

Immature Stages of the Fungus Gnats, *Bolitophila japonica* and *Mycetophila lineola* (Diptera, Mycetophilidae)*

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Abstract Mature larvae of *Bolitophila japonica* (OKADA) and *Mycetophila lineola* MEIGEN and pupa of the former are described and illustrated for the first time.

Little has been known of the immature stages of the Japanese fungus gnats. In recent years I had an opportunity to study those of *Bolitophila japonica* (OKADA) (Japanese name: Yamato-hoso-kinokobae) and *Mycetophila lineola* MEIGEN (Japanese name: Nakamon-nami-kinokobae). The larvae of these two species were taken from the cultivated mushroom, *Pholiota nameko* (Japanese name: Nameko) and *Lentinus edodes* (Japanese name: Shiitake), respectively. The present paper describes the mature larvae of the two species and the pupa of *B. japonica* for the first time. The terminology follows TESKEY's (1981).

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Bolitophila japonica (OKADA, 1934)

(Figs. 1, 3 A-D)

Mature larva. Length 4.2-5.4 mm. Creamy white, somewhat narrowly oval, constricted at intersegmental portions. Head trapezoidal, shining black. Genae widely separated ventrally by a broad gula, the median part of which is membranized and is ligament-like just posterior to labium; gena dorsally with 6 sensory pits and ventrally with 3 ones. Frontoclypeal apotome large, oval, with 5 pairs of sensory pits. Antenna 3-segmented; 1st segment brownish, with 3 sensilla on narrow chitinous band; 2nd entirely dark brown; 3rd light brown. Labrum broadly

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membranous, with 5 pairs of sensory pits; posterior chitinous frame not divided medially, extending ventrally to form a tormal bar; torma bearing 14 fans. Epipharynx carrying a pair of small sclerites. Mandible bearing 11 teeth along outer margin and small denticles on anterior submarginal portion, lacking prosthema. Maxilla lacking distinct cardo, which probably fuses with anteroventral corner of

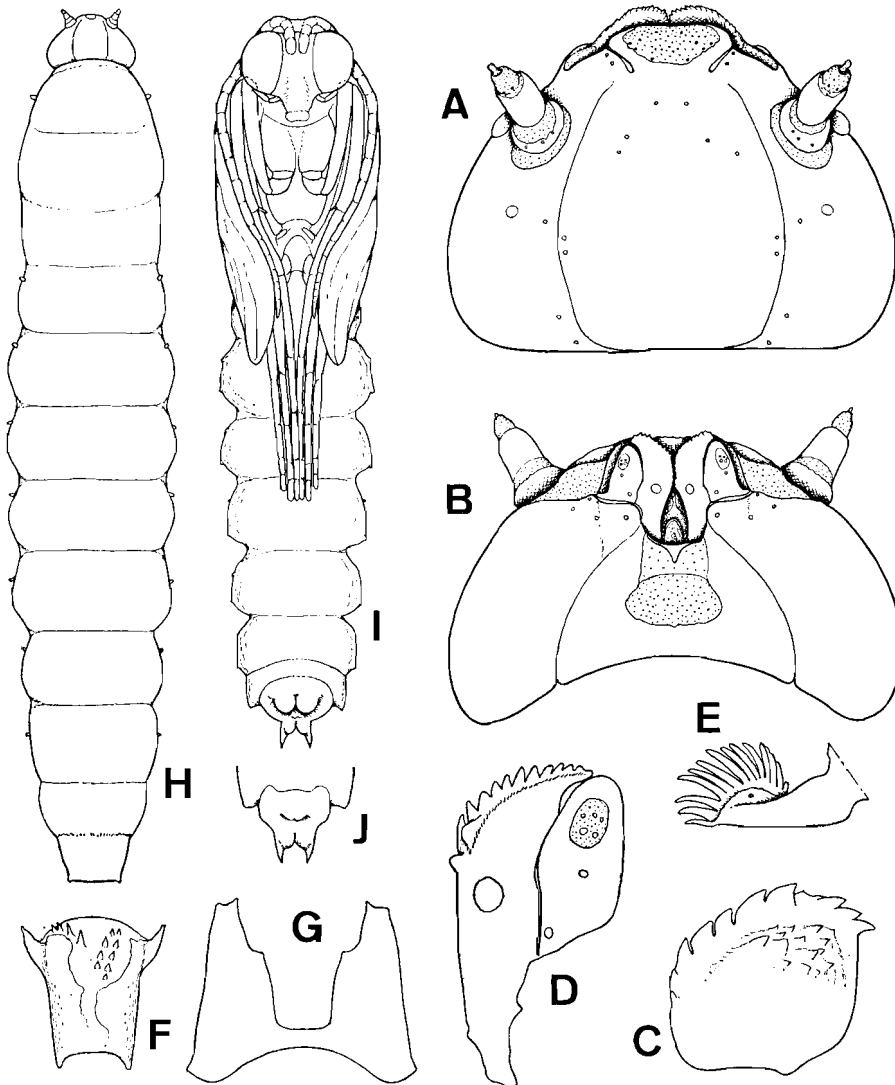


Fig. 1. Mature larva and pupa of *Bolitophila japonica* (OKADA). A, Head, dorsal; B, ditto, ventral; C, mandible, dorsal; D, maxilla, ventral; E, torma, ventral; F, hypopharynx, posteroventral; G, hypopharyngeal sclerite, ventral; H, larva, dorsal; I, male pupa, ventral; J, distal part of female pupa, ventral.

gena; stipes bearing 13 teeth along inner margin, with a large circular sensory organ near the middle; palpifer with 5 sensory papillae on circular membranous area and 2 sensory pits on posterior portion. Labium of narrow semicircular plate, with posterior margin convex. Hypopharynx represented by a single sclerite arched ventrally, weakly membranized on median portion and bearing several spines on anteroventral portion, with anterior corner produced to form a narrow arm which is articulated with hypopharyngeal sclerite supporting pharynx, the sclerite consisting of two lateral plates which are posteriorly connected with each other by a narrow bridge.

Prothoracic spiracle nipple-like, with 6 openings arranged semicircularly; abdominal spiracle nipple-like, with 4 openings.

Locomotory pad not projected, represented by flat portion furnished with numerous spinules.

Last abdominal segment having a pair of small lobes on either side of anus, and with a minute chitinous plate posterior to anus.

Pupa. Length 3.3–4.7 mm. Last abdominal segment distally bearing a pair of sharply pointed projections, with a pair of distinct swellings around anus, the swellings very weak in female.

Specimens examined. 25 mature larvae and 7 pupae, Ichimiya-chô, Nago-gun, Chiba Pref., 5. xii. 1986 (E. ISHITANI), collected from *Pholiota nameko*.

Remarks. The larvae of *Bolitophila* species are easily distinguished from those of other mycetophilids by having well developed antennae.

In addition to *Pholiota nameko*, *P. adiposa* (Japanese name: Numerisugitake), *P. terrestris* (Tsuchisugitake), *Naematoloma sublateritium* (Kuritake) and *Gymnophilus lubricus* have been recorded as hosts (OKADA, 1939).

Mycetophila lineola MEIGEN, 1818

(Figs. 2, 3 E–I)

Mature larva. Length 5.6–7.1 mm. Creamy white, slender, nearly parallel-sided, attenuated at both ends. Head cordiform, shining black. Genae ventrally connected by a hypostomal narrow bridge which is divided medially; gena dorsally with 9 sensory pits and ventrally with 4 ones arranged as in Fig. 2 A–B. Frontoclypeal apotome with anterior margin nearly straight, strongly tapered posteriorly on posterior 2/3, having 3 pairs of sensory pits and minute hairs, respectively. Antenna with 3 sensilla near upper and lower outer margins of annular chitinous band. Labrum membranous on anterior 1/2, dorsally with 4 pairs of sensilla and anteriorly with a pair of sensory groups, each consisting of 3 sensilla; posterior chitinous frame divided medially; torma bearing 9 triangular fans, just posteriorly accompanied by 5 slender chitinous processes (Fig. 2 E). Mandible bearing 13 teeth along outer margin and many minute denticles on anterior submarginal portion; prostheca composed of 5 small projections. Maxilla having distinct cardo

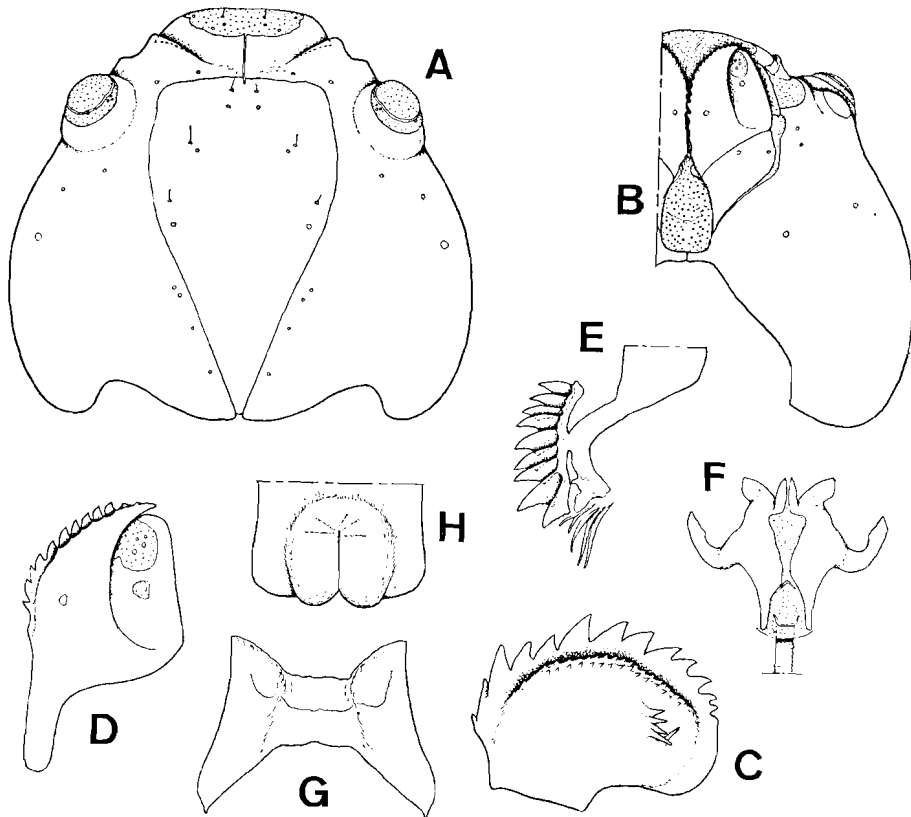


Fig. 2. Mature larva of *Mycetophila lineola* MEIGEN. A–G, lettering as in Fig. 1; H, distal part of larva, ventral.

with 2 sensory pits; stipes with 10 teeth and 2 minute ones along inner margin; palpifer carrying a circular transparent area, on which 4 sensory papillae are present. Labium markedly reduced to a small, narrow U-shaped plate supporting opening of salivary duct. Hypopharynx consisting of two irregular plates as in Fig. 2 F. Hypopharyngeal sclerite with anterior and posterior margins convex.

Prothoracic spiracle dorsally with 3 small swellings, each of which carries oval opening; abdominal spiracle attenuated distally, uniform.

Locomotory pad distinctly developed, with 2 rows of 33–36 hooks, surrounded by 2 rows of spinules anteriorly and by 3 rows posteriorly.

Last abdominal segment having a pair of well developed lobes on either side of anus.

Specimens examined. 36 mature larvae, Kukizaki-chô, Inashiki-gun, Ibaraki Pref., 6–12. xi. 1986 (T. GOTÔ), collected from *Lentinus edodes*.

Remarks. The larvae of *Mycetophila lineola* are frequently found on the

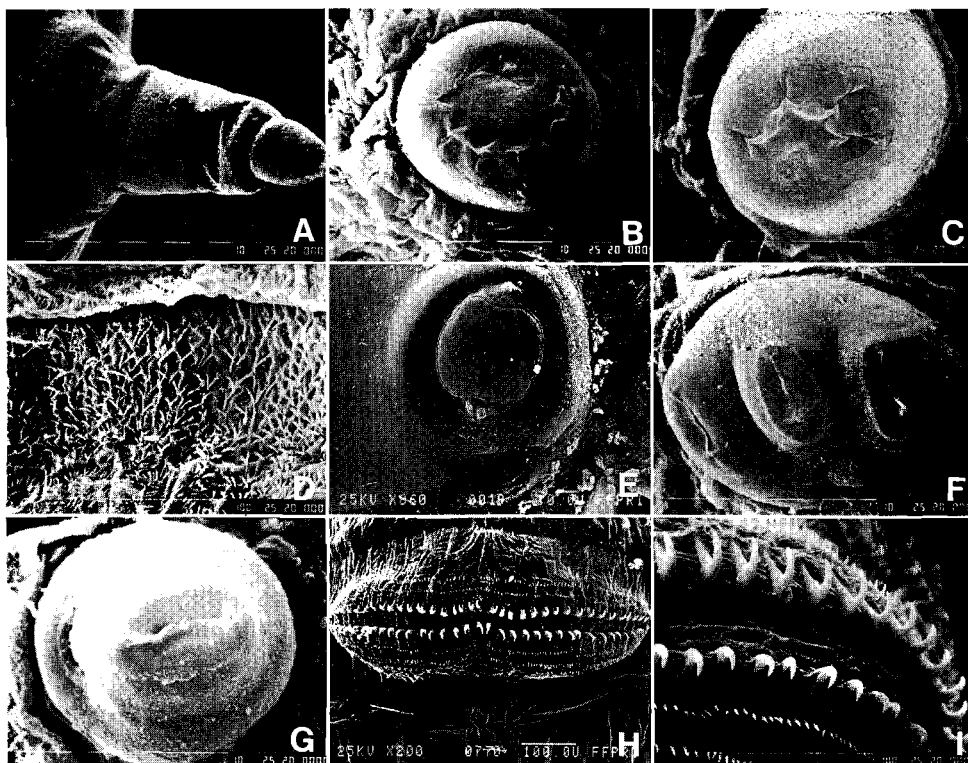


Fig. 3. Mature larvae of *Bolitophila japonica* (OKADA) (A–D) and *Mycetophila lineola* MEIGEN (E–I) (SEM). A & E, Antenna; B & F, prothoracic spiracle; C & G, abdominal spiracle; D, H & I, locomotory pad. Scales: A–C, E–G, 10 μ ; D, H, I, 100 μ .

cultivated mushroom, *Lentinus edodes*, sometimes in company with *Execia shiitakevora* OKADA. They are similar to each other in general appearance, but the locomotory pad of *E. shiitakevora* lacks double rows of hooks and is surrounded by rows of spinules only.

Mycetophila lineola has a wide host range. OKADA (1939) enumerated 12 species of fungi including *Armillariella mellea* (Japanese name: Naratake), *Flammulina velutipes* (Enokitake) and *Lepista nuda* (Murasakishimeji) as its hosts.

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