

# BULLETIN

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## CADDIS-FLIES (TRICHOPTERA) OF THE FAMILIES POLYCENTROPODIDAE AND HYALOPSYCHIDAE FROM DUMOGA-BONE NATIONAL PARK, SULAWESI, INDONESIA, WITH COMMENTS ON IDENTITY OF *POLYCENTROPUS ORIENTALIS* McLACHLAN

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### Abstract

A small number of specimens collected at Dumoga-Bone National Park, North Sulawesi, Indonesia during the Project Wallace 1985 expedition includes six new species referred to the family Polycentropodidae and another to Hyalopsychidae. The following species are described and illustrated: *Polyplectropus cuspidatus* sp.n., *didactylus* sp.n., *epitychnus* sp.n., *exallus* sp.n., *umbonatus* sp.n. and *Nyctiophylax lumarius* sp.n., Polycentropodidae and *Hyalopsychella haplotes* sp.n., Hyalopsychidae. It is shown that the type of *Polycentropus orientalis* McLachlan collected by Wallace, is from Sarawak and not from Celebes (=Sulawesi) as erroneously stated by McLachlan.

### INTRODUCTION

Until now, the only species of the family Polycentropodidae (formerly including the subfamily Hyalopsychinae) recorded from Sulawesi, was *Polycentropus orientalis* McLachlan, 1866. The type specimen, a male in the British Museum (Natural History) collection, is mounted on two microscope slides, one with head, thorax and abdomen in Canada Balsam, the other with one pair of dry-mounted wings and glued at one end a round label bearing the letters "SAR". This label is typical of those used by Alfred Wallace for specimens collected from Sarawak; the other label, apparently in McLachlan's handwriting, gives the identification "*Polycentropus orientalis* McLach." According to the original publication (McLachlan, 1866)

the single specimen on which the description is based "is not in good condition", the locality is given as "Habitat ad Macassar, in insula Celebes (Wallace)". So far there are no confirmed records of *P. orientalis* from Sulawesi (Celebes), and there is no reason to doubt the correctness of Wallace's label. Since most of the polycentropodids in the tropics are usually collected at altitude above 600 m (Holzenthal & Hamilton, 1988), it is probably reasonable to assume that the type specimen of *P. orientalis* came from mountainous areas inland from Kuching, Sarawak, as shown on Wallace's route maps (Wallace, 1869).

In the last paragraph of the description, McLachlan (1866) notes that *P. orientalis* wing venation "agrees entirely with the group of *P. flavomaculatus* Pictet",

but later (McLachlan, 1868: 205-206) admits that he "somewhat incorrectly stated that the neuration of *P. orientalis* was arranged..after...that of *P. flavomaculatus*, in as much as the apical fork No. 1 is not present in the hind wings; *P. orientalis* agrees with *P. puerilis* in this respect". Ulmer (1951) transferred *orientalis* to the genus *Polyplectropus* because fork 1 in the hind wing is absent, and discoidal cell open.

The five new species of *Polyplectropus* and one *Nyctiophylax* from Dumoga-Bone National Park, Sulawesi are all known from first or second order streams at elevations above 600 metres. One exception is *Polyplectropus didactylus* sp.n. which has been collected to elevations as low as 200 m. At least four of the previously recorded species of *Polyplectropus* from Sunda islands (Ulmer, 1951) are known from altitudes between 900 and 2200 m. It is of interest to note that *Nyctiophylax* in New Guinea is known from highlands as well as low level coastal districts (unpublished data). Similarly, the genus occur in Northern Australia at elevations below 100 m a.s.l. The observations by Holzenthal & Hamilton (1988) therefore may be applied to Sunda island *Polyplectropus* species, but not to *Nyctiophylax*.

Depository institutions are abbreviated as follows:

BMNH - British Museum (Natural History), London;  
MVM - Museum of Victoria, Melbourne;  
NTMD - Northern Territory Museum of Arts and Sciences, Darwin;  
RMNH - Rijksmuseum van Natuurlijke Historie, Leiden;  
ZMA - Zoölogisch Museum, Universiteit van Amsterdam;  
ZMB - Zoological Museum, Bogor.

### Family Polycentropodidae

The family shows some similarity to the Psychomyiidae and often has been treated as a subfamily (Ross, 1944), but Ulmer (1951) retained separate, subdividing the polycentropodids into four subfamilies. One, the Hyalopsychinae has subsequently been raised to family rank by Schmid (1980). Of the subfamily Polycentropodinae only two genera *Polyplectropus* with seven species and *Nyctiophylax* with one species, were previously recorded from the Sunda Island archipelago. To these a further five species of *Polyplectropus* and one of *Nyctiophylax* are added. Males of the new species of both genera are

clearly distinguished by differences in their genitalic structures but all are similar in their wing venation and general form to the other Sunda Island species.

The various parts of the male genitalia in Polycentropodidae are complicated and their terminology somewhat uncertain. Although Nielsen (1957) made an attempt to homologize these parts, the more recent works by Schmid (1980) and Holzenthal and Hamilton (1988) have been followed here.

Females of only three species have been associated and described.

### *Polyplectropus orientalis* (McLachlan)

(figs. 1, 2)

*Polycentropus orientalis*, McLachlan, 1866: 272; 1868: 205.

*Polyplectropus orientalis*, Ulmer, 1951: 113.

### DESCRIPTION

General appearance as described by McLachlan. Subsequently the type specimen was dissected and mounted on the two microscope slides from which new illustration have now been prepared (figs. 1,2).

Wing venation (fig. 2) regular for the genus, fore wing fork 1 about as long as its footstalk, fork 2 sessile, thyrudial cell just touches the base of median cell, veins A1 and A2 join A3 at some distance from each other; in hind wing fork 1 absent, fork 2 nearly sessile, fork 5 broad, anal veins joined at base, forming an obvious broad cell.

Male genitalia (fig. 1) visible in lateral view only. Segments 9 and 10 very short, a pair of long, internally looped spines extending just beyond the end of segment 10. Inferior appendages elongate, meso-apical angle acute.

Female unknown.

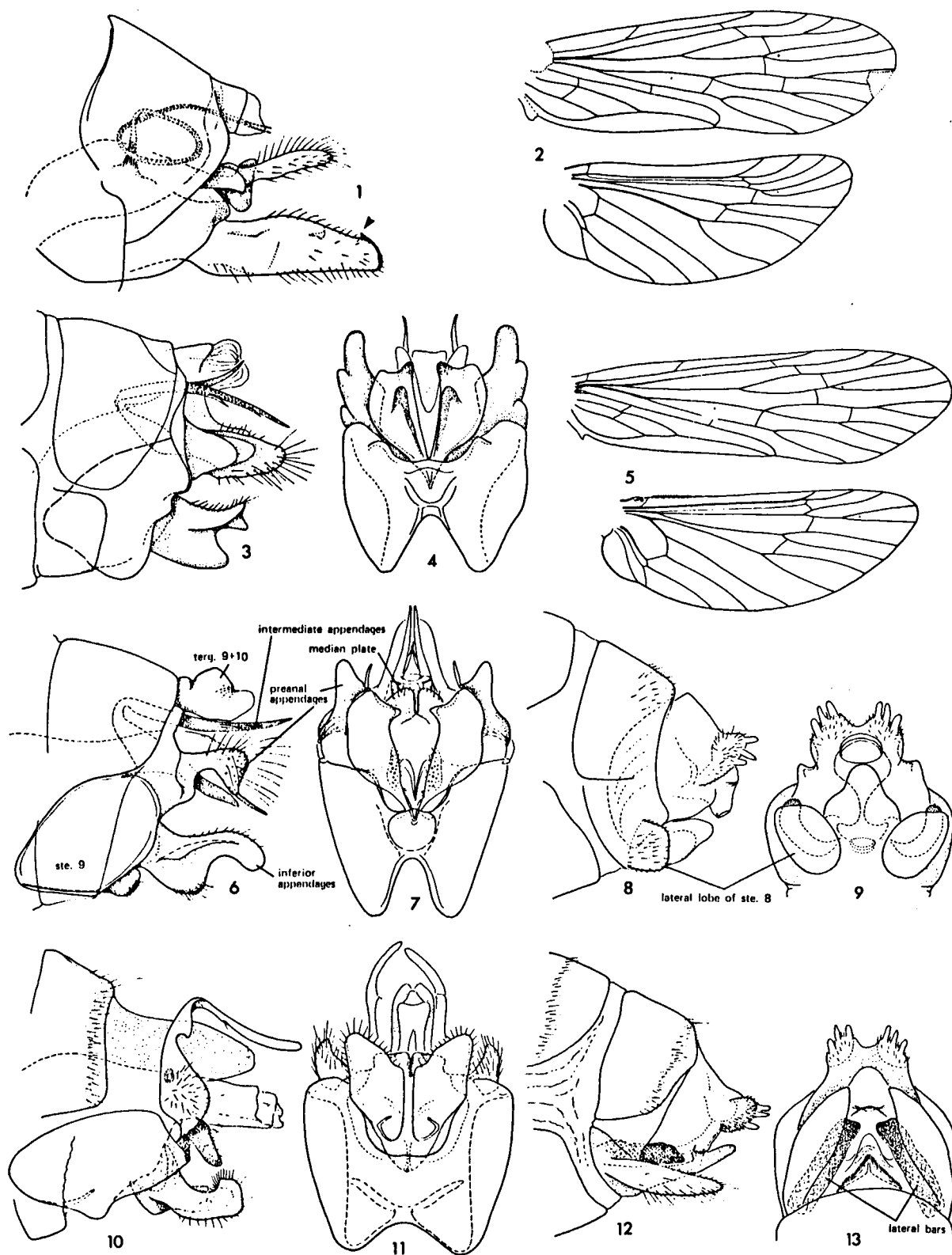
Length of fore wing: ♂ 6.2 mm.

### Type material

Holotype ♂, Sarawak, Coll. Wallace (BMNH) mounted on microscope slides. Specimen examined. No new material has been available for study.

### Distribution

Sarawak (Malaysia).



Figs. 1-13: *Polyplectropus* spp.- (1, 2) *Polyplectropus orientalis* (McLachlan) (1) male genitalia lateral; (2) male wing venation. (3,4) *Polyplectropus umbonatus* sp.n. (3) male genitalia lateral; (4) male genitalia ventral. (5-9) *Polyplectropus exallus* sp.n. (5) male wing venation; (6) male genitalia lateral; (7) male genitalia ventral; (8) female genitalia lateral; (9) female genitalia ventral. (10-13) *Polyplectropus didactylus* sp.n. (10) male genitalia lateral; (11) male genitalia ventral; (12) female genitalia lateral; (13) female genitalia ventral.

**Remarks**

The species is distinguished by long, internally looped spines. It appears to be closest to *Polyplectropus gedehensis* Ulmer from Western Java.

***Polyplectropus umbonatus* sp.n.**  
(figs. 3,4)

**DESCRIPTION**

Male (figs. 3,4) abdominal tergite 9 slightly sclerotized, fused with membranous segment 10, distal margin of sternite 9 irregularly lobed. Preanal appendages robust with rounded lateral bulges, rounded apically, bilobed plate basi-mesally. Intermediate appendages appear as a pair of internally reflexed and apically acute spines. Inferior appendages short, broad with lateral and ventral expansions. Phallus membranous, slightly curved, truncate apically.

Female unknown.

Length of fore wing: ♂ 6.4 mm.

**Remarks**

Distinguished from other species in the region by characteristic male genitalia, particularly the short, expanded inferior appendages.

**Type material**

Holotype ♂, Sulawesi Utara, Dumoga-Bone National Park, 1440 camp, 00°37'N 123°51'E, at light, 9-14 May 1985, J. Martin & M. Horak (genitalia prep. PT-1554 ♂ figured) (T 9987 MVM).

**Distribution**

North Sulawesi (Indonesia), known from type locality only.

**Etymology**

From Latin *umbo*, rounded protuberance; in reference to rounded preanal appendages.

***Polyplectropus exallus* sp.n.**  
(figs. 5-9)

**DESCRIPTION**

Wings dark brown (fig. 5) fore wing fork 2 just touch-

es discoidal cell, fork 4 sessile, hind wing with large cell at base of anal veins.

Male (figs. 6,7) abdominal tergites 9 and 10 membranous, fused, sternite 9 comparatively small, ovoid, distal margin rounded, rather large swollen node meso-ventrally. Preanal appendages ventral margin with distinct rounded excision (fig. 6) disto-ventral angle ends with a long spine (may be easily broken off), basi-mesally attached median plate. Intermediate appendages upcurved, acute apically with several small spines on mesal margin. Inferior appendages short, robust, curved with blunt rounded apex, flanged laterally. Phallus membranous, apex curved.

Female abdomen (figs. 8,9) with lateral lobe of sternite 8 short, broad, apico-ventral margin of tergite 8 extended ventrad and forming lateral pocket, covered with minute setae. Tergite 9 weakly sclerotized dorsally.

Length of fore wing: ♂ 6.2-7.0 mm; ♀ 7.2 mm.

**Remarks**

Distinguished from other species by distinctive preanal appendages.

**Type material**

Holotype ♂, Sulawesi Utara, Dumoga-Bone National Park, 1440 camp, 00°37'N 123°51'E, at light, 9-14 May 1985, J. Martin & M. Horak (T-9984 MVM). Paratypes: 2♂ 1♀ collected with holotype (genitalia prep. PT-1556 ♂, PT-1800, ♀ figured) (MVM, BMNH).

**Distribution**

North Sulawesi (Indonesia), known from type locality only.

**Etymology**

From *exallos* (Greek), quite different, in reference to the characteristic form of preanal appendages.

***Polyplectropus didactylus* sp.n.**  
(figs. 10-14)

**DESCRIPTION**

Wings dark brown (fig. 14), fore wing with forks 2,3 and 4 just touching corresponding cells, hind wing cell at base of anal veins smaller than in *P. exallus* sp.n.

Male (figs. 10,11) abdominal tergites 9 and 10 fused, membranous, sternite 9 rounded anteriorly, disto-ventral margin expanded mesally into transverse ridge of which the lower distal angle is extended ventrally, both sides meeting and fused mesally. Preanal appendages broad based, apical half slender, bent at right angle, apical end directed distally. Inferior appendages short, robust. Phallus straight, membranous.

Female abdomen (figs. 12,13) with lateral lobes of sternite 8 narrow, elongate, tapered apically. Tergite 9 weakly sclerotized. Vaginal apparatus with a pair of strongly sclerotized lateral bars converging distally.

Length of fore wing: ♂ 6.6-8.0 mm; ♀ 7.5-9.1mm.

#### Remarks

Distinguished from other species by distinctive preanal appendages.

#### Type material

Holotype ♂, Sulawesi Utara, Dumoga-Bone National Park, Edwards camp near Tumpah River, 00°35'N 123°51'E, alt. 650 m, MV-light, 28 Apr. 1985, J. Martin & M. Horak (T 9975 MVM). Paratypes: 3♂3♀ collected with holotype (genitalia prep. PT-1557 ♂ and PT-1799 ♀ figured) (BMNH, MVM); 2 ♀ same loc., 22 May 1985, A. Wells (MVM); 1 ♀ 1440 camp, at light, 9-14 May 1985, J. Martin & M. Horak (MVM); 2♂ Tumpah River, at light, Aug. 1985, D. Dudgeon (ZMA); 1♂2 ♀. Beach on Tumpah River, Picnic site, 225 m, MV-light, Oct. 1985, M. Malipatil (NTMD); 4♂ Hog's Back camp, 492 m, MV-light, 21 Oct.-4 Nov. 1985, M. Malipatil (NTMD, ZMB).

#### Distribution

North Sulawesi (Indonesia).

#### Etymology

From *daktylos* (Greek), finger, referring to diagnostic distal ends of the preanal appendages.

#### *Polyplectropus epitychmus* sp.n.

(figs. 15, 16)

#### DESCRIPTION

Male (figs. 15,16) abdominal tergite 8 depressed dorsally, tergites 9 and 10 short, membranous, fused, sternite 9 short with small meso-ventral projection. Preanal appendages short, broad, slightly curved.

Intermediate appendages in form of two curved, apically acute processes. Inferior appendages in lateral view broad based, gradually tapering distally, in ventral view strongly curved. Phallus curved, weakly sclerotized with several fine apical spines.

Female unknown.

Length of fore wing: ♂ 5.4 mm.

#### Remarks

The simple, strongly curved inferior appendages distinguish this species.

#### Type material

Holotype ♂, Sulawesi Utara, Dumoga-Bone National Park, Edwards camp near Tumpah River, 00° 35'N 123° 51'E, alt. 650m, MV-light, 28 Apr. 1985, J. Martin & M. Horak (genitalia prep. PT-1555 ♂ figured) (T-9983 MVM).

#### Distribution

North Sulawesi (Indonesia), known from type locality only.

#### Etymology

Derived from *epitychma* (Greek), flap, referring to the shape of preanal appendages.

#### *Polyplectropus cuspidatus* sp.n.

(figs. 17, 18)

#### DESCRIPTION

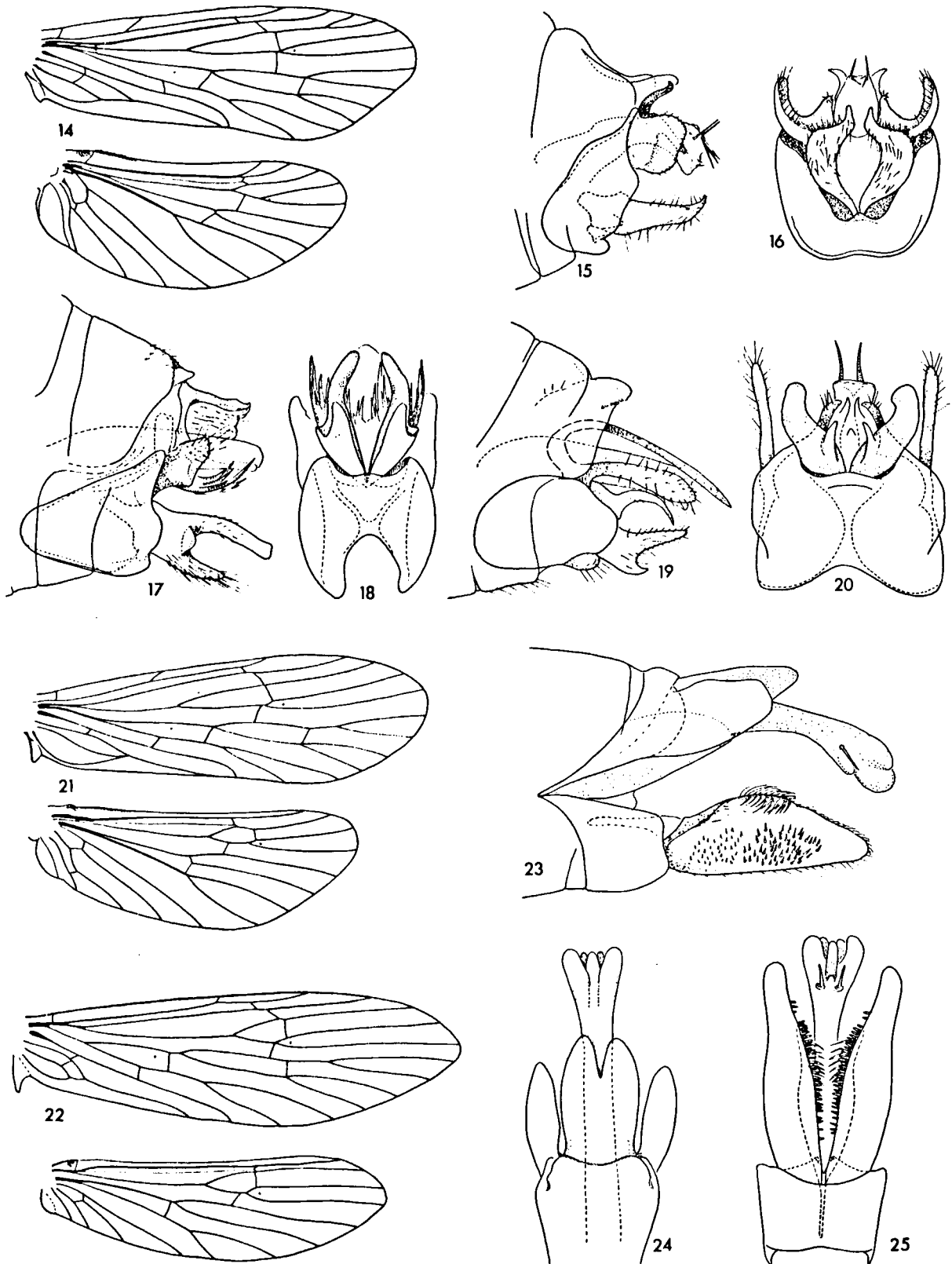
Male (figs. 17,18) abdominal tergite 8 produced mid-dorsally into small hood-shaped projection, tergites 9 and 10 fused, sclerotized dorsally, sternite 9 subtriangular. Preanal appendages arise as an extension to postero-dorsal angle of sternite 9, mesal margin with several curved spines, both sides joined by curved transverse spiny plate ventrad of phallus. Inferior appendages with long, slightly curved dorsal process, a shorter, apically tapered ventral process and a small lateral lobe. Phallus slightly curved, semimembranous.

Female unknown.

Length of fore wing: ♂ 5.5 mm.

#### Remarks

Close to *P. exallus* sp.n. but distinguished by distinct-



Figs. 14-25: (14) *Polyplectropus didactylus* sp.n., male wing venation. (15,16) *Polyplectropus epitychmus* sp.n. (15) male genitalia lateral; (16) male genitalia ventral. (17,18) *Polyplectropus cuspidatus* sp.n. (17) male genitalia lateral; (18) male genitalia ventral. (19-21) *Nyctiophylax lumarius* sp.n. (19) male genitalia lateral; (20) male genitalia ventral; (21) male wing venation. (22-25) *Hyalopsyche hapiotes* sp.n. (22) male wing venation; (23) male genitalia lateral; (24) male genitalia dorsal; (25) male genitalia ventral.

tive preanal and inferior appendages.

#### Type material

Holotype ♂, Sulawesi Utara, Dumoga-Bone National Park, Edwards camp near Tumpah River, 00°35'N 123°51'E, alt. 650m, MV-light, 28 Apr. 1985, J. Martin & M. Horak (genitalia prep. PT-1553 figured) (T-9974 MVM).

#### Distribution

North Sulawesi (Indonesia), known from type locality only.

#### Etymology

From *cuspidatus* (Latin), pointed, in reference to multispined preanal appendages.

### *Nyctiophylax lumarius* sp.n. (figs. 19-21)

The absence of fork 1 in fore wing and characteristically looped anal veins, of which A2 and A3 merges with A1 at a single point (fig. 21) places this species in the genus *Nyctiophylax*.

#### DESCRIPTION

Male (figs. 19,20) abdominal segment 8 short, tergites 9 and 10 membranous, fused, sternite 9 comparatively small, in lateral view ovoid. Preanal appendages formed by three processes of which the mid-lateral is dilated apically, the other two curved and pointed apically. Inferior appendages bifid, ventral process small, slightly curved, acute apically. Phallus straight, truncate apically, membranous, a pair of straight internal chitinous spines near apex.

Female unknown.

Length of fore wing: ♂ 3.9-4.6 mm.

#### Remarks

The species is unlike any congener found in the Australian - South-west Pacific area, particularly distinctive is the shape of preanal appendages.

#### Type material

Holotype ♂, Sulawesi Utara, Dumoga-Bone National Park, Edwards camp near Tumpah River, 00°35'N 123°51'E, alt.

650m, MV-light, 22 May 1985, A. Wells (T-9988 MVM).

Paratypes: 10♂ collected with holotype (genitalia prep. PT-1558 figured) (MVM, BMNH, RMNH, ZMB); 4♂ Tumpah River tributary first fall, 00°36'N 123°54'E, light trap, 4 May 1985, A. Wells (MVM, ZMA); 1♂ Tumpah River, Aug. 1985, D. Dudgeon (ZMA).

#### Distribution

North Sulawesi (Indonesia).

#### Etymology

Name derived from *luma* (Latin), thorn, in reference to diagnostic curved spines on preanal appendages.

### Family Hyalopsychidae Genus *Hyalopsychella* Ulmer

The genus is characterised by distinctive wing venation (fig. 22). In fore wing discoidal cell is short, median cell more than twice the length of discoidal cell, fork 1 is absent in both, fore and hind wings, and fork 3 is absent in hind wing.

The only species recorded previously from the Sunda Island archipelago was *Hyalopsychella winkleri* Ulmer from Borneo and Sumatra (Ulmer, 1951). The new species *Hyalopsychella haplotes* sp.n. is the first record of the genus as well as the family from Sulawesi. A closely related genus *Hyalopsyche* is known from India, New Guinea and Australia (Neboiss, 1980).

The description of *Hyalopsychella winkleri* was originally based on three syntype males from Borneo (Ulmer, 1930). Later Ulmer (1951) referred two further specimens from Sumatra to this species, noted that the syntype specimens had been burnt during World II, and designated a neotype from Sumatra (Weidner, 1964). Unfortunately the search for the Sumatran material described in 1951 or any other specimens of the family Hyalopsychidae in Hamburg Museum 1985 has proved unsuccessful (H. Strümpel, personal communication, 1985).

The figures of *Hyalopsychella winkleri* published by Ulmer (1930, 1951), particularly the arrangement of spines on the inner surface of inferior appendages and on the apex of phallus, are sufficiently distinct to separate it from *Hyalopsychella haplotes* sp.n., from Sulawesi.

*Hyalopsychella haplotēs* sp.n.  
(figs. 22 - 25)

### DESCRIPTION

Male wings yellowish-brown, veins distinct (fig. 22), fore wing with forks 2,3,4 and 5, fork 2 and 4 sessile, median cell slightly more than twice the length of discoidal cell. Hind wing with Sc distinctly thickened along its entire length, forks 2 and 5 only present.

Head with large, blackish eyes. Mesoscutum and scutellum each with a pair of warts. Abdomen without lateral filament on sternite 5.

Genitalia (figs. 23-25) is distinguished by extensive group of spinules on mesal surface of inferior appendages and a pair of strong ventral spines near the apex of phallus.

Female unknown.

Length of fore wing: ♂ 4.5 - 4.6 mm.

### Remarks

The genera *Hyalopsychella* and *Hyalopsyche* are extremely similar and may be separated by the short discoidal cell in *Hyalopsychella* fore wing. The male genitalia also follow the same general form and *Hyalopsychella haplotēs* may be recognized by two strong spines at the apex of phallus.

### Type material

Holotype ♂, Sulawesi Utara, Dumoga-Bone National Park, Edwards camp near Tumpah River, 00°35'N 123°51'E, alt. 650 m, MV-light, 22 May 1985, A. Wells (T-9997 MVM).

Paratypes: 1♂ collected with holotype (BMNH); 1♂ Tumpah River and tributary junction, 00°35'N 123°54'E, MV light, 26 May 1985, A. Wells (genitalia prep. PT-1409 figured) (MVM).

### Distribution

North Sulawesi (Indonesia).

### Etymology

Derived from *haplos* (Greek), single, referring to this as the only species of the family known from Sulawesi.

### ACKNOWLEDGEMENTS

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mological Society of London and the Indonesian Institute of Sciences. It is registered as Results of Project Wallace No.82.

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