

A SURVEY OF THE JAPANESE SPECIES OF *ANTHOPHILA*
HAWORTH AND *EUTROMULA* FROELICH AND THEIR EARLY
STAGES (LEPIDOPTERA, CHOREUTIDAE), WITH AN
APPENDIX

by

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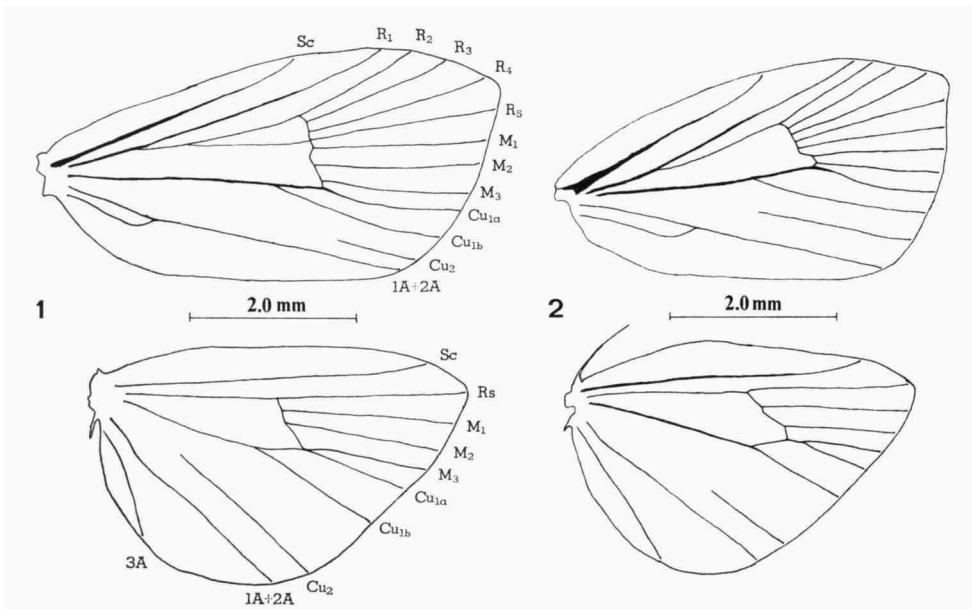
With 71 text-figures

The present synopsis is the result of the study of the first author; his manuscript has been examined by the second author, while the descriptions of the new species are by both authors together. Additions on the material of the Issiki Collection are by the second author. All text figures are by the first author, except figs. 70-71 which are by Mr. J. J. A. M. Wessendorp, of the Leiden Museum.

Seven species, *A. fabriciana* Linnaeus, *pariana* Clerck, *moiwana* Matsu-
mura, *yakushimensis* Marumo, *hyligenes* Butler, *japonica* Zeller, and
achyrodes Meyrick have been recorded from Japan previously as belonging
to the genus *Anthophila* Haworth, 1811, with the type species *Phalaena Tinea*
fabriciana Linnaeus, 1767. In the present paper these species, except *A.*
fabriciana, are being transferred to the genus *Eutromula* Frölich, 1829, with
the type species *Phalaena Tortrix pariana* Clerck, [1764].

The genus *Eutromula* appears to differ from *Anthophila* by the following
points: wing neuration (figs. 1-2); in the hind wing Cu_1 and M_3 are short-
stalked in *Eutromula*, connate in *Anthophila*; male genitalia with a well
developed and sclerotised gnathos in *Anthophila*, without gnathos in *Eutro-*
mula. The larva in both is similar in general appearance, but the number of
abdominal setae of the SV group is different, viz., the segments 1-3 and 7-9
with the following number of setae, respectively: 3:3:3:2:1:1, in *Anthophila*,
and 2:3:3:2:1:1, in *Eutromula*. The last abdominal segment in the pupa has
a cremaster of four pairs of short setae, in *Anthophila*, and of two dorsal
setae, in *Eutromula* (figs. 3 and 6, respectively).

"*Simaethis*" *moiwana* Matsumura is recognised as a junior synonym of "*Simaethis*" *atrosignata* Christoph (Diakonoff, 1978), while "*Simaethis*" *kochiensis* Matsumura and "*S.*" *albifacialis* Marumo the first author found to be junior synonyms of *Eutromula achyroides* (Meyrick) comb. nov. Two species and one subspecies are described as new, while six others are recorded from Japan for the first time, viz., *E. xanthogramma* (Meyrick), *E. basalis* (Felder), *E. ophiosema* (Lower), *E. amethystodes* (Meyrick), *E. fulminea* (Meyrick), and *E. diana* (Hübner).



Figs. 1-2. Wing neuration. 1, *Anthophila fabriciana* Linnaeus; 2, *Eutromula vinosa discolor* subsp. nov.

Descriptions of already known species are omitted.

In the Appendix the family Immidae is recorded for Japan for the first time and one species described as new.

The lists of literature contain the more important items, but are by no means claimed to be exhaustive.

As indicated in the paper, the type specimens and other material will be deposited in the collections of the following institutions (abbreviated):

EIHU: Entomological Institute, Faculty of Agriculture, Hokkaido University, Sapporo, Hokkaido, Japan,

RMNH: Rijksmuseum van Natuurlijke Historie, Leiden, the Netherlands, and

ZLMU: Zoological Laboratory, Faculty of Agriculture, Meijo University, Nagoya, Japan.

The material from the Issiki Collection has been kindly lent by the National Museum of Natural History of the Smithsonian Institution, Washington, D.C., U.S.A.

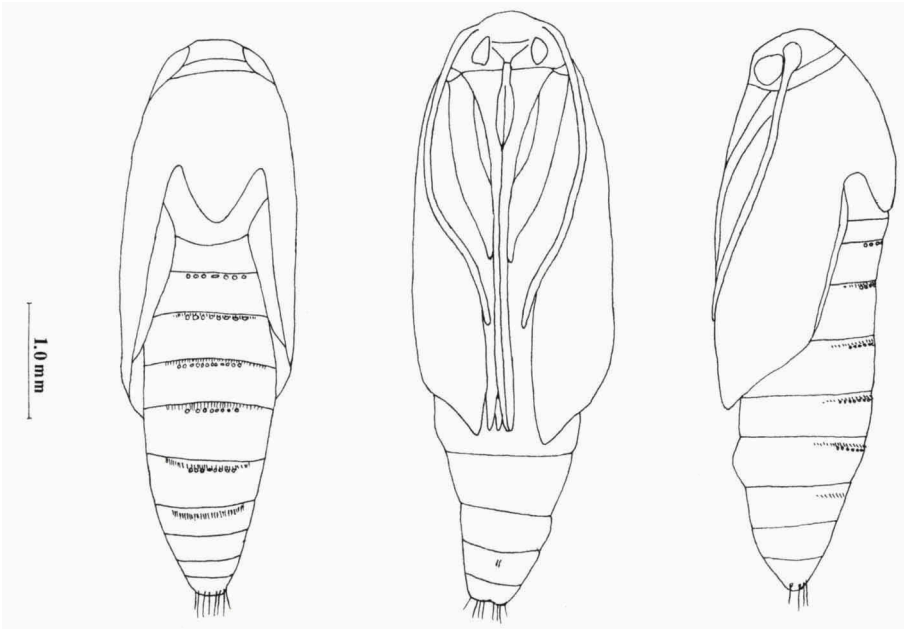


Fig. 3. *Anthophila fabriciana* Linnaeus, pupa, left: dorsal, middle: ventral, right: lateral aspect.

Anthophila Haworth

Anthophila Haworth, 1811, Lep. Brit., 471. — Toll, 1956, Klucze oznacz. owadów polski (39-40) 27: Lep.: 29. — Kodama, 1961, Publ. ent. Lab. Coll. Agric. Univ. Osaka, 6: 36. — Lhomme, 1963, Cat. Lep. France et Belgique, 2: 494. — Danilevsky, 1969, Rev. Ent. USSR, 48: 925.

Type species: *Phalaena Tortrix fabriciana* Linnaeus, 1767.

Simaethis Leach, 1815, Edinburg Encycl., 9: 135. — Spuler & Hofmann, 1910, Schmett. Eur. 2: 297. — Forbes, 1923, Lep. New York, 1: 352.

Type-species. *Tortrix dentana* Hübner, [1799] (= *fabriciana* Linnaeus, 1767).

Xylophoda Latreille, 1829, in Cuvier, Règne Anim., (2) 5: 412.

Type-species. *Phalaena Tortrix fabriciana* Linnaeus, 1767.

Head with closely appressed scales; ocelli present; tongue developed. Antenna 3/5, ciliated in male. Labial palpi moderately long, curved, thickened with scales, tip pointed. Maxillary palpi obsolete. Fore wing (fig. 1), sub-triangular, costa gently arched, apex obtuse, termen rounded; R1 from 1/3,

R₅ to termen, Cu_{1b} from 8/9, 1A+2A furcate. Hind wing very broad, Cu_{1a} and M₃ connate, 1A+2A furcate.

Male genitalia (fig. 31): Uncus and gnathos present; transtilla absent; valva broad, with a marginal cucullus.

Female genitalia (figs. 32-33): Papillae anales short; ostium bursae large; signum, a fine scobination.

Mature larva (fig. 4): Head broader than long; A₂ nearer A₃ than A₁. Prothorax with L₁ about equidistant from L₂ and L₃, and just below them. Setae of SV group on segments 1-3 and 7-9 usually numbering 3:3:3:2:1:1.

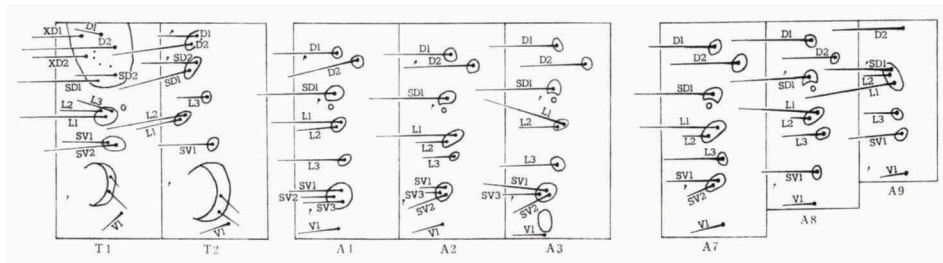


Fig. 4. *Anthophila fabriciana* Linnaeus, chaetotaxy of the mature larva.

Pupa (fig. 3): Similar to that of *Eutromula*, but distinct by the terminal segment of the abdomen, with a cremaster with four pairs of short setae.

Anthophila fabriciana (Linnaeus) (figs. 1, 3-4, 8, 16, 24, 31-33)

Phalaena Tortrix fabriciana Linnaeus, 1767, Syst. Nat., ed. 12(1): 880, no. 334.

Tortrix oxyacanthella Linnaeus, 1767, ibid.: 886, no. 357.

Pyralis fabriciana: Fabricius, 1794, Ent. Syst., 3: 276, nr. 143.

Tortrix dentana Hübner, [1799], Samml. europ. Schmett., 7, Tort.: pl. 2 figs. 4-5.

Tortrix urticana Hübner, [1822], ibid.: pl. 44 fig. 273.

Asopia alternalis Treitschke, 1829, Schmett. Eur., 7: 160, no. 13.

Simaethis fabriciana: Stephens, 1834, Ill. Brit. Ent., 4: 29. — Wood, 1839, Index Ent.: fig. 783. — Herrich-Schäffer, 1855, Schmett. Eur., 5: 95, no. 142. — Heinemann & Wocke, 1878, Schmett. Deutschl., 2(2): 5. — Snellen, 1882, Vlind. Ned., 2: 431, 437. — Meyrick, 1895, Handb. Brit. Lep.: 707; 1913, in Wagner, Lep. Cat., 13: 36; 1914a, in Wytzman, Genera Ins., 164: 22; 1928, Rev. Handb. Brit. Lep.: 707. — Rebel, in Staudinger & Rebel, 1901, Catal. Lep. Pal. Fauna: 129, no. 2318. — Meess, in Spuler & Hofmann, 1910, Schmett. Eur., 2: 297.

Anthophila fabriciana: Pierce & Metcalfe, 1935, Genit. Tineina: 40, pl. 23. — Ford, 1954, Proc. S. London Ent. & Nat. Hist. Soc., 1952-1953: 96, fig. 6 (*Simaethis*). — Toll, 1956, Klucze oznacz. owadow polski, (39-40) 27: 29, figs. 78-80. — Issiki, 1957, Icon. Het. Japon., 1: 33, pl. 4 fig. 130. — Kodama, 1961, Publ. ent. Lab. Coll. Agric. Univ. Osaka, 6: 38. — Lhomme, 1963, Catal. Lep. France & Belgique, 2: 496. — Danilevsky, 1969, Rev. Ent. USSR, 48: 926, figs. 7-8.

The adult and the genitalia have been described and figured by many

workers (Meyrick, 1895, 1928; Meess, in Spuler & Hofmann, 1910; Pierce & Metcalfe, 1935; Toll, 1956; Issiki, 1957; Danilevsky, 1969).

Material examined: Hokkaido — Sapporo, 11.vi.1955, 23.vi.1956, 25.vi.1956, 5.vii.1958, 6.vi.1959, 8.vii.1959 and 3.vii.1964 (T. Oku, T. Kumata), 4 ♂, 5 ♀. — Moiwa, Sapporo, 8.ix.1964, 21.viii.1966, 6.ix.1966 (T. Kumata), 3 ♂, 1 ♀. — Misumai, Sapporo, 30.viii.1967 (T. Kumata), 4 ♂, 4 ♀. — Siretoko, 10-17.vii.1965 (T. Kumata), 1 ♂. — Kenebetu, Nemuro, 4.vii.1966 (T. Kumata), 1 ♂. — Teine, 30.vi.1959 (T. Kumata), 1 ♂. — Abashiri, 11.vi.1956, 7.vi.1961 (T. Kumata), 3 ♂. — Nukabira, 14.vii.1959 (T. Kumata), 2 ♀, all in EIHU. — Kawayu, Kusiro, 21.vi.1958 (T. Yasuda), 1 ♂. — Akan, Kusiro, 23.vi.1958 (T. Yasuda), 1 ♀, all in ZLMU. Honshu — Yamanashi, Minamikuma, Narada, 27-29.viii.1977 (Y. Arita), 3 ♂, 2 ♀ in ZLMU; 2 ♂, 2 ♀ in RMNH. — Kyoto, Hanase, 22.v.1952 (A. Mutuura), 1 ♀; Kitayama, 19.v.1965 (Y. Arita), 1 ♀. — Osaka, Mioken, 21.v.1951 (A. Mutuura), 1 ♀. — Hyogo, Haga, 30-31.vii.1965 (S. Moriuti), 2 ♀; Okutani, 31.vii.1965 (T. Saito), 1 ♀; Ohginosen, emerged 3.vii.1966 (Y. Arita) reared from larvae on *Urtica thunbergiana* Siebold et Zuccarini, 2 ♀, all in ZLMU.

Extralimital material from Europe: Kortenhoef, 4.vi.1938 (C. Doets), 1 ♂. — Hilversum, 6.vi.1942 (C. Doets), 1 ♂. — Holl. Rading, 9.vi.1938 (C. Doets), 1 ♀. — Vogelenzang, Duinen, 20.v.1950 (C. Doets), 1 ♀. — Pieniny, Gorsztyn, 3.viii.1968 (J. Wojtusiak), 4 ♂, genit. slides 248, 286 YA, all in ZLMU.

Distribution: Japan (Hokkaido, Honshû, and Kyushû); all over the Palaearctic Region and in India.

Host plants in Japan: *Urtica thunbergiana* Siebold & Zuccarini (Urticaceae).

Mature larva (fig. 4): Length about 10 mm. Head blackish brown, mouth parts brown. Body light yellowish green; pinnacula dark brown; thoracic legs dark brown, tarsi yellowish brown. Head broader than long, front much longer than wide. Mandible (fig. 16) with a projecting inner side. Labrum, as in fig. 24. Ocelli, five on each side, arranged as in fig. 8. Head with A₂ nearer to A₃ than to A₁. Setal arrangement of metathorax similar to that of mesothorax (fig. 4). Setal maps of segments 4-6 similar to those of the abdominal segment 3 (fig. 4). Prothorax with L₁ about equidistant from L₂ and L₃ and just below them. Setae of SV group of abdominal segments 1-3 and 7-9 usually numbering 3:3:3:2:1:1.

Pupa (fig. 3): Length 5-5.5 mm. Width about 1.5 mm. Yellowish brown. Front a little raised, head ventrally slightly concave. Clypeal suture ill-defined. Labial palpus about 1/3 length of maxilla. Maxillary palpi developed. Maxilla reaching wing tips. Antenna about 4/5 length of maxilla. Fore wing reaching

almost $4/5$ length of maxilla. Fore wing almost to the middle of abdominal segment 5. Hind wing to about $1/2$ of third abdominal segment. Metathoracic legs reaching $2/3$ of maxilla. Abdominal segments 2-6 with a row of deep punctures along the frontal margin, and abdominal segments 3-7 with a row of sharp spines with deep punctures. Lateral part of terminal segment with four pairs of short setae. The arrangement of the setae as in fig. 4.

Ecological notes. The larva lives beneath a web on the upper side of the leaf of *Urtica thunbergiana* Siebold & Zuccarini, in May and June; when mature, it spins a white, spindle-shaped cocoon.

Eutromula Froelich

Eutromula Frölich, 1829, Enum. Tortr. Württemberg.: 11. — Fernald, 1900, Canad. Ent., 32: 240. — Fletcher, 1929, Mem. Dept. Agr. India, Ent., 11: 93. — Bradley, in Kloet & Hincks, 1972, Check-list Brit. Ins., 2: 12.

Type-species: *Phalaena pariana* Clerck [1764].

Hemerophila Hübner, 1806 (nec Hübner, 1817), Tentamen: 2. — Fernald, 1900, Canad. Ent., 32: 239. — Caradja, 1920, Iris, 34: 15. — Danilevsky & Kuznetsov, 1973, Horae Soc. ent. Union. Sov., 56: 8.

Type-species: *Phalaena pariana* Clerck [1764].

Entomoloma Ragonot, 1875, Ann. Soc. ent. Fr., (Ser. 5), 5, Bull.: XLIII.

Type-species: *Tortrix nemorana* Hübner [1799].

Hemerophila Fernald, 1900 (nec Hübner, 1817), Canad. Ent., 32: 239.

Type-species: *Phalaena pariana* Clerck [1764].

Orchemia Fernald, 1900 (nec Guenée, 1845), Canad. Ent., 32: 239.

Type-species: *Phalaena pariana* Clerck [1764].

Allononyma Busck, 1904, Proc. U.S. Nat. Mus., 27: 743. — Barnes & McDunnough, 1917, Check List: 181.

Type-species: *Tortrix diana* Hübner, [1822].

General characters are similar to those in the preceding genus, but *Eutromula* may easily be separated by the venation of the hind wing, Cu_1 and M_3 being short-stalked in the latter, and especially by the absence of a gnathos.

Male genitalia (*pariana*, figs. 59-61): A submembranous tuba analis with lateral bristles. Valva broad, of diverse shape; sacculus slender. Vinculum simple, U-shaped. Aedeagus diversely shaped.

Female genitalia (*pariana*, figs. 60-62): Ostium bursae usually strongly developed; ductus bursae long, sometimes very long; corpus bursae rounded. Signum, a denticulate or scobinate, usually flat sclerite.

Mature larva (*vinosa discolor*, fig. 5): Head broader than long; A_2 almost equidistant from A_1 and A_3 . Prothorax with L_1 , L_2 and L_3 usually in a straight line. Setae of SV group on the abdominal segments 1-3 and 7-9 usually numbering 2:3:3:2:1:1.

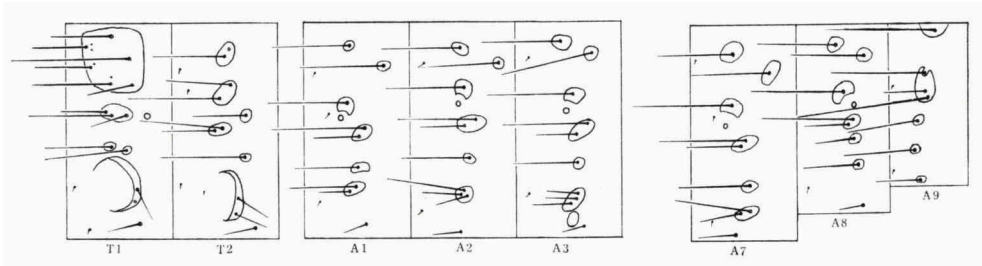


Fig. 5. *Eutromula vinosa discolor* subsp. nov., chaetotaxy of mature larva.

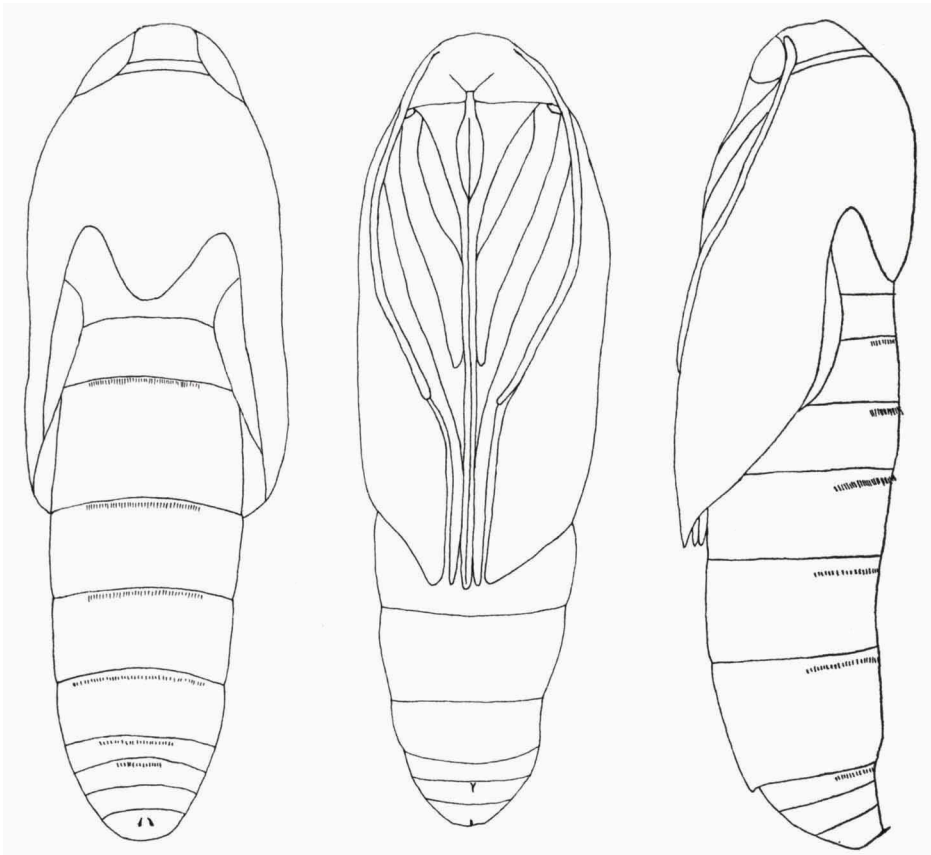


Fig. 6. *Eutromula vinosa discolor* subsp. nov., pupa, left : dorsal, middle : ventral, right : lateral aspect.

Pupa (*vinosa discolor*, fig. 6): Very similar to that of *A. fabriciana*, but the points of difference are as follows: abdominal segments 2-7 with a row of sharp spines along the front margin, without deep punctures along the margin. Terminal segment of the abdomen with a short cremaster of two dorsal setae.

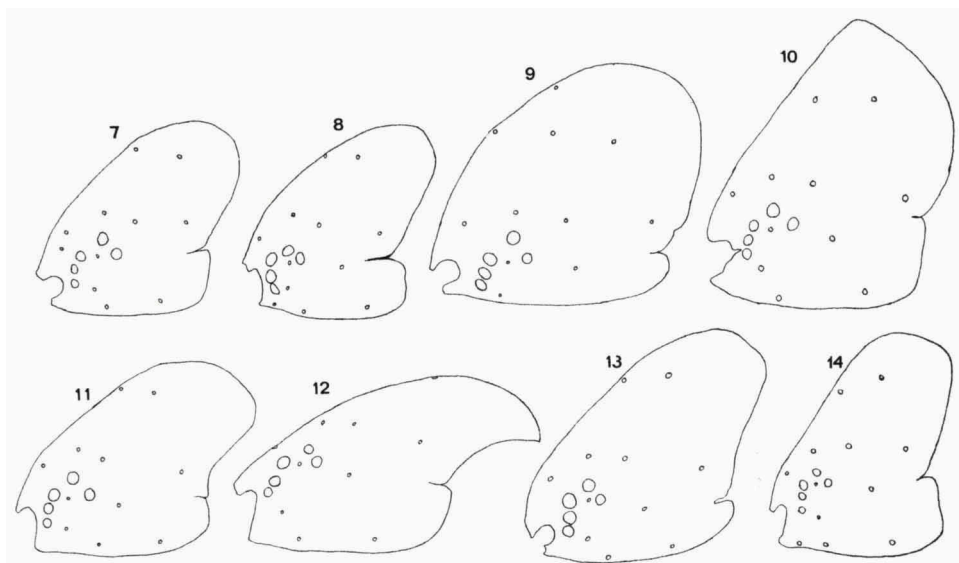
Biological notes: Leaf skeletonizers. The larva lives beneath a web on the upper or under side of the leaf. It is very active, jumping at the least touch. The white spindle-shaped cocoon is spun beneath a web on the upper surface of the leaf. The adults fly in sunshine about the host plants.

2. *Eutromula minuta* Diakonoff & Arita, spec. nov. (figs. 34-36)

♂ 9 mm. Head dark fuscous, frons and less so, vertex, sparsely mixed with pale yellow scales, face white slightly mixed with fuscous. Antenna blackish, banded with pale yellowish. Palpus blackish, basal segment whitish, median segment with a median and an apical yellowish ring, terminal segment with a median ring and an apical pale yellowish tip. Thorax dark fuscous, mixed with pale yellow scales, large on tegulae, apex of thorax yellowish. Abdomen blackish, banded with pale yellowish, anal tuft black.

Fore wing broadly triangular, costa curved, especially towards apex, apex obtusely-rectangular, termen gently rounded, prominent above middle. Dark fuscous, coarsely mixed and strewn with white and light ochreous. First transverse streak from beyond $1/3$ of costa to beyond $1/3$ of dorsum, white, moderately outwards-curved, more or less zigzagged, with 3-4 acute angulations posteriorly, largest of these below costa; basal patch sparsely strewn with pale yellow scales, a small oblique transverse white line beyond extreme base of costa; second transverse band from $2/3$ of costa to $3/4$ of dorsum, double, excurved posterad, upper third outwards-oblique and excurved median third vertical, lower part below fold shifted anterad and outwards-oblique; anterior line interrupted below $1/3$, below middle and in fold, preceded by an additional small curved line at $1/3$ and another, across fold; posterior line ochreous, broader than first along upper third and below fold, interrupted as the anterior; median space denser strewn with brighter ochreous, dusting forming some four longitudinal ill-defined denser patches, except before lower half of second band; posterior area similarly dusted, towards termen, with an oblique denser streak to apex. Cilia with basal third and three patches, in apex, above middle and in tornus, respectively, dark fuscous, remainder white.

Hind wing grey-fuscous, becoming slightly paler towards base, cell with some sparse whitish dusting, followed by a separated white suffused transverse spot before middle of termen, an ill-defined sub-marginal streak be-



Figs. 7-14. *Eutromula* and *Anthophila* species, ocellar region of the head capsule of the mature larva. 7, *E. vinosa discolor*; 8, *A. fabriciana*; 9, *E. hyligenes*; 10, *E. ophiosema*; 11, *E. yakushimensis*; 12, *E. atrosignata*; 13, *E. japonica*; 14, *E. achyrodes*.

tween this and tornus, dorsum with denser whitish dusting. Cilia white with a black basal line, around apex and tornus cilia grey.

Male genitalia: Tegumen moderate, triangular, in middle slightly narrowed, top rounded. Tuba analis weak, pointed, sparingly bristled with weak bristles. Vinculum strong, broadly triangular, sacculus represented by a backwards-directed prominence (in mount showing as an oval); frontal angles rounded, strongly sclerotic. Valva rather narrow, pointed, costa and sacculus parallel, cucullus edge oblique. Cuculus spined, extreme top with short, dense modified thicker spines; sacculus at end with a small oval patch of bristles. Anellus Y-shaped, upper half outwardly thinly haired. Aedeagus long and slender, sinuate, little dilated towards base, coecum penis short, apex with an obtuse thorn-like process above orifice. Cornuti, a longitudinal patch of aciculations along anterior 2/5.

Female genitalia: Eighth sternite moderately sclerotic, broadly transverse, upper angles rounded, upper edge moderately concave. Ostium indefinite. Ductus bursae thin, long, dilated only above corpus bursae which is pear-shaped. Signum, a finely dentate sclerite.

Japan, Iriomote Id., Okinawa Prefecture, 1 ♂, holotype, 18.iv.1962 (G. Kuno). Genit. slide 9775 AD. In EIHU. — Paratypes: Ryukyus — Is. Okinawa, Shuri, 28.viii.1965 (Y. Arita), 1 ♀ (allotype), genit. slide 114 YA. — Is. Miyako, 24.iv.1962 (G. Kuno), 3 ♂, genit. slides 90, 259 YA. — Same

data as holotype 1 ♂, 1 ♀, genit. slide ♀ 118 YA. — Is. Ishigaki, Takeda, 14.iii.1978 (Y. Arita), 2 ♀, paratypes deposited in EIHU and ZLMU; 1 ♀, paratype in RMNH.

The species is close to *Eutromula dichlora* (Meyrick), from Hainan Island (China) and from Java, superficially hardly differing at all, but with a shorter and less sinuate aedeagus, less modified spines at the top of the cucullus, different anellus and a different eighth sternite and sterigma in the female of the last species.

Host plant: Unknown.

***Eutromula xanthogramma* (Meyrick) comb. nov. (figs. 37-38, 40-41)**

Simaethis xanthogramma Meyrick, 1912, Exot. Microlep., 1: 42; 1913, in Wagner, Lep. Cat., 13: 35; 1914a, in Wytzman, Gen. Ins., 164: 21.

Anthophila xanthogramma: Diakonoff, 1968, Bull. U.S. Nat. Mus., 257: 204. — Clarke, 1969, Catal. Meyrick's Types, 6: 20, pl. 10 fig. 4.

The male genitalia have been illustrated by Clarke, 1969 (figs. 37-38).

Female genitalia: figs. 40-41. Ostium bursae very small. Ductus bursae broad, membranous. Corpus bursae with a dash-shaped signum.

Material examined: Ryukyu Ids. — Ishigaki Id., Takeda, 30.iii.1962 (Y. Arita), 1 ♀, genit. slide 111 YA. In ZLMU.

Distribution: Ryukyu Islands (Ishigaki Id.), Formosa, Philippine Ids. (Mindoro), New Guinea and Kei Ids.

Host plant: Unknown.

***Eutromula basalis* (Felder & Rogenhofer) comb. nov. (figs. 39, 42-43)**

Simaethis basalis Felder & Rogenhofer, 1875, Reise Novara, 2 (7), pl. 138 fig. 19. — Pagenstecher, 1900, Zoologica, 29 (12): 229. — Meyrick, 1907, Proc. Linn. Soc. New South Wales, 32: 111; 1913, in Wagner, Lep. Cat., 13: 35; 1914a, in Wytzman, Gen. Ins., 164: 21; 1938, Trans. Roy. ent. Soc. London, 87: 523. — Turner, 1913, Proc. Linn. Soc. New South Wales, 38: 210.

Anthophila basalis: Diakonoff, 1948, Treubia, 19: 204; 1955, Verh. Ned. Akad. Wet., Nat., ser. 2, 50 (3): 26; 1968, Bull. U.S. Nat. Mus., 257: 203.

Simaethis chionodesma Lower, 1896, Trans. Roy. Soc. S. Australia, 20: 167.

Male genitalia have been described and figured by Diakonoff, 1968 (fig. 39).

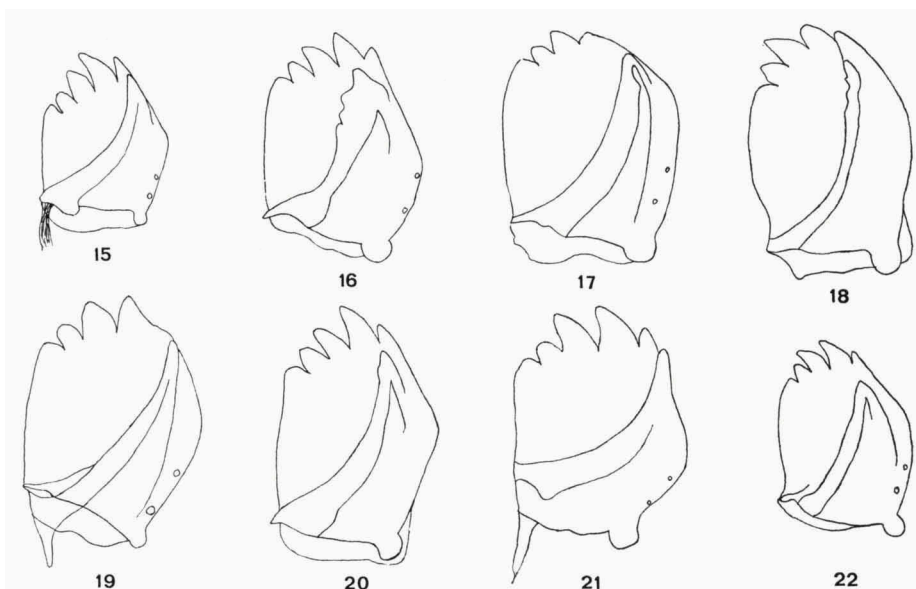
Female genitalia: figs. 42-43. Ostium bursae small, opening heavily sclerotized. Ductus bursae extremely long (about 9 mm). Signum, a scobinate patch.

Material examined: Ryukyus — Is. Ishigaki, Takela, 20.iii.1962, 30.iii.1962 (Y. Arita), 3 ♀, genit. slide 110 YA; Kawarayama, 6.v.1963 (Y. Arita), 1 ♂; Mt. Omotodake, 10.ix.1965 (Y. Arita), 3 ♂, 1 ♀ in ZLMU; 1 ♂, 1 ♀ in RMNH, genit. slides ♂ 37, ♂ 39, ♂ 255, ♀ 32, ♀ 116 YA. — Is. Iriomote,

Inaba, 20.v.1963 (Y. Arita), 1 ♂; Maira-gawa, 8.ix.1965 (Y. Arita), 3 ♂, 2 ♀, genit. slides ♂ 103, ♀ 33, ♀ 289 YA, all in ZLMU.

Distribution: Ryukyu Islands (Islands Ishigaki and Iriomote), Philippine Islands, New Guinea, Aru, Amboina, Buru, Moluccan Islands, Celebes and East Australia.

Host plant: Unknown.



Figs. 15-22. *Eutromula* and *Anthophila* species, mandible of mature larva. 15, *E. vinosa discolor*; 16, *A. fabriciana*; 17, *E. hyligenes*; 18, *E. ophiosema*; 19, *E. yakushimensis*; 20, *E. japonica*; 21, *E. atrosignata*; 22, *E. achyrodes*.

***Eutromula ophiosema* (Lower) comb. nov. (figs. 44-45)**

Simaethis ophiosema Lower, 1896, Trans. Roy. Soc. S. Australia, 20: 167. — Meyrick, 1913, in Wagner, Lep. Cat., 13: 35; 1914a, in Wytzman, Gen. Ins., 164: 21. Meyrick & De Joannis, 1929, Ann. Soc. ent. Fr., 98: 737.

Male genitalia: fig. 44. Tegumen slender. Aedeagus moderate, tubular. Valva with a finger-like costal process from 2/3; cucullus broad. Aedeagus short and broad, pointed at apex. Cornuti absent.

Female genitalia: fig. 45. Ostium bursae circular. Ductus bursae membranous. Corpus bursae pear-shaped. Signum denticulate.

Material examined: Yakushima — Miyanoura, emerged 22.ix.1975 (Y. Arita) reared from larvae on *Ficus microcarpa* Linnaeus filius, 1 ♂, 1 ♀, genit. slides ♂ 254, ♀ 288 YA in ZLMU; 2 ♂, 2 ♀ in RMNH; Nakama, emerged 11.viii.1973, 14.viii.1973 (A. Kawabe) reared from larvae on *F.*

microcarpa, 2 ♂, 2 ♀. Ryukyus — Is. Okinoerabu, 23.iv.1960, 24.iv.1965 (T. Kodama, H. Kuroko), 5 ♂, 1 ♀, genit. slides ♂ 105, ♀ 112 YA. — Is. Tokunoshima, 18.vii.1964 (Y. Hori), 2 ♂, 1 ♀, genit. slide ♂ 36 YA. — Is. Okinawa, Naha-shi, 12.ix.1965 (Y. Arita), 1 ♂. — Is. Miyako, Hirara, 16.iii.1962, 24.iv.1962, 1.v.1963 (Y. Arita, G. Kuno), 2 ♂, 2 ♀. — Is. Ishigaki, Takeda, 3.v.1963 (Y. Arita), 1 ♀. — Is. Iriomote, Komi, 11.iv.1962, 18.iv.1962 (Y. Arita, G. Kuno), 4 ♂, 1 ♀; Unishiikunomori, 7.viii.1962 (M. Sato et Y. Arita), 2 ♀; Inaba, 9.viii.1962 (M. Sato et Y. Arita), 1 ♂. — Is. Yonakuni, Tabarugawa, 9.v.1963, 12.v.1963, 15.v.1963 (Y. Arita), 2 ♂, 4 ♀, genit. slides ♂ 35, ♂ 42 YA, all in ZLMU and in EIHU.

Distribution: Japan (Kyushu; Island Yakushima and the Ryukyu Islands), S China, India, Moluccan Islands, and E Australia.

Host plant: *Ficus microcarpa* Linnaeus filius (Moraceae).

Mature larva about 12 mm. Similar in general appearance to larvae of other *Eutromula* species, except its being longer; slight other differences may be found in the ocellar region of the head (fig. 10), in the labrum (fig. 26) and in the shape of the mandible (fig. 18).

***Eutromula fulminea* (Meyrick) comb. nov. (figs. 47-48)**

Simaethis fulminea Meyrick, 1912, Exot. Microlep., 1: 48. — Clarke, 1969, Cat. Meyrick's Types, 6: 18, pl. 4 figs. 2-2c.

Male genitalia: fig. 47, have been figured by Clarke, 1969. Anellus moderate, tubular. Valva simple, with a long thorn on costal margin at 2/3. Aedeagus long, extremely slender, terminating in a distal hook. Cornuti absent.

Female genitalia: fig. 48. Ostium bursae, very large, heart-shaped. Ductus bursae sclerotized along posterior 2/9. Corpus bursae with a small flat signum.

Material examined: Ogasawara Ids. — Is. Chichijima, Oomura, 4.iv.1973, 26.iv.1973, 4.v.1974 (Y. Kusui, Y. Hori), 1 ♂, 3 ♀, genit. slides ♂ 124, ♀ 125, ♀ 204, ♀ 291 YA in ZLMU; 1 ♀ in RMNH.

Distribution. Japan (Ogasawara and Chichi-jima Islands). Ceylon (type locality).

Host plant: Unknown.

***Eutromula amethystodes* (Meyrick) comb. nov. (fig. 46)**

Simaethis amethystodes Meyrick, 1914b, Suppl. Ent., 3: 57.

Anthophila amethystodes: Diakonoff, 1968, Bull. U.S. Nat. Mus., 257: 204, figs. 338, 681-682.

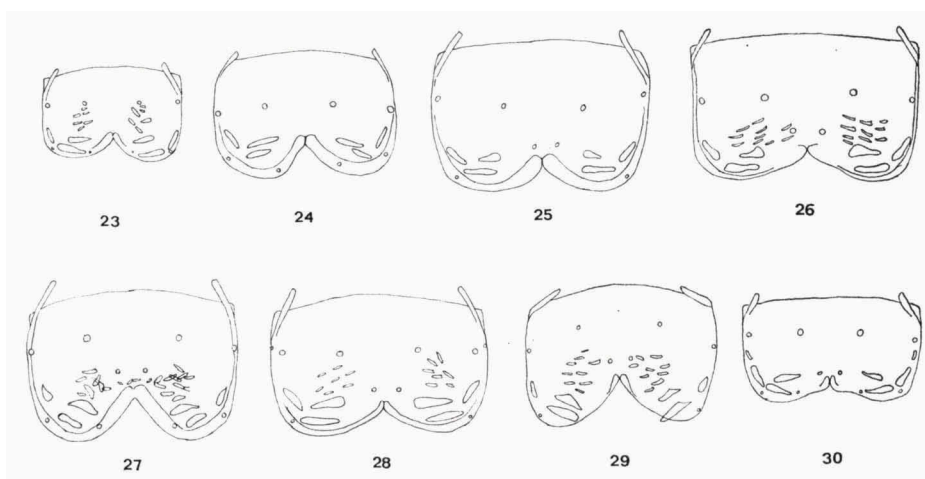
The adult and the male genitalia have been described and figured by Diakonoff, 1968.

Female genitalia: fig. 46. Ostium bursae very wide, funnel-shaped. Ductus bursae simple. Signum moderate, transverse.

Japan, Ryukyu Ids., Ishigaki Id., Mt. Omoto-dake, 10.x.1965 (Y. Arita leg.), 1 ♀, genit. slide no. 301 YA.

Distribution: Japan (Ryukyu Islands: Ishigaki and Iriomote Islands). Philippine Islands (Mindoro). Kei Islands.

Host plant: Unknown.



Figs. 23-30. *Eutromula* and *Anthophila* species, labrum of mature larva. 23, *E. vinosa* *discolor*; 24, *A. fabriciana*; 25, *E. hyligenes*; 26, *E. ophiosema*; 27, *E. yakushimensis*; 28, *E. japonica*; 29, *E. atrosignata*; 30, *E. achyrodes*.

***Eutromula cyanogramma* Diakonoff & Arita, spec. nov. (fig. 54)**

♀ 14-16 mm. Head ochreous tinged tawny-olive in certain lights, vertex opalescent blackish, face pale ochreous. Antenna black finely ringed with white. Palpus rather long, curved and subascending, smooth, gently narrowed, top truncate, median segment yellowish-white, with a subbasal and a subapical broad black bands; terminal segment black with a submedian yellowish-white narrow ring and tip. Thorax rather deep tawny-olive, with a suffused transverse blackish submedian and another, subapical band.

Fore wing broad, triangular, strongly dilated, costa curved, apex subobtusate, termen rounded and slightly prominent in middle. Bright orange-ochreous, on posterior half becoming rather obscured by tawny, termen light yellow, slightly mixed with black. Two transverse light blue bands, little iridescent, slightly tinged violet in certain lights, on costa each with a white dot; first

band at 1-3, edged anteriorly by a straight black slightly inwards-oblique streak, posterior edge of blue rather suffused with black and dusted with ochreous, edged by a narrower black streak, convex above, concave below; basal patch with two suffused blackish bands, one beyond base, another median; second blue band narrower than first, at 2/3, along upper half rounded posteriorly, from middle to fold with a stronger rounded prominence, from fold to dorsum rounded once more, less strongly; white mark on costa wedge-shaped, outwards-oblique; a more slender blue branch from anterior edge of band just above its middle, angulate in its middle, vertically rising above angulation halfway to costa; space between blue bands blackish, with a tawny-ochreous colour sparsely suffused along anterior edge of second band and filling out the furcation to below edge of costa, and with a bright ochreous-orange narrow submedian streak obtusely angulate above middle, outwards-convex below, not reaching dorsum; second blue band posteriorly edged by a black streak, this followed by a second such streak, broader, more suffused, especially irregular posteriorly, not quite reaching costa, with a rounded posterad median third, outwards-concave above and below this; termen rather dusted with black with a moderate marginal black line throughout. Cilia pale grey, with dark grey apical, median and tornal patch, extreme tips between patches white.

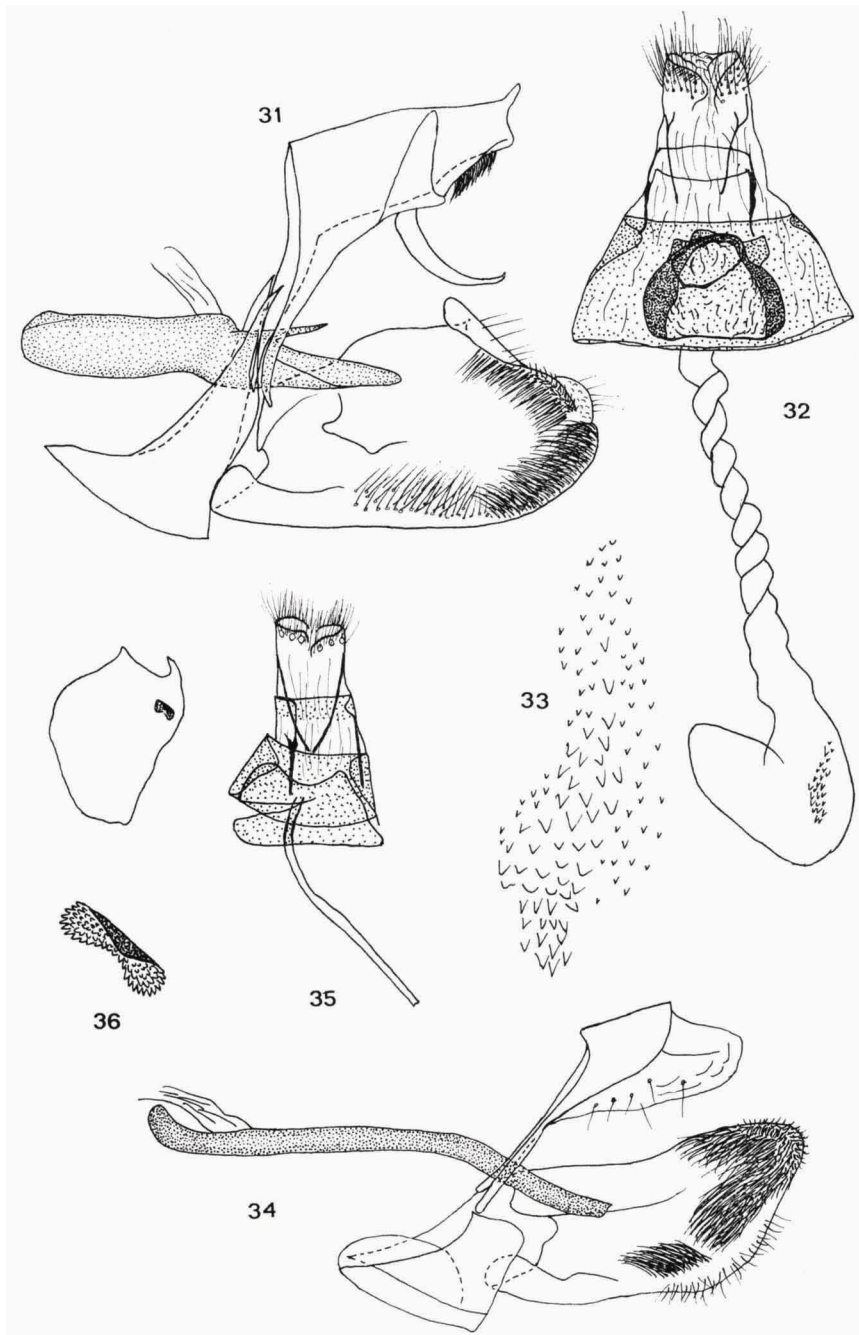
Paratype rather darker throughout, blue bands less contrasting, rather more violet tinged, broader, subterminal black line also broader.

Hind wing bronze-fuscous with a purple gloss, with deep ochreous markings: an undulate transverse band from dorsum above tornus, parallel to termen, not reaching costa, its costal end curving basad, a broad streak from its middle running almost to base, an acute cusp between them; a second just submarginal ochreous streak, from tornus to middle of termen; some loose ochreous scales in apex; a black marginal line, very narrow around apex, broader and darker along termen to before tornus. Cilia pale orange along costa, elsewhere pale yellow, with a grey, interrupted median band and whitish tips.

Female genitalia. Ovipositor and apophyses short, anapophyses dilated in middle. Ostium, a thin-walled rather weak almost spherical cup, upper rim with a broad rounded ventral lip. Ductus bursae long and narrow, moderately tortuous and longitudinally wrinkled throughout. Corpus bursae spherical, signum, a transverse scobinate sclerite, ends gradually dilated and truncate.

Japan, Ryukyu Ids., Iriomote Id., Inaba, 20.v.1963 (Y. Arita), 1 ♀, holotype, genit. slide 117 YA. In ZLMU. — Ishigaki Id., Takeda, 3.v.1963 (Y. Arita), 1 ♀, paratype, genit. slide 113 YA. In RMNH.

An elegant species, differing from *E. amethystodes* Meyr. by minor par-



Figs. 31-36. Genitalia of *Anthophila* Haworth and *Eutromula* Froelich. 31, *A. fabriciana* Linnaeus, ♂; 32, do., ♀; 33, do., signum; 34, *E. minuta* spec. nov. ♂; 35, do., ♀; with right, bursa; 36, do., signum, more magnified.

ticulars of the pattern, especially the furcate second band, and by the genitalia. Without males being available it is not possible to assign to the present species an exact place within *Eutromula*.

Host plant: Unknown.

***Eutromula japonica* (Zeller) comb. nov. (figs. 13, 20, 28, 49, 50)**

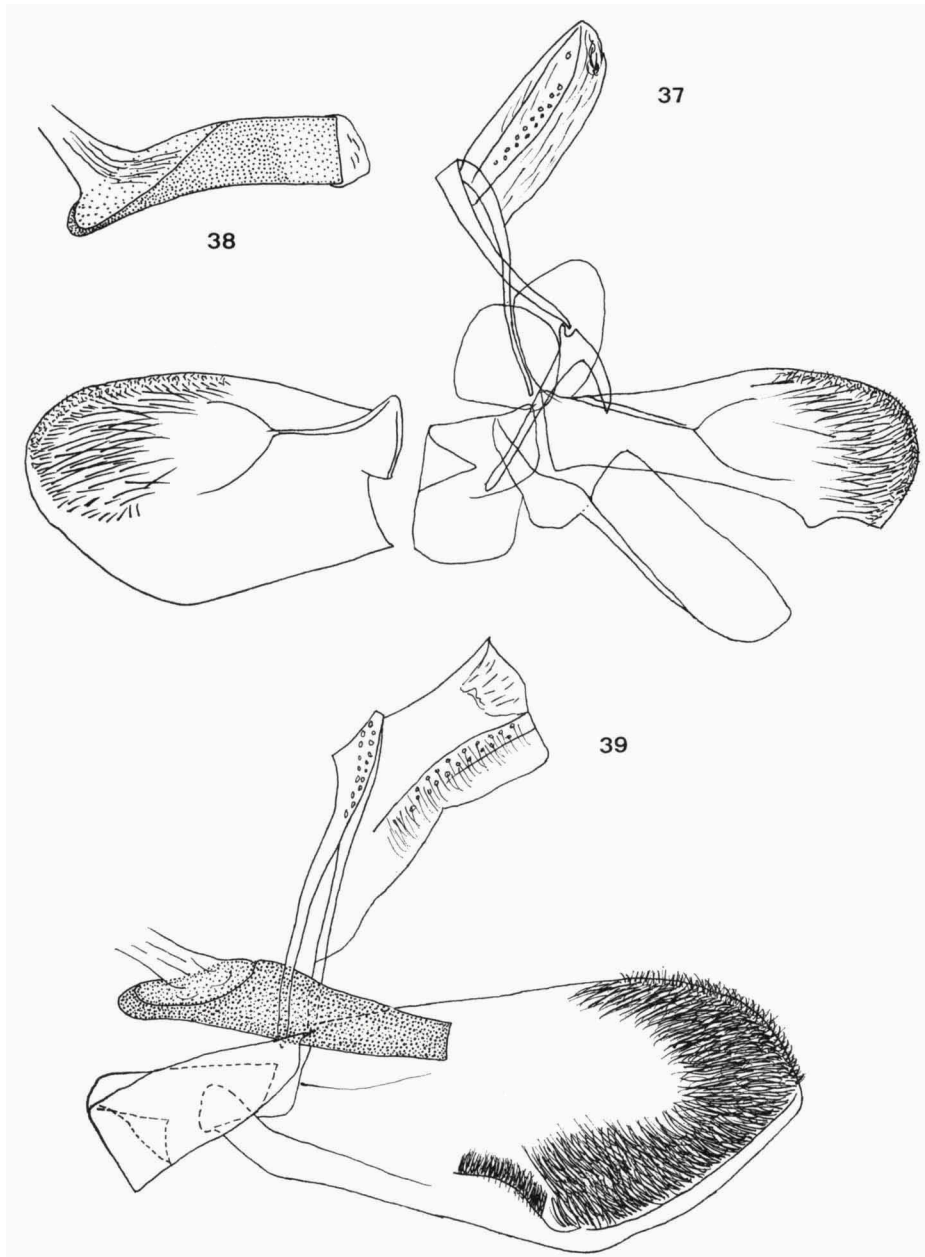
Simaethis japonica Zeller, 1877, Horae Soc. ent. Ross., 13: 174, pl. 2 fig. 64. — Meyrick, 1913, in Wagner, Lep. Cat., 13: 36; 1914a, in Wytzman, Gen. Ins., 164: 22. — Matsumura, 1931, 6000 Ill. Ins. Japan: 1080, no. 2193.

Anthophila japonica: Inoue, 1954, Check List Lep., 1: 48. — Issiki, 1957, Icon. Het. Japon. Col., 1: 33, pl. 4 fig. 128. — Kodama, 1961, Publ. Ent. Lab. Coll. Agric. Univ. Osaka, 6: 38.

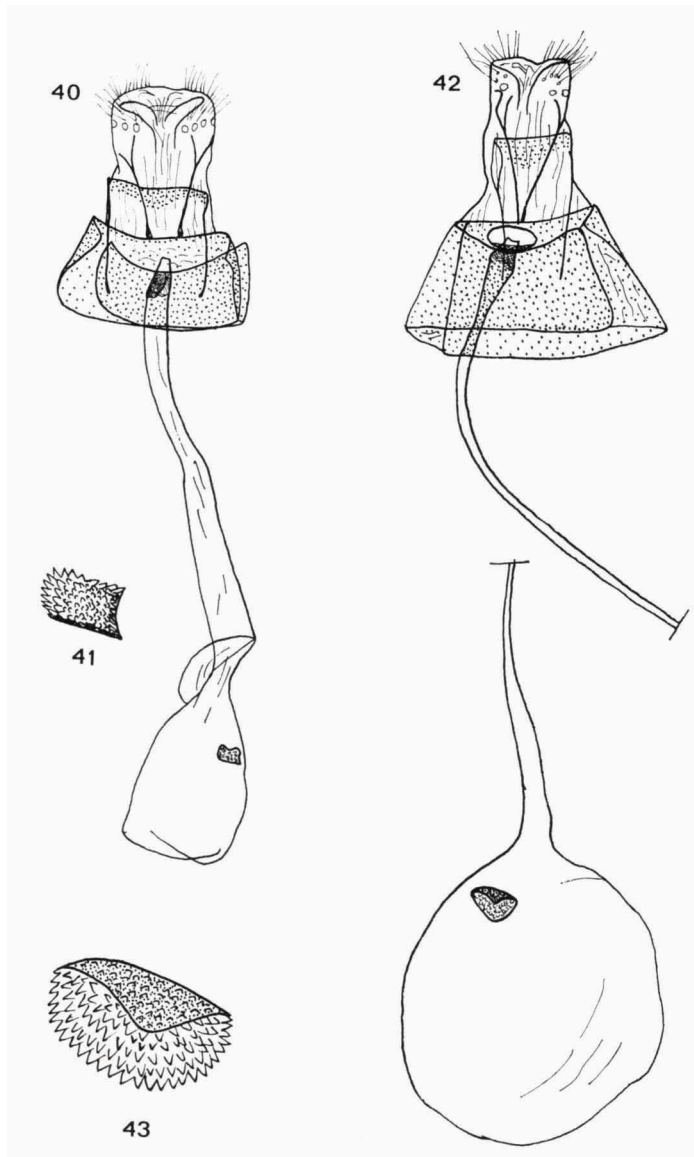
Male genitalia: fig. 49. A pair of spindle-shaped large socii-like subscaphia(?), well developed and clothed with short soft hairs. Valva broad, haired over apical part; sacculus moderately dilated in middle. Vinculum little sclerotic. Aedeagus narrow, with an acute top.

Female genitalia: fig. 50. Papillae anales short and broad, dilated at apex. Ostium bursae large, oval, beset with dense scales. Ductus bursae long, slender. Corpus bursae moderate, pear-shaped. Signum lozenge-shaped, scobinate.

Material examined: Honshu — Osaka, Ikoma, 7.vi.1965 (Y. Arita), 1 ♀, genit. slide 292 YA. — Wakayama, Nachisan, 17.v.1957 (T. Kodama), 1 ♀; Ozaki, Izumi, 16.v.1961 (T. Saito), 1 ♂, all in ZLMU; Kozagawa, 14-20.v.1954 (T. Kumata), 1 ♂; Taizi, 26.v.1964 (T. Kumata), 2 ♂; Kii-Oshima, 21-24.v.1964, 5.v.1966 (T. Kumata, Y. Arita), 8 ♂, 5 ♀ in ZLMU and in EIHU. — Yamaguchi, Shimonoseki, 31.vii.1965, emerged 8-17.viii.1965 (Y. Arita), reared from larvae on *Ficus erecta* Thunberg, 2 ♂, 11 ♀, genit. slides ♂ 13, ♀ 294 YA; 1 ♂, 2 ♀ in RMNH. Shikoku — Kooti, Ashizurimisaki, 11.vii.1963, 14.vi.1964 (Y. Arita, S. Moriuti), 1 ♂, 1 ♀; Iwaidani, 15.vi.1964 (S. Moriuti), 1 ♀. Kyushu — Kagoshima, Ikedako, 30.v.1953 (A. Mutuura), 2 ♀; Kaimon, 19.x.1958 (T. Yasuda), 1 ♂; Sata, Oosumi, 30.iv.1960 (S. Moriuti), emerged 28.vii.1975 (Y. Arita) reared from larvae on *Ficus pumila* Linnaeus, 5 ♂, 1 ♀, genit. slide ♂ 256 YA; Takakuma, 16.vi.1965 (T. Kumata), 1 ♀. — Is. Yakushima, Anbo, 12.vi.1965 (T. Kumata), 2 ♀; Miyanoura, emerged 7.x.1975 (Y. Arita) reared from larvae on *F. erecta*, 1 ♂, 1 ♀ in ZLMU and in EIHU. — Is. Tanegashima, Nishinoomote, 13.vi.1965 (T. Kumata), 1 ♀ in EIHU. Ryukyus — Amami-Oshima, Yuwan, 27.iv.1959 (K. Kamijo), 1 ♂; Santarotoge, 28.iv.1960 (T. Kodama), 1 ♂. — Is. Okinawa, Naha-shi, 29.iv.1963 (Y. Arita), 1 ♀, all in ZLMU. — Is. Ishigaki, 14.iv.1962 (G. Kuno), 1 ♀; Takeda, 22.iii.1962 (Y. Arita), 1 ♂,



Figs. 37-39. Male genitalia of *Eutromula* Froelich. 37, *xanthogramma* Meyrick; 38, do., aedeagus; 39, *basalis* Felder & Rogenhofer.



Figs. 40-43. Female genitalia of *Eutromula* Froelich. 40, *xanthogramma* Meyrick; 41, do., signum; 42, *basalis* Felder & Rogenhofer; 43, do., signum, more magnified.

genit. slide 34 YA; Omoto-dake, 9.ix.1965 (Y. Arita), 1 ♀ in ZLMU. — Is. Iriomote, 18.iv.1962 (G. Kuno), 1 ♂ in EIHU.

Distribution: Japan (Honshu, Shikoku, Kyushu and Ryukyus).

Host plant: *Ficus erecta* Thunberg and *F. pumila* Linnaeus (Moraceae).

Mature larva: about 10 mm. Externally identical with other species, but a slight difference from others can be found in ocellar region (fig. 13), labrum (fig. 28) and the form of mandible (fig. 20).

***Eutromula yakushimensis* (Marumo) comb. nov.**

(figs. 11, 19, 27, 51-53)

Simaethis yakushimensis Marumo, 1923, Journ. Coll. Agric. Imp. Univ. Tokyo, 8(2): 198, pl. 3 fig. 8.

Anthophila yakushimensis: Inoue, 1954, Check List Lep., 1: 48, no. 234.

Note. Since the private collection of Dr. Marumo and his type specimens have been destroyed by fire during World War II, it seems useful to select a neotype for the present species which is effected now.

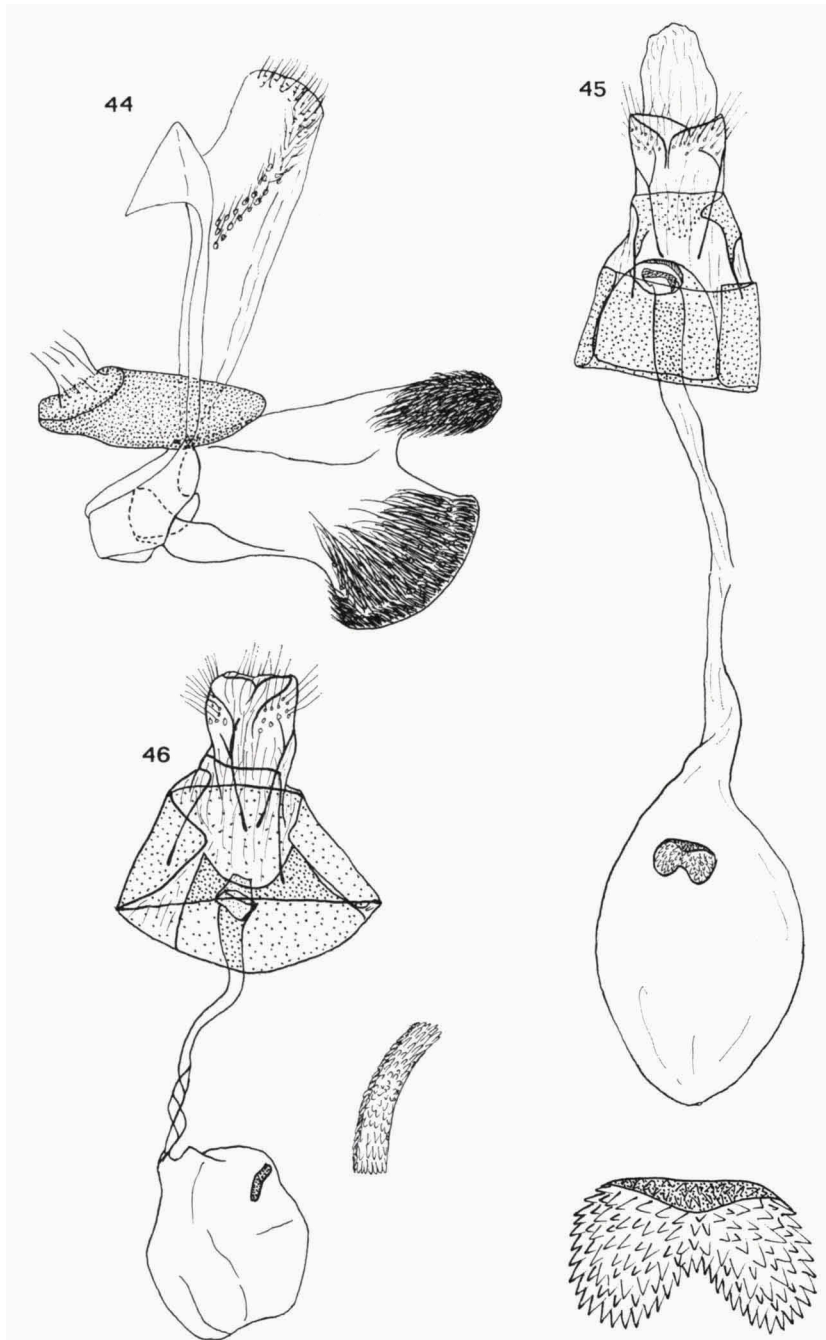
Neotypes, hereby selected: ♂/Larva collected Is. Yakushima, Miyanoura, 22.ix.1975 (Y. Arita leg.)/Em. date 2.x.1975. Host: *Villebrunea pedunculata* Shirai/♂/*Eutromula yakushimensis* Marumo ♂. Det. Y. Arita/Neoholotype, *Eutromula yakushimensis* Marumo ♂ Y. Arita 1978 (red)/. — ♀/The same label/Em. date 7.x.1975/Neallotype, ♀, *Eutromula yakushimensis* Marumo ♀, Y. Arita, 1978 (red)/.

Male genitalia: fig. 51. Subscaphium long, not pointed. Valva broad at apex, with fine and dense bristles on posterior half of the entire valva. Vinculum weakly sclerotized. Aedeagus short, apical part little sclerotic.

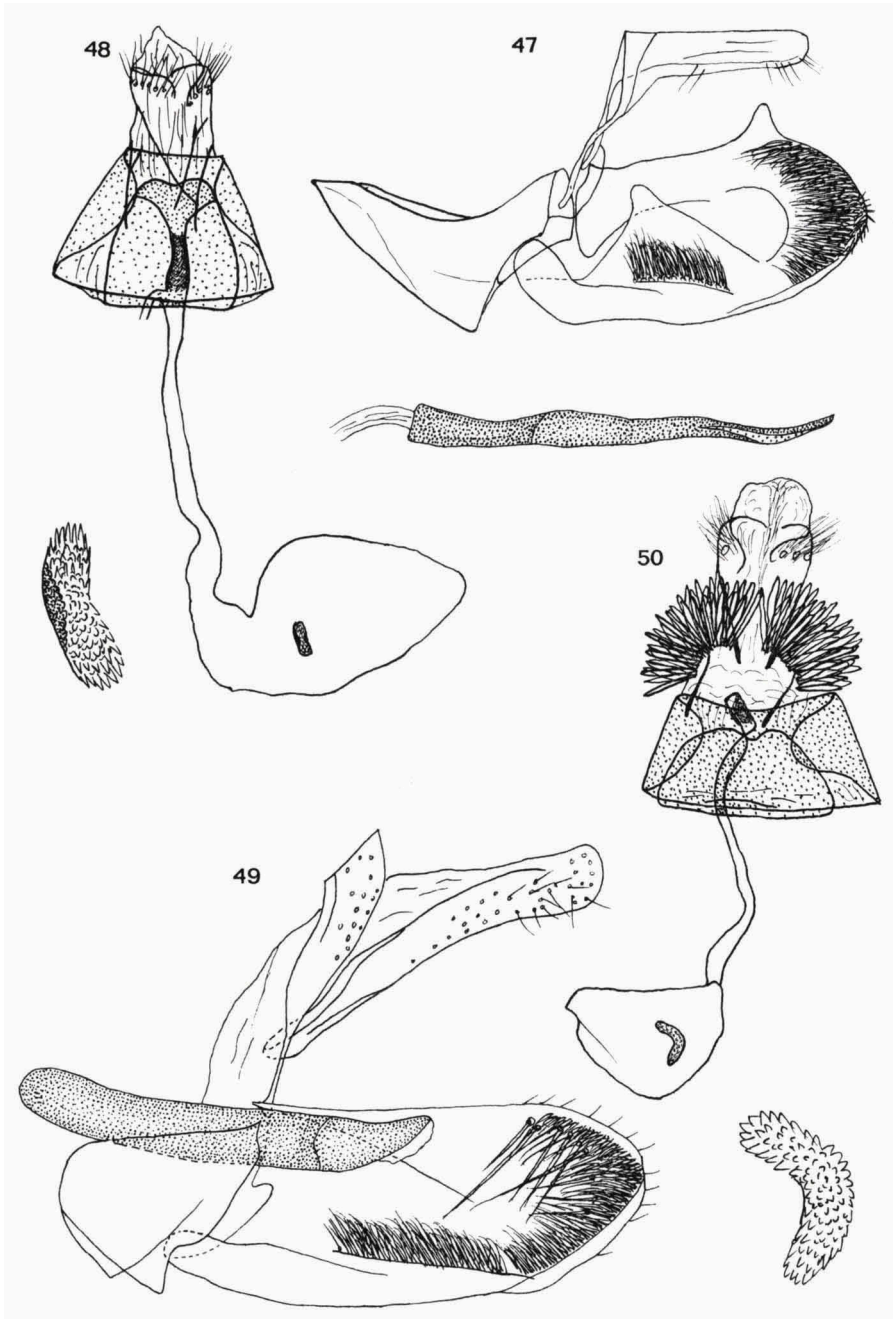
Female genitalia: figs. 52-53. Papillae anales short. Ostium bursae shallow, cup-shaped. Ductus bursae very long (4 mm), slender. Corpus bursae pear-shaped. Signum oblong.

Material examined: Honshu — Mie, Ohsugidani, 12.vi.1952 (T. Kodama), 1 ♀. — Nara, Odaigahara, 14.vii.1961 (T. Saito), 1 ♂. — Wakayama, Nachisan, 28.vii.1957, 30.viii.1958 (S. Moriuti, A. Mutuura), 1 ♂, 1 ♀; emerged 13.v.1957, 24.v.1957, 21.v.1957 (T. Kodama) reared from larvae on *Debregrasia edulis* Weddell, 4 ♂, 5 ♀, genit. slides ♂ 16, ♂ 297, ♀ 122, ♀ 23 YA. Kyushu — Fukuoka, Mt. Hikosan, 27.viii.1956, 17.vii.1957 (H. Kuroko), 2 ♀; emerged 25.vii.1957, 28.vii.1975 (Y. Arita) reared from larvae on *Boehmeria spicata* Thunberg, 3 ♀. — Kumamoto, Naidaijikei, emerged 30.x.1958 (T. Yasuda), reared from larvae on *B. spicata*, 4 ♂, 4 ♀, genit. slide ♂ 17 YA. — Kagoshima, Satamisaki, emerged 26.vii.1975, 28.vii.1975, 30.vii.1975 (Y. Arita) reared from larvae on *Villebrunea pedunculata* Shirai, 5 ♂, 1 ♀, genit. slide ♂ 258 YA in ZLMU; 2 ♂, 2 ♀, in RMNH. Is. Yakushima — Anbo, 21.vi.1965, 23.vi.1965, 1.vii.1965 (T. Kumata), 4 ♂, 7 ♀ in EIHU. — Miyanoura, 22.ix.1975 (Y. Arita), 4 ♀, genit. slide 295 YA, in ZLMU.

Distribution: Japan (Honshu and Kyushu).



Figs. 44-46. Genitalia of *Eutromula* Froelich. 44, *ophiosema* Lower, ♂; 45, do., ♀; with signum, more magnified; 46, *amethystodes* Meyrick, ♀, with signum, more magnified.



Figs. 47-50. Genitalia of *Eutromula* Froelich. 47, *fulminea* Meyrick, ♂; 48, do., ♀; with signum, more magnified; 49, *japonica* Zeller, ♂; 50, do., ♀, with signum, more magnified.

Host plants: *Debregrasia edulis* Weddell, *Boehmeria spicata* Thunberg (Urticaceae) and *Villebrunea pedunculata* Shirai.

Mature larva: about 9 mm. Apparently externally identical with the larva of *E. vinosa discolor*, but slight differences are to be found in the ocellar region of the head (fig. 11), the labrum (fig. 27) and the shape of the mandible (fig. 19).

Eutromula achyrodes (Meyrick) comb. nov. (figs. 14, 22, 30, 55, 57)

Simaethis achyrodes Meyrick, 1912, Exot. Microlep., 1: 46; 1913, in Wagner, Lep. Cat., 13: 35; 1914a, in Wytzman, Gen. Ins., 164: 21.

Anthophila achyrodes: Clarke, 1969, Cat. Meyrick's Types, 6: 3, pl. 1 figs. 1-1b.

Simaethis albifascialis Marumo, 1923, Journ. Coll. Agric. Imp. Univ. Tokyo, 8(2): 199, pl. 3 fig. 9. **Syn. nov.**

Anthophila albifascialis: Inoue, 1954, Check List Lep., 1: 49, no. 235.

Simaethis kochiensis Matsumura, 1931, 6000 Ill. Ins. Japan: 1080, no. 2194. **Syn. nov.**

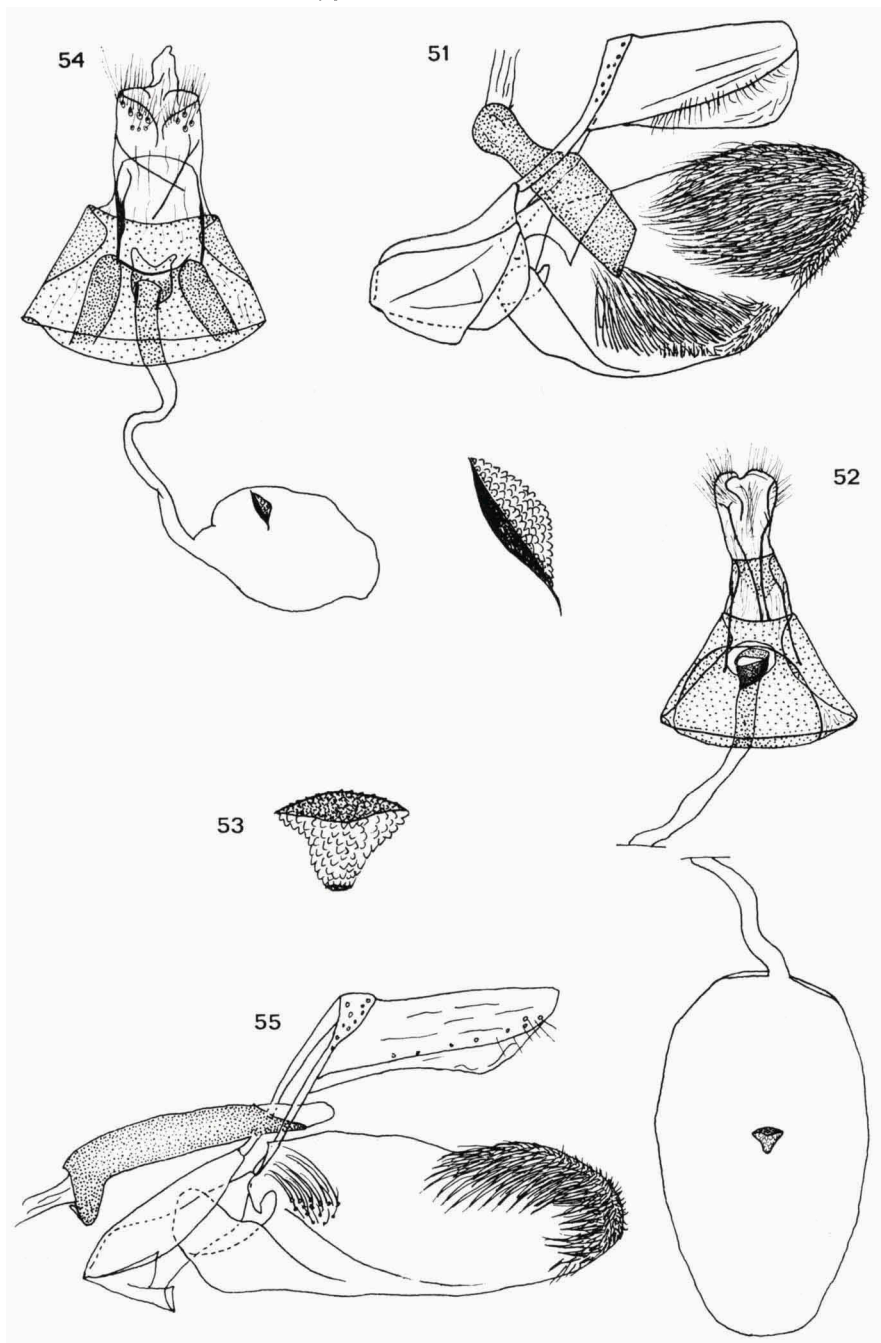
Anthophila kochiensis: Inoue, 1954, Check List Lep., 1: 49, no. 236.

The male genitalia: fig. 55, have been illustrated by Clarke, 1969. Subscaphium long, dilated basad; valva with costal margin curved, top of valva thorny. Vinculum weakly sclerotic. Aedeagus long, narrow, dilated basad.

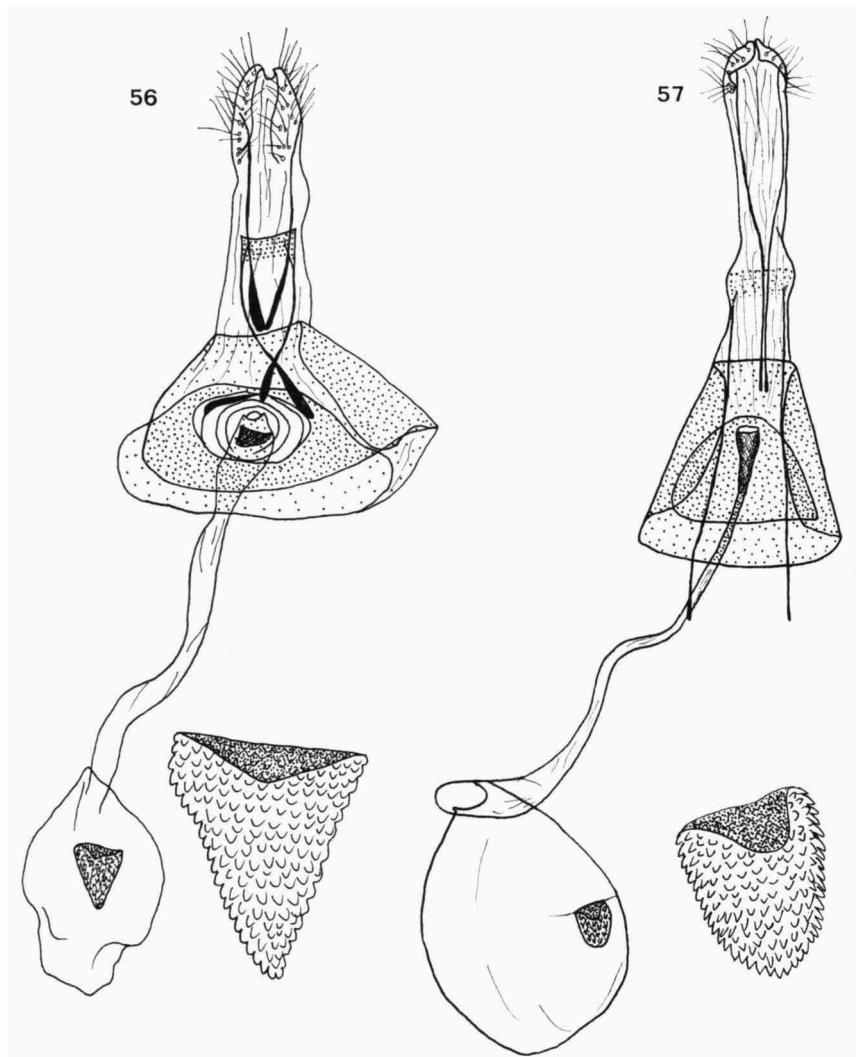
Female genitalia: fig. 57. Ovipositor long, slender, dilated at apex. Ostium bursae large, pear-shaped. Signum moderately elongate.

Material examined: Shikoku — Kooti, Ino, 21.vi.1957 (T. Kumata), 1 ♀ in EIHU; Murotomisaki, emerged 16.vi.1955 (F. Takeuchi et I. Miyagi), reared from larvae on *Ficus wightiana* Wallich, 2 ♂, 2 ♀. Kyushu — Kagoshima, Ikedako, 30.v.1953 (A. Mutuura), 2 ♀; Satamisaki, 8.x.1955, 8-10.x.1955, 4.xi.1957, 5.x.1959, 24.viii.1965 (T. Kodama, T. Yasuda, Y. Arita), 14 ♂, 9 ♀, genit. slides ♀ 24, ♀ 121 YA; emerged 6.xi.1958 (T. Yasuda) reared from larvae on *F. wightiana*, 4 ♂, 1 ♀; Kaimon, 19.x.1958, emerged 7.xi.1958 (T. Yasuda) reared from larvae on *F. wightiana*, 5 ♂, 1 ♀, genit. slide ♂ 18 YA. — Is. Yakushima, Anbo, 12.vi.1965 (T. Kumata), 1 ♂; Miyanoura, 22.ix.1975 (Y. Arita), 4 ♂, 4 ♀, genit. slide ♂ 253 YA. — Is. Okinoerabu, 23.iv.1960 (T. Kodama), 1 ♂. Ryukyus — Is. Okinawa, Naha-shi, 27.iv.1963 (Y. Arita), 6 ♂, 3 ♀; Shuri, 26.viii.1965 (Y. Arita), 7 ♂, 7 ♀ in ZLMU; 4 ♂, 4 ♀ in RMNH. — Is. Ishigaki, Takeda, 2.v.1963, 3.v.1963 (Y. Arita), 3 ♂, 1 ♀. — Is. Iriomote, 18.iv.1962 (G. Kuno), 3 ♂; Unishiikuno-mori, 7.viii.1962 (Y. Arita), 1 ♀; Komi, 6.ix.1965 (Y. Arita), 1 ♂, 4 ♀. — Is. Yonakuni, Mt. Urabe-dake, 12.v.1963 (Y. Arita), 2 ♂, genit. slide 38 YA, all in ZLMU.

Distribution: Japan (Shikoku, Kyushu and Ryukyus), Formosa, Assam, India and Ceylon.



Figs. 51-55. Genitalia of *Eutromula* Froelich. 51, *yakushimensis* Marumo, ♂; 52, do., ♀; 53, do., signum, more magnified; 54, *cyanogramma* spec. nov., ♀, with (below, right), signum, more magnified; 55, *achyrodes* Meyrick, ♂.



Figs. 56-57. Female genitalia of *Eutomula* Froelich. 56, *diana* Hübner, with signum, more magnified; 57, *achyrodes* Meyrick, with signum, more magnified.

Host plant: *Ficus wightiana* Wallich (Moraceae).

Mature larva about 11 mm. Similar in general appearance to other species, but a slight difference can be found in ocellar region (fig. 14), labrum (fig. 30) and the form of mandible (fig. 22).

***Eutomula diana* (Hübner) comb. nov. (figs. 56, 58)**

Tortrix diana Hübner [1819-1822], Samml. Europ. Schmett., 7, Tortr.: pl. 44, fig. 274.
Choreutis diana: Hübner [1825], Verz. bek. Schmett.: 373.

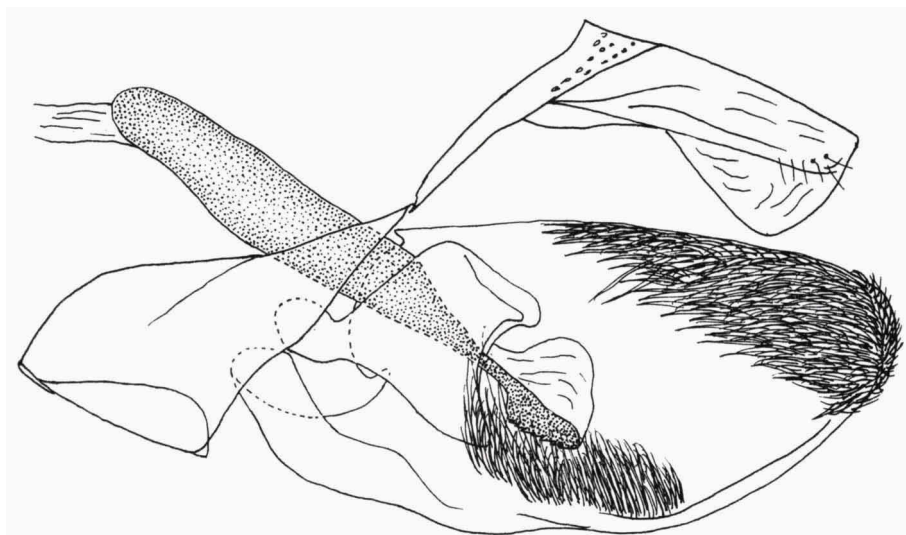


Fig. 58. Male genitalia of *Eutromula diana* Hübner.

Simaethis diana: Zeller, 1846, Isis, 208. — Herrich-Schäffer, 1855, Schmett. Eur., 5: 94, figs. 257-261. — Heinemann & Wocke, 1870, Schmett. Deutschl., (2) 2: 5. — Rebel, in Staudinger & Rebel, 1901, Cat. Lep. Pal. Faun.: 129, no. 2316. — Meess, in Spuler & Hofmann, 1910, Schmett. Eur., 2: 297. — Meyrick, 1913, in Wagner, Lep. Cat., 13: 36; 1914a, in Wytzman, Gen. Ins., 164: 22. — Forbes, 1923, Lep. New York, 1: 353. — Meyrick, 1928, Rev. Handb. Brit. Lep.: 706. — Hering, 1932, Tierwelt Mitteleur.: 176. — Toll, 1956, Klucze oznacz. owadow polski, (39-40) 27: 31-32, figs. 84, 86-87.

Orchemia diana: Fernald, 1900, Canad. Ent., 32: 238.

Anthophila diana: Ford, 1954, Proc. S. London Ent. & Nat. Hist. Soc., 1952-1953: 95, pl. 8, fig. 15.

Hemerophila diana: Danilevski & Kuznetsov, 1973, Horae Soc. ent. Union. Sov., 56: 11-13, figs. 4-5.

Coccyx decorana Zetterstedt, 1840, Ins. Lapp.: 982.

Amphisa luridana Walker, 1863, Cat. Lep. Het. Brit. Mus., 28: 318.

Allonyma diana: Busck, 1904, Proc. U.S. Nat. Mus., 27: 743. — Durrant, 1920, Proc. ent. Soc. London: xlv.

The male and female genitalia (figs. 56, 58) have been described and figured by Toll, 1956 and Danilevsky & Kuznetsov, 1973.

Material examined: Hokkaido — Daisetsu-zan, Ginsendai, 11.viii.1970, 12.viii.1970 (T. Kumata), 4 ♂, 4 ♀, genit. slides ♂ 249, ♀ 250 YA in EIHU.

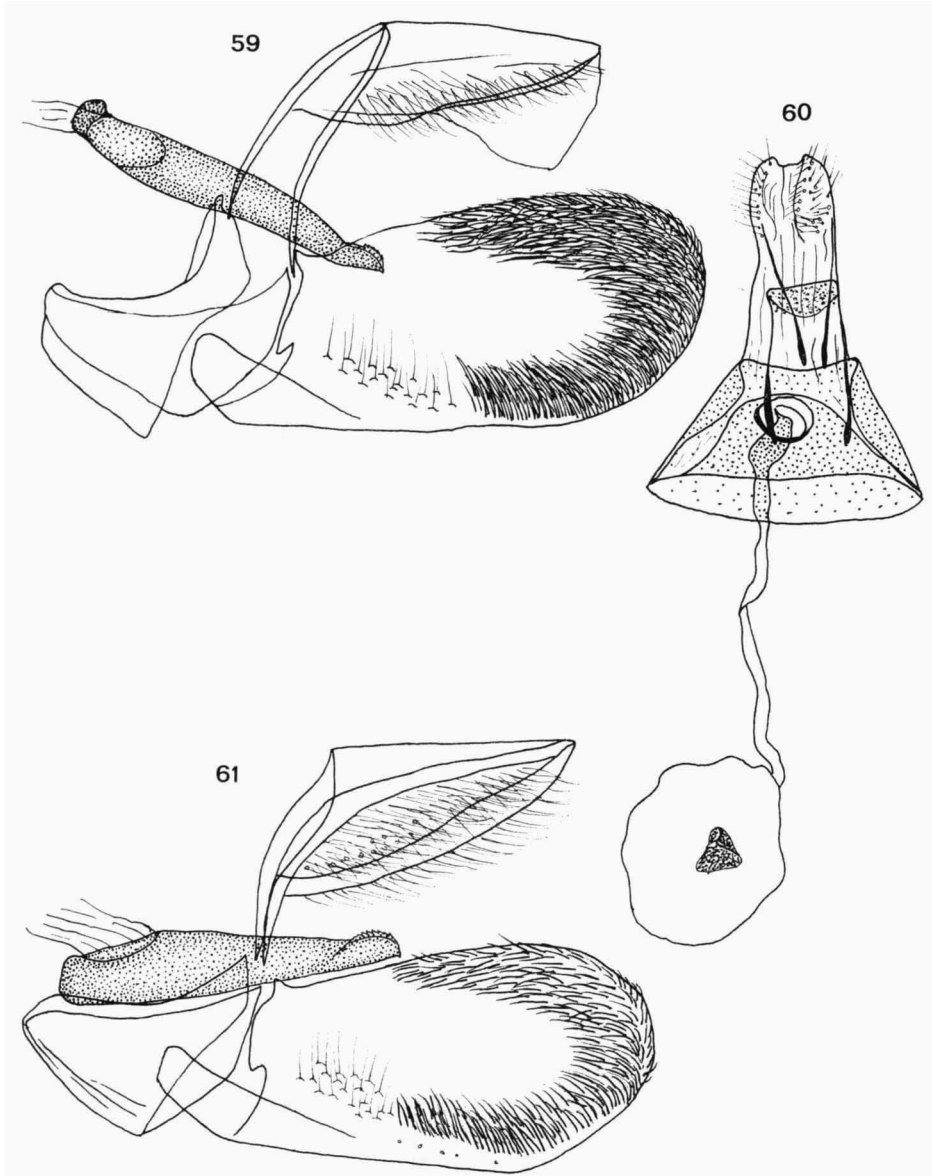
Distribution: Japan (Hokkaido), Europa and N America.

Host plant: Unknown in Japan. *Betula alba* Linnaeus (Betulaceae), in Europe (Ford, 1949).

***Eutromula pariana* (Clerck) (figs. 59-62)**

Phalaena pariana Clerck [1764], Icon. Ins.: pl. 10 fig. 9.

Pyralis pariana: Fabricius, 1794, Ent. Syst., 3: 277, no. 148.



Figs. 59-61. Genitalia of *Eutomula pariana* Hübner. 59, ♂, slide 279 YA; 60, ♂, slide 245 YA; 61, ♀, slide 291 YA.

Tortrix pariana: Hübner, [1797-1799], Samml. europ. Schmett., 7, Tortr.: pl. 1 fig. 2.

Xylopada pariana: Duponchel, 1834, Hist. Nat. Lep., 9: 457-458, pl. 260 fig. 6.

Simaethis pariana: Wood, 1839, Index Ent.: fig. 784. — Herrich-Schäffer, 1855, Schmett. Eur., 5: 94. — Heinemann & Wocke, 1870, Schmett. Deutschl., 2(2): 4. — Snellen, 1882, Vlind. Ned., 2: 436. — Meyrick, 1895, Handb. Brit. Lep.: 706; 1913, in

Wagner, Cat. Lep., 13: 36; 1914a, in Wytzman, Gen. Ins., 164: 22; 1928, Rev. Handb. Brit. Lep.: 706-707. — Rebel, in Staudinger & Rebel, 1901, Cat. Lep. Pal. Faun.: 129, no. 2315. — Meess, in Spuler & Hofmann, 1910, Schmett. Eur., 2: 297. — Forbes, 1923, Lep. New York, 1: 353. — Matsumura, 1931, 6000 Ill. Ins. Japan: 1080, no. 2196. — Toll, 1956, Klucze oznacz. owadów polski, (39-40) 27: 31-32, figs. 49, 84-85, 88.

Anthophila pariana: Haworth, 1811, Lep. Brit.: 471-472. — Pierce & Metcalfe, 1935, Genit. Tineina: 40, pl. 23. — Ford, 1954, Proc. S. London Ent. & Nat. Hist. Soc., 1952-1953: 96, fig. 25.

Hemerophila pariana: (Hübner, 1806, Tentamen: 2.) — Caradja, 1920, Iris, 34: 15. — Danilevski & Kuznetsov, 1973, Horae Soc. ent. Union. Sov., 56: 13, figs. 6-8b.

Anthophila lutosa Haworth, 1811, Lep. Brit.: 427. — Wood, 1839, Index ent.: fig. 785.

Asopia parialis: Treischke, 1829, Schmett. Eur., 7: 159. — Fischer von R., [1836], Abbild. Schmett.: 47, fig. 26.

Allononyma pariana: Barnes & McDunnough, 1917, Check List: 181.

Eutromula pariana: Bradley, in Kloet & Hincks, 1972, Check-list Brit. Ins., 2: 11.

The male and female genitalia (figs. 59-62) have been described and illustrated by Pierce & Metcalfe (1935) and Ford (1954). The adult was figured by Danilevsky & Kuznetsov (1973).

Material examined: Hokkaido — Mt. Rausudake, 22.vi.1969, 23.vi.1969 (Y. Arita), 4 ♂, 3 ♀, genit. slides ♀ 179, ♀ 243, ♂ 178, ♂ 242 YA in ZLMU; 2 ♂, 2 ♀ in RMNH. — Daisetsu-zan, Ginsendai, 11.viii.1970, 12.viii.1970 (T. Kumata), 1 ♂, 4 ♀, genit. slides ♀ 282, ♂ 280 YA in EIHU. — Akan, 23.vi.1958 (A. Mutuura), 1 ♀, genit. slide 278 YA. Honshu — Nagano, Kamikoti, 25.ix.1954 (T. Yasuda), 1 ♂, 4 ♀, genit. slides ♂ 203, ♀ 119 YA; Tokugotoge, 17.viii.1967 (Y. Arita), 1 ♂, genit. slide 279 YA; Okutadeshina, 11.ix.1966 (H. Kuroko), 1 ♂; Todai, 4.vii.1975 (F. Komai), 1 ♂. — Tottori, Mt. Daisen, 4.vii.1965 (H. Kuroko), 1 ♀, all in ZLMU.

Extralimital material: Europe, the Netherlands, — Hilversum, 23.x.1936, 21.vii.1943, 25.vii.1944, 7.x.1944, 19.x.1943, 24.ix.1944 (C. Doets), 3 ♂, 3 ♀, genit. slides ♂ 245, ♀ 246, ♀ 291 YA, all in ZLMU.

Material examined by the second author. — Honshu, 1 ♀, Mt. Hayachine, 25.vii.1968 (T. Oku), genit. slide 9680; the same, Odagoe, 1 ♂, 51 ♀, 5.ix.1975 (T. Oku), genit. slide 9571 ♂. — 1 ♀ Morioka, Iwate Pref., 27.vi.1972 (O. Saito), genit. slide 9506. — Tyubu, Nagano, Sigakogen, 12.ix.1953 (T. Kodama). Issiki Collection, NMNH, Washington.

Host plant: Uncertain; records presumably concerning *E. vinosa discolor* or *atrosignata*.

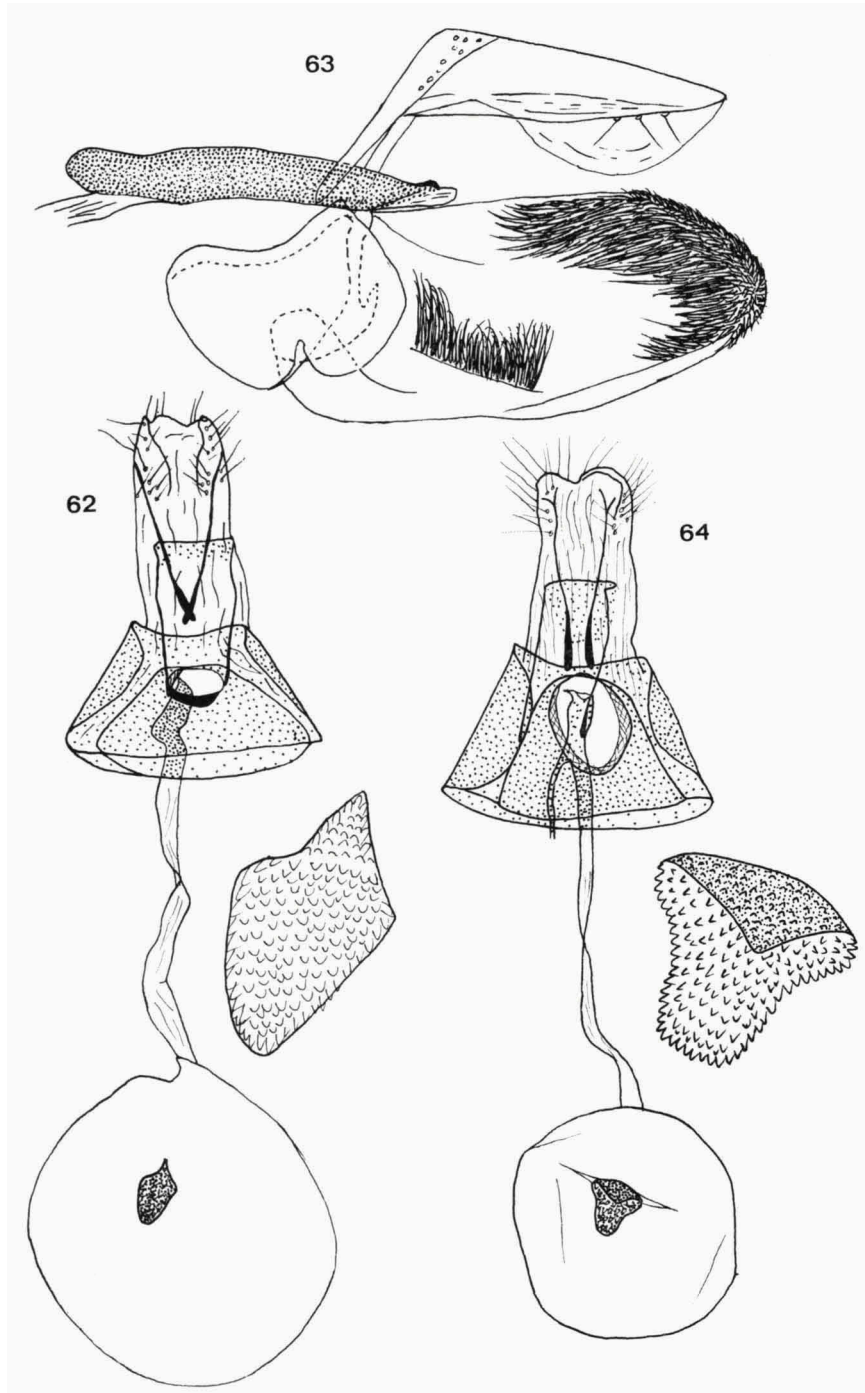
***Eutromula vinosa discolor* Diakonoff & Arita, subsp. nov.**

(figs. 2, 5-7, 15, 23, 65-66, 69)

(*discolor* = variegated)

Simaethis pariana Matsumura, 1931 (nec Clerck [1759-1764]), 6000 Ill. Ins. Japan: 1080, nr. 2196.

Anthophila pariana: Issiki, 1950, Icon. Ins. Japon., ed. 2: 457, fig. 1233; 1957, Icon.



Figs. 62-64. Genitalia of *Eutromula*. 62, *pariana* Hübner, ♀, with signum, more magnified; 63, *atrosignata* Christoph, ♂; 64, do., ♀, with signum, more magnified.

Ins. Japon. Color. Nat., 1: 35, pl. 4 fig. 127. — Inoue, 1954, Check List Lep. Japan, 1: 48, no. 230. — Okano, 1959, Icon. Ins. Japon. Color. Nat. Edita, 1: 273, pl. 181 fig. 3. — Kodama, 1961, Publ. Ent. Lab. Univ. Osaka Pref., 6: 38.

Eutromula vinosa Diakonoff, 1978, Zool. Med., 53: 202, figs. 4-7.

♂ 11 mm. Head pale greyish-tawny, face below white. Antenna dark purplish, ringed with white. Palpus moderate, subporrect, median segment roughish below, terminal segment truncate; white, median and apical segments finely dusted with fulvous towards apex. Thorax light ochreous-greyish, a fine angulate postmedian transverse line and a narrow inner edge of tegula, white. Abdomen fuscous.

Fore wing broad, dilated, costa curved, apex moderately rounded, terminally rounded. Rather bright tawny-ochreous, faintly suffused with light grey and partly mixed with blackish scales; transverse bands formed by dense white dusting. Base of wing dusted with white; first fascia at $1/4$, narrow, rather straight, anteriorly edged irregularly with black or dark brown dusting, forming a separate spot in fold and a larger one, on costa; second fascia broad, from before $1/2$ to beyond $3/4$, slightly narrowed on costa, margin on both sides irregularly serrulate, preceded and followed by a straight suffused moderate band of more or less confluent dark brown spots, respectively; anterior edge of white band with a semioval excision above middle, posterior edge straight; band on costa with three blackish spots: on anterior edge, close beyond it, and on posterior edge, respectively, last spot elongate; second spot emitting a thin dark brown line, irregularly zigzagging along middle of second band, obliterate above dorsum; termen evenly glossy ochreous-golden, with a deep vinaceous-brown terminal suffusion. Cilia vinaceous-fuscous, with a pale base and deeper patches: at apex, above middle and in tornus; between these, tips of cilia narrowly white.

Hind wing deep fuscous, with a strong pinkish-bronze gloss, speckled throughout with darker scales, especially dark towards margins and apex. Cilia pale vinaceous-fuscous, with a narrow sublateral dark fuscous band, anterior half of cilia between ends of veins 4 to 1b, deep vinaceous.

♀ 11.6 mm. Ground colour more grey-fuscous, instead of tawny-ochreous, head and thorax rather fuscous. Hind wing with cilia hardly vinaceous-tinged. Otherwise similar to male.

Male and female genitalia not perceptibly differing from those of the nominate species (from Siberia).

Material examined: Hokkaido — Gamushi, 14.ix.1958 (T. Kumata), 1 ♂. Allotype, ♀: — Misumai, Sapporo, 30.viii.1967 (T. Kumata), genit. slide 287 YA. — Soumkyo, 16.vi.1960 (K. Kamijo), 1 ♂, all in EIHU. Holotype, ♂, Honshu, Gifu, Takayama, Hida, emerged 7.viii.1954 (T. Kodama); para-

types, emerged 3-10.viii.1954, 4.vii.1966 (T. Kodama, Y. Arita), reared from larvae on *Malus pumila* Miller, 3 ♂, 1 ♀, genit. slides ♀ 15, ♀ 94, ♀ 22, ♂ 241 YA, in ZLMU; 1 ♂, 1 ♀ in RMNH. — Nagano, emerged 18.x.1952 (S. Moriuti), reared from larvae on *Pyrus pyrifolia* (Burm. f.) Nakai, 1 ♀, genit. slide 244 YA, in ZIMU.

Material examined by the second author: Honshu — Kuwayagama, Morioka, 3.ix.1963, Morioka Branch, Hort. Res. Sta, genit. slides 9602 ♂, 9603 ♀ AD. — Fujisaki (Amori), 17.ix.1956 (D 1117), Coll. H. Narita, genit. slide 9679 AD. All paratypes.

Material examined from S. Issiki Collection: Honshu — Tyubu, Hida, Takayama, 6-11.viii.1954 (S. Issiki), genit. slide 9897 ♂; and 1 ♂, 4 ♀, all paratypes. In NMNH, Washington, and RMNH.

Distribution. Japan (Hokkaido, Honshu).

Host plants: *Malus pumila* Miller and *Pyrus pyrifolia* (Burm. f.) Nak.

Mature larva: About 9 mm. Head pale yellowish brown. Lateral aspect of head, ocellar region: fig. 7. Labrum, fig. 23 and mandible, fig. 15.

Pupa, fig. 6.

***Eutromula atosignata* (Christoph) (figs. 12, 21, 29, 63-64)**

Simaethis atosignata Christoph, 1888, Horae Soc. ent. Ross., 22: 311.

Simaethis moiwana Matsumura, 1931, 6000 Ill. Ins. Japan: 1080, no. 2195, fig.

Anthophila moiwana: Inoue, 1954, Check List Lep. Japan, 1: 49, no. 237.

Hemerophila ussuriensis Danilevsky & Kuznetsov, 1973, Horae Soc. ent. Union. sov., 56: 16, fig. 9.

Eutromula atosignata: Diakonoff, 1978, Zool. Med., 53: 199, figs. 1, 2, 8.

Male genitalia, fig. 63. Tegumen, an equilateral triangle. Anellus broader at base, pointed. Valva elongate-suboval, broad. Cucullus rounded. Aedeagus straight, slender, basal half broader. Cornuti absent.

Female genitalia, fig. 64. Ostium bursae large, oval. Colliculum thick-walled, cylindrical, apical part distinctly constricted. Ductus bursae membranous. Signum elongate and rather flat.

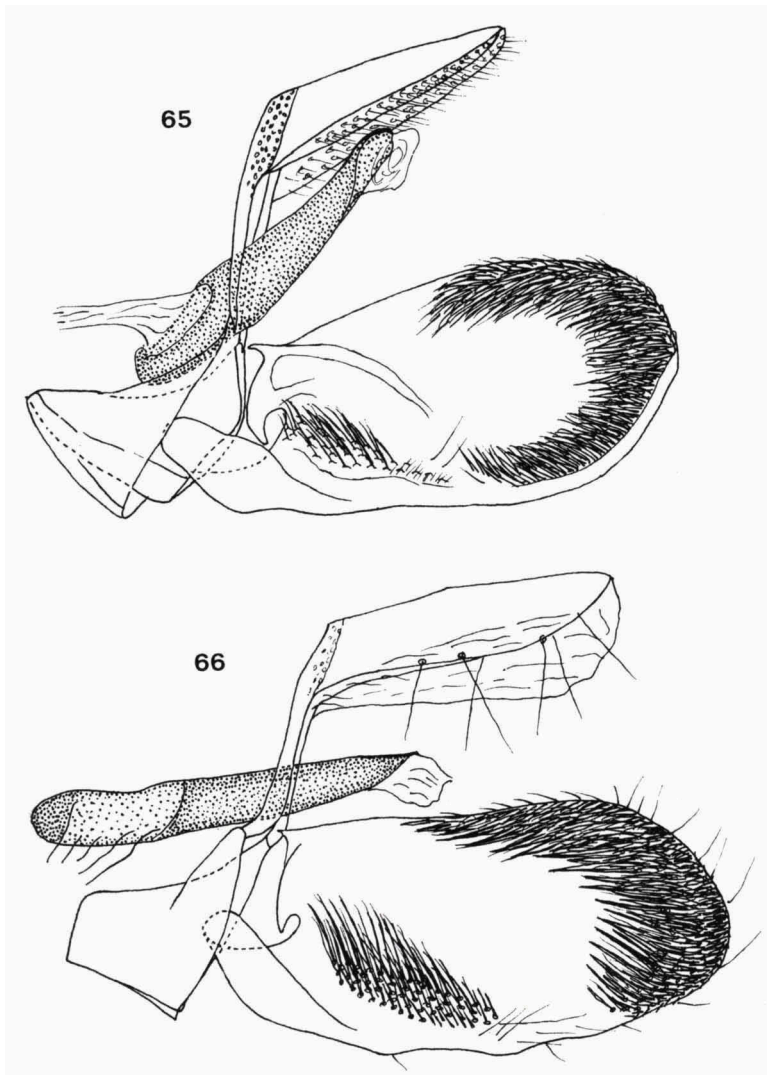
The adult has been figured by Matsumura, 1931.

Material examined: Hokkaido — Napporo, near Sapporo, emerged 10.x.1957, 20, 25, 30.ix.1970, 6 and 7.ix.1972 (T. Kodama, T. Kumata, Y. Arita), reared from larvae on *Ulmus davidiana* Planchton v. *japonica* f. *suberosa* Nakai, 4 ♂, 7 ♀, genit. slides ♂ 72, ♂ 247, ♀ 248 YA, in ZLMU and EIHU; 2 ♂, 2 ♀ in RMNH.

Distribution: Japan (Hokkaido).

Host plant: *Ulmus davidiana* Planchton v. *japonica* f. *suberosa* Nakai (Ulmaceae).

Mature larva: about 11 mm. Similar in general appearance to other species,

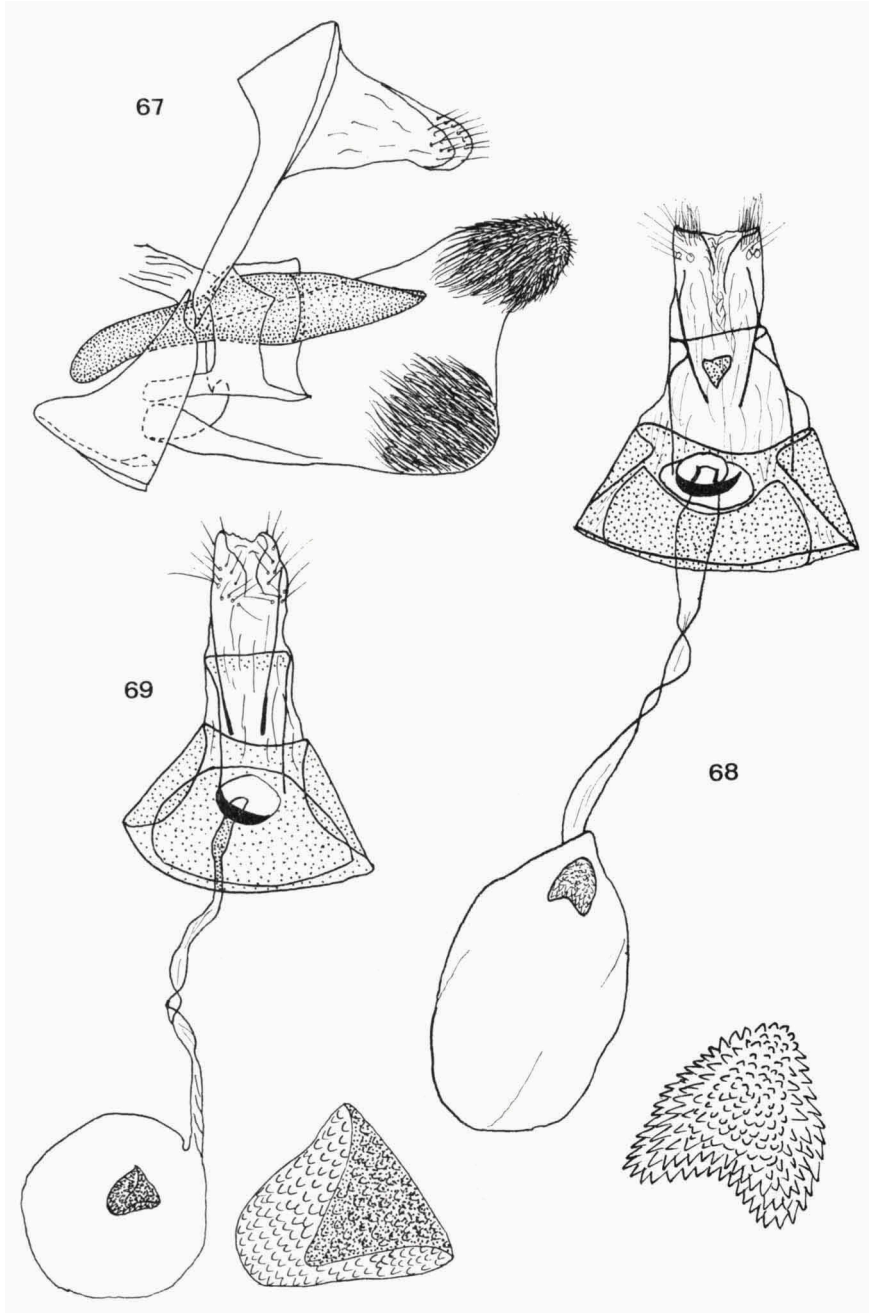


Figs. 65-66. Male genitalia of *Eutromula vinosa discolor* spec. nov. 65, slide 242 YA; 66, do., slide 241 YA.

but slight differences from others may be found in the ocellar region of the head (fig. 12), the labrum (fig. 29) and the shape of the mandible (fig. 21).

***Eutromula hyligenes* (Butler) comb. nov. (figs. 9, 17, 25, 67, 68)**

Simaethis hyligenes Butler, 1879, Ill. Het. Brit. Mus., 3: 80, pl. 60 fig. 10. — Meyrick, 1913, in Wagner, Lep. Cat., 13: 35; 1914a, in Wytzman, Gen. Ins., 164: 21. — Matsumura, 1931, 6000 Ill. Ins. Japan: 1079, no. 2192. — Issiki, 1932, Icon. Ins. Japon., ed. 1: 1484, fig. 2938.



Figs. 67-69. Genitalia of *Eutromula* Froelich. 67, *hyligenes* Butler; ♂; 68, do., ♀; 69, *vinosa discolor* subsp. nov., ♀.

Anthophila hyligenes: Issiki, 1950, Icon. Ins. Japon., ed. 2: 457, fig. 1234; 1957, Icon Het. Japon. Col. Nat.: pl. 4 fig. 129. — Inoue, 1954, Check List Lep. Japan, 1: 48, nr. 231. — Okano, 1959, Icon. Ins. Japon. Color. Nat. Edita., 1: 273, pl. 181, fig. 4. — Kodama, 1961, Publ. Ent. Lab. Univ. Osaka Pref., 6: 38.

Male genitalia, fig. 67. Subscaphium large, broad, partly pointed. Valva subquadrate, outer edge concave, with fine dense hairs at apical and tornal part; margin curved, sacculus narrowed. Vinculum weakly sclerotized. Aedeagus short, sinuate, basal half formed by coecum penis.

Female genitalia, fig. 68. Ostium bursae rounded. Ductus bursae moderate. Corpus bursae large, oval. Signum moderate, rounded, lower part concave.

Material examined: Honshu — Aichi, Mt. Sanage-yama, 24.x.1970, 9.x.1972 (K. Yamagishi), 7 ♂, 2 ♀, genit. slides ♂ 257, ♀ 293 YA in ZLMU; 2 ♂, 2 ♀ in RMNH. — Osaka, Iwawakisan, 18.vi.1954, 28.vi.1954, 19.v.1968 (T. Yasuda, H. Kuroko), 2 ♂, 1 ♀, genit. slide ♂ 14 YA; Kongosan, 6.vii.1959 (S. Moriuti), 1 ♂; Minoo, 5.iv.1961, 29-30.viii.1966 (T. Saito, Y. Arita), 3 ♀, genit. slide ♀ 21 YA. — Wakayama, Nachi, 4.v.1966 (Y. Arita), 1 ♂. — Hyogo, Haga, 30-31.vii.1965 (S. Moriuti), 4 ♀, genit. slide 123 YA. Shikoku — Kooti, Iwaidani, 15.vi.1964 (S. Moriuti), 1 ♂; Kuroson, 16.vi.1964 (S. Moriuti), 1 ♀. Kyushu — Ohita, Naidaiji, 11.x.1958 (T. Yasuda), 1 ♀. — Kagoshima, Utinomaki, 21.iv.1958 (S. Issiki et T. Yasuda), 1 ♂.

Distribution: Japan (Hokkaido, Honshu, Shikoku, and Kyushu) and Taiwan.

Host plants: *Broussonetia kazinoki* Siebold, and *B. kaempferi* Siebold (Moraceae).

Mature larva: about 12 mm. Externally identical to other species, except its length, besides a slight difference in the ocellar region of the head (fig. 9), the labrum (fig. 25) and the shape of the mandible (fig. 17).

APPENDIX

The record of the genus *Imma* Walker, 1863, from Japan, with description of a new species.

The large, chiefly circumtropical genus *Imma* Walker, 1863, formerly placed within the family Glyphipterygidae auctorum, is still puzzling taxonomists as to its true affinity. Having been tossed to and fro between several Dytrisian families, it has been assigned to a family of its own by Heppner, 1977, the Immidae. The new family is not less enigmatic than its type genus, for its place in the system remains obscure. It was thought to belong to the superfamily Sesioidea, but this opinion had to be abandoned because of too serious discrepancies of *Imma* and the true representatives of that superfamily.



Fig. 70. Genitalia of *Imma monocosma* spec. nov., ♂, with aedeagus.

Several species of *Imma* have been recorded from the Asiatic Continent: viz., from China and N Nepal. This is the first record from Japan.

Imma monocosma Diakonoff & Arita, spec. nov. (figs. 70-71)

(μόνο = single, κόσμος = ornament)

♂ 20-22 mm. Head light fuscous-grey. Antenna pale yellowish, scape and basal third of flagellum above, light greyish. Palpus thickened, smoothly scaled, curved and ascending, exceeding vertex, terminal segment short, pointed; pale yellowish, variably dusted with grey subopalescent scales, appearing pale yellowish in certain lights. Thorax light fuscous-grey, apex with a round light ochreous-yellow or white round spot, tegula narrowly edged with light ochreous. Abdomen pale fuscous. Hind tibia creamy.

Fore wing with veins 7 and 8 stalked, oblong-truncate, rather broad, costa curved at base, gently prominent at 2/3, apex rounded, termen slightly rounded above and beneath, almost straight in middle, vertical. Light fuscous, rather dull, with hardly any purplish tinge and with some slight pale greyish opalescence in certain lights; costal edge pale yellow; posterior half of wing densely suffused with light ochreous-yellow, edge of this colour with a deep excision in middle, including a darker fuscous round dot on its top, on middle of closing vein, yellow half dusted with light fuscous, except anteriorly and on costa; a strongly curved transverse row of suffused and partly interconnected small fuscous interneural spots from below 1/3 of costa to tornus, running well before termen, followed by elongate, wedge-shaped fuscous marks on ends of veins and a slender pale leaden-metallic marginal line from costa before apex to above tornus, sometimes entirely obliterate. Cilia with basal half yellow, gradually becoming fuscous downwards, apical half dark fuscous throughout.

Hind wing broadly semioval, over 1, without cubital pecten. Pale grey-fuscous, with a slight silky gloss, becoming slightly darker beyond middle posteriorly, costa pale except towards apex. Cilia grey-fuscous apical half pale yellowish, along lower part, viz. between veins 1a-1c, fuscous-grey.

♂ 24-25 mm. Similar to the male except that the anterior emargination of yellow area is somewhat more rounded, fuscous dusting denser, so obscuring first row of fuscous dots, leaden line little contrasting.

Male genitalia (fig. 70). Tegumen moderate, erected-conical. Uncus long, thin, hooked and acute. Vinculum longer than tegumen, with a subquadrate opening in upper (basal) half, end conical. Valva large, oval; base and costa sclerotic, top with a free, curved bristly hook; cucullus membranous, oblong-oval, not projecting; sacculus 3/4, moderately sclerotic, inner edge with a prominence beyond middle, followed by a down-curved, digitoid sclerotic

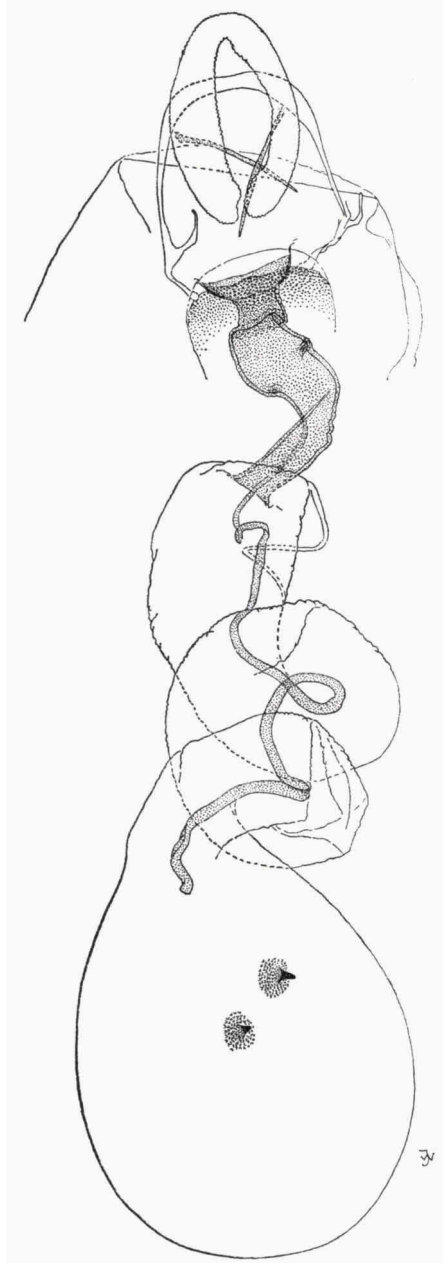


Fig. 71. Genitalia of *Imma monocosma* spec. nov., ♀.

harpe. Anellus, a strong fold with an 8-shaped split, bristly, lobes extending dorsad, slender. Aedeagus deeply sinuate, with dilated oval base; cornuti, two longitudinal patches of fine aciculae.

Female genitalia (fig. 71). Ovipositor oval, with strong bristles. Apophyses short, slender. Ostium bursae, a broad shallow sclerotic cup. Colliculum moderately long, sclerotic except at origin, thick-walled, slightly tortuous. Ductus bursae wide, tortuous, with three loops, passing into corpus bursae, this large, pear-shaped, punctulate at base. Signa two small, dark obtuse thorns.

Material examined: Japan, Kyusyu, Sata-misaki, 21.v.1952 (S. Issiki), 1 ♂, holotype, genit. slide 24401 (9766 AD); the same, 19.v.1952, 1 ♀, allotype, genit. slide 24402 (9767 AD); Kyusyu, Oosumi, Sata, 19.iv.1958 (S. Issiki & T. Yasuda), 1 ♀, paratype *. — Honsyu, Kinki, Kii, Osima, 28.vii.1955 (S. Issiki), 3 ♂, paratypes * (two without abdomen) Kinki, Wakayama, Osima, 29 and 30.iv.1954 (T. Kodama), 2 ♂. In the NMNH, Washington; 1 ♂ and 1 ♀ paratypes, marked with an asterisk, in RMNH, Leiden.

A modestly coloured, large species, with the facies, so characteristic for the present genus.

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