

FUNGUS GNATS ASSOCIATED WITH FLOWERS
OF THE GENUS *ARISAEMA* (ARACEAE)
PART 2. KEROPLATIDAE AND MYCETOPHILIDAE
(DIPTERA)¹⁾

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Abstract Six new species of the fungus gnats associated with the flowers of *Arisaema serratum* are described: *Zelmira angulata* of the Keroplatidae, and *Sciophila setiterminata*, *Boletina subnitidula*, *Leia ishitanii*, *Mycetophila ishiharai* and *Phronia longifurca* of the Mycetophilidae. *Monoclona silvatica* A. Zaitzev is recorded for the first time from Japan.

The present paper is based on a material collected by Mr. E. Ishitani of the Chiba Prefectural Forest Experimental Stand (CPFES) from the spadices of *Arisaema serratum* (Thunberg) in the forest stands of CPFES in May, 1993. Four species of the Mycetophilidae on *Arisaema* spp. have been recorded from Japan (Sasakawa, 1993). One species of the Keroplatidae and five species of the Mycetophilidae are herein described as new to science, and two known species are added as new to the associate, making total now known twelve.

The important features, previously overlooked, lie in the arrangement of specialised setae at the inner apex of the fore tibia as seen in the species of the Sciaridae, and of a serration of minute teeth on the ventral side of tibial spurs. The former consists of a neat comb of setae or a well-defined triangular patch of close-set setae, and its significance is discussed below from the viewpoint of phylogeny. The holotypes of the new species are deposited in the collection of the Entomological Laboratory, Kyoto Prefectural University (KPU), Shimogamo, Kyoto.

KEROPLATIDAE

1. *Zelmira angulata* n. sp.

(Figs. 1-2)

Male. Head pale yellowish brown, with a dark band between lateral ocelli; prefrons and clypeus yellow. Antenna pale yellowish brown except for yellow scape, pedicel and base of 1st flagellar segment; palpus yellow. Thorax testaceous yellow; mesonotum with lateral sides more or less darkened. Wing tinged with brownish yellow, with a brownish spot which is nearly 1/2 length of R_5 on tip of R_5 ; halter yellow. Legs yellow, tibia faintly brown tinged, tarsi brownish yellow. Abdomen with tergites testaceous yellow, T3-5 each with brown anterior band

1) Contribution No. 267 from Entom. Lab., Kyoto Prefectural University.

which is interrupted at middle, band on T6 almost complete; sternites yellow, S6 testaceous; genitalia brown.

Vertex densely setulose; central ocellus less than 1/2 of diameter of lateral one and separated from lateral ocellus by about diameter of the latter; eye very slightly emarginate above base of antenna, with dense hairs. Antenna as long as or slightly shorter than thorax; flagellar segments slightly broadened in lateral view and scattered with short but stout setae; 1st segment longest; 4th segment as wide as or a little wider than long; 14th segment ending in a papilla. Palpus with 1st segment 2/3 of the 2nd which is subequal to 3rd; 2nd segment with a group of sensillae and 6-8 strong setae on dorsal side in addition to pale short setae on ventral side; 4th segment clubbed, about 1.5 times as long as the 3rd.

Mesonotum densely setulose, with lateral setae long; scutellum with 6 pairs of marginal setae which are slightly longer than other marginals; metanotum setose along median longitudinal line; pronotum and propleuron setigerous; meso- and sternopleura and pleurotergite bare. Wing with costa extending to basal 1/3-2/5 of distance between apices of R_5 and M_{1+2} ; Sc ending in costa before level of R_s ; Sc_2 indistinct, situated at middle of Sc; R_4 short, terminating before middle of distance between apices of R_1 and R_5 ; R , R_1 , R_{4+5} , R_5 , about apical 1/2 of Cu-stem and r-m with setae above; R_4 without setae (rarely with 1-3 setae at base); media with forking point of M_2 obscure; A not reaching to wing margin, with distal 1/3 entirely obscure; halter densely hairy on knob. Fore tibia with inner apical comb consisting of a single transverse row of 12-17 subequal setae (Fig. 2); fore metatarsus as long as or slightly shorter than tibia; spurs variable in length, in ratio of 1.4-1.5: 1.8-2.4, 3-4.2: 2.2-3, 3.7-5.4; claws each with 1 strong (1/3 length of claw) and 1 short (1/4-1/5 of claw) ventral teeth.

Abdomen with T7 about 1/3 length of T6; T8 equilateral-triangular, slightly longer than T6+7; S1 only with a group of setae at middle of posterior margin; S7 semicircular, about 1/2 length of S6. Gonocoxites (Fig. 1) narrowly separated on ventromedian part, bearing 10 (7-11) stout setae on inner posteromedian margin; stylus subtriangular in lateral view, incurved and sharply pointed on apical black end, and lobate ventrally, bearing 14 (11-19) stout setae; paramere 375 μ m long, bending upward before end and with microscopic spinules which are directed inversely; aedeagus 300 μ m long, trumpetlike at end in ventral view.

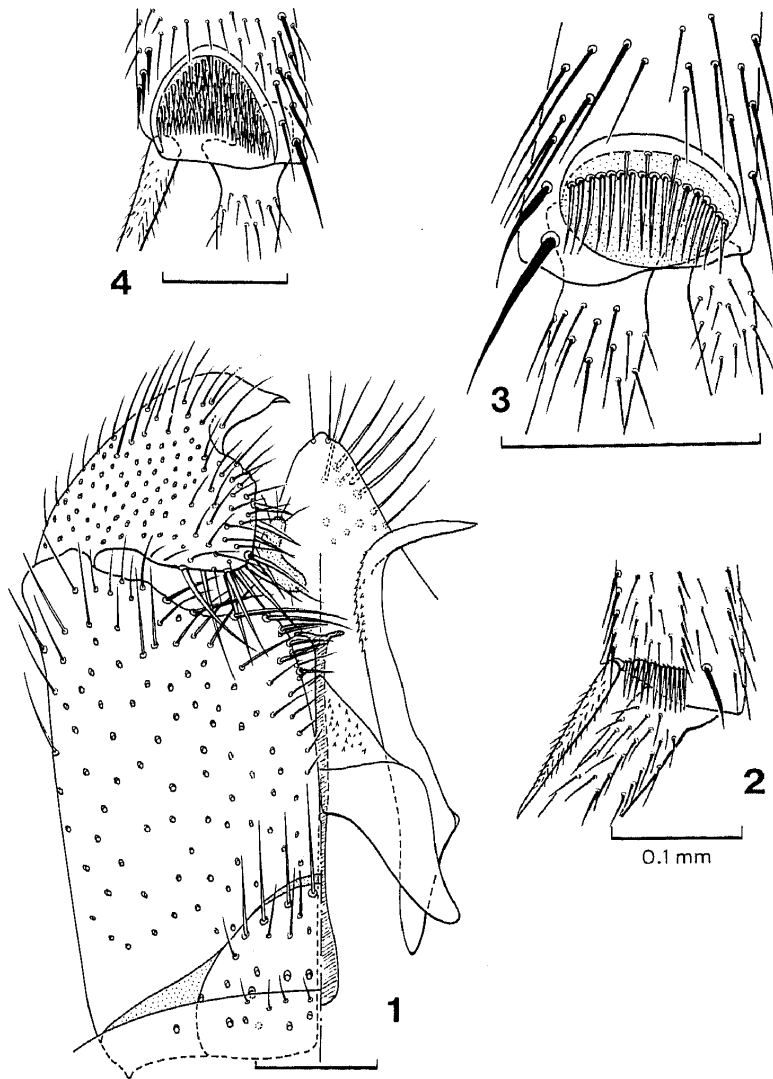
Length of body 4.5 (holotype)-5.3 mm, of wing 3.7 (holotype)-4.7 mm.

Female. Paler than male, but anterior bands of T3-6 usually complete; ovipositor testaceous yellow; S7 with a median cleft on posterior margin; fore tibial comb consisting of 10 setae; length of body 4.2-5.6 mm, of wing 4.3-5.5.

Holotype male, CPFES, Haniya, Sanbu-machi, Sanbu-gun, Chiba Pref., 26. V. 1993, on pistillate flower of *Arisaema serratum*, leg. E. Ishitani (KPU No. 261, on slide). Paratypes: 4♂7♀, same data as holotype (on slides excepting 6♀ in alcohol).

Distribution. Japan.

Remarks. This species is closely related to the European *pallida* Staeger in the coloration of abdomen, wing venation and length of fore metatarsus, but the sharply pointed stylus, and long and angulated paramere of the male genitalia are distinctive. The structure of stylus with a group of stout setae on ventral lobe is



Figs. 1-4. Male genitalia (1) and inner apex of fore tibia (2-4).
 1 and 2, *Zelmira angulata* n. sp. (1. ventral view, left half and inner view, right half);
 3, *Monoclona silvatica* A. Zaitzev; 4, *Leia ishitanii* n. sp. Scale 0.1 mm.

similar to that of *nemoralis* Meigen, but the latter has the shiny black mesonotum.

The setal arrangement in the form of comb at the inner apex of the fore tibia in this species is considered plesiomorphic. In *Monoclona silvatica* (Fig. 3) (Sciophilinae), a setal comb is situated in an oval patch defined distinctly, and in *Boletina* (Gnoristinae), *Leia* (Leiinae) (Fig. 4), *Mycetophila* and *Phronia* (Mycetophilinae), the dense setae are also well bordered subtriangularly. The triangular patch with dense setae may be the most apomorphic state.

MYCETOPHILIDAE

1. *Sciophila setiterminata* n. sp.

(Figs. 5-6)

Male. Blackish brown; antenna pale brown, with 1st-3rd flagellar segments somewhat yellowish; palpus testaceous yellow; pro-, meso- and hypopleura more or less pale; T2 with posterolateral and T3 with anterolateral corners yellowish; setae pale brown. Wing very faintly tinged with brown; halter yellow. Legs yellow, ventral sides of all trochanters brown, tarsi faintly brown tinged, spurs yellow.

Frons with 5-6 long setae on lateral margin; eye deeply emarginate above base of antenna, covered with hairs; clypeus setose over the surface. Antenna 1.4 times as long as thorax; pedicel with 3 extremely long setae on ventrodistal margin; flagellar segments with setae yellowish and shorter than width of segment; 1st segment 1.2 times as long as the 4th and subequal to the 14th; 4th segment about 1.7 times as long as wide, with neck short; palpus with 4 segments in relative length of 2: 2.3: 3.5: 6, 2nd segment with a group of about 13 sensillae on lateral side.

Mesonotum densely covered with short or long setae; scutellum with 8 marginal setae; propleuron setose; meso- and sternopleura each hairy on dorsoanterior 1/3; metapleuron with minute hairs in anterior part; metanotum centrally and pleurotergite dorsally setigerous. Wing with costa extending to basal 1/4 of distance between apices of R_{4+5} and M_1 ; Sc_1 ending at level of forking point of Cu; Sc_2 , Rs and r-m each almost at same level; cell R_1 almost as long as broad; M-stem nearly 1/2 of r-m; Sc_2 , Rs, R_{2+3} and r-m without setae on veins. Fore tibia with a setal patch in form of subtriangle on inner apex; tibial bristles slightly shorter than apical width of tibia; spurs in ratio of 2.8: 4, 5: 4, 5.6; claws each with 1 long (1/3 length of claw) and 2 minute ventral teeth.

Gonocoxites dorsally with posterior margin bordered by many stout spine-like setae on ventral side, ventrally narrowly separated along mid-line and weakly projected distally on each inner apex; stylus lobate in ventral view, bearing 4 long flattened setae on inner basal processes, many stout spine-like setae along apico-dorsal margin and 2 groups of many palmate spines on dorsal side; aedeagus bifid in ventral view, 110 μ m long, accompanying by a small tuft of spinules at base.

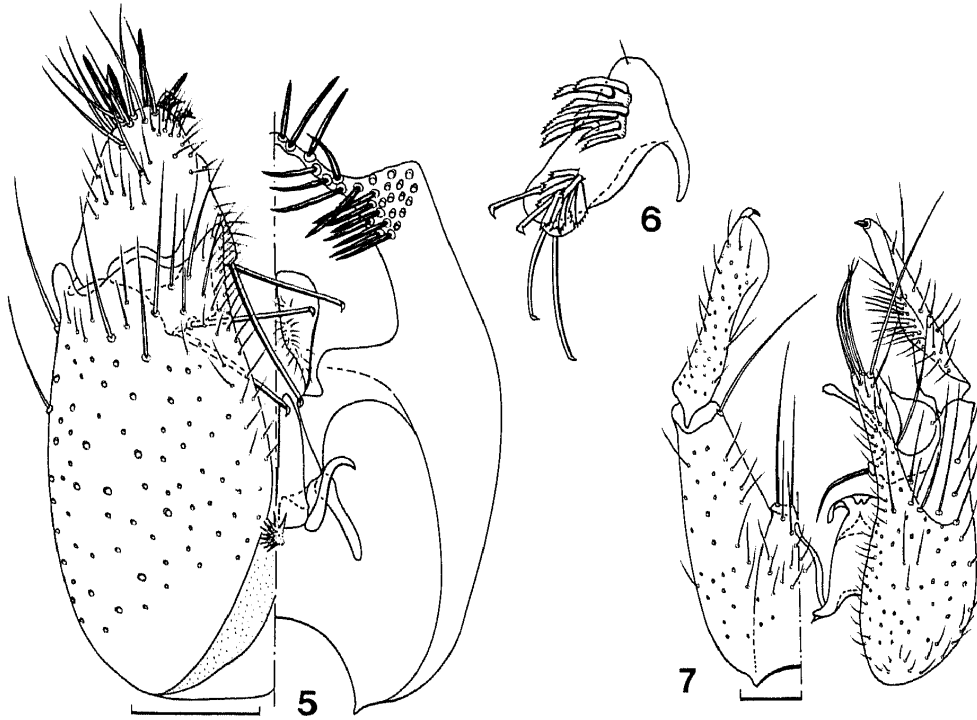
Length of body 3.5 mm, of wing 3.2 mm.

Female unknown.

Holotype male, CPFES, Haniya, Sanbu-machi, Sanbu-gun, Chiba Pref., 26. V. 1993, on pistillate flower of *Arisaema serratum*, leg. E. Ishitani (KPU No. 262, on slide).

Distribution. Japan.

Remarks. This species belongs to the *lutea*-group in the coloration of body, wing venation and shape of the gonostylus. It is similar to *S. yokoyamai* Sasakawa et Kimura in the arrangement of three kinds of setae and spines on the gonostylus and in the wing length, but is distinguishable by its structures of the gonocoxites, aedeagus and parameres.



Figs. 5-7. Male genitalia of *Sciophila setiterminata* n. sp. (5-6) and *Monoclona silvatica* A. Zaitzev (7).

5, ventral (left half) and inner (right half) views; 6, stylus, inner view; 7, dorsal (left half) and ventral (right half) views. Scale 0.1 mm.

2. *Monoclona silvatica* A. Zaitzev

(Figs. 3, 7)

Monoclona silvatica A. Zaitzev, 1984 : 166.

A male specimen is agreeable well with the characters and figures of the male genitalia given in the original description, that is, the presence of a group of weakly sinuous setae on the ventral processes of gonocoxites, and the shape of aedeagus which is fungoid apically.

Some characters are added as follows: Pale testaceous mesonotum trivittate; median vitta pale brown, linearly separated into 2 narrow stripes by a central line, extending at anterior 4/5 of notal length and narrowing posteriorly; lateral vittae dark brown caudad from transverse suture but not reaching to scuto-scutellar suture; abdominal T1 and 7 testaceous yellow; T2 pale brown, broadly yellowish in lateral sides; T3-5 brown, with anterolateral corners triangularly and posterior margins linearly yellow; T6 with pale brown transverse band at middle; flagellar segments of antenna more or less flattened, 4th segment as long as wide and with

dense setae nearly $1/3$ width of segment; palpus in ratio of 1.5: 1.5: 2.4: 3.6; scutellum with 8 long marginal setae, accompanying by an irregular row of short setae before margin; metanotum very sparsely setose on posterior $1/2$; pleurotergite setose over the surface; costa extending to basal $1/4$ of distance between apices of R_5 and M_1 ; Sc_1 ending in costa; R_4 arising closely from forking point of R_{4+5} and r-m, so that cell R_1 very small, in form of an inverted triangle; stem of M-fork about $1/2$ of r-m; Cu not bifid; fore tibia with a semicircular row of 17-18 setae in oval patch on inner apex; fore metatarsus subequal to tibia; tibial bristles short, but the longest about 1.5 times as long as apical width of tibia; spurs in ratio of 3: 3.5, 4.5: 3.8, 4.5; claws each with 1 long and usually 3 minute ventral teeth; gonostylus swollen and densely setose on ventral side, with a spine on tip, and accompanying by ventral process which is L-shaped in lateral view and born a long spine; aedeagus $210\ \mu\text{m}$ long; wing length 3 mm.

Specimen examined: 1♂, CPFES, 26. V. 1993, on pistillate flower of *Arisaema serratum*, leg. E. Ishitani.

Distribution. Russia, Japan. New to Japan.

3. *Boletina meniscophalloides* Sasakawa et Kimura

Boletina meniscophalloides Sasakawa et Kimura, 1974: 61.

This species is characteristic in having the long aedeagus and two processes, which are provided with a bristle and a stout spine on each tip, of the stylus. A male specimen examined is slightly smaller than that of the holotype: 3.5 mm in the length of wing, with forking point of Cu almost at same level of that of M, and has the entirely brown T5.

Some characters on legs are added as follows: fore tibia with a setal patch as seen in *Leia ishitanii*; fore tibial spur about $1/2$ length of the longest inner spur on hind tibia; claws each with 1 strong and 1 minute ventral teeth.

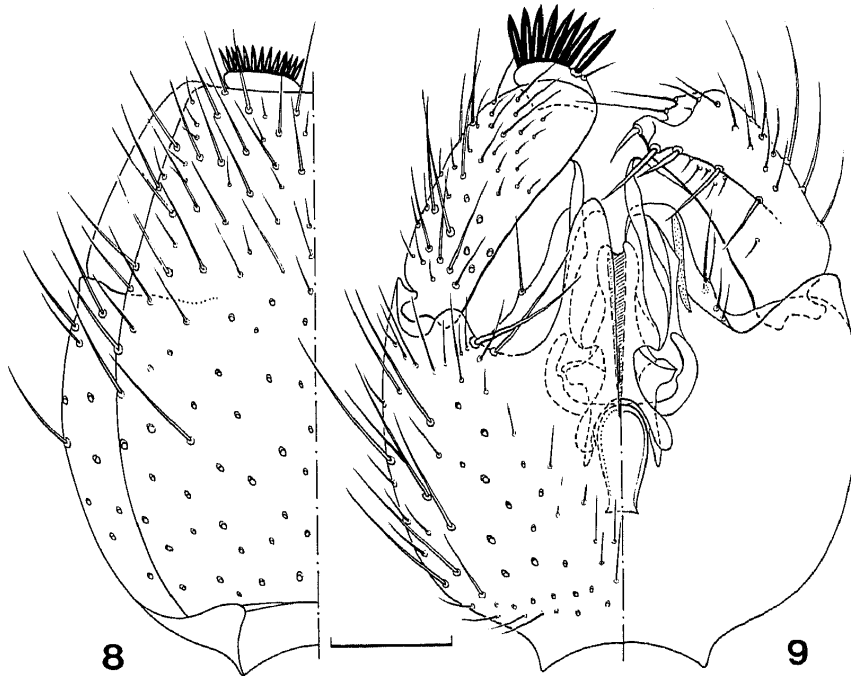
Specimen examined. 1♂, CPFES, 26. V. 1993, on pistillate flower of *Arisaema serratum*, leg. E. Ishitani.

Distribution. Japan.

4. *Boletina subnitidula* n. sp.

(Figs. 8-9)

Male. Head brown, but face and clypeus distinctly pale; ventral postgena and gena yellowish; antenna brown, but scape, pedicel, 1st-2nd or 3rd flagellar segments and ventral side of 3rd or 4th yellow; palpus yellow, 1st segment tinged with brown. Mesonotum testaceous yellow, with 3 vittae: median vitta brown, narrowing posteriorly and ending at posterior $1/3$ of notum, and lateral vittae pale brown, extending from transverse suture to scuto-scutellar suture; scutellum yellow anteromesally and broadly brown along margin; pleura testaceous yellow, sternopleuron sometimes pale brown on ventral $1/2$; metanotum and pleurotergite brown. Wing hyaline, very faintly tinged with brown; halter yellow. Legs yellow; trochanters brown; hind femur brown on apical $1/7$ - $1/9$; tarsi brown tinged; spurs testaceous.



Figs. 8-9. Male genitalia of *Boletina subnitidula* n. sp.
8, dorsal (left half), and 9, ventral (left half) and inner (right half) views.
Scale 0.1 mm.

Abdomen with T1-4 yellow, but anterior margin and median line of T1, about anterior 1/2 of T2-4 brown; T5-6 and S6 entirely brown; S1-4 yellow, S5 pale brown; genitalia brownish yellow, stylus pale brown, with spines black. Setae brown, but those on thoracic pleura and abdomen more or less pale.

Vertex densely covered with short setae; orbital setae long; lateral ocellus twice distant from median one by its diameter; eye shallowly emarginate above base of antenna, hairy; face setose (6-11 pairs) on lateral sides; clypeus rather densely setigerous. Antenna slightly longer than thorax; scape with dorsal and lateral setae 4-5 and longer than ventrals; pedicel with a dorsolateral seta which is longer than others; 1st flagellar segment longest, 1.3 times as long as the 4th which is about 2 (rarely 3) times as long as wide; 14th segment only a little longer than the 4th; each segment densely with pale setae which are shorter than width of segment; palpus with 4 segments in ratio of 1 : 2 : 2.5 : 4; 1st segment with a laterodistal seta extremely longer than laterals; 2nd segment setose on laterodistal 1/2 and with sparse sensillae.

Mesonotum with an irregular rows of *acr*, about 8 pairs of *dc*, 1 *ia*, 1 *sa* and 2 *pa* each long; scutellum with 2 pairs of marginal setae extremely long, medio-marginal pair setula-like; propleuron setose; pleurotergite with an irregular posterior row of several setae. Wing with costa extending to almost midpoint between

apices of R_{4+5} and M_1 ; Sc_1 ending at level of forking point of Cu which is situated basad of forking point of M; Sc_2 absent; r-m 2/3 or slightly shorter than M-stem; forking point of Cu at mid level of M-stem; R, R_1 and R_{4+5} setose above. Fore tibia with a semicircular setal patch on inner apex; fore metatarsus slightly shorter than tibia; tibial bristles short; spurs in ratio of 2: 2, 3: 3, 4, each with a serration of minute teeth on ventral side; claws each with 1 long (about 1/2 of claw) and 2 minute ventral teeth.

Abdominal T7 about 2/3 length of T6, with a shallow emargination on basal margin; T8 as long as T7, but only 1/2 width of that, deeply incised at middle of basal 1/2 and with marginal setae only. Gonocoxites weakly sclerotized ventromesally, with a pair of fingered processes distally, and with 2 pairs of combs on posterior end consisting of 8 (7-10) spines on tip and 13 (10-15) spines at dorsal base; stylus with 3 spine-like stout setae near ventral tip; paramere shorter than aedeagus which is about 160 μ m long and distinctly bifid at base.

Length of body 3.3-3.5 (holotype) mm, of wing 2.7-2.8 (holotype) mm.

Female unknown.

Holotype male, CPFES, Haniya, Sanbu-machi, Sanbu-gun, Chiba Pref., 26. V. 1993, on pistillate flower of *Arisaema serratum*, leg. E. Ishitani (KPU No. 263, on slide). Paratypes: 2♂, same data as holotype.

Distribution. Japan.

Remarks. This new species is intermediate between *B. nitida* Grzegorzec and *dispecta* Dziedzicki, known from Europe and Japan, in general appearance, but may be distinguished from them by the venation, especially absence of Sc_2 and situation of forking point of Cu. The male genitalia of *subnitidula* are very similar to those of *nitida*, but the dorsoproximal combs on the gonocoxites are in a sparse row of spines, and the stylus is provided with the spine-like setae.

5. *Leia ishitanii* n. sp.

(Figs. 4, 10)

Male. Head with vertex, occiput and postorbit dark brown; face, clypeus and gena yellow to pale testaceous; antenna brown, but scape, pedicel and base of 1st flagellar segment pale testaceous yellow, sometimes ventral side of 1st-2nd (3rd) segments yellowish; palpus yellow. Mesonotum and scutellum pale testaceous yellow, the former shiny, with a pair of brownish black vittae extending from transverse suture to scuto-scutellar suture, and accompanying by a pair of pale brown and narrow median stripes, which are linearly separated from each other along central line and extended from anterior margin of notum to about mid-point of vittae (stripes sometimes becoming pale before transverse suture); metanotum, pleurotergite and pleura blackish brown, excepting pronotum, propleuron, ventral 1/3 of mesopleuron and dorsal 1/3-1/4 of sternopleuron yellow. Wing hyaline, with brown subapical band crossing at middle of M_1 ; nearly 1/3 as wide as length of R_{4+5} , with lateral margins irregularly undulant and inner margin almost at level of apex of Cu_1 ; 2 brown markings: near forking point of r-m and M, and along posterodistal margin of vein Cu_2 ; halter yellow. Legs yellow; mid and hind femora each with ventroproximal side narrowly brown (1/3-1/2 of whole length of mid femur and 1/2-

2/3 of the hind), the latter with apex also brown ; all tibiae faintly or less distinctly tinged with brown ; spurs pale testaceous. Abdomen T1 and S6 entirely blackish brown, T2 with blackish brown band () and T3-5 on posterior 2/3 of tergal length, each protruding anterior triangle at middle ; T3-5 sometimes with only small yellow triangle at anterolateral corners as well as in almost entirely dark brown T6 ; with band interrupted at middle ; S1 narrowly pale brown ; genitalia setae and setulae pale testaceous but those on genitalia darkened brownish black.

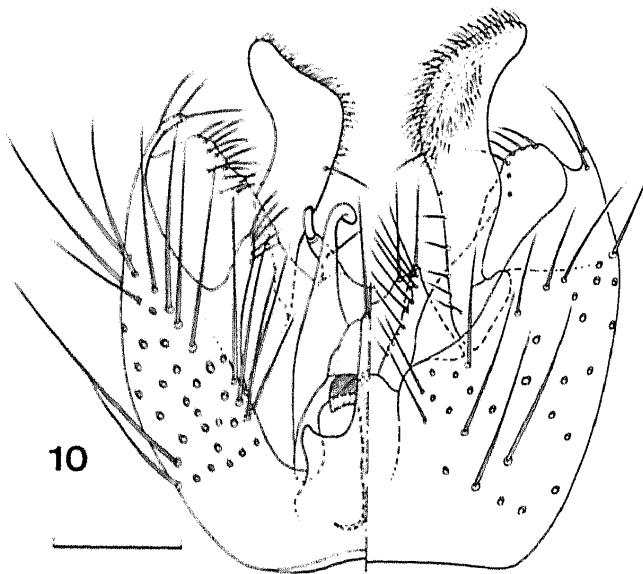


Fig. 10. Male genitalia of *Levia ishitanii* n. sp., ventral (left half) and dorsal (right half) views. Scale 0.1 mm.

Vertex covered densely with short and long setae ; lateral ocellus very large ; lateral ocellus separated from median one by about 4 times as wide as the former ; eye very slightly emarginate above base of antenna, with 8 postorbital bristles, very long ; frons and face bare ; clypeus dark brown ; antenna 1.6 times as long as thorax ; scape and pedicel each with 2-3 stout setae near ventrodistal margin ; flagellar segments densely hairy ; flagellar segments a little shorter than the longest 14th, 4th segment 1.7 times as long as 3rd, 2nd segment with 4 segments in ratio of 0.7 : 1.7 : 2-2.5 : 3.5-4, 2nd segment with 2 segments which is oval in outline on dorsoproximal 1/3.

Mesonotum with dense setulae on entire surface ; *dc* 6, of which pair about twice length of anterior ones ; *sa* and *pa* also long ; scutellum with marginal setae and scattered with short hairs marginally ; pronotum with proclinate setae ; pleurotergite with many slender setae along

gin. Wing with costa ending on apex of R_{4+5} ; Sc_2 present at middle of Sc ; R_1 a little shorter than r-m; forking point of M basad of level of Rs ; M -stem subequal to R_1 ; M -fork convergent on distal 1/3 and parallel with each other before apices; Cu_1 not connected with Cu_2 at base; all longitudinal veins except for Sc and basal part of M -stem with setae above, but setae on M and Cu shorter than those on R . Fore tibia with a group of short setae in form of subtriangular patch on inner apex; fore metatarsus slightly longer than tibia; mid tibia with 4 dorsal and 4-5 external bristles on dorsal side and 2 ventrals (internal one at middle of tibia); hind tibia with 4 dorsals, 7-8 externals on dorsal side; spurs in ratio of 3.9 (3.7-4): 4.5 (4.3-4.7), 6: 4.7 (4.5-5), 6.4 (6.2-6.7), each with a serration of minute teeth on ventral side; claws each with 1 strong (about 1/3 of claw) and 1-2 minute ventral teeth.

Gonocoxites with a pair of short posterior processes and a median long process on ventral side, the former bearing 5-6 short setae on each tip and the latter 2 long setae on tip; stylus densely hairy on apical part and with setae along inner side; cercus distinctly setose; paramere more or less membranous and clavate distally; a pair of processes which are provided with a spatulate spine on tip and a seta before ventral tip, respectively, dorsad of parameres; aedeagus basally with a pair of strongly chitinized processes, 120-130 μm long; aedeagal apodeme T-shaped, almost as long as aedeagus.

Length of body 2.9-4 (3.9 in holotype) mm, of wing 3.3-4.1 (3.7 in holotype) mm.

Female. Similar to male, but ovipositor yellow; length of body 3.7-4.4 mm, of wing 3.8-4.5.

Holotype male, CPFES, Haniya, Sanbu-machi, Sanbu-gun, Chiba Pref., 26. V. 1993, on pistillate flower of *Arisaema serratum*, leg. E. Ishitani (KPU No. 264, on slide). Paratypes: 16♂ 8♀, same data as holotype, on slides or in alcohol.

Distribution. Japan.

Remarks. This species is easily distinguishable from the European *bifasciata* Gimmerthal by its coloration: a pair of pale brown stripes between shiny black vittae on the mesonotum and brown ventroproximal margins of the mid and hind femora. The male genitalia of *ishitanii* are quite different from those of *bifasciata* (Figs. 37-38 by Landrock, 1927; Fig. 2 by Plassmann, 1973) in the shape of coxite and stylus.

6. *Mycetophila ishiharai* n. sp.

(Fig. 11)

Male. Head brown including antenna, but scape, pedicel and 1st-2nd flagellar segments yellowish; palpus pale testaceous yellow. Thorax and abdomen brown; mesonotum broadly in antero- and postero-lateral corners and narrowly along posterior margin yellowish; scutellum yellowish posteriorly; propleuron and genitalia pale brown. Wing with 2 pale brown spots: one on apex of cell R_1 , basally not reaching to apex of vein R_1 , extending mesally as an oblique band and ending at middle between veins of R_{4+5} and M_1 , and the other around Rs and r-m; halter yellow. Legs yellow; hind femur brown and tibia pale brown narrowly on each distal apex; all tarsi faintly brown tinged. Setae brown, but those on abdomen more or less pale.

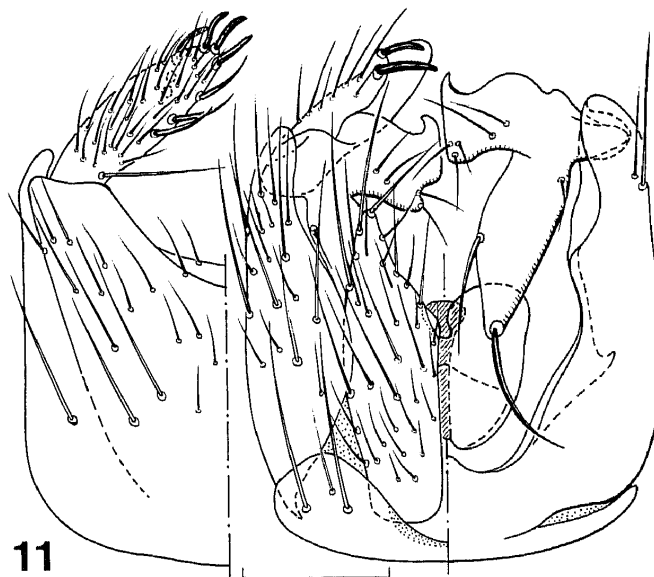


Fig. 11. Male genitalia of *Mycetophila ishiharai* n. sp., dorsal (left half), and ventral (left half) and inner (right half) views. Scale 0.1 mm.

Vertex densely setulose, with extremely long setae from vertical angle to frontal margin along orbit; face and clypeus also setulose; eye hairy; antenna slightly longer than thorax; scape and pedicel each with long setae on inner apical margin; flagellar segments covered with pale short setae which are less than 1/2 width of segment; 1st segment longest, slightly longer than the 14th; 4th segment about 1.5 times as long as broad, with neck very short; palpus with 4 segments in ratio of 0.5 : 2 : 2.5 : 4.2, 2nd segment with a small sensory pit at base, 2nd and 3rd segments each with 2 rows of microscopic papillae running through whole length of ventral side.

Mesonotum with a pair of long prescutellar setae; scutellum with 4 long marginals; propleuron with 7 long setae; mesopleuron hairy on dorsal 1/2 and with a row of setae along dorsoposterior margin; pteropleuron with 4 long setae dorsally; pleurotergite with many slender setae. Wing with costa ending in apex of R_{4+5} ; Sc short, free terminally; R_1 slightly shorter than R; stem of M-fork about 2/3 length of r-m; forking point of Cu at same level of that of M; R, R_1 and R_{4+5} with setae long, basal parts of M- and Cu-fork without setae. Fore tibia with setal patch in form of subtriangle on inner apex; fore metatarsus subequal to tibia; tibial bristles long, mid tibia with 4 dorsals, 3 externals and 3 ventrals, hind tibia with 4 dorsals and 6-7 externals; claws each with 1 long (about 1/3 of claw) and 3 minute ventral teeth.

Abdominal T7 about 1/3 length of T6; T8 as long as T7 but semioval in outline. Gonocoxites with a shallow emargination on posterodorsal margin; S9 separated

into 2 lobes ; stylus with 6 claviform and curved spines on tip and 3 stout setae along inner margin, accompanying by L-shaped process with a long apical seta ; paramere broad lobate ; aedeagus about 100 μ m long, slightly swollen on distal end.

Length of body 3.8 mm, of wing 3.1 mm.

Female unknown.

Holotype male, CPFES, Haniya, Sanbu-machi, Sanbu-gun, Chiba Pref., 26. V. 1993, on pistillate flower of *Arisaema serratum*, leg. E. Ishitani (KPU No. 265, on slide).

Distribution. Japan.

Remarks. This species is quite specific in having the L-shaped inner gonostylus. It is somewhat allied to the European *forcipata* Lundström in the general coloration and wing venation, but can be distinguished by its small apical cloud before the wing tip.

7. *Phronia longifurca* n. sp.

(Fig. 12)

Male. Head brown, but face, clypeus and postgena yellowish brown ; antenna brown excepting scape, pedicel, 1st flagellar segment and base of 2nd segment testaceous yellow ; palpus with 1st-2nd segments and dorsal 1/2 of 3rd segment brown, ventral 1/2 of 3rd and 4th segment entirely yellow. Thorax testaceous yellow ; mesonotum with 3 brown vittae, brownish along lateral side ; median vitta narrowing posteriorly and ending before scuto-scutellar suture, lateral vitta united with median one before transverse suture and extending posteriorly to scuto-scutellar suture ; scutellum with Y-shaped brown stripe, which is almost as wide as distance between 2 posteromedian marginal setae, at middle ; metanotum, pleura except for propleuron, and pleurotergite brown. Wing very faintly tinged with brown, with apical 1/4 between apices of R_1 and Cu_1 brownish, and with brown spot around R_s and slightly curved stripe between Cu -fork and posterior wing margin ; faintly brownish around M -fork and around A ; halter yellow. Legs yellow ; apex of hind coxa, apical 1/5 of hind femur and apices of mid and hind tibiae brown ; tarsi very faintly tinged with brown ; spurs testaceous yellow. Abdominal tergites brown, T1-3 with anterolateral corners broadly and triangularly yellow, T4 narrowly along anterolateral margin yellow ; S1-4 yellow, S5-6 brown ; genitalia brown. Setae pale brown.

Vertex densely setulose, orbital setae long ; lateral ocellus close to eye margin ; eye not emarginate above antennal base ; face hairy on ventral 1/3 ; clypeus sparsely setose ; antenna with scape and pedicel distinctly setose along apical margin, the former with a seta at middle of dorsal side and the latter with a seta in dorsodistal margin extremely long ; flagellar segments covered with pale setae which are shorter than width of segment ; 1st segment longest ; 4th segment 4/5 of the 1st and 1.7-2 times as long as wide ; distal 3-4 segments about 3/4 of the 4th ; 14th segment subequal to the 1st ; palpus with 4 segments in ratio of 1 : 2.3 : 2.5 : 4.5, setulose, 2nd segment with subcircular sensory pit near base.

Mesonotum with 14-15 long setae on *dc*-line, prescutellar pair extremely long ; scutellum with 4 long marginal setae ; propleuron with 4 long setae ; mesopleuron

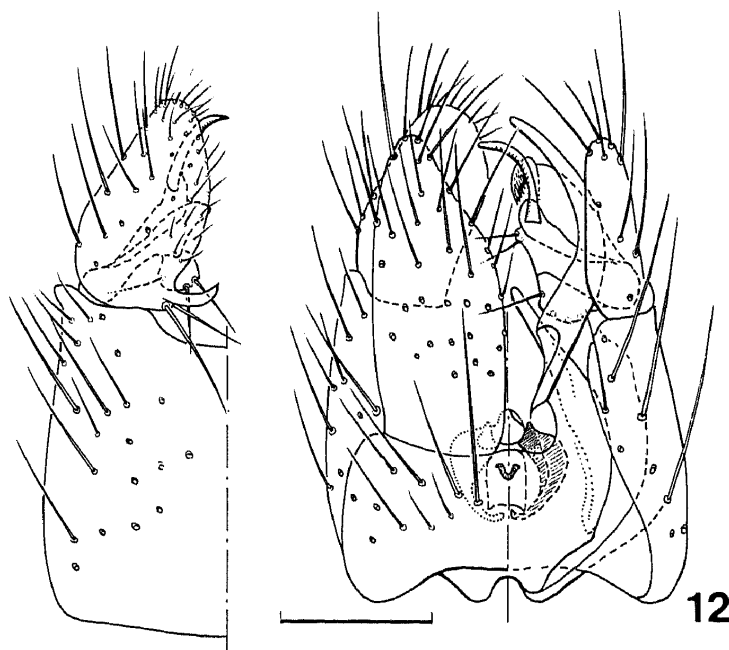


Fig. 12. Male genitalia of *Phronia longifurca* n. sp., dorsal (left half), ventral (left half) and inner (right half) views. Scale 0.1 mm.

with 3-4 long setae near posterodorsal corner and hairy on anterior 1/2; ptero- and sternopleura each hairy in dorsal margin; pleurotergite setose at middle; metanotum sparsely hairy at middle; metapleuron with a long seta and few setulae in posteroventral corner. Wing with costa ending in apex of R_{4+5} ; Sc short, free; R_1 about 1.5 times as long as R; r-m a little longer than M-Stem; forking point of M almost at same level of Rs; Cu-fork distinctly distad of M-fork; setae on R, R_1 , R_{4+5} and r-m long but those on M-fork and Cu short. Fore tibia with subtriangular setal patch on inner apex; fore metatarsus subequal to tibia; hind coxa with 2 setae on outer anterior and posterior apices; tibial bristles short, the longest slightly longer than broadest width of tibia; spurs in ratio of 3: 4, 5: 4.5, 6, and each with a distinct row of minute spines ventrally; claws each with a long ventral tooth which is about 1/2 length of claw.

Gonocoxites quadrate in dorsal side, with a shallow emargination at middle of posterior margin, broadly separated in ventral side; S9 consisting of a pair of lobate sclerites; dorsal stylus with a long claw-like spine on tip; paramere consisting of 2 pairs of long forcepses; aedeagus short, 60 μ m long.

Length of body 2.9 mm, of wing 2.7 mm.

Female. Similar to male, but apex of mid coxa narrowly brownish; T3-4 narrowly yellow in anterolateral margins; S4 pale brown; ovipositor brown; length of body and wing 2.8 (holotype)-3.3 mm, respectively.

Holotype female, CPFES, Haniya, Sanbu-machi, Sanbu-gun, Chiba Pref., 26. V. 1993, on pistillate flower of *Arisaema serratum*, leg. E. Ishitani (KPU No. 266, on

slide). Paratypes: 1♂2♀, same data as holotype.

Distribution. Japan.

Remarks. This is the second species of *Phronia* in our fauna. The wing markings are similar to those of the European *johannae* Steenberg, but the colorations of scutellum and legs are quite different from each other. Also, the long forceps-like parameres, only a single spinose gonostylus (2 spines and many setae in *johannae*, by Plassmann, 1977, Fig. 32) and short aedeagus of this new species are distinctive.

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2) See references in Part 1 (1993).