

Systematic Study of the Caddisflies from Taiwan, with Descriptions of Eleven New Species (Trichoptera : Insecta)

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台湾の毛翅目の分類学的研究

1982年から1983年にかけて馬場金太郎博士および内田臣一氏が台湾で採集した毛翅目（昆虫）標本を調べる機会を得ることができた。そこで未記載種を記載するとともに、その結果をここに報告する。
(小林峯生)

The Trichoptera of Taiwan was successively reported by ULMER (1911, 1913), TSUDA (1940, 1942) and ROSS (1956). But still now, it is only very insufficiently known. I had an opportunity of studying the Taiwanese specimens of this interesting insects which were collected by Dr. K. BABA and Mr. S. UCHIDA in 1982 and 1983. In the following pages, a list of these collections, including descriptions of eleven new species, is given.

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I. Fam. STENOPSCYHIDAE

Genus *Stenopsyche* McLACHLAN

1) *Stenopsyche piassetzkyi* MARTYNOV, 1914

Stenopsyche piassetzkyi MARTYNOV, 1914, Mus. Zool. Acad. Imp. Sci. Pstrograd, 19: 327-328, Figs. 4-6; ULMER, 1925, Arch. Natury., Berlin, 91 (A5): 33-34; SCHMID, 1969, Can. Ent., 101: 207, Pl. 5, Fig. 26.

Specimens examined: 7♂♂12♀♀ (7579), Fukukoo, Toen-Ken, Jan. 28, 1983 (K. BABA), Distribution: South China, Taiwan.

2) *Stenopsyche formosana* sp. nov. (Figs. 1-3)

Male: Coloring resembling that of *S. sauteri*. Body 15.5 mm in length. Fore wing 23.7 mm long and 6.5 mm wide. Hind wing 11.7 mm long and 10.6 mm wide. General structure typical for the genus. Genitalia as in Figs. 1, 2, 3. Ninth tergite reduced dorsally, with a narrow, transverse band; side piece long, acute at its apex. Tenth segment forming a pair of claviform plates in dorsal view, with a long process on the upper surface near each base. Cercus long and slender. Clasper with upper branch, short in lateral view, with lower branch thick, the apex rounded in ventral view.

Holotype: Male (7143), Nangzunkei, wulia, Apr. 16, 1982 (S. UCHIDA)

Distribution: Taiwan.

II. Fam. PHILOPOTAMIDAE

Genus *Sortosa* NAVAS

3) *Sortosa obrussa* ROSS, 1956

Sortosa obrussa ROSS, 1956, Evolution and Classification of the mountain Caddisflies, Urbana: 57-58, Figs. 33, 49.

Specimen examined: 1♂ (7144), Wulai, Apr. 16, 1982 (S. UCHIDA).

Distribution: Taiwan.

Genus *Wormaldia* McLACHLAN

4) *Wormaldia amyda* ROSS, 1956

Wormaldia amyda ROSS, 1956, Evolution and Classification of the mountain Caddisflies, Urbana: 67, Figs. 90, 91, 137, 138.

Specimens examined: 1♂2♀♀ (7593), Chihon spa., Taito-ken, Jan. 22, 1983 (K. BABA).

Distribution: Taiwan.

5) *Wormaldia spinosa* ROSS, 1956

Wormaldia spinosa ROSS, 1956, Evolution and Classification of the mountain Caddisflies, Urbana: 67, Figs. 89, 132, 133.

Specimen examined: 1♂ (7596), Shiiyukei spa., Heito-ken, Jan. 24, 1983 (K. BABA).

Distribution: Taiwan.

III. Fam. PSYCHOMYIIDAE

Genus *Psychomyiella* ULMER

6) *Psychomyiella babai* sp. nov. (Figs. 4, 5).

Male: Color brownish grey. Body 2.0mm in length. Fore wing 3.0mm long and 0.7mm wide. Hind Wing 2.5mm long and 0.4mm wide. General structure typical for the genus. Genitalia as in Figs. 4, 5. Ninth sternite broad, rounded in lateral view. Ninth tergite nearly triangular in dorsal view. Tenth segment long and slender in dorsal view, finger-shaped in lateral view. Clasper long, claviform in lateral view. Aedeagus long and thick in lateral view; upper margin with a short spine.

Holotype: Male (7586), Yomeizan spa., Taipei-shi, Jan. 27, 1983 (K. BABA). Paratypes: 7♂♂ (7588), same data as the holotype; 4♂♂1♀ (7597), Shiiyukei spa., Heito-ken, Jan. 24, 1985 (K. BABA).

Distribution: Taiwan.

IV. Fam. HYDROPSYCHIDAE

Genus *Hydropsyche* PICTET

7) *Hydropsyche spinata* sp. nov. (Figs. 6, 7, 8).

Male: Color brown. Body 6.0mm in length. Fore wing 9.0mm long and 3. mm wide. Hind wing 7.2 mm long and 3.2 mm wide. General structure typical for the genus. Genitalia as in Figs. 6, 7, 8. Ninth sternite clothed with long hairs and swollen at the distal margin in lateral view. Tenth segment obliquely truncate with upper angle rounded and clothed with short hairs in lateral view, lower angle produced downward as a cylindric stick. Clasper two-jointed; basal joint longer than terminal one; terminal joint with a long plate. Aedeagus with the apex divided in to an upper and lower portions; lower portion with a long appendage in lateral view; apical part with two spines.

Holotype: Male (7583-a), Hukukoo, Toen-ken, Jan. 28, 1983 (K. BABA). Paratype: 2 ♂♂ (7583), same data as the holotype; 1 ♂5♀♀ (7582), Chion spa., Taito-ken, Jan. 22, 1983 (K. BABA).

8) *Hydropsyche wulaiana* sp. nov. (Figs. 9, 10, 11, 12).

Male: Color brown. Body 9.4 mm in length. Fore wing 13.5 mm long and 4.8 mm wide. Hind wing 8.5 mm long and 5.5 mm wide. General structure typical for the genus. Genitalia as in Figs. 9, 10, 11, 12. Apical margin of the ninth tergite with a pair of rounded processes which are separated by an excision in lateral view. Tenth segment wide, short, rounded at apical margin in lateral view, apical margin with two processes. Clasper two-jointed; basal joint longer and thicker than terminal one in lateral view. Aedeagus stout, with two spines in lateral view; each spine strongly curved downward.

Holotype: Male (7151), Wulai, Apr. 1, 1982 (S. UCHIDA).

Distribution: Taiwan.

9) *Hydropsyche kagiana* sp. nov. (Fig. 13, 14, 15).

Male: Color brown. Body 6.8 mm in length. Fore wing 10.5 mm long and 3.5 mm wide. Hind wing 7.7 mm long and 3.5 mm wide. General structure typical for the genus. Genitalia as in Figs. 13, 14, 15. Apical margin of ninth segment produced at the middle portion in lateral view. Tenth segment long, serrated at apical margin in lateral view. Clasper slender, two-jointed; basal joint much longer than terminal one in lateral view; terminal joint slender, finger-shaped. Aedeagus stout, long, closely resembled to head of the duck in lateral view; each side with small black-spine.

Holotype: Male (7580-a), Kanshirei, Kagi-ken, Feb. 1, 1983 (K. BABA). Paratypes: 4 ♂♂ (7580), same data as the holotype.

Distribution: Taiwan.

10) *Hydropsyche breviculata* sp. nov. (Figs. 16, 17, 18).

Male: Color brown. Body 7.0 mm in length. Fore wing 11.0 mm long and 3.5 mm wide. Hind wing 8.0 mm long and 3.7 mm wide. General structure typical for the genus. Genitalia as in Figs. 16, 17, 18. Apical margin of ninth tergite produced at ventral portion in lateral view. Tenth segment stout, rounded at its apex, with long warts covered with short hairs. Clasper two-jointed; basal joint longer than the terminal one

in lateral view; terminal joint stout, rounded at apical margin. Aedeagus stout; apical margin deeply incurved at middle portion, with a pair of black short processes in dorsal view.

Holotype: Male (7152-a), Wulai, Apr. 1, 1982 (S. UCHIDA). Paratype: 3♂♂ (7152), same data as the holotype.

Distribution: Taiwan.

Genus *Cheumatopsyche* WALLENGREEN

11) *Cheumatopsyche uchidai* sp. nov. (Fig. 19, 20, 21).

Male: Color brown. Body 4.3 mm in length. Fore wing 6.0 mm long and 2.0 mm wide. Hind wing 4.8 mm long and 2.0 mm wide. General structure typical for the genus. Genitalia as in Figs. 19, 20, 21. Ninth segment bottle-shaped in lateral view; dorsal plate nearly triangular in lateral view. Tenth segment long, broad; apical margin produced upwards at its apex in lateral view. Clasper two-jointed; basal joint narrow at its base, broadened towards apex; terminal joint much shorter than basal joint, acute at its apex, pen-shaped in lateral view. Aedeagus dilated at its apex, divided into two lobes; each lobe acute at apex in lateral view.

Holotype: Male (7153), Wulai, Apr. 1, 1982 (S. UCHIDA).

Distribution: Taiwan.

12) *Cheumatopsyche sagitta* sp. nov. (Figs. 22, 23, 25).

Male: Color brown. Body 4.5 mm in length. Fore wing 6.5 mm long and 2.0 mm wide. Hind wing 5.0 mm long and 1.8 mm wide. General structure typical for the genus. Genitalia as in Figs. 22, 23, 24. Ninth segment broad at its ventral margin, narrowed, towards dorsal margin in lateral view. Tenth segment broad at its base, narrowed at its apex, nearly triangular in lateral view. Clasper two-jointed; basal joint much longer than terminal one, dilated at base and terminal portion; terminal joint slender, rounded at its apex in lateral view. Aedeagus broad, divided into two lobes at its apical portion in dorsal view; each lobe rounded at its apex.

Holotype: Male (7590-a), Kanshirei, Kagi-ken, Feb. 1, 1985 (K. BABA). Paratypes: 3♂♂ (7590), same data as the holotype.

Distribution: Taiwan.

13) *Cheumatopsyche chihonana* sp. nov. (Figs. 25, 26, 27).

Male: Color brownish grey. Body 4.5 mm in length. Fore wing 7.0 mm long and 2.4 mm wide. Hind wing 5.5 mm long and 2.3 mm wide. General structure typical for the genus. Genitalia as in Figs. 25, 26, 27. Ninth segment narrowed at dorsal and ventral margins; distal margin with a short process. Tenth segment thick and deeply excised at apical portion in lateral view; each lobe rounded at its apex; outer surface with a small wart. Clasper two-jointed; basal joint slender, longer than the terminal one; terminal joint short, claw-shaped in lateral view. Aedeagus divided into two lobes at its apical margin in dorsal view; each lobe long, slightly acute at its apex.

Holotype: Male (7591), Chihon spa, Taito-ken, Jan. 22, 1983 (K. BABA),

Distribution : Taiwan.

14) *Cheumatopsyche taipeiiana* **sp. nov.** (Figs. 28, 29, 30).

Male: Specimen with various shades of light brown. Body 3.8 mm in length. Fore wing 6.0 mm long and 2.0 mm wide. Hind wing 4.5 mm long and 2.0 mm wide. General structure typical for the genus. Genitalia as in Figs. 28, 29, 30. Ninth segment broad, ventral margin broader than dorsal margin in lateral view; apical margin projected at middle portion on dorsum. Tenth segment thick and long, deeply excised at apical margin in lateral view; each lobe stout and rounded at its apex. Clasper slender, two-jointed; basal joint longer than terminal one, dilated at apical portion in lateral view; terminal joint tapered to wards apex. Aedeagus stout, with apical portion divided into two lobes in dorsal view.

Holotype: Male (7587), Yomizan spa., Taipei-shi, Jan. 27, 1983 (K. BABA).

Distribution : Taiwan.

V. Fam. RHYACOPHILDAE

Genus *Rhyacophila* STEPHENS

15) *Rhyacophila kimminsi* ROSS, 1956.

Rhyacophila kimminsi ROSS, 1956, Evolution and Classification of the mountain Caddisflies. Urbana: 122, Fig. 271.

Specimen examined: 1♂ (7177), Rozan spa, April 6, 1982 (S. UCHIDA).

Distribution : Taiwan.

16) *Rhyacophila formosana* ULMER, 1927.

Rhyacophila formosana ULMER, 1927, Ent. Mitt., 16: 173, Tab. 5, Figs. 4, 6, Tab. 6, Fig. 5; ROSS 1956, Evolution and Classification of the mountain Caddisflies. Urbana: 122, Fig. 269.

Specimen examined: 1♂ (7592), Chihon spa., Taito-ken, Jan. 22, 1983 (K. BABA).

Distribution : Taiwan.

VI. Fam. LIMNEPHILIDAE

Genus *Apatania* KOLENATI

17) *Apatania taiwanensis* **sp. nov.** (Figs. 31, 32, 33, 34).

Male: Color darkish brown. Body 6.5 mm in length. Fore wing 8.0 mm long and 3.0 mm wide. Hind wing 7.0 mm long and 3.0 mm wide. General structure typical for the genus. Genitalia as in Figs. 31, 32. Ninth segment with ventral portion narrower than dorsal portion in lateral view; dorsal portion with a pair of long spines. Tenth segment slender, tapered to wards apex, acute at its apex in dorsal view. Clasper two-jointed; basal joint longer and thicker than terminal one; terminal joint shaped as a spine, incurved at middle portion in dorsal view, acute at its apex. Aedeagus long and divided into two lobes.

Female: Color darkish brown. Body 5.7 mm in length. Fore wing 8.0 mm long and 3.0 mm wide. Hind wing 7.0 mm long and 3.0 mm wide. General structure typical

for the male. Genitalia as in Figs. 33, 34.

Holotype: Male (7175), Rozan spa, April 6, 1982 (S. UCHIDA). Paratypes: 1♀ (7175-a), same data as the holotype; 1♀ (7577), Aikan-kai, Rizan, April 12, 1982 (S. UCHIDA).

Distribution: Taiwan.

VII. Fam. SERICOSTOMATIDAE

Genus *Gumaga* TSUDA

18) *Gumaga okinawaensis* TSUDA, 1938

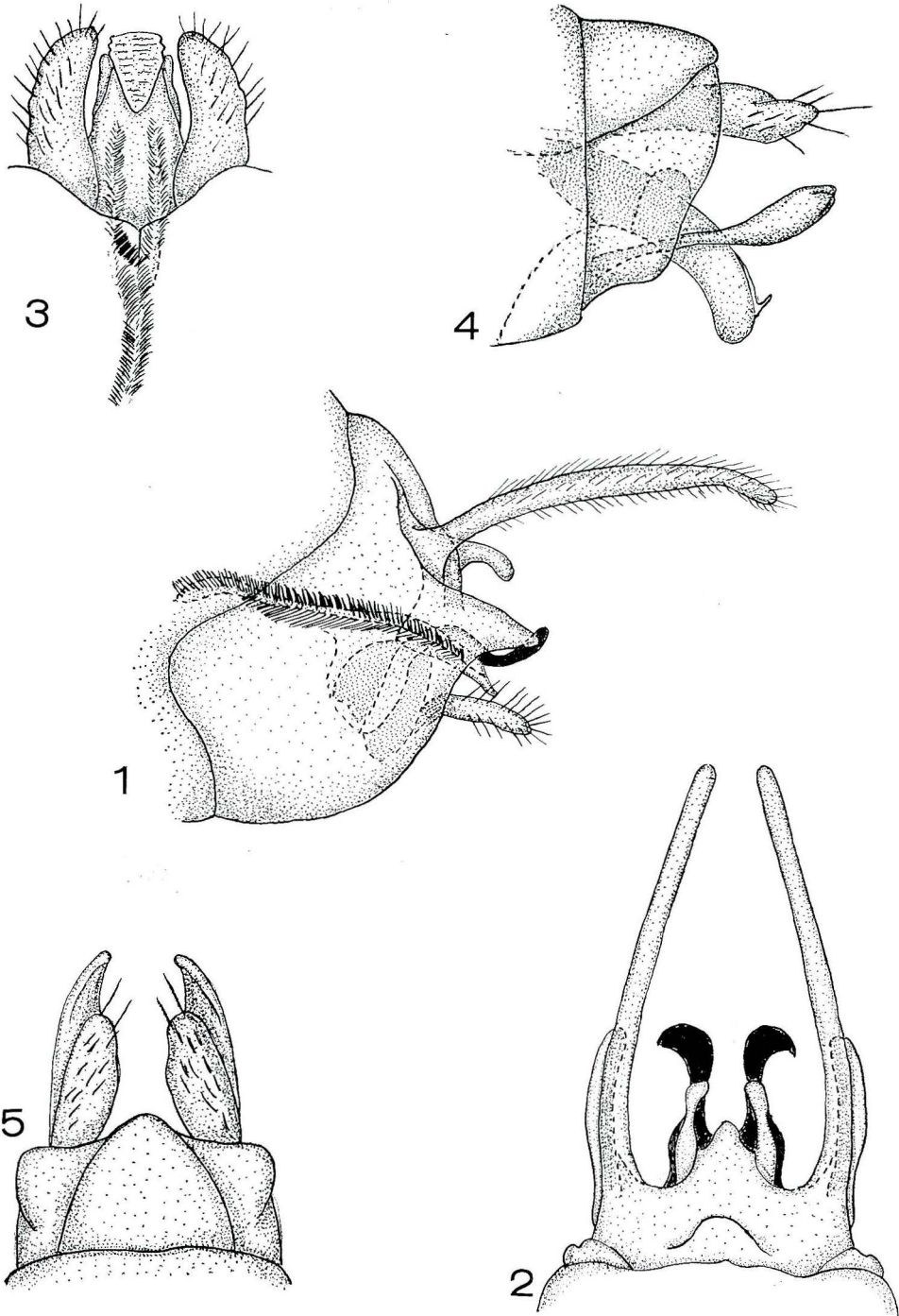
Gumaga okinawaensis TSUDA, 1938, Trans. Biogeogr. Soc. Japan, 3(1): 101, Fig. 1; KOBAYASHI, 1959, Bull. Nat. Sic. Mus. (Tokyo), (44): 354.

Specimens examined: 3♂♂ (7176), Rozan spa, Apr. 6, 1982 (S. UCHIDA). 1♀ (7186), Nanzankai, Apr. 8, 1982 (S. UCHIDA). 2♀♀ (7595), Shiyyukei spa., Heitoken, Jan. 24, 1983 (K. BABA).

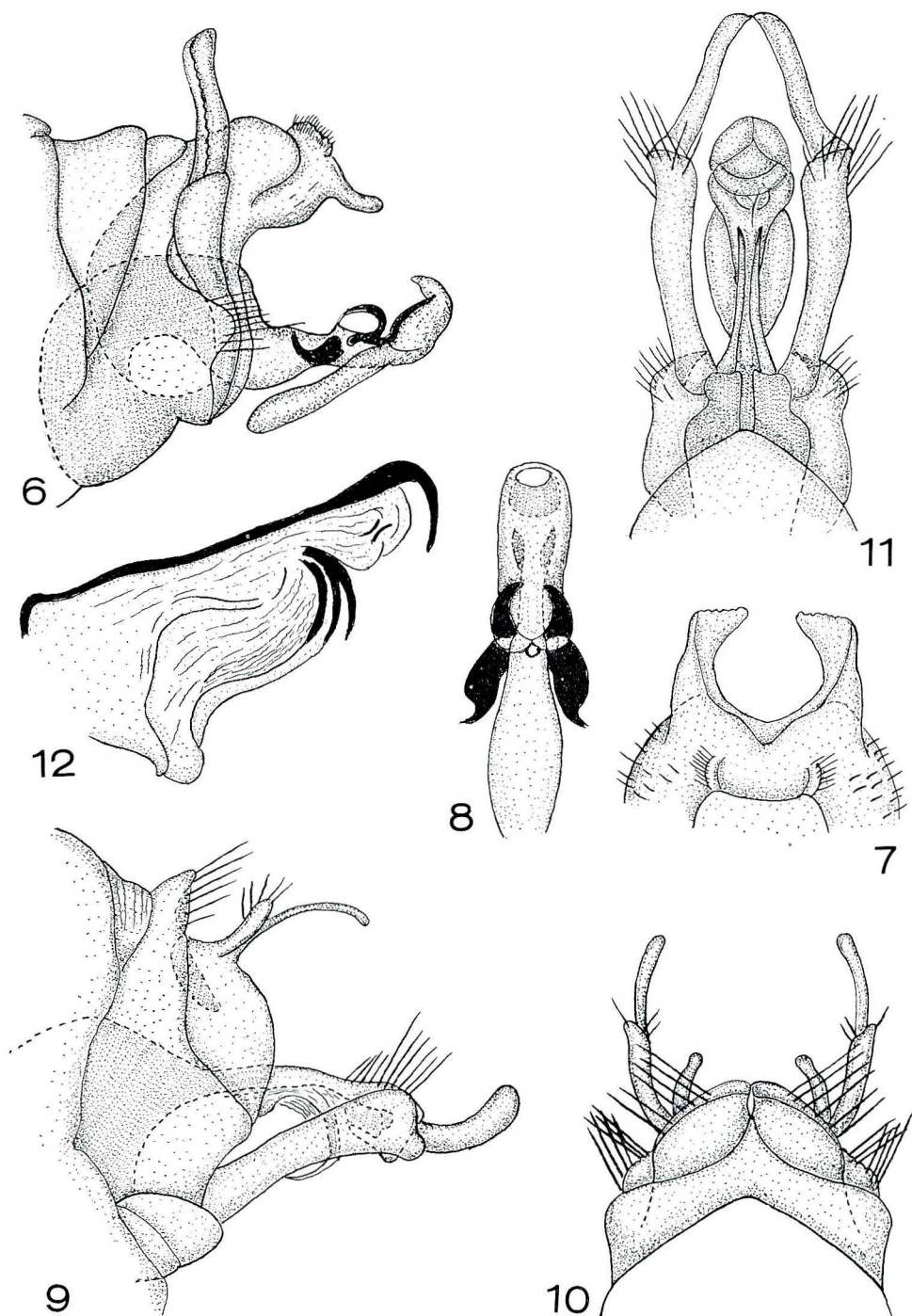
Distribution: Japan, Taiwan.

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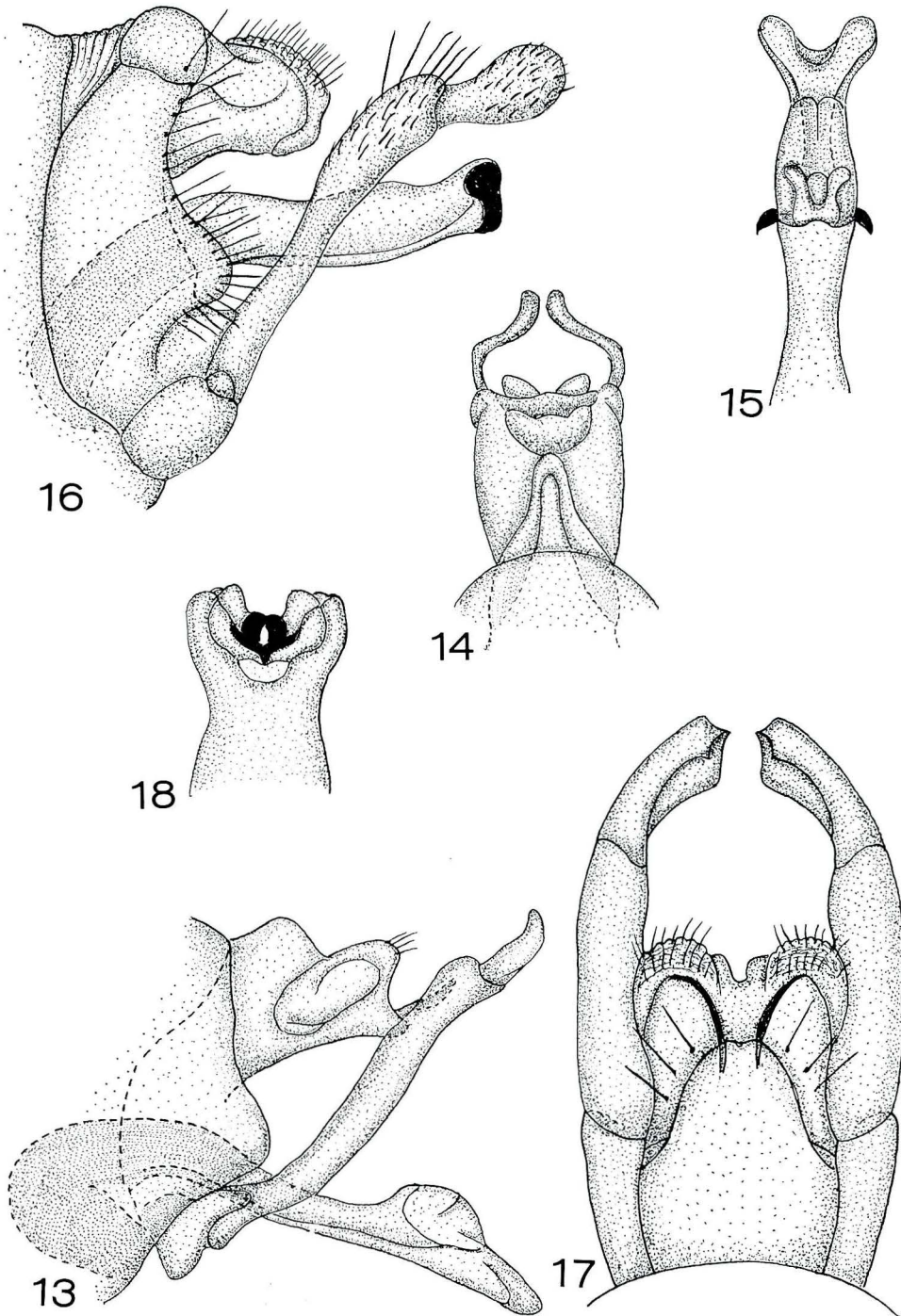
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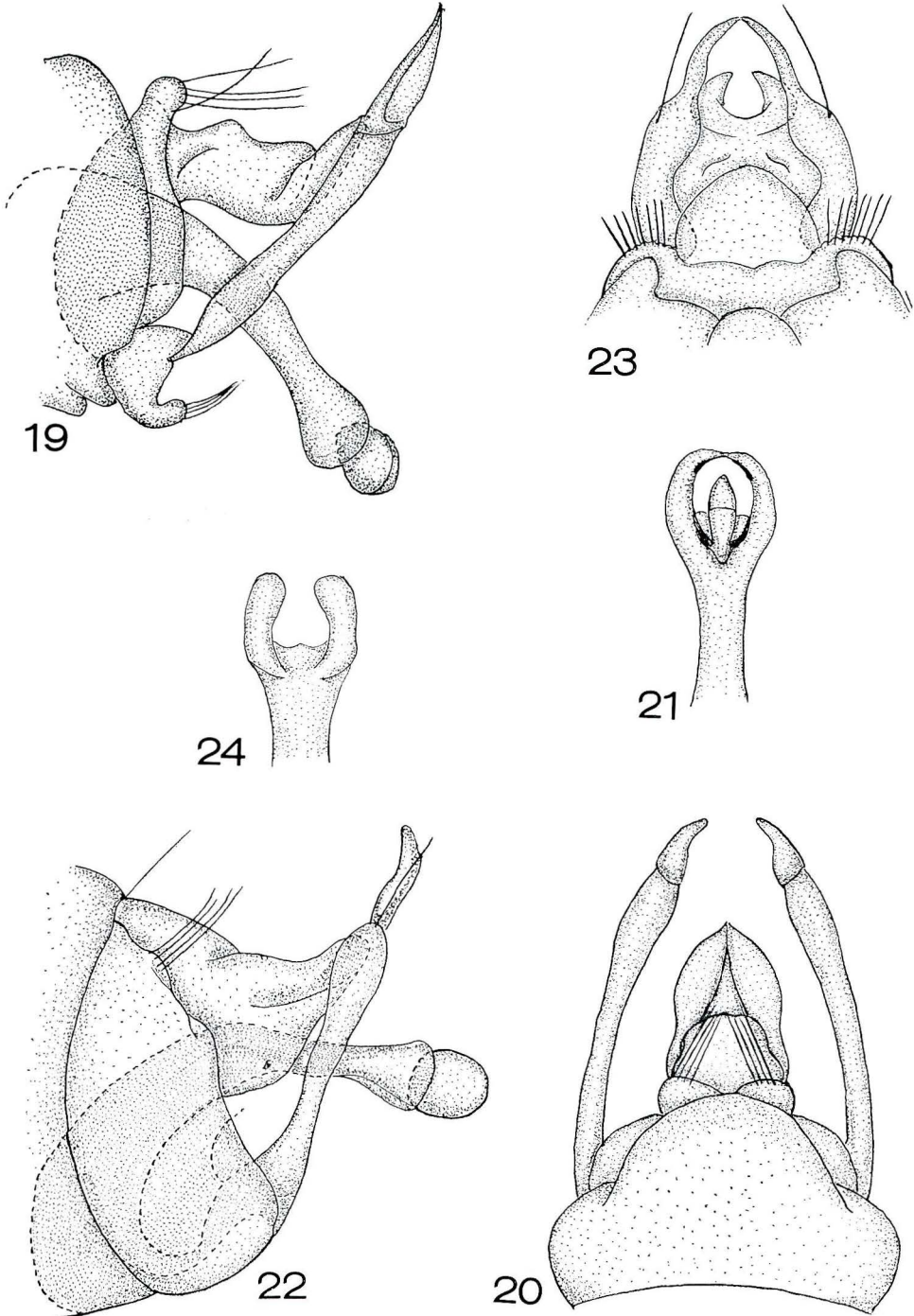
Figs. 1-5. 1-3, Male genitalia of *Stenopsyche formosana* sp. nov., 1, lateral view; 2, dorsal view; 3, ventral view. 4-5, Male genitalia of *Psychomyilla babai* sp. nov., 4, lateral view; 5, dorsal view.



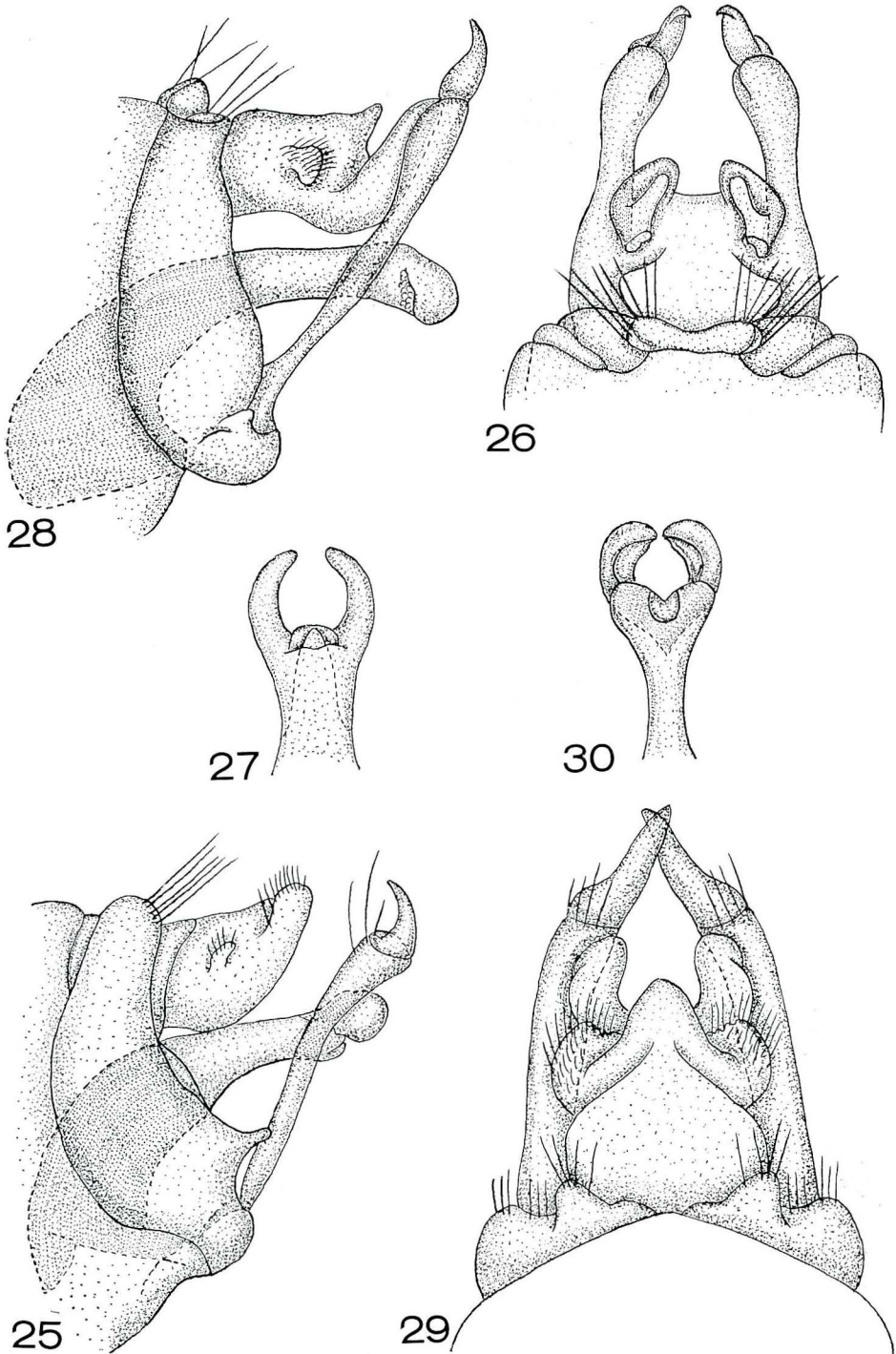
Figs. 6-12. 6-8, Male genitalia of *Hydropsyche spinata* sp. nov., 6, lateral view; 7, dorsal view; 8, aedeagus, dorsal view. 9-12, Male genitalia of *Hydropsyche wulaiana* sp. nov., 9, lateral view; 10, dorsal view; 11, ventral view; 12, aedeagus, lateral view.



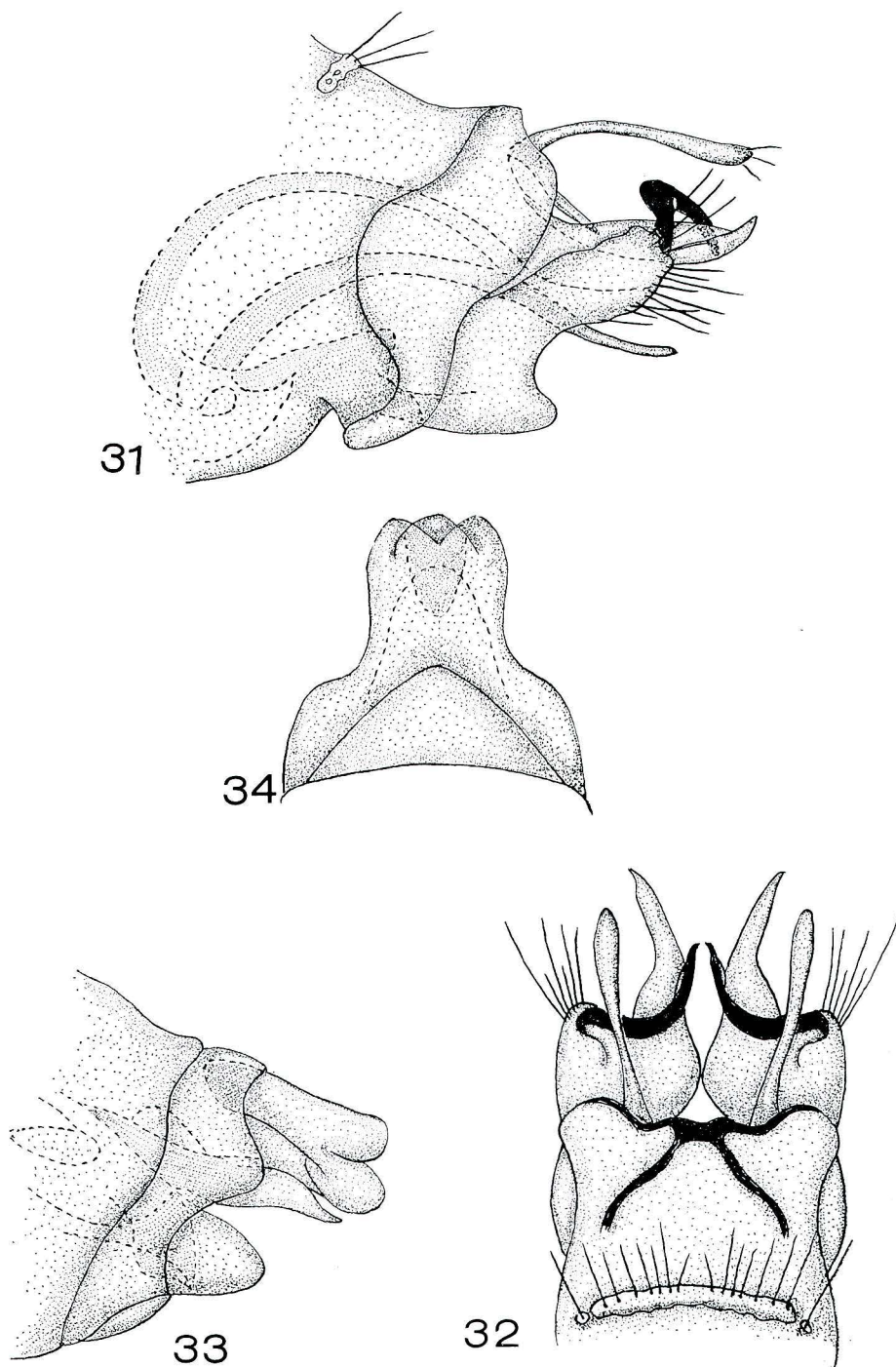
Figs. 13-18. 13-15, Male genitalia of *Hydropsyche kagiana* sp. nov., 13, lateral view; 14, dorsal view; 15, aedeagus, dorsal view. 16-18, Male genitalia of *Hydropsyche breviculata* sp. nov., 16, lateral view; 17, dorsal view; 18, aedeagus, dorsal view.



Figs. 19-24. 19-21, Male genitalia of *Cheumatopsyche uchidai* sp. nov., 19, lateral view; 20, dorsal view; 21, aedeagus, dorsal view. 22-24, *Cheumatopsyche sagitta* sp. nov., 22, lateral view; 23, dorsal view; 24, aedeagus, dorsal view.



Figs. 25-30. 25-27, Male genitalia of *Cheumatopsyche chihonana* sp. nov., 25, lateral view; 26, dorsal view; 27, aedeagus, dorsal view. 28-30, Male genitalia of *Cheumatopsyche taipeiiana* sp. nov., 28, lateral view; 29, dorsal view; 30, aedeagus, dorsal view.



Figs. 31-34. Male and female genitalia of *Apatenia taiwanensis* sp. nov., 31-32, male genitalia, 31, lateral view; 32, dorsal view; 33-34, female genitalia, 33, lateral view; 34, dorsal view.