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A systematic study of the tribe Winthemiini from Japan¹

(Diptera, Tachinidae)

With 138 figures

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Zusammenfassung

Die japanischen Arten der Tribus Winthemiini (Unterfamilie Exoristinae) werden revidiert. Die vier Gattungen Smidtia (= Timavia syn. nov., = Smidtiola syn. nov.), Winthemia, Crypsina und Nemorilla wurde aus Japan nachgewiesen. Smidtia besteht aus 13 Arten, fünf von ihnen werden neu beschrieben. Winthemia enthält 13 Arten, von denen vier neu sind. Von Crypsina ist eine Art bekannt und Nemorilla besteht in Japan aus vier Arten, von denen zwei neu sind. Smidtia antennalis sp. n., S. pauciseta sp. n., S. trisetosa sp. n., S. harai sp. n., S. fukushii sp. n., Winthemia mediocris sp. n., W. ikezakii sp. n., W. brevipennis sp. n., W. miyatakei sp. n., Nemorilla insulata sp. n., und N. aquila sp. n. werden beschrieben. Winthemia hokkaidensis Baranov ist ein neues Synonym zu W. venusta (MEIGEN). Nachfolgende Kombinationen werden neu eingeführt: Smidtia varipes (MESNIL) comb. n., Smidtia verna (KOCHA) comb. n., Smidtia japonica (MESNIL) comb. n., Smidtia amoena (MEIGEN) comb. n., Smidtia laeta (MESNIL) comb. n., Smidtia gemina (MESNIL) comb. n., Smidtia amurensis (BORISOVA) comb. n. und Smidtia orientalis (BORISOVA) comb. n. Eine Hymenopterenart und 41 Lepidopterenarten werden als Wirte gemeldet.

Summary

Japanese species of the tribe Winthemiini, the subfamily Exoristinae, are revised. Four genera, Smidtia (

= Timavia syn. nov., = Smidtiola syn. nov.), Winthemia, Crypsina and Nemorilla are recognized in

Japan. Smidtia is composed of 13 species, 5 of which are described as new, Winthemia of 13 species, 4 of

which are new, Crypsina of 1 species and Nemorilla of 4 species, 2 of which are new: Smidtia antennalis

sp. n., S. pauciseta sp. n., S. trisetosa sp. n., S. harai sp. n., S. fukushii sp. n., Winthemia mediocris sp.

n., W. ikezakii sp. n., W. brevipennis sp. n., W. miyatakei sp. n., Nemorilla insulata sp.n., and N. aquila

sp. n. Winthemia hokkaidensis BARANOV is synonymized with W. venusta (MEIGEN). The following new

combinations are proposed: Smidtia varipes (MESNIL) comb. n., Smidtia verna (KOCHA) comb. n.,

Smidtia japonica (MESNIL) comb. n., Smidtia amoena (MEIGEN) comb. n., Smidtia laeta (MESNIL) comb.

n., Smidtia gemina (MESNIL) comb. n., Smidtia amurensis (BORISOVA) comb. n., and Smidtia orientalis

(BORISOVA) comb. n. One hymenopterous and 41 lepidopterous host species are recorded.

¹Contribution from Biosystematics Laboratory, Graduate School of Social and Cultural Studies, Kyushu University (Npos.) 10.21248/contrib.entomol.46.1.169-235

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I. Introduction

Members of the tribe Winthemiini are relatively distinct within the vast complex of exoristine Tachinidae in their morphological structures as well as ovipositing habit. They are characterized by a haired katepimeron, telescopic female terminalia which have no modified structures in postabdominal terga, and macrooviparous habit. The tribe has been known from some 20 genera distributed in all major zoogeographical regions.

The tribe Winthemiini contains several commonly occurring species in Japan, so it is naturally or potentially important for control of agricultural and forestry insect pests. Female members of this tribe lay unincubated macrotype planoconvex eggs directly on host exoskeleton. Lepidopterous larvae usually serve as their hosts (HERTING, 1960; TSCHORSNIG & HERTING, 1994), but coleopterous, orthopterous and sawfly larvae are also recorded as hosts in North America (ARNAUD, 1982).

In the Old World the Winthemiini have usually been recognized to comprise 9 genera: Ossidingia, Nemorilla, Rhaphiochaeta, Smidtia, Smidtiola, Timavia, Winthemia, Crypsina and Hemiwinthemia (MESNIL, 1949; CROSSKEY, 1973, 1976, 1984; HERTING, 1984). Japanese species of this tribe have not been studied in detail. BARANOV (1939) first described a new species of Winthemia from Hokkaido; in his revisional work MESNIL (1949) recognized 1 species each of Nemosturmia and Nemorilla from Japan; TAKANO (1950) recorded 1 species each of Winthemia and Nemorilla; MESNIL (1957, 1967) described 1 new species each of Smidtia and Nemosturmia from Hokkaido; MESNIL & PSCHORN-WALCHER (1968) recorded 1 species of Smidtia, 2 of Nemosturmia and 1 of Winthemia from Honshu; KOCHA (1971) described 1 new species of Smidtiola from Hokkaido; HERTING (1984) recognized 10 species comprising 4 genera from Japan; SHIMA et al. (1992) added 2 species of Winthemia to the known fauna of Japan in their treatment of the Chinese species of the genus. Consequently, up to the present there have been recorded 13 species comprising 4 genera of the tribe from Japan.

The main purpose of this paper is to revise the Japanese species of the Winthemiini by providing diagnostic keys to genera and species, describing new species, revising host records and considering the hypothesized phylogenetic relationships among Old World genera. I recognize 4 genera of this tribe from Japan, treating *Timavia* and *Smidtiola* as junior synonyms of *Smidtia*. There are 13 species in each of *Smidtia* and *Winthemia*, 1 in *Crypsina* and 4 in *Nemorilla*. Five species of *Smidtia*, 4 of *Winthemia* and 2 of *Nemorilla* are described as new to science. Host records are revised for Japanese species on the basis of contemporary systematic study and 1 hymenopterous and 24 lepidopterous hosts are newly recorded in this study.

II. Material and methods

Material

Material has been studied mainly from my own collection in Biosystematics Laboratory, Graduate School of Social and Cultural Studies, Kyushu University (BLKU). Some other material including type specimens were borrowed from the following institutions:

Canadian National Collection of Insects, Ottawa (CNC)

Department of Entomology, Natural History Museum, London (BMNH)

Department of Medical Entomology, National Institute of Health, Tokyo (NIH)

Department of Natural Sciences, Bishop Museum, Honolulu (BPBM)

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Entomological Institute, Hokkaido University, Sapporo (EIHU)

Hyogo Prefectural Museum of Human and Nature, Sanda (HMHN)

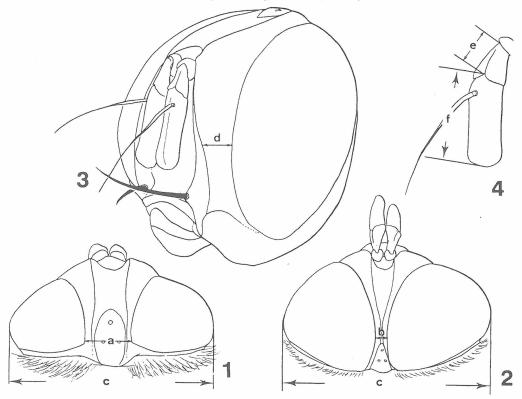
Institut voor Systematiek en Populatiebiologie (Zoologisch Museum), Universiteit van Amsterdam, Amsterdam (ZMA)

Laboratory of Systematic Entomology, National Institute of Agro-Environmental Sciences, Tsukuba (NIAS)

Naturhistorisk Museum, Wien (NHW)

Projektgruppe Entomologie, Fachhochschule Eberswalde (Deutsches Entomologisches Institut), Eberswalde (DEI)

U.S. National Museum of Natural History, Washington D.C. (USNM).



Figs 1-4 Winthemia spp. Male head in dorsal view (1-2) and in anterolateral view (3) and antenna (4): 1 ikezakii sp. n.; 2 orientalis; 3-4 miyatakei sp. n. a: width of vertex; b: width of narrowest point of frons; c: head width; d: width of parafacial at middle height; e: length of pedicel; f: length of 1st flagellomere.

Measurements

The vertex was measured between compound eyes in comparison with width of the head in dorsal view (Fig. 1, a, c). In some species the frons becomes very narrow in front of ocellar triangle and then widened toward the vertex. In this case the narrowest part of the frons was measured in dorsal view and compared with the width of the head (Fig. 2, b, c). The widths of parafacial and gena were measured in their respective horizontal position, not in the position of head profile (Fig. 3, d; Shima, 1984, Fig. 1). The parafacial was measured at mid height

between the anterior eye margin and anterior margin of the parafacial (or posterior margin of facial ridge if facial ridge developed). The gena was measured between the lowest margin of the eye and the lowest part of the gena at the level of lowest subfacial seta. The eye was measured at the highest vertical length. The pedicel was measured from the top of the pedicel to the upper end of the incision and the 1st flagellomere from the upper end of the incision of pedicel to its own apex (Fig. 4, e, f). The distance between the bend of the wing vein M and wing margin were measured in direct extension along vein M from its bend to the wing margin (Fig. 5, d, e).

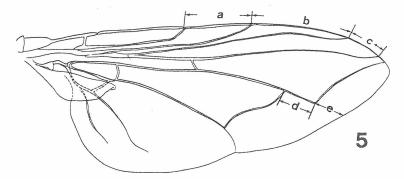


Fig. 5 Crypsina prima. Wing: a, b and c: 2nd, 3rd and 4th costal sectors, respectively; d; length of vein M from dm-cu crossvein to its bend; e: distance between bend of vein M and wing margin.

Terminology

Terminology mostly follows McAlpine (1981). The terms "tergum (terga)" and "sternum (sterna)" are adopted instead of "tergite (tergites)" and "sternite (sternites)", respectively. "Pollinose" and "pollinosity" are also used instead of "pruinose" and "pruinescens" mainly for practical reasons.

The following abbreviations of thoracic setae are used:

acr: acrostichal setae dc: dorsocentral setae ia: intra-alar setae sa: supra-alar setae ("pre-alar seta" is the first supra-alar seta).

For the position of the leg setae the following abbreviations are used:

ad: anterodorsal d

d: dorsal

p: posterior

pd: posterodorsal

pv: posteroventral

v: ventral

In the description of the genitalia the terms dorsal and ventral are adopted in their morphological meaning.

Scientific names of host species mainly follow those in the checklist by the Entomological Laboratory, Kyushu University & Japan Wildlife Research Center (1989).

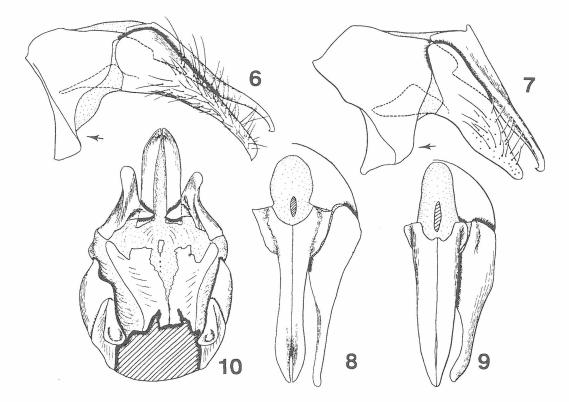
III. Systematics

Tribe Winthemiini

Winthemiae TOWNSEND, 1913: 52. Type genus: Winthemia ROBINEAU-DESVOIDY, 1830. General Characters:

Head usually dichoptic, from sometimes very narrowed in male; frontal vitta widened anteriorly; reclinate orbital setae sometimes absent or only one seta developed in male; parafacial some-

times hairy; gena usually narrower than frons at level of base of antenna; face concave, lower margin not extending beyond vibrissal angle; occiput usually moderately bulged; antennal pedicel sometimes rather long; arista bare; palpus clavate; eye densely hairy. Postpronotal lobe with 5 setae, 3 basal setae set in a triangle or in a straight line; 2-3+3 acr; 3+3-5 dc (usually 3+4); 0-1+2-3 ia (usually 1+3); 3 sa, 1st seta (pre-alar) rather fine and subequal in length to 1st postsutural ia seta; proepisternum bare; 1-2+1 katepisternal setae; katepimeron haired; anatergite bare; scutellum large, with 1 pair of discal and 4-5 pairs of marginal setae. Wing usually hyaline, at most weakly and evenly tinged with pale yellow, usually short; calypter rather large, abutted to scutellum on inner margin, outer margin sometimes bent downward; 2nd costal sector bare below; vein M without fold or appendix. Hind coxa bare posteroventrally; fore tibia with 2 p setae. Abdomen ovate; syntergum 1+2 excavated to posterior margin. Male genitalia: Basilliform sclerite very wide; epiphallus present (except *Crypsina*). Female genitalia more or less elongate, telescopic; 6th tergum longitudinally divided into 2 hemitergites; 6th sternum normal, without any modification; 7th tergum divided into 2 hemitergites; 7th sternum narrow and simple, sometimes absent; 8th tergum of very small hemitergites.



Figs 6-9 Smidtia spp. Epandrium, surstylus and cerci in dorsal view (hairs on epandrium and cerci omitted) (6-7); same in dorsal view, hairs omitted (8-9): 6, 8 varipes; 7, 9 conspersa.

Fig. 10 Rhaphiochaeta breviseta. Dorsal armature of male genitalia in ventral view, showing a pair of broad basilliform sclerites.

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Key to genera of Winthemiini from Japan

Postpronotal lobe with 5-6 setae, of which 3 basal setae are arranged nearly in a staight 1. line; scutellum with 2-3 lateral scutellar setae; thorax and abdomen with very fine short and dense hairs, abdomen without strong setae in male, at most with weak and short setae on 4th and 5th terga in female; male face at vibrissal level strongly narrowed and elongate to lower margin, distance between vibrissal angle to lower margin of face as long as that between base of antenna and vibrissal angle; occiput with many very short fine black hairs, especially in male Crypsina Brauer et Bergenstamm Postpronotal lobe with 3 basal setae arranged in a triangle; lateral scutellar seta usually single; thorax and abdomen with rather fine short hairs, abdomen with strong setae at least on 4th and 5th terga in both sexes; face not narrowed and elongate below vibrissal angle; occiput at most with a row of fine black hairs or several black hairs on upper portion near 2+1 katepisternal setae; 5th abdominal tergum narrowed posteriorly, only slightly wider 2. than long; male usually with 1 distinct reclinate orbital seta; occiput with or without black hairs; parafacial sometimes haired on upper 1/2 or more Smidtia Robineau-Desvoidy Usually 1+1 katepisternal setae; 5th abdominal tergum short and broad, quadrate, distinctly more than twice as long as wide; male without distinct reclinate orbital setae; occiput 3.

Genus Smidtia ROBINEAU-DESVOIDY

Smidtia ROBINEAU-DESVOIDY, 1830: 183. Type species: Smidtia vernalis ROBINEAU-DESVOIDY, 1830 (= Tachina conspersa MEIGEN, 1824), by designation of Desmarest in d'Orbigny, 1848 (after EVENHUIS & THOMPSON, 1990).

Timavia ROBINEAU-DESVOIDY, 1863: 257. Type species: Smidtia flavipalpis ROBINEAU-DESVOIDY, 1847 (= Tachina amoena MEIGEN, 1824), by original designation. Syn. nov.

Omotoma Lioy, 1864: 1338. Type species: Tachina amoena MEIGEN, 1824, by subsequent designation of Townsend, 1916.

Megalochaeta Brauer et Bergenstamm, 1889: 87. Type species: Megalochaeta eggeri Brauer et Bergenstamm, 1889 (= Tachina conspersa Meigen, 1824), by monotypy.

Homotoma BEZZI, 1907: 257. Preoccupied. Incorrect emendation of Omotoma.

Nemosturmia Townsend, 1926: 34. Type species: Nemosturmia pilosa Townsend, 1926 (= Winthemia fumiferanae Tothill, 1912, Nearctic species), by original designation. Syn. nov.

Smidtiola MESNIL, 1957: 7. Type species: Smidtiola varipes MESNIL, 1957, by monotypy. Syn. nov.

Although *Timavia* and *Smidtiola* have usually been treated as valid genera distinct from *Smidtia*, there are intermediate forms among them and I consider all of them to be included in one genus. Wood (1987) synonymized *Timavia* with *Winthemia* and placed it as a subgenus of the latter. I think, however, there are distinct differences between *Timavia* (= *Smidtia*) and *Winthemia*. In the external features *Smidtia* is characterized by 1 reclinate orbital seta in male, 2+1 katepisternal setae and tapering apex of 5th abdominal tergum, although some variations may be seen in

specimens of some species. In the male genitalia this genus is characterized by the rather short, broad and apically curved epiphallus, weakly sclerotized dorsodistal expansion of the distiphallus and absence of the 6th abdominal tergum, and in the female genitalia by the presence of rather strongly sclerotized and broad 7th abdominal sternum and rather long 8th abdominal hemitergites (e.g. Figs. 47, 64).

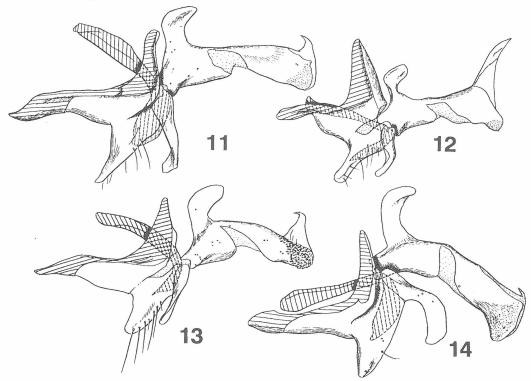


Fig. 11 Rhaphiochaeta breviseta. - Figs 12-13 Smidtia spp.: 12 varipes; 13 conspersa. - Fig. 14 Ossidingia cruciata. Hypandrium, gonopod, paramere and aedeagus in lateral view.

Smidtia, as here defined, has been known from 11 species in the Palearctic Region, 2 in northern part of the Oriental Region and 1 in South Africa. Members of this genus are sometimes very similar in general appearance, and it is possible that many more species will be found in eastern Palearctic and northern Oriental areas. Tachina atriventris WALKER, which CROSSKEY (1976) placed in Timavia and treated as a doubtful member of the Oriental fauna, has recently been considered as a representative of the North American genus Diotrephes REINHARD (WOOD, 1987). I think, however, this is a species of Smidtia and some New World genera of Winthemiini may be synonymized with Smidtia when studied in more detail.

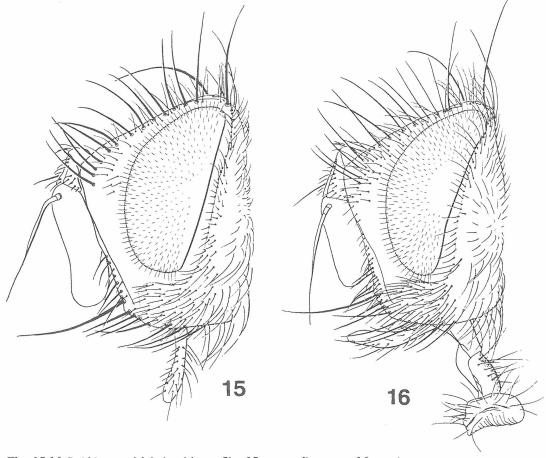
Key to Japanese species of Smidtia

1.	3+3 dc setae																						2
-	3+4 dc setae																						4

^{2.} Hind tibia with 3 preapical d setae; mid tibia with 2 strong submedian pv setae; parafacial DOI: 10.21248/contrib.entomol.46.1.169-235

	densely haired at least on anterior 1/2; facial ridge densely setulose on lower 3/4
-	Hind tibia with 2 preapical d setae; mid tibia without submedian pv setae; parafacial at most haired on upper 1/2; facial ridge rather sparsely setulose on lower 1/2 3
3.	Antenna with 1st flagellomere 2-2.3 times as long as pedicel in male, at most 2 times in female; parafacial sparsely haired
-	First flagellomere about 4 times as long as pedicel in male; parafacial rather densely haired (female unknown)
4.	Basicosta reddish yellow; occiput with a complete row of black setulae behind postocular setae; abdomen usually with strong median discal setae at least on 4th tergum; antennal pedicel reddish in male and female; tibiae reddish yellow 5
-	Basicosta black; upper occiput usually without a row of black setulae, rarely with an irregular row of fine black hairs or several fine black hairs near vertex; abdomen usually without median discal setae on intermediate terga, at most with rather fine setae on 4th in
5.	female; pedicel and tibiae usually darker in male
-	2 strong median discal setae
6.	Parafacial with several fine and short hairs just below lowest frontal seta; antenna with 1st flagellomere about 4 times as long as pedicel in male (female unknown)
-	Parafacial with short fine hairs on upper 1/2; 1st flagellomere 2.5-3 times as long as pedi-
7.	cel in male, about 2 times in female
	hind tibiae; upper occiput with an irregular row of fine black hairs; male hind tibia with
	a rather sparsely set row of fine and long hair-like ad setae; male with fine inner vertical, ocellar and reclinate orbital setae that are only slightly stronger than hairs around vertex;
	male antennal pedicel short, 1st flagellomere falling short of lower margin of face by about length of pedicel (female unknown)
-	3+3 acr setae; 1+3 ia setae; tibiae brown-black; upper occiput without a row of black
	hairs, at most with several black hairs near vertex; hind tibia with a rather closely set row of well developed ad setae; inner vertical, ocellar and reclinate orbital setae strong and well distinguishable from other hairs (except <i>orientalis</i>); male pedicel rather long, 1st
0	flagellomere falling short of lower margin of face by 1/2-3/5 length of pedicel 8
8.	Palpus black, apex sometimes narrowly pale brown especially in female; frons at the narrowest point 0.18-0.21 of head width in male, vertex 0.29-0.3 of head width in female; parafacial only sparsely haired on upper 2/3 gemina (MESNIL)
-	Palpus reddish yellow, at most darkened basally; frons narrower in male 9
9.	Gena wide, about 1/4 of eye height; upper occiput with several fine black hairs near vertex; 5th abdominal tergum broadly black on mid dorsal longitudinal portion, male
	abdominal dorsum thinly grayish white pollinose on anterior 3/5 of 3rd tergum and 2/3 of 4th; frons at the narrowest point 0.15-0.17 of head width in male, vertex 0.28-0.31 of
-	head width in female
	tergum more or less densely pollinose except apex and narrow mid dorsal longitudinal DOI: 10.21248/contrib.entomot.46.1.169-235

Male with fine and hair-like inner vertical, ocellar and reclinate orbital setae that are only 10. slightly stronger than hairs around vertex; frons narrow, 0.07- 0.08 of head width at the narrowest point in male; 2nd and 3rd abdominal terga each with 1-2 marginal setae in addition to 2 regular strong median marginal setae (female unknown) Inner vertical, ocellar and reclinate orbital setae strong, quite distinct from frontal hairs in male; frons wider in male; 2nd and 3rd abdominal terga each usually with 2 strong Head dull yellowish white pollinose; frons at the narrowest point 0.13-0.17 of head width 11. and gena about 1/5 of eye height in male (female unknown) harai sp. n. Head densely whitish pollinose; from at the narrowest point 0.1-0.12 of head width in male, 0.28-0.3 in female, gena about 1/6 of eye height in male and female . amoena (MEIGEN) & laeta (MESNIL) (see section on S. laeta for separation of these species)



Figs 15-16 Smidtia spp. Male head in profile: 15 antennalis sp. n.; 16 pauciseta sp. n.

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1. Smidtia antennalis sp. n. (Figs 15, 17, 23, 29)

Male: Head densely grayish white pollinose, fronto-orbital plate darkened posteriorly; antenna brown-black, pedicel and base of 1st flagellomere reddish; palpus yellowish. Vertex 0.22-0.23 of head width; frontal vitta subequal in width to fronto-orbital plate at middle; parafacial 2/3-5/6 as wide as 1st flagellomere at middle height; gena 0.37-0.4 of eye height. Inner vertical seta 2/3-4/7 of eye height; outer vertical seta undeveloped; reclinate orbital seta about 3/4 as long as inner vertical seta; ocellar seta strong, subequal in length to reclinate orbital seta; 11-12 frontal setae, lowest seta nearly level with apex of pedicel; fronto-orbital plate with fine and rather dense hairs; parafacial almost bare, several hairs present just below lowest frontal seta; facial ridge with short setae on lower 1/2; occiput with a row of fine black hairs. Antenna long and stout, apex almost reaching to lower margin of face; 1st flagellomere about 3 times as long as wide, about 4.5 times as long as pedicel. Arista with 2nd aristomere wider than long. Palpus about 2/3 as long as 1st flagellomere of antenna.

Thorax black in ground color, scutellum reddish on apical 2/3; dorsum rather dense grayish white pollinose, 5 rather broad longitudinal vittae present on scutum, median vitta absent on postsutural scutum; pleura grayish pollinose. 3+3 acr setae; 3+4 dc setae; apical scutellar setae rather strong, crossing each other and suberect, subequal in length to lateral seta; distance between bases of 2 subapical scutellar setae about 1.5 times that between subapical and basal setae of corresponding side.

Wing hyaline, slightly tinged with dull yellow basally and along veins; basicosta pale brown to brown; lower calypter whitish. Relative lengths of costal sectors 2nd, 3rd and 4th approximately as 2:3.5:1.5; length of vein M from dm-cu crossvein to its bend about 1.5 times distance between the bend and wing margin.

Legs black; tibiae reddish yellow, darkened basally and apically; pulvilli yellowish. Mid tibia with 3 strong ad setae; hind tibia with a sparsely set row of ad setae. Claws and pulvilli long. Abdomen black, side of 2nd and 3rd terga narrowly reddish; dorsum densely grayish white pollinose, with tessellate appearance; mid dorsal longitudinal vitta absent. Hairs long dense erect and black; 2nd tergum with 2 strong median marginal and 1-2 lateral marginal setae; 3rd tergum with 2 median discal, 2 median marginal and 2 lateral marginal setae, all setae very strong, a row of 4-5 rather strong suberect setae present on each side of median marginal setae; 4th tergum with 2 strong median discal and a row of strong marginal setae; 5th tergum with an irregular row of strong discal setae and a regular row of rather weak margin-al setae.

Male genitalia: Anteroventral portion of epandrium very narrow and elongate; dorsal arms of hypandrium long and broad on dorsal portion, closely associated with each other; cerci in dorsal view nearly parallel-sided, weakly narrowed apically, in lateral view flat and almost straight, apex weakly hooked ventrally; surstylus long and narrow, in lateral view not much narrowed posteriorly but rather parallel-sided, with short and dense hairs.

Female: Unknown.

Body length, 8.8-9.2 mm; wing length, 7.7-8.2 mm.

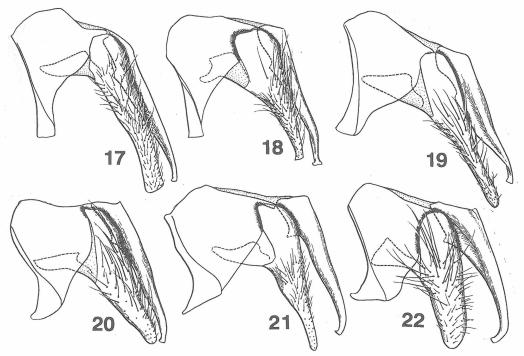
Distribution: Japan (Honshu, Kyushu).

Holotype male, Honshu, Aomori, Hirosaki City, Zatoishi, 15.v.1989, S. Fukushi (BLKU). Paratype: KYUSHU: 1 male, Miyazaki, Shiiba, Okawachi, 800-1,100 m, 24.v. 1974, H. Shima (BLKU).

Remarks: This species has similar features to those of the Burmese species Smidtia varipes

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(MESNIL) (comb. nov.), but is easily distinguished from it by the long and stout antenna, black hairs on the abdomen and grayish white pollinose body.



Figs 17-22 Smidtia spp. Epandrium, surstylus and cerci in lateral view (hairs on epandrium and cerci omitted): 17 antennalis sp. n.; 18 pauciseta sp. n.; 19 verna; 20 magnicornis; 21 trisetosa sp. n.; 22 japonica.

2. Smidtia pauciseta sp. n. (Figs 16, 18, 24, 30, 35, 36)

Closely resembling S. conspersa (MEIGEN), but differing as follows.

Male: Vertex narrow, frons at the narrowest point 0.16-0.18 of head width; parafacial sparsely haired on upper 1/2; gena about 1/3 of eye height; arista thickened on basal 2/5, 2nd aristomere short, at most as long as wide; 3+3 acr setae. Male genitalia: Anteroventral portion of epandrium very narrow; dorsal arms of hypandrium long and broad on dorsal portion, fused with each other mid-dorsally; cerci in dorsal view nearly parallel-sided from basal 1/4 to apical 1/6, apical portion evenly narrowed, in lateral view flat, weakly curved ventrally, apex distinctly hooked dorsally and ventrally; surstylus in lateral view long-triangular in shape, with long and dense hairs.

Female: Vertex 0.32-0.35 of head width; parafacial very sparsely fine-haired on upper 1/2, well narrowed below, about 1/2 as wide as 1st flagellomere at middle height; 1st flagellomere broadly reddish; 2nd aristomere short; 3+3 acr setae; mid and hind tibiae reddish especially

near middle; claws and pulvilli short. Female genitalia: rather elongate; intersegmental membrane between 6th and 7th segments distinctly longer than 6th sternum; several hairs present on both sides of membrane behind 7th hemitergites.

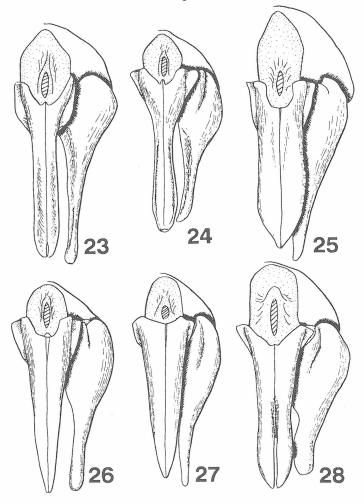
Body length, 6.2-7.8 mm; wing length, 5.5-7.1 mm.

Distribution: Japan (Hokkaido, Honshu).

Holotype male, Hokkaido, Nopporo, 3.vi.1973, M. Suwa (EIHU).

Paratypes: HOKKAIDO: 1 female, Ashorobuto, 30.vi.1967, T. Saigusa; 1 female, Mt. Upepesanke, 20.vii.1967, A. Nakanishi; HONSHU: 1 male, Nagano, Shimashima, 23.v.1975, A. Nakanishi & J. Emoto (Malaise trap)(all in BLKU); 1 female, Ishikawa, Komatsu, Sunodani, 12.v.1973, H. Kurahashi (NIH).

Remarks: In general appearance this species resembles S. conspersa, but the structure of the male genitalia seems to show a closer relationship to S. antennalis.



Figs 23-28 Smidtia spp. Epandrium, surstylus and cerci in dorsal view (hairs omitted): 23 antennalis sp. n.; 24 pauciseta sp. n.; 25 verna; 26 magnicornis; 27 trisetosa sp. n.; 28 japonica.

3. *Smidtia verna* (KOCHA) comb. n. (Figs 19, 25, 31, 37)

Smidtiola verna Kocha, 1971: 292.

This species was originally described from Hokkaido, and I have seen specimens from Kyushu. Although this species is not recorded from Honshu in this study, it must occur there, too. HERTING (1984) did not treated this species in his catalog and later HERTING & DELY-DRASKOVITS (1993) erroneously cited this species as originally described in *Timavia*.

KOCHA (1971) placed this species in *Smidtiola*, but in general appearance this species seems to have intermediate features between *Smidtiola* and *Smidtia* in MESNIL's sense. Description of this species was given in detail by KOCHA (1971), and here are added some characteristics of the male and female genitalia.

Male genitalia: Anteroventral portion of hypandrium very narrow and long; dorsal arms of hypandrium long, closely associated with each other; cerci in dorsal view rather broad and parallel-sided from base to apical 1/5, in lateral view narrowed and flattened to apex; surstylus in lateral view narrow and long, blunt apically, with dense long hairs; distiphallus weakly widened to apex in lateral view, dorsodistal portion rather narrow.

Female genitalia: Very narrow and long, especially elongate in intersegmental area between 7th and 8th segments; 8th hemitergite and 8th sternum very narrow and long.

Distribution: Japan (Hokkaido, Kyushu).

Type material examined. Holotype male of *Smidtiola verna* Kocha, Hokkaido, Maruyama, 1.v.1968, T. Kocha (EIHU).

Other specimens examined. KYUSHU: 2 males, Fukuoka, Mts. Sefuri, Mizunashi, 24.iv.1984, H. Shima; 1 female, Fukuoka, Mt. Sefuri, 13.v.1986, H. Shima; 1 female, Fukuoka, Mt. Kusenbu, 25.iv.1986, H. Shima; 1 male, Mt. Kusenbu, 6.v.1988, H. Shima (all in BLKU). Remarks: In general appearance this species resembles S. antennalis, but may be distinguished

Remarks: In general appearance this species resembles S. antennalis, but may be distinguished from it by the shorter antenna and densely haired upper 1/2 of parafacial. The female of this species is characterized by very long female genitalia.

4. *Smidtia magnicornis* MESNIL (Figs 20, 26, 32)

Smidtia magnicornis MESNIL, 1967: 40.

This species was originally described from a male obtained in Hokkaido, and I have seen another male from Honshu. As MESNIL (1967) mentioned, this species seems to be closely allied to *S. conspersa*, and the structure of the male genitalia also seem to show the close relationship between these two species. Description of this species was given by MESNIL (1967) in detail. Male genitalia: Cerci in dorsal view evenly narrowed posteriorly, in lateral view flat, apex weakly bent ventrally; surstylus in lateral view evenly narrowed to blunt apex, with dense and long hairs.

Distribution: Japan (Hokkaido, Honshu).

Type material examined. Holotype male of *Smidtia magnicornis* Mesnil, Sapporo, Mt. Moiwa, 16.v.1966, S. Takano (CNC).

Other specimen examined. HONSHU: 1 male, Yamanashi, Kanayama, 1,100-1,500 m, 19.vi. 1975, J. Emoto (Malaise trap) (BLKU).

5. Smidtia trisetosa sp. n. (Figs 21, 27, 33, 45)

Male: Head grayish white pollinose, upper portion of fronto-orbital plate darkened, gena and occiput grayish; antenna brown-black; palpus reddish yellow, weakly darkened at base. Vertex 0.16-0.18 of head width; frontal vitta subequal in width to fronto-orbital plate at middle; parafacial well narrowed below, subequal in width to 1st flagellomere at middle height; gena wide, 0.28-0.3 of eye height. Hairs fine long dense and black; inner vertical setae fine hair-like, about 1/2 of eye height, crossing each other; ocellar seta and reclinate orbital seta fine hair-like, slightly shorter than inner vertical seta; 8-10 fine hair-like frontal setae; profrons and anterior 1/2-1/3 of parafacial with very dense long hairs; facial ridge with dense long fine hairs on lower 1/2; vibrissa nearly level with lower margin of face; genal dilation with long dense hairs; occiput with 2-3 rows of fine black hairs. Antenna long, falling short of lower margin of face by about 1/2 length of pedicel; 1st flagellomere about 3 times as long as pedicel. Arista with 2nd aristomere about 2 times as long as wide. Palpus subequal in length to 1st flagellomere of antenna.

Thorax black in ground color, scutellum reddish brown on apical 1/2-1/3; dorsum thinly grayish pollinose, 4 narrow longitudinal vittae visible when seen from behind; postpronotal lobe and pleural region rather densely grayish white pollinose. Hairs long fine dense and black; all setae fine and rather hair-like; 2-3+3 acr; 3+3 dc; 0+3 ia; preapical scutellar seta fine long and hair-like; lateral scutellar seta very fine, slightly longer than apical seta; apical scutellar setae fine, 1.2-1.3 times as long as scutellum, crossing each other and suberect; subapical scutellar setae rather close to each other, distance between their bases only slightly more than that between subapical and basal setae of corresponding side.

Wing narrow in shape, weakly tinged with brown; basicosta black. Second costal sector about 1/2 as long as 3rd, slightly longer than 4th; vein M from dm-cu crossvein to its bend about 1.5 times distance between the bend and wing margin.

Legs black; pulvilli dull yellowish. Mid-tibia with 3 ad, 3 pd, 2 pv and 1 v setae; hind tibia with a row of sparsely set ad setae, submedian one strong, 3-4 pd and 3 v setae; 3 strong preapical d setae present on hind tibia. Claws and pulvilli elongate.

Abdomen black, narrowly reddish on side of 2nd and 3rd terga; dorsum of 3rd tergum thinly grayish white pollinose on anterior 1/2, the pollinosity dense on side; 4th tergum rather densely grayish white, somewhat dull yellowish, pollinose on dorsum of anterior 2/3, and 5th tergum pollinose on anterior 3/4; a broad mid dorsal longitudinal vitta distinct on 4th and 5th terga. Hairs long dense and erect, strong and bristle-like on mid dorsal portion of intermediate terga; 2nd tergum with 2 strong median marginal and 2-3 lateral marginal setae; 3rd tergum with 4 median marginal and 3-4 lateral marginal setae, 4th with a row of long marginal setae, and 5th with rows of discal and marginal setae mixed with many erect strong hairs.

Male genitalia: Cerci in dorsal view slender, evenly tapering to apex, in lateral view straight, weakly curved ventrally at apex; surstylus in lateral view narrow, tapering to apex, with short hairs.

Female: Unknown.

Body length, 8.0-8.7 mm; wing length, 7.5-8.4 mm.

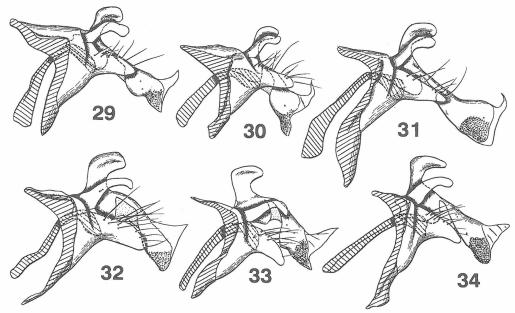
Distribution: Japan (Shikoku, Kyushu).

Holotype male, Shikoku, Ehime, Omogokei, 5-6.iv.1974, S. Shinonaga (BLKU).

Paratypes: SHIKOKU: 1 male, same data as holotype; KYUSHU: 1 male, Kumamoto, Mt. Shira-tori, 18.iv.1981, I. Otsuka (all in BLKU).

Remarks: This species is peculiar in having strong submedian pv setae on the mid tibia, 3 preapical d setae on the hind tibia and very dense hairs on the parafacial. In general appearance this species resembles members of the genus *Phryno*, but the structure of the male genitalia apparently shows the characteristics of *Smidtia*.

This species seems to be allied to S. conspersa, but is much more specialized in weak head and thoracic setae and in the chaetotaxy of the legs.



Figs 29-34 Smidtia spp. Hypandrium, gonopod, paramere and aedeagus in lateral view: 29 antennalis sp. n.; 30 pauciseta sp. n.; 31 verna; 32 magnicornis; 33 trisetosa sp. n.; 34 japonica.

6. *Smidtia japonica* (MESNIL) comb. n. (Figs 22, 28, 34, 60)

Nemosturmia japonica MESNIL, 1957: 9.

This species has intermediate characters between *Smidtiola* and *Timavia* in Mesnil's sense, such as a row of black setulae on the occiput, the haired parafacial on its upper 1/2 and almost bare facial ridge except for several setulae just above the vibrissa. The male genitalia of this species are rather peculiar among members of this genus in having rather well separated cerci on the apical portion. The holotype male and another male specimen seem to have been reared at the same time in Mitaka, Tokyo, from a sawfly species. This is the first record of a sawfly as a host of the Winthemiini in the Old World (this host record was not mentioned by Mesnil in his description of *japonica*). Detailed description of this species was given by Mesnil (1957).

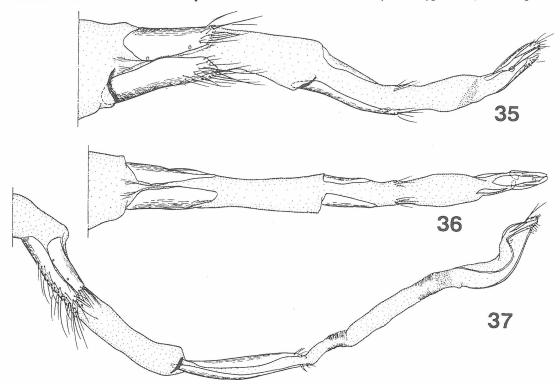
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Male genitalia: Cerci in dorsal view nearly parallel-sided from base to posterior 1/5, separated from each other on apical 1/3, in lateral view curved ventrally at apical 1/5; surstylus in lateral view broad, weakly narrowed posteriorly, with dense and long hairs on basal portion.

Female: Differing from male as follows: Frons wide, vertex 0.31-0.34 of head width; all head setae strong, outer vertical seta and 2 reclinate and proclinate orbital setae developed; parafacial rather sparsely haired on upper 1/2; antennal pedicel long, 1st flagellomere only 2 times as long as pedicel; claws and pulvilli short; thorax and abdomen more densely whitish pollinose than in male. Female genitalia: Rather short; 7th hemitergite small; 7th sternum short and small; several hairs present on both sides of weakly sclerotized area behind 7th hemitergites and on ventral weakly sclerotized area behind 7th sternum.

Distribution: Japan (Honshu, Kyushu, Tsushima).

Host: HYMENOPTERA: Cimbycidae: Palaeocimbex carinulata (Konow)[Mitaka, Honshu].



Figs 35-37 Smidtia spp. Female genitalia in lateral view (35, 37) and dorsal view (36): 35-36 pauciseta sp. n.; 37 verna.

Type material examined. Holotype male of *Nemosturmia japonica* MESNIL, Mitaka, 2.vi.1949 (L), 21.iv.1950 (A), T. Okutani (CNC).

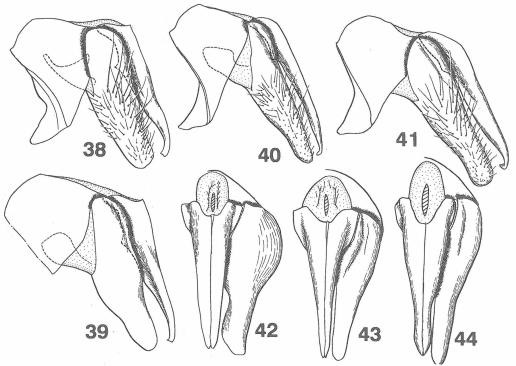
Other specimens examined. HONSHU: 1 male, same data as holotype, with host data, *Palaeocimbex carinulata* (KNW)(EIHU); 1 male, Saitama, Minano, 29.iv.1972, K. Hara; 1 male, Yamanashi, Amarisawa, 11.v.1974, A. Nakanishi; 1 male, Wakayama, Susami, Mirozu, 12.iv. 1972, K. Yamagishi (all in BLKU); TSUSHIMA: 1 male, Hitakatsu, 27.v.1968, H. Shima; 1 male, Sasuna, 26.v.1968, M. Honda; KYUSHU: 1 male, Fukuoka, Mt. Kusenbu, 21.v.1990,

H. Shima; 1 female, Kumamoto, Mt. Ichifusa, 800-1,300 m, 26.v.1974, H. Shima; 1 male, Miyazaki, Shiiba Vill., Okawachi, 800-1,100 m, 24.v.1974, H. Shima (all in BLKU).

7. Smidtia amoena (MEIGEN) comb. n. (Figs 38, 39, 42, 62, 63, 64, 65)

Tachina amoena MEIGEN, 1824: 264. Tachina delitescens WALKER, 1853: 73. Tachina certans WALKER, 1853: 74. Chetolyga pilifera RONDANI, 1859: 110.

This species is widely distributed in the Palearctic Region. This is the most common species of this genus in Japan and seems to have at least two generations a year. Many males are sometimes observed hovering under trees in the morning from May to June. Two lepidopterous species have been recorded previously as hosts of this species in Japan, and here are added 2 other species.



Figs 38-44 Smidtia spp. Epandrium, surstylus and cerci in lateral view (hairs on epandrium and cerci omitted) (38-41) and in dorsal view (hairs omitted) (42-43): 38 amoena from Japan; 39 amoena from Europe; 40 laeta; 41 harai sp. n.; 42 amoena from Japan; 43 laeta; 44 harai sp. n.

Males of Japanese specimens identified as this species differ from European specimens of amoena in having narrower frons (0.1-0.12 of head width at the narrowest point) and narrower gena (1/5-1/6 of eye height), and the poste genitalia are also slightly different in the shape of the

surstylus (Figs 38, 39). I treat here, however, this common Japanese species as conspecific with European S. amoena.

Male: Head densely white pollinose, fronto-ortibal plate reflecting somewhat grayish with direction of light, gena and upper occiput grayish pollinose; antenna brown-black, base of 1st flagellomere sometimes reddish yellow; palpus reddish yellow, darkened at base. Frons at the narrowest point 0.1-0.12 of head width; frontal vitta about 2 times as wide as fronto-orbital plate at middle; parafacial rather weakly narrowed below, about 3/5 as wide as 1st flagellomere at middle height; gena narrow, 0.17-0.19 of eye height. Hairs fine long dense and black; inner vertical setae fine, about 1/3 of eye height, converging apically; ocellar seta and reclinate orbital seta slightly shorter than inner vertical seta; 11-13 frontal setae, lowest seta nearly level with middle of pedicel; parafacial with dense fine and rather long hairs at least on upper 2/3; facial ridge with several fine hairs just above vibrissa; vibrissa nearly level with lower margin of face; genal dilation with long dense hairs; occiput without black hairs. Antenna falling short of lower margin of face by about 1/2 length of pedicel; 1st flagellomere 1.8-2 times as long as pedicel. Arista with 2nd aristomere slightly longer than wide. Palpus slightly longer than 1st flagellomere of antenna.

Thorax black in ground color, scutellum reddish yellow except narrow basal portion, rather thinly grayish white pollinose; 5 longitudinal black vittae distinct on dorsum. Hairs long fine dense and black; all setae strong; 3+3 acr; 3+4 dc; 1+3 ia; preapical scutellar seta rather strong; lateral scutellar seta slightly shorter than apical seta; apical scutellar setae about 1.5 times as long as scutellum, crossing each other suberectly; distance between bases of subapical scutellar setae about 1.5 times that between subapical and basal setae of corresponding side.

Wing only slightly tinged with pale brown at base; basicosta black. Relative lengths of costal sectors 2nd, 3rd and 4th approximately as 1:2:1; vein M from dm-cu crossvein to its bend about 1.5 times distance between the bend and wing margin.

Legs black; pulvilli dull yellowish. Mid-tibia with 3-4 ad, 2 pd and 1 v setae; hind tibia with a row of rather closely set ad setae, submedian one strong, 2-3 pd and 3-4 v setae; 2 preapical d setae present on hind tibia. Claws and pulvilli elongate.

Abdomen black, narrowly reddish on side of 2nd and 3rd terga; dorsum rather densely grayish white or pale yellowish white pollinose, with tessellate appearance, posterior portion of each tergum shining black; a narrow mid dorsal longitudinal vitta distinct on 3rd to 5th terga. Hairs long dense fine and erect; 2nd tergum with 2 strong median marginal and 1 lateral marginal setae; 3rd tergum with 2 strong median marginal and 3-4 lateral marginal setae, 1-2 rather strong setae sometimes present in addition to 2 median marginal setae; 4th tergum with a row of strong marginal setae, and 5th with rows of fine discal and marginal setae mixed with many erect strong hairs.

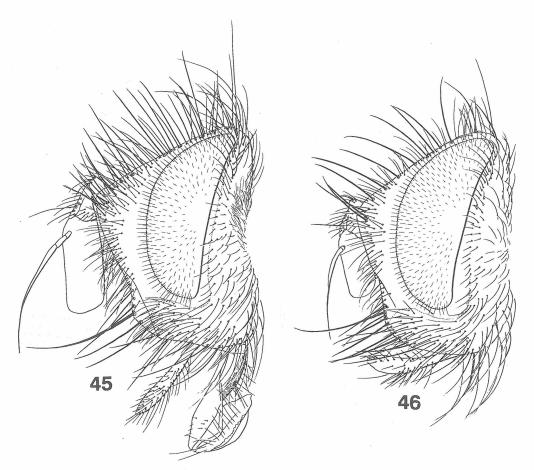
Male genitalia: Cerci in dorsal view weakly narrowed to apex, in lateral view weakly bent ventrally on apical 1/6; surstylus broad, in lateral view very weakly narrowed to rounded apex, with long and dense hairs on mid-dorsal portion.

Female: Differing from male as follows: Head more whitish pollinose; frons wide, vertex 0.28-0.31 of head width; frontal vitta at most 1.5 times as wide as fronto-orbital plate at middle; parafacial more strongly narrowed below; all head setae strong, inner vertical seta slightly less than 2/3 of eye height; outer vertical seta about 2/3 as long as inner seta; ocellar seta slightly shorter than outer vertical seta; 2 reclinate and proclinate orbital setae; 6-8 frontal setae; antenna falling short of lower margin of face by about 1/3 length of pedicel. Thorax more densely DOI: 10.21248/contrib.entomol.46.1.169-235

whitish pollinose; hairs shorter. Claws and pulvilli short. Abdomen more densely whitish or grayish white pollinose, posterior portion of each tergum more narrowly black; hairs strong and short. Female genitalia: 6th tergum rather long, sometimes narrowly divided into 2 hemitergites; 7th hemitergites short, with a few hairs on membrane behind the hemitergites; 7th sternum with several hairs on posterior portion.

Distribution: Japan (Hokkaido, Honshu, Kyushu, Tsushima); Europe northwards to England, S. Norway, S. Sweden and Leningrad; Transcaucasia, Khazakhstan, Tadzhikstan, S. Siberia; China.

Hosts: LEPIDOPTERA: Arctiidae: Arctia caja phaeosoma (BUTLER)[Hokkaido] (TAKANO, 1950, as Winthemia amoena); Geometridae: Tristrophis veneris (BUTLER) [Hokkaido]; Noctuidae: Celaena leucostigma (HÜBNER) [Obihiro, Hokkaido]; Notodontidae: Drymonia dodonides (STAUDINGER) [Sasayama, Honshu] (SHIMA, 1973, as Nemosturmia amoena).



Figs 45-46 Smidtia spp. Male head in profile; 45 trisetosa sp. n.; 46 fukushii sp. n.

Type material examined. Holotype male of *Tachina delitescens* WALKER, England (BMNH); holotype female of *Tachina certans* WALKER, England (BMNH).

DOI: 10.21248/contrib.entomol.46.1.169-235

Other specimens examined. 150 males 39 females from the following localities (all in BLKU): HOKKAIDO: Mts. Taisetu: Yukomanbetsu, Ten'ninkyo; Nukabira; Ashoro; Mt. Yubari; Mt. Apoi; HONSHU: Aomori: Mt. Bonju; Hirosaki, Zatoishi; Mt. Iwaki: Saitama: Moroyama; Yoshida; Kamikawa; Arakawa; Ogano; Minano; Ryokami; Tokigawa; Misato; Yorii: Niigata, Deya: Nagano: Shimashimadani; Shigakogen; Karuizawa: Yamanashi: Kanayama; TSUSHIMA: Mt. Ariake; Mt. Matsunashi; Kuwa; Sumo; KYUSHU: Fukuoka: Minami Park; Mt. Aburayama; Mt. Inunaki; Mt. Kusenbu; Mt. Sefuri: Mts. Kuju: Yoshibu; Mt. Kuroiwa: Kumamoto: Naidaijin, 650-800 m; Momiki-Gokanosho: Mts. Kirishima: Jingu-Yunono; Yunono: Is. Yaku, Miyanoura.

8. Smidtia laeta (MESNIL) comb. n. (Figs 40, 43, 66)

Nemosturmia laeta MESNIL, 1963: 5.

This species very closely resembles S. amoena, but in general has narrower frons, more yellowish pollinose head and more thinly pollinose abdomen than amoena. The width of frons, however, seems to vary significantly from individual to individual in both amoena and laeta, and differences in the color and density of pollinosity of the head and abdomen are rather minor, so these species can be distinguished with certainty only by the shape of the male cerci. I have seen some female which may belong to this species, but the identification of them is left for further study. Diagnostic characters of this species were given by MESNIL (1963).

Male genitalia: Resembling amoena; cerci in dorsal view very narrow, evenly narrowed to apex, in lateral view nearly straight, weakly bent ventrally at apex; surstylus in lateral view narrower than in amoena, evenly narrowed to blunt apex.

Distribution: Japan (Hokkaido, Honshu); Europe (France).

Type material examined. Holotype male of *Nemosturmia laeta* MESNIL, France, nr. Versaille, La Colle Sr Choud, 21.v.1939 (CNC).

Other specimens examined. HONSHU: 9 males, Nagano, Shimashimadani, 22-24.v.1975, A. Nakanishi & J. Emoto (Malaise trap)(BLKU).

9. *Smidtia harai* sp. n. (Figs 41, 44, 67)

Very closely resembling S. amoena but differing as follows.

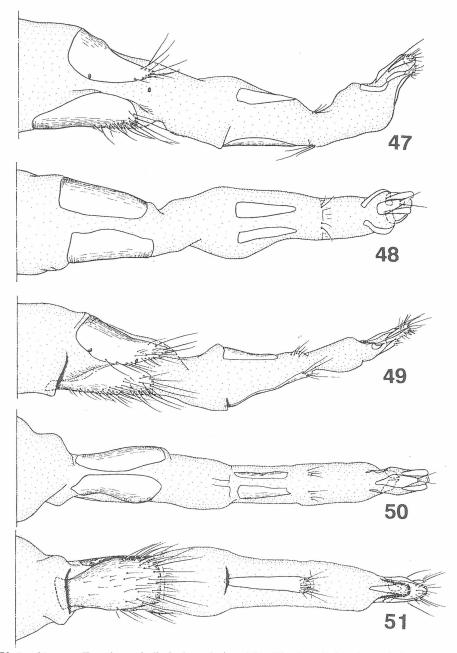
Male: Head dull yellowish white pollinose; vertex wide, frons at the narrowest point 0.13-0.17 of head width; gena wide, about 0.2 of eye height; parafacial more densely haired than in amoena; abdominal hairs longer and stronger than in amoena, long hairs on 4th abdominal tergum more than 1/2 length of 4th tergum. Male genitalia: Closely resembling amoena; cerci more distinctly narrowed to apex in dorsal view, in lateral view nearly straight and apex angularly bent ventrally; surstylus with dense long hairs, in lateral view narrower than in amoena.

Female: Unknown.

Body length, 7.3-12.3 mm; wing length, 7.0-9.2 mm.

Distribution: Japan (Honshu).

Holotype male, Honshu, Nagano, Karuizawa, Kutsukake, 9.vii.1966, H. Shima (BLKU).



Figs 47-51 Smidtia spp. Female genitalia in lateral view (47, 49), dorsal view (most hairs omitted) (48, 50) and ventral view (51): 47-48 conspersa; 49-51 gemina.

Paratypes: HONSHU: 1 male, Mt. Hakkoda, Okiagetani, 3.viii.1985, S. Fukushi; 1 male, Saitama, Mitsumine, 23.vii.1974, K. Hara; 6 males, same locality as holotype, 9-11.vii.1960, H. Shima; 1 male, same data as holotype except for collector, M. Honda; 1 male, Karuizawa, DOI: 10.21248/contrib.entomol.46.1.169-235

Nagahinata, 12.vii.1966, H. Shima; 3 males, Nagano, Shimashimadani, 4-5.vii.1966, H. Shima (all in BLKU).

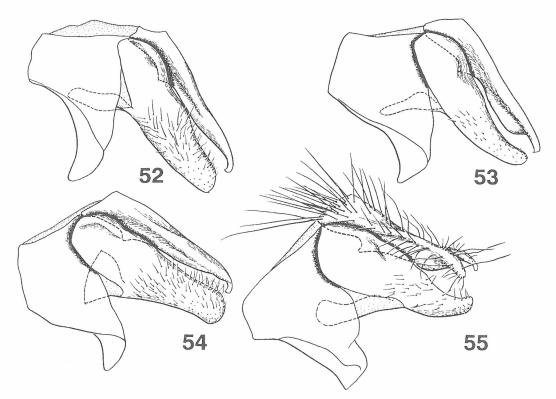
Remarks: This species very closely resembles S. amoena and laeta in general appearance, and differs from them mainly in its wider frons and gena. The male genitalia of this species also only slightly differ from those of amoena and laeta in the shape of the cerci. I think, however, these differences are enough to treat these species as distinct from each other. I have seen some females with a broader gena than the female of amoena, but the identification of them is left for further study.

10. *Smidtia gemina* (MESNIL) comb. n. (Figs 49, 50, 51, 52, 56, 68)

Nemosturmia gemina MESNIL, 1949: 75.

This species was originally described from China, and has also been collected in Japan. This species is peculiar among members of this genus in its black palpus.

Male genitalia: Cerci in dorsal view broad, nearly parallel-sided from basal 1/6 to 5/6, narrowed apically, in lateral view nearly straight, weakly curved ventrally at apex; surstylus broad, in lateral view weakly narrowed to blunt apex, with short and dense hairs on apical 1/2.



Figs 52-55 Smidtia spp. Epandrium, surstylus and cerci in lateral view (hairs on epandrium and cerci omitted except in 55): 52 gemina; 53 amurensis; 54 orientalis; 55 fukushii sp. n. DOI: 10.21248/contrib.entomol.46.1.169-235

Female: Differing from male as follows: Frons wide, vertex 0.27-0.29 of head width; outer vertical seta and 2-3 reclinate and 2 proclinate orbital setae developed; apex of palpus sometimes narrowly reddish brown; claws and pulvilli short. Female genitalia: Resembling *amoena*, but 6th tergum more broadly separated into 2 hemitergites, 7th hemitergites and sternum smaller.

Distribution: Japan (Honshu, Tsushima, Kyushu); Korea, China.

Specimens examined. HONSHU: 1 male, Tokyo, Mt. Takao, 8.vi.1971, R. Kano; 1 male, Niigata, Okutadami, 26.vii.1955, Y. Ohmori; 1 male, Niigata, Sado, Ryotsu, Akadamasugiike, 22.vii.1970, K. Baba; 1 female, Yamanashi, Amarisawa, 5.v.1975, T. Saigusa; 1 male, Ishikawa, Nomidani, 27.v.1977, I. Togashi (all in BLKU); 1 male, Kanazawa, Nodayama, ix.1964, H. Kurahashi (NIH); 1 male, Wakayama, Kozagawa, 14-20.v.1964, T. Kumata (EIHU); 1 male, Shimane, Mt. Sambe, 16.vi.1964, K. Buei (BLKU); TSUSHIMA: 1 female, Mt. Tatsura, 23.v.1968, H. Shima; KYUSHU: 1 female, Fukuoka, Aburayama, 15.viii.1987, H. Shima; 1 male, Fukuoka, Mt. Inunaki, 28.v.1982, H. Shima; 1 female, Fukuoka, Kuroki, 9.viii.1979, H. Shima; 1 male, Kagoshima, Lake Imuta, 16.v.1965, H. Shima (all in BLKU).

11. Smidtia amurensis (BORISOVA) comb. n. (Figs 53, 57, 69, 72, 73, 74)

Nemosturmia amurensis BORISOVA, 1962: 326.

Closely resembling S. amoena, but differing as follows.

Male: Fronto-orbital plate dark grayish; vertex wide, frons at the narrowest point 0.15-0.17 of head width; gena wide, 0.25-0.27 of eye height; antenna falling short of lower margin of face by only about 1/2 length of pedicel, 1st flagellomere about 2 times as long as pedicel; upper occiput with an irregular row of fine black hairs near vertex; scutellum dark reddish on at most apical 2/3, sometimes reddish only on median portion; wing with cells br, bm and cup more or less distinctly brownish tinged; wing vein M from dm-cu crossvein to its bend about 2 times distance between the bend and wing margin; abdominal dorsum thinly grayish white pollinose on anterior 3/5 of 3rd tergum and 2/3 of 4th; 5th abdominal tergum thinly grayish white pollinose on side, median portion broadly black.

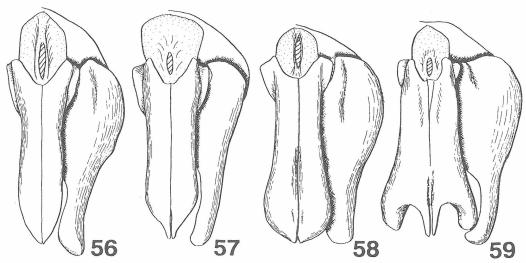
Male genitalia: Cerci resembling those of *gemina*, in lateral view more distinctly narrowed apically; surstylus in lateral view weakly curved dorsally, with very fine short hairs.

Female: Differing from female of *S. amoena* as follows: Gena wide, 0.26-0.29 of eye height; antennal pedicel about 1/2 as long as 1st flagellomere; occiput with several fine black hairs near vertex; wing distinctly tinged with brown as in male; dorsum of 5th abdominal tergum broadly black on median longitudinal portion. Female genitalia: 6th tergum reduced to 2 small hemitergites which are at most 2/3 as long as 6th sternum; 7th hemitergites still smaller, without hair. Body length, 6.9-11.5 mm; wing length, 6.3-10.2 mm.

Distribution: Japan (Hokkaido, Honshu); Far East Russia (Amur).

Specimens examined. HOKKAIDO: 1 male 1 female, Nukabira, 4.vii.1986, H. Shima (BLKU); 1 male 1 female (in copula), Mts. Daisetsu, Ten'ninkyo, 9-13.vii.1986, H. Shima; 1 female, Mts. Daisetsu, Yukomanbetsu, 10-13.vii.1986, H. Shima; 1 male, Ashoro, Berabonai, 5.vii. 1986, M. Abe; HONSHU: 1 male, Niigata, Mikuni Pass, 13.vii.1966, Y. Miyatake; 1 male, Gifu, Ontake, Nigorigo-onsen, 9.vii.1969, A. Nagatomi (all in BLKU).

Remarks: This species was described from Amur, Far East Russia. I have found specimens corresponding well to the original description of this species from Hokkaido and Honshu, Japan.



Figs 56-59 Smidtia spp. Epandrium, surstylus and cerci in dorsal view (hairs omitted): 56 gemina; 57 amurensis; 58 orientalis; 59 fukushii sp. n.

This species closely resembles *S. amoena*, *laeta* and *harai*, but may be distinguished from them by the broad gena, presence of fine black hairs on the upper occiput near the vertex, broadly black abdominal apex and dark male abdomen. The male genitalia of this species are also different from those of *amoena* in the broad and parallel-sided cerci.

12. Smidtia orientalis (BORISOVA) comb. n. (Figs 54, 58, 70)

Nemosturmia orientalis BORISOVA, 1962: 328.

Closely resembling S. amoena, but differing as follows.

Male: Frons narrow, 0.07-0.08 of head width at the narrowest point; all head setae fine, hairs long and dense; inner vertical seta 1/3-2/7 of eye height; ocellar and reclinate orbital setae fine, shorter than inner vertical seta, only slightly longer than postocellar seta; 16-18 frontal setae, upper ones hair-like; parafacial with dense and long hairs; abdomen with fine hairs; 2nd and 3rd abdominal terga each with 2-4 rather strong marginal setae in addition to strong median marginal setae.

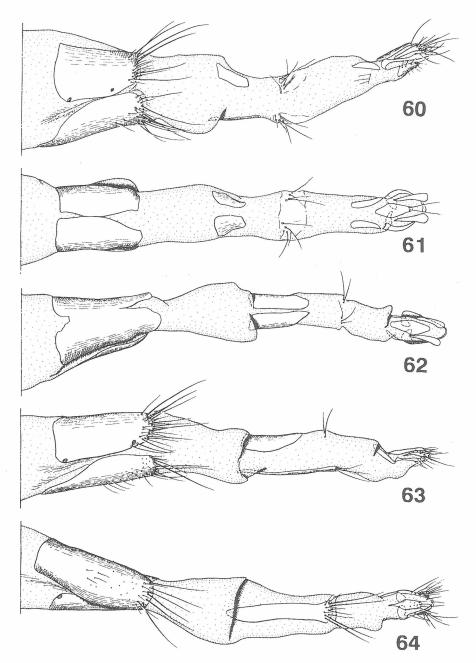
Male genitalia: Cerci in dorsal view broad, widened apically and rather rounded at apex, in lateral view bent ventrally at apex; surstylus broad, in lateral view weakly narrowed posteriorly, with short and dense hairs on dorsodistal portion.

Female: Unknown.

Body length, 10.9-11.2 mm; wing length, 9.4-9.5 mm.

Distribution: Japan (Honshu); Far East Russia (Primorye).

Specimens examined. HONSHU: 2 males, Nagano, Shimashimadani, 23.v.1975, A. Nakanishi & J. Emoto (Malaise trap) (BLKU).

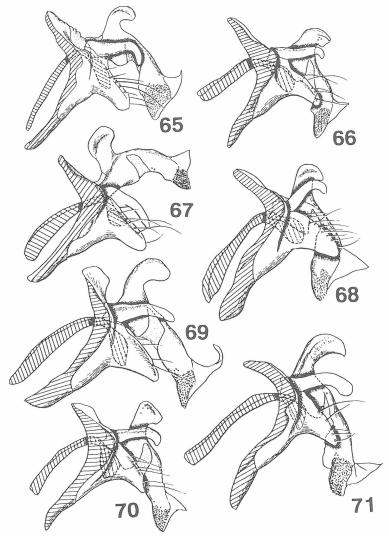


Figs 60-64 Smidtia spp. Female genitalia in lateral view (60, 63), dorsal view (most hairs omitted) (61-62) and ventral view (64): 60-61 japonica; 62-64 amoena.

Remarks: This species is peculiar in the broad cerci of the male genitalia, although in general appearance closely resembles *S. amoena* and related species mentioned above. This species may be distinguished from them by weak head setae and very narrow vertex in the male. This

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species was originally described from Primorye, Far East Russia, and is here recorded from Honshu.



Figs 65-71 Smidtia spp. Hypandrium, gonopod, paramere and aedeagus in lateral view: 65 amoena; 66 laeta; 67 harai sp. n.; 68 gemina; 69 amurensis; 70 orientalis; 71 fukushii sp. n.

13. *Smidtia fukushii* **sp. n.** (Figs 46, 55, 59, 71)

Resembling S. amoena, but differing as follows.

Male: Gena wide, 0.28-0.32 of eye height; all head setae fine; inner vertical setae crossing or converging each other, about 2/5 of eye height, only slightly longer than hairs around vertex; ocellar seta subequal in length to inner vertical seta and slightly longer than reclinate orbital

seta; lowest frontal seta nearly level with base of pedicel; parafacial hairs dense and long; occiput rather strongly bulged, with an irregular row of fine black hairs behind row of postocular setae; antenna with pedicel and base of 1st flagellomere broadly reddish, pedicel short, 1/2-2/5 as long as 1st flagellomere, 1st flagellomere falling short of lower margin of face by about length of pedicel.

Thorax with rather fine setae and long hairs; 2+3 acr setae; 0+3 ia setae; discal scutellar seta fine and hair-like, sometimes indistinct.

Wing long and wide, tinged with pale brown along veins, distinctly tinged along r-m crossvein; basal node of vein R4+5 with only 1 fine setula or none; relative lengths of costal sectors 2nd, 3rd and 4th approximately as 1:2:1; vein M from dm-cu crossvein to its bend about 2 times distance between the bend and wing margin.

Legs with tibiae pale brownish or yellowish brown on median portion; hind tibia with a row of fine hair-like ad setae, submedian seta strong.

Abdominal dorsum thinly whitish pollinose on 3rd tergum which contrasts with densely pollinose 4th tergum, densely grayish white pollinose on anterior 3/4 of 4th tergum and on almost entire 5th, apex of 5th tergum narrowly black; hairs long and dense, long hairs on mid dorsal area of 4th tergum about 4/5 as long as 4th tergum.

Male genitalia: Cerci in dorsal view broad, tripartite apically, with many long hairs; surstylus in lateral view narrowed apically and weakly curved dorsally, with only minute hairs.

Female: Unknown.

Body length, 9.7-11.6 mm; wing length, 9.0-11.0 mm.

Distribution: Japan (Honshu).

Holotype male, Honshu, Akita, Oga Pen., Mt. Shinzan, 4.v.1989, S. Fukushi (BLKU).

Paratypes: HONSHU: 3 males, same data as holotype (BLKU).

Remarks: This species is distinct in having fine setae and long and dense hairs on the body, densely pollinose dorsum of 4th and 5th abdominal terga which contrasts with thinly pollinose 3rd tergum, pale brownish tibiae, and long and wide wing.

Genus Winthemia ROBINEAU-DESVOIDY

Winthemia ROBINEAU-DESVOIDY, 1830: 173. Type species: Musca quadripustulata FABRICIUS, 1794, by designation of Desmarest in d'Orbigny, 1849 (after EVENHUIS & THOMPSON, 1990).

Dorbinia ROBINEAU-DESVOIDY, 1847: 272. Type species: Dorbinia ludibunda ROBINEAU-DESVOIDY, 1847 (= Musca quadripustulata FABRICIUS, 1794), by subsequent designation of ROBINEAU-DESVOIDY, 1863

Eversmannia ROBINEAU-DESVOIDY, 1863: 181. Type species: Eversmannia ruficauda ROBINEAU-DESVOIDY, 1863 (= Nemoraea erythrura MEIGEN, 1824), by original designation.

Arge ROBINEAU-DESVOIDY, 1863: 182. Preoccupied by Arge SCHRANK, 1802. Type species: Arge terminalis ROBINEAU-DESVOIDY, 1863 (= Musca quadripustulata FABRICIUS, 1794), by original designation.

Dorbinia of Townsend, 1941: 99 (nec Robineau-Desvoidy), 1847. Misidentification of Dorbinia ludibunda Robineau-Desvoidy, 1863.

Dorbiniella Mesnil, 1949: 85. As subgenus. New name for Dorbinia of Townsend, 1941 (nec Robineau-Desvoidy, 1847)

The genus Winthemia has well been recognized by the haired parafacial, absence of reclinate orbital setae in the male, rather quadrate or semicircular head shape, usually 1+1 katepisternal DOI: 10.21248/contrib.entomol.46.1.169-235

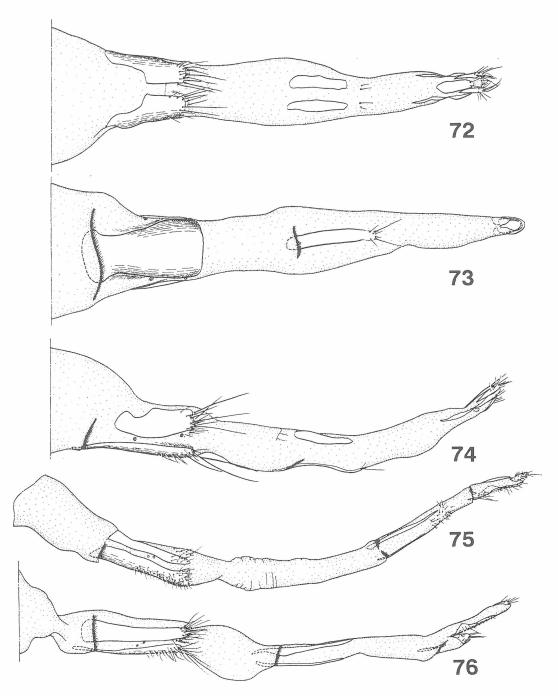
setae, and broadly truncated apex of the 5th abdominal tergum. In the male genitalia this genus is characterized by having long epiphallus and narrowly and backwardly curved dorsal membranous apex of distiphallus. In the female genitalia this genus is characterized by the reduction of the 7th abdominal sternum and 8th hemitergites (e.g. Figs 93, 119).

The genus Winthemia is widely distributed and very diverse in the world. Members of this genus are sometimes very similar to each other and difficult to identify species especially in females. Diagnostic keys are available for 8 European species (Tschorsnig & Herting, 1994), 11 Chinese species (Shima et al., 1992), 12 Oriental and Australasian species (Cantrell, 1989) and 26 North American species (Guimaraes, 1972; Sabrosky, 1973), but there still seem to remain many difficulties in identifying species and problems with the identities of some described species.

Key to Japanese species of Winthemia

1.	Anepisternum with dense and apically frizzled pale yellowish white hairs behind row of
	anepisternal setae
-	Anepisternum without pale yellowish hairs
2.	Males
-	Females (female of remittens unknown)
3.	Second and 3rd abdominal terga each with strong median marginal setae; abdomen without
	distinct hair fascicles on venter of 4th and 5th terga; vertex wide, slightly wider than 1/4
	of head width marginalis SHIMA, CHAO et ZHANG
-	2nd and 3rd abdominal terga without median marginal setae; venter of 4th and 5th
	abdominal terga each with a pair of broad hair fascicles of dense and long hairs; vertex
	narrow, 1/5 of head width or much narrower
4.	Claws and pulvilli short, fore claw and pulvillus at most as long as 5th tarsomere; 1+1
	katepisternal setae
-	Claws and pulvilli distinctly longer than 5th tarsomere; usually 2+1 katepisternal setae
_	remittens (WALKER)
5.	Vertex about 2/7 of head width; parafacial mostly with black hairs; prosternum with
	whitish hairs mixed with several black ones; abdominal apex black
	marginalis SHIMA, CHAO et ZHANG
-	Vertex about 1/4 of head width; parafacial hairs mostly whitish; prosternum with fine
	whitish hairs; abdominal apex usually reddish
6.	Males
-	Females (females of brevipennis and ikezakii unknown)
7.	Abdomen with a pair of hair fascicles at least on venter of 4th tergum
-	Abdomen without hair fascicles
8.	Hair fascicles present only on venter of 4th abdominal tergum, small and roundish; vertex
	narrow, less than 1/6 of head width sumatrana (Townsend)
-	Hair fascicles present on both 4th and 5th terga, larger, though sometimes sparse; vertex
	wider, about 1/5 of head width or more
9.	Vertex about 0.2 of head width; thorax dark brown in ground color, thinly grayish white
	pollinose on dorsum angusta SHIMA, CHAO et ZHANG
-	Vertex wider, 0.22-0.27 of head width; thorax more densely pollinose 10 DOI: 10.21248/contrib.entomol.46.1.169-235

10. - 11.	Thorax and abdomen densely golden yellowish pollinose venustoides (MESNIL Thorax and abdomen grayish white or pale yellowish white pollinose
12.	Vertex about 0.27 of head width; vibrissa inserted above level of lower margin of face by about 1/2 length of pedicel; thorax pale yellowish white pollinose on dorsum; wing short about 1.5 times as long as abdomen brevipennis sp. n Vertex about 0.23-0.25 of head width; vibrissa nearly level with lower margin of face thoracic dorsum grayish white pollinose; wing longer, about 1.8 times as long as abdomen
13.	Mid tibia with 3 strong ad setae; 3rd abdominal tergum with 2-4 strong median margina setae; thorax rather thinly grayish white pollinose on dorsum cruentata (Rondani) Mid tibia with only 1 ad setae; 3rd abdominal tergum usually without median margina seta; thoracic dorsum very thinly dark grayish pollinose or thinly grayish white pollinose
14.	First flagellomere shorter than 2 times length of pedicel; vertex 0.22-0.24 of head width 5th abdominal tergum densely whitish pollinose on anterior 2/3-3/4 . venusta (MEIGEN) 1st flagellomere about 2.5 times as long as pedicel; vertex 0.19-0.21 of head width
15.	Thorax broadly blackish dorsally, postpronotal lobe, notopleural area and supra-alar area dark golden yellow or grayish yellow pollinose, no distinct longitudinal vittae; 5th abdominal tergum rather thinly whitish pollinose on anterior 1/2; gena narrow, 0.13-0.15 of eye height; lower calypter brownish
16. - 17. - 18.	Mid tibia with 2-3 ad setae; abdominal apex more or less reddish
19.	Abdomen broadly reddish brown in ground color; 5th abdominal tergum entirely pale yellowish white pollinose; 1st flagellomere about 2.5 times as long as pedicel
-	Abdomen broadly black in ground color; 5th abdominal tergum not pollinose and exposing black ground color on apical 1/2; 1st flagellomere at most 2 times as long as pedicel



Figs 72-74 Smidtia amurensis. - Fig. 75 Crypsina prima. - Fig. 76 Nemorilla floralis. Female genitalia in dorsal view (72), ventral view (most hairs omitted) (73) and lateral view (74-76).

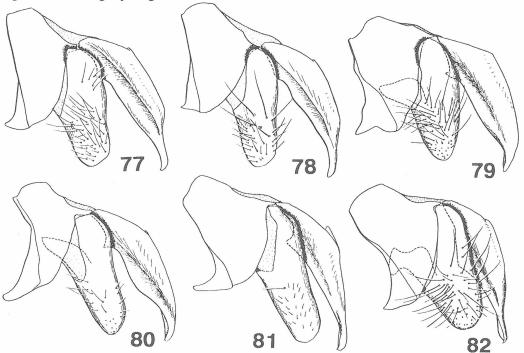
1. Winthemia venusta (MEIGEN) (Figs 77, 78, 83, 84, 93, 94)

Tachina venusta Meigen, 1824: 327. Chaetolyga cilitibia Rondani, 1859: 109.

Winthemia hokkaidensis BARANOV, 1939: 110. Syn. nov.

This is one of the most common species of Winthemia in Japan and northern and central China, though it is said to be difficult to find in Europe (MESNIL, 1949). Adults are found from May to September, but most abundant in mid summer.

Male: Fronto-orbital plate and upper parafacial densely yellowish pollinose, upper fronto-orbital plate sometimes black, lower portion of parafacial and face whitish pollinose, genal dilation and occiput grayish or dull yellowish gray pollinose; antenna brown-black, narrowly reddish on basal portion of 1st flagellomere; palpus reddish yellow. Vertex 0.2-0.22 of head width; frontal vitta only slightly wider than fronto-orbital plate at middle; parafacial subequal in width to 1st flagellomere; gena 0.16-0.18 of eye height. Outer vertical seta about 2/3 as long as inner seta; 12-14 frontal setae, lowest seta nearly level with apex of pedicel; parafacial with 3-4 rows of fine short black hairs; vibrissa nearly level with lower margin of face. Antenna falling short of lower margin of face by about 1/2 length of pedicel; 1st flagellomere about 1.8-2 times as long as pedicel, about 2.5 times as long as wide. Palpus rather weakly clavate, about as long as 1st flagellomere or slightly longer.



Figs 77-82 Winthemia spp. Epandrium, surstylus and cerci in lateral view (hairs on epandrium and cerci omitted): 77 venusta from Hokkaido; 78 venusta from Kyushu; 79 mediocris sp. n.; 80 speciosa; 81 venustoides; 82 cruentata.

Thorax black in ground color, reddish yellow or pale brownish on scutellum; dorsum broadly black or thinly dark brownish pollinose, postpronotal lobe and notopleural and intra-alar regions rather densely grayish white pollinose, pleura thinly grayish white pollinose; broad median and rather narrow outer longitudinal black vittae visible on dorsum when seen from behind. Hairs fine dense and black.

Wing hyaline, slightly tinged with pale brown on anterior portion; lower calypter pale yellowish white. Relative lengths of costal sectors 2nd, 3rd and 4th approximately as 1.5:2.5:1; vein M from dm-cu crossvein to its bend slightly longer than distance between the bend and wing margin.

Legs black, pulvilli pale brownish. Mid tibia with 1 ad and 2 pd setae, the latter rather short; hind tibia with a rather closely set row of ad setae, without strong submedian seta among them. Claws and pulvilli very long.

Abdomen broadly black in ground color, reddish on side of 3rd and 4th terga and sometimes on apex of 5th; dorsum densely and broadly white or pale yellowish white pollinose, black on syntergum 1+2 and narrow posterior portion of each 3rd to 5th terga; venter thinly whitish pollinose. Hairs dense fine short and recumbent on 3rd and 4th terga, suberect on 5th; 3rd tergum usually without median marginal setae; venter without hair fascicle.

Male genitalia: Cerci in lateral view rather flat, in dorsal view narrowly separated from each other on apical 1/6-1/7; surstylus in lateral view nearly parallel-sided or weakly narrowed posteriorly, with rather long and dense hairs.

Female: Differing from male as follows: Fronto-orbital plate and narrow upper parafacial densely pale yellowish white pollinose, lower parafacial, face, gena and occiput whitish pollinose; vertex 0.29-0.32 of head width; inner and outer vertical and ocellar setae distinctly stronger than in male; 1 reclinate and 2 proclinate orbital setae present; 8-10 frontal setae; hairs on fronto-orbital plate and parafacial sparser; parafacial slightly narrower than 1st flagellomere; 1st flagellomere 2-2.2 times as long as pedicel, about 2.3 times as long as wide; palpus clavate, yellowish; thoracic dorsum densely pale yellowish white pollinose, with 5 longitudinal black vittae, median vitta sometimes disappearing, pleura rather thinly grayish white pollinose; hind tibia with a row of ad setae more sparsely set than in male and a strong submedian seta; claws and pulvilli short; 2nd and 3rd abdominal terga each with 2 strong median marginal setae; 5th abdominal tergum black on posterior 1/3. Female genitalia: 6th hemitergite strongly narrowed on posterior 1/2; 7th hemitergite short and narrow; 7th sternum absent; 8th hemitergite indistinct; epiproct with a pair of very fine apical hairs.

Distribution: Japan (Hokkaido, Honshu, Kyushu); Palearctic.

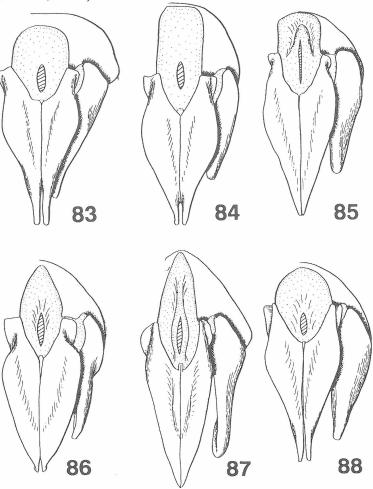
Hosts: LEPIDOPTERA, Geometridae: Ascotis selenaria cretacea (BUTLER) [Ishikawa, Honshu] (TOGASHI, 1985); Notodontidae: Stauropus fagi persimilis BUTLER [Ishikawa, Honshu], Torigea straminea (MOORE) [Hakone, Honshu].

Type material examined. Holotype female of Winthemia hokkaidensis BARANOV, Hokkaido, Sapporo, 10.ix.1923, S. Takano (USNM).

Other specimens examined. 151 males 38 females from the following localities: HOKKAIDO: Shibecha; Nukabira; Ashoro; Shotoshibetsu; Aizankei; Ten'ninkyo; Mt. Antaroma; Obihiro; Mt. Apoi; HONSHU: Aomori: Shimokita; Natsudomari Pen.; Mt. Iwaki; Hirosaki City; Aomori City: Saitama: Yorii; Mitsumine; Chichibu; Ogose; Ryokami; Moroyama; Mt. Buko (all in BLKU); Hakone (NIAS): Nagano: Shimashimadani; Kamikochi: Ishikawa: Itaodani; Tsurugi: Niigata: Kurokawa; KYUSHU: Fukuoka: Mt. Aburayama; Mt. Inunaki; Mt. Wakasugi; Mt. Kusenbu: Nagasaki: Mt. Tara; Hirado Is.; Matsuura: Kagoshima: Mt. Kirishima; Kagoshima

City; Cape Sata; Is. Yaku (all in BLKU).

Remarks: In Hokkaido there seems to occur two forms of this species, i.e. usual form with densely pollinose abdomen and apparently dark form: the dark form has a grayish white pollinose head and thinly grayish white pollinose abdomen in both sexes; males sometimes bear 2-4 weak but distinct median marginal setae on the 3rd abdominal tergum; the male vertex is also slightly wider than in usual form. I treat both as conspecific, because I can find no distinct difference in the male genitalia of both forms. The dark form is mainly found in early July. Among specimens from Hokkaido and Kyushu there is a slight difference in the shape of the male cerci (Figs. 77-78, 83-84).



Figs 83-88 Winthemia spp. Epandrium, surstylus and cerci in dorsal view (hairs omitted): 83 venusta from Hokkadio; 84 venusta from Kyushu; 85 mediocris sp. n.; 86 speciosa; 87 venustoides; 88 cruentata.

2. Winthemia mediocris sp. n. (Figs 79, 85, 89, 99)

Male: Head whitish pollinose, fronto-orbital plate pale yellowish white and darkened toward vertex; vertex 0.2-0.21 of head width; frontal vitta about 2 times as wide as fronto-orbital plate at middle; antenna reddish on apical portion of pedicel and basal 1/2-1/3 of 1st flagellomere, 1st flagellomere about 2.8 times as long as pedicel; thoracic dorsum rather densely pale brownish gray or grayish pollinose on postpronotal lobe, presutural area and broad supra-alar area of postsutural scutum, very thinly brownish pollinose on median and posterior portion of postsutural scutum, with 5 broad longitudinal vittae, outer vitta distinctly wider than pollinose portion between inner and outer vittae on postsutural area; abdomen broadly reddish yellow in ground color, densely whitish pollinose.

Male genitalia: Cerci in dorsal view rather evenly narrowed from basal 1/2 to apex, in lateral view weakly curved ventrally at apex; surstylus broad and rounded apically, with many long hairs; distiphallus rather narrow in lateral view.

Female: Unknown.

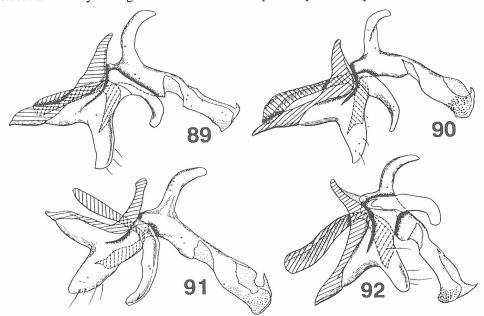
Body length, 9.0-9.2 mm; wing length, 7.2-7.4 mm.

Distribution: Japan (Hokkaido, Honshu).

Holotype male, Hokkaido, Ashoro, Berabonai, 24.vii.1967, H. Shima (BLKU).

Paratype: HONSHU: 1 male, Yamanashi, Kanayama, 21.vii.1970, M. Honda (BLKU).

Remarks: This species seems to be intermediate in many characters between *W. venusta* and *W. speciosa*. It is easily distinguished from these two species by the well pollinose thoracic dorsum.



Figs 89-92 Winthemia spp. Hypandrium, gonopod, paramere and aedeagus in lateral view: 89 mediocris sp. n.; 90 speciosa; 91 venustoides; 92 cruentata.

3. Winthemia speciosa (EGGER) (Figs 80, 86, 90)

Nemoraea speciosa EGGER, 1861: 209.
Winthemia speciosissima MESNILDd 29:48/contrib.entomol.46.1.169-235

Male: Fronto-orbital plate densely yellowish pollinose, upper 1/3-1/4 black, parafacial, face and occiput whitish pollinose, genal dilation grayish pollinose; antenna brown-black, narrowly reddish on basal portion of 1st flagellomere; palpus yellow. Vertex about 0.2 of head width; frontal vitta about 2 times as wide as fronto-orbital plate at middle; parafacial 2/3 as wide as 1st flagellomere at middle height; gena about 0.16 of eye height, outer vertical seta about 2/3 as long as inner seta; 12-13 frontal setae, lowest seta inserted slightly below level of middle of pedicel; parafacial with 2-3 rows of fine short black hairs; vibrissa inserted slightly above level of lower margin of face. Antenna falling short of lower margin of face by about 5/6 length of pedicel; 1st flagellomere about 2.3-2.5 times as long as pedicel, 3 times as long as wide. Palpus rather clavate, about as long as 1st flagellomere.

Thorax black in ground color, reddish brown on scutellum; dorsum broadly black, dark brownish pollinose on postpronotal lobe, notopleural and intra-alar regions, posterior 1/4 of postsutural scutum and pleura; longitudinal vittae indistinct.

Wing hyaline, slightly tinged with pale brown on anterior portion; lower calypter pale brownish. Relative lengths of costal sectors 2nd, 3rd and 4th approximately as 1.5:2:1; vein M from dm-cu crossvein to its bend slightly shorter than 1.5 times distance between the bend and wing margin.

Legs black, pulvilli pale brownish. Mid tibia with 1 ad and 2 pd; hind tibia with a closely set row of ad setae, without strong submedian seta among them. Claws and pulvilli very long.

Abdomen broadly black in ground color, reddish on side of 3rd and 4th; dorsum very densely silvery white or pale yellowish white pollinose, the pollinosity thinner on 5th tergum; narrow posterior portion of 4th tergum and posterior 1/2-1/3 of 5th black; venter thinly grayish white pollinose. Hairs dense fine short and suberect on 3rd and 4th terga, erect on 5th; 2nd and 3rd terga without median marginal setae; venter without hair fascicle.

Male genitalia: Cerci in dorsal view broad and rather rounded, narrowly separated from each other on apical portion; surstylus only with several fine short hairs; epiphallus rather small; distiphallus with distinct spinules on apical portion.

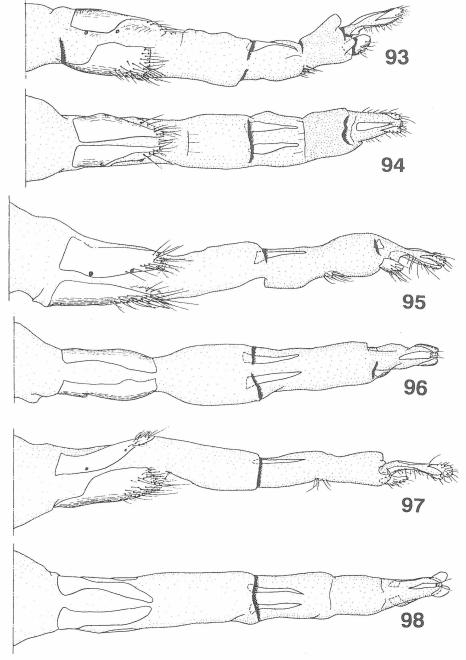
Female: Differing from male as follows: Head densely yellowish or golden yellowish pollinose, lower parafacial, face, gena and occiput pale yellowish white; vertex 0.3-0.32 of head width; frontal vitta only slightly wider than fronto-orbital plate at middle; inner and outer vertical and ocellar setae very strong; 1 reclinate and 2 proclinate orbital setae present; 8-10 frontal setae; hairs on fronto-orbital plate and parafacial sparser; vibrissa nearly level with lower margin of face; parafacial slightly more than 1/2 width of 1st flagellomere at middle height; 1st flagellomere broadly reddish at basal portion and broader than in male, about 3 times as long as pedicel and about 2 times as long as wide; palpus more strongly clavate, yellowish; thoracic dorsum densely yellowish pollinose, with 4 rather narrow longitudinal black vittae, pleura densely yellowish white pollinose; hind tibia with a row of ad setae more sparsely set than in male and a strong submedian seta; claws and pulvilli short; abdomen broadly reddish yellow in ground color, black on mid dorsal longitudinal area, dorsum densely yellowish pollinose; 2nd and 3rd abdominal terga each with 2 strong median marginal setae.

Distribution: Japan (Honshu); Europe, Mongolia.

Type material examined. Holotype male of Winthemia speciosissima MESNIL, Bois St. Martin, Versailles, France, 27.viii.1936 (CNC).

Other specimens examined. HONSHU: 1 male, Aomori, Nishimeya, Tashiro, 16.vii.1972, S. Fukushi; 1 male, Niigata, Murakami, 16.vii.1966, Y. Miyatake; 1 male, Niigata, Mt. Atema, 14.vii.1976, M. Honda; 1 male, Ishikawa, Oshimizu-machi, Sogo, 13.viii.1990, I. Togashi; 1

female, Kanazawa City, Tsukiura, 9.ix.1990, I. Togashi; 1 male, Nara, Yamatokamiichi, 21.vi.1964, S. Shinonaga (all in BLKU).



Figs 93-98 Winthemia spp. Female genitalia in lateral view (93, 95, 97) and dorsal view (most hairs omitted in 96 and 98) (94, 96, 98): 93-94 venusta; 95-96 venustoides; 97-98 cruentata.

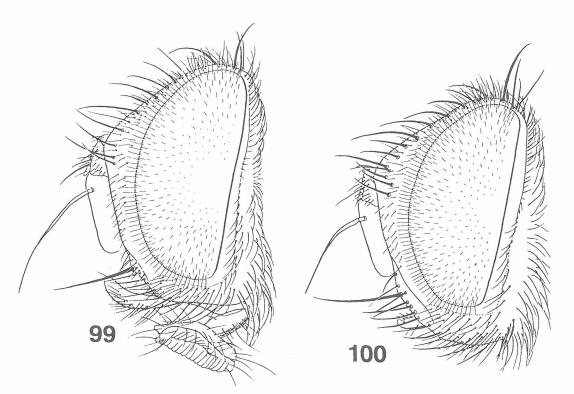
Remarks: The male of this species may be easily distinguished from other species by the antenna with long 1st flagellomere and very densely silvery white or pale yellowish white pollinose abdomen which contrasts with the black thorax. The female, however, closely resembles W. venustoides MESNIL and is only slightly different in the length of the antenna as mentioned in the key.

4. Winthemia venustoides MESNIL (Fig. 81, 87, 91, 95, 96)

Winthemia venustoides MESNIL, 1967: 39.

This species was originally described from Hokkaido, and I have seen specimens from several localities in Honshu and Kyushu and from China.

Male: Head yellowish or golden yellowish pollinose, paler on parafacial and face; antenna brown, reddish on basal portion of 1st flagellomere; palpus yellow. Vertex 0.21-0.25 of head width; parafacial subequal in width to 1st flagellomere; gena about 1/5 of eye height. Outer vertical seta fine; 10-12 frontal setae; parafacial with 2-3 rows of fine short black hairs on anterior portion; vibrissa nearly level with lower margin of face. Antenna falling short of lower margin of face by about 4/5 length of pedicel; 1st flagellomere about 3 times as long as pedicel. Palpus clavate, nearly as long as 1st flagellomere.



Figs 99-100 Winthemia spp. Male head in profile: 99 mediocris sp. n.; 100 ikezakii sp. n. DOI: 10.21248/contrib.entomol.46.1.169-235

Thorax black in ground color, reddish yellow on scutellum; dorsum densely yellowish or pale grayish yellow pollinose, pleura grayish white pollinose; 4 longitudinal black vittae present on dorsum, inner vitta distinctly narrower than pollinose portion between inner and outer vittae.

Wing hyaline, slightly tinged with pale brown on anterior portion. Relative lengths of costal sectors 2nd, 3rd and 4th approximately as 2:3:1.5; bend of vein M about equidistant between dm-cu crossvein and wing margin.

Legs black, pulvilli pale brownish. Mid tibia with 1 ad and 2 pd setae, the latter short and sometimes indistinct; hind tibia with a closely set row of ad setae, without strong submedian seta among them. Claws and pulvilli very long.

Abdomen broadly reddish yellow in ground color, black on mid dorsal longitudinal portion of syntergum 1+2 to 4th tergum, narrow posterior portion of 4th and entire 5th except apex; dorsum densely yellowish or golden yellow pollinose, venter thinly whitish pollinose on narrow anterior portion of 3rd and 4th terga. Hairs dense fine and short; 2nd and 3rd terga without median marginal setae; venter of 4th and 5th terga each with a pair of broad hair fascicles of dense and long hairs.

Male genitalia. Cerci in dorsal view evenly tapering to apex, in lateral view nearly straight; surstylus rather broad in lateral view, with sparse fine short hairs; epiphallus weakly curved posteriorly near middle; distiphallus with very fine spinules.

Female: Differing from male as follows: Parafacial and face whitish pollinose contrasting with yellow or golden yellow pollinose fronto-orbital plate; vertex 0.28-0.31 of head width; inner and outer vertical and ocellar setae distinctly stronger than in male; 1 reclinate and 2 proclinate orbital setae present; 8-10 frontal setae; parafacial almost 3/5 as wide as 1st flagellomere; 1st flagellomere about 3.5 times as long as pedicel; palpus strongly clavate; mid tibia with 2-3 strong p setae; hind tibia with a row of ad setae more sparsely set than in male and a strong submedian seta; claws and pulvilli short; 2nd and 3rd abdominal terga each with 2 strong median marginal setae; abdominal venter without hair fascicles. Female genitalia: 6th hemitergite rather broad; 7th hemitergite small; ventral area of 7th hemitergites very weakly sclerotized, with several hairs; 8th hemitergite very small, triangular; epiproct with several fine hairs.

Body length, 6.6-13.5 mm; wing length, 5.2-9.6 mm.

Distribution: Japan (Hokkaido, Honshu, Kyushu); China (Beijing).

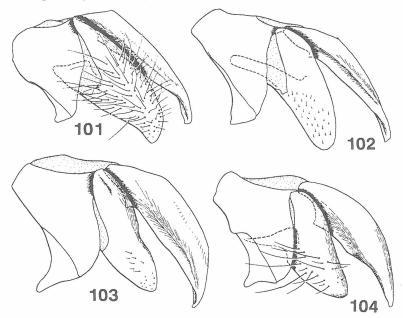
Type material examined. Holotype male of Winthemia venustoides MESNIL, Tsukisappu nr. Sapporo, Hokkaido, 19.viii.1961 (CNC).

Other specimens examined. HOKKAIDO: 1 male, Shibecha, Shirarutoro, 1.viii.1967, M. Honda (BLKU); 1 female, Obihiro, Inada, 5.ix.1949, S. Takano (EIHU); 1 female, Kamuikotan, 8.viii.1964, K. Kusigemati (BLKU); HONSHU: 1 female, Mt. Iwaki, 13.ix.1981, S. Fukushi; 1 female, Aomori, Asamushi, 18.x.1980, S. Fukushi; 1 male, Niigata, Kurokawa, 9.viii.1967, K. Baba; 2 females, Saitama, Moroyama, 12.vii.1981, 6.ix.1979, N. Tamaki (all in BLKU); 2 males, Mt. Asama, 11.viii.1976, H. Kurahashi (BLKU, NIH); KYUSHU: 1 male 6 females, Fukuoka, Aburayama, 24.vii.1991, 5.viii.1989, 15.viii.1987, 8.x.1988, 13.x.1988, H. Shima (BLKU).

5. Winthemia cruentata (RONDANI) (Figs 82, 88, 92, 97, 98)

Chaetolyga cruentata RONDANI, 1859: 106. Winthemia lingusti STEIN, 1924: 59.

Japanese specimens of this species seem darker in the body color than specimens from Europe. This species has been known as a gregarious parasitoid of *Sphinx ligustri* in Europe, and I have seen specimens reared from a sphingid larva and a noctuid larva in Japan. Detailed redescription of this species is given by MESNIL (1949).



Figs 101-104 Winthemia spp. Epandrium, surstylus and cerci in lateral view (hairs on epandrium and cerci omitted): 101 ikezakii sp. n.; 102 brevipennis sp. n.; 103 miyatakei sp. n.; 104 mallochi.

Male genitalia: Cerci in lateral view flat, in dorsal view broad at base and narrowed posteriorly, narrowly separated from each other on apical portion; surstylus in lateral view broad, rounded apically, with dense long hairs; distiphallus with rather distinct spinules on apical portion.

Female genitalia: 6th hemitergite rather narrow; 7th hemitergite very small; 7th sternum absent, several hairs present on membrane of ventral area of 7th segment; 8th tergum very weak, sometimes indistinct.

Distribution: Japan (Hokkaido, Honshu, Kyushu); Palearctic Region.

Hosts: LEPIDOPTERA, Noctuidae: Autographa gamma (LINNÉ) (KANEKO & KONISHI, 1995) [Sapporo, Hokkaido]; Sphingidae: Sphinx constricta BUTLER [Kurume, Kyushu].

Specimens examined: HOKKAIDO: 4 males, Ashoro, Berabonai, 5.vii.1986, H. Shima; 1 male 3 females, Berabonai, 21-24.vii.1967, H. Shima; 1 male, Ashorobuto, 29.vii.1967, M. Honda; 1 female, Mt. Taisetsu, Aizankei, 5.viii.1967, A. Nakanishi; 1 female, Hitsujigaoka, Sapporo, 8.x.1992 emg., ex *Autographa gamma* larva, J. Kaneko; HONSHU: 1 male, Hirosaki City, Zatoishi, 16.viii.1980, S. Fukushi; 2 males, Niigata, Jigami, 9.viii.1972, K. Baba; 1 male, Saitama, Mt. Buko, 24.vii.1971, K. Hara; 1 male, Saitama, Yokose, 25.vii.1971, K. Hara; 1 male, Saitama, Kamisaka, 19.v.1973, K. Hara; 1 male, Saitama, Otaki, 16.vi.1974, K. Hara; 1 female, Saitama, Moroyama, 14.x.1979, N. Tamaki; 1 male, Nagano, Shimashimatani, 22.v.1975, A. Nakanishi; 2 females, Yamanashi, Kanayama, 24.vii.1986, 24.vii.1970, H.

Shima, M. Honda; KYUSHU: 2 males, Fukuoka, Mt. Aburayama, 14.v.1989, 23.vi.1990, H. Shima; 2 males 2 females, Fukuoka, Kurume, 8-19.xi.1984 emg. ex *Sphinx constricta* larva, N. Gyotoku; 5 males 1 female, Kumamoto, Naidaijin, 650-800 m, 10.v.1967, H. Shima (all in BLKU).

6. Winthemia angusta Shima, CHAO et ZHANG (Figs 113, 114)

Winthemia angusta SHIMA, CHAO et ZHANG, 1992: 220.

This species is rather widely distributed throughout China and Japan. For details see SHIMA et al. (1992).

Female genitalia: Rather short and broad, intersegmental membrane between 6th and 7th segments short; 7th tergum reduced to a pair of small triangular sclerites, without hair; 7th sternum absent; epiproct rather broad, with a pair of setulae.

Distribution: Japan (Honshu, Kyushu); China.

Hosts: LEPIDOPTERA: Sphingidae; *Dolbina tancrei* STAUDINGER [Kobe, Honshu], *Smerinthus planus* WALKER [Kobe, Honshu] (SHIMA, et al. 1992).

7. Winthemia ikezakii sp. n. (Figs 100, 101, 105, 109)

Male: Head whitish pollinose, fronto-orbital plate pale yellowish gray; antenna black, apex of pedicel and base of 1st flagellomere reddish. Vertex 0.23-0.25 of head width; frontal vitta about 1.5 times as wide as fronto-orbital plate at middle; parafacial 1.3-1.5 times as wide as 1st flagellomere at middle height; gena about 1/5 of eye height. Inner vertical seta strong; outer vertical seta developed, slightly shorter than ocellar seta; 11-13 frontal setae, lowest seta nearly level with apex of pedicel, a row of several setae present outside the row of frontal setae near base of antenna; fronto-orbital plate with dense black hairs; parafacial with 2-3 rows of rather sparse black hairs on anterior 1/2; vibrissa nearly level with lower margin of face. Antenna falling short of lower margin of face by about length of pedicel; 1st flagellomere about 2.5 times as long as pedicel.

Thorax rather densely grayish white pollinose; dorsum with 4 longitudinal vittae, inner vitta slightly narrower than pollinose portion between inner and outer vittae on postsutural scutum. All hairs black; anepisternum with rather dense apically frizzled hairs behind row of anepisternal setae.

Wing hyaline; lower calypter white, slightly tinged with pale brown. Relative lengths of costal sectors 2nd, 3rd and 4th approximately as 1.5:2:1; bend of vein M about equidistant between dm-cu crossvein and wing margin.

Legs black; pulvilli pale brownish. Mid tibia with 1 ad seta; hind tibia with a closely set row of ad setae, without strong submedian seta; claws and pulvilli long.

Abdomen black in ground color, broadly reddish on side and venter of 2nd to 4th terga; dorsum of 3rd to 5th terga rather densely grayish white pollinose, posterior 1/6 of 3rd tergum, 1/5 of 4th and 1/3 of 5th black; venter of syntergum 1+2 and 3rd tergum thinly whitish pollinose.

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Hairs dense fine and recumbent on syntergum 1+2 to 4th tergum, suberect on 5th; no median marginal seta on 2nd and 3rd terga; venter of 4th and 5th terga each with a pair of broad hair fascicles of dense and long hairs.

Male genitalia: Cerci long, in dorsal view rather narrow and weakly tapering to apex, narrowly separated from each other on apical 1/4 portion, in lateral view weakly bent ventrally; surstylus in lateral view broad, narrowed to apex, with dense fine long hairs; distiphallus rather narrow in lateral view.

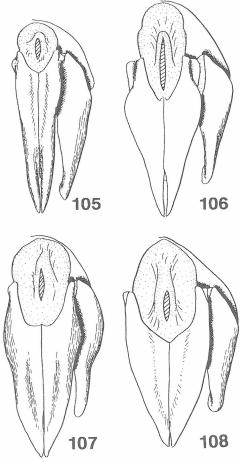
Female: Unknown.

Body length, 10.5-10.7 mm; wing length, 7.9-8.1 mm.

Distribution: Japan (Kyushu).

Holotype male, Kyushu, Nagasaki, Matsuura, 5.vi.1966, Y. Ikezaki (BLKU). Paratype: KYUSHU: 1 male, same as holotype except date, 8.vi.1966 (BLKU).

Remarks: This is a distinct species well separable from the other species by rather densely pollinose abdomen, broad vertex, parafacial and gena and broad hair fascicles on venter of 4th and 5th abdominal terga in the male.



Figs 105-108 Winthemia spp. Epandrium, surstylus and cerci in dorsal view (hairs omitted): 105 ikezakii sp. n.; 106 brevipennis sp. n.; 107 miyatakei sp. n.; 108 mallochi.

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8. Winthemia brevipennis sp. n. (Figs 102, 106, 110)

Male: Closely resembling W. ikezakii, but differing as follows: Head pale yellowish white pollinose, more yellowish on fronto-orbital plate; vertex wide, about 0.27 of head width; no additional row of setae outside row of frontal setae; vibrissa inserted above level of lower margin of face by about 1/2 length of pedicel; 1st flagellomere about 3 times as long as pedicel; thoracic dorsum pale yellowish gray pollinose, with 5 longitudinal vittae, middle vitta very narrow; wing short, about 1.5 times as long as abdomen; abdomen broadly reddish, black on anterior and mid dorsal portions of syntergum 1+2, mid dorsal longitudinal portion of 3rd tergum, mid dorsal and posterior 1/3 of 4th, anterior 1/2 of 5th; abdominal dorsum pale yellowish gray pollinose on anterior 2/3 of 3rd tergum, 3/4 of 4th and 1/2 of 5th. Male genitalia: Resembling venustoides; cerci in lateral view flat, in dorsal view rather well separated from each other on apical portion; surstylus in lateral view rather long and broad, rounded apically, with very fine short hairs; distiphallus with very fine spinules.

Female: Unknown.

Body length, ca. 12.3 mm; wing length, ca. 8.5 mm.

Distribution: Japan (Honshu).

Holotype male, Honshu, Saitama, Ogose, 1.viii.1977, T. Nambu (BLKU).

Remarks: This species seems to be closely allied to W. ikezakii and miyatakei, but is distinct in having shorter wings in comparison with body length.

9. Winthemia miyatakei sp. n. (Figs 109, 107, 111)

Male: Closely resembling W. ikezakii, but differing in the following points: Vertex narrower, about 0.22 of head width; frontal vitta only slightly wider than fronto-orbital plate; parafacial about 3/5 as wide as 1st flagellomere at middle height; gena narrower, about 0.18 of eye height; antenna falling short of lower margin of face by about 3/5 length of pedicel, 1st flagellomere about 3 times as long as pedicel. Male genitalia: Cerci in dorsal view broad, evenly narrowed to apex, narrowly separated from each other at apex, in lateral view weakly curved ventrally near apex; surstylus short, in lateral view narrowed to apex, with several very short fine hairs; distiphallus with rather strong spinules on apical and ventral portion.

Female: Unknown.

Body length, ca. 7.5 mm; wing length, ca. 6.1 mm.

Distribution: Japan (Kyushu).

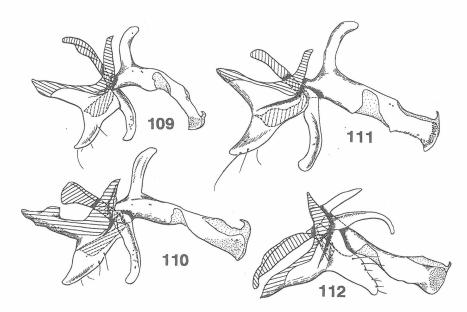
Holotype male, Kyushu, Oita, Usa Shrine, 27.ix.1966, Y. Miyatake (BLKU).

10. Winthemia remittens (WALKER)

Eurygaster remittens WALKER, 1859: 125.

A male specimen obtained in Kyushu, which I tentatively identify here as *W. remittens*, slightly differs from the type specimen of *remittens* in the more whitish and broadly pollinose thorax and abdomen. Additional specimens from Kyushu may make further discussion possible on the true identity of this specimen.

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Figs 109-112 Winthemia spp. Hypandrium, gonopod, paramere and aedeagus in lateral view: 109 ikezakii sp. n.; 110 brevipennis sp. n.; 111 miyatakei sp. n.; 112 mallochi.

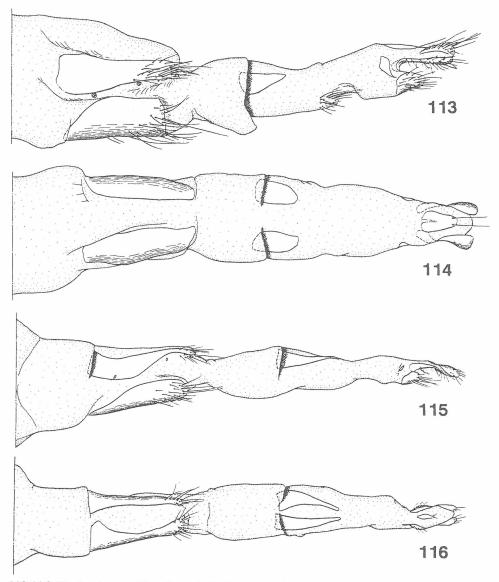
The female of W. remittens is unknown. It is possible that the female of this species closely resembles that of W. sumatrana and W. mallochi. The redescription of W. remittens is given below based on the type specimen and other specimens from China and Southeast Asia.

Male: Head whitish pollinose, fronto-orbital plate grayish; antenna brown-black, base of 1st flagellomere narrowly reddish; palpus reddish yellow, basal 1/2 darkened. Vertex 0.19-0.21 of head width; frontal vitta about 2 times as wide as fronto-orbital plate at middle; parafacial about 3/5 as wide as 1st flagellomere at middle height; gena about 0.1 of eye height. Inner vertical seta about 2/7 of eye height; outer vertical seta undeveloped; 9-12 frontal setae, lowest seta slightly below level of middle of pedicel; parafacial rather densely hairy, sometimes white hairs present especially on lower portion; vibrissa nearly level with lower margin of face. Antenna falling short of lower margin of face by about 2/3 length of pedicel; 1st flagellomere 2.5-3 times as long as pedicel.

Thorax rather thinly whitish, or grayish white, pollinose; 4 narrow longitudinal vittae present, inner vitta distinctly narrower than pollinose portion between inner and outer vittae on post-sutural scutum; scutellum broadly reddish brown in ground color. Prosternum with pale yellowish white hairs mixed with several black ones; 1-2+1 katepisternal setae (usually 2+1); proepimeron with several pale yellowish hairs; anepisternum with dense long apically frizzled pale yellowish hairs behind row of anepisternal setae; anepimeron, katepimeron and upper portion of katepisternum usually with pale yellowish white hairs.

Wing hyaline, weakly tinged with pale brownish on anterior portion; lower calypter pale yellowish white. Relative lengths of costal sectors 2nd, 3rd and 4th approximately as 3:4:2; bend of vein M about equidistant between dm-cu crossvein and wing margin.

Legs black; pulvilli dull yellowish white. Mid tibia with 1 ad seta; hind tibia with a rather closely set row of ad setae; claws and pulvilli long.



Figs 113-116 Winthemia spp. Female genitalia in lateral view (113, 115) and dorsal view (most hairs omitted in 114) (114, 116): 113-114 angusta; 115-116 mallochi.

Abdomen broadly black in ground color, side of 3rd tergum, anterolateral portion of 4th and apex of 5th reddish; 3rd tergum rather densely whitish pollinose on anterior 2/5, 4th on 1/2 to 3/5 and 5th on 2/5; venter rather thinly whitish pollinose on anterior portion of 3rd and 4th terga, thinly so on 2nd. First sternum with pale yellowish hairs; median marginal seta absent on 2nd and 3rd terga; 5th tergum with rows of discal and marginal setae, the former close to the latter; venter of 4th and 5th terga each with a pair of rather broad hair fascicles of long and dense hairs.

Female: Unknown.

Body length, 7.9-12.2 mm; wing length, 6.3-8.7 mm.

Distribution: Japan (Kyushu); China (Yunnan, Hainan), Laos, Thailand, Singapore, Indonesia

(Sulawesi), Philippines (Luzon, Basilan, Mindanao).

Type material examined. Holotype male of *Eurygaster remittens* WALKER, Celebes [Sulawesi], Makassar [Ujung Pandang], iv.1868, A. R. Wallace (BMNH).

Other specimen examined: KYUSHU, 1 male, Kumamoto Pref., Haki, vii.1978, H. Shima (BLKU).

11. Winthemia mallochi BARANOV (Figs 104, 108, 112, 115, 116)

Winthemia mallochi BARANOV, 1932: 46.

Japanese specimens here determined as this species seem to be slightly different from the type specimen. They have slightly narrower frons and more whitish fronto-orbital plate than the type specimen. I think, however, that they are conspecific and that these differences may be included in individual variation. The epiphallus of the male genitalia of *W. mallochi* characteristically arises from the anterior margin of the basiphallus and this character state is also found in Japanese specimens (Fig. 112).

Male: Closely resembling W. remittens, but differing as follows: Parafacial narrow, about 1/2 as wide as 1st flagellomere at middle; gena about 1/12 of eye height; outer vertical seta strong, about 2/3 as long as inner seta; antenna falling short of lower margin of face by about length of pedicel; claws and pulvilli short, shorter than 5th tarsomeres. Male genitalia: Closely resembling remittens; cerci in dorsal view broad, narrowly but distinctly separated from each other at apical portion; epiphallus rather short, arising from anterior margin of basiphallus; aedeagus not expanded laterally on its mid dorsal portion.

Female: Differing from male as follows: Vertex wide, 0.26-0.29 of head width; all head setae strong; 1 reclinate and 2 proclinate orbital setae present; 1st flagellomere about 3.5 times as long as pedicel; pollinosity on thorax and abdomen denser; thoracic pleura more extensively covered with pale yellowish white hairs; 2nd and 3rd abdominal terga each with a pair of median marginal setae; abdominal venter without hair fascicle. Female genitalia: Resembling sumatrana; 6th hemitergite narrowed posteriorly; 7th hemitergite rather short, long triangular; 7th sternum absent; 8th hemitergite very small; epiproct small, with a pair of minute apical hairs.

Body length, 8.2-9.4 mm; wing length, 5.8-6.7 mm.

Distribution: Japan (Honshu, Kyushu); Taiwan, India.

Host: LEPIDOPTERA, Notodontidae: *Phalera assimilis* (Bremer et Grey) [Oita, Kyushu]. Type material examined: Holotype male of *Winthemia mallochi* Baranov, Sokutu, Formosa, ix.12, H. Sauter (DEI).

Other specimens examined: HONSHU, 1 male, Hyogo Pref., Kinosaki-gun, Kasumi Beach, 1.xi.1991, K. Higuchi (HMHN); KYUSHU: 5 males 7 females, Kyushu, Oita, Kamizutsumi, 17.xi.1981, ex *Phalera assimilis* larva, A. Miyata (BLKU).

DOI: 10.21248/contrib.entomol.46.1.169-235

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12. Winthemia sumatrana (TOWNSEND) (Figs 117, 118, 119)

Pseudokea sumatrana Townsend, 1927: 69.
Pseudokea neowinthemioides Townsend, 1928: 394.
Winthemia diversa MALLOCH, 1930: 348.
?Winthemia albidopilosa MESNIL, 1949: 83.

In addition to the usual sexual dimorphism observed in many Winthemia species, such as differences in the width of the vertex, development of the head setae, and color and density of the pollinosity of the thorax and abdomen, the color of the hairs is different in sexes of this species: the male lacks pale hairs on the body, but the female bears pale yellowish white hairs on the parafacial, thoracic pleura and the 1st abdominal sternum. In this respect this species closely resembles W. mallochi and probably the female W. remittens, too, though the female of remittens is unknown. The identification of the females of remittens, mallochi and sumatrana must rely on reared specimens with corresponding males, until the discriminative features among these species are found. For this reason I cannot determine with certainty if W. albidopilosa, known only from a female, is the same as W. sumatrana as treated by CROSSKEY (1976). This species is distributed mainly in tropical and subtropical Asia, and in Japan it is known only from the Ryukyus. An acraeid butterfly has been known as a host of this species from Taiwan (SHIMA et al., 1992) and 3 lepidopterous hosts are added here from the Ryukyus.

Male: Head whitish pollinose; frontal vitta black; antenna and arista brown black, base of 1st flagellomere narrowly reddish; palpus reddish yellow, darkened basally. Vertex 0.16-0.19 of head width; frontal vitta about 2.5 times as wide as fronto-orbital plate at middle; parafacial about 1/2 as wide as 1st flagellomere at middle height; gena about 1/8 of eye height. Hairs black, dense and rather long on parafacial; inner vertical seta about 2/5 of eye height; outer vertical seta undeveloped; 12-13 frontal setae, lowest seta slightly below level of middle of pedicel; ocellar seta rather strong, about 2/3 as long as inner vertical seta; parafacial densely haired on its whole length; vibrissa nearly level with lower margin of face. Antenna with 1st flagellomere 3-3.3 times as long as pedicel and slightly longer than palpus.

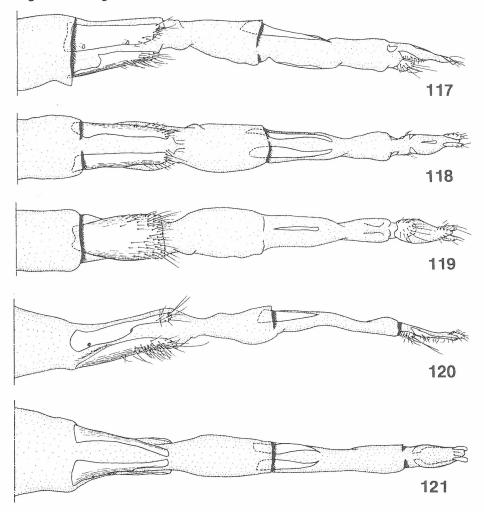
Thorax black in ground color, scutellum broadly reddish brown on apical portion; dorsum thinly grayish, somewhat brownish, pollinose; 4 rather broad longitudinal vittae present on presutural area of scutum, 5 on postsutural scutum, middle one narrow; pleura rather densely grayish pollinose. Anepisternum with long fine apically frizzled brown hairs behind anepisternal setae; anepimeron and katepimeron with apically frizzled brownish hairs.

Wing hyaline, calypter pale yellowish white. Relative lengths of costal sectors 2nd, 3rd and 4th approximately as 2:2.5:1; vein M from dm-cu crossvein to its bend about 1.5 times distance between the bend and wing margin.

Legs black; pulvilli pale brown. Mid tibia with 1 ad seta; hind tibia with a row of closely set ad setae, without strong submedian seta among them; claws and pulvilli long.

Abdomen broadly reddish brown on posterolateral portion of syntergum 1+2, side of 3rd tergum and anterolateral portion of 4th; apex of 5th tergum narrowly reddish; dorsum of 3rd tergum rather thinly pale yellowish white pollinose on anterior 1/2-1/3, 4th tergum rather densely pale yellowish white pollinose on anterior 2/3-3/5, and 5th tergum thinly pollinose on anterior 1/2-1/3; venter thinly whitish pollinose on anterior 1/2 of 3rd and 4th terga. Hairs fine dense and suberect; 2nd and 3rd terga without median marginal setae; 4th tergum with a row of

6 marginal setae; 5th tergum with regularly set rows of discal and marginal setae, the former weaker than the latter; venter of 4th tergum with a pair of small roundish hair fascicles; venter of 5th tergum with long and dense hairs but without hair fascicle.



Figs 117-121 Winthemia spp. Female genitalia in lateral view (117, 120), dorsal view (most hairs omitted in 121) (118, 121) and ventral view (119): 117-119 sumatrana; 120-121 marginalis.

Female: Differing from male as follows: Antenna with pedicel and basal portion of 1st flagellomere broadly reddish; palpus yellowish; vertex 0.23-0.24 of head width; frontal vitta about 2 times as wide as fronto-orbital plate; all head setae strong; outer vertical seta about 1/2 as long as inner vertical seta; 2 reclinate orbital setae present, anterior seta fine; 2 strong proclinate orbital setae; 6-8 frontal setae; parafacial with pale yellowish white hairs; genal dilation with pale yellowish white hairs on anterior portion; thorax densely grayish white pollinose; thoracic pleura extensively covered with dense pale yellowish white hairs, anepisternum with apically frizzled pale yellowish white hairs behind row of anepisternal setae; claws and pulvilli short;

2nd abdominal tergum with 2 rather short median marginal setae, 3rd with 2 strong median marginal setae; 4th abdominal tergum without hair fascicle; 5th abdominal tergum more narrowly truncated at apex than in male. Female genitalia: 6th hemitergite long rectangular in shape; 7th hemitergite long triangular; 7th sternum very narrow; epiproct without apical hair. Body length, 8.5-10.6 mm; wing length, 6.6-8.1 mm.

Distribution: Japan (Ryukyus); China, Thailand, Indonesia, Philippines, Papua New Guinea. Hosts: LEPIDOPTERA: Danaidae: Anosia chrysippus chrysippus (LINNÉ) [Amami Oshima, Ryukyus]; Hesperiidae: Erionota torus EVANS [Okinawa, Ryukyus]; Lymantriidae: Lymantria mathura aurora BUTLER [Okinawa, Ryukyus] (SCHAEFER & SHIMA, 1981, as W. sp.); Zygaenidae: Histia flabellicornis ultima HERING [Okinawa, Ryukyus].

Type material examined. Holotype male of *Pseudokea sumatrana* Townsend, Gunung Singalang (Sumatra Westkust) 1,600 m, viii.1925, E. Jacobson (ZMA); holotype male of *Pseudokea neowinthemioides* Townsend, Cagayan, Mindanao, Baker (USNM); holotype female of *Winthemia albidopilosa* Mesnil, Sude Flores, 13.vi.1927, Rensch (CNC).

Other specimens examined. RYUKYUS: 2 males 1 female, Amami-oshima, Akaogi, 9.xi.1972, ex Anosia chrysippus pupae, M. Wakabayashi; 1 male, Okinawa, Miyazato, 23.vii.1978, ex Erionoa torus pupa, Suzuki; 1 male 5 females, Okinawa, Koza, 6.vi.1969, ex Lymantria mathura aurora, Azuma; 3 males 3 females, Okinawa, Shuri, 10.xi, 9.xii. 1972, ex Histia flabellicornis ultima, Y. Oshiro (all in BLKU).

13. Winthemia marginalis Shima, CHAO et ZHANG (Figs 120, 121)

Winthemia marginalis SHIMA, CHAO et ZHANG, 1992: 223.

This is a rather large Winthemia and distributed in China and Japan. See SHIMA et al. (1992) for detailed data and description.

Female genitalia: Rather long and slender, longer than abdomen; 7th tergum separated into 2 long-triangular hemitergites, without hair; 7th sternum absent; epiproct absent, a pair of fine setulae present on area of epiproct.

Distribution: Japan (Honshu, Tsushima, Kyushu); China.

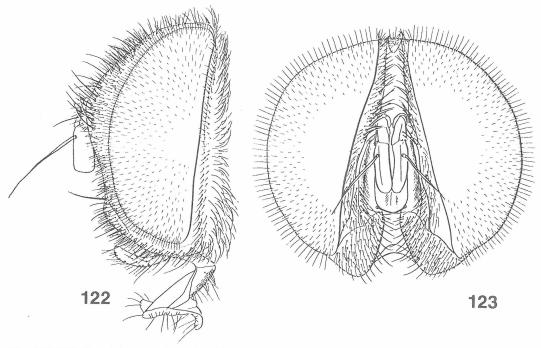
Genus Crypsina Brauer et Bergenstamm

Crypsina Brauer et Bergenstamm, 1889: 97. Type species: Crypsina prima Brauer et Bergenstamm, 1889, by original designation and monotypy.

Amplipila Curran, 1927: 446. Type species Amplipila versicolor Curran, 1927 (= Crypsina prima Brauer & Bergenstamm, 1889), by original designation.

In general features this genus resembles *Winthemia*, but differs in the strongly narrowed and elongate face below vibrissal angle in the male, fine black hairs on the occiput, short antenna, 3 basal setae of 5-6 postpronotal setae arranged in a nearly straight line, 2 lateral scutellar setae and very fine and dense hairs on the thorax and abdomen. The male genital structure of this genus is, however, much more different from that of *Winthemia*, and I therefore treat it as a distinct genus. In this genus the male 6th abdominal tergum is entire and relatively long, bearing many hairs on posterior portion, and the epiphallus is absent. The female genitalia of *C. prima* are elongate.

This genus has been known only from the type species from Queensland, Australia, and the same species is found in Japan and China.



Figs 122-123 Crypsina prima. Male head in profile (122) and frontal view (123).

1. Crypsina prima BRAUER et BERGENSTAMM (Figs 75, 122, 123, 124, 129, 134)

Crypsina prima Brauer et Bergenstamm, 1889: 97.

Amplipila versicolor Curran, 1927: 446.

Winthemia sp.: SHIMA et al., 1992: 227.

Male: Head densely dark brownish pollinose, postocular area dull yellowish gray and occiput grayish brown; frontal vitta black; antenna and arista reddish yellow to reddish brown; palpus reddish brown. Vertex 0.11-0.15 of head width; frontal vitta subequal in width to fronto-orbital plate at middle; parafacial 3/4-5/8 as wide as 1st flagellomere at middle height; face strongly narrowed to lower margin below level of vibrissae, distance between vibrissal angle to lower margin of face about 1.5 times as long as pedicel; gena 1/8-1/10 of eye height. All head hairs black; inner and outer vertical setae undeveloped; ocellar seta indistinct; 14-18 fine and short frontal setae, upper setae very fine, lowest seta nearly level with base of arista; fronto-orbital plate, parafacial and genal dilation densely covered with fine short hairs; postocular setae rather close to posterior eye margin; occiput with 2-3 irregular rows of fine black hairs and dull yellowish pile. Antenna falling short of level of vibrissal angle by about 4/5 length of pedicel; 1st flagellomere 2-2.5 times as long as pedicel; arista thickened on basal 1/4. Palpus slightly longer than 1st flagellomere.

Thorax dark brown, postpronotal lobe, posterior triangular portion of postsutural scutum and scutellum reddish; rather dense grayish brown pollinosity visible on scutum when seen from behind; scutellum thinly whitish gray pollinose; scutum with 4 distinct narrow longitudinal vittae; pleura dark grayish pollinose. All thoracic hairs black; hairs on scutum short, erect and very dense, on scutellum slightly sparser and longer; hairs on posterolateral portion of post-pronotal lobe, proepimeron, anepisternum and anepimeron dense long and frizzled apically; 3+4-5 acr; 3+4 dc; 0+2 ia; 2-3 lateral scutellar setae.

Wing hyaline, tinged with brown from wing base to level of bm-cu crossvein; basicosta black; calypter brownish. Wing short, about 1.5 times as long as abdomen; relative lengths of costal sectors 2nd, 3rd and 4th approximately as 1.5:2:0.8; vein M from dm-cu crossvein to its bend about 1.2 times as long as distance between the bend and wing margin.

Legs usually black, median portions of mid and hind tibiae sometimes narrowly reddish brown; pulvilli dull yellowish. Hind femur with a closely set row of fine ad setae; mid tibia with 2-3 (usually 2) ad setae and 2-3 fine hair-like pd setae; hind tibia with a very closely set row of comb-like ad setae, without strong submedian seta. Claws and pulvilli short, fore claw and pulvillus at most subequal in length to 5th tarsomere.

Abdomen broadly reddish yellow to reddish brown; dorsal excavation of syntergum 1+2 and mid dorsal narrow long triangular portion of 3rd tergum and 1st to 4th sterna black; mid dorsal narrow longitudinal portion of 4th and 5th terga sometimes darkened; dorsum thinly whitish pollinose on lateral 1/3 of 3rd tergum and anterior and mid dorsal longitudinal portion of 4th; venter evenly and very thinly whitish pollinose. Hairs very dense fine and black, short and recumbent on 3rd and 4th terga, rather long and suberect on 5th; marginal setae absent on 2nd and 3rd terga; 4th tergum with a row of fine and short marginal setae which are at most 1/3 as long as 4th tergum; 5th tergum with a row of rather short marginal setae, discal setae indistinct; hair fascicle absent on venter.

Male genitalia: Sixth tergum entire, rather long, with many hairs; cerci in dorsal view broad, narrowed to apex, apical portion narrowly separated from each other; surstylus in lateral view rather broad, with many long hairs; gonopod broad, rounded apically, with few short hairs; epiphallus absent; distiphallus with minute spinules on ventrodistal portion.

Female: Vertex about 0.23 of head width; frontal vitta about 2/3 as wide as fronto-orbital plate at middle; lower portion of face not elongate below vibrissal level, vibrissa inserted above level of lower margin of face by about 2/5 length of pedicel. Inner vertical seta about 2/7 of eye height; outer vertical seta strong; 1-2 short reclinate and 2-3 proclinate orbital setae present; ocellar seta fine, slightly longer than postocellar seta; parafacial and gena with dense pale yellowish white hairs; occiput sometimes without black hairs. Antenna with 1st flagellomere about 2.8 times as long as pedicel. Thorax with pleural hairs mostly pale yellowish; dorsal hairs fine short dense and mainly black. Legs yellowish, tibiae broadly darkened basally and distally; tarsi and claw brown-black; claws and pulvilli short. Abdomen broadly reddish brown, rather darkened on 4th and 5th terga, dorsum rather thinly whitish pollinose with tessellate appearance; 4th tergum with a row of marginal setae; 5th tergum with short and fine marginal setae; hairs dense fine short and recumbent. Female genitalia very long, almost as long as length of thorax and abdomen together; 6th and 7th spiracles close to each other, situated in membrane of 6th segment; intersegmental membrane between 6th and 7th segments very long; 7th hemitergite narrow and long; 7th sternum reduced to a very narrow strip, without hair; 8th hemitergite very small; epiproct elongate.

Body length, 7.0-11.4 mm; wing length, 6.5-7.7 mm.

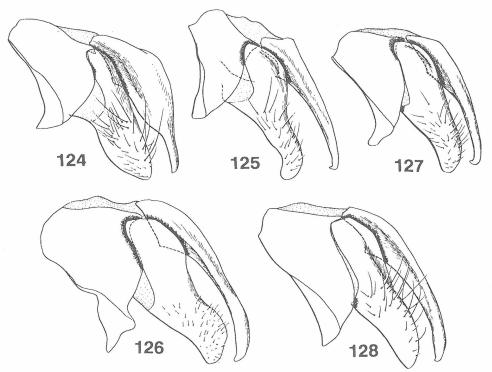


Fig. 124 Crypsina prima. - Figs 125-128 Nemorilla spp. Epandrium, surstylus and cerci in lateral view (hairs on epandrium and cerci omitted): 125 floralis; 126 insulata sp. n.; 127 maculosa; 128 aquila sp.n.

Distribution: Japan (Kyushu); China (Yunnan); Australia (Queensland).

Type material examined: Holotype female of Crypsina prima Brauer et Bergenstamm, Thorey, 1868, Both Hampton (NHW); holotype male of Amplipila versicolor Curran, Herberton, 3700 Ft., II 1911, Dodd; paratype male of A. versicolor, same data as holotype (both in DEI). Other specimens examined: KYUSHU: 33 males, Fukuoka City, Mt. Aburayama, 20.vii.1989, 5,11,15.viii.1989, 6.viii.1987, 3,5,27.ix.1987; 14.ix.1988, H. Shima; 4 males, Fukuoka Pref., Mt. Kusenbu, 14.vii.1989, H. Shima (all in BLKU).

Remarks: In Japan this species is found only in mid summer. Males fly very fast and sound peculiar buzzing. Although the known localities of this species are widely separated, it is probable that it will be found throughout the area from Southeast Asia to New Guinea when surveyed in more detail.

Genus Nemorilla RONDANI

Nemorilla Rondani, 1856: 66. Type species: Tachina maculosa Meigen, 1824, by original designation. Thyella Robineau-Desvoidy, 1863: 183. Preoccupied by Thyella Wallengren, 1858. Type species: Tachina pabulina Meigen, 1824 (= Tachina floralis Fallén, 1810), by original designation.

Aubaea ROBINEAU-DESVOIDY, 1863: 185. Type species: Aubaea aurulenta ROBINEAU-DESVOIDY, 1863 (= Tachina floralis FALLÉN, 1810), by original designation.

Pitthaea ROBINEAU-DESVOIDY, 1863: 188. Type species: Pitthaea nebulosa ROBINEAU-DESVOIDY, 1863 (= Tachina floralis FALLÉN, 1810) by original designation designation (= Tachina floralis FALLÉN, 1810) by original designation (= Tachina floralis FALLÉ

Essenia ROBINEAU-DESVOIDY, 1863: 193. Type species: Essenia appendiculata ROBINEAU-DESVOIDY, 1863 (= Nemorilla species), by original designation.

The genus Nemorilla is similar in general appearance to Winthemia, but is different in lacking hairs on the parafacial. The male genitalia of Nemorilla species are rather similar to those of Winthemia species, but the cerci are usually more flattened, the epiphallus is rather broad, the distiphallus is rather large and cylindrical and the male 6th abdominal tergum only weakly constricted at middle. The female genitalia are rather similar in structure to those of Smidtia but usually more elongate and the 7th abdominal sternum more reduced.

Nemorilla is a small genus containing one of the most common species of tachinids in the Old World. This genus is worldwide in distribution: 2 species have been known from the Palearctic region, 2 from Afrotropical, 1 from the Oriental, 1 from the Oceanian, 3 from North America and 4 from South America. Two of them are known even from oceanic islands, 1 from Seychelles and 1 from New Caledonia.

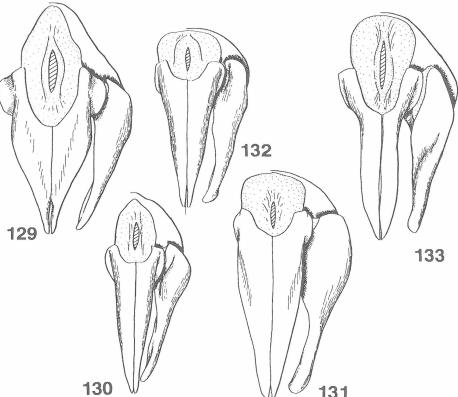


Fig. 129 Crypsina prima. - Figs 130-133 Nemorilla spp. Epandrium, surstylus and cerci in dorsal view (hairs omitted): 130 floralis; 131 insulata sp. n.; 132 maculosa; 133 aquila sp. n.

Key to Japanese species of Nemorilla

- 2. Abdomen densely grayish white pollinose on entire dorsum of 3rd and 4th terga, 3 roundish black spots visible on 3rd tergum, posterior transverse black band only distinct on 5th tergum; vertex wide, 0.25 or more of head width in male, about 0.35 in female; postocellar seta straight, rather short and stout in male maculosa (MEIGEN)
- Abdomen with rather broad posterior transverse black bands on each 3rd to 5th terga; vertex narrower, less than 0.22 of head width in male, about 0.3 in female; male postocellar seta fine and long, directed forward apically (female *insulata* unknown) 3
- Vertex 0.22-0.25 of head width in male, 0.27-0.3 in female; abdominal dorsum usually more broadly pollinose, male 3rd tergum with broad posterior transverse black band which is extended triangularly on median and lateral portions; 4th tergum grayish yellow pollinose on anterior 2/3-2/4, 5th on anterior 1/2-2/3; in female abdominal dorsum grayish yellow-white pollinose on anterior 4/5 of each 3rd and 4th terga and anterior 2/3 of 5th

. floralis (Fallén)

1. Nemorilla floralis (FALLÉN) (Figs 76, 125, 130, 135)

Tachina floralis Fallén, 1810: 287.

Tachina notabilis Meigen, 1824: 333.

Tachina angustipennis Meigen, 1824: 333.

Tachina pabulina Meigen, 1824: 358.

Exorista laticella Macquart, 1849: 373.

Exorista arrogans Macquart, 1849: 374.

Tachina intersita Walker, 1853: 72.

Nemorilla amica Rondani, 1859: 100.

Aubaea campstris Robineau-Desvoidy, 1863: 186

Aubaea aurulenta Robineau-Desvoidy, 1863: 187.

Pitthaea nebulosa Robineau-Desvoidy, 1863: 189.

Nemorilla maculosa: Auct. (nec Meigen, 1824)

Nemorilla floralis is one of the most common tachinids occurring from Hokkaido to Kyushu in Japan, but unknown from the Ryukyus. Ten lepidopterous species have been recorded as hosts in Japan and here are added 16 species of Lepidoptera.

Male: Head whitish pollinose, fronto-orbital plate and upper parafacial grayish yellow; occiput dark grayish pollinose; antenna brown-black, basal and inner portion of 1st flagellomere narrowly reddish; palpus black. Vertex 0.22-0.25 of head width; frontal vitta widened anteriorly, about 1.5 times as wide as fronto-orbital plate at middle; parafacial narrowed below, slightly narrower than 1st flagellomere at middle height; gena 0.17-0.2 of eye height; face rather well concave, lower margin warped forward, not extending beyond vibrissal angle. Inner vertical seta fine and long, slightly more than 1/2 length of eye height; outer vertical seta absent; postocellar seta DOI: 10.21248/contrib.entomol.46.1.169-235

rather fine and long, curved anteriorly at apex, about 3/4 as long as inner vertical seta; lowest frontal seta nearly level with apex of pedicel; vibrissa level with lower margin of face; occiput without black hairs, with pale yellowish white pile. Antenna falling short of lower margin of face by about 1/4 length of pedicel, 1st flagellomere 1.8-2 times as long as pedicel.

Thorax including scutellum black, dorsum rather densely grayish yellow-white pollinose, with a broad median and 2 rather broad lateral longitudinal black vittae; pleura rather thinly grayish white pollinose. Lateral scutellar seta single; apical scutellar seta fine, slightly shorter than scutellum.

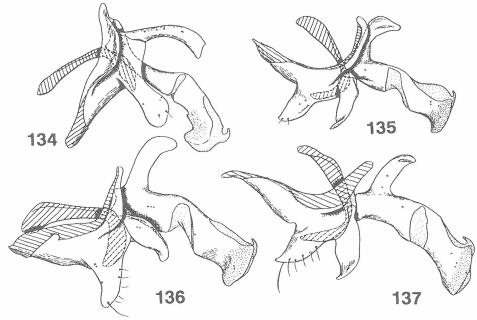


Fig. 134 Crypsina prima. - Figs 135-137 Nemorilla spp. Hypandrium, gonopod, paramere and aedeagus in lateral view: 135 floralis; 136 insulata sp. n.; 137 aquila sp. n.

Wing hyaline, slightly and evenly tinged with pale brown; lower calypter pale brown. Relative lengths of costal sectors 2nd, 3rd and 4th approximately as 1.5:2.5:1.5; vein R4+5 with only 1 fine setulae at base dorsally; vein M from dm-cu crossvein to its bend about 2 times distance between the bend and wing margin.

Legs black, pulvilli pale brown. Mid tibia with 1 ad, 2 pd and 1 v setae; hind tibia with a sparsely set row of ad setae, a strong submedian seta present. Claws and pulvilli longer than 5th tarsomere.

Abdomen black in ground color, dorsum rather thinly dull yellowish white pollinose on anterior 3/5 of 3rd tergum, 2/3 of 4th and 1/2 of 5th, median longitudinal portion black; posterior black band of 3rd tergum extending triangularly to anterior portion on both sides; bases of hairs and setae roundly black. Hairs rather dense fine and erect; 2nd tergum with 2 rather weak median marginal setae; 3rd tergum with 2 strong median marginal and 2-4 irregular and rather fine median discal setae; 4th tergum with a row of strong marginal and 4 irregular median discal setae; 5th tergum with a row of rather strong discal and marginal setae.

Male genitalia. Cerci in dorsal view narrow, evenly narrowed to apex, in lateral view, weakly

curved ventrally; surstylus in lateral view weakly curved ventrally at apex, with rather dense short hairs; gonopod short, with a few hairs on posteroventral portion; epiphallus rather short, apical portion broadly curved posteriorly.

Female: Head more whitish pollinose; vertex about 0.27-0.3 of head width; all head setae stronger; postocellar seta rather strong, slightly curved anteriorly at apex; 1 reclinate orbital setae present; antenna falling only slightly short of lower margin of face, 1st flagellomere 2-2.3 times as long as pedicel; palpus reddish yellow, darkened basally; thoracic dorsum densely pale yellowish gray-white pollinose, with 3 broad longitudinal black vittae; claws and pulvilli shorter than 5th tarsomeres; abdominal dorsum more densely and broadly pale yellowish gray-white pollinose, with tessellate appearance, mid dorsal longitudinal vitta rather broad and diffusing marginally on 3rd tergum; 3rd tergum black on 2 lateral roundish spots and on posterior 1/3, 4th black on posterior 1/4 and 5th on 1/2; hairs on abdomen sparser and recumbent; 3rd and 4th terga each with 2 median discal setae. Female genitalia: Long and narrow; 6th and 7th spiracles close to each other, both present below 6th hemitergite; 7th hemitergite narrow and long, without hair; 7th sternum very narrow, without hair; 8th hemitergite small and elongate.

Distribution: Japan (Hokkaido, Honshu, Shikoku, Kyushu); Palearctic Region.

Hosts: LEPIDOPTERA: Hesperiidae: Parnara guttata (BREMER & GREY) [Niigata, Honshu]; Lymantriidae: Euproctis subflava (BREMER) [Honshu] (as E. flava, ASHIBA, 1958; Takano, 1956); Noctuidae: Autographa gamma (LINNÉ) [Sapporo, Hokkaido], A. nigrisigna (WALKER) [Hirosaki, Honshu], Macdunnoughia confusa (STEPHENS) [Ibaraki, Honshu], Nycteola asiatica (Krulikowski) [Bibai, Hokkaido]; Pyralidae: Cnaphalocrocis medinalis (Guenee) [Shikoku; Kyushu] (SAKAI et al., 1942; TAKANO, 1950), Conogethes sp. [Kanagawa, Honshu], Goniorhynchus butyrosa (BUTLER) [Tokyo, Honshu], Ostrinia furnacalis (GUENEE) [Kyushu] (as O. nubilalis, CLARK, 1934; TAKANO, 1950), Pagyda quinquelineata HERING [Tokyo & Ishikawa, Honshul (Togashi, 1985), Palpita nigropunctalis (Bremer) [Hokkaido] (Takano, 1950, 1956); Tortricidae: Archips fumosus KODAMA [Bibai, Hokkaido], A. fuscocupreanus WALSING-HAM [Morioka, Honshu], A. issikii KODAMA [Bibai, Hokkaido], A. pulchra (BUTLER) [Bibai, Hokkaido] (as N. maculosa and as Ariola, MOMOI & KAMIJO, 1963), A. oporanus (LINNÉ) [Bibai, Hokkaido; Iwate, Honshu] (as Cacoecia, CIBC, 1962; as N. maculosa and as A. piceanus, MOMOI & KAMIJO, 1963; as A. similis, SATO & KAMIJO, 1979), Choristoneura diversana (HÜB-NER) [Asahikawa, Ashibetsu & Bibai, Hokkaido] (KAMIJO, 1973), Cymolomia hartigiana (SAXE-SEN) [Bibai, Hokkaido], Eurydoxa advena FILIPJEV [Asahikawa, Hokkaido], Lozotaenia coniferana (ISSIKI) [Asahikawa & Bibai, Hokkaido], Ptycholomoides aeriferana (HERRICH-SCHÄFFER) [Utashinai & Bibai, Hokkaido] (as N. maculosa, Momoi & Kamijo, 1963; Kamijo & Suzuki, 1967); Sparganothis pilleriana (DENIS & SCHIFFERM.) [Sasayama, Honshu] (SHIMA, 1973), Spilonota eremitana MORIUTI [Takikawa, Hokkaido], Zeiraphera rufimitrana truncata OKU [Asahikawa, Hokkaido]; Yponomeutidae: Yponomeuta melianellus ZELLER [Tomakomai, Hokkaido]. Specimens examined (262 males 221 females from the following localities): HOKKAIDO: Mt. Rausu; Shari-machi; Akan-machi; Shibecha; Nukabira; Ashoro; Mts. Daisetu, Aizankei, Ten'ninkyo; Mt. Yubari; Bibai; Asahikawa; Sapporo City; Mt. Moiwa; Nopporo; Mt. Apoi; Tomakomai; HONSHU: Aomori Pref.: Mt. Bonju (all in BLKU); Hirosaki City (NIAS); Morioka City: Ibaraki Pref.: Saitama Pref.: Minano; Yorii; Ogano; Kodama; Kamikawa; Tokigawa; Hanno (all in BLKU): Tokyo: Mt. Takao; Atsugi: Kanagawa Pref.: Hiratsuka (all in NIAS): Nagano Pref.: Karuizawa; Togakushi; Izuna-kogen: Niigata Pref.: Mts. Washigasu, Sasaguchihama; Arakawa; Naeba; Myoko-kogen; Mt. Atema: Ishikawa Pref., Noto-machi: Hyogo Pref., Sasayama; SHIKOKU: Matsuyama City, Dogo; TSUSHIMA: Hitakatsu; Mt. Ariake; Sumo; DOI: 10.21248/contrib.entomol.46.1.169-235

Nii; KYUSHU: Fukuoka Pref.: Fukuoka City; Mt. Tachibana; Mt. Aburayama; Mt. Inunaki; Mt. Kusenbu: Nagasaki Pref., Mie, Matsuura; GOTO IS: Meshima: Oita Pref.: Mts. Kuju, Mt. Kuroiwa: Kumamoto Pref.: Gokanosho; Mt. Ichifusa: Kagoshima Pref.: Mts. Kirishima; Mt. Shibi; Iriki Pass; YAKU IS: Kurio (all in BLKU).

2. Nemorilla insulata sp. n. (Figs 126, 131, 136)

Closely resembling N. floralis, but differing as follows:

Male: Vertex narrow, about 0.2 of head width; frontal vitta about 2 times as wide as fronto-orbital plate at middle; parafacial narrow, about 3/5 as wide as 1st flagellomere at middle height; gena very narrow, about 0.1 of eye height; antenna long, falling short of lower margin of face by about 2/5 length of pedicel, 1st flagellomere about 2 times as long as pedicel; thoracic dorsum grayish white pollinose, presutural area of scutum with 5 longitudinal vittae, postsutural scutum with 4 vittae, pollinose portion between 2 inner vittae of presutural area and between 2 outer vittae of postsutural scutum brownish; thoracic pleura grayish white pollinose; abdominal dorsum whitish pollinose on narrow anterior portion of 3rd tergum, anterior 2/5 of 4th and 1/3 of 5th, narrow median longitudinal black vitta distinct on 4th and 5th terga, pollinosity on 3rd tergum expanded to anterior 1/2 on both sides, posterior black area reflecting dark brownish when seen from behind. Male genitalia: Cerci in lateral view flat, gently curved ventrally, in dorsal view rather broad at base and narrowed at middle; surstylus weakly narrowed near middle, with short and fine hairs; distiphallus rather short and broad, with minute spinules on distal portion.

Body length, 7.3-7.6 mm; wing length, 6.1-6.6 mm.

Female: Unknown.

Holotype male, Bonin Is., Chichijima Grp., Ani Jima, Sen-zan (NE Bay), 28.v.1958, F. M. Snyder (BPBM).

Paratype: OGASAWARA IS., 1 male, same data as holotype (BLKU).

Distribution: Japan (Ogasawara Is. = Bonin Is.).

Remarks: This species is apparently closely allied to the widely distributed species *N. floralis* and *N. maculosa*. It is probable that this species is derived from one of these species in the isolated north Pacific islands.

3. Nemorilla maculosa (MEIGEN) (Figs 127, 132)

Tachina maculosa MEIGEN, 1824: 256.

Exorista notata MACQUART, 1849: 377.

Exorista pusilla MACQUART, 1849: 377.

Nemorilla aristalis RONDANI, 1859: 100.

Aubaea cita ROBINEAU-DESVOIDY, 1863: 186.

Aubaea minuta ROBINEAU-DESVOIDY, 1863: 188.

Nemorilla floralis: Auct. (nec FALLÉN, 1810)

Among many Nemorilla specimens examined in this study I have seen this species only from Hokkaido, Kyushu and the Ryukyus, but not from Honshu. It is not certain if this species is absent from Honshu. The host of this species is not known in Japan.

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distinguished from it by the wider vertex and more densely pollinose body as far as the Japanese specimens are concerned.

Male genitalia: Closely resembling *floralis*; cerci in dorsal view slightly wider at base; surstylus in lateral view rather broad, weakly narrowed to blunt apex.

Distribution: Japan (Hokkaido, Kyushu, Ryukyus); Oriental and Palearctic Regions.

Specimens examined: HOKKAIDO: 5 males 2 females, Abashiri, Sharimachi, 2.viii.1967, H. Shima & A. Nakanishi (BLKU); KYUSHU: 2 males, Nagasaki Pref., Matsuura City, 3.xi.1965, Y. Ikezaki; 1 male, Nagasaki City, Mt. Hiko, 8.viii.1965, H. Shima; 2 males, Kagoshima City, Terayama Park, 10.v.1966, A. Tanaka; 2 females, Kagoshima City, Uearata, 28.v.1965, 20.ix.1966, A. Tanaka; 1 male, Ibusuki City, Mt. Uomi, 19.vi.1968, A. Mori (all in BLKU); RYUKYUS: 1 male, Tokara Is., Nakanoshima I., 12.vii.1964, H. Shima; 1 female, Tokara Is., Takara I., 16.vii.1964, A. Tanaka; 1 female, Amami I., Setouchi, Sude, 22.i.1972, H. Suzuki; 1 female, Ishigaki I., 25.vii.1978, K. Hara (all in BLKU); 1 male 1 female, Ryukyu I., 7.iii.1953, T. Shiraki (NIAS).

4. Nemorilla aquila sp. n. (Figs 128, 133, 137)

Male: Head grayish white pollinose, fronto-orbital plate dark brownish and parafacial slightly yellowish; occiput entirely black; antenna brown-black, basal and inner portion of 1st flagellomere reddish; palpus reddish yellow, darkened at basal 1/2. Vertex about 0.22 of head width; frontal vitta widened anteriorly, only slightly wider than fronto-orbital plate at middle; parafacial slightly narrowed below, about 2/3 as wide as 1st flagellomere at middle height; gena narrow, about 0.13 of eye height; face rather weakly concave, lower margin warped forward, not extending beyond vibrissal angle. Inner vertical seta short, less than 1/4 of eye height; outer vertical seta absent; postocellar seta rather strong, nearly straight, about 4/5 as long as inner vertical seta; lowest frontal seta nearly level with base of arista; vibrissa level with lower margin of face; occiput without black hairs, with dull yellowish pile. Antenna with 1st flagellomere about 2.8 times as long as pedicel.

Thorax black, dorsum thinly dark brownish pollinose, 2 narrow longitudinal black vittae visible; pleura more densely grayish brown pollinose; scutellum black. All scutellar setae rather short; lateral setae double, anterior seta longer than posterior one and about as long as scutellum; apical scutellar setae fine, about 1/2 as long as scutellum.

Wing hyaline, slightly and evenly tinged with pale brown; lower calypter pale brown. Relative lengths of costal sectors 2nd, 3rd and 4th approximately as 1.5:2.5:1.5; vein R4+5 with only 1 fine setulae at base dorsally; vein M from dm-cu crossvein to its bend about 2 times distance between the bend and wing margin.

Legs black, pulvilli pale yellowish brown. Mid tibia with 1 ad and 3 short and fine pd setae, without v seta; hind tibia with a rather closely set ad setae, a strong submedian seta present. Claws and pulvilli longer than 5th tarsomere.

Abdomen black in ground color, broadly brownish pollinose; 3rd tergum with 4 narrow pollinose spots on anterior portion, black on broad inverse triangular area of median portion and both lateral longitudinal portions; 4th tergum rather thinly whitish pollinose on anterior 1/2, the pollinosity with tessellate appearance, median longitudinal portion and lateral portions black; 5th tergum thinly whitish pollinose on anterior 2/5, the pollinose area with tessellate appearance, median longitudinal portion black. Hairs dense fine and erect, becoming sparser posteriorly; 2nd tergum without distinct median marginal seta; 3rd tergum with 2 short and fine median marginal DOI: 10.21248/contrib.entomol.46.1.169-235

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setae; 4th tergum with a row of rather short marginal setae; 5th tergum with a row of short discal and marginal setae.

Male genitalia. Cerci in dorsal view nearly parallel-sided on basal 1/3 to apical 1/3, then narrowed apically, in lateral view flat, weakly curved ventrally; surstylus in lateral view weakly narrowed to apex, with rather dense long hairs on dorsal portion; epiphallus rather short; distiphallus with minute spinules on apical portion.

Female: Head more whitish pollinose, occiput grayish; vertex about 0.26 of head width; all head setae stronger, inner vertical seta about 2/5 of eye height; outer vertical seta about 1/2 as long as inner seta; postocellar seta fine, slightly shorter than outer vertical seta; 1 reclinate orbital seta subequal in length to outer vertical seta; lowest frontal seta nearly level with base of 1st flagellomere; palpus more broadly reddish yellow; thorax rather thinly grayish white pollinose, dorsum with 3 broad longitudinal black vittae; mid tibia with 2 pd setae; claws and pulvilli shorter than 5th tarsomere; abdomen rather thinly grayish white pollinose on anterior 2/3 of 3rd and 4th terga and 1/2 of 5th, the pollinose portion with tessellate appearance, mid dorsal longitudinal vittae distinct on 3rd to 5th terga, both sides of each 3rd and 4th terga obliquely and longitudinally black; 2nd tergum with 2 fine median marginal setae; 3rd tergum with 2 rather long median marginal setae; hairs on dorsum recumbent.

Body length: 5-6.5 mm; wing length; 4.3-5 mm.

Distribution: Japan (Honshu, Shikoku, Ryukyus).

Holotype male, Aichi Pref., Nishio City, Saimyojisan, 13.vii.1957, H. Kurahashi (EIHU).

Paratypes: SHIKOKU: 1 female, Tokushima Pref., Mugi-cho, Mugi Oshima, 1.xi.1991, K. Ohara; RYUKYUS: 1 female, Amami Oshima, Uken-mura, Edateku-Jima, 19.ix.1972, H. Suzuki (all in BLKU).

Remarks: This species very closely resembles N. oceanica described from New Caledonia by CURRAN (1929), but may be distinguished from it by its darker color, reddish yellow palpus, weak marginal scutellar setae and 2 short lateral scutellar setae. These 2 species, together with N. nemorilloides (BEZZI) from Seychelles and N. afra CURRAN from Africa, are characteristic in lacking ventral setae on the mid tibia.

III. Phylogenetic Considerations

As many of New World winthemiine genera and an African genus *Hemiwinthemia* were not available in this study and their identities are not certainly defined as yet, it is impossible to deduce the phylogenetic relationships among all the genera of the Winthemiini. Here I try to infer tentatively the phylogenetic relationships among Old World members of the tribe that I have examined. A cladogram of hypothesized relationships is shown in Fig. 138, and is based on the character states discussed below.

The basilliform sclerites are very broad and sometimes fused medially (Fig. 10) in all members of this tribe examined in this study. This character state is not found in most of other tribes of the Tachinidae and seem to be an autapomorphy of this tribe (character state 1 in Fig. 138). Members of the Winthemiini have an elongate female genitalia. This character state is considered as an adaptation for parasitization and found in scattered genera of exoristine Tachinidae.

This is also considered as an autapomorphy of this tribe (2). The fully haired katepimeron is found in the members of Winthemiini and Ethiliini sensu HERTING (1984). At present I cannot determine if this character state is a synapomorphy shared by Winthemiini and Ethillini or occurred independently in stem species of these tribes, so it is not used to define the monophyly DOI: 10.21248/contrib.entomol.46.1.169-235

of the Winthemiini. Female members of the Winthemiini lay unincubated hard-shelled eggs directly on host exoskelton and this character state is found in Exoristini, Ethillini and some members of Eryciini in the subfamily Exoristinae. I think, however, this character state is plesiomorphic in the family Tachinidae, so it is not used to define the monophyly of this tribe. In aedeagal structure members of *Smidtia* and *Rhaphiochaeta* seem to be more specialized than those of *Crypsina*, *Winthemia* and *Nemorilla* (including *Ossidingia* TOWNSEND [reference synonymy, e.g. CROSSKEY, 1980]) in having a weakly sclerotized dorsodistal expansion (Figs. 11-13). This area is almost always membranous in most genera of Exoristinae, although it varies in shape among groups. This character state is considered to be a synapomorphy shared by *Smidtia* and *Rhaphiochaeta* (4).

The male 6th abdominal tergum is more or less reduced in members of the subfamily Tachininae and Exoristinae sensu HERTING in comparison with that in the Phasiinae and Dexiinae. The entire and rather elongate condition of the male 6th abdominal tergum is considered to be primitive compared with strongly reduced condition, because strongly reduced 6th abdominal tergum is scattered in some genera among the vast complex of exoristine genera. The former condition is found in *Crypsina*, *Winthemia* and *Nemorilla*, and the latter in *Rhaphiochaeta* and *Smidtia* (3). In species of *Smidtia* the 6th abdominal tergum is completely absent or rarely represented by a pair of setae (*japonica*) (5) and in *Rhaphiochaeta breviseta*, the only representative of the genus, it is reduced to a pair of very small hemitergites. In contrast, it is rather well represented and bears several setae in members of *Crypsina*, *Winthemia* and *Nemorilla*. In *Crypsina prima* it is entire and long, but in members of *Winthemia* and *Nemorilla* it is more or less constricted at the middle or narrowly separated medially into 2 rather broad and long hemitergites (11).

A thickened 3rd aristomere is sometimes found in scattered genera of Exoristinae, but only in *Rhaphiochaeta* in this tribe. This seems to be a derived condition of a slender 3rd aristomere (6) In the male genitalia of *Smidtia antennalis*, *pauciseta*, *verna* and the Burmese species *S. varipes* (MESNIL) the anteroventral portion of the epandrium is strongly narrowed (Fig. 6, arrow) and the distal arms of the hypandrium are long and broad. These character states are absent from other species of this tribe (e.g. Fig. 7, arrow), and they seem to represent a secondary adaptation for copulation. These states may be considered synapomorphies of these species (7).

The parafacial is usually bare in most genera of exoristine Tachinidae, but it is fully haired in many species of *Smidtia* and in all members of *Winthemia* and *Crypsina*. The parafacial is haired at most on upper portion or sparsely so in *Smidtia antennalis*, *pauciseta*, *verna* and *varipes*. The haired parafacial is considered to be apomorphic and this state of the character seems to have occured at least two times in this tribe (8) (12).

The reclinate orbital setae are usually developed in the males of most genera of the Exoristinae, and the reduction of this character seems to be derived. This condition is found in members of *Crypsina*, *Winthemia* and *Nemorilla* (10).

In the female genitalia the 7th abdominal sternum is represented by a rather broad and long sclerite (Smidtia) or the sternum is greatly reduced or absent (9) (Crypsina, Nemorilla, Winthemia; Rhaphiochaeta female not examined). The 8th abdominal tergum is always reduced to a pair of small sclerites in members of this tribe, and the reduction is much more advanced in Crypsina and Winthemia than in Nemorilla and Smidtia. As the reduction of the abdominal terga and sterna is considered to be the derived condition, Winthemia is considered to be most advanced (16), and Crypsina follows it. Nemorilla and Smidtia are plesiomorphic in these structures.

The epiphallus is usually developed in most genera of Exoristinae. It is absent in *Crypsina prima* (Fig. 129) (14), but well developed and long in species of *Winthemia*, *Nemorilla*, *Rhaphiochaeta* and *Smidtia*. It seems to be most developed in *Nemorilla* (13).

The lower portion of face is strongly narrowed and elongate in male of *Crypsina prima*, but it is not so in all other members of this tribe as well as in most other members of exoristine genera. These character states seem to represent autapomorphies of *Crypsina* (15).

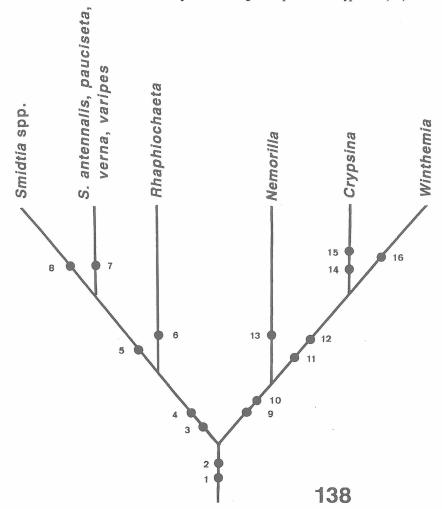


Fig. 138 Tentatively inferred phylogenetic relationships among Old World genera of Winthemiini. Numbers indicating synapomorphies of clades: 1. Broad basilliform sclerite; 2. female genitalia elongate; 3. reduction of male 6th abdominal tergum; 4. weakly sclerotized dorsodistal portion of distiphallus; 5. absence of male 6th abdominal tergum; 6. thickened arista; 7. narrow and elongate anterodorsal portion of epandrium; 8. fully haired parafacial; 9. reduction of female 7th abdominal sternum; 10. absence of reclinate orbital seta in male; 11. medially divided orconstricted male 6th abdominal tergum; 12. fully haired parafacial; 13. enlarged epiphallus; 14. absence of epiphallus; 15. narrowed and elongate lower portion of face in male; 16. strong reduction of female 7th abdominal sternum and 8th hemitergites.

IV. Host/Parasite Lists of Winthemiini from Japan

1. Parasite-Host List

Parasitoid Names
Nemorilla floralis (FALLÉN)

Smidtia amoena (MEIGEN)

Smidtia japonica (MESNIL)
Winthemia angusta SHIMA, CHAO
et ZHANG
Winthemia cruentata (RONDANI)

Winthemia mallochi BARANOV Winthemia sumatrana (TOWNSEND)

Winthemia venusta (MEIGEN)

Host names [Literature]

Archips fumosus; A. fuscocupreanus; A. issikii; A. pulchra [MOMOI & KAMIJO, 1963]; A. oporanus [CIBC, 1962; MOMOI & KAMIJO, 1963; SATO & KAMIJO, 1979]; Choristoneura diversana [KAMIJO, 1973]; Cymolomia coniferana; Ptycholomoides aeriferana [KAMIJO & SUZKI, 1967; MOMOI & KAMIJO, 1963]; Sparganothis pilleriana [SHIMA, 1973]; Spilonota eremitana; Zeiraphera rufimitrana truncata (Lep., Tortricidae)

Autographa gamma; A. nigrisigna; Macdunnoughia confusa; Nycteola asiatica (Lep., Noctuidae)

Cnaphalocrocis medinalis [SAKAI et al., 1942; TAKANO, 1950]; Conogethes sp.; Ostrinia furnacalis [TAKANO, 1950]; Pagyda quinquelineata [TOGASHI, 1985]; Palpita nigropunctalis [TAKANO, 1950, 1956] (Lep., Pyralidae)

Euproctis subflava [ASHIBA, 1958; TAKANO, 1956] (Lep., Lymantriidae)

Parnara guttata guttata (Lep., Hesperiidae)

Yponomeuta melianellus (Lep., Yponomeutidae)

Arctia caja phaeosoma [TAKANO, 1950, 1956] (Lep.,

Arctiidae)

Tristrophis veneris (Lep., Geometridae) Celaena leucostigma (Lep., Noctuidae)

Drymonia dodonides [SHIMA, 1973] (Lep., Notodontidae)

Palaeocimbex carinulata (Hym., Cimbycidae) Dolbina tancrei; Smerinthus planus [SHIMA et al., 1992] (Lep., Sphingidae)

Autographa gamma (Lep., Noctuidae) [KANEKO & KONISHI, 1995]

Sphinx constricta (Lep., Sphingidae)

Phalera assimilis (Lep., Notodontidae)

Anosia chrysippus chrysippus (Lep., Danaidae)

Erionota torus (Lep., Hesperiidae)

Histia flabellicornis ultima (Lep., Zygaenidae)

Lymantria mathura aurora [SCHAEFER & SHIMA, 1981] (Lep., Lymantriidae)

Ascotis selenaria cretacea [Togashi, 1985] (Lep., Geometridae)

Stauropus fagi persimilis; Torigea straminea (Lep., Notodontidae)

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2. Host-Parasite List

Host names [Japanese Common names]

Parasitoid names [Localities]

Order Hymenoptera

Cimbycidae

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Palaeocimbex carinulata (KONOW) Smidtia japonica [Honshu]

[Nasiashibuto-habachi]
Order Lepidoptera

Arctiidae

Arctia caja phaeosoma (BUTLER) Smidtia amoena [Honshu]

[Hitoriga] **Danaidae**

Anosia chrysippus chrysippus (LINNÉ Winthemia sumatrana [Ryukyus]

[Kaba-madara] Geometridae

Ascotis selenaria cretacea (BUTLER) Winthemia venusta [Honshu]

[Yomogi-eashaku]

Tristrophis veneris (BUTLER) [Torafu-Smidtia amoena [Hokkaido]

tsubame-edashaku]

Hesperiidae

Erionota torus Evans [Banana-seseri] Winthemia sumatrana [Ryukyus]
Parnara guttata guttata (BREMER et Nemorilla floralis [Honshu]

GREY) [Ichimonji-seseri]

Lymantriidae

Euproctis subflava (BREMER) [Dokuga] Nemorilla floralis [Honshu]
Lymantria mathura aurora BUTLER Winthemia sumatrana [Ryukyus]

[Kashiwa-maimai]

Noctuidae

Autographa gamma (LINNÉ) [Gamma-Nemorilla floralis [Hokkaido]; kin-uwaba] Winthemia cruentata [Hokkaido]

A. nigrisigna (WALKER) [Tamana-kin-Nemorilla floralis [Honshu] uwaba]

Celaena leucostigma (HÜBNER) [Sho- Smidtia amoena [Hokkaido]

buyoto]

Macdunnoughia confusa (STEPHENS) Nemorilla floralis [Honshu]

[Kiku-gin-uwaba]

Nycteola asiatica (KRULIKOWSKI) Nemorilla floralis [Hokkaido]

[Kobusuji-kinokawaga]

Notodontidae

Drymonia dodonides (STAUDINGER) Smidtia amoena [Honshu]

[Tobimon-shachihoko]

Phalera assimilis (Bremer et Grey) Winthemia mallochi [Kyushu]

[Tsumaki-shachihoko]

Stauropus fagi persimilis BUTLE Winthemia venusta [Honshu]

[Shachihoko-ga]

Torigea straminea (MOORE) [Ki- Winthemia venusta [Honshu]

shachihoko]

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[matsu-amime-hime-hamaki]

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Pyralidae	A7
Cnaphalocrocis medinalis (GUENEE) [Kobu-nomeiga]	Nemorilla floralis [Shikoku, Kyushu]
Conogethes sp. [Matsuno-	Nemorilla floralis [Honshu]
gomadara\nomeiga]	Tremortita fioratis [Honsilu]
Goniorhynchus butyrosa (BUTLER)	Nemorilla floralis [Honshu]
[Kuroheri-ki-nomeiga]	Tremerina frorums [Honshu]
Ostrinia furnacalis (GUENEE)	Nemorilla floralis [Honsu, Kyushu]
[Awanomeiga]	[,,
Pagyda quinquelineata HERING	Nemorilla floralis [Honshu]
[Yoshinomeiga]	
Palpita nigropunctalis (BREMER)	Nemorilla floralis [Hokkaido]
[Maeaka-sukashi-nomeiga]	
Sphingidae	
Dolbina tancrei STAUDINGER	Winthemia angusta [Honshu]
[Sazamami-suzume]	TY1
Smerinthus planus WALKER [Uchi-suzume]	Winthemia angusta [Honshu]
Sphinx constricta Butler	Winthemia cruentata [Kyushu]
[Ko-ebigara-suzume]	wininenaa craeniaia [Kyasha]
Tortricidae	
Archips fumosus KODAMA [Ichii-oo-	Nemorilla floralis [Hokkaido]
hamaki]	[-10-10-10-10-10-10-10-10-10-10-10-10-10-
A. fuscocupreanus Walsingham	Nemorilla floralis [Honshu]
[Midare-kakumon-hamaki]	
A. issikii Kodama [Momi-atoki-	Nemorilla floralis [Hokkaido]
hamaki]	
A. pulcher (BUTLER) [Tatesuji-hamaki]	Nemorilla floralis [Hokkaido]
A. oporanus (LINNÉ) [Matsu-atoki-	Nemorilla floralis [Hokkaido, Honshu]
hamaki]	N
Choristoneura diversana (HÜBNER) [Kosuji-obi-hamaki]	Nemorilla floralis [Hokkaido]
Cymolomia hartigiana (SAXESEN)	Nemorilla floralis [Hokkaido]
[Tohi-hime-hamaki]	Tremortita jioratis [Hokkaldo]
Eurydoxa advena FILIPJEV [Hiroba-	Nemorilla floralis [Hokkaido]
birodo-hamaki]	[
Lozotaenia coniferana (Issiki) [Tohi-	Nemorilla floralis [Hokkaido]
oo-hamaki]	
Ptycholomoides aeriferana	Nemorilla floralis [Hokkaido]
(HERRICH-SCHAEFER) [Karamatsu-	
itohiki-hamaki]	
Sparganothis pilleriana (DENIS &	Nemorilla floralis [Honshu]
SCHIFFERMÜLLER) [Tengu-hamaki]	N
Spilonota eremitana MORIUTI	Nemorilla floralis [Hokkaido]
[Karamatsu-] [Todomatsu-hime-	
hamaki] Zeiraphera rufimitrana truncata OKU	Namovilla floralis [Hokkeide]
[matsu-amima hima hamaki]	Nemorilla floralis [Hokkaido]

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Yponomeutidae

Yponomeuta melianellus ZELLER

[Ringo-suga]

Zygaenidae

Histia flabellicornis ultima HERING

[Kuro-tsubame]

Nemorilla floralis [Hokkaido]

Winthemia sumatrana [Ryukyus]

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^{*} Not directly seen.