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<https://doi.org/10.5109/23923>

出版情報 : 九州大学大学院農学研究院紀要. 33 (1/2), pp.109-130, 1988-10. Kyushu University
バージョン :
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Larvae of the Weevil Family Curculionidae of Japan
Part 1. Key to Genera and the Short-nosed Group
(Insecta: Coleoptera) *

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(Received June 30, 1988)

Larvae of 50 genera and 81 species of Japanese Curculionidae are described and illustrated in five parts. First part deals with the Curculionidae adelognathi, together with a key to genera of the Curculionidae examined. Genera included in this part are *Sitona*, *Otiarhynchus*, *Arrhaphogaster*, *Episomus*, *Pseudocneorhinus*, *Scepticus*, *Meotiorhynchus*, and *Catapionus*.

INTRODUCTION

In continuation of our studies on the weevil larvae of Japan, we report the family Curculionidae in five parts as the third of the series.

The descriptions of weevil larvae in the older literature are mostly very schematic and quite useless for identification. Recent important contributions are made by Cotton (1924) on North American Calandrinae, Kieffer (1933) on some broad-nosed weevils of the Pacific coast, Gardner (1932-38) on many Indian species, Anderson (1938-60) on *Proterrhinus*, *Hypera*, Anthribidae, Calandrinae and Cossoninae, Viedema (1963) on the European lignivorous weevils, Emden (1938, 52) on the primitive families and the short-nosed subfamilies, Ahmad and Burke (1972) on Anthonomini, and by May (1966-) mostly on New Zealand weevils.

For the Japanese weevils, descriptions were made by Hayashi (1959) on 18 species, Morimoto (1957, 59) on *Ceuthorrhynchidius albosuturalis* and *Derelomus uenoi*, and by Morimoto and Enda (1962) on *Dorytomus* spp. Many other papers written in Japanese are mostly useless for their taxonomy owing to their insufficient descriptions.

Gardner's papers (1934, 38) contain the largest amount of taxonomic informations on the Oriental weevil larvae yet published. But, the informations on the weevil larvae we can obtain at present are surprisingly little and there is no means of identifying the great majority of their larvae or even of placing them definitely in their subfamilies.

Present paper is intended to set forth the accurate descriptions of the weevil larvae from Japan for the purpose of their identification and to give basic data for their phylogenetic study.

We wish to express our cordial thanks to Prof. Y. Hirashima, of Kyushu University, for his kind guidance in the course of the present study.

*Contribution from the Entomological Laboratory, Faculty of Agriculture, Kyushu University, Fukuoka (Ser. 3, No. 280).

Family Curculionidae

Body usually whitish and soft, more or less curved, and circular in cross-section.

Head free or retracted, slightly longer than wide or as long as wide. Anterior and posterior ocelli present, or posterior ocellus absent, rarely ocelli entirely absent. Antenna with a segment. Catapophyses in same plane as frons. Hypopharyngeal bracon present except Rhynchaeninae. Frontal sutures distinct, reaching the base of antennae. Endocarina present or absent. Frons with five pairs of setae in general. Epicranium typically with five of dorsal setae, two lateral setae, two ventral setae, and four minute posterior setae. Clypeus with two setae and a sensillum on each side, clypeal seta 1 short to moderately long, nearly twice as long as 2 or subequal. Labrum with three pairs of setae, and often with a median sensillum and a pair of lateral sensilla, without tormae, posterior margin more or less produced posteriorly into clypeal zone in the middle. Epipharynx usually bears a pair of longitudinal labral rods, often asperite between the rods. Labial palpus with one or two segments. Prementum usually with premental sclerite. Postmentum with three pairs of setae. Maxillary palpus with two segments. Mandible with two apical teeth in general.

Pronotum strongly to moderately transverse, often sclerotized and pigmented. Thoracic spiracle on pronotum.

Abdomen with eight pairs of spiracles. Typical abdominal segment with three or four dorsal folds. Anus terminal in general, sometimes ventral, surrounded by four to eight lobes, or conically produced posteriorly in the Rhynchaeninae.

Key to genera

1. Antennae not or hardly longer than wide, subglobular or ellipsoidal cushion (as long as wide and conical in *Episomus*). 2
- . Antennae much longer than wide, ogival or subconical (in *Lissorhoptrus* antennae ellipsoidal cushion, but its spiracles dorsal and hook-shaped). 11
2. Postdorsum of typical abdominal segments with five setae. Anus at posterior extremity. Labrum with median and posterior areas often pigmented. Mandible longer than wide, mandibular seta 2 at the outer edge. Larvae feed on roots in the soil. Curculionidae adelognathi 3
- . Postdorsum of typical abdominal segments with four setae. Anus more or less ventral in position. Labrum without median and posterior pigmented area. Mandible as long as wide, mandibular seta 1 short, directly behind 2. Ceutorhynchinae 10
3. Mandible with one or several teeth at middle or between middle and bifid apex. All spiracles bicameral. Endocarina present. Paired labral sensilla absent. Ninth abdominal epipleurite with two setae. Sitoninae *Sitona*
- . Mandible with only a slight obtuse or rounded bend near middle of cutting edge. 4
4. Antennae conical, as long as wide. Spiracles slender, bicameral, air tubes much shorter than peritreme. Posterior epipharyngeal spines

- separated by less than half the distance between the anterior pair.
 Endocarina absent. Apex of abdomen not sclerotized. Episomini *Episomus*
- . Antennae broader than long, subglobular or ellipsoidal cushion. 5
5. Spiracles bicameral or unicameral. Abdomen not sclerotized at apex. 6
- . Spiracles without air-tubes. Ninth abdomen sclerotized. *I.* 8
6. Spiracles all bicameral. 7
- . Thoracic spiracles bicameral, abdominal spiracles unicameral.
 *Pseudocneorhinini* *Pseudocneorhinus*
7. Air tubes of spiracles short, hardly longer than width of peritreme.
 Posterior epipharyngeal spines separated by about half the distance
 between anterior pair. *Otiiorhynchini* *Otiiorhynchus*
- . Air tubes of spiracles much longer than width of peritreme. Posterior
 epipharyngeal spines as widely separated as anterior pair.
 *Celeuthetini* *Arrhaphogaster*
8. Frontal sutures well-marked. Endocarina absent. *Cneorrhini* *Catapionus*
- . Frontal sutures absent *Tanymecini* 9
9. Endocarina present. *Meotiorhynchus*
- . Endocarina absent. *Scepticus*
10. Head broadly and deeply emarginate at posterior margin. Thoracic
 and first to seventh abdominal spiracles unicameral, eighth abdominal
 spiracles bicameral. *Hypurus*
- . Head normally rounded posteriorly. Spiracles all bicameral. 11
11. Eighth abdominal spiracles on papillae. Air-tubes of spiracles different
 in length, dorsal air-tube about half as long as ventral air-tube. ... *Mecysmoderes*
- . Eighth abdominal spiracles not on papillae, but near dorsal bases of
 papillae or in normal position. 12
12. Pleurum of eighth and/or ninth abdominal segments papillose dorsal-
 ly. * 13
- . Pleurum of eighth and ninth abdominal segments at most weakly
 papillose laterally or latero-posteriorly. 14
13. Dorsal epicranium with three setae, 4 and 5 absent. *Rhinoncus*
- . Dorsal epicranium with four setae, seta 4 absent. *Homo rosoma*
14. Conjoint width of air-tubes of spiracles much wider than peritreme,
 each air-tube with four constrictions. *Ceuthorhynchidi*
- . Conjoint width of air-tubes of spiracles scarcely wider than peritreme,
 each air-tube with more than four constrictions. *Ceutorhynchus*
15. Head deeply and broadly emarginate at posterior margin, frons very
 pointed posteriorly and reaching occipital foramen, endocarina long
 and reaching posteriorly far beyond posterior end of epicranium in the
 middle. Hypopharyngeal bracon absent. Labial palpi widely separat-
 ed. *Rhynchaeninae* 16
- . If head emarginate posteriorly, frons not reaching occipital foramen
 and endocarina not produced posteriorly. Hypopharyngeal bracon
 present. 18
16. Labial palpus with two segments. Labral rods long, reaching epistoma.

- Median spines of epipharynx similar to anterolateral setae of epipharynx in shape. Anus terminal, surrounded by four lobes. Dinorhopalini *Ixalma*
- . Labial palpus with one segment. Labral rods short, not beyond basal margin of labrum. Median spines of epipharynx short and flat. Ninth abdominal segment conical. Rhynchaenini 17
17. Premental sclerite incomplete. Postmentum broadly pigmented. Median spines of epipharynx blade-like, dilated apically. *Rhynchaenus*
- . Premental sclerite complete. Postmentum not pigmented. Median spines of epipharynx short setiform. *Rhamphus*
18. Labial palpus with two segments. 19
- . Labial palpus with one segment. 45
19. Head distinctly longer than wide and deeply retracted into thorax. Pronotum large, not strongly transverse, with a large posterior asperate brownish area. Spiracles bicameral. Camptorhinini *Camptorhinus*
- . Head usually subcircular, free. Pronotum transverse and with a smooth median broad area. 20
20. Epipharynx with four or six anterolateral setae. Cleoninae 21
- . Epipharynx with three anterolateral setae. 22
21. Typical abdominal segment with four dorsal folds, postdorsum with five setae. *Lixus*
- . Typical abdominal segment with three dorsal folds, postdorsum with seven setae. *Larinus*
- 22.** Eusternum bilobed. Larvae exposed on leaves. Spiracles each surrounded by a crescent-shaped pigmented area. *Listroderes*
- . Eusternum normal, not bilobed. Larvae cryptic in plant tissue. Spiracles without pigmented surrounding area. 23
- 23.** Spiracles with air-tubes sharply projected, thorn-like or hood-like. 24
- . Spiracles normal, not projected. 25
24. Spiracles on second to seventh abdominal segments projecting hook-shaped and placed dorsally. *Lissorhoptrus*
- . Spiracles shortly pointed, thorn-like, normal in position. ***Echinocnemus***
- 25.** Spiracles completely surrounded by fine ridge, strongly transverse, twice or more times as long as wide, paired air-tubes regularly annulated and together as wide as peritreme. Hylobiinae 26
- . Spiracles not or partly surrounded by ridge, air-tubes narrower than peritreme, peritreme often circular. 28
26. Head normally convex dorsally. Air-tubes of spiracles much longer than peritreme. *Dyscerus*
- . Head depressed. Clypeus angulate at sides. Air-tubes of spiracles at most as long as peritreme. 27
27. Epipharynx with dense and hairy asperities. Air-tubes of spiracles shorter than peritreme. *Aclees*
- . Epipharynx not asperate. Air-tubes of spiracles about as long as peritreme. *Niphades*
28. Posterior margin of labrum nearly straight, not extended medially into

- clypeal zone. Acicnemidinae **Acicnemis**
- Posterior margin of labrum triangularly extened into clypeal zone. 29
29. Anus surrounded by six or more lobes. 30
- Anus surrounded by four lobes. 31
30. Head retracted, deeply emarginate at posterior margin. Anus surround-
ed by six lobes. Endaeini **Endaeus**
- Head free, normally rounded posteriorly. Anus surrounded by eight
lobes. Derelomini **Derelomus**
31. Anal segment ventral, usually transverse. Mecysolobinae (= Alcidodinae) 32
- Anal segment terminal, circular or oval in outline. 33
32. Body subcylindrical. **Mecysolobus**
- Body gradually attenuate posteriorly. **Mesalcidodes**
33. Spiracles located in shallow hollows, inside of the follow finely wrinkled
to form several irregular fine surrounding rings. Pissodinae **Pissodes**
- Peripheral areas of spiracles normal, not wrinkled. 34
34. Anal segment circular in outline. Labral rods short, not extending
posteriorly into clypeal zone, separated. Curculioninae **Curculio**
- Anal segment transverse oval in outline. Labral rods often conjoined at
posterior extremity. Cryptorhynchinae **35**
- 35.** Labral rods short, only shortly extended posteriorly into clypeal zone,
not conjoined at posterior extremity. **Colobodes**
- Labral rods conjoined posteriorly. 36
36. Air-tubes of spiracles about as long as or longer than peritreme. 37
- Air-tubes of spiracles shorter than peritreme. Peritreme often pigment-
ed. 40
37. Conjoint labral rods Y-shaped, stout. **Euscepes**
- Labral rods conjoined at posterior extremity. 38
38. Frons broadly brownish excepting the basal area. Labrum less than
twice as wide as long. Epipharynx not asperate. **Apries**
- Frons not pigmented excepting the anterior margin. Labrum at least
twice as wide as long. Epipharynx asperate between rods. 39
- 39.** Anterior margin of labrum evenly arched. Mandible with one median
and one postmedian rather sharp teeth on cutting edge. **Hyotanizo**
- Anterior margin of labrum weakly trilobed. Mandible with one sharp
median and one obtuse postmedian teeth on cutting edge. **Cryptorhynchus**
- 40.** Abdominal spiracles unicameral. Conjoint labral rods Y-shaped. **Anaechmura**
- Abdominal spiracles bicameral. 41
41. Mala with twelve ventral and six to eight dorsal setae. 42
- Mala with **five** to seven ventral and six to nine dorsal setae. 43
42. Epipharynx with three anterolateral setae. Mandible not bidentate at
apex. Labral rods short, conjoined at the posterior margin of la-
brum. **Cechania**
- Epipharynx with six anterolateral setae. Mandible bidentate at apex.
Conjoint labral rods Y-shaped, extended posteriorly into clypeal
zone **Syrotelus**
43. Epipharynx not asperate. Conjoint labral rods Y-shaped. 44

- . Epipharynx asperate between labral rods. Labral rods conjoined at posterior extremity. *Shirahoshizo*
- 44. Labrum with a triangular brownish area. Labial palpus with apical segment as long as basal segment. *Simulatacalles*
- . Labrum without brownish area. *Endymia*
- 45. Spiracles unicameral, thoracic spiracles intersegmental. Legs with two-segment. Gymnetrinae *Gymnetron*
- . Spiracles bicameral. Legs vestigial. 46
- 46. Labral rods absent. Labrum more or less emarginatae in the middle. Pedal areas swollen to form prolegs or large lobes. Mandible with sharp apical teeth. 47
- . Labral rods present. Pedal areas normal. Mandibles not serrate. Anthonominae *Anthonomus*
- 47. Epipharynx with two anterolateral and four anteromedian setae. *Hypera*
- . Epipharynx with three anterolateral and six anteromedian setae. Mandible behind inner apical tooth serrate internally. Cioninae 48
- 48. Mandibles dentate or angulate internally near base. Prosternum not pigmented. *Cionus*
- . Mandibles not dentate internally near base. Prosternum with a transverse pigmented area. *Stereonychus*

Genus *Sitona* Germar

Sitona : Emden, 1952, Proc. 2001. Soc. London, 122 : 684. — Prescott and Anderson, 1961, Ann. Ent. Soc. Amer., 54 : 465 (*S. lineata* and *hispidula*). — Sakamoto, 1970, J. Coll. Dairy Agr., 3 : 231 (Japanese spp.). — May, 1977, J. Roy. Soc. New Zealand, 7: 207. — Scherf, 1978, Ordnung Coleoptera : 351.

Key to some Japanese species (after Sakamoto, 1970)

- 1. Mandible with small, accessory tooth near middle of inner margin, without denticles between inner apical tooth and accessory tooth. *Sitona hispidulus*
- . Mandible with denticles between inner apical tooth and accessory tooth. 2
- 2. Mandible with three denticles between inner apical tooth and accessory tooth. *Sitona lineatus*
- . Mandible with five denticles between inner apical tooth and accessory tooth. *Sitona lineellus*

Sitona hispidulus (Fabricius) (Fig. 1)

Sitona hispidula : Prescott and Anderson, 1961, Ann. Ent. Soc. Amer., 54 : 466. — Sakamoto, 1979, J.

Coll. Dairy Agr., 3 : 231.

Body moderately stout, tapered posteriorly.

Head free, lightly pigmented, as broad as long, broadest at the middle. Anterior ocellus absent. Antenna at least three times as broad as long, the outer part always conspicuously projecting both forward and outward and thus forming an angle. Catapophyses in same plane as frons. Hypopharyngeal bracon readily discernible. Frontal sutures conspicuous. Endocarina $2/3$ the length of frons. Frons with four pairs of setae, setae 1 and 2 short to moderately long, subequal, 4 and 5 long, subequal, and with two pairs of sensilla. Dorsal epicranial setae 1, 3 and 5 long, subequal, 2 moderately long, 4 short. Lateral epicranial seta 1 moderately long, 2 long. Ventral epicranial setae short to moderately long, subequal. Four minute posterior epicranial setae present. Clypeal seta 1 short to moderately long, nearly twice as long as 2. Clypeus pigmented across basal angles. Anterior margin of labrum weakly trilobed. Labrum with median and posterior areas pigmented, with three setae ; labral seta 2 more widely separated than 1, paired lateral sensilla absent, median sensillum present,

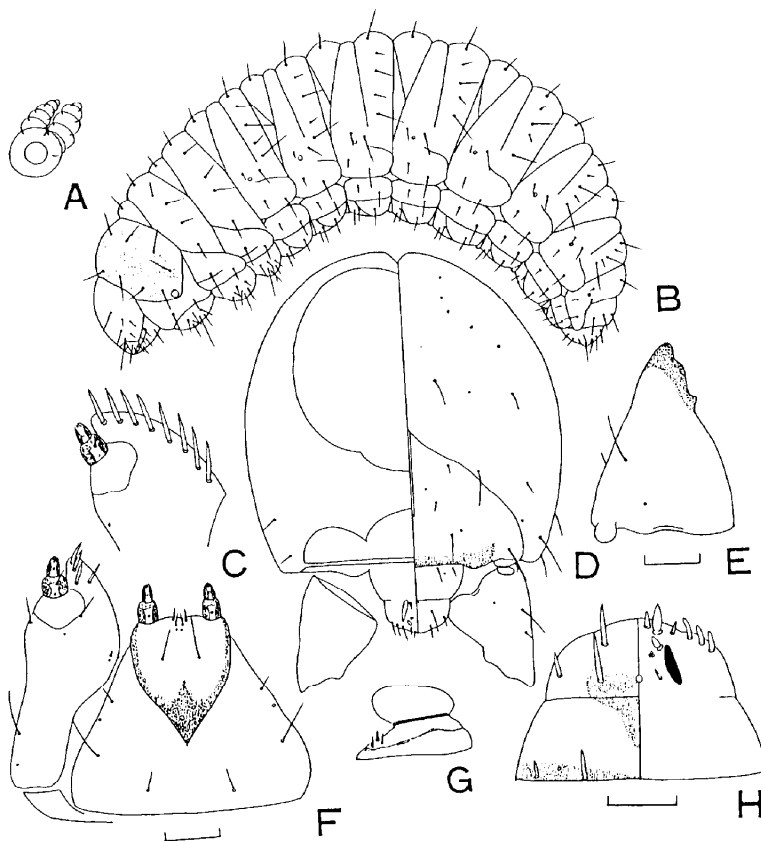


Fig. 1. *Sitona hispidulus* (Fabricius)

A. Spiracle. B. Mature larva. C. Maxilla, dorsal. D. Head. E. Mandible. F. Maxilla and labium. G. Antenna. H. Labrum and epipharynx. Scale : 0.1 mm.

median sensillum at about level of seta 1. Labral rods short. Epipharynx with three anterolateral setae, six anteromedian setae, of which dorsal pair much stronger than anterolateral setae, and four median spine. Epipharyngeal sensory pores in two clusters, three in each cluster, between the anterior and posterior pairs of median spines. Epipharynx not asperate. Mandible with small, accessory tooth near middle of inner margin, longer than wide, with two setae, mandibular seta 2 at the outer edge, very short. Labial palpus with two segments, basal and apical segments each longer than wide. Premental sclerite complete, anterior extension of premental sclerite long and parallel-sided, Posterior extension rather long and pointed. Postmentum with three pairs of setae, the posterior pair separated by a distance approximately one-half as great as that between setae of middle pair. Maxillary palpus with two segments, basal and apical segment each longer than wide. Mala with four ventral and eight dorsal setae.

Pronotum with eight setae on a common sclerite. Thoracic spiracle bicameral. Prodorsum of mesothorax and metathorax with one short seta. Postdorsum of mesothorax and metathorax with four setae, setae 1 and 2 short, subequal, 3 and 4 moderately long, subequal. Alar area with one short seta. Spiracular area with one short seta. Epipleurum with one seta. Pleurum of prothorax with two setae, of meso- and metathorax with one seta. Pedal area with seven setae, one moderately long, the remainder shorter. Most ventral seta of pedal area subequal to very short sternal seta. Sternal setae subequal to eusternal setae.

Abdomen with eight pairs of spiracles. Spiracles all lateral, bicameral. Typical abdominal segments with three dorsal folds. Abdominal segments one to seven each with five setae on postdorsum, setae 1, 3 and 5 long, subequal, setae 2 and 4 short, subequal. Eighth segment with three setae on postdorsum Tenth segment with three small but quite conspicuous setae on each lateral lobe. Epipleurum with two setae, one short, the other slightly longer. Pleurum with two setae, one short, the other slightly longer. Pedal area with one short seta. Eusternum with two very short setae. Sternellum present. Anus terminal, surrounded by four lobes.

Width of head : 0.9 mm.

Materials examined. Chiba. City, Chiba Pref., 11. vi. 1965, injurious to clover.

Genus *Otiorhynchus* Germar

Brachyrhinus : Barrett, 1930, Univ. Calif., Publ. Ent., 5 : 92.—Keifer, 1933, Ent. Amer., 13 : 62.

Otiorhynchus : Emden, 1952, Proc. 2001. Soc. London, 122 : 717.—Scherf, 1978, Ordnung Coleoptera : 351.

Otiorhynchus : May, 1977, J. Roy. Soc. New Zealand, 7 : 213.

Otiorhynchus sulcatus (Fabricius)

(Fig. 2)

Brachyrhinus sulcatus : Barrett, 1930, Univ. Calif., Publ. Ent. 5 : 92. — Keifer, 1933, Ent. Amer., 13 : 65

Otiorhynchus sulcatus : Emden, 1952, Proc. Zool. Soc. London, 122 : 722.

Otiorhynchus sulcatus : May, 1977, J. Roy. Soc. New Zealand, 7 : 213.

Body widest near thorax, tapered posteriorly.

Head free, subdepressed, emarginate behind, widest behind middle. Anterior ocellus present. Antenna projecting, two to three times as wide as long, apex rather evenly but broadly rounded. Catapophyses in same plane as frons. Hypopharyngeal bracon readily discernible. Frontal sutures conspicuous. Endocarina absent. Frons with two setae, setae 4 and 5 long, subequal, setae 1, 2 and 3 absent. Dorsal epicranial setae 1, 3 and 5 long, subequal, 2 moderately long, 4 absent. Lateral epicranial seta 1 moderately long, 2 long. Ventral epicranial setae short to moderately long, subequal. Four minute posterior epicranial setae present. clypeal seta 1 short to moderately long, nearly twice as long as 2. Clypeus pigmented across basal angles. Labrum with median and posterior areas pigmented, with three setae, labral seta 2 less widely separated than 1, median and paired lateral sensilla present. Labral rods moderately elongate, stout, angulate at the middle of labral zone and subparallel thence posteriorly. Epipharynx with three anterolateral setae, six anteromedian setae and four median spines; posterior epipharyngeal spines separated by less than half to a third distance

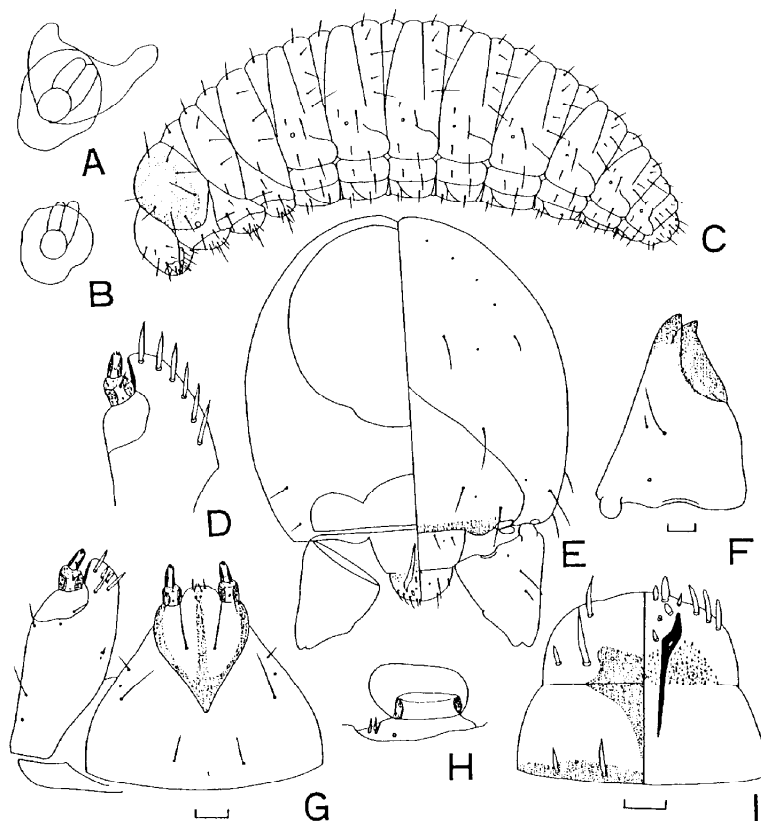


Fig. 2. *Otiorhynchus sulcatus* (Fabricius)

A. Thoracic spiracle. B. Abdominal spiracle. C. Mature larva. D. Maxilla, dorsal. E. Head. F. Mandible. G. Maxilla and labium. H. Antenna. I. Labrum and epipharynx. Scale : 0.1 mm.

of anterior pair. Epipharyngeal sensory pores in two clusters, three in each cluster, between the anterior and posterior pairs of median spines. Epipharynx asperate. Mandible with two apical teeth, longer than wide, with two setae, mandibular seta 2 at the outer edge, seta 1 usually very short. Labial palpus with two segments, basal segment longer than wide, apical segment twice as long as wide. Premental sclerite complete, posterior extension rather long, anterior extension long and moderately narrow, parallel-sided. Postmentum with three pairs of setae, the posterior pair separated by a distance approximately one-half as great as that between setae of middle pair. Maxillary palpus with two segments, basal and apical segment longer than wide. Mala with five ventral and six dorsal setae.

Pronotum with eight setae, transverse with a smooth rectangular plate. Thoracic spiracle bicameral, pseudannular with two short unsegmented air-tubes. Prodorsum of mesothorax and metathorax with one short seta. Postdorsum of mesothorax and metathorax with four setae, setae 1 and 2 short, subequal, 3 and 4 moderately long, subequal. Alar area with one short seta. Spiracular area with one short seta. Epipleurum with one seta. Pleurum of prothorax with two setae, of meso- and metathorax with one seta. Pedal area with six setae, one moderately long, the remainder shorter. Most ventral setae of pedal area subequal to very short sternal seta. Sternal setae subequal to eusternal setae.

Abdomen with eight pairs of spiracles, spiracles all lateral, bicameral. Typical abdominal segments with three dorsal folds. Prodorsum of typical abdominal segments with one short seta. Postdorsum of abdominal segments with five setae, 1, 2 and 4 short, 3 and 5 moderately long, subequal. Spiracular area with two setae, seta 1 very short, seta 2 short. Epipleurum with two setae, one short, the other slightly longer. Pleurum with two setae, one short, the other slightly longer. Pedal area with one short seta. Eusternum with two very short setae. Sternellum present. Anus terminal, with four lobes.

Width of head 1.6 mm.

Materials examined. Shiojiri, Nagano Pref., 29. x. 1982, from *Cyclamen* in a green house.

This species was recently introduced into Japan, but its establishment is uncertain owing to extensive control operations.

***A. rrhaphogaster pilosa* Roelofs**

(Fig. 3)

Body moderately stout, slender.

Head free, dark brown, as broad as long, broadest at the middle, rounded posteriorly. Anterior ocellus present. Antenna projecting, twice as broad as long, the outer part conspicuously projecting both forward and outward. Catapophyses in same plane as frons. Hypopharyngeal bracon readily discernible. Frontal sutures conspicuous. Endocarina absent. Frons with two pairs of setae, seta 4 and 5 long, subequal, seta 1, 2 and 3 absent. Dorsal epicranial setae 1, 3 and 5 long, subequal, 2 moderately long, 4 absent. Lateral epicranial seta 1 moderately long, 2 long. Ventral epicranial setae short to moderately long, subequal. Four minute posterior epicranial setae present. Clypeal seta 1 short to moderately long, nearly twice as long as 2. Clypeus pigmented

across basal angles. Labrum with median and posterior areas pigmented. Labrum with three setae, median and paired lateral sensilla present on labrum, lateral sensilla at about level of median sensilla. Labral rods moderately elongate, stout, subparallel. Epipharynx with three anterolateral setae, six anteromedian setae and four median spines, posterior epipharyngeal spines separated by the distance between the anterior pair. Epipharyngeal sensory pores in two clusters, three in each cluster, outside the anterior spines. Epipharynx asperate. Mandible with two acute apical teeth and smooth angulation on ventral cutting edge, longer than wide, mandibular seta 2 at the outer edge, usually very short. Labial palpus with two segments, each segment longer than wide. Premental sclerite complete, with anterior and posterior median extensions. Postmentum with three pairs of setae, the posterior pair separated by a distance approximately one-half as great as that between setae of middle pair. Maxillary palpus with two segments, each segment longer than wide. Mala with four ventral and eight dorsal setae.

Pronotum with eight setae, transverse with a smooth rectangular plate. Thoracic

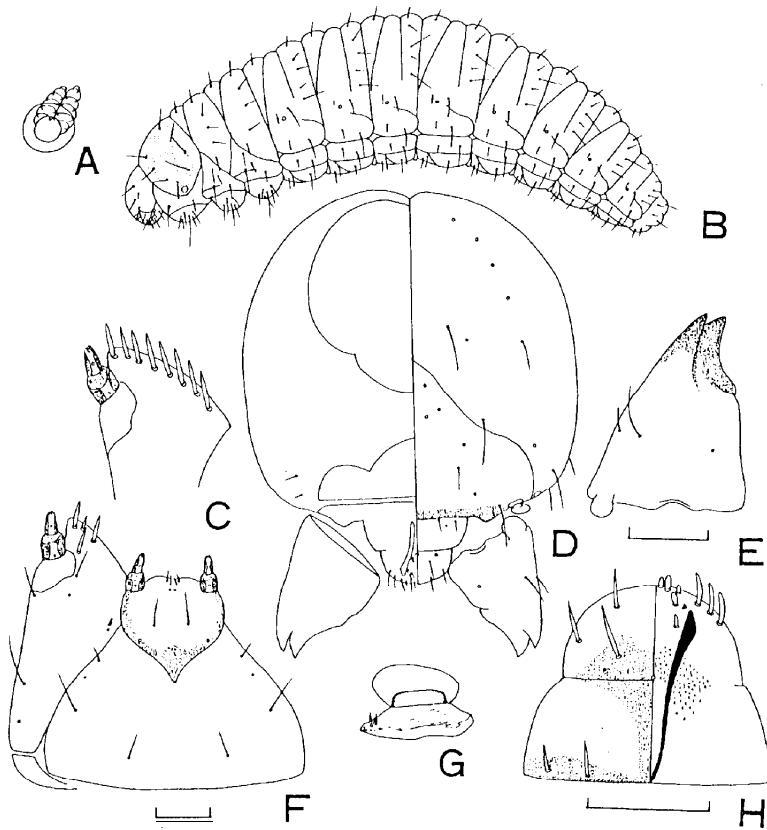


Fig. 3. *Arrhaphogaster pilosa* Roelofs

A. Spiracle. B. Mature larva. C. Maxilla, dorsal. D. Head. E. Mandible. F. Maxilla and labium. G. Antenna. H. Labrum and epipharynx. Scale : 0.1 mm.

spiracle bicameral. Postdorsum of meso- and metathorax with four setae. Alar area with one short seta. Spiracular area with two setae, one moderately long, one very short. Epipleurum with one seta. Pleurum of prothorax with two setae, of meso- and metathorax with one seta. Pedal area with six setae, seta z sensu Emden present. Most ventral setae of pedal area subequal to very short sternal setae. Sternal setae subequal to eusternal setae.

Abdomen with eight pairs of spiracles. Spiracles all lateral, bicameral. Typical abdominal segments with three dorsal folds. Prodorsum with one short seta. Postdorsum with five setae, setae 1, 2 and 4 moderately short, subequal, 3 and 5 long, subequal. Eighth postdorsum with four setae. Spiracular area with two setae, seta 1 very short, seta 2 short. Epileurum with two setae, one short, the other slightly longer. Pleurum with two setae, one short, the other slightly longer. Pedal area with one short seta. Eusternum with two very short setae. Sternellum present. Anus terminal, with four lobes.

Width of head. 0.6 mm.

Materials examined. Chiba City, Chiba Pref., 7. x. 1982, injurious to the leaves of pear, bred.

This genus belongs to the tribe Celeuthetini and comes close to *Psalidium*, *Premnotrypes* and *Trypopermnon* in the key given by Emden, but is separable from them by the following points : Alar area of meso- and metathorax with one seta, seta z of pedal lobes present, apex of abdomen not sclerotized, frontal sutures present, spiracles bicameral, and postdorsum of meso- and metathorax with four setae.

Episomus mundus Sharp

(Fig. 4)

Body stout, gradually tapered posteriorly.

Head free, dark brown, as broad as long, broadest at the middle, with longitudinal stripes dorsally on epicranium behind frons. Anterior ocellus present. Antenna consisting of one membranous article which bears a conical accessory sensory appendage and several minute setae. Catapophyses in same plane as frons. Hypopharyngeal bracon readily discernible. Frontal sutures conspicuous. Endocarina absent. Frons with five pairs of setae, setae 1, 2 and 3 short to moderately long, subequal, 4 and 5 long, subequal. Dorsal epicranial setae 1, 3 and 5 long, subequal, 2 moderately long, 4 short. Lateral epicranial seta 1 moderately long, 2 long. Ventral epicranial setae short to moderately long, subequal. Four minute posterior epicranial setae present. Clypeal seta 1 short to moderately long, nearly twice as long as 2. Clypeus pigmented across basal angles. Labrum with median and posterior areas pigmented. Anterior margin of labrum weakly trilobed, labral setae 1 and 2 short to moderately long, nearly twice as long as 3. Median and paired lateral sensilla present on labrum. Labral rods moderately elongate, stout, subparallel. Epipharynx with three anterolateral setae, six anteromedian setae and four median spines, posterior epipharyngeal spines separated by one-third the distance between the anterior pair. Epipharyngeal sensory pores in two clusters, three in each cluster, between the anterior and posterior pairs of median spines. Epipharynx with asperities, of which the anterior area hair-like. Mandible with one apical tooth. Mandibular seta 1 short, slightly longer than and directly

behind 2. Labial palpus with two segments, basal segment wider than long, apical segment longer than wide. Premental sclerite complete, with anterior and posterior median extensions. Hypopharynx with hair-like asperities at side and apical margins. Maxillary palpus with two segments, each segment longer than wide. Mala with five ventral and seven dorsal setae.

Pronotum with eight setae, transverse with a smooth rectangular plate. thoracic spiracle bicameral, with slender peritreme and short air-tubes. Prodorsum of meso- and metathorax with one short setae. Postdorsum of meso- and metathorax with four setae. Alar area with one short seta. Spiracular area with two setae, one moderately long, one very short. Epipleurum with one seta. Pleurum of prothorax with two setae, of meso- and metathorax with one seta. Pedal area with seven setae. Most ventral setae of pedal area subequal to very short sternal setae. Sternal setae subequal to eusternal setae.

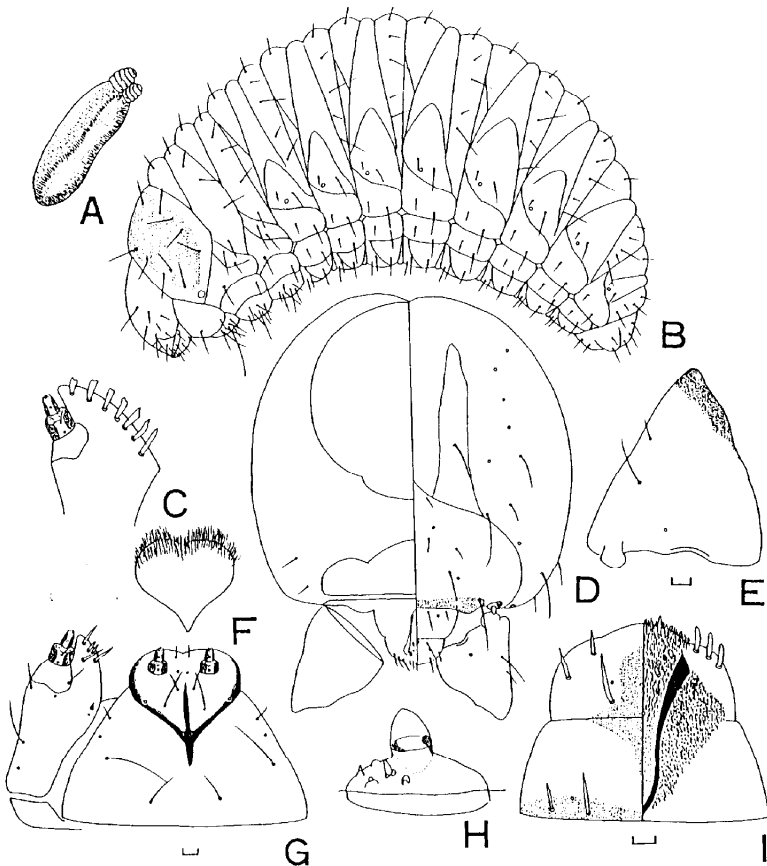


Fig. 4. *Episomus mundus* sharp

A. Spiracle. B. Mature larva. C. Maxilla, dorsal. D. Head. E. Mandible. F. Prementum, dorsal. G. Maxilla and labium. H. Antenna. I. Labrum and epipharynx. Scale : 0.1 mm.

Abdomen with eight pairs of spiracles. Spiracles all lateral, bicameral, with slender peritreme and short air-tubes. Typical abdominal segments with three dorsal folds. Prodorsum with one short seta. Postdorsum with five setae, setae 1, 2 and 4 short, 3 and 5 moderately long, subequal. Eighth postdorsum with four setae. Spiracular area with two setae, seta 1 very short, seta 2 short. Epipleurum with two setae, one short, the other slightly longer. Pleurum with two setae, one short, the other slightly longer. Pedal area with one short seta. Eusternum with two very short setae. Sternellum present. Anus terminal, with four lobes.

Wided of head. 2.8 mm.

Materials examined. Kagoshima Pref., bred by Mr. Segawa.

The genus *Episomus* (Otiorynchinae : Episomini) was not included in the key of Emden. It is well characterized by the following points : Antenna conical, as long as wide ; mandible with blunt apex, not bi-toothed ; spiracles slender, with two short air-tubes ; and apex of abdomen not sclerotized.

Genus *Pseudocneorhinus* Roelofs

Pseudocneorhinus : Emden, 1952, Proc. Zool. Soc. London, 122 : 730.

Pseudocneorhinus bifasciatus Roelofs

(Fig. 5)

Pseudocneorhinus bifasciatus : Emden, 1952, Proc. 2001. Soc. London, 122 : 731.

Callirhopalus (*Pseudocneorhinus*) *bifasciatus* : Marrone and Zepp, 1979, Ann. Ent. Soc. Amer., 72 : 833.

First instar larvae.

Body moderately slender and stout, tapered posteriorly.

Head free, testaceous-yellow, slightly wider than long. Anterior ocellus absent. Antenna strongly prominent, three times as wide as long, strongly rounded and shifted somewhat towards the outer side. Catapophyses in same plane as frons. Hypopharyngeal bracon readily discernible. Frontal sutures conspicuous. Endocarina absent. Frons with five setae, setae 1, 2 and 3 short, subequal, 4 and 5 long, subequal. Dorsal epicranial setae 1, 3 and 5 long, subequal, 2 moderately long, 4 short. Lateral epicranial seta 1 moderately long, 2 long. Ventral epicranial setae short to moderately long, subequal. Four minute posterior epicranial setae present. Clypeal seta 1 short to moderately long, nearly twice as long as 2. Anterior margin of labrum trilobes. Labrum with three setae and paired lateral sensillae between labral seta 1 and 3. Labral rods moderately short, subparallel. Epipharynx with three anterolateral setae, six anteromedian setae and four median spines. Epipharyngeal sensory pores in two clusters, three in each cluster, between the anterior and posterior pairs of median spines. Mandible with two apical teeth, longer than wide. Mandible with two setae, mandibular seta 2 at the outer edge, usually very short. Labial palpus with two segments, basal segment almost twice as wide as long, apical segment almost as long as wide. Premental sclerite moderately sclerotized, posterior extension rather short. Postmentum with three pairs of setae, the posterior pair separated by a distance approximately one-half as great as that between setae of middle pair. Maxillary

palpus with two segments, basal segment almost twice as wide as long, apical segment longer than wide. Mala with five ventral and six dorsal setae.

Pronotum with eight setae, transverse with a smooth rectangular plate. Thoracic spiracle bicameral. Prodorsum of mesothorax and metathorax with one short seta. Postdorsum of mesothorax and metathorax with four setae, setae 1 and 2 short, subequal, 3 and 4 moderately long, subequal. Alar area with one short seta. Spiracular area with two short setae. Epipleurum with one seta. Pleurum of prothorax with two setae, of meso- and metathorax with one seta. Pedal area with seven setae, one moderately long, the remainder shorter. Most ventral setae of pedal area subequal to very short sternal setae. Sternal setae subequal to eusternal setae.

Abdomen with eight pairs of spiracles. Spiracles all lateral, unicameral. Typical abdominal segments with three dorsal folds. Prodorsum with one short seta. Postdorsum of first to seventh segment with five setae, setae 1, 3 and 5 long, subequal, 2 and

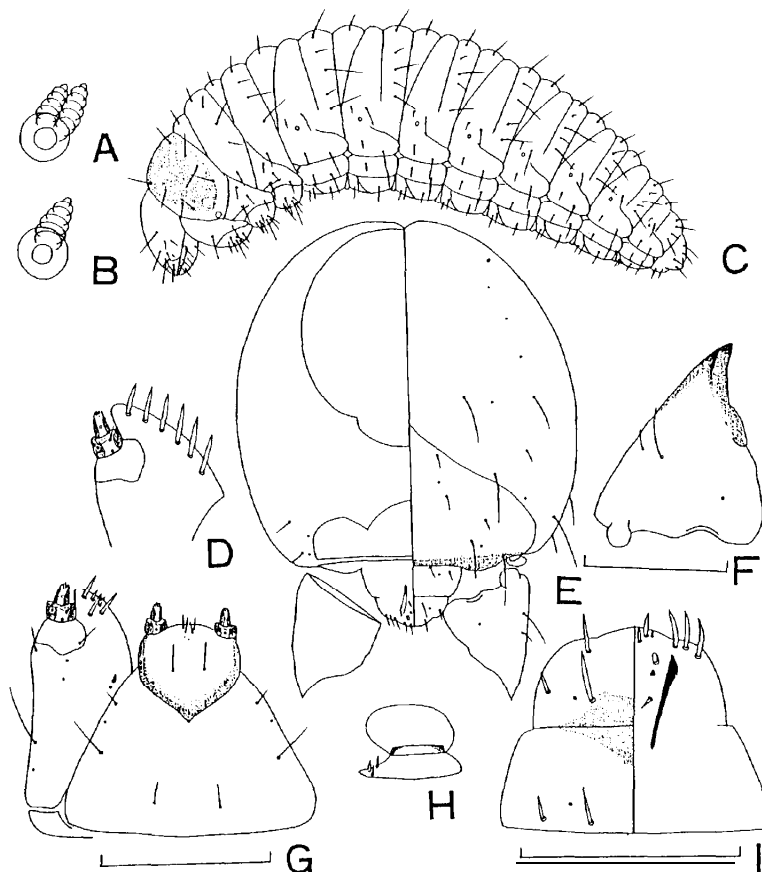


Fig. 5. *Pseudocneorhinus bifasciatus* Roelofs

A. Thoracic spiracle. B. Abdominal spiracle. C. Mature larva. D. Maxilla, dorsal. E. Head. F. Mandible. G. Maxilla and labium. H. Antenna. I. Labrum and epipharynx. Scale : 0.1 mm.

4 short, subequal. Postdorsum of eighth segment with four setae. Spiracular area with two setae, seta 1 very short, seta 2 short. Epipleurum with two setae, one short, the other slightly longer. Pleurum with two setae, one short, the other slightly longer. Pedal area with one short seta. Eusternum with two very short setae. Sternellum present. Anus terminal, X-shaped, without obvious setae.

Width of head : 0.3 mm.

Materials examined. Specimens are obtained by breeding. viii. 1960.

Genus ***Scepticus*** Roelofs

(Figs. 6-8)

Body moderately stout, slender

Head free, brownish yellow. Anterior ocellus present. Antenna moderately projecting, almost thrice as wide as long, evenly convex. Catapophyses in same plane

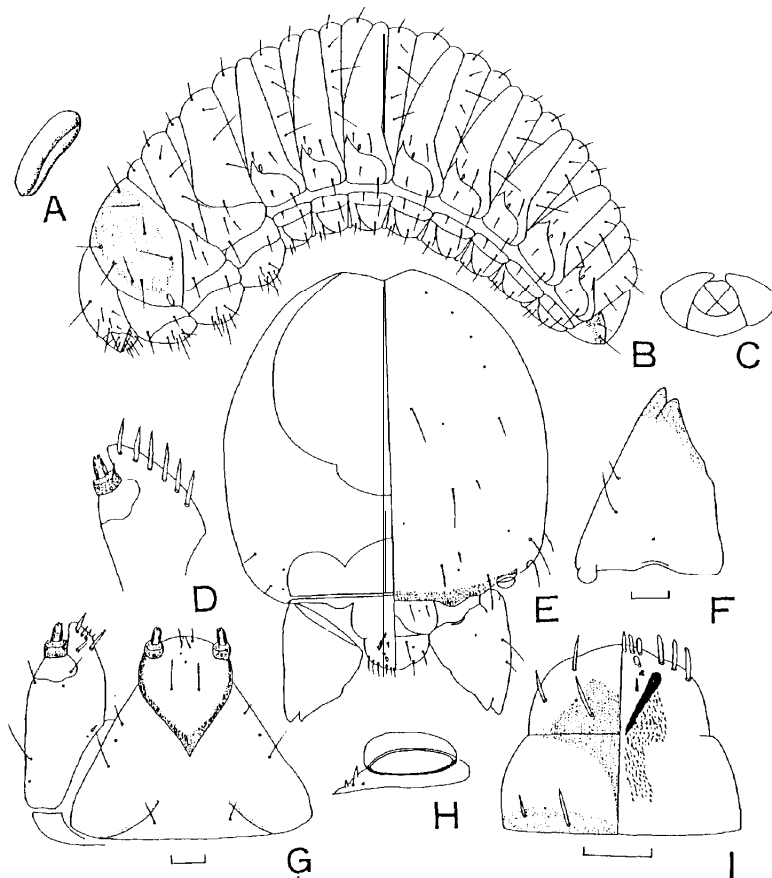


Fig. 6. *Scepticus griseus* Roelofs

A. Spiracle. B. Mature larva. C. Anus. D. Maxilla, dorsal. E. Head. F. Mandible.

G. Maxilla and labium. H. Antenna. I. Labrum and epipharynx. Scale : 0.1 mm.

as frons. Hypopharyngeal bracon readily discernible. Frontal sutures absent. Endocarina absent. Frons with three setae, setae 4 and 5 long, seta 3 short, setae 1 and 2 absent. Dorsal epicranial setae 1, 3 and 5 long, subequal, 2 moderately long, 4 short. Lateral epicranial seta 1 moderately long, 2 long. Ventral epicranial setae short to moderately long, subequal. Four minute posterior epicranial setae present. Clypeal seta 1 short to moderately long, nearly twice as long as 2. Labrum with median and posterior areas pigmented. Labrum with three setae, labral seta 1 less widely separated than 2. Median and paired lateral sensilla present on labrum. Labral rods moderately short, oblique. Epipharynx with three anterolateral setae, six anteromedian setae and four median spines, posterior epipharyngeal spines separated by slightly more than distance between the anterior pair. Epipharyngeal sensory pores in two clusters, three in each cluster, between the anterior and posterior pairs of median spines. Epipharynx with asperities. Mandible with two apical teeth, longer than wide. Labial palpus with two segments, basal segment 1.5 times wide as long, apical segment almost as long as wide. Premental sclerite complete, but weak in the middle. Postmentum with three pairs of setae. Maxillary palpus with two segments, basal segment twice as wide as long,

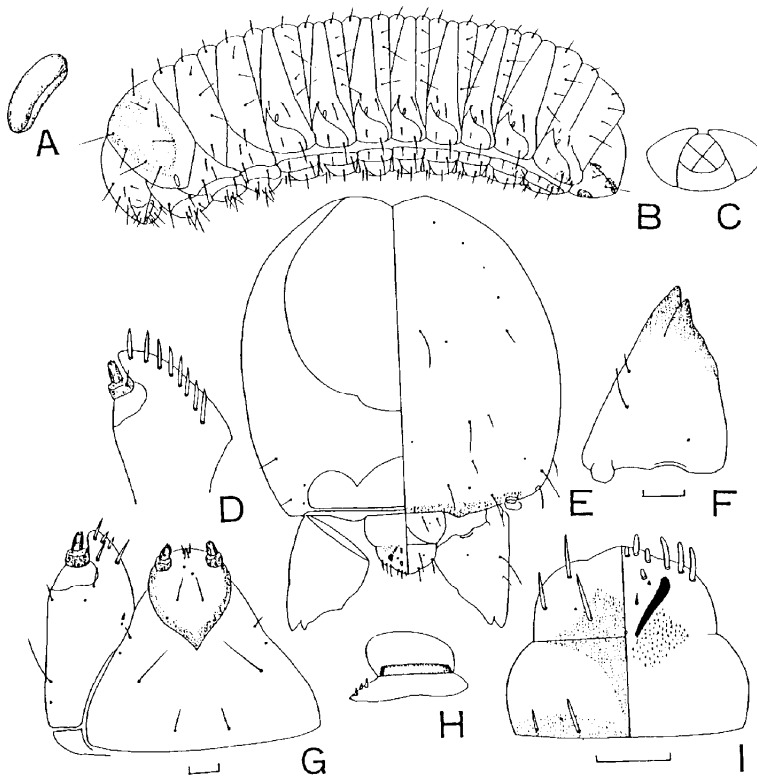


Fig. 7. *Scepticus uniformis* Kôno

A. Spiracle. B. Mature larva. C. Anus. D. Maxilla, dorsal. E. Head. F. Mandible.
G. Maxilla and labium. H. Antenna. I. Labrum and epipharynx. Scale : 0.1 mm.

apical segment longer than wide. Mala with five ventral and six dorsal setae.

Pronotum with eight setae, transverse with a smooth rectangular plate. Thoracic spiracle elliptical, without air-tubes. Prodorsum of meso- and metathorax with one short seta. Postdorsum of meso- and metathorax with four setae, setae 1 and 2 short, subequal, 3 and 4 long, subequal. Alar area with one short seta. Spiracular area with two short setae. Epipleurum with one seta. Pleurum of prothorax with two setae, of meso- and metathorax with one seta. Pedal area with seven setae, one moderately long, the remainder shorter. Most ventral setae of pedal area subequal to very short sternal setae. Sternal setae subequal to eusternal setae.

Abdomen with eight pairs of spiracles. Spiracles all lateral, elliptical, without air-tubes. Typical abdominal segments with three dorsal folds. Prodorsum with one short seta. Postdorsum of first to seventh segment with five setae, setae 1, 2 and 4 short, subequal, setae 3 and 5 long, subequal, eighth segment with four setae. Ninth segment wholly sclerotized, tergite elongate triangular, with base rather strongly convex, sides straight and meeting in a point between the protruding parts of the epipleurites. Spiracular area with two setae, seta 1 very short, seta 2 short. Epipleurum with two setae, one short, the other slightly longer. Pleurum not strong, with two setae, one short, the other slightly longer. Pedal area with one short seta. Eusternum with two very short setae. Sternellum present. Anus terminal, X-shaped.

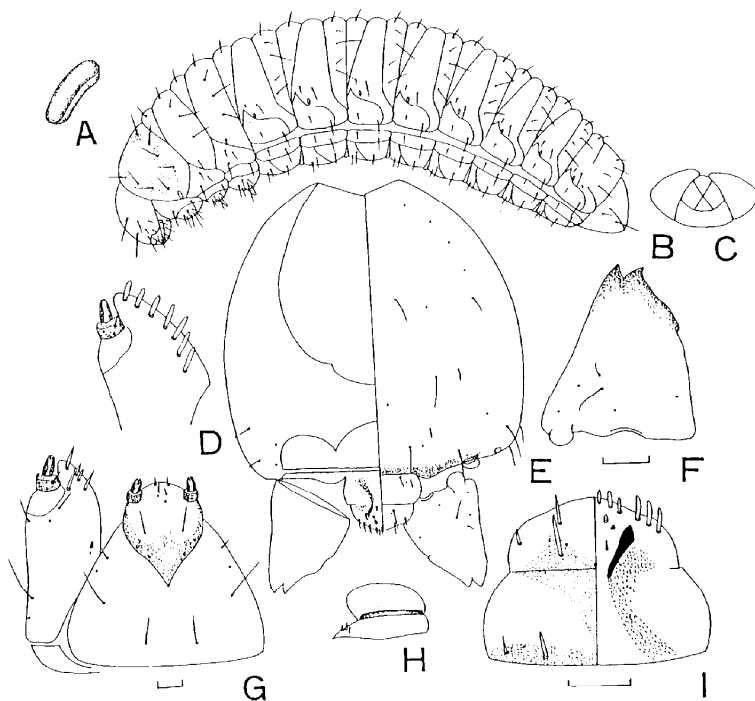


Fig. 8. *Scepticus insularis* koelofs

A. Spiracle. B. Mature larva. C. Anus. D. Maxilla, dorsal. E. Head. F. Mandible. G. Maxilla and labium. H. Antenna. I. Labrum and epipharynx. Scale: 0.1 mm.

This genus is close to *Tylacites* in systematic position and their larvae are also similar to each other. Comparing with the description of *Tylacites* by Emden, the former is separable from the latter by the ordinal and complete sclerite of prementum.

I have examined following three species, but key to species is not provided here owing to insufficiency of each material.

Species and materials examined.

Scepticus griseus Roelofs. Yamada, Kochi Pref., 20. viii. 1958, from a nursery of *Cryptomeria japonica*.

Scepticus uniformis Kôno. Hakozaki. Fukuoka Pref, 20. vi. 1959, feeding on root of *Calystegia soldanella*.

Scepticus insularis Roelofs. Kuroishi, Aomori Pref., 5. x. 1954, from a nursery of *Cryptomeria japonica*.

***Meotiorhynchus querendus* Sharp**

(Fig. 9)

Body stout and moderately slender.

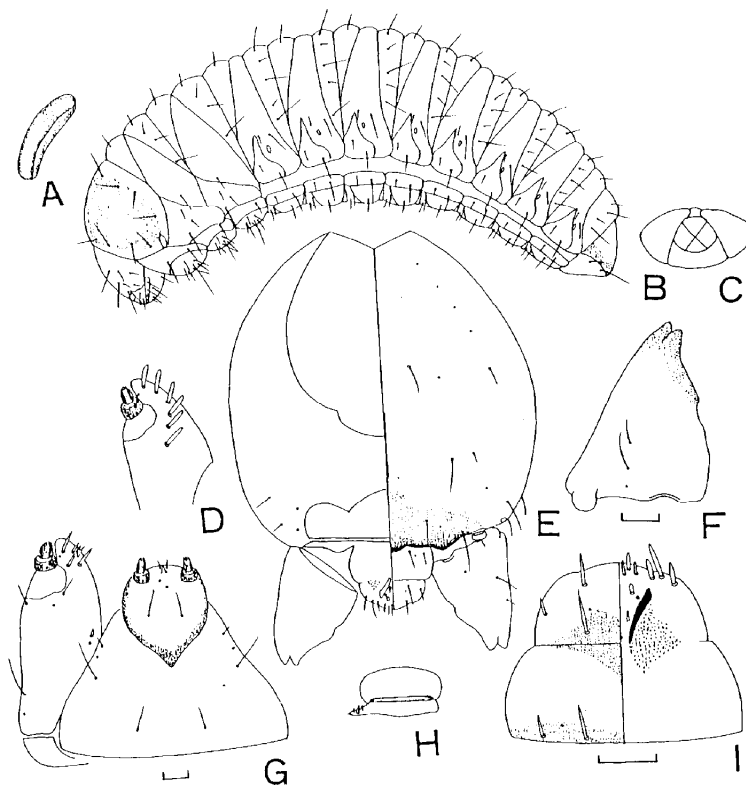


Fig. 9. *Meotiorhynchus querendus* Sharp

A. Spiracle. B. Mature larva. C. Anus. D. Maxilla, dorsal. E. Head. F. Mandible.
G. Maxilla and labium. H. Antenna. I. Labrum and epipharynx. Scale : 0.1 mm.

Head free, brownish yellow, as long as wide. Anterior ocellus present. Antenna moderately projecting, almost thrice as wide as long, apex evenly convex. Catapophyses in same plane as frons. Hypopharyngeal bracon readily discernible. Frontal suture absent. Endocarina present. Frons broadly brownish, with two setae, setae 4 and 5 long, subequal, setae 1, 2 and 3 absent. Dorsal epicranial setae 1, 3 and 5 long, subequal, 2 moderately long, 4 short. Lateral epicranial seta 1 moderately long, 2 long. Ventral epicranial setae short to moderately long, subequal. Four minute posterior epicranial setae present. Clypeal seta 1 short to moderately long, nearly twice as long as 2. Clypeus pigmented across basal angles. Labrum with median and posterior areas pigmented. Anterior margin of labrum trilobes, with three setae, 1 almost as widely separated as 2. Median and paired lateral sensilla present on labrum. Epipharynx with three anterolateral setae, six antromedian setae and four median spines, posterior epipharyngeal spines separated as widely as anterior pair. Epipharyngeal sensory pores in two clusters, three in each cluster, between the anterior and posterior pairs of median spines. Epipharynx with asperities. Mandible with two apical teeth, longer than wide. Mandibular seta 1 short, slightly longer than and directly behind 2. Labial palpus with two segments, basal segment twice as wide as long, apical segment almost as long as wide. Premental sclerite complete, but weak medianly. Postmentum with three pairs of setae, the posterior pair separated by a distance approximately half as great as that between setae of middle pair. Maxillary palpus with two segments, basal segment 1.5 times as wide as long, apical segment almost as long as wide. Mala with five ventral and six dorsal setae.

Pronotum with eight setae, transverse, with a smooth rectangular plate. Thoracic spiracle reniform or elliptical, without air-tubes. Prodorsum of meso- and metathorax with one short seta. Postdorsum of meso- and metathorax with four setae, setae 1 and 2 short, subequal, 3 and 4 long, subequal. Alar area with one short seta. Spiracular area with two short setae. Epipleurum with one seta. Pleurum of prothorax with two setae, of meso- and metathorax with one seta. Pedal area with seven setae, one moderately long, the remainder shorter. Most ventral setae of pedal area subequal to very short sternal setae. Sternal setae subequal to eusternal setae.

Abdomen with eight pairs of spiracles. Spiracles all lateral, like thoracic ones. Typical abdominal segments with three dorsal folds. Prodorsum with one short seta. Postdorsum of first to seventh abdominal segments with five setae, setae 1, 3 and 5 long, subequal, 2 and 4 short, subequal, postdorsum of eighth segment with four setae, 1 and 3 short, subequal, 2 and 4 long, subequal. Ninth segment wholly sclerotized, tergite elongate triangular, base rather strongly convex, sides straight and meeting in a point between the protruding parts of the epipleurites. Lateral part of body with a drain between epipleurum and pleurum. Epipleurum with two setae, one short, the other slightly longer. Pleurum not strong, with two setae, one short, the other slightly longer. Pedal area with one short seta. Eusternum with two very short setae. Stemellum present. Anus X-shaped.

Width of head. 1.3 mm.

Materials examined. Abashiri City, Hokkaido, 4. xi. 1976.

Ca tapionus sp.

(Fig. 10)

First instar larvae of the intermediate population of *C. obscurus* and *modestus* from Niigata Pref. .

Body stout, slender.

Head free, brownish yellow, as long as wide. Anterior ocellus present. Antenna moderately projecting, almost thrice as wide as long, apex evenly convex. Catapophyses in same plane as frons. Hypopharyngeal bracon readily discernible. Frontal sutures conspicuous. Endocarina absent. Frons with two setae, seta 4 and 5 long, subequal, setae 1, 2 and 3 absent. Dorsal epicranial setae 1, 3 and 5 long, subequal, 2 moderately long, 4 short. Lateral epicranial seta 1 moderately long, 2 long. Ventral epicranial setae short to moderately long, subequal. Four minute posterior epicranial setae present. Clypeal seta 1 short to moderately long, nearly twice as long as 2. Anterior margin of labrum trilobed. Labrum with three setae, median and paired lateral sensilla present. Labral rods moderately short, oblique. Epipharynx with three anterolateral setae, six anteromedian setae and four median spines. Epipharyngeal

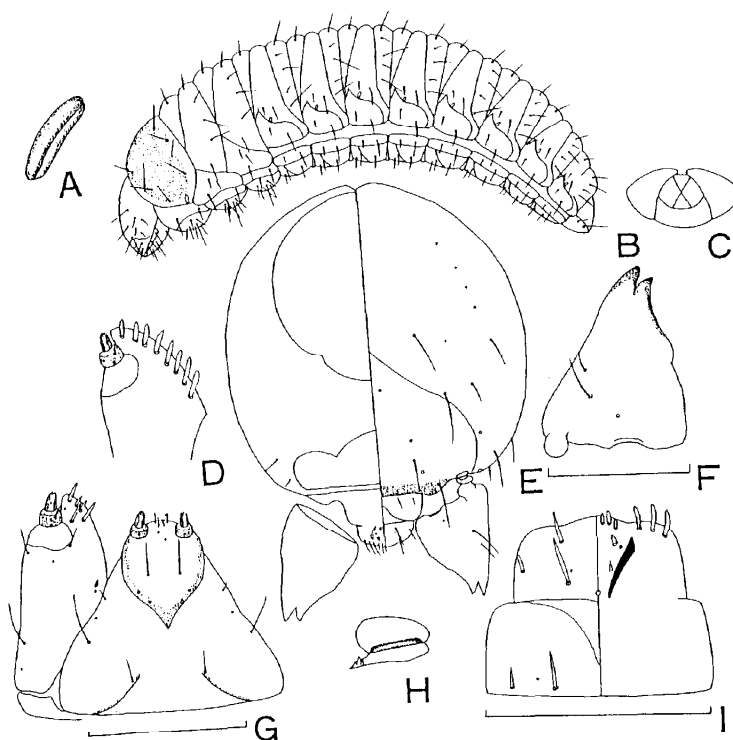


Fig. 10. *Catapionus* sp.

A. Spiracle. B. Mature larva. C. Anus. D. Maxilla, dorsal. E. Head. F. Mandible. G. Maxilla and labium. H. Antenna. I. Labrum and epipharynx. Scale : 0.1 mm.

sensory pores in two clusters, three in each cluster, between the anterior and posterior pairs of median spines, posterior epipharyngeal spines separated by two-thirds distance between anterior pair. Epipharynx not asperate. Mandible with two apical teeth, longer than wide. Labial palpus with two segments, basal segment wider than long, apical segment longer than wide. Premental sclerite complete, posterior extension rather long, anterior extension long and moderately narrow, parallel-sided. Postmentum with three pairs of setae, the posterior pair separated by a distance approximately half as great as that between setae of middle pair, with strong fold near posterior margin. Maxillary palpus with two segments, basal segment wider than long, apical segment longer than wide. Mala with five ventral and eight dorsal setae.

Pronotum with eight setae, transverse with a smooth rectangular plate. Thoracic spiracle reniform or elliptical, without air-tubes. Prodorsum of meso- and metathorax with one short seta. Postdorsum of meso- and metathorax with four setae, setae 1 and 2 short, subequal, 3 and 4 long, subequal. Alar area with one short seta. Spiracular area with two short setae. Epipleurum with one seta. Pleurum of prothorax with two setae, of meso- and metathorax with one seta. Pedal area with seven setae, one moderately long, the remainder shorter. Most ventral setae of pedal area subequal to very short sternal setae. Sternal setae subequal to eusternal setae.

Abdomen with eight pairs of spiracles, spiracle all lateral, elliptical. Typical abdominal segments with three dorsal folds. Prodorsum with one short seta. Postdorsum of first to seventh abdominal segments with five setae, setae 1, 3 and 5 long, subequal, 2 and 4 short, subequal. Postdorsum of eighth abdominal segment with four setae, setae 1 and 3 short, subequal, 2 and 4 long, subequal. Ninth segment wholly sclerotized tergite elongate triangular, base rather strongly convex, sides straight and meeting in a point between the protruding parts of the epipleurites. Lateral part of body between epipleurites and pleurites with a drain. Epipleurum with two setae, one short, the other slightly longer. Pleurum not strong, with two setae, one short, the other slightly longer. Pedal area with one short seta. Eusternum with two very short setae. Sternellum present. Anus X-shaped.

Width of head : 0.25 mm.

Materials examined. Naeba, Niigata Pref., 9. vi. 1977, reared.

This genus belongs to the tribe Cneorrhinini, and is different from *Philopedon* by the eighth postdorsum of abdomen with four setae and alar area with one short seta, and from *Cneorrhinus* by the lack of sclerites on eighth segment.