

Descriptions of Several Species of Trichoptera from Central Japan (Insecta)

Mineo KOBAYASHI

毛翅目（昆虫）の新種

現在、日本産毛翅目の分類学的研究およびファウナの解明をおこなっているが、その過程において新種と思われる個体を幾つか得ることができた。そこで、これらの個体のうち、明らかに新種であることが確定できた8種について、ここに報告する。なお、雄はすでに記載されているが、雌が未記載であった *Neophylax japonicus* SCHMID の雌個体を得ることができたので、ここに記載する。

Examination of several collections of caddis flies has yielded eight new species from Central Japan. I wish to express my appreciation to Dr. K. BABA, the director of Kurokawa Hospital, Niigata Prefecture, for his kind offer of materials.

PHILOPOTAMIDAE

Wormaldia McLACHLAN

Spurs 2, 4, 4. Ocelli present. Maxillary palpi with the first segment always short; terminal segment fairly long and articulated. Anterior wing with fork of M anterior to other two, the three forming a triangle. Posterior wing with vein 2A atrophied beyond cross-vein 2A. Discoidal cell always present in both wings. Male genitalia with two clasper not fused, ninth segment reduced dorsally by recessed tenth tergite.

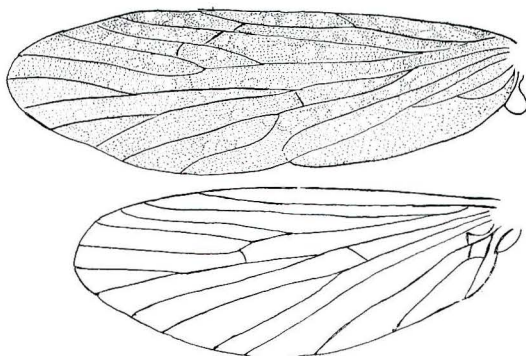
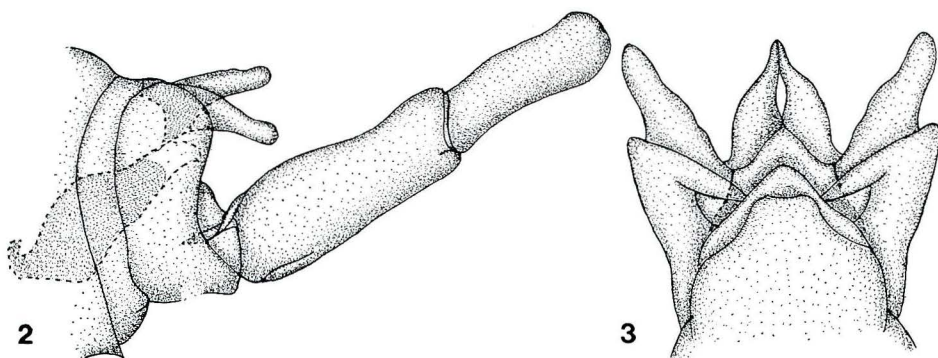
Wormaldia triangulata sp. nov.

(Figs. 1-3)

Male: Length 9 mm. Color dark brown, almost black, the hair also very dark, membrane of the wing dark smoky. General structure typical for genus. Genitalia as in Figs. 2, 3. Ninth tergite wide, its anterior margin produced into a sharp point. Tenth tergite elongate, acuted at the apex. Cercus long and slender, rounded at the apical margin. Clasper with two segments about equal width but the apical one shorter than the basal segment. Apical segment rounded at the apex. Aedeagus simple.

Holotype, male (7172): Daigenta, Yuzawa-machi, Niigata Pref., March 22, 1982; M. KOBAYASHI leg. In the collection of the Kanagawa Prefectural Museum.

This species belongs to the same group of the subgenus *Doloclanes*.

Fig. 1. Venetion of *Wormaldia triangulata*.Figs. 2-3. Male genitalia of *Wormaldia triangulata*. 2, lateral aspect ; 3, dorsal aspect.

PSYCHOMYIDAE

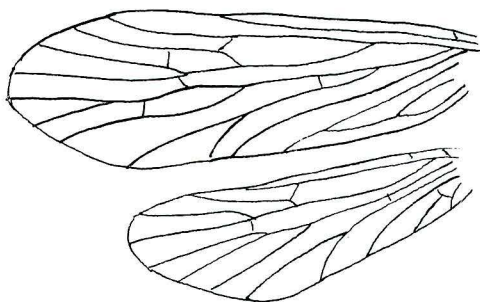
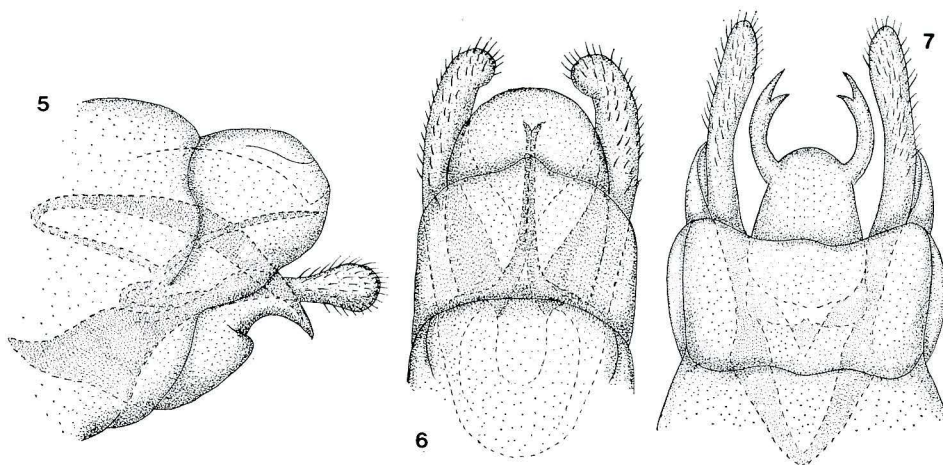
Tinodes LEACH

Spurs 2, 4, 4. Maxillary palpi long and stout, third segment little longer than the second. Anterior wing rounded at the apex, very hairy. At the base of R_1 rounded nude spot, not always evident. Discoidal cell of anterior wing short, its posterior margin distinctly angled. Cell M_2 of the posterior wing sessile. Clasper one-segmented.

Tinodes aonensis sp. nov.

(Figs. 4-7)

Male: Length 8 mm. Color brown, the hair also brown and membrane of the wing brown smoky. General structure typical for genus. Genitalia as in Figs. 5-7. Ninth tergite long and broad, apical margin projected at the middle portion. Tenth tergite broad, covered with ninth tergite, rounded at the apical margin. Clasper long and stout, rounded at the apex; apical portion, from side, rice scoop-shaped. Aedeagus complexity; upper part divided into two chitinous lobes; upper lobe thicker than the lower lobe, pointed knife-shaped; ventral part, from ventral, helmet-shaped, apical

Fig. 4. Venation of *Tinodes aonensis*.Figs. 5-7. Male genitalia of *Tinodes aonensis*. 5, lateral aspect; 6, dorsal aspect; 7, ventral aspect.

margin with a pair antler-shaped lobes.

Holotype, Male (7292): Konomazawa, Anone, Tsukui-machi, Kanagawa Pref., August 9, 1983; M. KOBAYASHI leg. In the collection of the Kanagawa Prefectural Museum.

POLYCENTROPODIDAE

Kyopsyche TSUDA

Spurs 3, 4, 4. Intermediate tibiae and tarsi of the female scarcely dilated. Antennae stout, basal segment bulbous. Maxillary palpi long; first and second segment short and stout, third long, fourth shorter, fifth as long as the others united. Anterior wing with apical forks nos. 1, 2, 3, 4 and 5: discoidal cell short; median cell longer than the discoidal cell. Posterior wing with forks 2, 3 and 5; discoidal cell short and triangular. Sc and R connected towards the apex and forming a small fork. Genitalia

complexity. Clasper rather long and slender in the male.

Kyopsyche tsukuiensis sp. nov.

(Figs. 8-11)

Male: Length 5 mm. Color yellowish brown, the hair brown and membrane of the wing yellowish brown smoky. General structure typical for genus. Genitalia as in Figs. 9-11. Ninth tergite broad and short, acuted at the apical margin. Tenth tergite long, slender, divided into two short lobes. Cercus very long and narrow, with many long hairs, armed at the apices on the apical surface with stiff bristles. Clasper, from above, very long, inner margin projected inwardly, with a few stiff bristles. Aedeagus divided into two parts; upper part chitinized, very slender, lobe-shaped, pointed at the apex; lower part stout and short, membranous, basal portion very stout.

Holotype, male (7265); Konomazawa, Aone, Tsukui-machi, Kanagawa Pref., July 13, 1983; M. KOBAYASHI leg; paratype, two male (7265a, b); same locality as holotype; M.

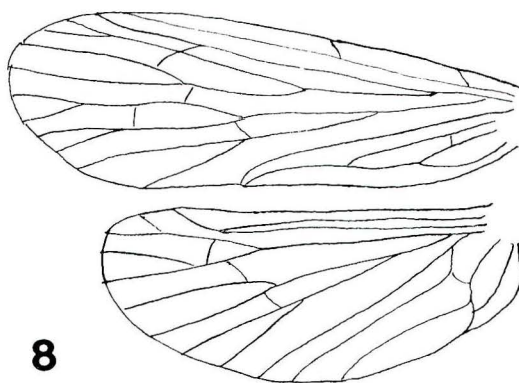
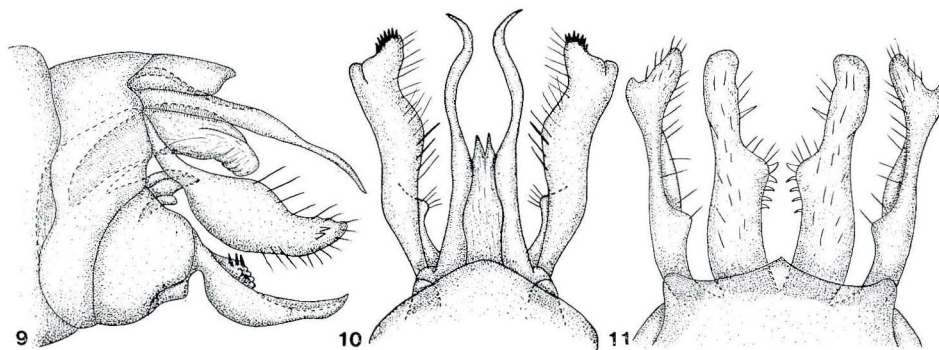


Fig. 8. Venation of *Kyopsyche tsukuiensis*.



Figs. 9-11. Male genitalia of *Kyopsyche tsukuiensis*. 9, lateral aspect; 10, dorsal aspect; 11, ventral aspect.

KOBAYASHI legs. In the collection of the Kanagawa Prefectural Museum.

This species is second species from Japan which belongs to the Genue *Kyopsche*.

HYDROPSYCHIDAE

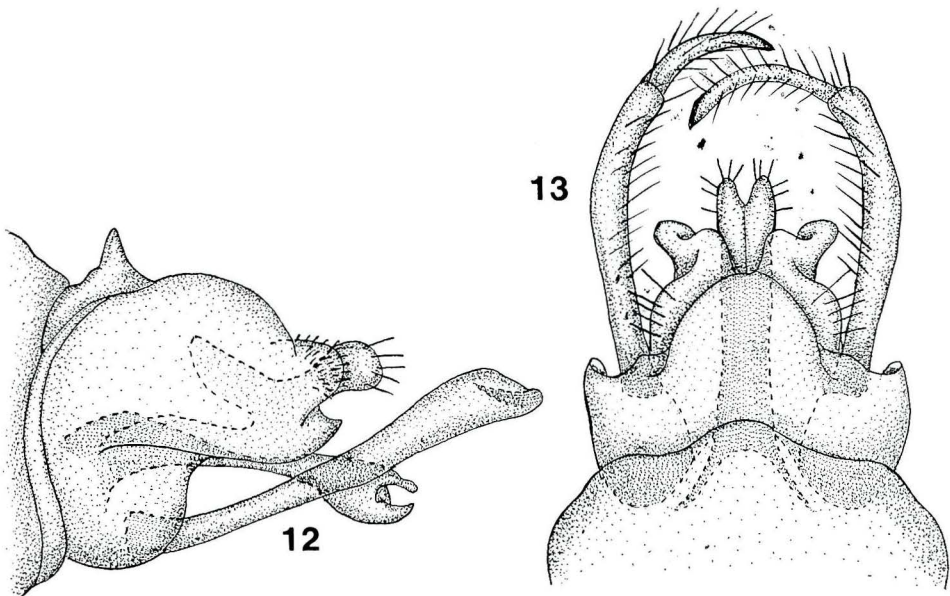
Hydropsyche PICTET

Spurs 2, 4, 4. Maxillary palpi with very short basal segment; second in comparison very long; third and fourth about equal; fifth as long as the first four together. Anterior wing with apical forks nos. 1, 2, 3, 4 and 5 present; discoidal cell short and broad. Posterior wing with forks nos. 1, 2, 3 and 5 present, no. 1 always small, discoidal cell always closed; median cell present. In the anterior tarsus of the male one of the claws is shrouded in a dense mass of hairs. Intermediate tibiae and tarsi of the female flattened and dilated. In the male genitalia there is always a strongly chitinized prolognation of the ninth tergite and a pair of slender, two-segmented clasper. Aedeagus generally prominent, sometimes with lateral, angular projections before the apex.

Hydropsyche difficultata sp. nov.

(Figs. 12-13)

Male: Length 5.5 mm. Specimen various of light brown. (The specimen was preserved in alcohol, so that in life it was proably a much darker bronw). General structure typical for genus. Genitalia as in Figs. 12, 13. Ninth tergite wide, long, apical margin produced widely rounded at the apex. Tenth tergite, from side, finger-shaped, the apex



Figs. 12-13. Male genitalia of *Hydropsyche difficultata*. 12, lateral aspect; 13, dorsal aspect.

with long bristles; lateral margin crooked. Clasper two-segmented; very long, slender; basal segment much longer than the apical segment, apical portion curved inwardly; the apical segment slender, curved inwardly. Aedeagus with the apex divided into an upper and lower portion, the upper thinner than the lower, rounded at the apex.

Holotype, male (7262): Konomazawa, Aone, Tsukui-machi, Kanagawa Pref., July 13, 1983; M. KOBAYASHI leg.: paratype, male (7262a); same locality as holotype, M. KOBAYASHI leg. In the collection of Kanagawa Prefectural Museum.

RHYACOPHILIDAE

Rhyacophila PICTET

Spurs 3, 4, 4. Antennae slender, as long as or shorter than the anterior wing; basal segment stout, shorter than the head. Ocelli present. Maxillary palpi alike in the sexes, five-segmented; terminal segment not articulated; the first two segment very short, the following segments long, cylindrical. Wings elongate, vestiture variable. Discoidal cell in both wings closed. Anterior wing with apical forks nos. 1, 2, 3, 4 and 5; R generally forked at its apex. Thyridial cell always present. Posterior wing shorter and narrower, forks variable, but at least nos. 2 and 5 present. Aedeagus is composed by a cup-like or broader base. Tenth tergite may be a simple structure, often divided into a pair of lateral lobes.

Rhyacophila ishihanaensis sp. nov.

(Figs. 14-15)

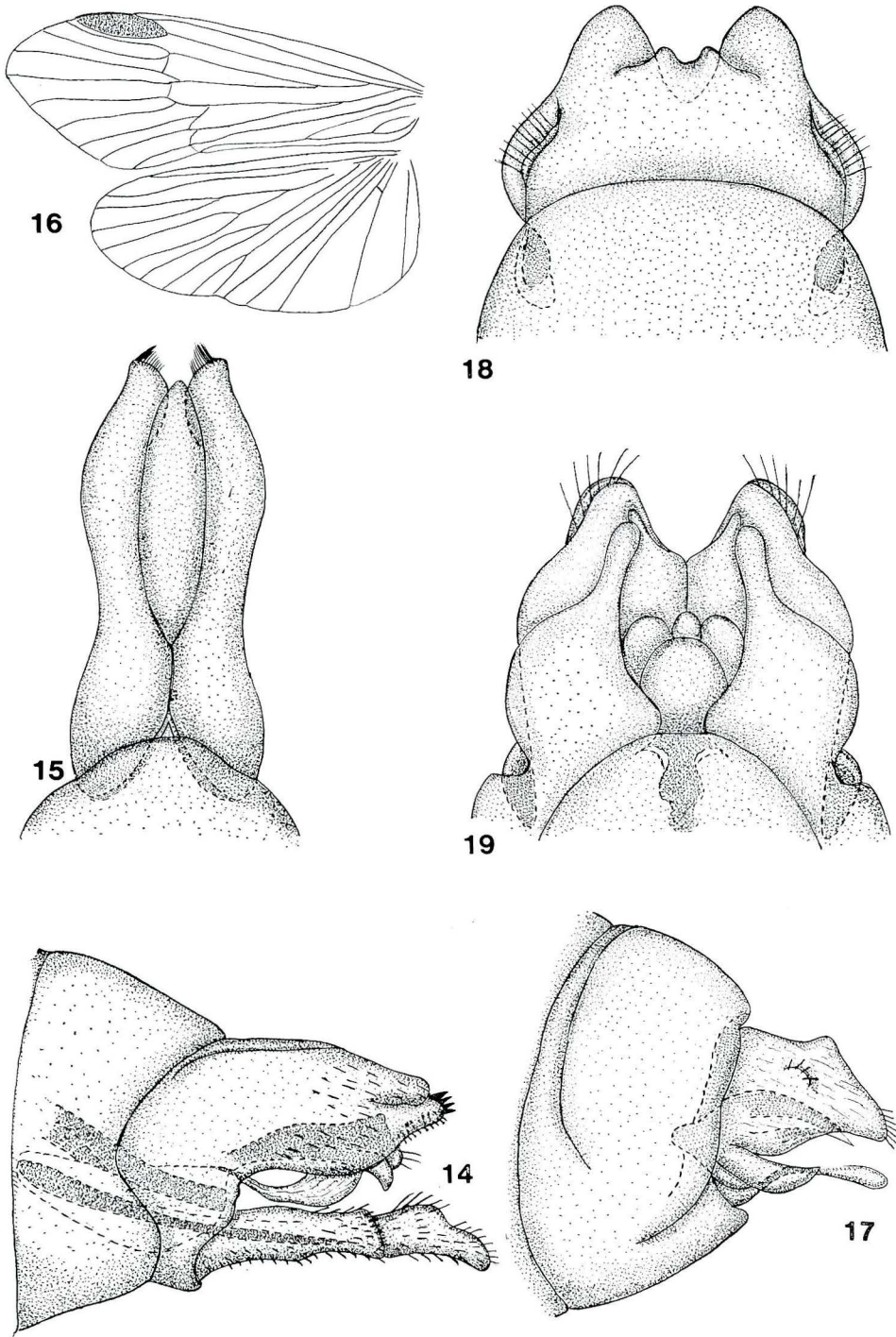
Male: Length 6.5 mm. Color dark brown, the venter slightly lighter than the dorsum, the wings deep smoky. General structure typical from genus. Genitalia as in Figs. 14, 15. Ninth tergite long and stout, taper to a point; apical portion divided into an upper and lower lobes, lower lobe slightly longer than the upper, with many bristles. From above, tenth tergite nearly tongue-shaped. Clasper two-segmented, slender; basal segment longer than the apical segment; the apical segment, from side, bottle-shaped, apical portion clothed with short bristles. Aedeagus large, composed of a slender lobes and stouter lobes; slender lobes pine-shaped holded in clasper; stouter lobes divided into an upper and lower portion, upper portion chitinized, lower portion membranous.

Holotype, male (7305); Ishihana River. Aikawa-machi; Sado Isl., Niigata Pref., August 22, 1983; M. KOBAYASHI leg. In the collection of the Kanagawa Prefectural Museum. This species belongs to *acropedes* group.

LIMNAPHILIDAE

Neophylax McLACHLAN

Spurs 1, 2, 4. Ocelli present. Antennae as long as the anterior wing, the basal seg-



Figs. 14-15. Male genitalia of *Rhyacophila ishihanaensis*; 14, lateral aspect; 15, dorsal aspect. Figs. 16-19. Venation and female genitalia of *Neopylax japonicus*; 16, venation; 17-19, female genitalia; 17, lateral aspect; 18, dorsal aspect; 19, ventral aspect.

ment longer than the head. Head with a small pair of warts between lateral ocelli and posterior warts. Anterior wing hairy, narrow at base, widened toward the apex; 2A complete; Sc not ending in an oblique cross-vein. Apical forks nos. 1, 2, 3 and 5 present. Posterior wing with M_{1+2} undivided.

Neophylax japonicus SCHMID

(Figs. 16-19)

In 1964 Schmid described as *Neophylax japonicus* the genitalia of a male from Japan, but female undescribed by Schmid. This place deals with the female of *japonicus*.

Female: Length 8.5 mm. General structure typical for male. Genitalia as in Figs. 17-19. Tenth segment from the side obliquely truncate apically, its lower apical angle rounded; the basal portion with clow-shaped lobes. From side the dorsal plate long, stick-shaped, rounded, at its apex. Internal structure as in Fig. 19. Cerci wart-shaped, clothed with short hairs.

1♂1♀, Konomazawa, Aone, Tsukui-machi, Kanagawa Pref., Oct. 26, 1982; M. KOBAYASHI legs. In the collection of the Kanagawa Prefectural Museum.

LEPTOCERIDAE

Leptocerus LEACH

Spurs 2, 2, 2. Antennae more than twice the length of the anterior wing, those of the males somewhat longer than those of the females. Anterior wing long, narrow. Posterior wing with a broad anal area. In the anterior wing Sc apparently ending shortly beyond the level of the cross-vein r; the discoidal cell long and slender. Tenth segment divided in some species and undivided in other. Clasper two-segmented, apical segment often forming a fork with the continuation of the first.

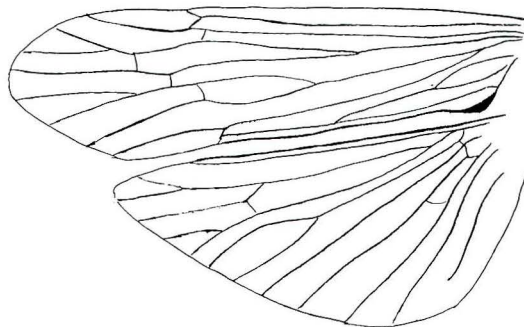
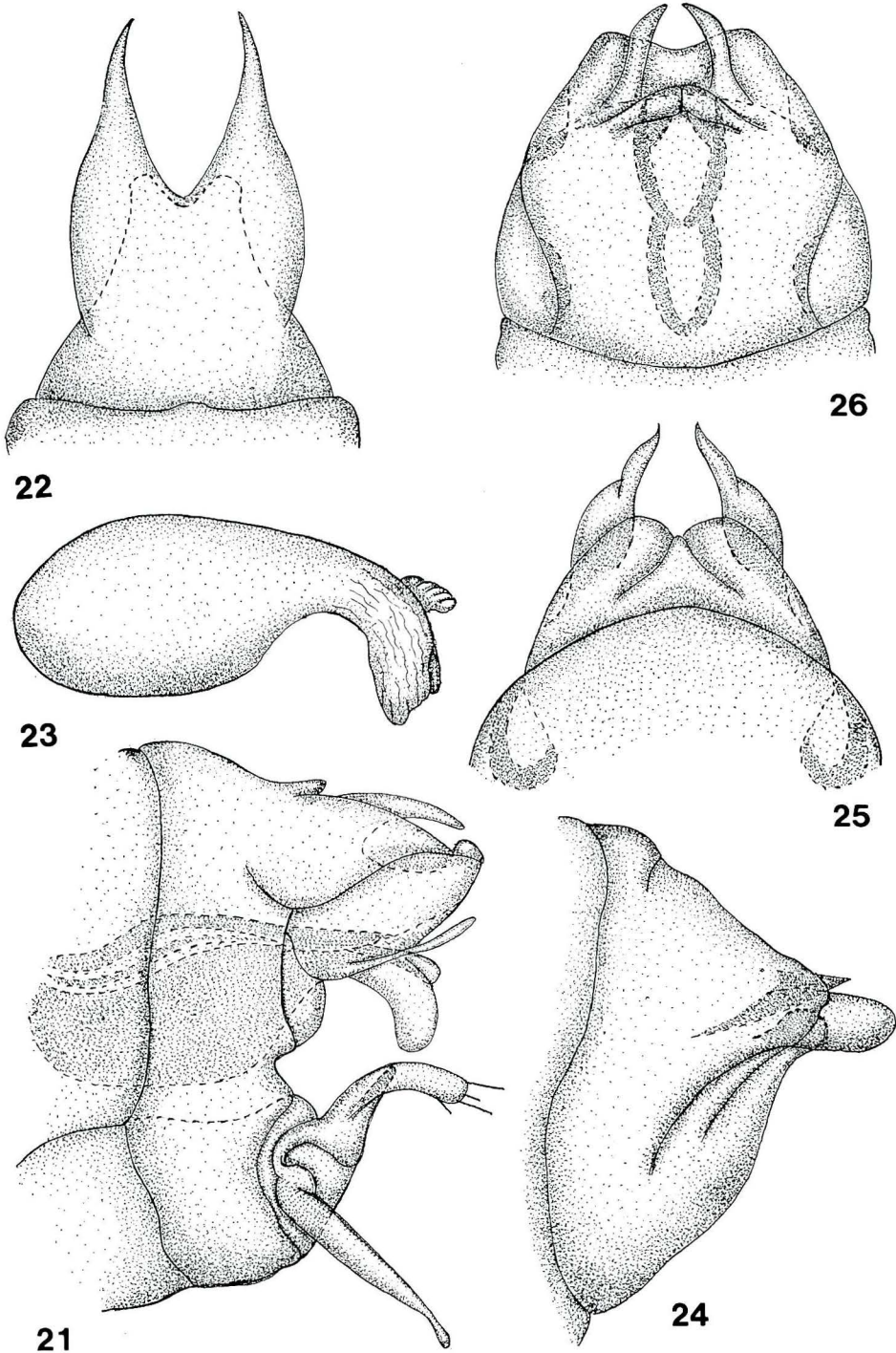


Fig. 20. Venation of *Leptocerus complicatus*.



Figs. 21-26. Male and female genitalia of *Leptocerus complicatus*. 21-23, male genitalia; 21, lateral aspect; 22, dorsal aspect; 23, aedeagus; 24-26, female genitalia: 24, lateral aspect; 25, dorsal aspect; 26, ventral aspect.

Leptocerus complicatus sp. nov.

(Figs. 20-26)

Male: Length 8.5 mm. Color dark brown, the hair also very dark and membrane of the wing dark smoky. General structure typical for genus. Genitalia as in Figs. 21-23. Ninth tergite, from side, divided into two long parts, lower part bean-shaped, acuted at the apex; apical margin of upper part sharply acuted. Tenth tergite, from above, divided into two lobes, each lobes sharply acuted at the apex; basal portion broadened. From side, clasper is divided into two long lobes; upper lobe finger-shaped, rounded at apex; lower lobes slender, acuted at the apex. Aedeagus as indicated in Fig. 23.

Female: Length 8.5 mm. Color and size similar to male. Genitalia as in Figs. 24-26. From side, ninth tergite with a large spine. Tenth segment, from side, stout, thumb-shaped, rounded at the apex. Internal structure as indicated in Fig. 26.

Holotype male (7321) and allotype female (7321a): Konomazawa, Aone, Tsukui-machi, Kanagawa Pref., May 26, 1983; M. KOBAYASHI legs. Paratype five males; same locality as holotype, M. KOBAYASHI legs. In collection of the Kanagawa Prefectural Museum.

Setodes RAMBUR

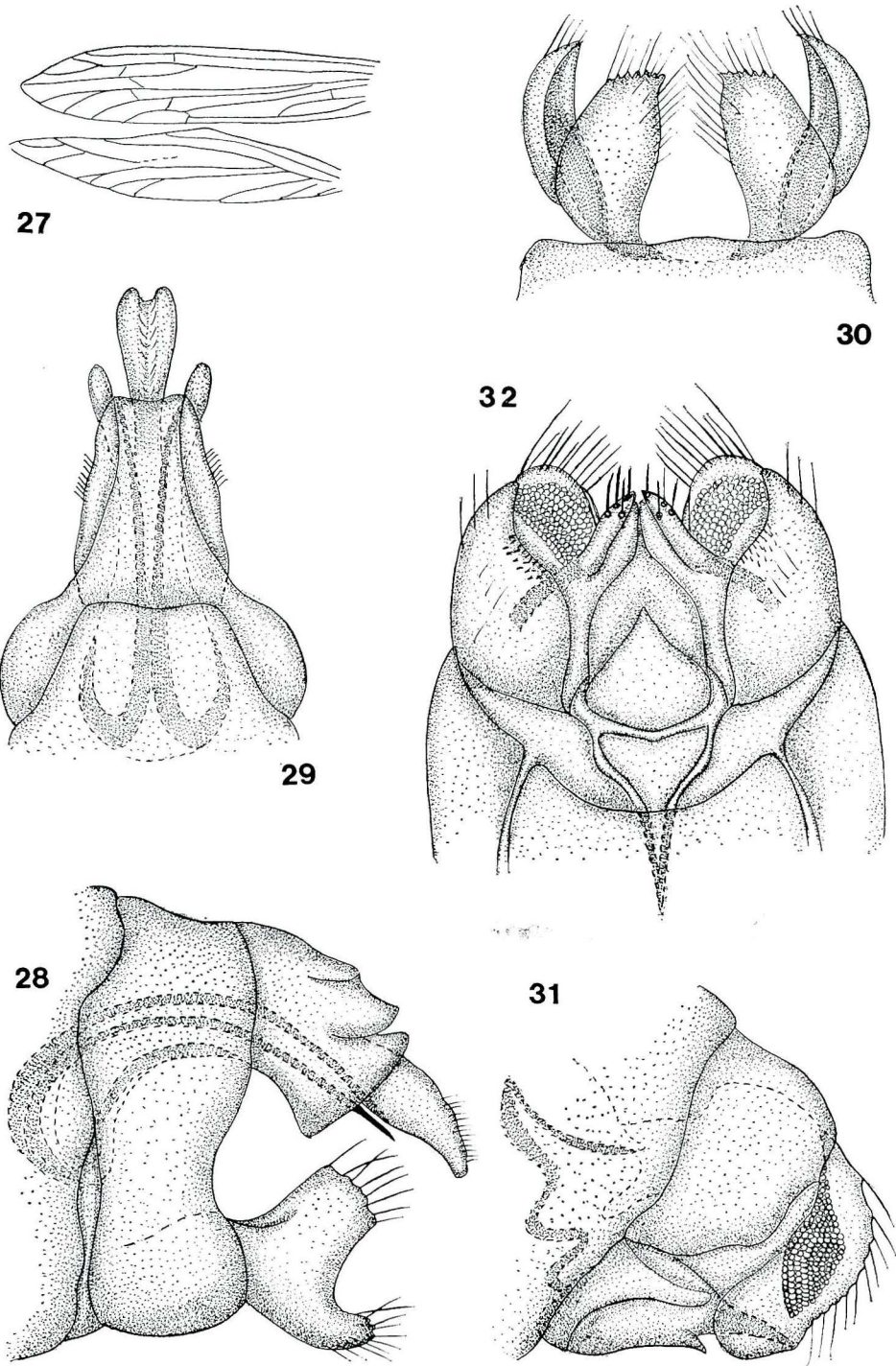
Spurs 0, 2, 2 or 1, 2, 2. Antennae one and one-half to two time as long as the anterior wing, basal segment not longer than the head. Anterior wing long and narrow, pointed at the apex, with dense pubescence and long fringe. Posterior wing still narrower, particularly at base. Anterior wing with stem of M present, so that free main veins are present between convex R_1 and convex Cu_1 . M obviously branched.

Setodes shirasensis sp. nov.

(Figs. 27-32)

Male: Length 4 mm. Color pale yellowish, the hair also pale yellowish and membrane of the wing brown smoky. General structure typical from genus. Genitalia as in Figs. 28-30. From side ninth tergite is long, obliquely truncated at the apical margin. Tenth tergite, from beneath, banana-shaped. Clasper, from side, short and broad, divided into two lobes, upper lobes stout, truncated at the apical margin, the apical margin serrated, with long pubescence; lower lobe shorter than the upper lobes clothed with long pubescence, the apical margin rounded, with a few spines. From beneath the clasper is broadened in plate-like. Aedeagus composed by three very long lobes, its structure as Figs. 28-30.

Female: Length 4 mm. Color and size similar to male. General structure typical for genus. Genitalia as in Figs. 31, 32. Ninth tergite from side is long, broad, rounded at the apex. Tenth tergite short, apical margin serrated, with long hair, lateral surface with pattern of a net. Ventral plate long, sharply acuted at the apex. Internal structure



Figs. 27-32. Venation and genitalia of *Setodes shirasensis*, 27, venation; 28-30, male genitalia; 28, lateral aspect; 29, dorsal aspect; 30, ventral aspect; 31-32, female genitalia; 31, lateral aspect; 32, ventral aspect.

as indicated in Fig. 32.

Holotype male (7330) and allotype female (7330a): Shirase River, Ryotsu-shi, Sado Isl., Niigata Pref., August 25, 1983; M. KOBAYASHI legs. Paratype five males; same locality as holotype, M. KOBAYASHI legs. In collection of the Kanagawa Prefectural Museum.

***Oecetis* McLACHLAN**

Spurs 0, 2, 2 or 1, 2, 2. Antennae more than twice the length of the wing, general pale, without apparent annulations; basal segment as long as, or rather longer than the head. Anterior wing very long and narrow. Sc connected to R_1 near the apex by a thickened cross-vein. R_1 also thickened apically. Discoidal cell often very long; thyridial cell long and narrow. Median apparently unforked, M_{3+4} arising from the cross-vein between M and Cu, or even fused with Cu_{1a} for some distance. Posterior wing sometimes broader than anterior.

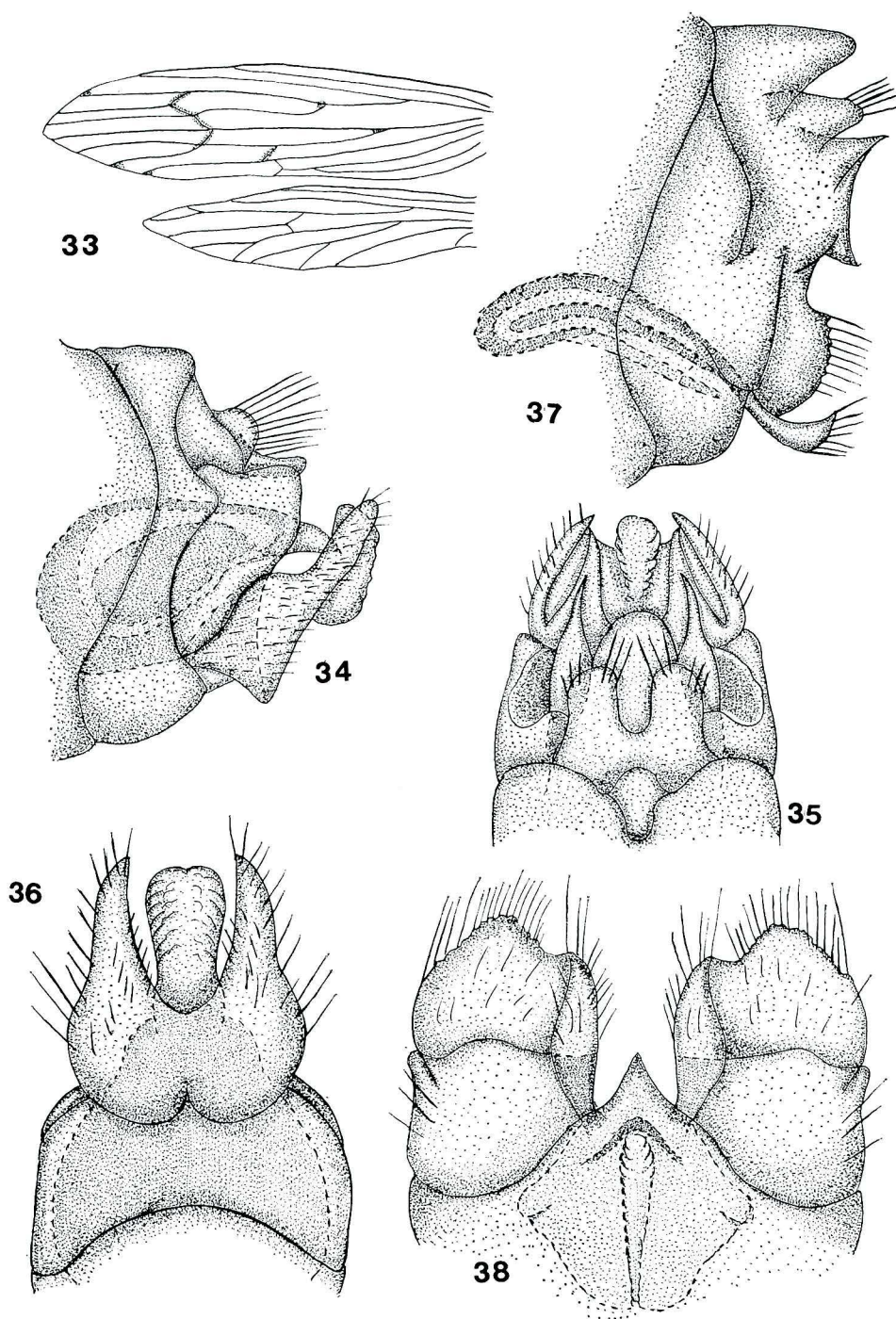
***Oecetis hamochiensis* sp. nov.**

(Figs. 33-38)

Male: Length 4.5 mm. Color fulvous, the hair whitish and membrane of the wing fulvous smoky. General structure typical for genus. Genitalia as in Figs. 34-36. Ninth segment from side very short, middle portion of the apical margin projected outwardly. From above the tenth tergite is divided into two round lobes, clothed with long hair. Clasper from the side obliquely truncated basally, apical portion narrow, finger-shaped. From beneath the clasper is divided into two lobes, acuted at apex. Aedeagus large, composed by membranous and chitinous part.

Female: Length 5 mm. General structure typical for the male. Genitalia as in Figs. 37-38. From side the tenth segment is divided into three parts; upper part produced with long hair; middle part truncated at the apical margin; lower part rounded, the apical margin serrated. Ventral lobe from side long and slender, its apex curved upwardly, with long hair. From beneath the dorsal plate is very wide, clothed with long hair, the apical margin projected at middle portion. Internal structure as in indicated in Fig. 38.

Holotype male (7329) and allotype female (5868): Hamochi. Sado Isl., Niigata Pref., Sept. 7, 1966; S. SAKURAI legs: paratype, three male; same locality as holotype; S. SAKURAI legs. 3♀♀, Shinpo River, Kanai-machi, Sado Isl., Niigata Pref., August 23, 1983; M. KOBAYASHI legs; 1♂1♀, Shirase River, Ryotsu-shi, Sado Isl., Niigata Pref., August 25, 1983; M. KOBAYASHI legs. In collection of the Kanagawa Prefectural Museum.



Figs. 33-38. Venation and genitalia of *Oecetis hamochiensis*. 33, venation; 34-36, male genitalia; 34, lateral aspect; 35, lateral aspect; 36, ventral aspect; 37-38, female genitalia; 37, lateral aspect; 38, ventral aspect.

References

- BANKS, N. 1906. New Trichoptera from Japan. Proc. Ent. Soc. Washington, 7: 106-112.
- KOBAYASHI, M. 1980. A Revision of the family Philopotamidae from Japan. (Trichoptera: Insecta). Bull. Kanagawa Pref. Mus. (Nat. Sci.), 12: 85-104.
- KUWAYAMA, S. 1930. A New and Two Unrecorded Species of Trichoptera from Japan. Ins. Mats., 5(1-2): 53-57.
- MARTYNOV, A. B. 1934. The Trichoptera Annulipalpia of the USSR. Leningrad, 1-343.
- MOSELY, M. E. & D. E. KIMMINS. 1953. The Trichoptera (Caddis-flies) of Australia and New Zealand. British Mus. (Nat. Hist.), London, 1-550.
- ROSS, H. H. 1944. The Caddis Flies or Trichoptera of Illinois. Bull. Ill. Nat. Hist. Surv., Urbana, Ill., 23(1): 1-326.
- . 1956. Evolution and Classification of the Mountain Caddisflies. Univ. Ill. Press, Urbana, 1-213.
- . 1967. The Evolution and Past dispersal of the Trichoptera. Ann. Rev. Ent., 12: 169-206.
- SCHMID, F. 1955. Contribution à l'étude des Limnephilidae (Trichoptera). Mett. Schw. Ent. Ges. 28: 1-245.
- . 1970. Le Genre *Phyacophila* et la Famille des Rhyacophilidae. Me. Soc. Ent. Canada, 66: 1-123.
- TSUDA, M. 1942. Japonische Trichopteren I. Systematik. Mem. Coll. Sci. Kyoto Imp. Univ. (B), 17: 239-339.
- ULMER, G. 1907. Catalogue des Collections zoologiques du Baron Edm. de Selys Longshamps. 6(1): 1-102.
- . 1908. Japanische Trichopteren. Deutsch. Ent. Zeitschr. 339-355.