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CADDIS-FLIES (TRICHOPTERA) OF THE FAMILIES RHYACOPHILIDAE, HYDROBIOSIDAE AND GLOSSOSOMATIDAE FROM SULAWESI

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SUMMARY

Species of three caddis-fly families (Rhyacophilidae, Hydrobiosidae and Glossosomatidae) are recorded and described from Dumoga Bone and Lore Lindu National Parks, Sulawesi, Indonesia. Described are *Rhyacophila dumogana* sp.n. (Rhyacophilidae), *Agapetus aliceae* sp.n., *A. torautus* sp.n., *A. gunungus* sp.n., and *A. lindus* sp.n. (Glossosomatidae). *Apsilochorema gisbum* (Mosely, 1953) (Hydrobiosidae), previously known only from eastern Australia, is now recorded for the first time from northern Sulawesi.

INTRODUCTION

This paper, based on material collected by the participants of the Project Wallace 1985 expedition to Dumoga Bone National Park, provides the first records of the families Rhyacophilidae, Hydrobiosidae and Glossosomatidae from Sulawesi, Indonesia (Neboiss, 1987). The National Park is a reserve covering approximately 300,000 hectares of mountainous terrain covered with primeval rainforest, located in northern Sulawesi (Sulawesi Utara) at 00°30'N 124°30'E. Other specimens were collected at Lore Lindu National Park in central Sulawesi (Sulawesi Palu) 01°30'S 120°00'E.

Each of the three families is represented by a single genus and all species, except one, are restricted to Sulawesi. The exception is *Apsilochorema gisbum* (Mosely, 1953) (Hydrobiosidae), a species previously known only from eastern Australia. Although the genus is well represented by a number of species in New Guinea, *A. gisbum* is not known from there. Specimens of *Rhyacophila dumogana* sp.n. and *Apsilochorema gisbum* have been collected at higher elevations, whereas the four *Agapetus* species occur in the mountains as well as the lowlands. There is still insufficient information to speculate on species distributions and relationships with species on surrounding islands. The four *Agapetus* species constitute a distinct and unusual group within the genus as they share the presence of a lateral filament on dorso-anterior angle of sternite 5 in both sexes.

Depository institutions are abbreviated as follows:

Australian National Insect Collection, Canberra ..... ANIC;
British Museum (Natural History), London..... BMNH;
Hong Kong University, Zoology Department, Hong Kong..... HKU;
Zoölogisch Museum, Universiteit van Amsterdam..... ZMA;
Museum of Victoria, Melbourne..... MVM;
Museums and Art Gallery of Northern Territory, Darwin ..... NTMD;
Rijksmuseum van Natuurlijke Historie, Leiden..... RMNH;
Zoological Museum, Bogor..... ZMB.

FAMILY RHYACOPHILIDAE

The family, known by several species from Java, has not been previously recorded from Sulawesi. Present records extend the family distribution in the Sunda island region eastward to Weber's line. The species described below belongs to the *lieftincki* group (Schmid, 1970) and shares similarities with *Rhyacophila impar* Martynov, 1914, from eastern Asia and Japan.

Rhyacophila dumogana sp.n. (figs. 1-6)

Type material

Holotype ♂, Sulawesi Utara, Dumoga Bone National Park, Edwards Camp near Tumpah River, 650 m, 00°35'N 123°51'E, MV light, 22 May 1985, A. Wells (MVM T 9749).

DESCRIPTION

General appearance pale, greyish-brown, forewing mottling subdued, indistinct; antennae distinctly annulate; fore- and mid-tibiae and tarsi, and especially tibial spurs on all legs, distinctly darker than the rest of legs.

Length of forewing: ♂ 6.8 mm.

Male abdominal segment 9 strongly sclerotized, annulate, very short ventrally, extended mid-dorsally into an elongate triangular hood above segment 10, concave ventrally with median keel, apex pointed, curved downward, lateral margins finely serrate near apex, reaching beyond dorsal angle of harpago. Segment 10 (fig. 2) terminates distally with two pairs of vertical lobes, margins of inner lobes distinctly serrate, with a few short setae, margins of outer lobes evenly curved, margin of anal sclerite (as) with few dentations; dorsal branch (db) slender, broadened proximally; "bande tergale" (bt) (Schmid, 1970) long, slender; "bande apicale" (u) (Schmid, 1970) broadly "U" shaped. Inferior appendages (fig. 4) with coxopodite robust, longer than wide; harpago short, dorsal angle short, only slightly produced, lower angle extended, small oval patch of strong setae on the inner surface near apex. Aedeagus distinctly longer than parameres (fig. 5), broad at base, abruptly tapered to slender apex; parameres long, slender, pointed apically with row of 2 or 3 strong ventrally situated preapical spurs.

Female unknown.

Remarks

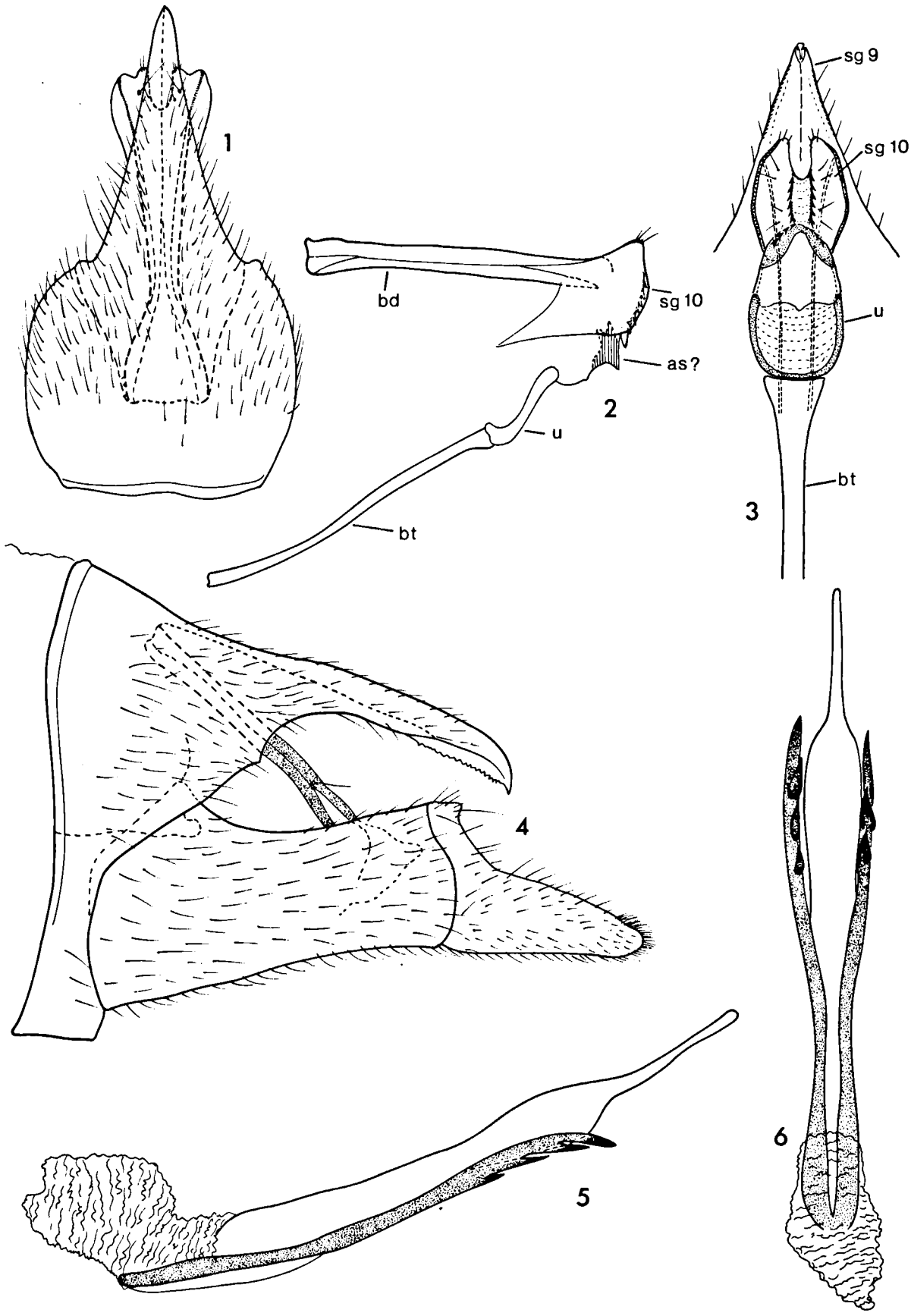
The species is distinguished from *Rhyacophila lieftincki* Ulmer, 1951, by the shape of the harpago and from *Rhyacophila impar* Martynov, 1914, by the shape of segment 9 and the parameres.

Etymology

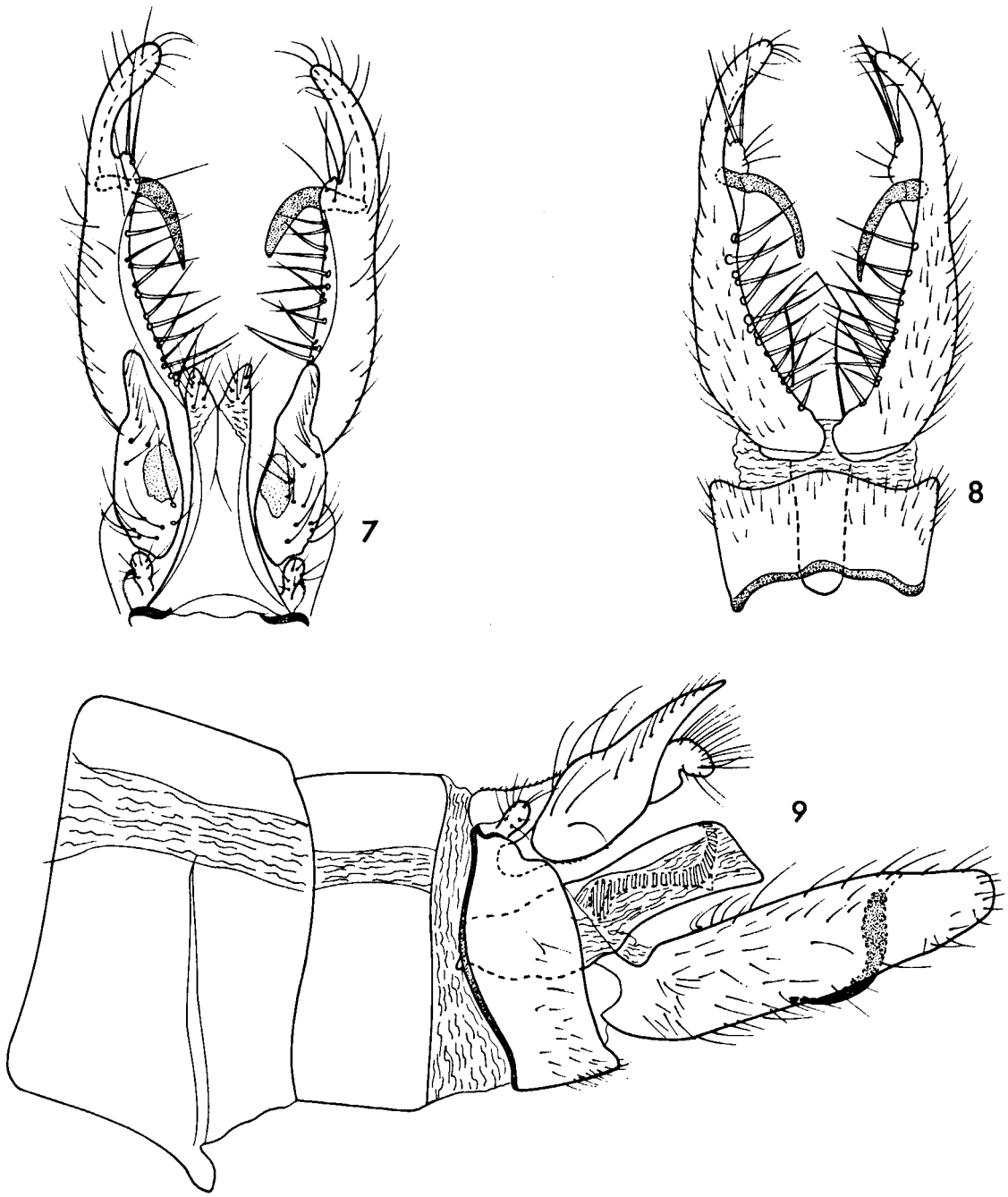
Species name derived from the name of type locality.

FAMILY HYDROBIOSIDAE

The only genus of this family present in the Sunda island archipelago area is *Apsilochorema,* with a few species recorded from Java and Sumatra. However, east of Weber's line, the number of species increases and in New Guinea another genus *(Tanorus)* is also present. It was therefore not surprising to find a species of *Apsilochorema* in suitable habitats in Sulawesi. It was surprising, however, that the same species is known from eastern Australia. The previously known distribution of *Apsilochorema gisbum* (Mosely) extended from Tasmania and Victoria along a rather narrow coastal belt to south-eastern Queensland. The farthest northern record is a detached locality south of Cairns. It is not known from New Guinea, where a number of endemic species occur.



Figs 1 - 6: *Rhyacophila dumogana* sp. n.; 1, segments 9 and 10 dorsal; 2, segment 10 lateral; db - dorsal branch of segment 10; as - anal sclerite; u - 'bande apicale'; bt - 'bande tergale'; 3, segment 9 and 10 ventral; 4, male genitalia lateral; 5, phallic complex lateral; 6, phallic complex ventral.



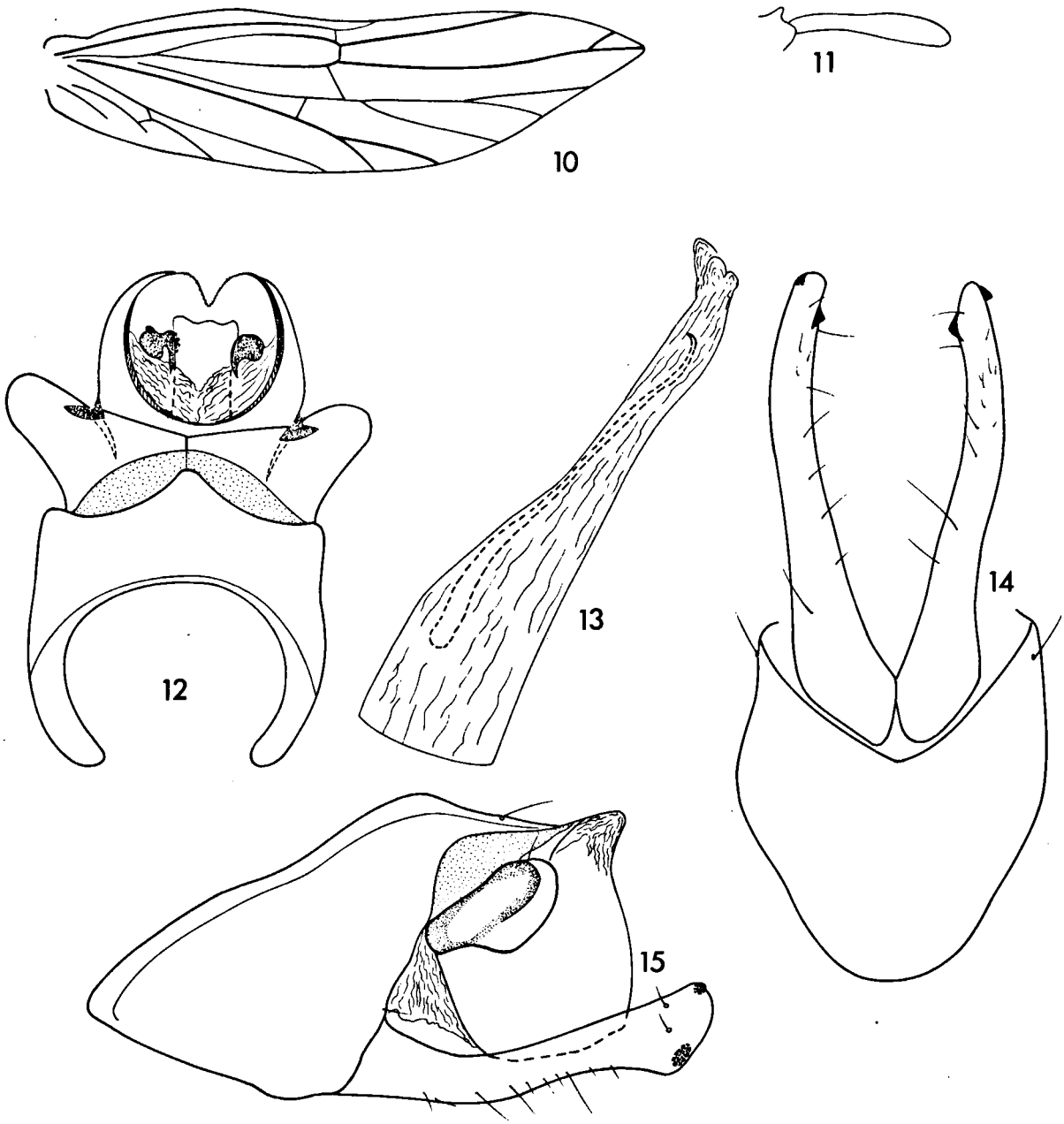
Figs 7 - 9: *Apsilochorema gisbum* (Mosely); 7, male genitalia dorsal; 8, ventral; 9, lateral.

Apsilochorema gisbum (Mosely, 1953) (figs. 7-9)

Material examined

Sulawesi Utara, Dumoga Bone National Park: 8♂, 4♀, 1440 camp, 00°37'N 123°51'E, at light, 9-14 May 1985, J. Martin and M. Horak (ANIC; BMNH; ZMA; MVM;ZMB); 1♀ Edwards Camp near Tumpah River, 00°35'N 123° 51'E, light trap, 21 May 1985, A. Wells (MVM); 1♀, Tumpah River and tributary junction, below first fall, 00°35'N 123°54'E, on rock, 19 May 1985, A. Wells (MVM).

Length of forewing: (Sulawesi specimens) ♂ 5.4-5.8 mm; ♀ 6.5-7.0 mm.



Figs 10 - 15: *Agapetus gunungus* sp. n.; male; 10, hind wing; 11, lateral filament of sternite 5; 12, genitalia dorsal; 13, phallus lateral; 14, genitalia ventral; 15, genitalia lateral.

Remarks

The figures here reproduced were prepared from a specimen collected at "1440 camp" (prep. PT-1485 ♂). Compared with specimens from the vicinity of the type locality in Victoria, Australia, they appear slightly smaller, yet no morphological differences have been detected to support species separation. We are convinced that specimens from Sulawesi are conspecific with those from Australia.

FAMILY GLOSSOSOMATIDAE

The glossosomatid genus *Agapetus* of the subfamily

Agapetinae is well known from New Guinea, Java and Sumatra, but from Sulawesi it is recorded here for the first time. The classification of the subfamily is rather unsettled (Neboiss, 1986) with the generic names *Agapetus* and *Synagapetus* being associated with various species groupings (Ross, 1956; Schmid, 1959). To avoid speculation of possible future generic and subgeneric arrangement, we have preferred to use the generic name *Agapetus* without further subdivisions. Characters shared by all four species described in this paper include possession of a lateral filament on the dorso-anterior angles of sternite 5 in both sexes, the dilatation and flattening of the intermediate legs in females, and location of the anterior tentorial pits close to the eyes, closer than in Australian species.

Agapetus gunungus sp.n. (figs. 10-15)

Type material

Holotype ♂, Sulawesi Utara, Dumoga Bone National Park, Edwards Camp near Tumpah River, 650 m, 00°35'N 123°51'E, MV light, 22 May 1985, A. Wells. (Genitalia prep. PT-1509 figured) (MVM T-9707); Paratype ♂, Beach on River Tumpah, Picnic site, 225 m, MV-light, Oct. 1985, M. Malipatil. (Genitalia prep. PT-1552) (NTMD).

DESCRIPTION

The size and colour is similar to those of other species of the genus in the area, but the new species is distinguished by distinct details of male genitalia. Filaments on dorsal margin of sternite 5 present in both sexes, slender (fig. 11), slightly clavate apically; segment 6 with moderately large, apically pointed meso-ventral process.

Length of fore-wing ♂ 2.7 mm.

Male abdominal segment 9 in lateral view (fig. 15), broad ventrally, proximal margin oblique, distal margin almost vertical, dorsal margin with distinct medio-posterior projection, ventral margin widely excised. Superior appendages robust, somewhat globose laterally, connected middorsally by narrow bridge. Segment 10 in lateral view quadrangular, apically notched, upper apical part membranous, widely opened dorsally, margin of the opening sclerotized, darker in colour, a pair of strongly sclerotized hooks on inner walls. Inferior appendages long, slender, slightly compressed laterally, apices in lateral view widened, with dark, sclerotized points on upper and lower apical angle. Phallus (fig. 13), broad at base, tapering apically, without dark, strongly sclerotized spurs.

Female unknown.

Etymology

Species name derived from Indonesian word *gunung* meaning mountain.

Agapetus lindus sp.n. (figs. 16-23)

Type material

Holotype ♂, Sulawesi Palu, 50 km SE of Lore Lindu National Park, Sopu River near Dongi Dongi, 950 m, 8 Dec. 1985, J. van Tol (RMNH); Paratypes 8♂, 8♀ same data as holotype (♂ PT-1728; ♀ PT-1729 dissected and figured; MVM) (RMNH; MVM; ZMB); 1♂, same loc. as holotype but 9 Dec. 1985, J. van Tol and J. Krikken (RMNH); 1♀, 65 km SSE of Lore Lindu National Park, Marena shelter, 600 m, 14 Dec. 1985, J. van Tol and J. Krikken (RMNH); 1♂ 1♀, Sulawesi Tengah, Lore Lindu National Park Marena, Hihia, 360 m, 10 km of Gimpu, riverbank rainforest, MV light, 19 Mar. 1985, J.P. Duffels (ZMA).

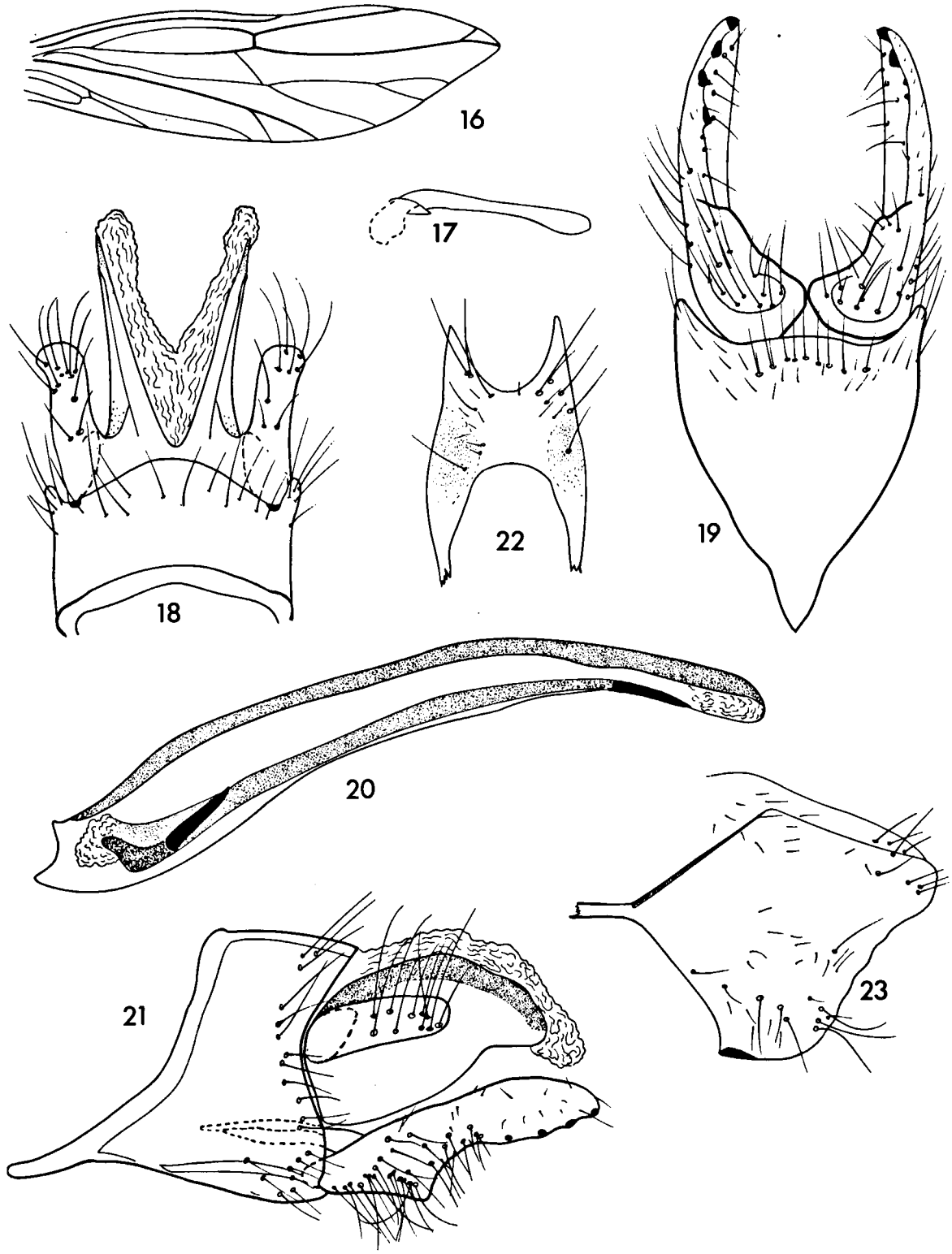
DESCRIPTION

There are no distinguishing characters other than the genitalic structures to recognize the species.

Lateral filaments (fig. 17) on dorso-anterior angle of sternite 5 present in both sexes, rather slender, clavate apically. Intermediate legs in females somewhat flattened and moderately widened. Segment 6 with moderately large apically pointed meso-ventral process; smaller and more acute in female.

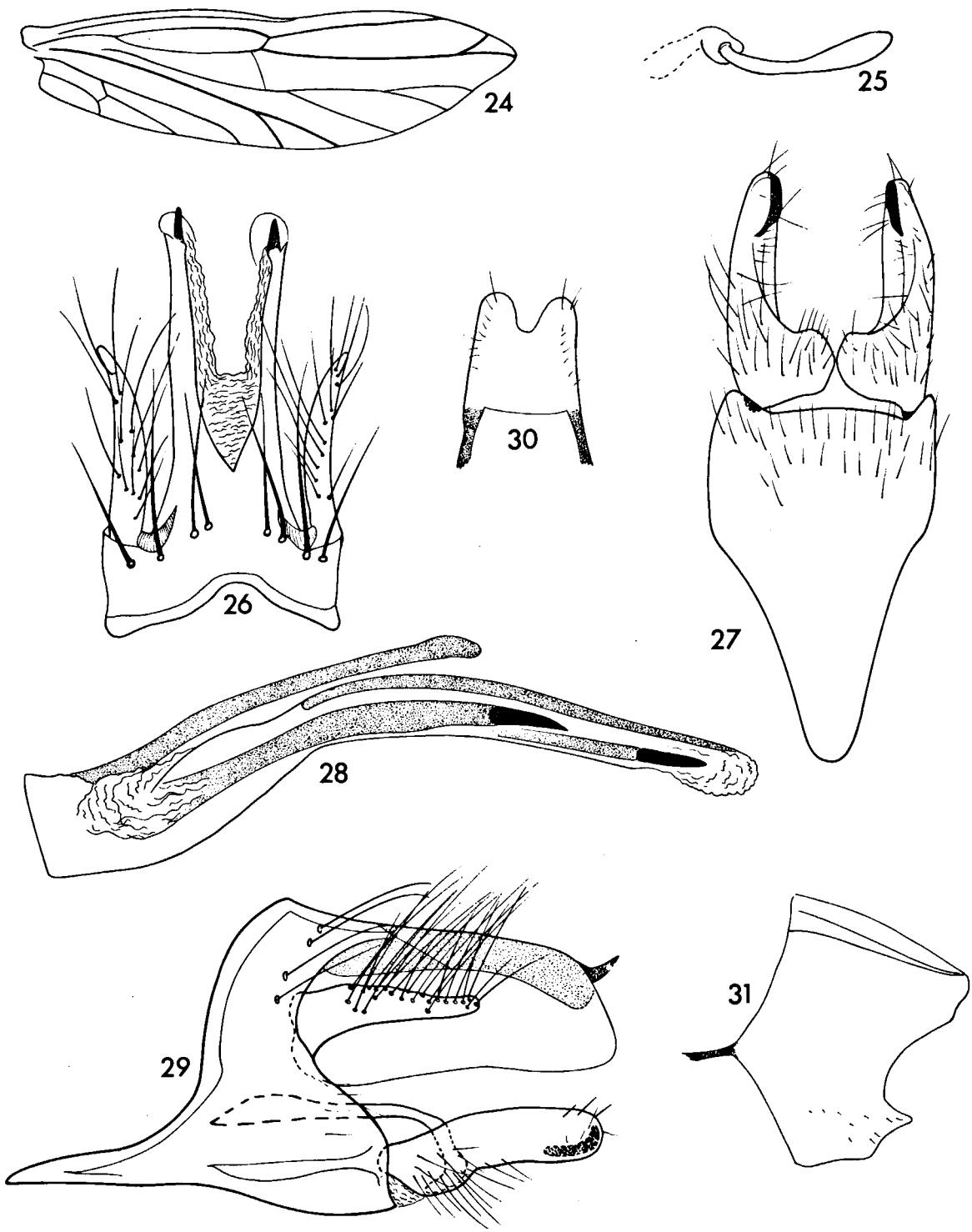
Length of forewing: ♂ 2.8-3.1 mm; ♀ 3.0-3.3 mm.

Male abdominal segment 9 annulate, short, in ventral view triangular (fig. 19), pointed proximally; short, angular in dorsal view, distinctly delimited from segment 10. Superior appendages somewhat flattened, elongate, parallel-sided, rounded and slightly turned outward at apex, a group of stiff, long, up-



Figs 16 - 23: *Agapetus lindus* sp. n.; 16, hind wing; 17, lateral filament of sternite 5; 18, male genitalia dorsal; 19, male genitalia ventral; 20, phallus lateral; 21, male genitalia lateral; 22, female abdominal segment 8 ventral; 23, female abdominal segment 8 lateral.

right bristle-like hairs on external apical end. Segment 10 formed by sclerotised, laterally flattened lobes, connected medially by flexible membrane, dorso-lateral ridge distally curved downward, in dorsal view appearing as two divergent, distally tapering projections; inferior appendages relatively long, slender, tapering to bluntly rounded apex, more or less distinct ventro-basal angle visible in lateral view, medially strongly concave, ventral ridge with two to four unevenly sized teeth. Phallic complex very long, slender, with two strong internal spines, one situated near the apex at the end of a long rod, the other



Figs 24 - 31: *Agapetus torautus* sp. n.; 24, hind wing; 25, lateral filament of sternite 5; 26, male genitalia dorsal; 27, male genitalia ventral; 28, phallus lateral; 29, male genitalia lateral; 30, female abdominal segment 8 ventral; 31, female abdominal segment 8 lateral.

near the base.

Female abdominal segment 8 large, in lateral view (fig. 23) distal margin slightly concave, in ventral view (fig. 22) with deep rounded proximal and distal excisions.

Etymology

Species name derived from the name of type locality.

Agapetus torautus sp.n. (figs. 24-31)

Type material

Holotype ♂, Sulawesi Utara, Dumoga Bone National Park, Toraut and Tumpah River junction, 00°34'N 123°55'E, light trap, 16 May 1985, A. Wells (MVM T-9714); Paratypes: 2 ♂, Base Camp, R. Toraut, cleared area 211 m, 00°34'N 123°54'E, MV-light, 4 Oct.-8 Nov. 1985, M. Malipatil (ZMA; NTMD); 1♂, beach of river Tumpah, picnic site, 225 m, UV-light, Oct. 1985, M. Malipatil (genitalia prep. PT-1726; MVM); 1♀, Toraut and Tumpah River junction, MV-light, 26 May 1985, A. Wells and M. Wilson (genitalia prep. PT-1727; MVM); 1♂, Motolanga River, Dolodua-Malibagu road, 00°28'N 123°58'E, at light, 7 May 1985, A. Wells (MVM); 1♀, same loc. but 9 May 1985, A. Wells and C. Dowling (MVM).

Other material examined

1♀ (?) Sulawesi Utara, Dumoga River at Dumoga Ketjil, 00°31'N 123°57'E, at light, 11 May 1985, A. Wells and C. Dowling (MVM).

DESCRIPTION

This species very closely resembles *Agapetus lindus* from Central Sulawesi, but it is distinguished by details of genitalic structures in both sexes. The lateral filaments (fig. 25) on dorso-anterior angle of sternite 5 present in both sexes, rather slender, gradually thickened apically; ventral process on segment 6 in male relatively long, somewhat conical, pointed apically, in female shorter, pointed; intermediate legs in female slightly dilated.

Length of forewing: ♂ 2.9-3.3 mm; ♀ 3.0-3.2 mm.

Male abdominal segment 9 annulate, in ventral view elongate triangular (fig. 27) pointed proximally, distal margin straight, dorsal section short with shallow medio-proximal excision. Superior appendages somewhat flattened laterally, elongate, slightly curved, gradually tapering towards laterally obtuse apex, external upper surface with a group of long, stiff, bristle-like hairs. Segment 10 formed by sclerotised, laterally flattened lobes, connected medio-dorsally by flexible membrane, dorso-lateral margin strongly sclerotised, terminating subapically with a characteristic dark, rather strong upturned acute spur (fig. 29). Inferior appendages relatively short, robust, widened baso-mesally, visible as expanded base in lateral view, medially slightly concave, bluntly rounded apically, a characteristic strong, black subapical ridge or keel on ventro-mesal margin. Phallic complex long (fig. 28), slender, slightly curved with paramere(?) arising dorso-basally; internally two long sclerotized rods, each ending with a strong black spine, one of them more proximal, the second distal.

Female abdominal segment 8 in lateral view (fig. 31) with broadly excavated distal margin, in ventral view (fig. 30) proximally straight, distinctly bilobed distally, with narrow basally rounded excision.

Etymology

Species name derived from the name of the type locality.

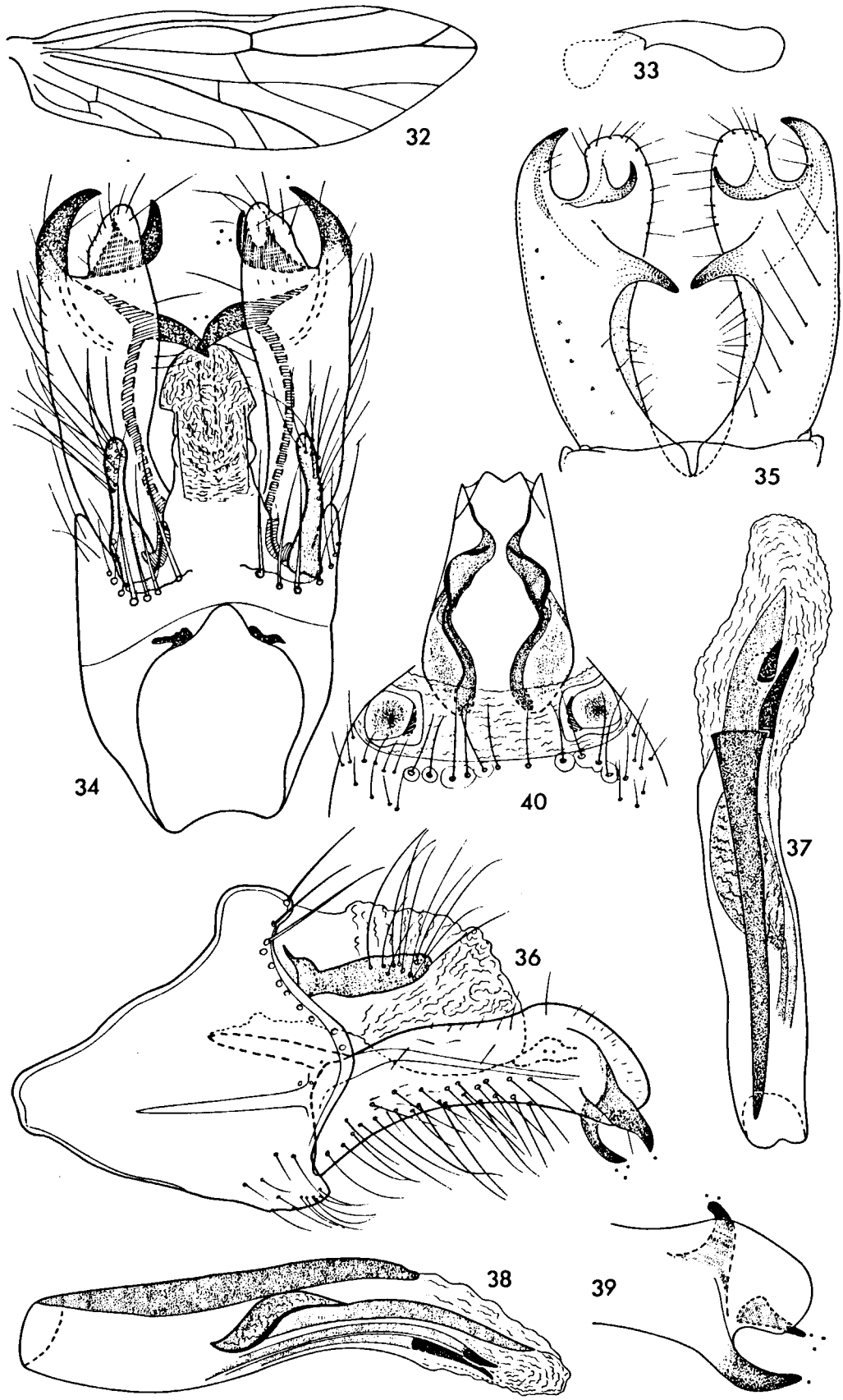
Agapetus aliceae sp.n.(figs. 32-40)

Type material

Holotype ♂, Sulawesi Utara, Motolanga River, Dolodua-Malibagu road, 00°28'N 123°58'E, at light, 9 May 1985, A. Wells and C. Dowling (MVM T-9719); Paratypes 20♂ 25♀, collected with holotype (ANIC; BMNH; ZMA; MVM; RMNH; ZMB); 1♂ 2♀, same loc., 7 May 1985, A. Wells (MVM); 2♂ 1♀ Pononontuma River, bridge 6.5 km N. of Malibagu, 00°25'N 123°58'E, at light, 18 May 1985, A. Wells and J. van Tol (MVM); 2♂, same loc., 24 May 1985, A. Wells and M. Wilson (MVM); 4♂ 6♀, Edwards Camp near Tumpah River, 650 m, MV-light, 00°35'N 123°51'E, 22 May 1985, A. Wells (BMNH; ZMB); 3♂ 5♀, same loc., 22-23 Oct. 1985, M. Malipatil (NTMD); 6♂ 4♀, beach on river Tumpah, picnic site, 225 m, MV-light, Oct. 1985, M. Malipatil (NTMD).

Other material examined

Sulawesi Utara, Dumoga Bone National Park, 3♂ 20♀,



Figs 32 - 40: *Agapetus aliceae* sp. n.; 32, hind wing; 33, lateral filament of sternite 5; 34, male genitalia dorsal; 35, male genitalia ventral; 36, male genitalia lateral; 37, phallus ventral; 38, phallus lateral; 39, inferior appendage, oblique view of apex; 40, female genitalia dorsal.

Toraut and Tumpah River junction, Aug. 1985, D. Dudgeon; 2♂ 22♀, Edwards Camp near Tumpah River, 650 m, 22 May 1985, A. Wells (MVM); 1♂, Sulawesi Palu, 50 km of Lore Lindu National Park, Sopu River near Dongi Dongi, 950 m, Dec. 1985, J. van Tol (RMNH).

DESCRIPTION

On average this is the largest of the four *Agapetus* species now recorded from Sulawesi localities. Similar to other species in the genus, specimens show no distinct colour pattern which would be suitable for identification, only the distinct genitalic structures present in both sexes can be used for positive identification. The lateral filament (fig. 33) on dorso-anterior angles of sternite 5 is present in both sexes, rather broad, laterally somewhat flattened, gradually widened apically, rounded at end; ventral process on segment 6 strong in male, smaller and apically acute in female; intermediate legs in female distinctly dilated.

Length of forewing: ♂ 2.9-3.5 mm; ♀ 3.2-4.0 mm.

Male abdominal segment 9 very short dorsally; line of separation from segment 10 obscure, indistinct; in lateral view segment 9 broadly triangular (fig. 36), ventral section long. Segment 10 mostly membranous, slightly sclerotised only near base, in dorsal view somewhat elongate, margins irregular, apex slightly widened, split medio-ventrally. Superior appendages elongate, slightly compressed laterally, bluntly rounded apically, group of long, stiff, bristle-like hairs in apical half. Inferior appendages very strong (fig. 34), heavily sclerotised apices gradually curved downwards with prominent sclerotised distal hooks, one arising from apico-lateral angle curved postero-medially, the second directed distally, the third, arising from median surface, curved medio-proximallly (fig. 35); a strong sclerotised keel runs from the base of these hooks proximal to the base of inferior appendage. Phallus slender (fig. 38), apically membranous, with two internal, strongly sclerotised spurs, one long, one short.

Female abdominal segment 7 with sclerotised dorso-lateral pockets, obviously acting as receptacles for inferior appendage terminal claws in copulation; segment 8 sculptured dorsally (fig. 40).

Etymology

The species is dedicated to Dr. Alice Wells in recognition of her efforts in assembling extensive caddis-fly material in Sulawesi.

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