

## Descriptions of Donaciine Larvae (Coleoptera, Chrysomelidae) from Japan

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**Abstract** The larvae of eighteen species of the chrysomelid subfamily Donaciinae occurring in Japan are described and illustrated. Diagnostic characters of the two genera, *Plateumaris* and *Donacia*, are discussed from the morphological point of view.

### Introduction

The Donaciinae is one of the subfamilies of the Chrysomelidae, comprising about 160 species in the world. Of these, 23 species belonging to three genera (*Macrolea*, *Donacia* and *Plateumaris*) have been recorded from Japan.

The adult beetles and their larvae are found in or around the waters. The larvae are sticking to the roots of aquatic plants with the hook of the 8th abdominal segment, obtaining oxygen from them and feeding on them. Most species complete their life cycles within the waters and seldom leave from there. Since the beetles strictly depend on their host plants, it is possible to estimate environmental conditions in the past from fossil remains of this group. Besides, this group of beetles are also used as an indicator of the present environment. A few species have been reported to be injurious to rice plants and lotus roots, the most important of them being considered to be *Donacia provostii* as was reported by MISUMI (1935), NISHIO *et al.* (1959) and UCHIDA (1964). The damage is, however, negligible at present.

In contrast to the well documented adult ecological observations described above, morphological studies on the larvae have been less satisfactory, except for a few important studies by HAYASHI (1959), KANAZAWA (1985), NARITA (1989) and LEE (1991). Moreover, phylogenetic scrutiny at the generic level has never been made, probably because of difficulty in dealing with many species at the same time.

In the present paper I will describe the last instar larvae of 18 species and 3 subspecies belonging to two genera (*Donacia* and *Plateumaris*) occurring in Japan, and will give a key to the species at the larval stage. All the materials examined were collected or reared by myself.

In the course of this study, the structure of head-capsule, antennae, mouth-parts, spiracles of the 8th abdominal segment and a sclerotized shape of prothoracic shield were found to be of taxonomic importance. The terminology used in this paper is explained by the diagrams in Fig. 1. The arrangement of species follows that of

ASKEVOLD (1990, 1991).

## Results

### Morphological Characteristics of the Larvae of the Donaciinae

(Figs. 1 A–F)

The larvae of the Donaciinae are generally characterized by the following points:

Body (Fig. 1 A) spindle-shaped, more or less shiny, ventrally arcuate, fleshy, covered entirely with fine pubescence; head and thoracic legs very small; 8th abdominal segment equipped with a pair of hook-shaped spiracles (Fig. 1 F) on dorsum; 9th abdominal segment extremely small and indistinct.

Head capsule (Figs. 1 B–D) rounded, widest near the middle in dorsal view, and 1.5 to 3 times as wide as the base; dorso-posterior margin moderately or strongly arcuate forwards; frontal sutures colorless, indistinct; endocarina absent; stemmata basically five in number on each side of head and arranged in two groups (three in anterior and two in posterior), though becoming indistinct or disappearing on the approach of the pupal period. Antennal articulating membrane well elevated. Antennae comparatively small, 3-segmented, located dorso-laterally, the 1st segment much larger than the other segments, bearing a transverse series of several sensilla in the middle, the 2nd furnished with a conical sensory appendage on the apical disc, the 3rd truncated apically, slightly shorter than the sensory appendage, furnished with a thin and a stout setae at the apex. Labrum less than twice as wide as long; anterior margin nearly straight or broadly retracted; dorsum with two or three rows of setae and a few sensilla. Epipharynx with a transverse series of setae near anterior margin, which consists of two or three pairs of short setae (median setae) at the median part and a pair of long setae (lateral setae) at the lateral parts. Mandibles nearly triangular, bidentate apically (dorso-apical tooth and ventro-apical tooth), usually furnished with a series of small teeth along the cutting edge behind dorso-apical tooth, but occasionally obsolete; molar part not developed, bearing two setae and a few sensilla on the dorsal surface. Maxillae (Fig. 1 E) more or less slender, widely separated from each other by a well developed labium; palpifer larger than the 1st segment of palpus, bearing two long setae; palpus 3-segmented, decreasing in length towards the 3rd; mala with a seta and two or three spines which are highly specialized in form, the former rather ligulate (knife-shaped seta), the latter consisting of a stout spine and one or two thin spines. Labial palpi widely separated from each other, 1-segmented, Labia-hypopharyngeal area with sensilla and setiferous sensilla, or numerous microtrichia in hypopharyngeal area, ligula not developed.

Prothoracic segment about 1.5 times as wide as long in dorsal view; tergum with a U-shaped shield, which is scattered with a number of sclerotized patches. Legs similar to one another; coxae approaching to each other; trochanter small; femur longer than tibia except in a few species, bearing a long seta near the tip.



Abdominal segments except for the 8th and 9th clearly divided into three parts (tergum, pleurum, sternum) by two longitudinal grooves; tergum with two transverse tubercles. All the tubercles suffused with setae except in the spiracular area.

### Tribe Plateumarini

#### *Plateumaris akiensis* TOMINAGA et KATSURA, 1984

(Figs. 2 A, 3 A, 4 A, 5 A, 6 A, 8 A, 9 A, 10 A)

Body about 10.5 mm in length, milky white.

Head capsule (Fig. 2 A) about 0.50 mm in breadth, more or less parallel-sided in dorsal view, about twice as wide as the base; dorsal surface and lateral sides with a pair of setae and three pairs of sensilla, respectively; frons with six pairs of setae and two pairs of sensilla, stemmata with five spots on each side. Antennae (Fig. 3 A) with the 1st, 2nd and 3rd segments in the ratio of 1: 0.57: 0.24 in length; 1st a little shorter than width; 2nd a little shorter than width, furnished with two minute sensilla, the sensory appendage being large, projecting well beyond 3rd segment, and about a half longer than 2nd. Clypeus with only a pair of setae and a pair of sensilla. Labrum with anterior margin slightly pointed at median part and broadly rounded at anterior corners; dorsum with four setae and a sensillum on lateral half as shown in Fig. 4 A. Epipharynx with three pairs of median and a pair of lateral setae, the median setae closely set, arranged as shown in Fig. 5 A. Mandibles (Fig. 6 A) obscurely serrated behind dorso-apical tooth; dorsal surface with three sensilla. Maxillae (Fig. 8 A) with stipes bearing a sensillum; palpifer with a sensillum; 2nd segment of palpus with a sensillum, and a little shorter than 3rd; 3rd without sensilla; mala with a knife-shaped seta 0.6 times as long as palpus, bearing a short seta and two sensilla. Labia-hypopharyngeal area with four sensilla and two setiferous sensilla distributed as shown in Fig. 9 A.

Prothoracic tergum (Fig. 10 A) with paired sclerites which are weakly sclerotized and wholly bear setae except for sclerotized area. Legs comparatively small. Hooks of 8th abdominal segment about 1.7 times as long as the basal width.

*Host.* *Carex otaruensis* FRANCH.

*Specimens examined.* 6 exs., Nishi-yahatabara, Geihoku-chô, Hiroshima Pref., 2-VI-1990, Y. NARITA leg.

#### *Plateumaris constricticollis constricticollis* (JACOBY, 1885)

(Figs. 2 B, 3 B, 4 B, 5 B, 6 B, 8 B, 9 B, 10 B)

Body about 13.0 mm in length, milky white.

Head capsule (Fig. 2 B) about 0.57 mm in breadth, parallel-sided in dorsal view, about 1.6 times as wide as the base; dorsal surface and lateral sides with four pairs of setae and two pairs of sensilla, respectively; frons with six pairs of setae and two pairs of sensilla. Antennae (Fig. 3 B) with the 1st, 2nd and 3rd segments in the ratio of 1:

0.76: 0.28 in length; 1st a little shorter than width; 2nd as long as wide, furnished with two minute sensilla, the sensory appendage hardly projecting beyond 3rd segment, and slightly more than a half as long as 2nd. Labrum with anterior margin slightly pointed at median part; dorsum with four setae and four sensilla on lateral half as shown in Fig. 4 B. Epipharynx with three pairs of median and a pair of lateral setae arranged as shown in Fig. 5 B. Mandibles (Fig. 6 B) with extremely small teeth behind dorso-apical tooth; dorsal surface with three sensilla. Maxillae (Fig. 8 B) with stipes bearing a sensillum; palpifer with a sensillum; 1st segment of palpus about twice as long as 2nd or 3rd; 2nd without sensilla; 3rd without sensilla; knife-shaped seta of mala 0.6 times as long as palpus. Labia-hypopharyngeal area with two setiferous sensilla and many microtrichia distributed as shown in Fig. 9 B.

Prothoracic tergum (Fig. 10 B) with paired sclerites which are weakly sclerotized on the whole. Legs comparatively small, tarsal claws thick at bases.

Abdominal setae stiff and dark brown. Hooks of the 8th abdominal segment about 1.9 times as long as the basal width.

*Host.* *Carex* sp.

*Specimens examined.* 5 exs., near Ô-numa, Nanai-machi, Hokkaido, 2–VII–1989, Y. NARITA leg.

***Plateumaris constricticollis babai* CHÛJÔ, 1959**

(Figs. 2 C, 3 C, 4 C, 5 C, 6 C, 8 C, 9 C, 10 C)

Similar to the subsp. *constricticollis*, but differing as follow:

Body about 12.0 mm in length; Head capsule (Fig. 2 C) about 0.60 mm in breadth; dorsal surface and lateral sides with five pairs of setae and three pairs of sensilla, respectively; frons with four pairs of setae and a pair of sensilla. Maxillae (Fig. 8 C) with 2nd segment of palpus bearing a sensillum; mala with a knife-shaped seta 0.4 times as long as palpus.

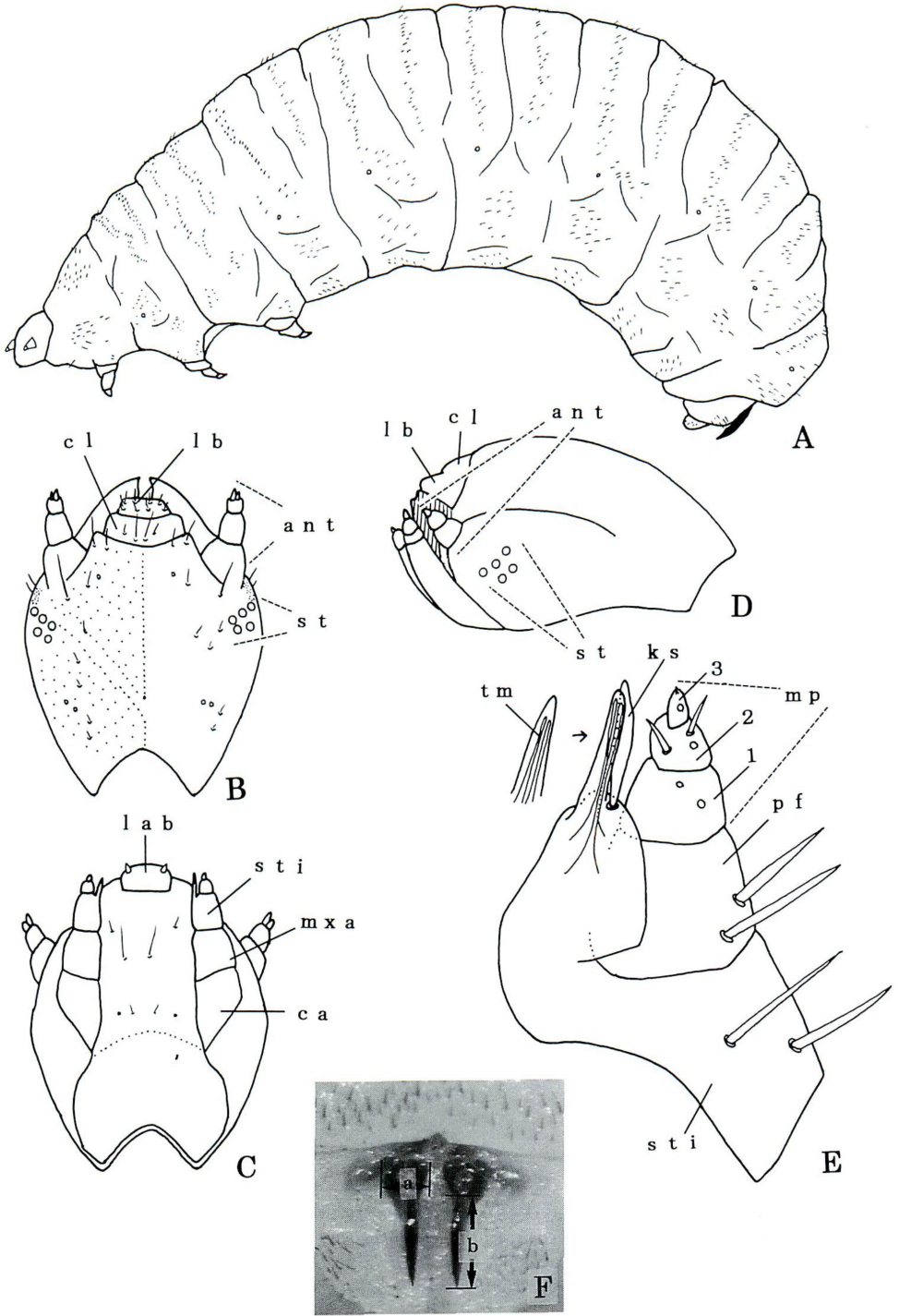
Abdominal setae soft and pale yellow. Hooks of 8th abdominal segment about 2.3 times as long as the basal width.

*Host.* *Carex thunbergii* STEUD.

*Specimens examined.* 7 exs., near Furu-ike, Shinano-machi, Nagano Pref., 18–VI–1989, Y. NARITA leg.; 5 exs., Okami, Satomi-mura, Ibaraki Pref., 5–VIII–1999, Y. NARITA leg.

Fig. 1. Larva of *Donacia splendens hiurai*. (head capsule and maxilla are aspect in slide-mounted specimen). — A, Larva (lateral view); B, head (dorsal view) (ant: antenna; cl: clypeus; lb: labrum; st: stemmata); C, ditto (ventral view) (ca: cardo; lab: labium; mxa: maxillary articulating area; sti: stipes); D, ditto (lateral view) (ant: antenna; cl: clypeus; lb: labrum; st: stemmata); E, left maxilla (ventral view) (ks: knife-shaped seta; mp: maxillary palpus; 1,2,3: 1st, 2nd and 3rd segments of palpus; pf: palpifer; sti: stipes; tm: thin mala); F, hooks of 8th abdominal segment (a: width, b: length).





***Plateumaris constricticollis toyamensis*** TOMINAGA et KATSURA, 1984

(Figs. 2 D, 3 D, 4 D, 5 D, 6 D, 8 D, 9 D, 10 D)

Body about 12.0 mm in length. Head capsule (Fig. 2 D) about 0.55 mm in breadth; dorsal surface and lateral sides with two pairs of setae and a pair of sensilla, respectively; frons with six pairs of setae and two pairs of sensilla. Antennae (Fig. 3 D) with the 1st, 2nd and 3rd segments in the ratio of 1: 0.46: 0.36 in length; 1st shorter than width. Maxillae (Fig. 8 D) with 2nd segment of palpus bearing a sensillum; 3rd with a sensillum. Labia-hypopharyngeal area with two sensilla and some microtrichia distributed as shown in Fig. 9 D.

Prothoracic tergum (Fig. 10 D) with median groove clearly visible. Legs with tarsal claws weakly arcuate. Abdominal setae relatively weak. Hooks of 8th abdominal segment about 2.2 times as long as the basal width.

*Host.* *Carex* sp.

*Specimens examined.* 6 exs., near Okugahora, Miyagawa-mura, Gifu Pref., 4–VI–1991, Y. NARITA leg.

***Plateumaris constricticollis chugokuensis*** TOMINAGA et KATSURA, 1984

(Figs. 2 E, 3 E, 4 E, 5 E, 6 E, 8 E, 9 E, 10 E)

Similar to the subsp. *constricticollis*, but differing as follows:

Body about 10.5 mm in length. Head capsule (Fig. 2 E) about 0.44 mm in breadth, moderately convergent posteriorly; anterior margin of frons nearly straight; dorsal surface and lateral sides with three pairs of setae and two pairs of sensilla, respectively; frons with six pairs of more or less strong setae and a pair of sensilla. Labrum with four setae and two sensilla in lateral half as shown in Fig. 4 E. Maxillae (Fig. 8 E) with a knife-shaped seta of mala 0.5 times as long as palpus, bearing two short setae and a sensillum; 2nd segment of palpus with a sensillum. Labia-hypopharyngeal area with four sensilla and two setiferous sensilla distributed as shown in Fig. 9 E.

Legs with tarsal claw short. Abdominal setae weak. Hooks of 8th abdominal segment about 2.2 times as long as the basal width.

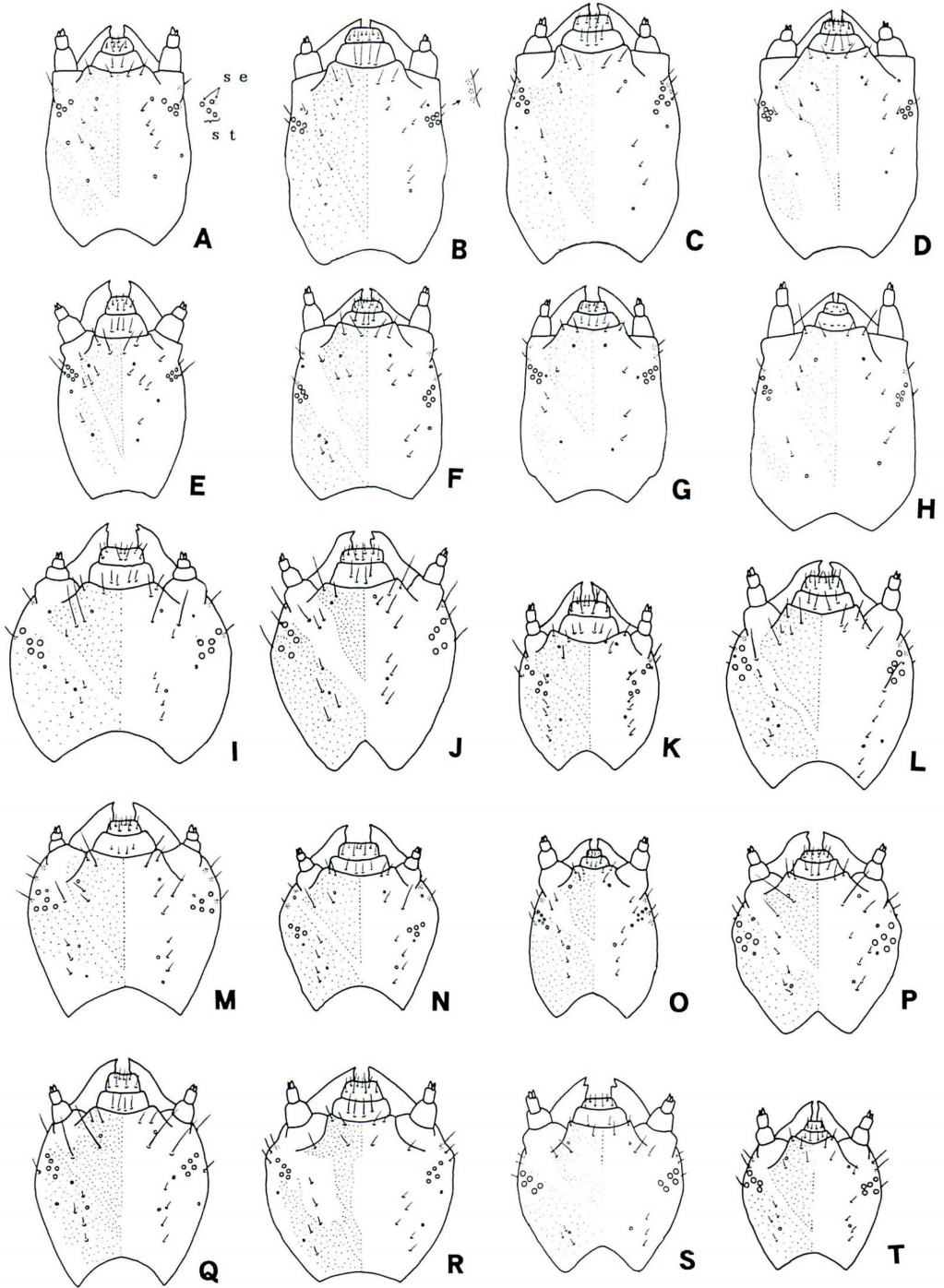
*Host.* *Scirpus* sp.

*Specimens examined.* 12 exs., Tonomine, Ôkawachi-chô, Hyôgo Pref., 2–V–1988, Y. NARITA leg.

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Fig. 2. Heads (se: sensilla; st: stemmata). — A, *Plateumaris akiensis*; B, *P. constricticollis constricticollis*; C, *P. c. babai*; D, *P. c. toyamensis*; E, *P. c. chugokuensis*; F, *P. weisei*; G, *P. sericea*; H, *P. shirahatai*; I, *D. bicoloricornis*; J, *D. clavareai*; K, *D. flemola*; L, *D. hirtihumeralis*; M, *D. japana*; N, *D. katurai*; O, *D. nitidior*; P, *D. sparganii gracilipes*; Q, *D. vulgaris*; R, *D. ozensis*; S, *D. lenzi*; T, *D. provostii*.





*Plateumaris weisei* (DUVIVIER, 1885)

(Figs. 2 F, 3 F, 4 F, 5 F, 6 F, 8 F, 9 F, 10 F)

Body about 9.0 mm in length, pale white.

Head capsule (Fig. 2 F) about 0.53 mm in breadth, more or less widened posteriorly in dorsal view, about 1.7 times as wide as the base; dorsal surface and lateral sides with five pairs of setae and two pairs of sensilla, respectively; frons with five pairs of setae and a pair of sensilla. Antennae (Fig. 3 F) with the 1st, 2nd and 3rd segments in the ratio of 1: 0.57: 0.33 in length; 1st a little longer than width; 2nd as long as wide, furnished with two minute sensilla, the sensory appendage projecting well beyond 3rd, and about as long as 2nd. Labrum with anterior margin slightly pointed at median part and rounded at the anterior corners, dorsum with four setae and two sensilla on lateral half as shown in Fig. 4 F. Epipharynx with anterior margin rounded, bearing three pairs of median and a pair of lateral setae arranged as shown in Fig. 5 F. Mandibles (Fig. 6 F) with small vanishing tooth of dorsal cutting edge; dorsal surface with three sensilla. Maxillae (Fig. 8 F) with stipes bearing a sensillum; palpifer with a sensillum; 2nd segment of palpus with a sensillum, and as long as 3rd; 3rd with a sensillum; mala with a knife-shaped seta 0.6 times as long as palpus. Labia-hypopharyngeal area with four sensilla, two setiferous sensilla and a few microtrichia distributed as shown in Fig. 9 F.

Prothoracic tergum (Fig. 10 F) with paired sclerites which are weakly sclerotized, though moderately sclerotized basally. Legs with tarsal claw nearly straight. Hooks of 8th abdominal segment about 2.2 times as long as the basal width.

*Host.* *Carex middendorffii* FR. SCHM.

*Specimens examined.* 5 exs., Aka-numa, Kushiro-shitsugen, Hokkaido, 24–VII–1991, Y. NARITA leg.

*Plateumaris sericea* (LINNAEUS, 1768)

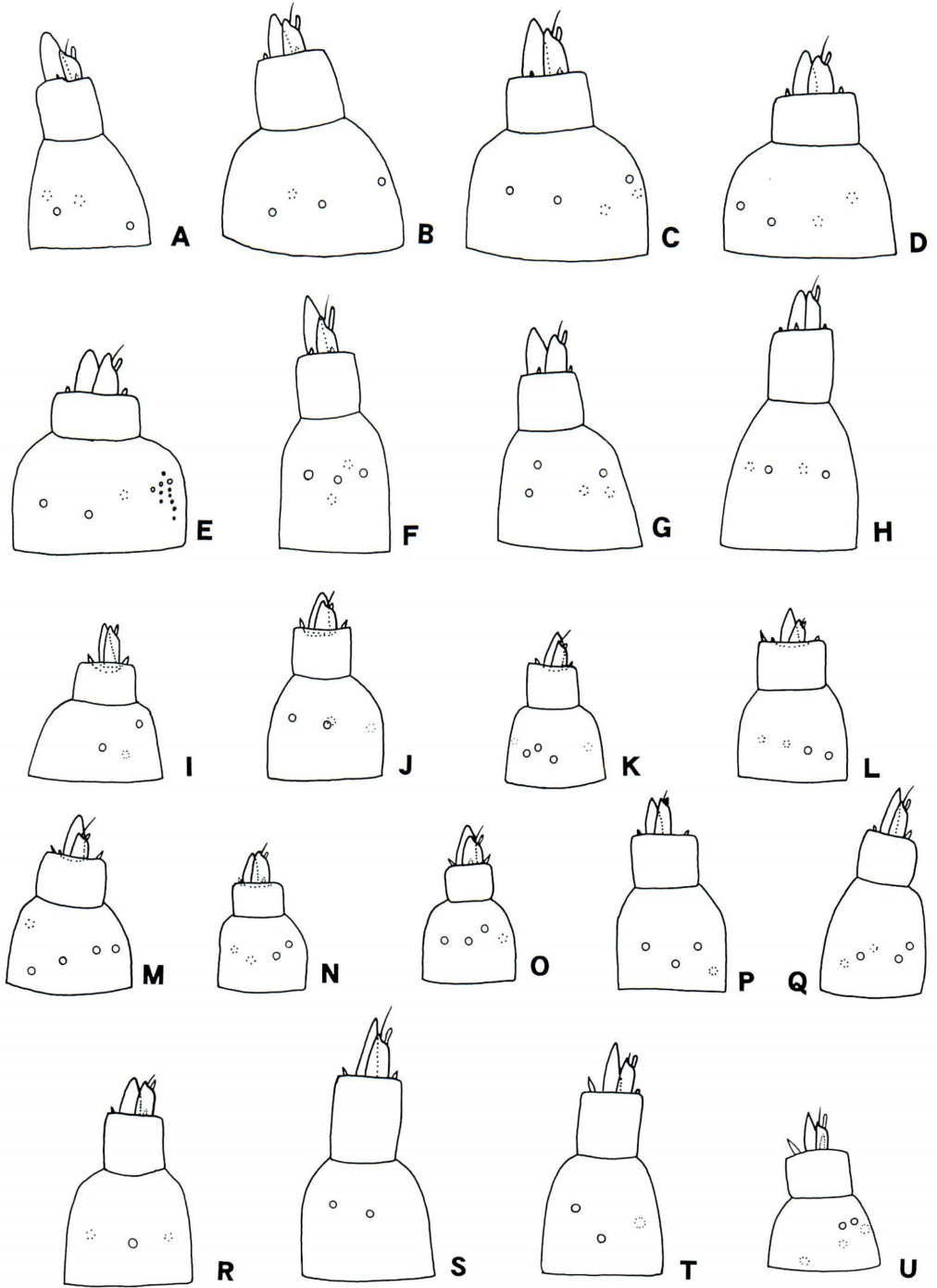
(Figs. 2 G, 3 G, 4 G, 5 G, 6 G, 8 G, 9 G, 10 G)

Body about 8.0 mm in length, milky white.

Head capsule (Fig. 2 G) about 0.52 mm in breadth, nearly twice as wide as the base; dorsal surface and lateral sides with four pairs of setae and a pair of sensilla, respectively; frons with three pairs of setae and two pairs of sensilla. Antennae (Fig. 3 G) with the 1st, 2nd and 3rd segments in the ratio of 1: 0.42: 0.29 in length; 1st a little longer than wide; 2nd a little shorter than wide, furnished with two minute sensilla, the sensory appendage hardly projecting beyond 3rd, and about as long as 2nd. Labrum with anterior margin waved; dorsum with four setae and two sensilla on lateral half as

Fig. 3. Antenna (right dorsal view). — A, *Plateumaris akiensis*; B, *P. constricticollis constricticollis*; C, *P. c. babai*; D, *P. c. toyamensis*; E, *P. c. chugokuensis*; F, *P. weisei*; G, *P. sericea*; H, *P. shirahatai*; I, *Donacia bicoloricornis*; J, *D. clavareau*; K, *D. flemola*; L, *D. hirtihumeralis*; M, *D. japana*; N, *D. katurai*; O, *D. nitidior*; P, *D. sparganii gracilipes*; Q, *D. splendens hiurai*; R, *D. vulgaris*; S, *D. ozensis*; T, *D. lenzi*; U, *D. provostii*.





shown in Fig. 4 G. Epipharynx with posterior corners angulate, bearing two pairs of median and two pairs of lateral setae arranged as shown in Fig. 5 G. Mandibles (Fig. 6 G) clearly serrated behind dorso-apical tooth, dorsal surface with three sensilla. Maxillae (Fig. 8 G) with stipes bearing a sensillum; palpifer without sensilla; 2nd segment of palpus with a sensillum, and about a half as long as 3rd; 3rd with a sensillum; mala with a knife-shaped seta 0.8 times as long as palpus. Labia-hypopharyngeal area with four sensilla, two setiferous sensilla and some microtrichia distributed as shown in Fig. 8 G.

Prothoracic tergum (Fig. 10 G) with paired sclerites which are uniformly sclerotized. Legs with tarsal claws thick at the bases. Hooks of 8th abdominal segment about 2.2 times as wide as the basal width.

*Host.* *Carex dispalata* BOOTT. *Scirpus fluviatilis* (TORR.) A. GRAY.

*Specimens examined.* 22 exs., Kotoku-numa, Urizura-machi, Ibaraki Pref., 3–IX–1989, Y. NARITA leg.

***Plateumaris shirahatai* KIMOTO, 1971**

(Figs. 2 H, 3 H, 4 H, 5 H, 6 H, 8 H, 9 H, 10 H)

Body about 12.0 mm in length, pale white.

Head capsule (Fig. 2 H) about 0.57 mm in breadth, slightly widened posteriorly in dorsal view, nearly twice as wide as the base; dorsal surface and lateral sides with four pairs of setae and a pair of sensilla, respectively; frons with four pairs of setae and a pair of sensilla. Antennae (Fig. 3 H) with the 1st, 2nd and 3rd segments in the ratio of 1: 0.46: 0.25 in length; 1st as long as wide; 2nd as long as wide, furnished with two minute sensilla, the sensory appendage as long as 3rd and shorter than 2nd. Labrum with anterior margin retracted at median part; dorsum with three setae and two sensilla on lateral half as shown in Fig. 4 H. Epipharynx with anterior margin waved, bearing two pairs of median and two pairs of lateral setae arranged as shown in Fig. 5 H. Mandibles (Fig. 6 H) moderately serrated behind dorso-apical tooth. Maxillae (Fig. 8 H) with stipes bearing a sensillum; palpifer with a sensillum; 2nd segment of palpus as long as 3rd, bearing a sensillum; 3rd with a sensillum; mala with a knife-shaped seta 0.7 times as long as palpus. Labia-hypopharyngeal area with two sensilla and two setiferous sensilla distributed as shown in Fig. 9 H.

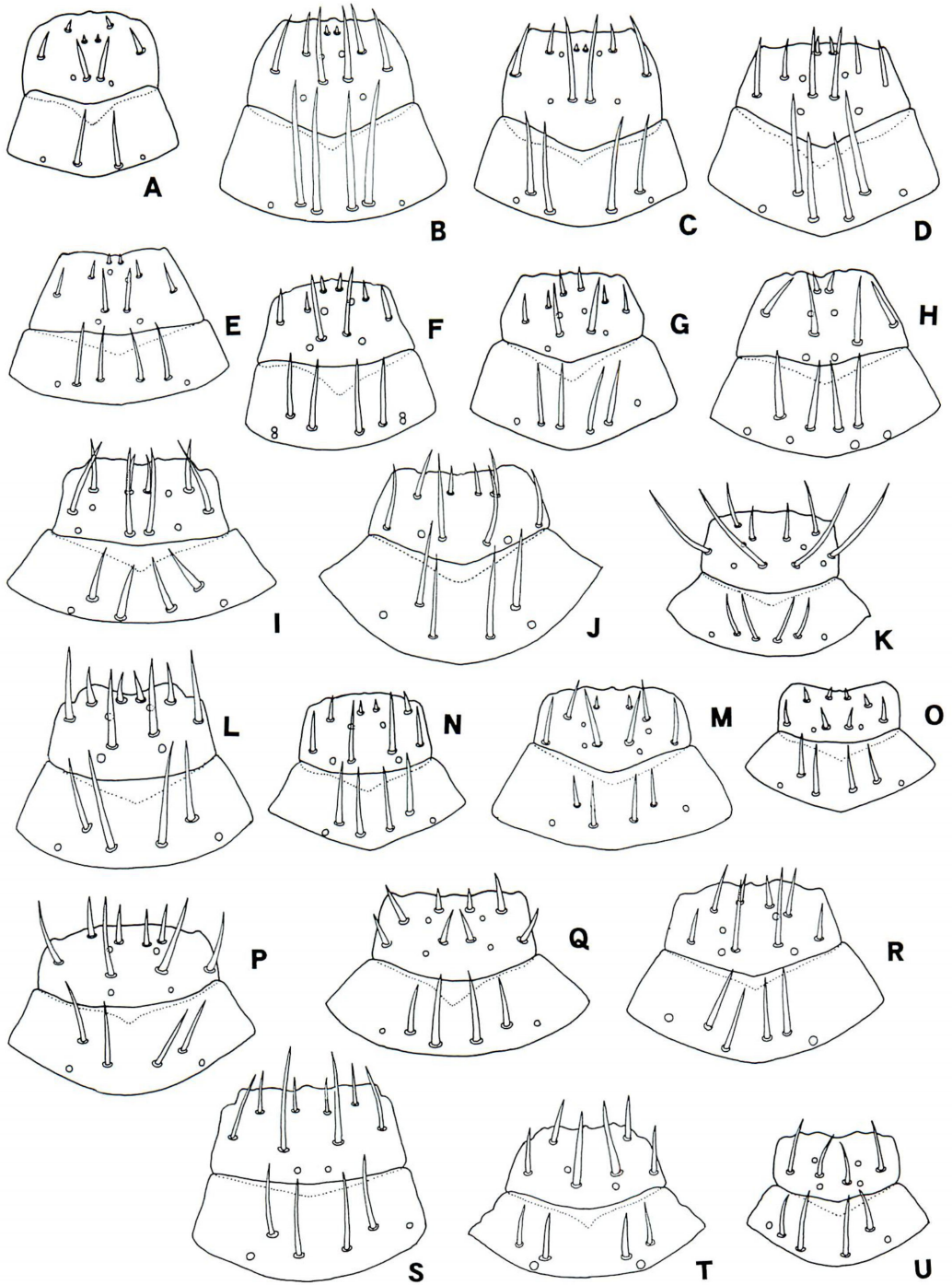
Prothoracic tergum (Fig. 10 H) with paired sclerites which are weakly sclerotized. Legs comparatively small; tarsal claws thick at bases. Hooks of 8th abdominal segment about 2.0 times as wide as the basal width.

*Host.* *Carex* sp.

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Fig. 4. Clypeus and Labrum. — A, *Plateumaris akiensis*; B, *P. constricticollis constricticollis*; C, *P. c. babai*; D, *P. c. toyamensis*; E, *P. c. chugokuensis*; F, *P. weisei*; G, *P. sericea*; H, *P. shirahatai*; I, *Donacia bicoloricornis*; J, *D. clavareauï*; K, *D. flemola*; L, *D. hirtihumeralis*; M, *D. japana*; N, *D. katsurai*; O, *D. nitidior*; P, *D. sparganii gracilipes*; Q, *D. splendens hiurai*; R, *D. vulgaris*; S, *D. ozensis*; T, *D. lenzi*; U, *D. provostii*.





*Specimens examined.* 6 exs., Shizu, Nishikawa-machi, Yamagata Pref., 29-X-1998, Y. NARITA leg.

### Tribe Donaciini

#### *Donacia (Donaciomima) bicoloricornis* CHEN, 1941

(Figs. 2 I, 3 I, 4 I, 5 I, 6 I, 8 I, 9 I, 10 I)

Body about 10.2 mm in length, milky white.

Head capsule (Fig. 2 I) about 0.76 mm in breadth, evenly rounded laterally, about 1.6 times as wide as the base, dorsal surface and lateral sides with six pairs of setae and two pairs of sensilla, respectively; frons with five pairs of setae and two pairs of sensilla. Antennae (Fig. 3 I) with the 1st, 2nd and 3rd segments in the ratio of 1: 0.53: 0.47 in length; 1st about twice as wide as long; 2nd a little shorter than width, furnished with two sensilla, the sensory appendage about as long as 3rd, which is subequal to 2nd in length. Labrum with anterior margin retracted at median part, labro-clypeal suture nearly straight; dorsum with four setae and two sensilla on lateral half as shown in Fig. 4 I. Epipharynx with anterior margin transversely retracted medially and incised laterally, bearing three pairs of median and two pairs of lateral setae arranged as shown in Fig. 5 I. Mandibles (Fig. 6 I) obscurely serrated behind dorso-apical tooth; dorsal surface with three sensilla. Maxillae (Fig. 8 I) with stipes bearing a sensillum; palpifer without sensilla; 2nd segment of palpus with a sensillum; 3rd without sensilla; mala with a knife-shaped seta 1.1 times as long as palpus. Labia-hypopharyngeal area with six sensilla and eight setiferous sensilla distributed as shown in Fig. 9 I.

Prothoracic tergum (Fig. 10 I) with clearly visible median groove. Legs with tarsal claws strongly arcuate. Hooks of 8th abdominal segment about 2.4 times as long as the basal width.

*Host.* *Sparganium erectum* L.

*Specimens examined.* 3 exs., Someya, Ishioka City, Ibaraki Pref., 6-VIII-1991, Y. NARITA leg.

#### *Donacia (Donaciomima) clavareai* JACOBSON, 1906

(Figs. 2 J, 3 J, 4 J, 5 J, 6 J, 8 J, 9 J, 10 J)

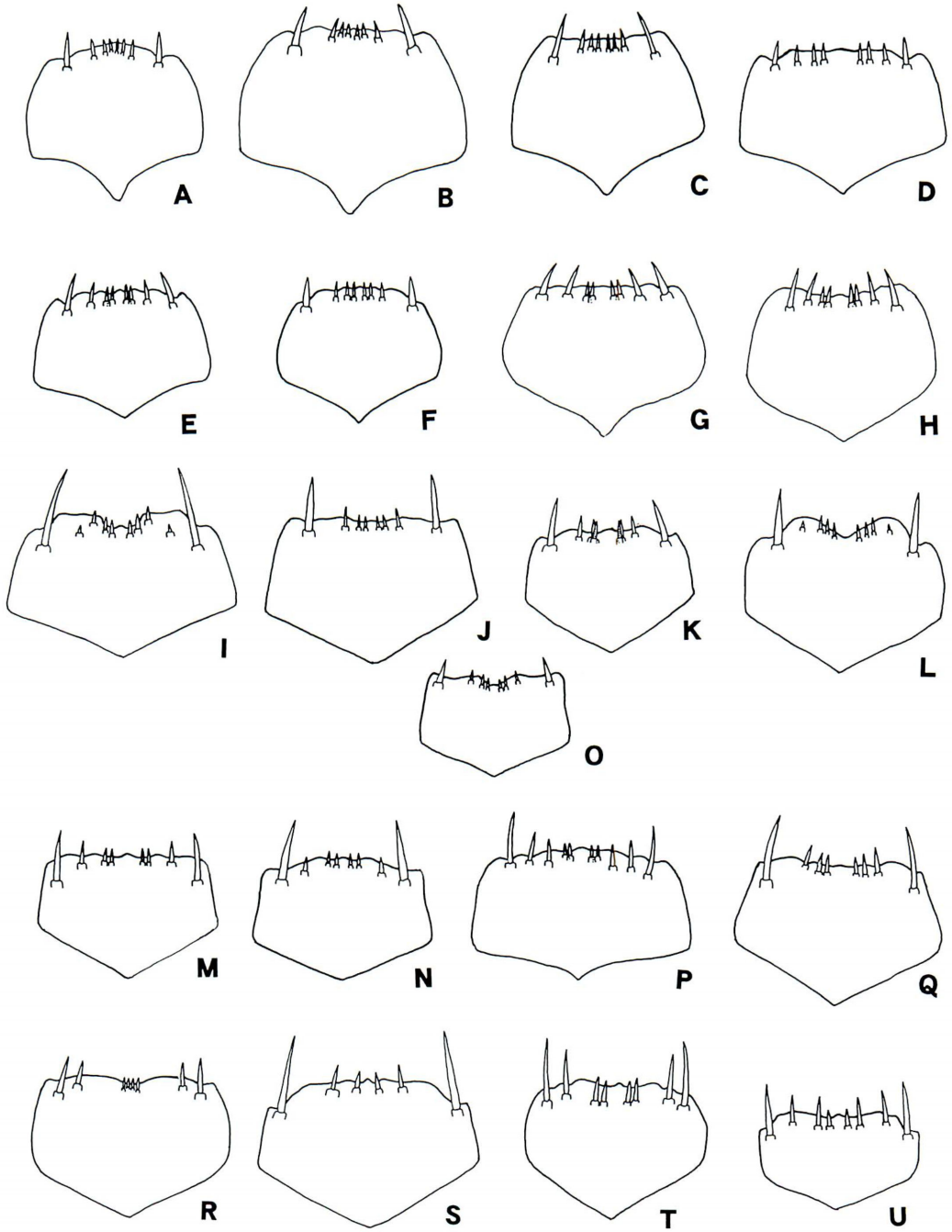
Body about 10.2 mm in length, milky white.

Head capsule (Fig. 2 J) about 0.62 mm in breadth, about 2.2 times as wide as the base, strongly convergent posteriad; hind margin of head capsule acutely concave; dor-

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Fig. 5. Epipharynx. — A, *Plateumaris akiensis*; B, *P. constricticollis constricticollis*; C, *P. c. babai*; D, *P. c. toyamensis*; E, *P. c. chugokuensis*; F, *P. weisei*; G, *P. sericea*; H, *P. shirahatai*; I, *Donacia bicoloricornis*; J, *D. clavareai*; K, *D. flemola*; L, *D. hirtihumeralis*; M, *D. japana*; N, *D. katsurai*; O, *D. nitidior*; P, *D. sparganii gracilipes*; Q, *D. splendens hiurai*; R, *D. vulgaris*; S, *D. ozensis*; T, *D. lenzi*; U, *D. provostii*.





sal surface and lateral sides with seven pairs of setae and a pair of sensilla, respectively; frons with five pairs of setae and a pair of sensilla. Antennae (Fig. 3 J) with the 1st, 2nd and 3rd segments in the ratio of 1: 0.50: 0.25 in length; 1st a little shorter than wide; 2nd as long as wide, furnished with two sensilla, the sensory appendage hardly projecting beyond 3rd and a little shorter than 2nd. Labrum with four setae and two sensilla on lateral half as shown in Fig. 4 J. Epipharynx with three pairs of median and a pair of lateral setae arranged as shown in Fig. 5 J. Mandibles (Fig. 6 J) obscurely serrated behind dorso-apical tooth; dorsal surface with four sensilla. Maxillae (Fig. 8 J) with stipes without sensilla; palpifer bearing a sensillum; 2nd segment of palpus with two setae and a little shorter than 3rd, 3rd without sensilla; mala with a knife-shaped seta 1.0 times as long as palpus. Labia-hypopharyngeal area with four sensilla and six setiferous sensilla distributed as shown in Fig. 9 J.

Prothoracic tergum (Fig. 10 J) with paired sclerites which are strongly sclerotized. Legs with tarsal claws weakly curved and dull. Hooks of 8th abdominal segment about 2.6 times as long as the basal width.

*Host.* *Scirrpus fluviatilis* (TORR.) A. GRAY.

*Specimens examined.* 12 exs., Kotoku-numa, Urizura-machi, Ibalaki Pref., 1–IX–1991, Y. NARITA leg.

*Notes.* The larval structure of this species was already described in my previous paper (1991), but a redescription is given in the present study.

***Donacia (Donaciomima) flemola* GÖECKE, 1944**

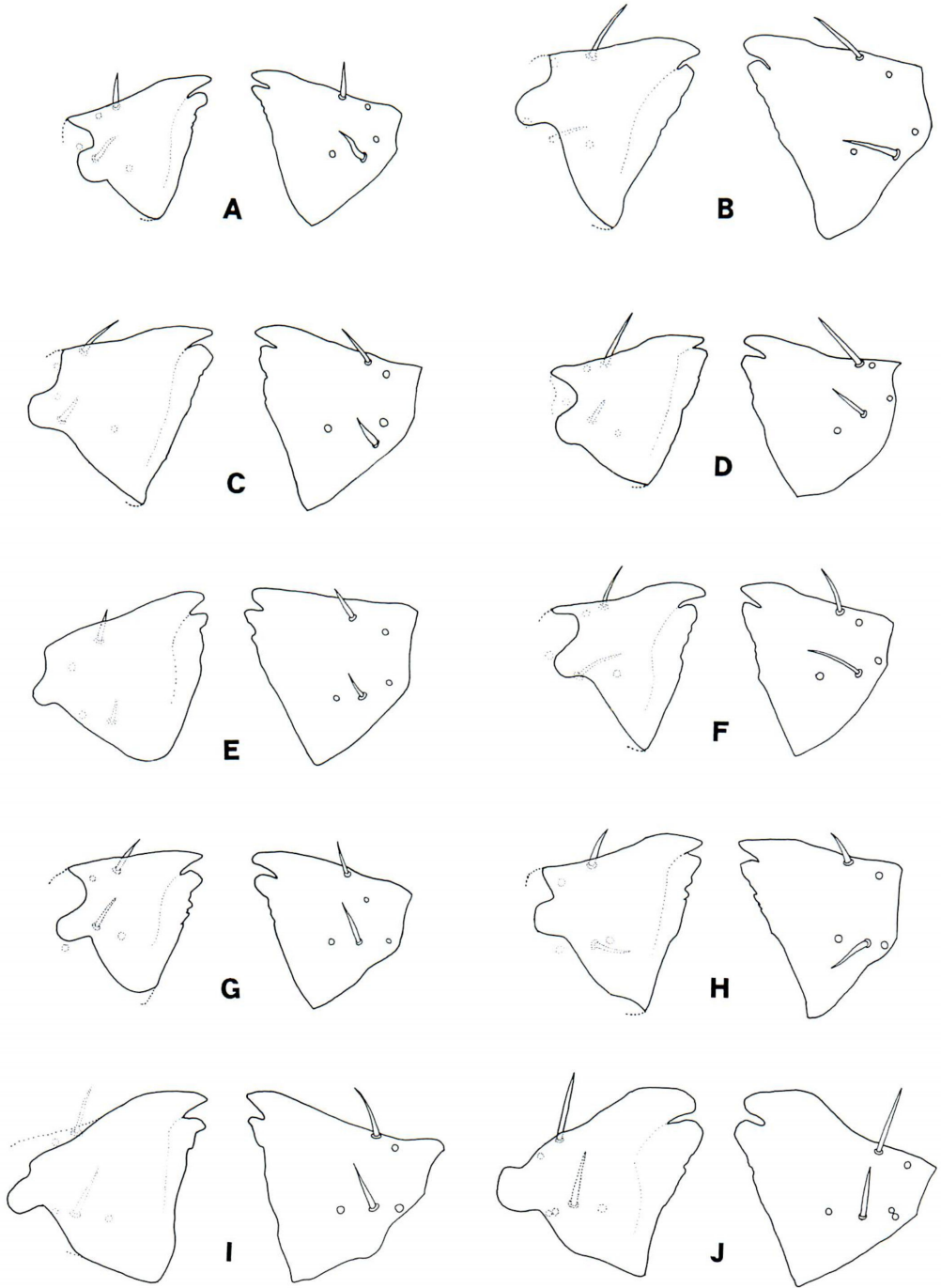
(Figs. 2 K, 3 K, 4 K, 5 K, 7 K, 8 K, 9 K, 10 K)

Body about 9.5 mm in length, milky white.

Head capsule (Fig. 2 K) about 0.48 mm in breadth, comparatively parallel-sided in dorsal view, dorsum about 2.4 times as wide as the base; dorsal surface and lateral sides with six pairs of setae and a pair of sensilla, respectively; frons with four pairs of setae and two pairs of sensilla; stemmata with the anterior one widely apart from the other. Antennae (Fig. 3 K) with the 1st, 2nd and 3rd segments in the ratio of 1: 0.53: 0.27 in length; 1st a little shorter than width; 2nd as long as wide, furnished with two minute sensilla, the sensory appendage hardly projecting beyond 3rd, and a little shorter than 2nd. Labrum with anterior margin nearly straight; dorsum with four setae and two sensilla on lateral half as shown in Fig. 4 K. Epipharynx with three pairs of median and a pair of lateral setae arranged as shown in Fig. 5 K. Mandibles (Fig. 7 K) with a small tooth on dorsal cutting edge being obsolete; dorsal surface with three sensilla. Maxillae (Fig. 8 K) with stipes bearing a sensillum; palpifer with a sensillum; 2nd segment of palpus with a sensillum, 3rd without sensilla; mala with a knife-shaped

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Fig. 6. Mandibles (right dorsal and ventral view). — A, *Plateumaris akiensis*; B, *P. constricticollis*; C, *P. c. babai*; D, *P. c. toyamensis*; E, *P. c. chugokuensis*; F, *P. weisei*; G, *P. sericea*; H, *P. shirahatai*; I, *Donacia bicoloricornis*; J, *D. clavareau*.





seta 0.7 times as long as palpus. Labia-hypopharyngeal area with 12 sensilla and two setiferous sensilla distributed as shown in Fig. 9 K.

Prothoracic tergum (Fig. 10 K) with paired sclerites which are weakly sclerotized, especially at the central part. Legs with tarsal claw directed ventrad. Hooks of 8th abdominal segment about 2.0 times as long as the basal width.

*Host.* *Carex otaruensis* FRANCH.

*Specimens examined.* 10 exs., Okami, Satomi-mura, Ibaraki Pref., 4–VIII–1991, Y. NARITA leg.

***Donacia (Donaciomima) hirtihumeralis* KOMIYA et KUBOTA, 1987**

(Figs. 2 L, 3 L, 4 L, 5 L, 7 L, 8 L, 9 L, 10 L)

Body about 10.8 mm in length, milky white.

Head capsule (Fig. 2 L) about 0.64 mm in breadth, nearly twice as wide as base; dorsal surface and lateral sides with eight pairs of strong setae and three pairs of sensilla, respectively; frons with six pairs of setae. Antennae (Fig. 3 L) with the 1st, 2nd and 3rd segments in the ratio of 1: 0.53: 0.24 in length; 1st a little shorter than wide, 2nd more or less shorter than wide, furnished with three sensilla, two of which are minute, the sensory appendage projecting beyond the 3rd and a little shorter than 2nd. Labrum with anterior margin exceedingly retracted medially, and clearly incised at corners, dorsum with four setae and two sensilla on lateral half as shown in Fig. 4 L. Epipharynx markedly concave, bearing three pairs of median and two pairs of lateral setae arranged as shown in Fig. 5 L. Mandibles (Fig. 7 L) comparatively small, obscurely serrated behind dorso-apical tooth; dorsal surface with three sensilla. Maxillae (Fig. 8 L) with stipes bearing a sensillum; palpifer with a sensillum; 2nd segment of palpus as long as 3rd, bearing a sensillum; 3rd with a sensillum. Labia-hypopharyngeal area with eight sensilla and two setiferous sensilla distributed as shown in Fig. 9 L.

Prothoracic tergum (Fig. 10 L) with paired sclerites which are narrow and strongly sclerotized at base. Legs slender. Hooks of 8th abdominal segment about 2.6 times as long as the basal width.

*Host.* *Schoenoplectus tabernaemontani* GMEL.

*Specimens examined.* 20 exs., Mukai-tameike, Kitsuregawa-machi, Tochigi Pref., 5–IX–1991, Y. NARITA leg.

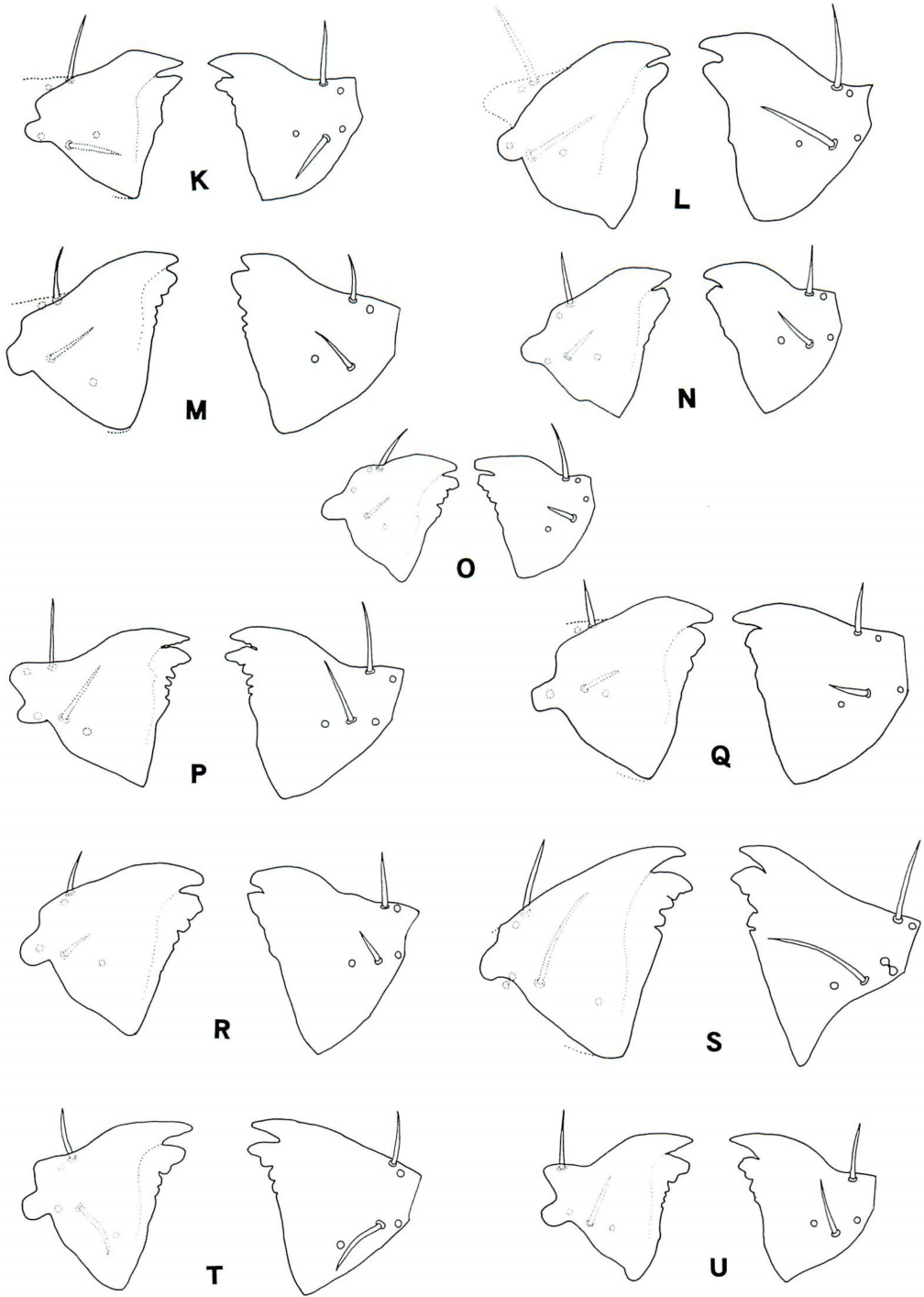
***Donacia (Donaciomima) japana* CHŪJŌ et GOECKE, 1956**

(Figs. 2 M, 3 M, 4 M, 5 M, 7 M, 8 M, 9 M, 10 M)

Body about 11.0 mm in length, milky white.

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Fig. 7. Mandibles (right dorso-apical and ventral view). — K, *D. flemola*; L, *D. hirtihumeralis*; M, *D. japana*; N, *D. katsurai*; O, *D. nitidior*; P, *D. sparganii gracilipes*; Q, *D. splendens hiurai*; R, *D. vulgaris*; S, *D. ozensis*; T, *D. lenzi*; U, *D. provostii*.



Head capsule (Fig. 2 M), about 0.66 mm in breadth, about 1.5 times as wide as base; dorsal surface and lateral sides with six pairs of setae and two pairs of sensilla, respectively; frons with five pairs of setae and two pairs of sensilla. Antennae (Fig. 3 M) with the 1st, 2nd and 3rd segments in the ratio of 1: 0.56 : 0.22 in length; 1st a little shorter than wide, 2nd as long as wide, furnished with three minute sensilla, one of which is minute, the sensory appendage hardly projecting beyond 3rd, and a little shorter than 2nd. Labrum with anterior margin slightly pointed at median part, dorsum with four setae and two sensilla on lateral half as shown in Fig. 4 M. Epipharynx with anterior margin slightly pointed at median part, bearing two pairs of median and two pairs of lateral setae arranged as shown in Fig. 5 M. Mandibles (Fig. 7 M) moderately serrated behind dorso-apical tooth; dorsal surface with two sensilla. Maxillae (Fig. 8 M) with stipes without sensilla; palpifer without sensilla; 2nd segment of palpus about as long as 3rd, and without sensilla; mala with a knife-shaped seta 0.9 times as long as palpus. Labia-hypopharyngeal area with four sensilla and six setiferous sensilla distributed as shown in Fig. 9 M.

Prothoracic tergum (Fig. 10 M) with median groove clearly visible. Legs with small tarsal claws. Hooks of 8th abdominal segment about 2.2 times as long as the basal width.

*Host.* *Sparganium japonicum* ROTHERT.

*Specimens examined.* 6 exs., Yamabe, Juô-machi, Ibaraki Pref., 31–VIII–1988, Y. NARITA leg.

***Donacia (Donaciomima) katsurai* KIMOTO, 1981**

(Figs. 2 N, 3 N, 4 N, 5 N, 7 N, 8 N, 9 N, 10 N)

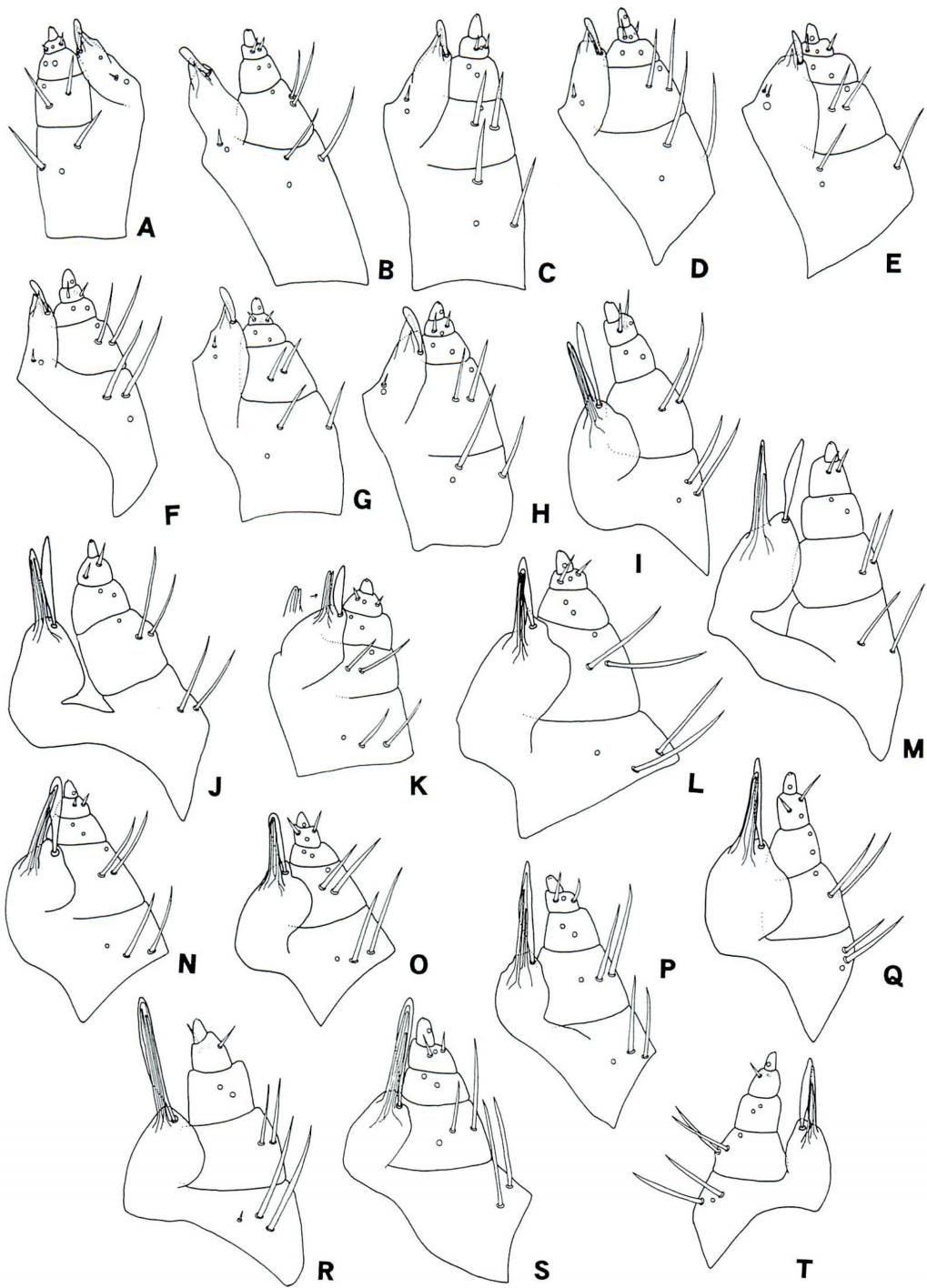
Body about 10.2 mm in length, milky white.

Head capsule (Fig. 2 N) about 0.55 mm in breadth, nearly twice as wide as the base; dorsal surface and lateral sides with six pairs of setae and three pairs of sensilla, respectively; frons with four pairs of setae and a pair of sensilla; stemmata with four pigmented spots on each side. Antennae (Fig. 3 N) with the 1st, 2nd and 3rd segments in the ratio of 1: 0.40: 0.40 in length; 1st a little shorter than width; 2nd a little shorter than width, furnished with two minute sensilla, 3rd about as long as the sensory appendage. Labrum with anterior margin nearly straight; dorsum with three long setae and a short seta and two sensilla on lateral half as shown in Fig. 4 N. Epipharynx with two pairs of median and two pairs of lateral setae arranged as shown in Fig. 5 N. Mandibles (Fig. 7 N) comparatively slender, obscurely serrated behind dorso-apical tooth; dorsal surface with three sensilla. Maxillae (Fig. 8 N) with stipes bearing a sen-

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Fig. 8. Maxillae (right ventral view except Figs. A, T). — A, *Plateumaris akiensis*; B, *P. constricticollis constricticollis*; C, *P. c. babai*; D, *P. c. toyamensis*; E, *P. c. chugokuensis*; F, *P. weisei*; G, *P. sericea*; H, *P. shirahatai*; I, *Donacia bicoloricornis*; J, *D. clavareau*; K, *D. femola*; L, *D. hirtihumeralis*; M, *D. japana*; N, *D. katsurai*; O, *D. nitidior*; P, *D. sparganii gracilipes*; Q, *D. vulgaris*; R, *D. ozensis*; S, *D. lenzi*; T, *D. provostii*.





sillum; palpifer with a sensillum; 2nd segment of palpus without sensilla; 3rd with a sensillum; mala with a knife-shaped seta 1.2 times as long as palpus. Labia-hypopharyngeal area with six sensilla and six setiferous sensilla distributed as shown in Fig. 9N.

Prothoracic tergum (Fig. 10N) with paired sclerites which are uniformly sclerotized. Legs comparatively short. Hooks of 8th abdominal segment about 2.5 times as long as the basal width.

*Host.* *Carex omiana* FRANCH. et SAVAT.

*Specimens examined.* 6 exs. (2 exs. reared), Todoma, Kamigôri-chô, Hyôgo Pref., 19-V-1991, Y. NARITA leg.

***Donacia (Donaciomima) nitidior* (NAKANE, 1963)**

(Figs. 2O, 3O, 4O, 5O, 7O, 8O, 9O, 10O)

Body about 8.8 mm in length, milky white.

Head capsule (Fig. 2O) about 0.44 mm in breadth, more or less wide posteriorly in dorsal view, about 1.8 times as wide as the base; dorsal surface and lateral sides with seven pairs of setae and two pairs of sensilla, respectively; frons with five pairs of setae and a pair of sensilla; stemmata minute. Antennae (Fig. 3O) with the 1st, 2nd and 3rd in the ratio of 1: 0.44: 0.31 in length; 1st a little shorter than width, and twice as long as 2nd; 2nd as long as wide, furnished with three sensilla, the sensory appendage projecting beyond 3rd and about as long as 2nd. Labrum with anterior margin moderately retracted; dorsum with four short setae and a sensillum on lateral half as shown in Fig. 4O. Epipharynx strongly retracted at median part, bearing three pairs of median and a pair of lateral setae arranged as shown in Fig. 5O. Mandibles (Fig. 7O) clearly serrated behind dorso-apical tooth; dorsal surface with three sensilla. Maxillae (Fig. 8O) with stipes bearing a sensillum; palpifer with a sensillum; 1st segment of palpus about as long as 2nd; 2nd with a sensillum; 3rd with a sensillum; mala with a knife-shaped seta 1.1 times as long as palpus. Labia-hypopharyngeal area with four sensilla and six setiferous sensilla distributed as shown in Fig. 9O.

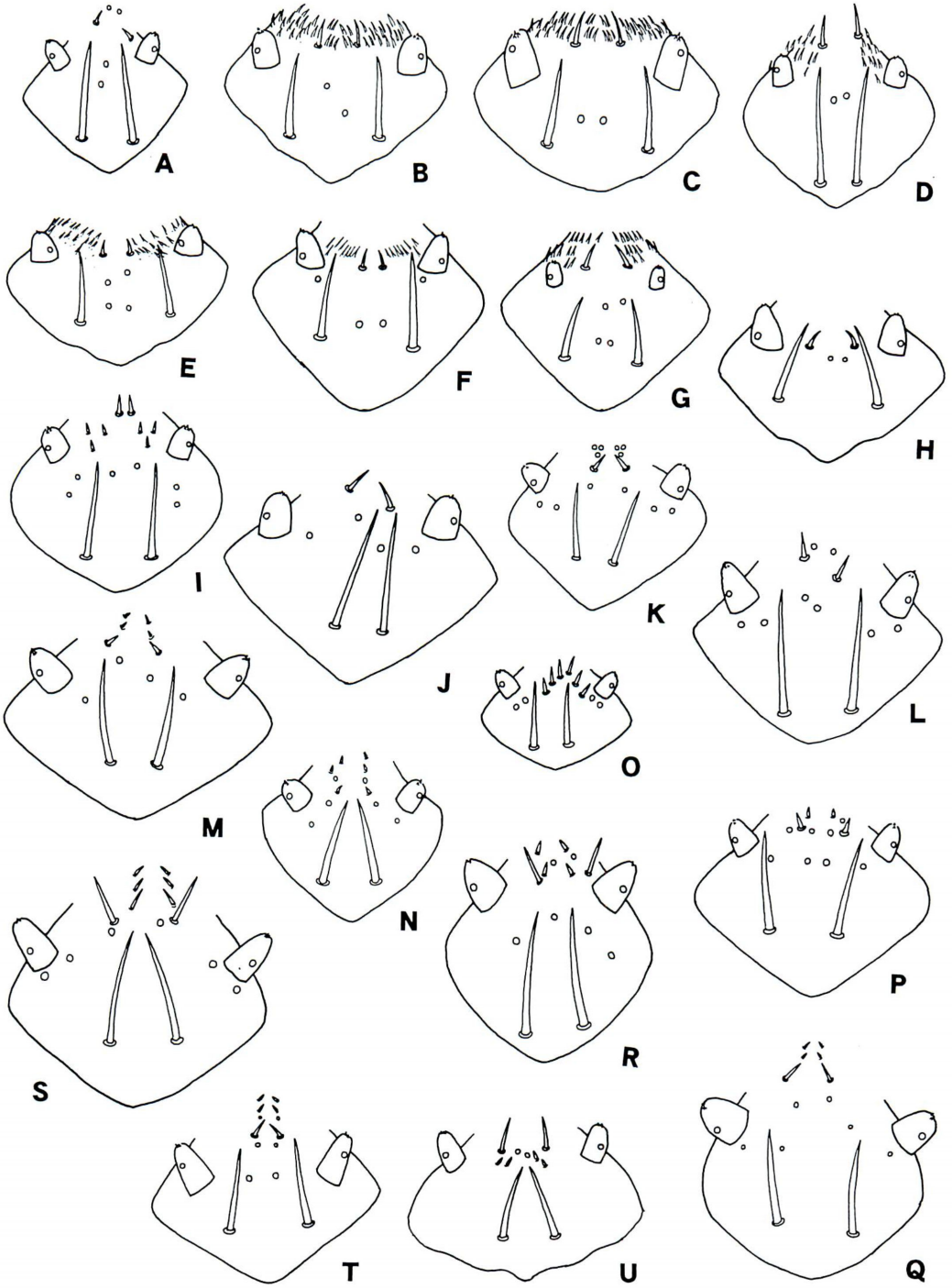
Prothoracic tergum (Fig. 10O) with paired sclerites which are rather strongly sclerotized. Legs with comparatively stout tarsi; tarsal claws dull. Hooks of the 8th abdominal segment about 2.8 times as long as basal width.

*Host.* *Carex dickinsii* FRANCH. et SAVAT.

*Specimens examined.* 6 exs., Uwaso, Yasato-machi, Ibaraki Pref., 6-VIII-1991, Y. NARITA leg.

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Fig. 9. Labia-Hypopharyngeal area. — A, *Plateumaris akiensis*; B, *P. constricticollis constricticollis*; C, *P. c. babai*; D, *P. c. toyamensis*; E, *P. c. chugokuensis*; F, *P. weisei*; G, *P. sericea*; H, *P. shirahatai*; I, *Donacia bicoloricornis*; J, *D. clavareauii*; K, *D. flemola*; L, *D. hirtihumeralis*; M, *D. japana*; N, *D. katsurai*; O, *D. nitidior*; P, *D. sparganii gracilipes*; Q, *D. splendens hiurai*; R, *D. vulgaris*; S, *D. ozensis*; T, *D. lenzi*; U, *D. provostii*.





***Donacia (Donaciomima) sparganii gracilipes* JACOBY, 1885**

(Figs. 2 P, 3 P, 4 P, 5 P, 7 P, 8 P, 9 P, 10 P)

Body about 10.5 mm in length, milky white.

Head capsule (Fig. 2 P) about 0.58 mm in breadth, unevenly narrowed towards the base in dorsal view and about 2.5 times as wide as base; dorsal surface and lateral sides with seven pairs of setae and three pairs of sensilla, respectively; frons with five pairs of setae and a pair of sensilla; stemmata with anterior one apart from the other. Antennae (Fig. 3 P) with the 1st, 2nd and 3rd segments in the ratio of 1: 0.50: 0.35 in length; 1st a little shorter than width; 2nd as long as wide, furnished with two minute sensilla, the sensory appendage as long as 2nd, hardly projecting beyond 3rd, and 2/3 as long as the 2nd. Labrum with anterior corners produced; dorsum with four setae and two sensilla on lateral half as shown in Fig. 4 P. Epipharynx with anterior margin slightly pointed at median part, bearing two pairs of median and three pairs of lateral setae arranged as shown in Fig. 5 P, distances of three lateral setae being equal to one another. Mandibles (Fig. 7 P) clearly serrated behind dorso-apical tooth, furnished with three sensilla on dorsal surface. Maxillae (Fig. 8 P) with stipes bearing a sensillum; palpifer with a sensillum; 1st segment of palpus about twice as long as 2nd or 3rd; 2nd with a sensillum; 3rd without sensilla; mala with a knife-shaped seta 1.3 times as long as palpus. Labia-hypopharyngeal area with eight sensilla and four setiferous sensilla distributed as shown in Fig. 9 P.

Prothoracic tergum (Fig. 10 P) with clearly visible median groove; paired sclerites weakly sclerotized. Legs with tarsal claws strongly arcuate. Hooks of the 8th abdominal segment about 2.5 times as long as the basal width.

*Host.* *Sparganium* sp.

*Specimens examined.* 4 exs., Fukushima City, Fukushima Pref., 22-X-1991, Y. NARITA leg.

***Donacia (Donaciomima) splendens hiurai* KIMOTO, 1983**

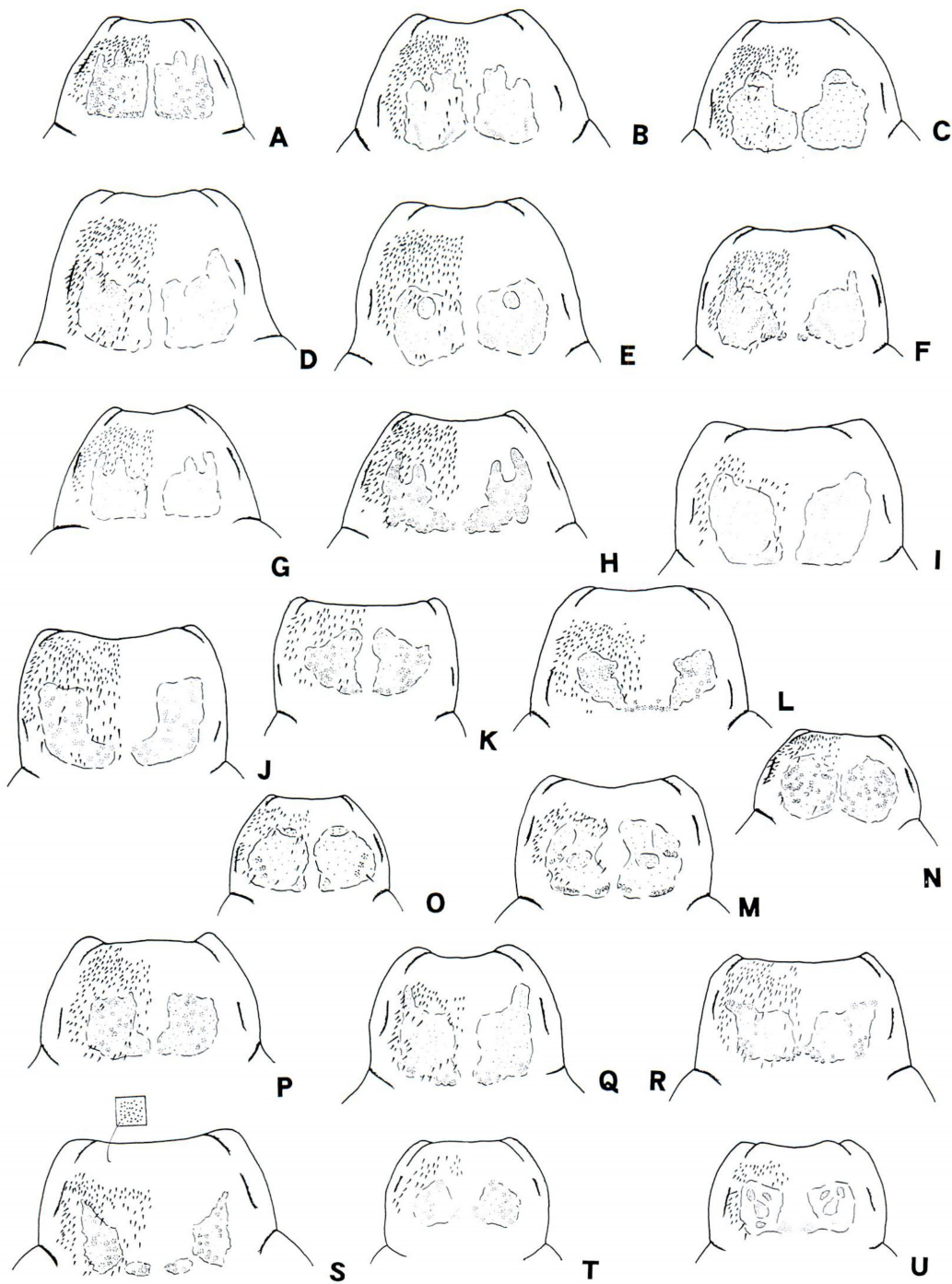
(Figs. 1 A-F, 3 Q, 4 Q, 5 Q, 7 Q, 9 Q, 10 Q)

Body (Fig. 1 A) about 9.8 mm in length, milky white.

Head capsule (Figs. 1 B, C, D) about 0.55 mm in breadth, about 2.3 times as wide as the base, strongly narrowed posteriad; dorsal surface and lateral sides with six pairs of setae and three pairs of sensilla, respectively; frons with five pairs of setae and a pair of sensilla. Antennae (Fig. 3 Q) with the 1st, 2nd and 3rd segments in the ratio of 1: 0.41: 0.35 in length; 1st longer than width and about twice as long as 2nd; 2nd as long

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Fig. 10. Prothoracic tergum. — A, *Plateumaris akiensis*; B, *P. constricticollis constricticollis*; C, *P. c. babai*; D, *P. c. toyamensis*; E, *P. c. chugokuensis*; F, *P. weisei*; G, *P. sericea*; H, *P. shirahatai*; I, *Donacia bicoloricornis*; J, *D. clavareai*; K, *D. flemola*; L, *D. hirtihumeralis*; M, *D. japana*; N, *D. katsurai*; O, *D. nitidior*; P, *D. sparganii gracilipes*; Q, *D. splendens hiurai*; R, *D. vulgaris*; S, *D. ozensis*; T, *D. lenzi*; U, *D. provostii*.



as wide, furnished with two sensilla, the sensory appendage projecting beyond 3rd and as long as the 2nd. Labrum with anterior corners produced; dorsum with four short setae and two sensilla on lateral half as shown in Fig. 4 Q. Epipharynx with two pairs of median and two pairs of lateral setae arranged as shown in Fig 5 Q. Mandibles (Fig. 7 Q) obscurely serrated behind dorso-apical tooth; dorsal surface with three sensilla. Maxillae (Fig. 8 Q) with stipes without sensilla; palpifer without sensilla; 2nd segment of palpus with a sensillum; 3rd with a sensillum; mala with a knife-shaped seta 0.8 times as long as palpus. Labia-hypopharyngeal area with six sensilla and six setiferous sensilla distributed as shown in Fig. 9 Q.

Prothoracic tergum (Fig. 10 Q) with paired sclerites which are uniformly sclerotized. Legs with tarsal claws thick at bases and thin at apices. Hooks of 8th abdominal segment (Fig. 1 F) about 2.0 times as long as the basal width.

*Host.* *Carex thunbergii* STEUD.

*Specimens examined.* 4 exs., Moro-numa, Kanuma City, Tochigi Pref., 29–VIII–1988, Y. NARITA leg.; 5 exs., Okami, Satomi-mura, Ibaraki Pref., 5–VIII–1999, Y. NARITA leg.

***Donacia (Donaciomima) vulgaris* ZSCHACH, 1788**

(Figs. 2 Q, 3 R, 4 R, 5 R, 7 R, 8 Q, 9 R, 10 R)

Body about 8.6 mm in length, milky white.

Head capsule (Fig. 2 Q) about 0.60 mm in breadth, nearly twice as wide as the base; dorsal surface and lateral sides with six pairs of setae and three pairs of sensilla, respectively; frons with four pairs of stout setae and a pair of sensilla; stemmata comparatively small. Antennae (Fig. 3 R) with the 1st, 2nd and 3rd segments in the ratio of 1: 0.48: 0.23 in length; 1st a little shorter than width, and twice as long as 2nd; 2nd as long as wide, furnished with two sensilla, the sensory appendage as long as 3rd segment and a little shorter than 2nd. Labrum with anterior margin waved; dorsum with four setae and two sensilla on lateral half as shown in Fig. 4 R. Epipharynx with two pairs of median and two pairs of lateral setae, the former pairs being closely set, arranged as shown in Fig. 5 R. Mandibles (Fig. 7 R) moderately serrated behind dorso-apical tooth, dorsal surface with three sensilla. Maxillae (Fig. 8 Q) with stipes bearing a sensillum; palpifer with a sensillum; 2nd segment of palpus about twice as long as 3rd, bearing a sensillum; 3rd with a sensillum; mala with a knife-shaped seta 0.9 times as long as palpus. Labia-hypopharyngeal area with six sensilla and six setiferous sensilla distributed as shown in Fig. 9 R.

Prothoracic tergum (Fig. 10 R) with paired sclerites which are weakly sclerotized. Legs with microtrichia on coxae. Hooks of 8th abdominal segment about 2.4 times as long as the basal width.

*Host.* *Typha angustifolia* L.

*Specimens examined.* 6 exs., Ura-bandai, Kitashiobara-mura, Fukushima Pref., 17–IX–1989, Y. NARITA leg.



*Donacia (Donacia) ozensis* NAKANE, 1954

(Figs. 2 R, 3 S, 4 S, 5 S, 7 S, 8 R, 9 S, 10 S)

Body about 12.0 mm in length, white.

Head capsule (Fig. 2 R) about 0.66 mm in breadth, about 3.3 times as wide as the base; hind margin of head capsule weakly concave; dorsal surface and lateral sides with eight pairs of setae and two pairs of sensilla, respectively; frons with four pairs of setae. Antennae (Fig. 3 S) with the 1st, 2nd and 3rd segments in the ratio of 1: 0.48: 0.35 in length; 1st as long as wide; 2nd longer than width, furnished with two sensilla, the sensory appendage projecting well beyond 3rd and shorter than 2nd. Labrum with anterior margin slightly pointed at median part and anterior corners incised; dorsum with four setae and a sensillum on lateral half as shown in Fig. 4 S. Epipharynx with anterior margin slightly pointed at median part, bearing two pairs of median and a pair of lateral setae arranged as shown in Fig. 5 S. Mandibles (Fig. 7 S) clearly serrated behind dorso-apical tooth, dorsal surface with four sensilla. Maxillae (Fig. 8 R) with stipes bearing two long and a short setae; palpifer without sensilla; 2nd segment of palpus with a sensillum, and about twice as long as the 3rd; mala with a knife-shaped seta 1.3 times as long as palpus. Labia-hypopharyngeal area with six sensilla and eight setiferous sensilla distributed as shown in Fig. 9 S.

Prothoracic tergum (Fig. 10 S) with asperities in anterior area. Legs comparatively large. Hooks of 8th abdominal segment about 3.4 times as long as the basal width.

*Host.* *Nuphar japonicum* DC.

*Specimens examined.* 8 exs., Itako-numa, Noheji-machi, Aomori Pref., 1–VIII–1989, Y. NARITA leg.

*Donacia (Cyphogaster) lenzi* (SCHÖNFELD, 1888)

(Figs. 2 S, 3 T, 4 T, 5 T, 7 T, 8 S, 9 T, 10 T)

Body about 12.5 mm in length, pale white.

Head capsule (Fig. 2 S) about 0.58 mm in breadth, about 2.5 times as wide as the base; dorsal surface and lateral sides with six pairs of setae and a pair of sensilla, respectively; frons with four pairs of setae and a pair of sensilla. Antennae (Fig. 3 T) with the 1st, 2nd and 3rd segments in the ratio of 1: 0.54: 0.25 in length; 1st as long as wide; 2nd a little longer than width, furnished with two sensilla, one of which is minute, the sensory appendage projecting well beyond 3rd, which is about a half longer than 2nd. Labrum with anterior margin slightly pointed at median part; dorsum with three setae and a sensillum on lateral half as shown in Fig. 4 T. Epipharynx with anterior margin slightly pointed at median part, bearing two pairs of median and two pairs of lateral setae arranged as shown in Fig. 5 T. Mandibles (Fig. 7 T) clearly serrated behind dorso-apical tooth, furnished with three sensilla on dorsal surface. Maxillae (Fig. 8 S) with stipes without sensilla; palpifer bearing a sensillum; segments of palpus equal in length; 2nd segment of palpus with a sensillum, 3rd with a sensillum;

mala with a knife-shaped seta 1.2 times as long as palpus. Labia-hypopharyngeal area with six sensilla and six setiferous sensilla distributed as shown in Fig. 9 T.

Prothoracic tergum (Fig. 10 T) with paired sclerites which are rather weakly sclerotized. Legs with femora bearing weak setae on ventral surfaces. Hooks of 8th abdominal segment about 3.9 times as long as the basal width.

*Host.* *Brasenia schreberi* J. F. GMEL.

*Specimens examined.* 4 exs., Ura-bandai, Inawashiro-machi, Fukushima Pref., 14–VIII–1990, Y. NARITA leg.

***Donacia (Cyphogaster) provostii* FAIRMAIRE, 1885**

(Figs. 2 T, 3 U, 4 U, 5 U, 7 U, 8 T, 9 U, 10 U)

Body about 9.2 mm in length, more or less yellowish white.

Head capsule (Fig. 2 T) about 0.48 mm in breadth, nearly twice as wide as the base; dorsal surface and lateral sides with seven pairs of setae and a pair of sensilla, respectively; frons with four pairs of setae and a pair of sensilla. Antennae (Fig. 3 U) with the 1st, 2nd and 3rd segments in the ratio of 1: 0.67: 0.33 in length; 1st shorter than width; 2nd a little shorter, as long as width, furnished with two remarkable sensilla, the sensory appendage projecting beyond 3rd, which is about a half longer than 2nd. Labrum with anterior margin waved; dorsum with two setae and two sensilla on lateral half as shown in Fig. 4 U. Epipharynx with anterior margin slightly pointed at median part and incised laterally, bearing two pairs of median and two pairs of lateral setae arranged as shown in Fig. 5 U. Mandibles (Fig. 7 U) clearly serrated behind dorso-apical tooth, furnished with two sensilla on dorsal surface. Maxillae (Fig. 8 T) with stipes bearing a sensillum; palpifer bearing a sensillum; 2nd segment of palpus twice as long as 3rd, and bearing a sensillum; 3rd with a sensillum; mala with a knife-shaped seta 0.9 times as long as palpus. Labia-hypopharyngeal area with two sensilla and six setiferous sensilla distributed as shown in Fig. 9 U.

Prothoracic tergum (Fig. 10 U) with paired small sclerites. Legs with tarsal claws dull.

Hooks of the 8th abdominal segment about 3.2 times as long as the basal width.

*Host.* *Nymphoides peltata* (GMEL) O. KUNTZE.

*Specimens examined.* 4 exs., Nanasawa, Atsugi City, Kanagawa Pref., 26–VIII–1991, Y. NARITA leg.

**Key to the Species Based on the Larvae**

In the preceding pages are given descriptions of the larvae of 18 species and three subspecies belonging to two genera. They are discriminated by the following key.

1. Head capsule rounded laterally; anterior margin of head capsule strongly porrect; frontal sutures forming a Y-shape, the base being separated from posterior mar-



- gin of head capsule. Antenna directed antero-laterally. Maxillary stipes subquadrate; mala with a stout spine and two thin elongate spines. . . . . 2
- Head capsule more or less rectangular; anterior margin of head capsule nearly straight; frontal sutures forming a V-shape, the base being continuous to posterior margin of head capsule. Antenna directed anteriorly. Maxillary stipes elongate; mala with two stout spines, which are not elongate. . . . . 14
2. Hook of 8th abdominal segment more than three times as long as the basal width. . . . . 3
- Hook of 8th abdominal segment less than three times as long as the basal width. . . . . 5
3. Stipes with two long and a short setae. Epipharynx with a pair of lateral setae. . . . . *Donacia ozensis*
- Stipes with two long setae only. Epipharynx with two pairs of lateral setae. . . . . 4
4. Labrum with two pairs of setae. . . . . *Donacia provostii*
- Labrum with three pairs of setae. . . . . *Donacia lenzi*
5. Third segment of antenna about as long as the sensory appendage. . . . . 6
- Third segment of antenna about twice or a little less as long as the sensory appendage. . . . . 9
6. Mandibles obviously serrated behind dorso-apical tooth. . . . . 7
- Mandibles obscurely serrated behind dorso-apical tooth. . . . . 8
7. Third segment of maxillary palpus with a sensillum. Coxa with asperities. . . . . *Donacia vulgaris*
- Third segment of maxillary palpus without sensilla. Coxa without asperities. . . . . *Donacia sparganii gracilipes*
8. Palpifer with a sensillum. . . . . *Donacia katsurai*
- Palpifer without sensilla. . . . . *Donacia bicoloricornis*
9. Labrum with a pair of sensilla. . . . . *Donacia nitidior*
- Labrum with two pairs of sensilla. . . . . 10
10. Mandibles obviously serrated behind dorso-apical tooth. . . . . *Donacia japona*
- Mandibles obscurely serrated behind dorso-apical tooth. . . . . 11
11. Third segment of maxillary palpus with a sensillum. . . . . 12
- Third segment of maxillary palpus without sensilla. . . . . 13
12. Setae of labrum comparatively short, subequal in length. . . . . *Donacia splendens hiurai*
- Setae of labrum variable in length. . . . . *Donacia hirtihumeralis*
13. Dorso-apical and ventro-apical teeth of mandible pointed. . . . . *Donacia flemola*
- Dorso-apical and ventro-apical teeth of mandible blunt. . . . . *Donacia clavareauii*
14. Clypeus with a seta in lateral half. . . . . *Plateumaris akiensis*
- Clypeus with two setae in lateral half. . . . . 15
15. Labrum with three setae in lateral half. Third segment of antenna about as long as sensory appendage. . . . . *Plateumaris shirahatai*
- Labrum with four setae in lateral half. Third segment of antenna longer than sen-



- sory appendage. . . . . 16
16. Third segment about half as long as sensory appendage. Clypeus with two sensilla in lateral half. . . . . *Plateumaris weisei*
- Third segment a little longer than sensory appendage. Clypeus with a sensillum in lateral half. . . . . 17
17. Anterior marginal setae of frons close to fronto-clypeal suture. Stemmata small, pointed. Longitudinal grooves of abdomen deep. . . . . *Plateumaris sericea*
- Anterior marginal setae of frons moderately apart from fronto-clypeal suture. Stemmata large, spread. Longitudinal grooves of abdomen not deep. . . . . 18
18. Third segment of maxillary palpus with a sensillum. . . . . 19
- Third segment of maxillary palpus without sensilla. . . . . 20
19. Mala with two setae in basal portion. . . . . *Plateumaris constricticollis chugokuensis*
- Mala with a seta in basal portion. . . . . *Plateumaris constricticollis toyamensis*
20. Setae of abdominal tergum comparatively long and strong. . . . .
- . . . . . *Plateumaris constricticollis constricticollis*
- Setae of abdominal tergum short and weak. . . . . *Plateumaris constricticollis babai*

### Discussion

ASKEVOLD (1990, 1991) proposed to classify the species of the subfamily Donaciinae into eight genera in three tribes. His tribal arrangement is as follows: Plateumarini – Donaciini – Haemonini. Though the species of all these three tribes are distributed in Japan, only two genera (*Plateumaris* and *Donacia*) in the Plateumarini and Donaciini are dealt with in the present study.

Several distinct differences are recognized between the two genera, as described below.

Genus *Plateumaris*: the general form of the head capsule is more or less rectangular; the anterior margin is moderately straight; the frontal suture is V-shaped; the base of the posterior margin is continuous, the antennae are directed anteriorly, both cardo and stipes of the maxilla are elongate; mala has a seta and two spines, the former being roundly ligulate (knife-shaped) and the latter nearly conical.

Genus *Donacia*: the general form of the head capsule is rounded; the anterior margin is concave posteriorly; the frontal suture is Y-shaped; the base of the posterior margin is separated, the antennae are directed antero-laterally, cardo of the maxilla bearing a seta and stipes is almost quadrate; mala is roundish at the base with a seta and three spines which are of highly specialized form, the former being rather ligulate (knife-shaped) and the latter consisting of one stout and two thin spines.

The structural characteristics of the three subgenera of the genus *Donacia* are as described as below.

Subgenus *Donaciomima*: the labrum bears four setae in its lateral half.

Subgenus *Cyphogaster*: the labrum bears two or three setae in its lateral half, the median setae of the epipharynx are situated near the central area.

Subgenus *Donacia*: the epipharyngeal setae consist of three pairs instead of four, the stipes bears two setae, anterior portion of the prothorax bears asperities.

From the above-mentioned larval characters of the three subgenera, the subgenus *Donacia*, though only one species was examined, is clearly distinguished from the remaining two subgenera, in accordance with the conclusion given by ASKEVOLD (1990, 1991) on the study of adult.

TOMINAGA *et al.* (1984) recognized four subspecies within *Plateumaris constricticollis*. I basically support their conclusion from the present larval morphology of the subspecies *P. constricticollis constricticollis* (s. str.), though it has little difference from the subspecies *P. constricticollis babai*, offering open question to the subspecific validity of these two populations together with the relationship to the subpopulation on the Pacific side.

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### 要 約

成田行弘：日本産ネクイハムシ亜科（甲虫目ハムシ科）の幼虫形態による分類学的研究。——日本産ネクイハムシ亜科甲虫，2属18種3亜種の幼虫を記載し，属間の形態差を明らかにした。さらに，*Donacia*属を3亜属に分類することについて，日本に産する種で比較するかぎり，この扱いを支持することができた。また，*Plateumaris*属に属するオオミズクサハムシの4亜種については，差異が認められるものの，亜種エゾオオミズクサハムシ (*P. constricticollis* s. str.) と亜種シナノオオミズクサハムシ (*P. c. babai*) の間ではその差異が小さいので，関東以北の太平洋側に産するこの両者の個体群についてさらに検討する必要がある。

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