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ADDITIONAL NOTES ON THE LARVAE OF LAGRIIDAE AND TENEBRIONIDAE OCCURRING IN JAPAN¹⁾

(COLEOPTERA : CUCUJOIDEA)

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In my previous papers³⁾ the larvae of numerous species of the families Lagriidae and Tenebrionidae are discussed. Recently I have had the opportunity to examine further material, by which the larvae of several species will be described in the following pages. The terminology of body parts used in this paper is explained in my previous paper (1966).

Before going further I wish to express my sincere thanks to Prof. C. Watanabe for his kindness in reading through this manuscript. Thanks are also due to Dr. T. Nakane, Dr. N. G. Skopin, Dr. J. C. Watt, Mr. M. T. Chûjô, Mr. A. Haga, Mr. K. Shirahata and Mr. H. Takenaka for their kind help in various ways.

Family **Lagriidae**

Tribe **Heterotarsini**

The group, tribe Heterotarsini or subfamily Heterotarsinae, has been placed by authors either in the family Tenebrionidae or the family Lagriidae. Furthermore, it has been raised to the rank of family, Heterotarsidae, by M. T. Chûjô (1966). Having examined the larvae of *Heterotarsus carinula* Marseul I have been convinced that this group might be placed in the Lagriidae.

Heterotarsus carinula Marseul, 1876

Body ocher-brown, fusiform, flattened ventrally, suffused with minute setae, without long setae; 9th abdominal segment extremely small, rather semicircular in dorsal view, without cerci; anal tubes stout.

Head-capsule (Fig. 1, B & C) about 1.7 mm. in breadth, strongly swollen laterally; median suture nearly half length of head-capsule; ocelli (Fig. 1, D) in 4 separated spots on each side, of which the posterior one is largest. Antennae (Fig. 1, E) 3-jointed, laterad of and close to mouth-frame (antennal insertion not separated from base of mandible); 1st joint about 1.5 times as long as wide; 2nd joint a little more than twice as long as the 1st, slightly enlarged apically, the apical third being colorless, having a C-shaped sensorium at apex; 3rd joint 1/5 to 1/6 as long as the 2nd, slightly tapered apically, without microscopic setae at apex. Labrum (Fig. 1, F) almost twice as wide as long, the anterior margin being broadly retracted medianly. Epipharynx (Fig. 1, G)

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3) Insecta Matsumurana, 27 (1): 24-30 (1964) & Supplement 1, 41 pp. 32 pls. (1966).

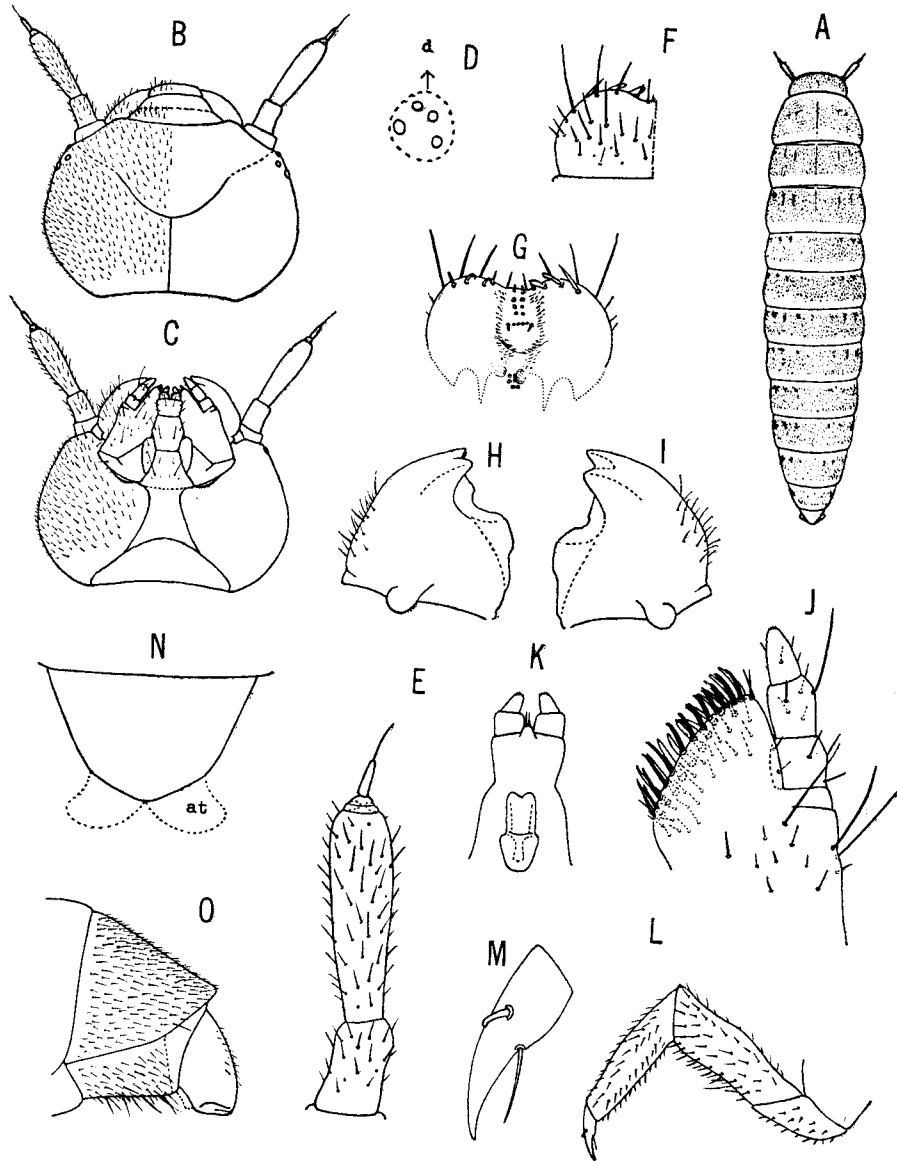


Fig. 1, A-O: Larva of *Heterotarsus carinula*. A: Larva (dorsal view). B: Head (dorsal view). C: ditto (ventral view). D: Ocelli (d: shows dorsal surface). E: Right antenna (dorsal view). F: Labrum (left half). G: Epipharynx. H: Right mandible (ventral view). I: Left mandible (ventral view). J: Left maxilla (ventral view). K: Labium (buccal view). L: Mesothoracic leg (posterior view). M: ditto, claw (posterior view). N: Ninth abdominal segment (dorsal view) (at: anal tubes). O: ditto (lateral view).

with posterior lobes small. Mandibles (Fig. 1, H & I) with dorsal and ventral cutting edges not strikingly retracted; grinding surface not pointed outwardly at extremity; external surface with a number of short setae. Maxillary mala (Fig. 1, J) distinctly dilated basally. Labium (Fig. 1, K) with palpi close to each other at base, the basal joint being transverse, subequal to the apical one in length; ligula very small. Hypopharyngeal sclerome (Fig. 1, K) with a long projection from basal thickening.

Thoracic legs (Fig. 1, L) slender, elongate, and hardly increasing towards posterior pair in length (21 : 22 : 23); tibia about 4.5 times as long as wide; setae of claw (Fig. 1, M) different in shape, and not on the same level. Prothorax moderately widened backwards, nearly 1.5 times as wide as long. Abdominal segments (except caudal ones) almost 2.5 times as wide as long; spiracles of 1st segment dorsolateral, and those of 2nd to 8th ventrolateral. Ninth abdominal segment (Fig. 1, N & O) becoming declivous towards hind margin; hind margin not pointed backwards. Body-length about 13 mm.

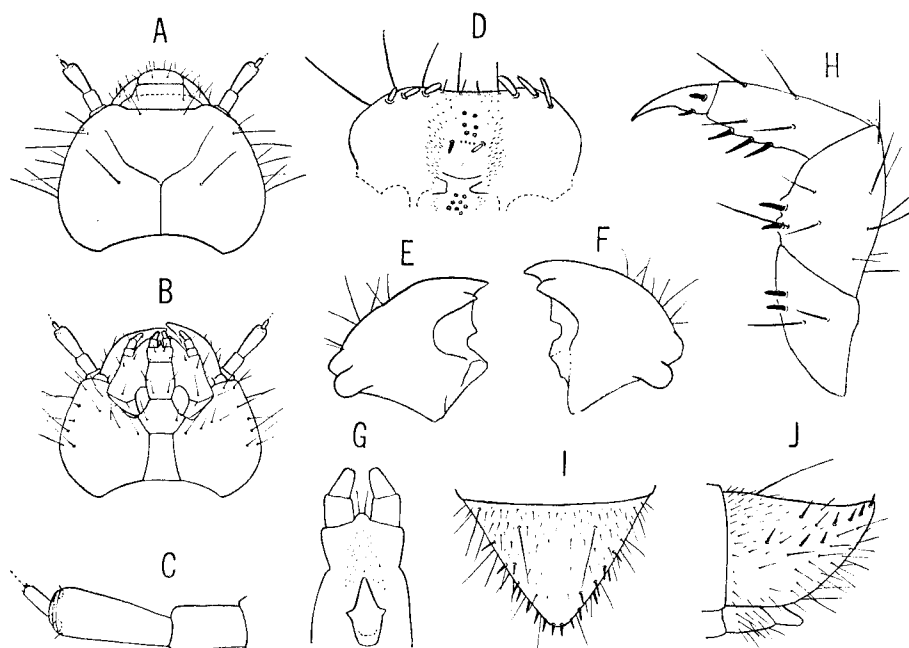


Fig. 2, A-J: Larva of *Mesomorphus villiger*. A: Head (dorsal view). B: ditto (ventral view). C: Left antenna (dorsal view). D: Epipharynx. E: Right mandible (ventral view). F: Left mandible (ventral view). G: Labium (buccal view). H: Left prothoracic leg (posterior view). I: Ninth abdominal segment (dorsal view). J: ditto (lateral view).

Larval food: Decaying vegetable matter.

Specimens examined: 2 exs. collected from refuses on seashore. Kuwakawa, Niigata-ken, 6. VI. 1964, N. Hayashi & H. Takenaka leg.

Family **Tenebrionidae**

In 1966 I described the larvae of 58 species of Tenebrionidae occurring in Japan,

giving the key to the species based on the larvae. In this paper the larval forms of 9 other species of this family are described.

Tribe **Pedinini**

Mesomorphus villiger (Blanchard, 1853)

Body yellowish brown, flattened ventrally; 9th abdominal segment conical, not pointed at tip-end, furnished with several spiniform setae on lateral sides, without cerci.

Head-capsule (Fig. 2, A & B) about 1.4 mm. in breadth, markedly widened basally; frontal setae absent; median suture a little shorter than half length of head-capsule; ocelli hardly visible or obsolete. Antennae (Fig. 2, C) with 1st joint about 1.5 times as long as wide; 2nd joint nearly 1.5 times as long as the 1st, club-shaped, the sensorium being C-shaped; 3rd joint about 1/3 as long as the 2nd. Labrum without stout setae. Epipharynx (Fig. 2, D) with subanterior sensillae; posterior lobes extremely small. Mandibles (Fig. 2, E & F) with several slender setae and without spiniform setae on external surface; grinding surface of the right one weakly concave, well developed at extremity. Maxillary mala broadened basally. Ligula (Fig. 2, G) exceedingly small. Hypopharynx (Fig. 2, G) with microtrichoid swelling indistinct; hypopharyngeal sclerome almost pentagonal, the apical angle being strongly exerted towards ligula.

Prothoracic legs (Fig. 2, H) moderately stouter than the succeeding; claw a little longer than half length of tibia, with setae short, spiniform, different in shape and not on the same level; tibia and femur with 3 and 2 spiniform setae respectively on ventral margin; coxae with 2 or 3 spiniform setae. Tergites each with a few irrorations near base. Abdominal segments except for the 9th without setae on dorsum. Ninth abdominal segment (Fig. 2, I & J) straight convergent towards tip-end, scattered with long and minute setae, the minute setae being chiefly distributed on basal part of dorsal surface. Anal tubes present. Body-length about 12 mm.

Larval food: Decaying vegetable matter.

Specimens examined: 3 exs. living in soil. Ogunimachi, Nishiohitamagun, Yamagata-ken, 18. VII. 1962, K. Shirahata leg.

Tribe **Opatrini**

Caedius maderi Kaszab, 1942

Body light yellowish brown, flattened ventrally; 9th abdominal segment conical, ending in a single point, furnished with 3 small, spiniform setae on each side, without cerci.

Head-capsule (Fig. 3, A & B) about 0.95 mm. in breadth, with numerous setae on lateral sides; dorsal surface (except for clypeal condylus) uniformly light yellow, the anterior margin of frons being widely retracted; frontal setae absent; clypeal condylus forming a transverse tubercle; ocelli present. Antennae (Fig. 3, C) with 1st joint 1.5 to 2 times as long as wide; 2nd joint 1.5 times as long as the 1st, club-shaped, the sensorium being C-shaped; 3rd joint about 1/4 as long as the 2nd. Clypeus with inner clypeal setae located near clypeo-frontal suture. Labrum truncate anteriorly in dorsal view; the anterior margin being weakly retracted medianly; median setae stout. Epipharynx (Fig. 3, D) with posterior lobes extremely small. Mandibles (Fig. 3, E & F) with dorso-external ridge strongly elevated basally; 2 slender setae on the basal eleva-

tion; grinding surface well developed outwardly. Maxillary mala amplicated proximally. Ligula (Fig. 3, G) very small. Submentum with 4 setae. Gula exceedingly narrow. Hypopharynx (Fig. 3, G) with microtrichoid swelling indistinct; hypopharyngeal sclerome almost pentagonal, with a strongly pointed apical angle, which is thickened seen laterally.

Prothoracic legs (Fig. 3, H) much stouter than the succeeding; claw subequal to tibia in length, with setae spiniform, different in shape and not on the same level; tibia with a single spiniform seta on ventral margin; femur and coxa with a large knob-like elevation ventrally, which has 2 puffball-shaped setae. Abdominal segments except for the 9th with a long seta on each side. Ninth abdominal segment (Fig. 3, I & J)

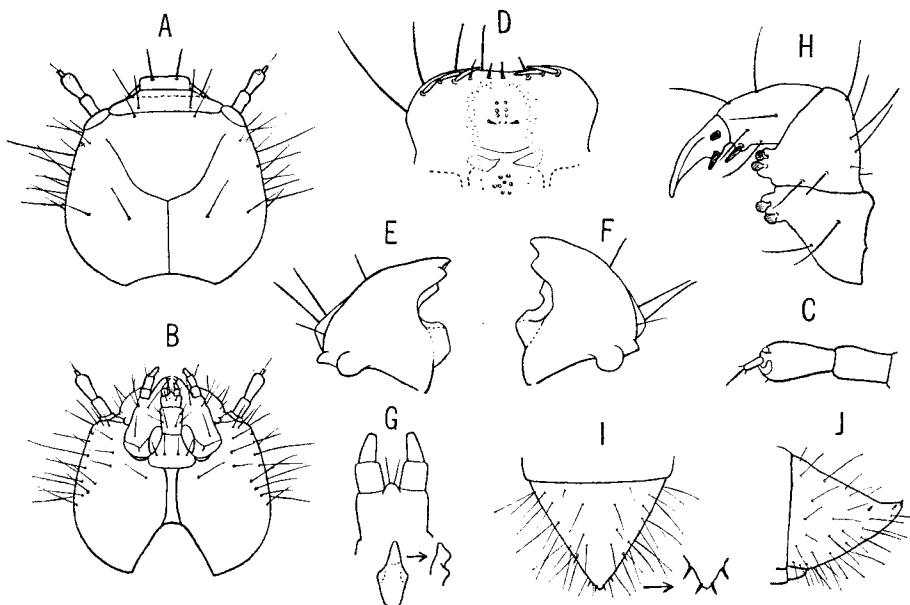


Fig. 3, A-J: Larva of *Caedius maderi*. A: Head (dorsal view). B: ditto (ventral view). C: Left antenna (ventral view). D: Epipharynx. E: Right mandible (ventral view). F: Left mandible (ventral view). G: Labium (buccal view). H: Left prothoracic leg (posterior view). I: Ninth abdominal segment (dorsal view). J: ditto (lateral view).

straight convergent laterally, furnished with 2 small, spiniform setae on each side of tip-end. Anal tubes present. Body-length about 9 mm.

Larval food: Decaying vegetable matter.

Specimens examined: 1 ex. living on seashore. Miyakejima, Izu, 6. V. 1966, N. Hayashi & H. Takenaka leg.; 1 ex. Yakushima, Kagoshima-ken, 3. IV. 1967, H. Takenaka leg.

Gonocephalum coriaceum Motschulsky, 1857

Body umber to yellowish brown, flattened ventrally; 9th abdominal segment ending in a dull point, with several spiniform setae on lateral sides, without cerci.

Head-capsule about 1.5 mm. in breadth, broadest at basal 1/3; lateral sides with

setae not densely distributed (15 to 18 setae on each side); antero-lateral angles of dorsum (clypeal condylus) not developed outwardly; median suture 1/3 length of head-capsule; ocelli present. Antennae with 1st joint hardly longer than width; 2nd joint 1.5 times as long as the 1st; 3rd joint about 1/4 as long as the 2nd. Labrum nearly straight anteriorly. Epipharynx (Fig. 4, A) with subanterior sensillae between unisetiferous sensillae; unisetiferous sensillae not extremely close to each other. Mandibles with dorso-external ridge not strongly undulated. Ninth abdominal segment (Fig. 4, B & C) moderately depressed, straight convergent laterally, with 8 to 12 comparatively long, spiniform setae on each side; dorsal surface without spiniform setae. Body-length about 12 mm.

Larval food: Vegetable matter.

Specimens examined: 7 exs. living in soil. Fudakake, Tanzawa, Kanagawa-ken, 16. VII. 1967, N. Hayashi leg.

Notes: The larva of this species is distinguished from any other congeneric larvae ever known in the distribution of the spiniform setae of the ninth abdominal segment, and in the body-length.

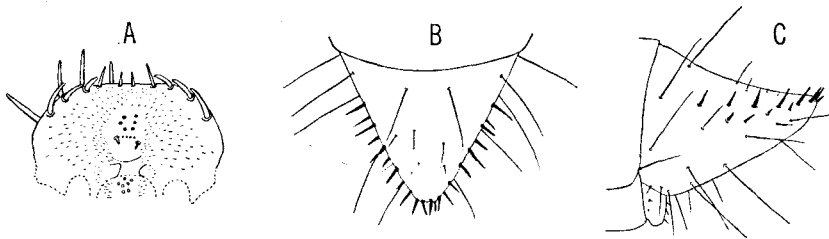


Fig. 4. A-C: Larva of *Gonocephalum coriaceum*. A: Epipharynx. B: Ninth abdominal segment (dorsal view). C: ditto (lateral view).

Tribe **Diaperini**

Platydema parallelicorne Nakane, 1956

Body light yellowish brown, flattened ventrally; caudal segments gradually narrower posteriorly; 9th abdominal segment very small, terminating in a horn-shaped point, without cerci.

Head-capsule about 1.3 mm. in breadth, weakly widened backwards; dorsal surface light yellowish brown, finely punctured; median suture a little more than 1/3 as long as head-capsule; ocelli deeply pigmented. Antennae with 1st joint slightly wider than long; 2nd joint about 2.5 times as long as the 1st; 3rd joint 1/4 to 1/5 as long as the 2nd. Labrum strongly constricted basally. Mentum with only 2 setae. Tentorial pit (Fig. 5, A; tp) strikingly developed outwardly. Prothoracic legs (Fig. 5, B): tibia with 2 posterior setae, of which the one situated about the middle is not spiniform (Fig. 5, B: ps), and with 2 or 3 spiniform setae on ventral margin. Ninth abdominal segment (Fig. 5, C & D) with several conspicuous granules; posterior spiniform setae located on venter behind tip-end. Body-length about 9 mm.

Larval food: Tree-fungus (*Polyporus* sp.).

Specimens examined: 20 exs. Daisen, Tottori-ken, 16. X. 1966, A. Haga leg.

Notes: The larva of this species is easily distinguished from any other congeneric

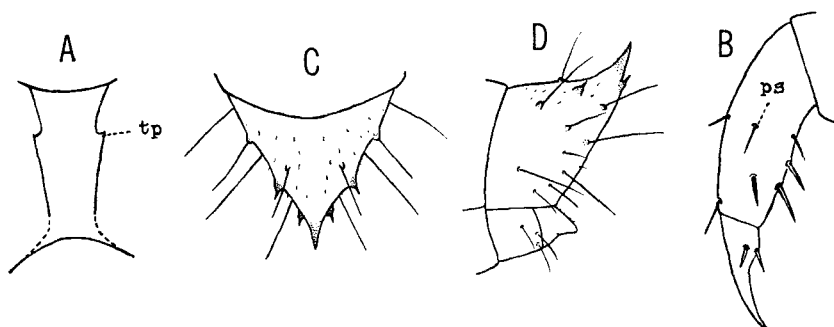


Fig. 5, A-D: Larva of *Platyedema parallelicorne*. A: Gula (tp: tentorial pit). B: Claw and tibia of left prothoracic leg (posterior view) (ps: posterior seta). C: Ninth abdominal segment (dorsal view). D: ditto (lateral view).

larvae ever known in the shape of the ninth abdominal segment, and in having the granules on the segment.

Tribe **Ulomini**

Uloma marseuli Nakane, 1956

Body yellowish brown, cylindrical, suffused with conspicuous punctures; 9th abdominal segment ellipsoidal, circular in cross-section, without cerci.

Head-capsule (Fig. 6) about 1.3 mm. in breadth; frontal sutures well developed outwardly; ocelli absent. Clypeus extremely short; anterior part extending hardly beyond apex of clypeal condylus, the anterior margin being weakly arched forwardly. Prothoracic legs with spiniform seta of claw not small. Ninth abdominal segment with each puncture without a microscopic seta. Body-length about 14 mm.

Larval food: Decaying wood.

Specimens examined: 3 exs. Kikuna, Yokohama, Kanagawa-ken, 22. IV. 1964, N. Hayashi leg.

Notes: The larva of this species is easily distinguished from *Uloma* sp. described in my previous paper (1966) by the structure of the clypeus, by the shape of the frontal sutures, and by lacking ocelli.

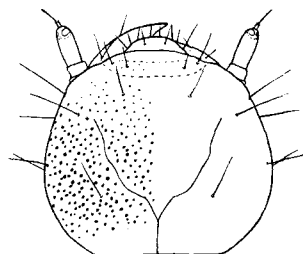


Fig. 6: Larva of *Uloma marseuli*, head (dorsal view).

Hypophloeus gentilis (Lewis, 1894)

Body pale yellow with caudal part orange yellow, flattened ventrally, with last 2 segments strongly narrower posteriorly; 9th abdominal segment ending in a round hind margin, without cerci.

Head-capsule (Fig. 7, A & B) about 0.5 mm. in breadth, rather transversely rectangular seen dorsally; dorsal surface without long setae (frontal setae absent), scattered with minute setae; lateral side with a long seta; clypeal condylus slightly elevated upwardly; ocelli represented by 5 spots, of which the dorso-posterior one is clear. Antennae (Fig. 7, C) with 1st joint transverse; 2nd joint cylindrical, about 3.5 times as

long as the 1st, furnished with about 10 setae on surrounding surface, the sensorium being C-shaped; 3rd joint extremely small. Labrum semicircular, with a single seta between median setae. Epipharynx (Fig. 7, D) with subanterior sensillae; unisetiferous sensillae not on same level, located near posterior lobes; posterior lobes longitudinally comb-shaped. Mandibles (Fig. 7, E & F) with several setae of different length on dorso-external surface; right one without conspicuous carinae on grinding surface. Maxillae (Fig. 7, G) with 3rd joint of palpi longest, nearly as long as combined length of the 1st and 2nd; mala relatively narrow, rounded apically, weakly widened proximally. Labium (Fig. 7, H) with palpi short, far separated by a transverse ligula; suture between submentum and

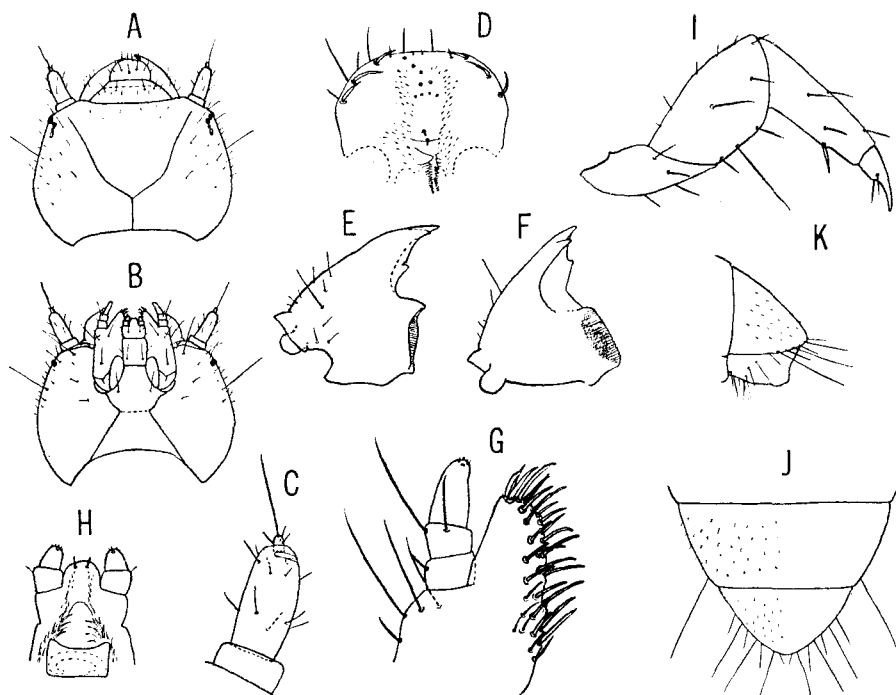


Fig. 7, A-K: Larva of *Hypophloeus gentilis*. A: Head (dorsal view). B: ditto (ventral view). C: Left antenna (ventral view). D: Epipharynx. E: Left mandible (dorsal view). F: Right mandible (ventral view). G: Left maxilla (buccal view). H: Labium (buccal view). I: Right prothoracic leg (posterior view). J: Eighth and 9th abdominal segments (dorsal view). K: Ninth abdominal segment (lateral view).

gula obscure. Gula strikingly broadened towards hind margin of head-capsule. Hypopharynx (Fig. 7, H) with a tuft of microtrichia along swelling; hypopharyngeal sclerome transversely rectangular, the antero-lateral angles being pointed forwardly.

Prothoracic legs (Fig. 7, I) subequal to the succeeding in length; tibia with a single spiniform seta on ventral margin. Body hardly enlarged posteriorly, sparsely scattered with minute setae. Abdomen comparatively short, about 3 times as long as wide; segments except for the 9th with 1 and 3 or 4 long setae on lateral side of dorsum and lateral half of venter respectively. Ninth abdominal segment (Fig. 7, J & K) be-

coming distinctly declivous towards hind margin, furnished with about 3 pairs of long setae along margin. Anal tubes present. Body-length about 4 mm.

Larval food: Bark of decaying oaken wood.

Specimens examined: 20 exs. living under bark. Kikuna, Yokohama, Kanagawa-ken, 2. V. to 26. VI. 1967, N. Hayashi leg.

Tribe Tenebrionini

Setenis noctivigila Lewis, 1894

Body nearly white, slightly depressed, parallel-sided; 9th abdominal segment ending in 2 large, hook-like cerci, armed with 2 tridentate swellings and 4 small spines on dorsum behind cerci.

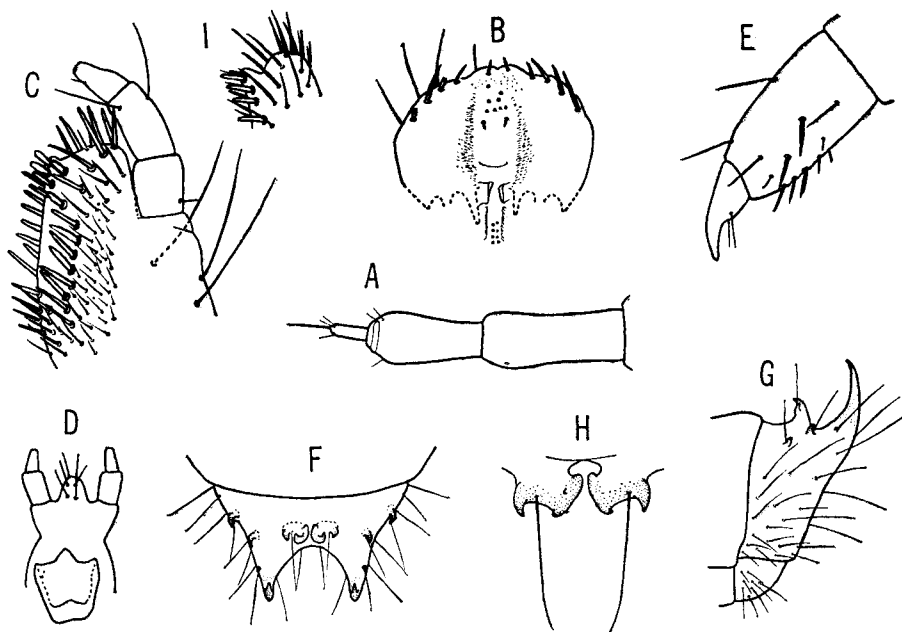


Fig. 8, A-H: Larva of *Setenis noctivigila*. A: Left antenna (dorsal view). B: Epipharynx. C: Right maxilla (buccal view). D: Labium (buccal view). E: Claw and tibia of left prothoracic leg (posterior view). F: Ninth abdominal segment (dorsal view). G: ditto (lateral view). H: Swellings of dorsomedian region of ninth abdominal segment (anterior view). I: Larva of *Setenis oshimanus*, apical part of maxillary mala (buccal view).

Head-capsule about 2.5 mm. in breadth. Antennae (Fig. 8, A) with 1st joint about 2.5 times as long as wide; 2nd joint $\frac{4}{5}$ as long as the 1st, lacking a transverse series of setae near apex; 3rd joint nearly $\frac{1}{3}$ as long as the 2nd. Epipharynx (Fig. 8, B) without a V-shaped ridge on median region; posterior lobes not strongly ridged. Maxillary mala (Fig. 8, C) with apical notch shallower than that of *Setenis oshimanus* (Fig. 8, I). Labium (Fig. 8, D) with 6 setae on buccal surface of ligula. Prothoracic legs (Fig. 8, E) stouter than the succeeding, but subequal in length to the latter, lacking unisetiferous granules; tibia with 3 or 4 and 2 spiniform setae on ventral margin and posterior surface

respectively. Eighth abdominal segment tapered posteriorly, with a weakly elevated caudal band (posttergite). Ninth abdominal segment (Fig. 8, F & G) depressed, extremely short; dorsomedian swellings (Fig. 8, H) close to each other, the teeth being different in shape; cerci slightly recurved forwards, the distance between them being almost equal to half width of segment. Body-length about 22 mm.

Larval food: Decaying hardwood.

Specimens examined: 2 exs. Gozaisyo-dake, Mie-ken, 29. V. 1966, N. Hayashi leg.

Notes: The larva of this species is readily distinguished from any other congeneric larvae ever known by the structure of the ninth abdominal segment, and by the body-length.

Menephilus lucens Marseul, 1876

Body nearly white with dorsocaudal part yellowish brown, subcylindrical; caudal segments strongly punctured; 9th abdominal segment with 2 large, hook-like cerci which are strikingly recurved forwards.

Head-capsule about 1.6 mm. in breadth. Antennae with 1st and 2nd joints subequal

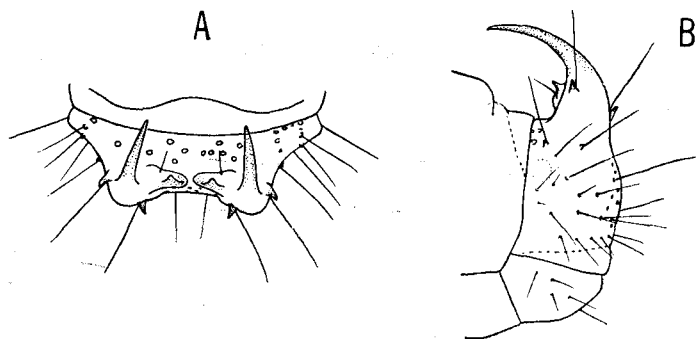


Fig. 9, A & B: Larva of *Menephilus lucens*. A: Ninth abdominal segment (dorsal view). B: ditto (lateral view).

in length. Epipharynx without a V-shaped ridge. Hypopharyngeal sclerome bicuspidate. Eighth abdominal segment with swellings of dorsum not strongly produced backwards in lateral view. Ninth abdominal segment (Fig. 9, A & B) with lateral side distinctly angulated at base, lacking a conspicuous spine behind cercus (except for basal one); cerci extremely slender, widely separated than that of *Menephilus arciscelis* (distance between them is a little wider than $1/3$ of the greatest width of segment), with projection of inner side elongate. Body-length about 15 mm.

Larval food: Decaying wood of Japanese cedar (*Cryptomeria japonica*).

Specimens examined: 2 exs. Ōyama, Kanagawa-ken, 16. XI. 1967, N. Hayashi leg.; 1 ex. Takaosan, Tokyo-toka, 14. IV. 1953, N. Hayashi leg.

Notes: The larva of this species is easily distinguished from that of *Menephilus arciscelis* by the structure of the ninth abdominal segment, and by the body-length.

Tribe **Amarygmini**

Plesiophthalmus spectabilis Harold, 1875

Body yellowish brown with anterior and posterior parts reddish brown, slightly

depressed, parallel-sided; 9th abdominal segment obliquely truncate dorsally, with a spoon-like excavation, without cerci.

Head-capsule about 3.5 mm. in breadth, yellowish to reddish brown dorsally; clypeal condylus (Fig. 10, A) more strongly produced forwardly than that of *Plesiophthalmus nigrocyaneus* (Fig. 10, E); ocelli with anterior one (3 connected spots) obscure. Antennae with 1st joint nearly as long as wide, and 4/7 as long as the 2nd. Ninth abdominal segment (Fig. 10, B to D) with 4 conspicuous angulations on hind margin, the inner ones being strongly or moderately pointed backwards (Fig. 10, B & C). Body-length about 25 mm.

Larval food: Decaying oaken wood.

Specimens examined: 4 exs. living under bark. Kikuna, Yokohama, Kanagawa-ken, V. 1966 & IV. 1967, N. Hayashi leg.; 2 exs. Setagaya, Tokyo, 10. II. 1950, N. Hayashi leg.; 1 ex. Aoyama, Tokyo, 24-27. V. 1948, T. Nakane leg.

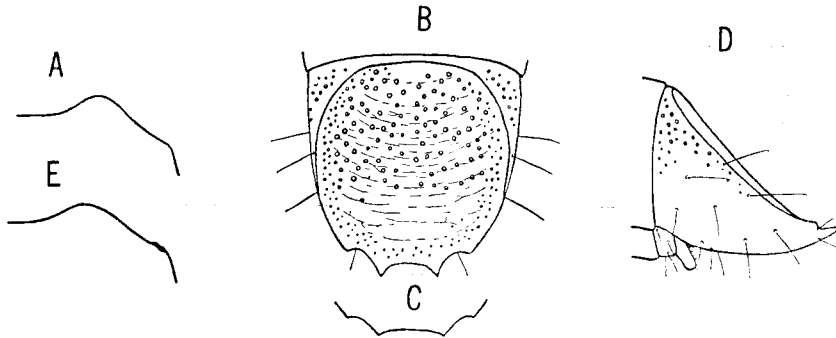


Fig. 10, A-D: Larva of *Plesiophthalmus spectabilis*. A: Clypeal condylus. B: Ninth abdominal segment (dorsal view). C: ditto, hind margin. D: ditto (lateral view). E: Larva of *Plesiophthalmus nigrocyaneus*, clypeal condylus.

Notes: The larva of this species is readily distinguished from that of *Plesiophthalmus nigrocyaneus* by the shape of the ninth abdominal segment and by the structure of the clypeal condylus.

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ADDENDUM

The larva of *Heterotarsus carinula* Marseul described on the foregoing pages disagrees with the definitions of the Lagriidae given by authors in the antennal insertion. It should be added here, however, that the larvae of *Arthromacra* and *Nemostria*, both of the Lagriidae, are identical with that of *Heterotarsus carinula* in having the antennae situated quite close to the mouth-parts.

Corrections

In the author's preceding paper, "A contribution to the knowledge of the larvae of Tenebrionidae occurring in Japan (Coleoptera : Cucujoidea)", *Ins. Mats.*, Supplement 1: 41 pp. 32 pls. 1966, are found the following errors.

- Page 13, line 15 from top, for "the left one" read "the right one".
- Page 15, line 8 from bottom, for "Labium" read "Labrum".
- Page 21, line 16 from bottom, for "hamp" read "hump".
- Page 23, line 20 from top, for "Labium" read "Labrum".