

*Kontyû*, 1971, 39 (4): 361-367.

## ON THE LARVAE OF MYCETOPHAGIDAE OCCURRING IN JAPAN (COLEOPTERA: CUCUJOIDEA)\*

NODOKA HAYASHI

Kikuna-machi 534, Kôhoku-ku, Yokohama

The Mycetophagidae form a rather small family of the superfamily Cucujoidea, including about 200 species in the world. So far as I am aware, 23 species of this family have been known to occur in Japan, and yet no larvae of these species have been informed except for *Typhaea stercorea* (Linnaeus) occurring in the world. On this occasion the mature larvae of 6 Japanese species belonging to 4 genera will be described in the following pages.

Before going further, I express my sincere acknowledgement to Prof. C. Watanabe of Hokkaido University for his kindness in giving constant encouragement. I am especially obliged to Mr. M. Miyatake of Ehime University for the identification of Mycetophagid-beetles.

### Family Mycetophagidae

The larvae of this family are characterized by the following features:-

Body subcylindrical in cross-section, provided with different kinds of setae. Head-capsule comparatively globular; median (coronal) and frontal sutures visible, the base of the latter located near caudal margin of head-capsule; frons and clypeus confluent, but portion between them transversely sulcated; ocelli in 4 or 5 spots on each side. Antennae 3-jointed. Mandibles asymmetrical; grinding surface of left mandible produced at extremity; molar part with an area of asperities on ventral or both dorsal and ventral surfaces. Maxillary mala rounded apically, usually lacking uncus at inner-distal angle. Labial palpi 2-jointed. Ligula present. Submentum and gula united. Hypopharynx well developed, extremely broadened; hypopharyngeal sclerome forming a  $\Lambda$ -shaped, transverse band. Prothorax with presternum small; coxal cavities not far separated from each other. Thoracic and abdominal tergites haired. Epipleurum of abdominal segments distinct. Urogomphi spine-like or absent. Thoracic and abdominal spiracles with or without an extentional part on margin.

#### *Mycetophagus antennatus* (Reitter, 1879)

Body light umber brown dorsally, parallel-sided or slightly enlarged medianly, furnished with pubescence and long setae on dorsum; 9th abdominal segment terminating in upturned urogomphi.

Head-capsule (Fig. 1, B & C) about 0.8 mm. in breadth, moderately widened basally, colorless anteriorly; groove between frons and clypeus obscure; ocelli (Fig. 1, D) in 5 spots on each side. Antennae (Fig. 1, E) elongate; 1st joint nearly as long as wide, a little shorter than the 3rd; 2nd joint about twice as long as the 3rd, the sensory appendage being small, lens-shaped. Epipharynx (Fig. 1, F) with 2 comb-shaped lobes on proximal region. Mandibles (Fig. 1, G & H) bidentate apically; right mandible with an additional tooth on dorsal cutting edge behind apical tooth; molar part asperated ventrally; external surface with several setae. Maxillae (Fig. 1, I) with apical joint of palpus about twice as long as the basal; mala comparatively elongate, parallel-sided. Maxillary articulating area not bilobed. Labium (Fig. 1, J) with about 4 short setae on ligula; submental gular region slightly pigmented, moderately constricted medianly. Hypopharyngeal sclerome as in Fig. 1, J.

\* Hayashi, N: Contributions to the knowledge of the larvae of Cucujoidea VII.

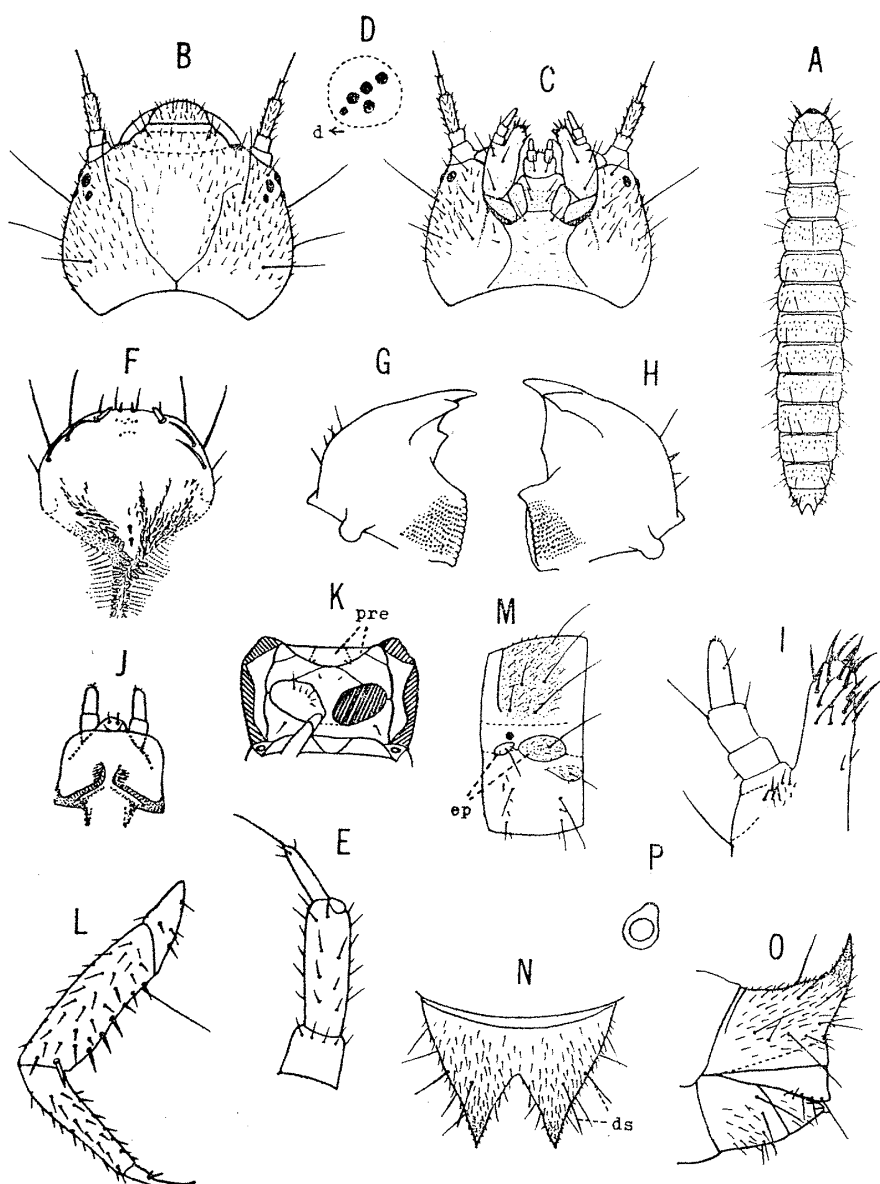


Fig. 1: Mature larva of *Mycetophagus antennatus*. A: Larva (dorsal view). B: Head (dorsal view). C: *ditto* (ventral view). D: Ocelli (right, d: shows dorsal surface). E: Antenna (left, ventral view). F: Epipharynx. G: Mandible (right, ventral view). H: *ditto* (left, ventral view). I: Maxilla (left, buccal view). J: Labium (buccal view). K: Prothoracic segment (ventral view, pre: presternum). L: Metathoracic leg (left, posterior view). M: Third abdominal segment (lateral view, ep: epipleurum). N: Ninth abdominal segment (dorsal view, ds: dorso-median setae). O: *ditto* (lateral view). P: First abdominal spiracle.

Prothoracic segment about 1.5 times as wide as long. Legs (Fig. 1, L) elongate, the posterior pair being longest (12:13:14); coxal cavities well contiguous with each other as in Fig. 1, K; femur and tibia with a number of setae, of which ventral ones are spiniform; claw slender. Abdomen not expanded backwards; 1st to 6th segments 2 to 2.5 times as wide as long, bearing 4 to 6 long setae on each tergite; epipleurum (Fig. 1, M: ep) slightly or moderately swollen laterally, divided into 2 lobes; lateral side of sternum (hypopleurum) moderately elevated. Ninth abdominal segment (Fig. 1, N & O) small, colorless basally, the dorso-median setae (Fig. 1, N: ds) being more or less stouter; urogomphi moderately curved upwardly, slightly longer than median length of segment, the distance between urogomphi at apex being subequal or shorter than half width of segment at base. Out-

line of thoracic and 1st abdominal spiracles (Fig. 1, P) guitar-shaped. Body-length about 6.5 mm.

Specimens examined: 2 exs. living on tree-fungi, Kikuna, Yokohama, Kanagawa-ken, IX. 1966, N. Hayashi leg.

***Mycetophagus pustulosus* (Reitter, 1889)**

The larva of this species is similar to that of *M. antennatus*, from which it differs in the following characters:—

Body apparently depressed; head and prothorax more deeply pigmented than succeeding parts. Head-capsule about 1 mm. in breadth; pubescence reticulately distributed dorsally. Abdomen except caudal 2 segments parallel-sided or expanded posteriorly. Ninth abdominal segment (Fig. 2, A & B) with dorso-median setae much stouter; urogomphi strikingly curved upwards, much longer than median length of segment, the distance between urogomphi at apex being subequal or longer than half width of segment at base. Body-length about 7 mm.

Specimens examined: 14 exs. living on tree-fungi, Tanigawa-dake, Gumma-ken, 29. VII. 1967, N. Hayashi leg.

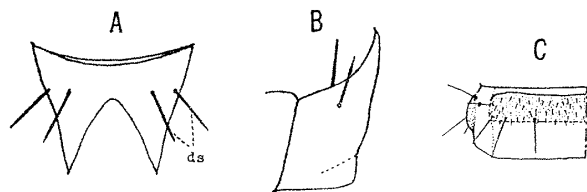


Fig. 2: Mature larvae of *Mycetophagus* spp. A: Outline of 9th abdominal segment of *M. pustulosus* (dorsal view, ds: dorso-median setae). B: *ditto* (lateral view). C: Left half of 2nd abdominal segment of *M. irroratus* (dorsal view).

***Mycetophagus irroratus* (Reitter, 1879)**

The larva of this species is similar to that of *M. antennatus*, from which it differs in the following points:—

Body chestnut brown, fleshy. Head-capsule about 0.7 mm. in breadth; pubescence more sparsely distributed dorsally; Abdomen exceedingly enlarged medianly; 1st to 6th segments (Fig. 2, C) with epipleurum strikingly swollen laterally, with pigmented area of each tergite apparently narrow, clearly divided from colorless area (posterior half). Ninth abdominal segment including urogomphi similar to that of *M. pustulosus*, but dorso-median setae not conspicuously stouter. Body-length about 5.5 mm.

Specimens examined: 28 exs. living on tree-fungi, Kirizumi, Gumma-ken, 28. V. 1962, N. Hayashi leg. 5 exs. Okunikko, Tochigi-ken, 11–13. VI. 1967, N. Hayashi leg. 1 ex. Kanayama, Yamanashi-ken, 9. VI. 1968, N. Hayashi leg.

***Typhaea stercorea* (Linnaeus, 1758)**

References: Perris, 1877. Larves de Coléoptères: 89. Böving & Craighead, 1931. Ent. Amer. 11: 186, pl. 50. Hinton, 1945. Beetles associated with stored products, 1, London: 173–174, figs. 203–208.

Body whitish to pale brown, suffused with pubescence and long setae; 9th abdominal segment terminating in upturned urogomphi.

Head-capsule with ocelli in 5 spots on each side, occasionally fused into 3 or 4 spots. Antennae comparatively elongate; 1st joint transverse, much shorter than the 3rd; 2nd joint about 1.5 times as long as the 3rd, the sensory appendage being small, cone-shaped. Mandibles bidentate apically; right mandible with an additional tooth on dorsal cutting

edge behind apical tooth; molar part asperated ventrally. Maxillary mala comparatively elongate, parallel-sided. Hypopharyngeal sclerome characteristically shaped. Legs comparatively elongate, slender. Thoracic and abdominal segments with many setae; abdominal tergites except caudal ones with 2 transverse rows of setae, the posterior row consisting of about 10 long setae. Ninth abdominal segment including urogomphi similar to that of *Mycetophagus*-larva, but more elongate; urogomphi feebly flexed upwards. Outline of thoracic spiracle guitar-shaped. Body-length about 4.3 mm.

Notes: This species is widely distributed over the world, its larva and adult being found on stored products (especially mouldy vegetable matter). The above mentioned features are based upon the descriptions given by Böving and Craighead (1931), and by Hinton (1945).

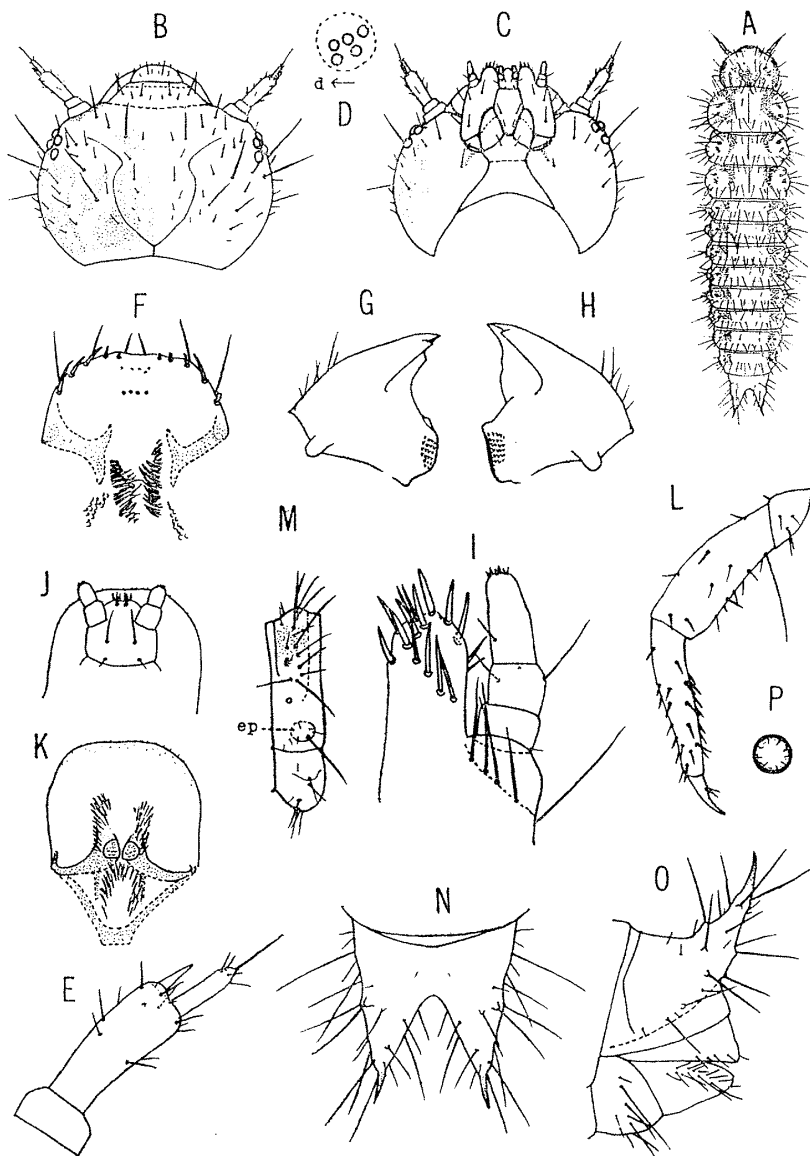


Fig. 3: Mature larva of *Parabaptistes* sp. A: Larva (dorsal view). B: Head (dorsal view). C: *ditto* (ventral view). D: Ocelli (right, d: shows dorsal surface). E: Antenna (left, ventral view). F: Epipharynx. G: Mandible (right, ventral view). H: *ditto* (left, ventral view). I: Maxilla (right, buccal view). J: Labium (ventral view). K: *ditto* (buccal view). L: Metathoracic leg (left, posterior view). M: Second abdominal segment (lateral view, ep: epipleurum). N: Ninth abdominal segment (dorsal view). O: *ditto* (lateral view). P: First abdominal spiracle.

*Parabaptistes* sp.

Body whitish to pale brown, with pigmented maculations, suffused with long, stout setae; thoracic and abdominal segments with a pair of conspicuous maculations on dorsal surface; 9th abdominal segment terminating in upturned urogomphi.

Head-capsule (Fig. 3, B & C) about 0.7 mm. in breadth, evenly rounded laterally; dorsal surface with several obscure markings; frontal suture lyre-shaped; groove between frons and clypeus extremely deep; ocelli (Fig. 3, D) in 5 lens-shaped spots on each side. Antennae (Fig. 3, E) comparatively elongate; 1st joint transverse, a little shorter than the 3rd; 2nd joint nearly twice as long as the 3rd, the sensory appendage being slender, projecting beyond basal half of the 3rd. Epipharynx (Fig. 3, F) with 2 tufts of spine-like papillae on proximal region, which are arranged longitudinally and recumbent inwardly. Mandibles (Fig. 3, G & H) bidentate apically; right mandible with an additional tooth on dorsal cutting edge behind apical tooth; molar part asperated ventrally; external surface with several setae. Maxillae (Fig. 3, I) with apical joint of palpus almost as long as the combined length of 2 basal joints; mala relatively elongate, parallel-sided, bearing an oblique row of spine-like setae on buccal surface; margin between palpiger and stipes with about 4 long setae on buccal surface. Maxillary articulating area bilobed by a transverse groove. Labium (Fig. 3, J) with about 6 short setae on ligula; mentum strongly narrowing basally; portion between submentum and gula moderately constricted, slightly bounded by a transverse, shallow groove. Hypopharyngeal sclerome as in Fig. 3, K.

Prothoracic segment about 1.8 times as wide as long; front and hind angles broadly rounded. Legs (Fig. 3, L) elongate, slender, the posterior pair being longest (18:19:20); coxal cavities moderately separated from each other; femur and tibia with many setae; claw slender. Thoracic tergites with 2 dark pigmented spots between marking and lateral margin, the marking being crescent-shaped. Abdomen including urogomphi short, about twice as long as thorax; segments except caudal ones almost 3.5 times as wide as long, the tergites with a single dark pigmented spot between marking and lateral margin, with 2 transverse rows of setae, the posterior row consisting of 10 to 20 long setae; epipleurum (Fig. 3, M) strikingly swollen laterally, not divided into 2 lobes; lateral side of sternum (hypopleurum) moderately elevated. Ninth abdominal segment including urogomphi (Fig. 3, N & O) much longer than preceding segment; urogomphi rather elongate, feebly flexed upwardly, abruptly spiniform near tip-end. Outline of thoracic and abdominal spiracles (Fig. 3, P) circular. Body-length about 4 mm.

Specimens examined: 24 exs. living on a tree-fungus (*Polystictus* sp.), Sagamiko, Kanagawa-ken, 20. III. 1971, N. Hayashi leg.

*Triphylloides seriatus* (Reitter, 1889)

Body, whitish to pale brown, fleshy, gradually tapered anteriorly and posteriorly, suffused with comparatively stout setae; 9th abdominal segment terminating in upturned urogomphi.

Head-capsule (Fig. 4, B & C) about 0.5 mm. in breadth, moderately widened basally; ocelli (Fig. 4, D) in 4 or 5 spots on each side. Antennae (Fig. 4, E) relatively short; 1st joint transverse, a little shorter than the 2nd or 3rd; 2nd joint nearly as long as wide, equal to the 3rd in length, the sensory appendage projecting beyond basal half of the 3rd, cone-shaped. Epipharynx (Fig. 4, F) with 2 comb-shaped lobes on proximal region. Mandibles (Fig. 4, G & H) bidentate apically; right mandible with an additional tooth on dorsal cutting edge behind apical tooth; molar part asperated ventrally; external surface with about 2 setae. Maxillae (Fig. 4, I) with 1st joint of palpus transverse, subequal to the 2nd in length, and about half as long as the 3rd; mala comparatively blunt.

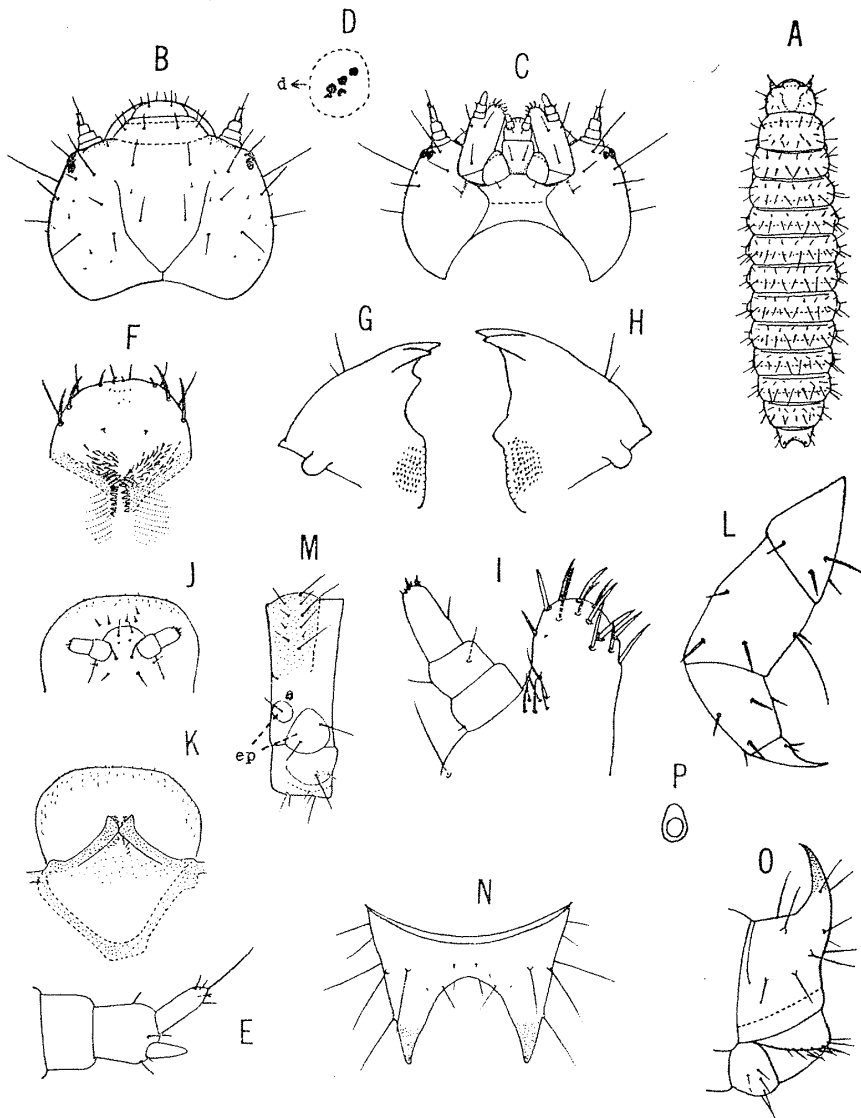


Fig. 4: Mature larva of *Triphyllioides seriatus*. A: Larva (dorsal view). B: Head (dorsal view). C: *ditto* (ventral view). D: Ocelli (right, d: shows dorsal surface). E: Antenna (left, ventral view). F: Epipharynx. G: Mandible (right, ventral view). H: *ditto* (left, ventral view). I: Maxilla (left, buccal view). J: Labium (ventral view). K: *ditto* (buccal view). L: Metathoracic leg (left, posterior view). M: Second abdominal segment (lateral view, ep: epipleurum). N: Ninth abdominal segment (dorsal view). O: *ditto* (lateral view). P: First abdominal spiracle.

Maxillary articulating area bilobed by a transverse groove. Labium (Fig. 4, J) with 4 to 6 setae on ligula; submental gular region relatively vast, moderately constricted medianly, slightly bounded by a transverse groove. Hypopharyngeal sclerome as in Fig. 4, K.

Prothoracic segment 1.8 to 2 times as wide as long. Legs (Fig. 4, L) short, stout, the posterior pair being longest (25:26:27); coxal cavities moderately separated from each other; femur and tibia with several setae; claw not slender. Abdominal segments except caudal ones about 3 times as wide as long; tergite with 2 transverse rows of setae, the posterior row consisting of about 10 setae; epipleurum (Fig. 4, M) strongly produced laterally, divided into 2 lobes; lateral side of sternum (hypopleurum) conspicuously elevated. Ninth abdominal segment including urogomphi (Fig. 4, N & O) small, the dorso-median length of segment extremely short; urogomphi strongly flexed upwardly, distinctly slender apically, the excision between urogomphi being broadly rounded. Outline of thoracic and abdominal spiracles (Fig. 4, P) guitar-shaped. Body-length about 4 mm.

Specimens examined: 5 exs. living on tree-fungi, Kirizumi, Gumma-ken, 26. V. 1962, N. Hayashi leg.

The larvae of the species mentioned in this paper are distinguished by the following key:—

#### Key to the species based on the larvae

1. Antennae long, the 2nd joint being more than twice as long as the 1st. Legs elongate. 2  
 — Antennae short, the 2nd joint being less than twice as long as the 1st. Legs not elongate. 3  
     .....*Triphyllioides seriatus* (Reitter)
2. Abdominal segments except caudal ones with 10 or more long setae on each tergite. Body less than 5 mm. in length. 3  
 — Abdominal segments except caudal ones with 6 or less long setae on each tergite. Body more than 5 mm. in length. 4
3. Thoracic and abdominal tergites with a pair of conspicuous maculations. Outline of thoracic spiracle circular. 4  
 — Thoracic and abdominal tergites without a pair of conspicuous maculations. Outline of thoracic spiracle guitar-shaped. 5  
     .....*Typhaea stercorea* (Linnaeus)
4. Body not distinctly depressed. Ninth abdominal segment with dorsomedian setae not much stouter. 5  
 — Body distinctly depressed. Ninth abdominal segment with dorsomedian setae much stouter. 5  
     .....*Mycetophagus pustulosus* (Reitter)
5. Abdomen markedly enlarged medianly. First to 6th abdominal segments strongly produced laterally, the pigmented area of each tergite being exceedingly narrow. 5  
     .....*Mycetophagus irroratus* (Reitter)  
 — Abdomen not markedly enlarged medianly. First to 6th abdominal segments not strongly produced laterally, the pigmented area of each tergite being not exceedingly narrow. 5  
     .....*Mycetophagus antennatus* (Reitter)

#### References

- Anderson, W.H. 1936. A comparative study of the labium of Coleopterous larvae. *Smiths. Miscell. Coll.* 95(13): 1-29, 8 pls.
- Böving, A.G. & F.C. Craighead. 1931. An illustrated synopsis of the principal larval forms of the order Coleoptera. *Ent. Amer.* 11: 1-351.
- Crowson, R.A. 1955. The natural classification of the families of Coleoptera. London, 187 pp.
- . 1963. Observations on British Tetratomidae (Col.), with a key to the larvae. *Ent. mon. Mag.* 99: 82-86.
- Emden, F. van. 1942. Larvae of British beetles. III. Key to the families. *Ent. mon. Mag.* 78: 206-226, 253-272.
- Hayashi, N. & M. Nakamura. 1952. Description on the immature stages of *Pseudotriphyllus rufitarsis* Reitter and *Dacne picta* Crotch (Mycetophagidae and Erotylidae, Col.) (Studies on Mycetophagous beetles V). *New Ent.* 2(3/4): 7-17 (in Japanese).
- Hinton, H.E. 1945. A monograph of the beetles associated with stored products, 1. British Museum, London, 443 pp.
- Miyatake, M. 1960. The genus *Pisenus* Casey and some notes on the family Tetratomidae (Coleoptera). *Trans. Shikoku Ent. Soc.* 6(8): 121-135.
- Perris, M.E. 1877. Larves de Coléoptères, 590 pp. 14 pls.
- Peterson, A. 1951. Larvae of Insects II. Columbus, Ohio, 416 pp.