sia, Sg. Ritan-Rurun, 1040 m, 29.xi.1989, J. Huisman. Paratypes: (RMNH), East Malaysia, Sabah: 2 ♂♂, 2 ♀♀ (including allotype) same data as holotype; 1 ♂, 60 km W Lahad Datu, DVFC, Sg. Palum Tambun, 04° 58'N 117°48'E, 150 m, 9.ix.1986, J. Huisman; 4 ♂♂, 10 km NW Long Pa Sia, confluence Sg. Maga - Sg. Pa Sia, 04°26'N 115°40'E, 1210 m, 16-19.x.1986, J. Huisman; 1 ♂, 11 km NNE Ranau, Sg. Montokungon, 06°02'N 116°43'E, 450 m, 25.xi.1986, J. Huisman; 2 ♂♂, 10 km SW Long Pa Sia, Ulu Rurun, 04°22'N 115°40'E, 1400 m, 21.xii.1986, J. Huisman; 5 ♂♂, 12 km NNE Ranau, Poring Hot Springs, Sg. Langanan, 06°03'N 116°43'E, 450 m, 29.i.1987, J. Huisman; 1 ♂, 20 km NNE Ranau, Kg Takutan, Sg. Mokodou, 06°05'N 116°45'E, 325 m, 4.ii.1987, J. Huisman; 3 ♂♂, 10 km S Ranau, Kg Nalapak, Sg. Kananapun, 05°58'N 116°47'E, 350 m, 5.ii.1987, J. Huisman; 4 ♂♂, same locality, 7.ii.1987, J. Huisman; 4 ♂♂, 60 km W Lahad Datu, DVFC, confluence Sg. Segama - Sg. Palum Tambun, 04°58'N 117°48'E, 150 m, 17.iii.1987, J. Huisman; 2 ♂♂, same locality, 18.iii.1987, J. Huisman; 1 ♂, 2 km E Long Pa Sia, Paya Kalaba, 04°24'N 115°44'E, 1000 m, 13.iv.1987, J. Huisman; 1 ♂, Long Pa Sia, airstrip, 04°24'N 115° 43'E, 1000 m, 15.iv.1987, J. Huisman & J. van Tol; 1 ♂, 15 km E Kg Sapulut, Sg. Saburan, 04°42'N 116° 36'E, 300 m, 1.v.1987, J. Huisman; 3 ♂♂, Kinabalu National Park, Ulu Liwagu, below Carsons Camp, 06°02'N 116°33'E, 2550 m, 5.x.1987, J. Huisman; 1 ♂, 60 km W Lahad Datu, DVFC, Sg. Segama, 04° 58'N 117°48'E, 150 m, 20.x.1987, J. Huisman & R. de Jong; 1 ♂, 75 km W Lahad Datu, confluence Sg. Danum - Sg. Sabran, 04°57'N 117°41'E, 200 m, 25.x.1987, J. Huisman & R. de Jong; 5 ♂♂, 65 km W Lahad Datu, Sg. Purut, 04°57'N 117°45'E, 200 m, 26.x.1987, J. Huisman & R. de Jong; 1 ♂, 8.5 km S Long Pa Sia, Sg. Malabit, 04°21'N 115°41'E, 1180 m, 2.xii.1987, J. Huisman & C. v. Achterberg; 1 ♂, same locality, 14.xii.1987, J. Huisman & J. van Tol; 3 ♂♂, 2 km SW Long Pa Sia, confluence Sg. Ritan - Sg. Rurun, 04°21'N 115°42'E, 1040 m, 5.xii.1987, J. Huisman & C. van Achterberg. Brunei: 6 ♂♂, Sg. Temburong, 140 m, 8.iv.1990, M.J.E. Coode. East Malaysia, Sarawak: 3 ♂♂, 16 km N Bario, Long Rapun, Sg. Dapur, 03°53'N 115°35'E, 1200 m, 20. ii.1987, J. Huisman; 2 ♂♂, same locality, 22.ii.1987, J. Huisman.

**Male.**— Antennae damaged. Anterior wing length 2.2-2.5 mm. For genitalia, see figs. 71-72. Abdominal segment IX with elongate lateral lobes extending beyond inferior appendages. Dorsal plate rounded apically, margins folding anteriorly. Inferior appendages membranous ventrally, apices sclerotised; paired dorsal processes with sclerotised straps medially. Subgenital plate not evident. Aedeagus hooked distally.

**Female.**— Antennae damaged. Anterior wing length 2.6-2.7 mm. For genitalia, see fig. 70. Terminalia broad. Abdominal segment VIII short, with a glandular structure apico-mesally, and sparse setae apico-laterally.

**Immatures.**— Unknown.

**Remarks.**— This species is closest to *H. litita* Wells (1990: 393) and can be recognised by its tapered inferior appendages.

**Distribution.**— East Malaysia, Sabah, Sarawak; Brunei.

**Etymology.**— Malay - *bulat* - round, referring to the apex of the dorsal plate.

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**Appendix****Checklist of Hydroptilidae from Malaysia and Brunei****West Malaysia**

- Hydroptila rumpun* spec. nov.  
    *sabit* spec. nov.  
    *segitiga* spec. nov.  
    *sudip* spec. nov.  
    *tumpul* spec. nov.  
*Macrostactobia runcing* spec. nov.  
*Oxyethira campanula* Botosaneanu,  
    *ikal* spec. nov.  
*Tricholeiochiton fortensis* (Ulmer, 1951)  
*Ugandatrichia hairanga* Oláh, 1989

**Sabah**

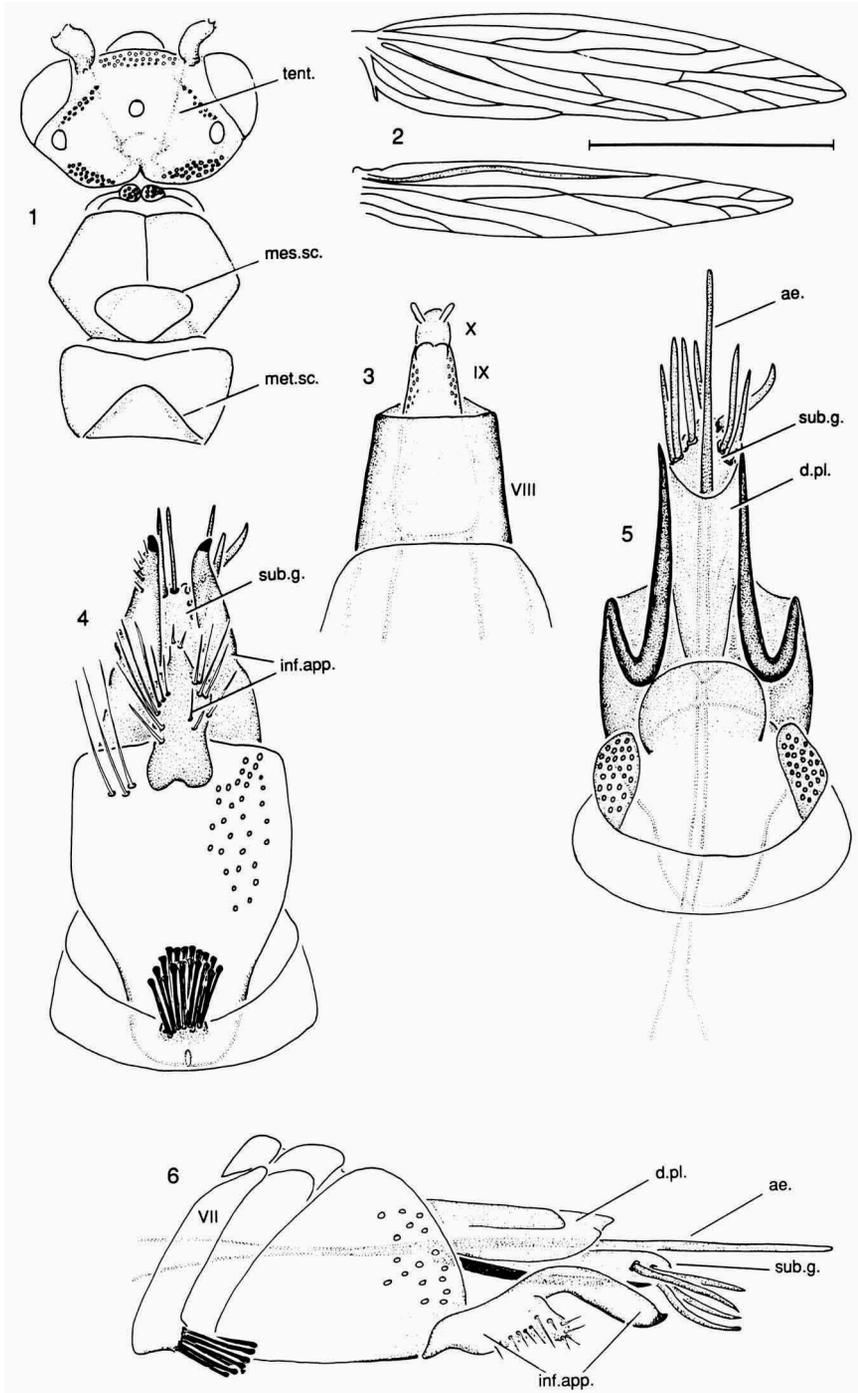
- Hellyethira bulat* spec. nov.  
*Hydroptila batang* spec. nov.  
    *begap* spec. nov.  
    *berkait* spec. nov.  
    *bibir* spec. nov.  
    *dayung* spec. nov.  
    *daun* spec. nov.  
    *halus* spec. nov.  
    *kebawah* spec. nov.  
    *lidah* spec. nov.  
    *obscura* Wells, 1979  
    *pintal* spec. nov.  
    *sederhana* spec. nov.  
*Oxyethira bogambara* Schmid, 1958  
    *campanula* Botosaneanu, 1970

**Sarawak**

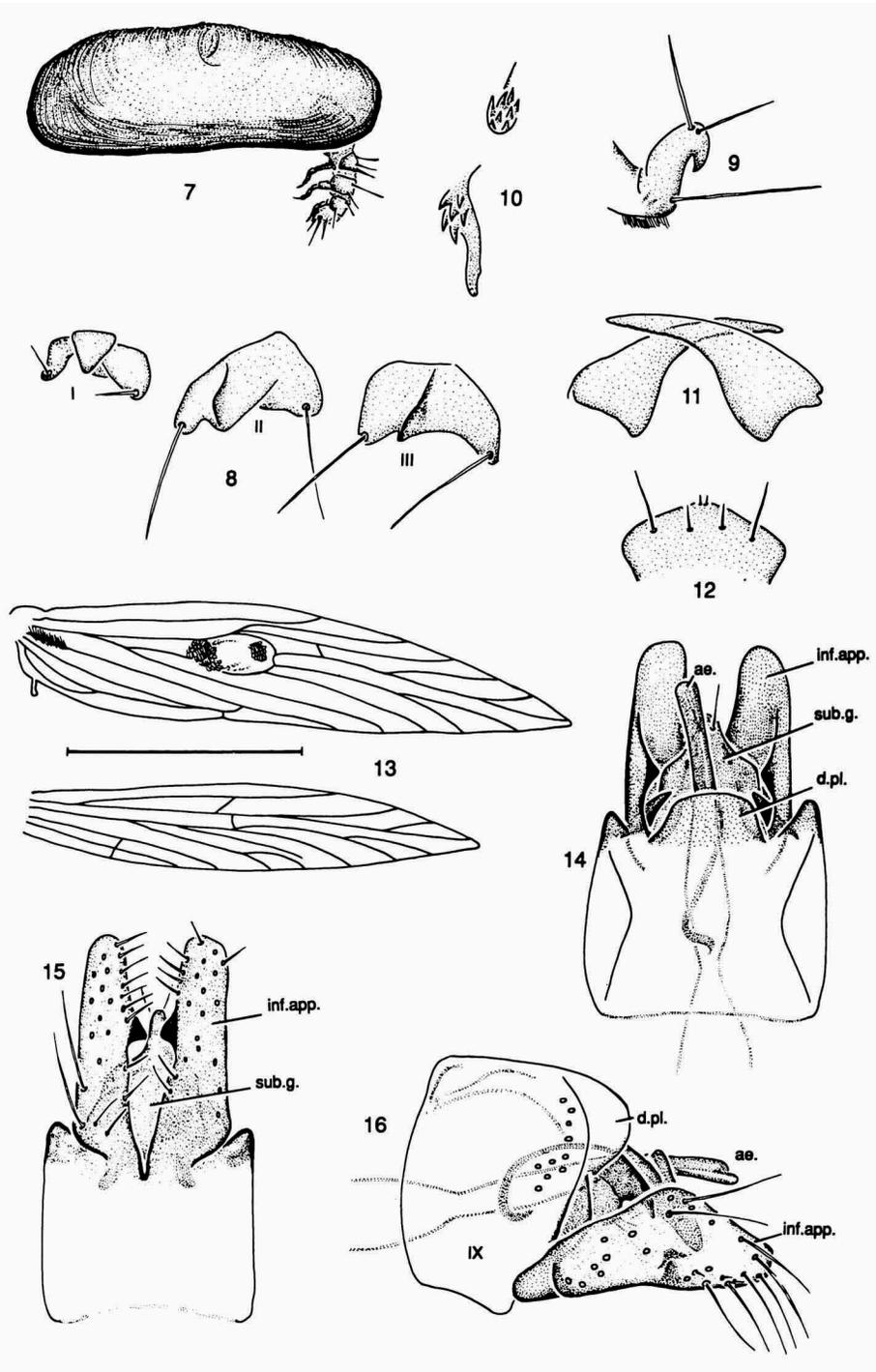
- Hellyethira bulat* spec. nov.  
*Hydroptila kebawah* spec. nov.  
    *sudip* spec. nov.  
*Ugandatrichia lampai* spec. nov.

**Brunei**

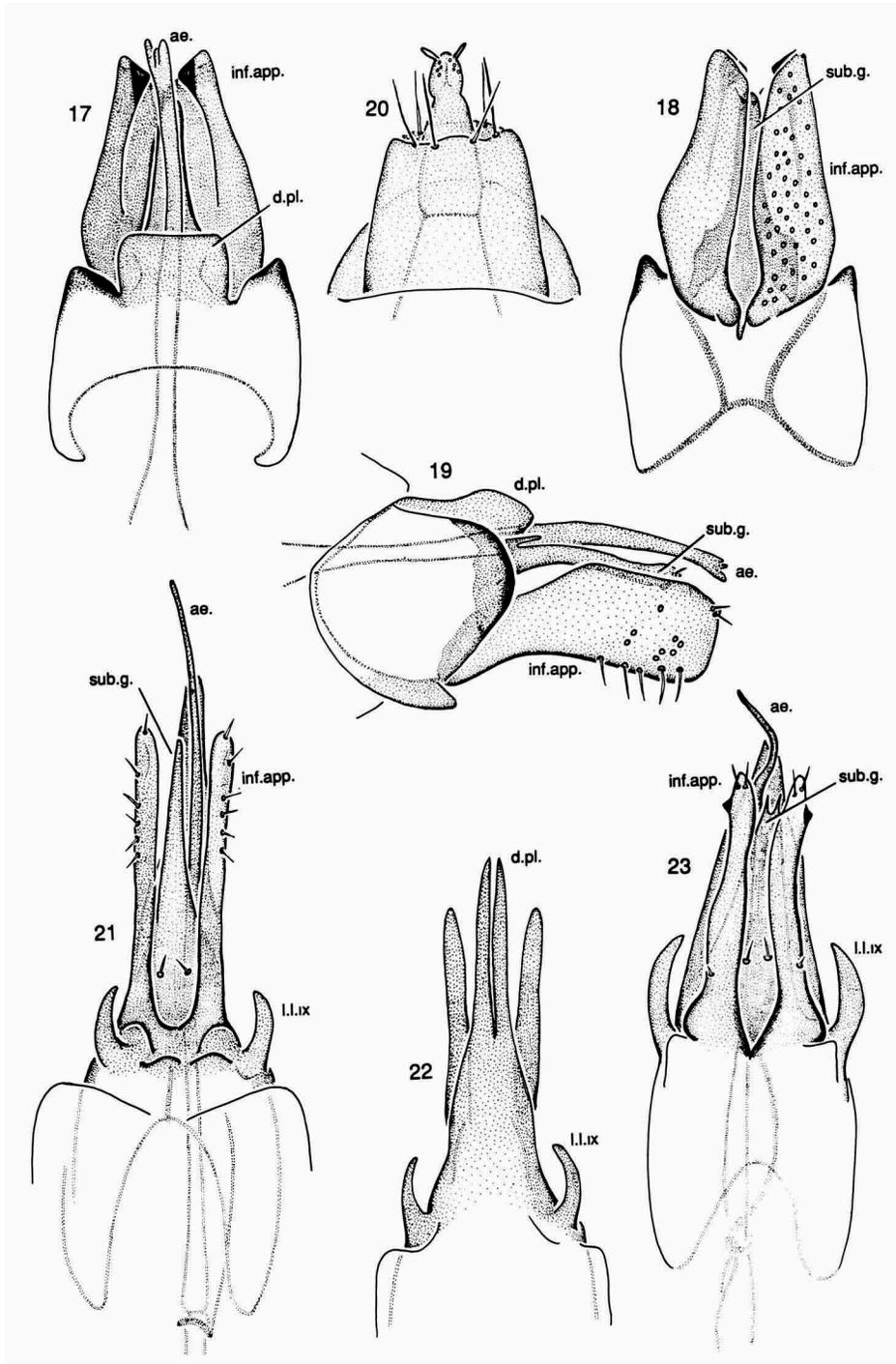
- Hellyethira bulat* spec. nov.  
    *piala* spec. nov.  
    *selaput* spec. nov.  
*Hydroptila batang* spec. nov.



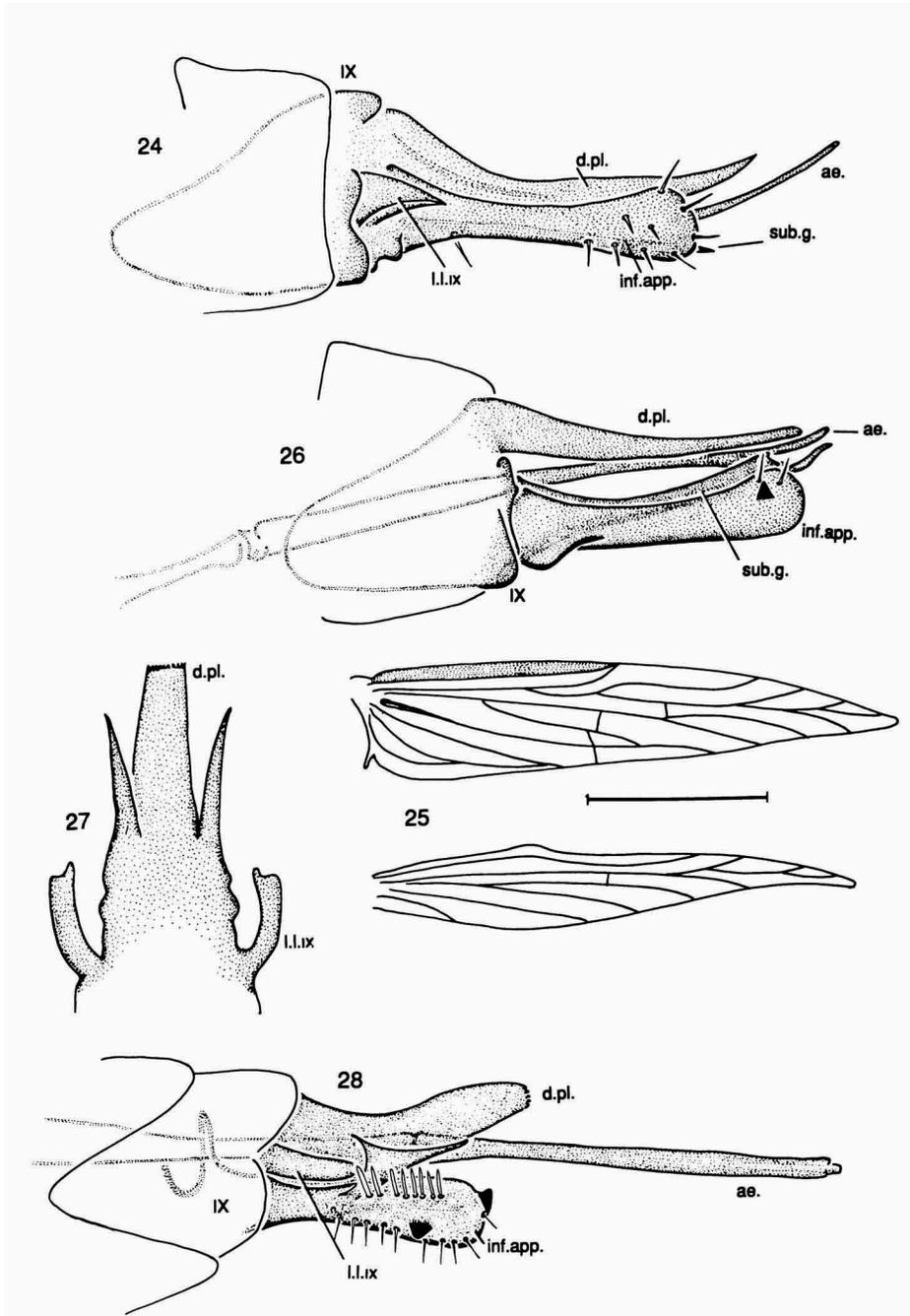
Figs. 1-6. *Macrostactobia runcing* spec. nov. 1, head and thorax, dorsal view; 2, wings; 3, female terminalia, ventral view; 4-6, male genitalia, ventral, dorsal and lateral views. Abbreviations: ae., aedeagus; d.pl., dorsal plate; inf. app., inferior appendages; mes. sc., meso-scutellum; met. sc., meta-scutellum; sub. g., subgenital plate; tent., tentorium; VII, VIII, IX, X, seventh-tenth abdominal segments. Scale bar = 1 mm.



Figs. 7-12. *Macrostactobia runcing* spec. nov. 7, cased larva; 8, larval thoracic pleura; 9, larval anal claw; 10, pupal hook-plates; 11, pupal mandibles; 12, pupal labrum. Figs. 13-16. *Ugandatrachia hairanga* Oláh, male: 13, wings; 14-16, genitalia, dorsal, ventral, and lateral views. Abbreviations: ae., aedeagus; d.pl., dorsal plate; inf. app., inferior appendages; sub. g., subgenital plate; I, II & III, pro-, meso- & meta-pleuron; IX, ninth abdominal segment. Scale bar = 1 mm.



Figs. 17-20. *Ugandatrichia lampai* spec. nov. 17-19, male genitalia, dorsal, ventral and lateral views; 20, female terminalia, ventral view. Figs. 21, 22. *Hydroptila sudip* spec. nov., male genitalia, ventral and dorsal views. Fig. 23. *H. segitiga* spec. nov., male genitalia, ventral view. Abbreviations: ae., aedeagus; d.pl., dorsal plate; inf. app., inferior appendages; l.l.IX, lateral lobes of abdominal segment IX; sub. g., subgenital plate; IX, ninth abdominal segment.



Figs. 24, 25. *Hydroptila sudip* spec. nov. 24, male genitalia, lateral view; 25, wings. Fig. 26. *H. segitiga* spec. nov., male genitalia, lateral view. Figs. 27, 28. *H. batang* spec. nov.: male genitalia, dorsal and lateral views. Abbreviations as for figs. 17-23. Scale bar = 1 mm.

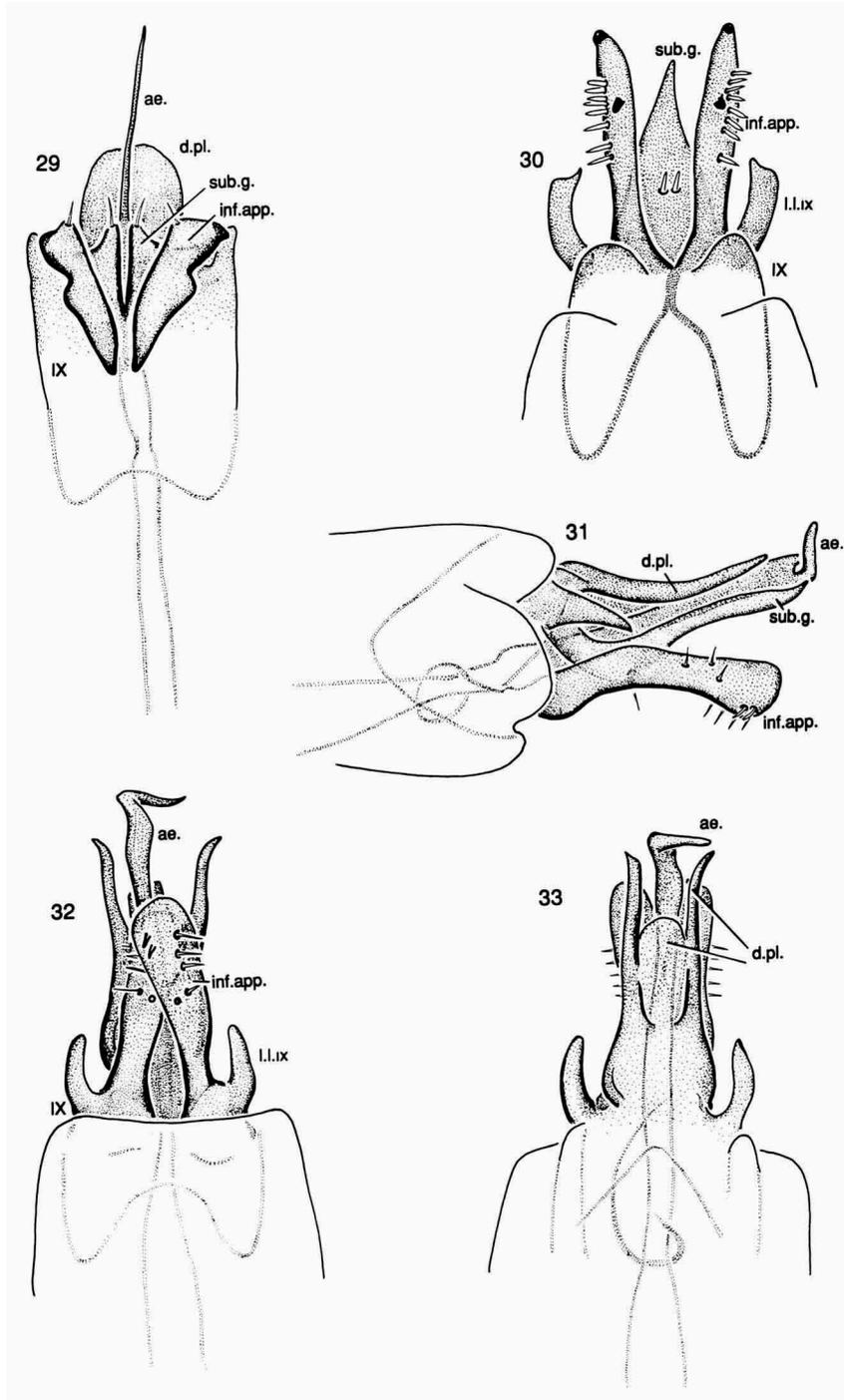


Fig. 29. *Hydroptila sederhana* spec. nov., male genitalia, ventral view. Fig. 30. *H. batang* spec. nov. male genitalia, ventral view. Figs. 31-33. *H. pintal* spec. nov., male genitalia, lateral, ventral and dorsal views. Abbreviations as for figs. 17-23.

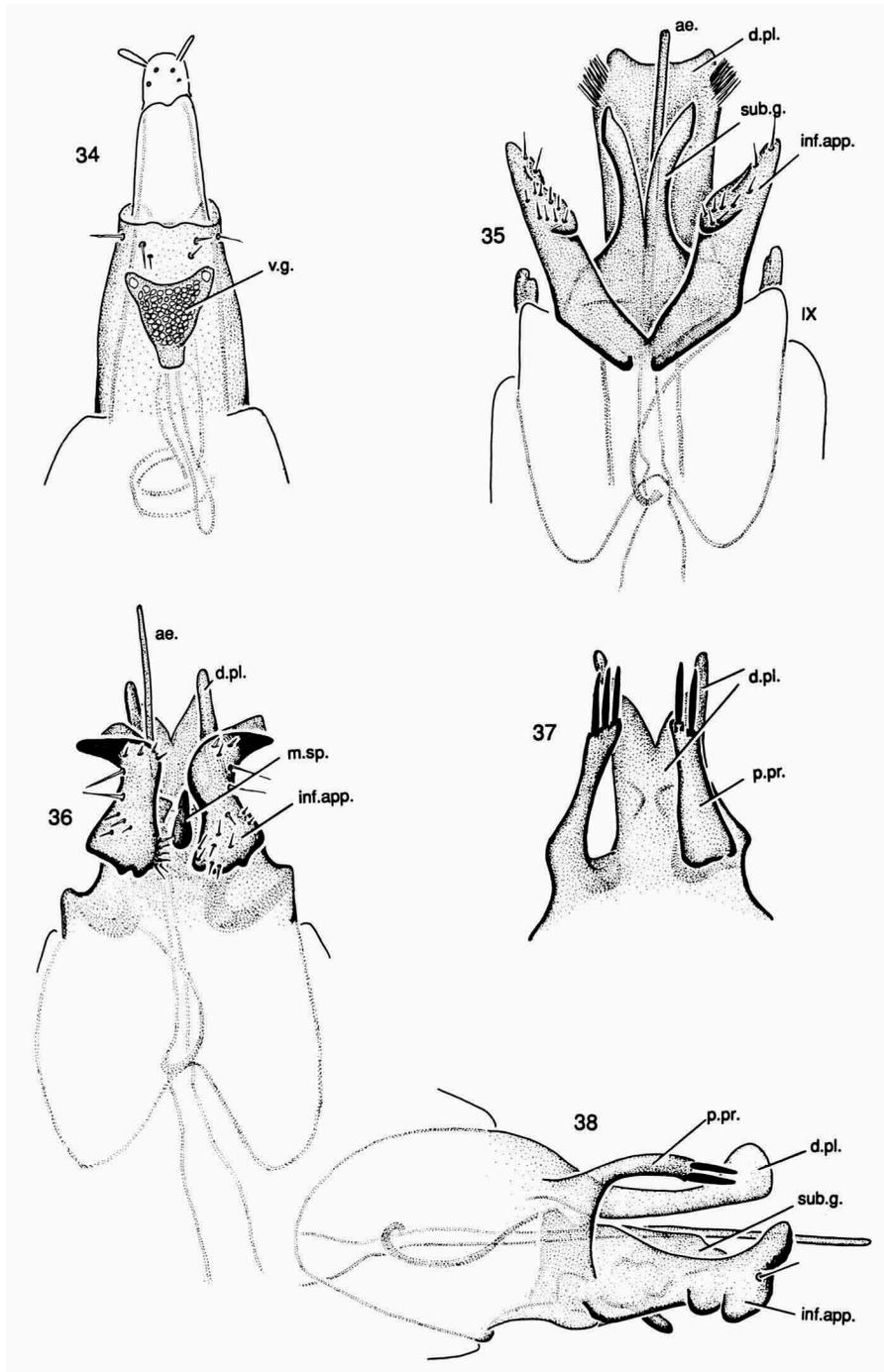
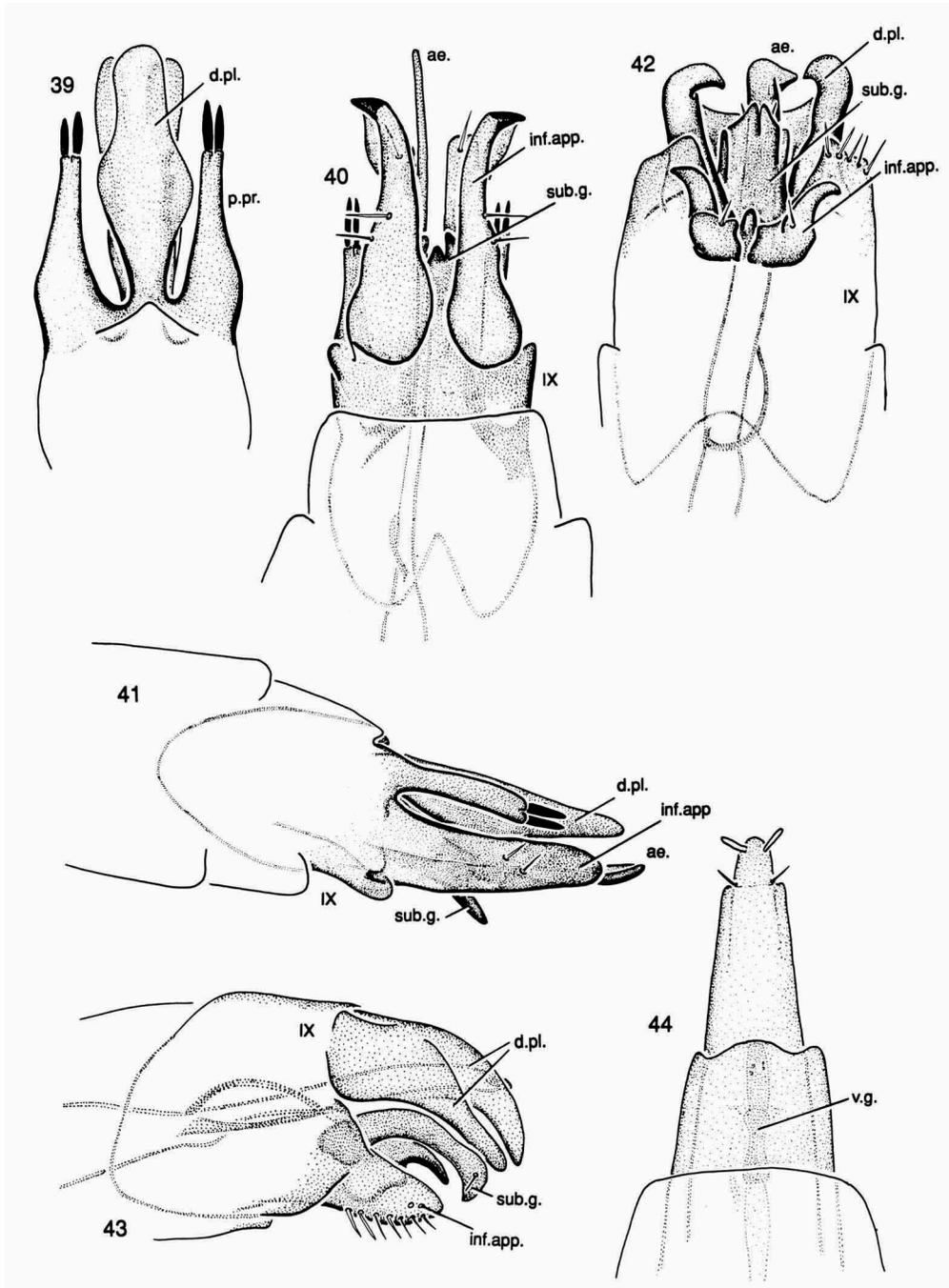
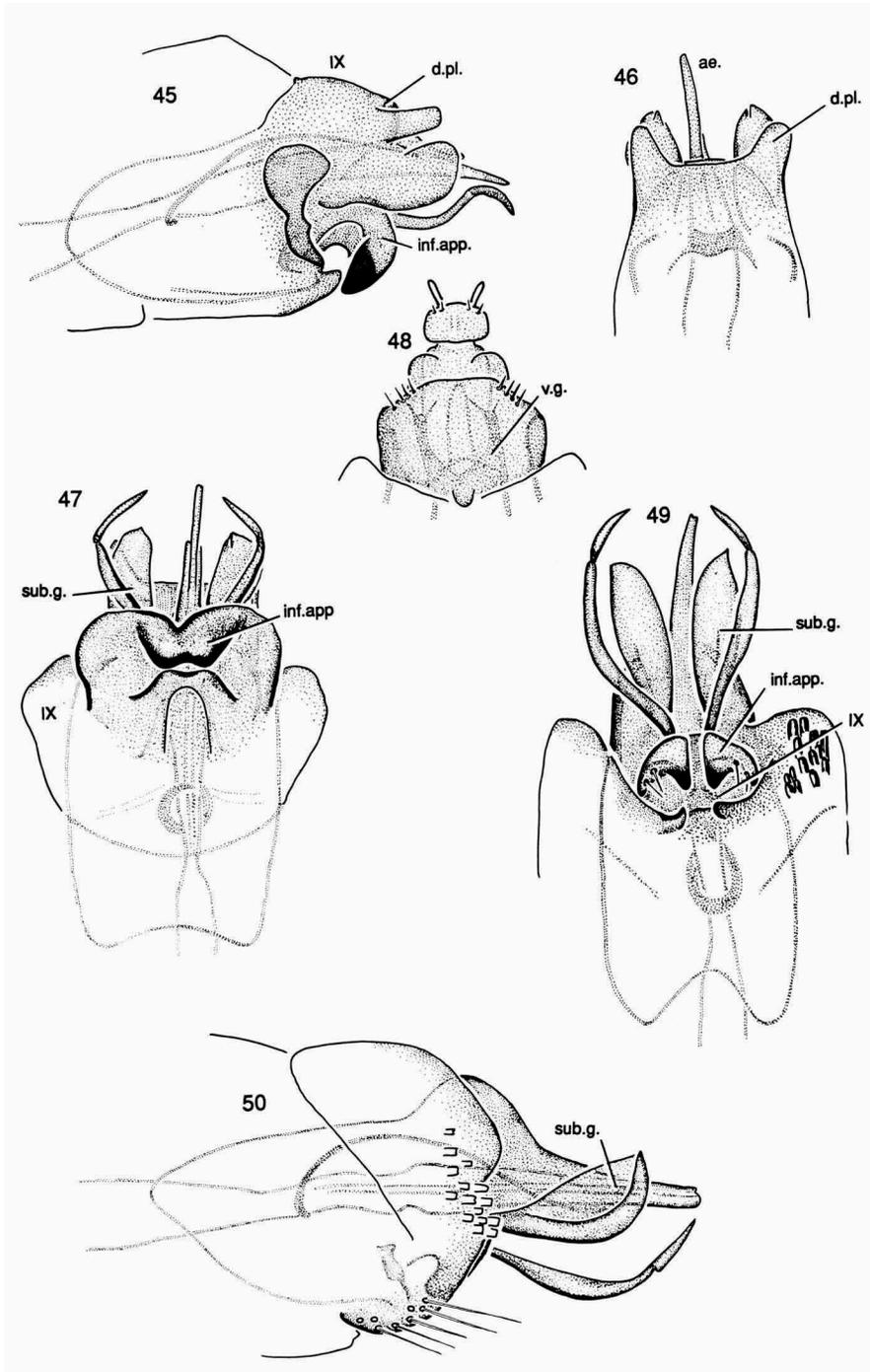


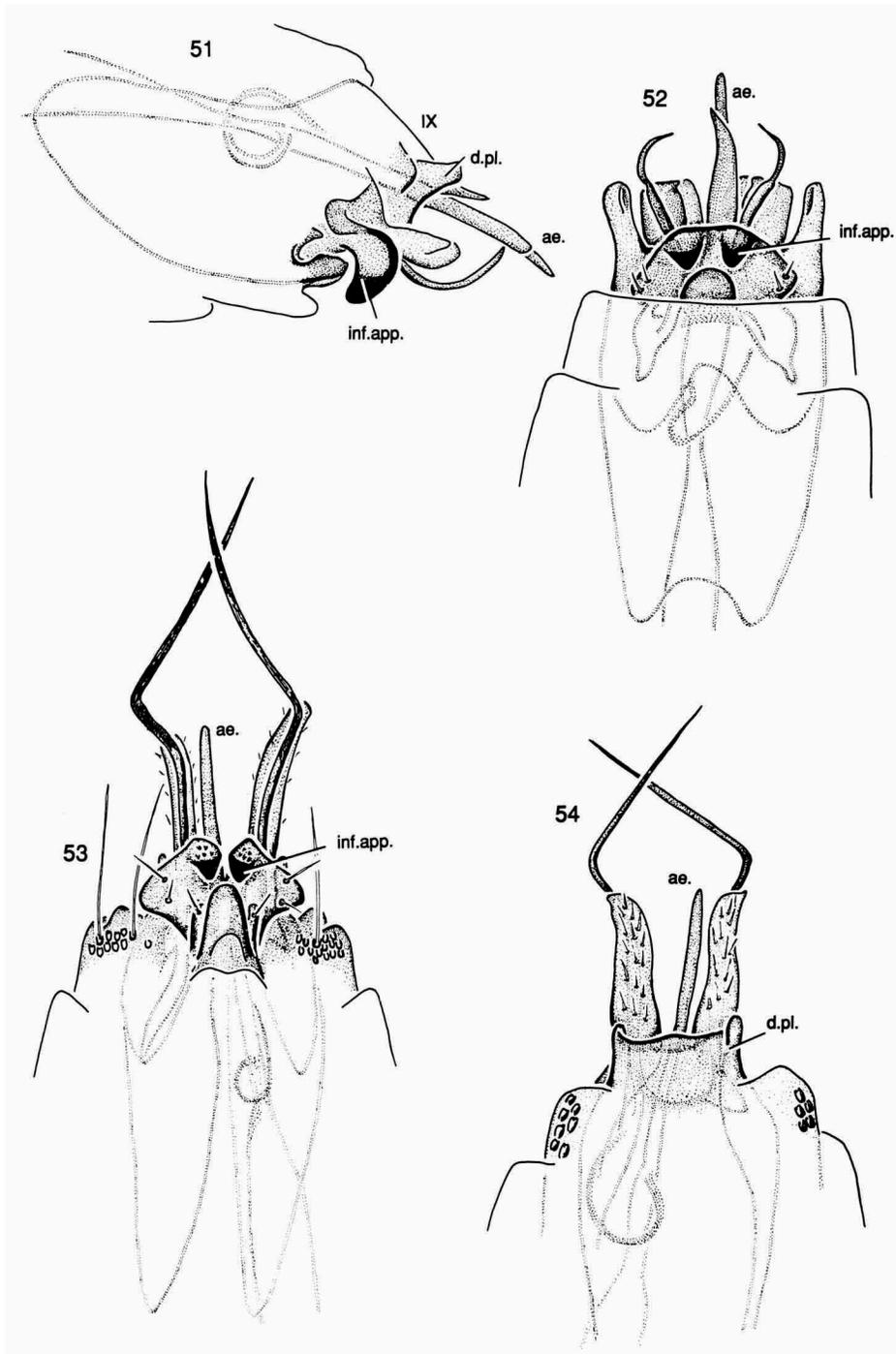
Fig. 34. *Hydroptila pintal* spec. nov., female terminalia, ventral view. Fig. 35. *H. rumpun* spec. nov., male genitalia, ventral view. Figs. 36-38. *Hydroptila berkait* spec. nov., male genitalia ventral, dorsal and lateral views. Abbreviations: ae., aedeagus; d.pl., dorsal plate; inf. app., inferior appendages; m.sp., mesal spine; p.pr., posterior process; sub. g., subgenital plate; v.g., ventral gland; IX, ninth abdominal segment.



Figs. 39-41. *Hydroptila lidah* spec. nov., male genitalia, dorsal, ventral and lateral views. Figs. 42-44. *H. begap* spec. nov. 42, 43, male genitalia, ventral and lateral views; 44, female terminalia, ventral view. Abbreviations as for figs. 34-38.



Figs. 45-48. *Hydroptila bibir* spec. nov. 45-47, male genitalia, lateral, dorsal, and ventral views; 48, female terminalia, ventral view. Figs. 49, 50. *H. daun* spec. nov., male genitalia, ventral and lateral views. Abbreviations as for figs. 34-38.



Figs. 51-52. *Hydroptila kebawah* spec. nov., male genitalia, lateral and ventral view. Figs. 53, 54. *H. halus* spec. nov., male genitalia, ventral and dorsal views. Abbreviations as for figs. 17-23.

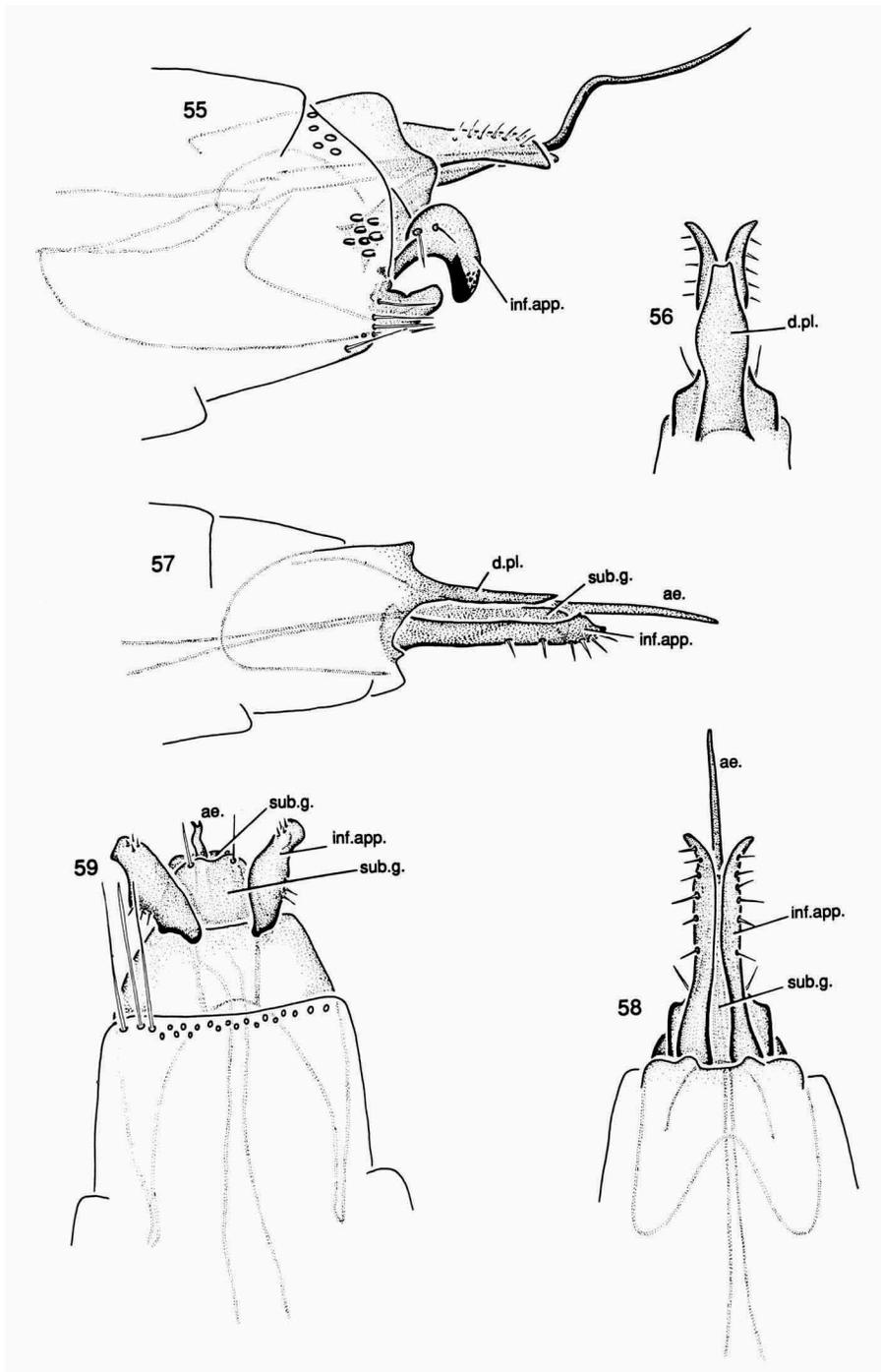
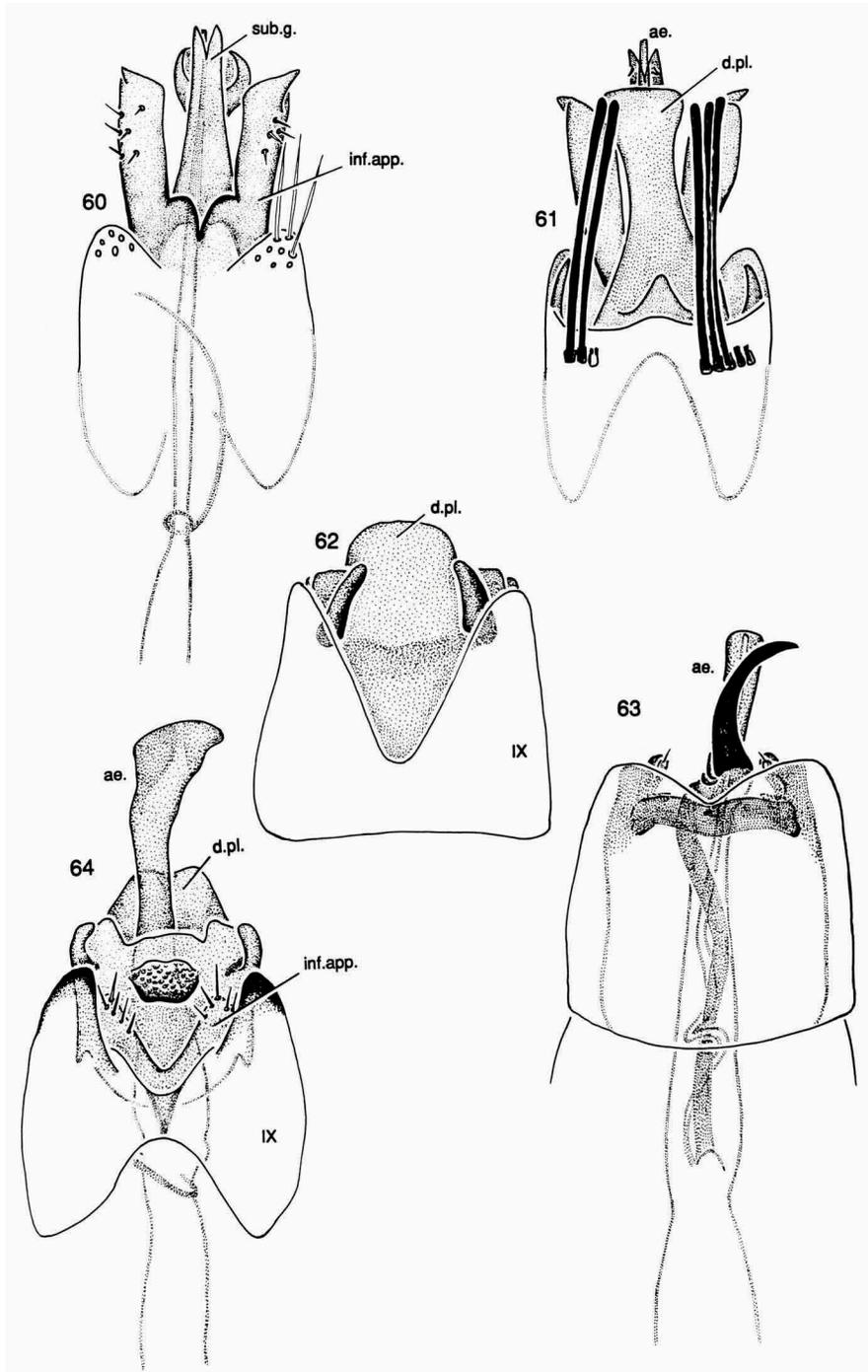
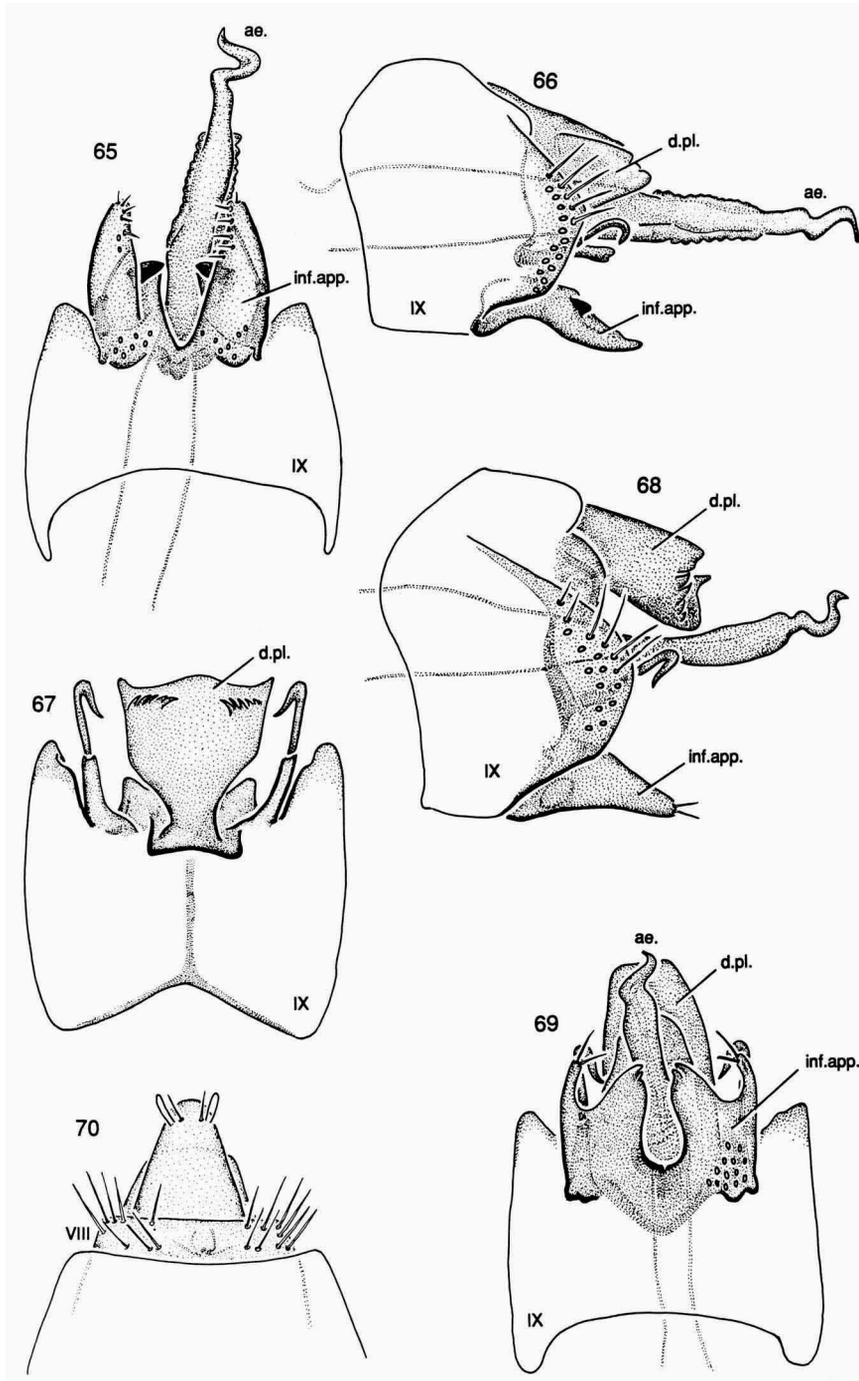


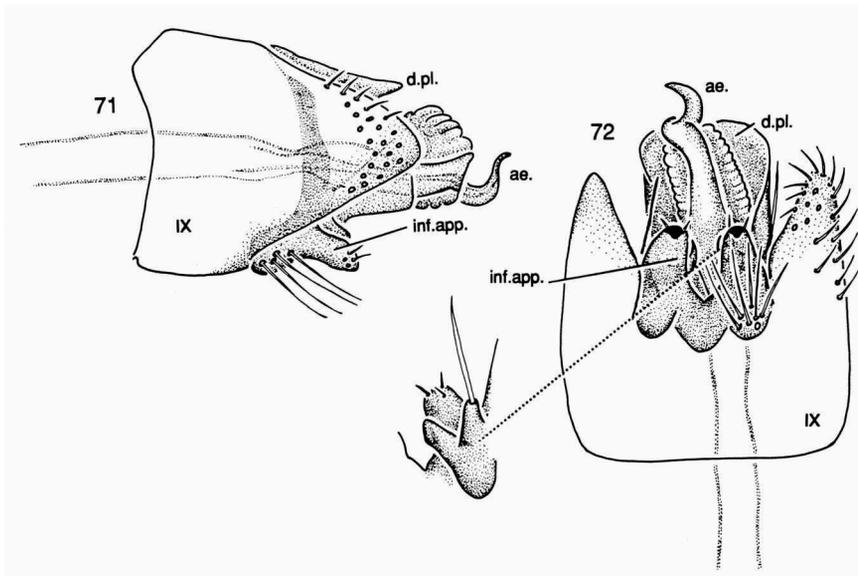
Fig. 55. *Hydroptila halus* spec. nov., male genitalia, lateral view. Figs. 56-58. *H. tumpul* spec. nov., male genitalia, dorsal, lateral and ventral views. Fig. 59. *H. dayung* sp. nov., male genitalia, ventral view. Abbreviations as for figs. 17-23.



Figs. 60, 61. *Hydroptila sabit* spec. nov., male genitalia, ventral and dorsal views. Figs. 62, 63. *Oxyethira ikal* spec. nov., male genitalia, dorsal and ventral views. Fig. 64. *Tricholeichiton fortensis* (Ulmer), male genitalia, ventral view. Abbreviations as for figs. 17-23.



Figs. 65-67. *Helyethira selaput* spec. nov., male genitalia, ventral, lateral and dorsal views. Figs. 68, 69. *H. piala* spec. nov., male genitalia, lateral and ventral views. Fig. 70. *H. bulat* spec. nov., female terminalia, ventral view. Abbreviations as for figs. 17-23.



Figs. 71, 72. *Hellyethira bulat* spec. nov., male genitalia, lateral and ventral views. Abbreviations as for figs. 17-23.