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**A REVISION OF THE GENUS EMMESOMYIA MALLOCH  
IN JAPAN (DIPTERA : ANTHOMYIIDAE)**

By MASAOKI SUWA

*Abstract*

SUWA, M. 1991. A revision of the genus *Emmesomyia* Malloch in Japan (Diptera : Anthomyiidae). *Ins. matsum. n. s.* 45 : 1-48, 108 figs. (69 text-figs. ; 39 figs. in 15 pls.).

Nine species of *Emmesomyia* from Japan are dealt with. Two species, *E. kurahashii* and *E. similata*, are described as new to science, and two others, *E. dorsalis* and *E. megastigmata*, are recorded as new to Japan. Keys to the species are given, based not only on the males but also on the females. However, *E. oriens* can hardly be distinguished from *E. similata* in the female. The larviparity was confirmed in 3 species, *flavitaris*, *suwai* and *kurahashii*, by the presence of a larva of the first or second instar in the female abdomen dissected.

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## INTRODUCTION

The concept of *Emmesomyia* has recently been modified by Griffiths (1984) to include the members of *Taeniomyia* Stein, which is thus recognized as a distinct subgenus occurring in the New World. Even in this sense the genus *Emmesomyia* is a rather small group represented by about 40 species in the world. Up to the present 5 species of the genus have been recorded from Japan (Suwa, 1974, 1979). In recent years not a few specimens belonging to *Emmesomyia* have been accumulated at hand from various localities of Japan. A study shows that the material represents 9 species, of which two are new to science and two others new to Japan.

The species of *Emmesomyia* (s. str.) are readily distinguishable from those of other genera by the much enlarged lower calyptra and the presence of one to several setae on the pteropleuron. On the other hand, it is not always easy to distinguish the species of the genus unless their genital structures are examined. Even in the genitalia they may hardly be distinguished. In fact, I have failed to find any distinct differences between the females of two Japanese species, *oriens* Suwa and *similata* sp. nov.

The larvae of *Emmesomyia* are, so far as known, coprophagous, feeding on human or cattle faeces (Hennig, 1972; Suwa, 1979; Griffiths, 1984). In the course of the present study oviparity was confirmed or suggested in some Japanese species by the presence of eggs in the female abdomen. Some others are undoubtedly larviparous. In three Japanese species I often found a larva of the first or second instar in the female abdomen.

In the following lines descriptions or redescriptions of the Japanese species are given. The genital structures of *E. socia* and *E. megastigmata*, based on European and Chinese material respectively, are also figured for comparison. The holotypes of the new species are deposited in the collection of the Entomological Institute, Hokkaido University.

## GENUS EMMESOMYIA MALLOCH

*Emmesomyia* Malloch, 1917: 114. Type-species: *Emmesomyia unica* Malloch, 1917 (= *Spilogaster socialis* Stein, 1898), original designation.

*Taeniomyia* Stein, 1919: 150. Type-species: *Taeniomyia auricollis* Stein, 1918, designated by Séguy (1937). Synonymized by Griffiths (1984).

For further synonyms, see Griffiths (1984: 351).

According to Griffiths (1984) the genus is divided into two subgenera, *Emmesomyia* and *Taeniomyia*. However, *Taeniomyia* is predominantly neotropical in distribution, extending into the Nearctic Region no further than Arizona, and represented by 6 species and 2 problematical ones. I have examined no representatives of the subgenus. On the basis of the species at hand a diagnosis of *Emmesomyia* (s. str.) is given as follows: —

♂. Mesonotum almost wholly blackish in frontal view, and almost wholly pollinose in caudal view, with some black or dark markings appearing in some angles of view. Legs yellow at least on tibiae.

Head much higher than long (more than 1.5 times), giving the impression that it

is compressed before and behind; eyes well developed and large, accordingly orbits reduced in width, at parafrontal angle distinctly narrower than  $A_3$ ; frons narrower than anterior ocellus; *if* absent; parafrontals contiguous, with 1 microscopical *ors* discernible; arista long pubescent or shortly plumose; cheeks distinctly less high than  $A_3$ -width; occiput on upper plane almost bare, only with a few or some setulae discernible ventrolaterally.

Mesonotum with rows of *pre-acr* widely separated from each other by a distance at least as long as that to adjacent *dc*-row, and with a few or some rows of setulae present between the rows of *acr*; pteropleuron with 1 to several setae (*ptpl*) near upper margin.

Abdomen with no setae on 6th tergite; 5th sternite with a series or patch of spine-like setae on or near inner base of each process; cercal plate concave on lateral margins subapically, usually with a sharply pointed apex; surstylus divided into inner and outer processes apically, with a few or some setae at base ventrally; praegonite deeply divided into dorsal and ventral processes, each with 1 seta apically, in certain species with some additional setae visible on dorsal process; postgonite with no setae; basiphallus with long epiphallus; distiphallus with paraphalli well developed.

Mid femur with a few or some *pv* on basal third to half, and usually with no *av* discernible;  $t_1$  with 1 *pv*, and usually with no *ad* discernible;  $t_2$  with 1 *pd*, 2 *p-pv*, and no *ad*;  $t_3$  with 1 *av*, 3 *ad* and 2 *pd*, and without apical *pv*. Wings with costal thorns minute; costa setulose ventrally;  $R_{4+5}$  usually with 1 to some minute setulae discernible at base both dorsally and ventrally in most species, though often not setulose there in certain species. Lower calyptra well developed and much larger than the upper.

♀. Mesonotum with pollinosity discernible in any angles of view, with shifting dark markings.

Frons not much narrower than one-third head-width; *if* present and strong; orbits wider than in male; parafrontals with 3 *ors*; occiput on upper plane setulose.

Abdomen with ovipositor long in oviparous species, yet much shortened in certain larviparous species, which deposit one larva of 2nd or 3rd instar at a time; 6th tergite divided into main plate and small posterolateral sclerites or entire, and never divided medially; 6th and 7th spiracles situated close together on 6th tergite; 7th tergite divided into 2 or 3 strips or sclerites anteriorly and continuously sclerotized posteriorly; 8th tergite completely divided into 3 sclerites, the median one being much narrower than the outers, often reduced to vestigial strip, and completely lost in certain species; 8th sternite represented by a pair of bare plates, which are hardly discernible in certain species.

Remarks. The enlargement of lower calyptra, absence of *ad* on  $t_2$ , representation of female 8th sternite by a pair of bare plates or sclerites, and presence of spine-like setae on male 5th sternite — all these characters may be synapomorphic, shared between *Emmesomyia* (s. str.) and *Taeniomyia*. On the other hand, the presence of seta(e) on the pteropleuron, the absence of a seta on the postgonite, and the subapical concavity on the cercal plate may be autapomorphic for *Emmesomyia* (s. str.).

KEYS TO THE SPECIES OF EMMESOMYIA KNOWN FROM JAPAN

Males

1. Mid and hind femora wholly yellow. . . . . 2
- All femora blackish, at most narrowly yellowish apically. . . . . 3
2. Thoracic spiracles conspicuously large, anterior one with major axis about as long as 2nd and 3rd segments of fore tarsus combined, and posterior one much larger than knob of haltere; 2nd *ph* well developed, as strong as the 1st; *pra* much longer than posterior *ntpl* and about as long as anterior *ntpl*; pteropleuron with a few or several setae. . . . . 9. *megastigmata* Ma, Mou et Fan
- Thoracic spiracles ordinary in size, anterior one with major axis about as long as 2nd segment of fore tarsus, and posterior one smaller than knob of haltere; 2nd *ph* fine; *pra* shorter than posterior *ntpl*; pteropleuron with 1 seta. . . . . 5. *dorsalis* (Stein)
3. Legs with tarsi yellowish. . . . . 4
- Legs with tarsi blackish or dark brown. . . . . 6
4. Fifth sternite rather densely setose on basal plate (Fig. 71), with processes not expanded downwards at apices. . . . . 6. *flavitarsis* Suwa
- Fifth sternite sparsely setose on basal plate (Fig. 26), with processes expanded downwards at apices. . . . . 5
5. Fifth sternite much expanded on apical half of each process (Figs. 20-21), with distalmost seta usually isolated from anterior series of inner setae; praegonite with dorsal process broadened and armed with several setae; distiphallus with narrow mesophallus (Fig. 25). . . . . 7. *suwai* Ge et Fan
- Fifth sternite expanded on restricted apical area of each process (Fig. 27), with distalmost seta continuous to anterior series of inner setae; praegonite with dorsal process narrow and armed with 1 seta; distiphallus with much broadened mesophallus (Fig. 33). . . . . 8. *kurahashii* sp. nov.
6. Body with a yellowish tinge in pollinosity; 5th sternite with basal plate well developed and longer than twice length of each process, and along anterior margin with setae longer than the sternite itself; praegonite with a median projection discernible between dorsal and ventral processes. . . . . 4. *hasegawai* Suwa
- Body without a yellowish tinge in pollinosity; 5th sternite with basal plate shorter than twice length of each process, and along anterior margin with no setae longer than the sternite; praegonite with no projection discernible between dorsal and ventral processes. . . . . 7
7. Abdomen with median vitta narrow, not reaching to marginal row of setae on 2nd tergite, and usually also on the 3rd; 4th sternite gradually broadening caudad and longer than wide (Figs. 75-76); 5th sternite with processes bare apically, and with basal plate rather sparsely setose medially and broadly bare anteriorly. . . . . 2. *oriens* Suwa
- Abdomen with median vitta moderate to rather broad, rarely narrow, and usually reaching to marginal row of setae on each tergite; 4th sternite rapidly broadening caudad and wider than long (Fig. 77); 5th sternite with processes setose to near apices, and with basal plate densely setose to near anterior margin. . . . . 8
8. Mesonotum distinctly to strongly tinged with brown in pollinosity; 4th sternite with marginal setae all or mostly much longer than the sternite; genital pouch (membranous area between 6th sternite and hypandrium) with any sclerite indiscernible, at most very faintly chitinized just behind 6th sternite; surstylus without a notch on outer process inside (Fig. 4); praegonite with dorsal process narrow (Fig. 7); postgonite unilobed apically. . . . . 3. *similata* sp. nov.
- Mesonotum slightly to rather distinctly tinged with brown in pollinosity; 4th sternite with some median marginal setae not much longer than the sternite; genital pouch with a curved narrow sclerite discernible just behind 6th sternite; surstylus with a notch on outer process inside; praegonite with dorsal process broadened (Fig. 3); postgonite bilobed apically. . . . . 1. *grisea* (Robineau-Desvoidy)

Females

1. Mid and hind femora wholly yellow. . . . . 2

- All femora blackish, at most narrowly yellowish apically. .... 3
- 2. Frons a little wider than one-third head-width; pteropleuron with several setae; thoracic spiracles large, anterior one with major axis longer than 2nd segment of fore tarsus; abdomen with 6th tergite entirely polished. .... 9. *megastigmata* Ma, Mou et Fan
- Frons slightly narrower than one-third head-width; pteropleuron with 1 seta; thoracic spiracles ordinary in size, anterior one with major axis shorter than 2nd segment of fore tarsus; abdomen with 6th tergite broadly pollinose along posterior margin. .... 5. *dorsalis* (Stein)
- 3. Legs with tarsi yellowish; ovipositor with no spinules. .... 4
- Legs with tarsi dark brown to blackish; ovipositor with numerous spinules on 7th segment posteriorly. .... 6
- 4. Abdominal 6th tergite polished, only with a trace of pollinosity along posterior margin narrowly, and about thrice as wide as long in mounted condition on a slide. .... 6. *flavitarsis* Suwa
- Abdominal 6th tergite entirely pollinose (often almost concealed under 5th tergite and difficult to examine), and distinctly less than thrice as wide as long. .... 5
- 5. Frons nearly parallel-sided, the width at lunule less than 1.1 times of that at the narrowest part (near anterior ocellus); ovipositor (Figs. 99-100) with 7th tergite with posterior lobes developed; 8th sternite represented by a pair of rather large plates; suranal plate with no setulae except for a pair of rather long ones; subanal plate with 4 long setulae and no additional. .... 8. *kurahashiii* sp. nov.
- Frons gradually broadening ventrad, the width at lunule more than 1.1 times of that at the narrowest part; ovipositor (Figs. 96-98) with 7th tergite with posterior lobes scarcely developed; 8th sternite reduced to a pair of small sclerites, often hardly discernible; suranal plate with a few or some short setulae apart from a pair of rather long ones; subanal plate densely setulose on posterior half, some near apical margin being long. .... 7. *suwai* Ge et Fan
- 6. Abdominal 6th tergite almost entirely polished, with pollinosity very narrowly discernible along posterior margin; ovipositor (Fig. 88) with subanal plate convex on lateral margins. .... 1. *grisea* (Robineau-Desvoidy)
- Abdominal 6th tergite wholly or considerably pollinose; ovipositor with subanal plate nearly parallel-sided or concave on lateral margins. .... 7
- 7. Body with a yellowish tinge in pollinosity; abdomen with 6th tergite wholly pollinose; subanal plate (Fig. 92) distinctly concave on lateral margins and with no setulae except for 4 long ones along apical margin. .... 4. *hasegawai* Suwa
- Body hardly with a yellowish tinge in pollinosity; abdomen with 6th tergite considerably pollinose on posterior part (Fig. 84); subanal plate (Figs. 89-90) with lateral margins slightly concave or nearly parallel, and with 4 long setulae near apex and a few or some short ones more apically. .... 3. *similata* sp. nov. (*E. oriens* Suwa also runs here)

#### DESCRIPTIONS OF THE SPECIES

##### 1. *Emmesomyia grisea* (Robineau-Desvoidy, 1830) (Figs. 1-3, 70, 72, 88)

*Phorbia grisea* Robineau-Desvoidy, 1830 : 560.  
*Emmesomyia socia* (Fallén) sensu Hennig, 1972 : 450; Suwa, 1974 : 186.  
*Emmesomyia* sp. : Suwa, 1983 : 42.  
*Emmesomyia grisea* : Michelsen, 1983 : 116; Fan et al., 1988 : 376.

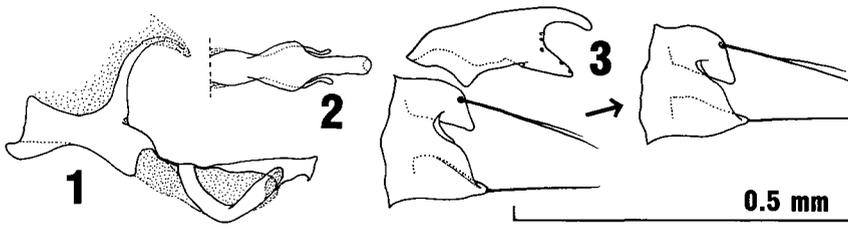
Material examined. Hokkaidō: —Apoi-dake, 3♀, 10. vii. 1966 (M. Suwa); Nukabira, 1♀, 2. vii. 1951 (I. Hattori); Shikaribetsu-ko, 1♂, 2♀, 30. vi. 1951 (S. Katō & I. Hattori); Tomuraushi-onsen, 2♂, 2♀, 18. vii. 1976 (M. Suwa); Mt. Tomuraushi, 2♂, 30. vii. 1966 (H. Kurahashi); Mt. Meakan, 700-1,000 m, 4♂, 4. vii. 1990 (M.

Suwa); Mt. Shari-dake, 250-400 m, 1 ♀, 5. vii. 1990 (M. Suwa). Honshū: — Mt. Bonju, Aomori-ken, 6 ♂, 3 ♀, 24. x. 1980, 23. vi. 1984, and 29. vi. 1985 (S. Fukushi); Ôwani, Aomori-ken, 1 ♀, 2. viii. 1983 (S. Fukushi); Sarukura, Hakkôda, Aomori-ken, 2 ♂, 17. ix. 1989 (S. Fukushi); Mt. Waga-dake, Iwate-ken, 2 ♀, 10. x. 1988 (T. Chiba); Tashiro-dake, Akita-ken, 3 ♂, 16. ix. 1989 (S. Fukushi); Kawairi, Mt. Iide, Fukushima-ken, 1 ♀, 27-28. vi. 1987 (K. Konishi); Shimotashiro - Numajiri, Oze, Fukushima-ken, 1 ♀, 19. vii. 1950 (S. Katô); Hachirôgahara, Shiobara, Tochigi-ken, 2 ♀, 20. viii. & 11. ix. 1981 (T. Matsumura); Momokura-yama, Yamanashi-ken, 1 ♂, 26. v. 1978 (M. Suwa); Mt. Daibosatsu, 1,400-2,000 m, Yamanashi-ken, 4 ♂, 1 ♀, 6. vii. 1980 and 16-18. v & 18-19. vi. 1982 (M. Suwa); Renge-onsen - Hakuba-ôike, 1,500-2,400 m, Mt. Shirouma, Niigata-ken, 3 ♂, 19. vii. 1989 (M. Suwa); Mt. Yatsugatake, Nagano-ken, 1 ♀, 16. vii. 1970 (M. Suwa). Shikoku: — Mt. Tsurugi, 2 ♂, 16. vii. 1971 (M. Suwa). Kyûshû: — Hikosan, Fukuoka-ken, 1 ♂, 1 ♀, 23. v. 1950 (S. Katô & N. Fukuhara); Mt. Hakuchô (= Shiratori-yama), 1,300 m, Gokanoshô, Kumamoto-ken, 24 ♂, 3 ♀, 5-7. vi. 1980 (M. Suwa), and 1 ♀, 5. vi. 1979 (N. Kôda); Mt. Sobo-san, Ôita-ken, 1 ♂, 9. vi. 1978 (H. Takahashi); Mt. Takachiho, Miyazaki-ken, 1 ♂, 7. vii. 1979 (T. Gotô); Kurino-dake, Mt. Kirishima, Kagoshima-ken, 1 ♀, 14. vii. 1967 (A. Tanaka), and 11 ♀, 11. v. 1967 (M. Suwa); Eboshi-dake, Taniyama, Kagoshima-ken, 1 ♀, 17. iv. 1965 (H. Shima); Mt. Takakuma, Kagoshima-ken, 1 ♀, 13. ix. 1958 (S. Ueda).

♂. Body-length 4.7-6.5 mm; wing-length 4.4-6.1 mm. Body blackish in ground colour, pale grey and a little to distinctly bluish in pollinosity. Obrsits whitish grey pollinose; antennae blackish; palpi blackish; haustellar mentum blackish or dark brown, thinly pollinose. Mesonotum slightly to rather distinctly tinged with brown in pollinosity; in frontal view almost wholly blackish, with pollinosity discernible only peripherally; in caudal view almost wholly pollinose, with some black markings appearing as follows: — presutural lateral patches and prescutellar lateral spots; postsutural lateral patches visible in caudolateral angle of view. Abdomen with brownish pollen rather narrowly to broadly discernible around median vitta especially on 3rd to 5th tergites; median vitta moderate to rather broad and sharp, reaching to marginal row of setae on each tergite; on 3rd tergite wider or sometimes narrower than  $t_3$ -height, and always wider than height of hind metatarsus; marginal bands absent. Coxae and trochanters blackish or dark brown; femora blackish, with apex slightly yellow or brown especially on  $f_1$ ; tibiae yellow; tarsi blackish or dark brown. Wings distinctly tinged with yellow; calyptrae tinged with yellow.

Head slightly wider than mesonotum (1.03-1.1 times; mesonotal width represented by the distance between anterolateral edges of notopleura in dorsal view), and about 1.6 times as high as long (1.55-1.65); frons as wide as, or slightly wider than, semi-diameter of anterior ocellus; parafrontals with 3-4 or sometimes 5 *ori*;  $A_3$  2.6-2.8 times as long as wide; arista with the longest hairs 2-3 times as long as basal diameter of arista.

Mesonotum with rows of *pre-acr* separated from each other by a distance at most 1.5 times as long as that to adjacent *dc*-row, 2-3 rows of setulae present between the rows of *acr*; 2nd *ph* slightly developed, usually easily distinguishable from adjacent setulae; *pra* shorter than posterior *ntpl*; 1 *ptpl*; *stpl* 1(2): 2, the lower anterior much weaker than the upper.



Figs. 1-3. *Emmesomyia grisea* (Robineau-Desvoidy), ♂. 1, basiphallus and distiphallus; 2, distiphallus, dorsal view; 3, praegonite and postgonite. England.

Abdomen depressed on basal half, thick on caudal segments, subparallel-sided or long-ovoid, and usually about twice as long as wide; 4th sternite much broadening caudad and wider than long, with setae of hind-marginal series becoming weaker towards middle, some outers being conspicuously long, yet some medians not much longer than the sternite; 5th sternite and hypopygium as in Figs. 507-512, Suwa (1974), and Figs. 1-3 (European form) and 70, present paper; 5th sternite with processes setose almost to apices, and with basal plate setose to near anterior margin; genital pouch with a curved sclerite developed just behind 6th sternite (Fig. 72); surstylus with outer process notched inside near apex, and with 3-6 (usually 4) setae at base ventrally; praegonite with dorsal process broadened; postgonite bifurcated apically.

Mid femur with 3-5 (usually 4) *pv* on basal half;  $f_3$  with 5-9 *av*, 1 *pv* near base (practically *v*) and 1-2 *pv* near basal third or on median third;  $t_3$  with setae as usual, yet in 1 specimen with 2 *av*, 3 *ad*, 2 *pd* and 0-1 *pv*. Wings with *dm-cu* strongly oblique and sinuate;  $R_{4+5}$  with 1 or a few minute setulae often discernible at base ventrally, yet usually indiscernible on dorsal side.

♀. Wing-length 4.5-6.1 mm. Body bluish grey in pollinosity, with a faint brownish tinge. Mesonotum with black markings as follows: — In frontal view, before suture with broad median and narrower submedian vittae discernible; the submedian vittae running along rows of *dc* and extending to 1st *ph*, fused with the median posteriorly; behind suture with submedian vittae between rows of *dc* and *acr* and lateral patches outside *ia*, the submedian vittae rather broad and terminating around 3rd *post-dc*; in caudal view, before suture with wedge-like submedian vittae between rows of *dc* and *acr* and lateral patches, the submedian vittae fused with each other along anterior margin of mesonotum and running caudad a little beyond 2nd *acr*; behind suture, 3 vittae visible along rows of *acr* and between rows of *dc* and *ia*, the median narrow anteriorly and more or less broadening caudad; lateral patches discernible in caudolateral view. Abdomen with median vitta broad and usually sharply visible; fore-marginal bands rather broadly and hind-marginal bands narrowly appearing, not sharply; 6th tergite almost entirely polished, with pollinosity very narrowly visible along posterior margin, often indiscernible unless carefully examined. Wings and calyptrae paler than in male.

Head about as wide as mesonotum (0.95-1.1 times); frons as wide as or slightly wider than one-third head-width (0.32-0.36); parafrontals with 2-3 *ori*. Mesonotum with 2nd *ph* weaker than in male.

Abdomen with 6th segment developed and largely exposed; ovipositor long

(Fig. 88); 6th tergite divided into main plate and small posterolateral sclerites by very weakly chitinized strips, naturally the sclerites being folded ventrally along the strips; the tergite with 4 weakly sclerotized lobes developed along hind margin (the lobes are hardly observed in Fig. 88, being folded under the tergite; cf. those of *megastigmata* in Fig. 102), the inner two from the main plate being large and the outers from the sclerites much smaller; in addition to marginal series of setae, some weaker setae or setulae present on sclerites, yet only a few on main plate posteromedially; 6th and 7th spiracles situated close together on the folds anteriorly within posterior half of the tergite; 6th sternite much narrowed and bare on anterior half and setose on posterior half; 7th tergite anteriorly with 3 projections, the outers long and strongly sclerotized, and posteriorly with 4 spinulose lobes, marginal setae being represented by a few rather short ones at base of each lobe; 7th sternite setose on posterior part, with about 4 setae and some spinules, the anterior part bare and much reducing cephalad in width and sclerotization; 8th tergite divided into 3 longitudinal bare sclerites, the median sclerite much narrower and shorter than outers; 8th sternite represented by a pair of large bare plates; suranal plate with a pair of short setulae near apex, and with no additional discernible; subanal plate convex on lateral margins, with 4 long setulae near apex and with a few or some short ones more apically; cerci strongly swollen on caudal half.

Mid femur with 1-2 *av* near base and 2-3 *pv* on basal third;  $t_1$  usually with 1 *ad* discernible near apex. Wings with *dm-cu* a little oblique and slightly to distinctly sinuate or curved inwards;  $R_{4+5}$  more frequently setulose at base than in male, sometimes with 1-2 setulae dorsally and usually with 1-3 ones ventrally.

Distribution. Japan (Hokkaidô, Honshû, Shikoku and Kyûshû); Korea; China; India (Kashmir); Europe.

Remarks. This species had long been misidentified as *socia* Fallén until the European species of *Emmesomyia* have recently been revised by Michelsen (1983). I am uncertain whether the species recorded by Stein (1915) as "*socia*" from Taiwan is also referable to *grisea*. *E. grisea* has quite similar species in Asia, namely *oriens* Suwa and *similata* sp. nov.

For the present study 2 pairs of *grisea* are available from Europe. Having compared the material with the Japanese form, any significant differences have been found between them.

This species may be oviparous. Its ovipositor is long, and numerous eggs were often found in the abdomen of dissected females, and sometimes observed in dried specimens through the abdominal membrane.

## 2. *Emmesomyia oriens* Suwa, 1974

(Figs. 75-76)

*Emmesomyia oriens* Suwa, 1974: 187, *partim*.

Material examined. Hokkaidô: — Mt. Tomuraushi, 5♂, 30. vii-1. viii. 1966 (H. Kurahashi). Honshû: — Mt. Waga-dake, Iwate-ken, 1♂, 27. vii. 1988 (T. Chiba); Mt. Zaô, Miyagi-ken, 1♂, 4. vii. 1979 (M. Iwasa); Mt. Kumotori, Saitama-ken, 9♂, 23. vii. 1974 (K. Hara); Mt. Kuragatake, Ishikawa-ken, 1♂, 1. viii. 1969 (H. Kurahashi); Tengunoniwa - Hakuba-ike, 2,000-2,400 m, Mt. Shirouma, Niigata-

ken, 6♂, 19. vii. 1989 (M. Suwa); Mt. Kiso-Komagatake, Nagano-ken, 3♂ (holotype and paratypes), 27. vii. 1970 (M. Suwa).

This species was originally described on the basis of 5 males from Honshû and Kyûshû. Examination of numerous additional specimens has convinced me that the original series of *oriens* contained two distinct species, *oriens* and an undescribed species. The latter will be described later as new to science under the name *E. similata*. In the following lines a redescription of *oriens* is given.

♂. Very similar to the preceding species, *grisea*. Body-length 6-7.9 mm; wing-length 5.7-7.4 mm. Mesonotum partly with a slight brownish tinge in pollinosity. Abdomen with brownish pollen narrowly discernible near median vitta especially on 3rd to 5th tergites; median vitta very narrow, not reaching to the row of marginal setae on 2nd tergite and usually also on 3rd tergite. Wings and calypterae strongly tinged with yellow.

Head about 1.7 times as high as long (1.59-1.74); frons as wide as or slightly narrower than, rarely wider than, semi-diameter of anterior ocellus;  $A_3$  2.6-3 times as long as wide; the longest arisal hairs as long as or slightly longer or, rarely, shorter than thrice the diameter of arisal base; parafrontals with 4-5 *ori*.

Mesonotum with rows of *pre-acr* separated at the 1st pair by a distance usually longer than 1.5 times of that to adjacent *dc*-row, and between the rows of *acr* with 3-4 setulae abreast anteriorly and 2-3 posteriorly; 2nd *ph* rather well developed; *pra* slightly shorter to a little longer than posterior *ntpl*.

Abdomen distinctly longer than twice the width, and nearly parallel-sided; 4th sternite (Figs. 75-76) gradually broadening caudad and longer than wide, hind-marginal setae arranged in a regular or an irregular row and most of them shorter than the sternite; 5th sternite and hypopygium as in Figs. 513-517 and 520, Suwa (1974); 5th sternite with processes not setose apically, and with basal plate rather sparsely setose medially and bare anteriorly; genital pouch with no sclerite discernible; surstylus without a notch on outer process inside; dorsal process of praegonite narrow; postgonite unilobed apically; basiphallus much higher before epiphallus than behind.

Mid femur with 4-5 (sometimes 6) *pv* on basal half;  $f_3$  with 5-9 *av*, 1 *pv* near base and 2-4 *pv* on median third, and with several *pv*-setulae on apical third sometimes rather well developed. Wings with 1 to some minute setulae usually present at base of  $R_{4+5}$  ventrally, and sometimes also dorsally.

♀. Unknown. I have examined a lot of female specimens which may belong to *oriens* or the succeeding species, *similata*. I have failed, however, to find any differences to divide them to the species. The characters of these female specimens will be given under *similata*.

Distribution. Japan (Hokkaidô and Honshû). The records of "*oriens*" from Kyûshû, Japan (Suwa, 1974) and from Korea (Suwa and Park, 1982), and another record from India (Suwa, 1981) probably also, should be referred to *similata*. The record of "*oriens*" from China by Fan et al. (1988) needs verification.

Remarks. In general appearance this species is quite similar to *grisea* and also to *similata*. Nevertheless, the bare apices of 5th sternite processes and the narrow and interrupted median vitta on the abdomen are useful when identifying *oriens* without dissecting genitalia.

3. *Emmesomyia similata* sp. nov.

(Figs. 4-8, 77, 84, 89-91)

*Emmesomyia oriens* Suwa, 1974: 187, *partim*.

*Emmesomyia oriens* Suwa sensu Suwa & Park, 1982: 502.

Type material. Kyūshū: — Yakushima, 5♂ (one the holotype), 16-20. vi. 1980 (M. Suwa); Kosugidani, Yakushima, 1♂ (paratype of *oriens*), 1. vi. 1969 (K. Kusigemati); Mt. Miyanoura, Yakushima, 1♂, 22. vii. 1980 (M. Iwasa); Amami-ōshima, 1♂, 1. vi. 1965 (H. Kurahashi), and 1♂, 4. ix. 1966 (T. Okuno); Terayama, Kagoshima-ken, 1♂, 27. iv. 1970 (K. Kusigemati); Mt. Iwaya, Nagasaki-ken, 2♂, 27. v & 6. vi. 1978 (Y. Ikezaki). Honshū: — Mt. Kariyose, Tōkyō-to, 1♂ (paratype of *oriens*), 16. v. 1968 (H. Takizawa); Morioka, Iwate-ken, 1♂, on cow-dung, 23. vii. 1982 (K. Amano). Hokkaidō: — Otofuke, near Obihiro, 3♂, reared from eggs on cow-dung, em. 22-24. viii. 1978 (M. Iwasa).

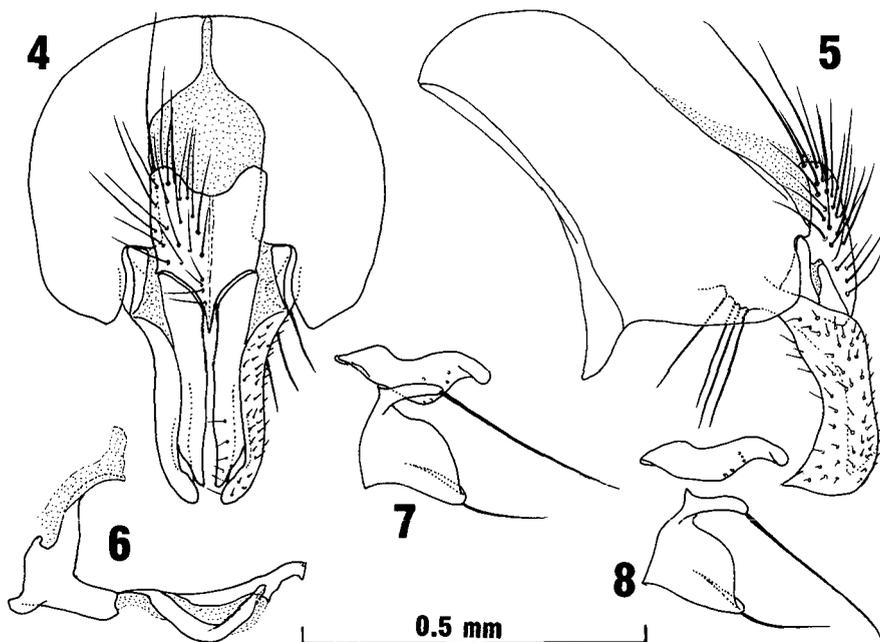
Other material examined. Kyūshū: — Hikosan, Fukuoka-ken, 1♀, 22. v. 1950 (S. Katō), and 1♀, 1. vi. 1971 (Malaise Trap, Kyūshū Univ.); Miike, Takaharu-chō, Miyazaki-ken, 5♀, 28. v. 1977 (S. Ōhara); Mt. Kirishima [Kurino-dake], Kagoshima-ken, 19♀, 11. v. 1967 (M. Suwa); Ōkuchi, Kagoshima-ken, 1♀, 12. vi. 1967 (K. Kanmiya); Tarumizu, Kagoshima-ken, 1♀, 13-14. vi. 1980 (M. Suwa); Amami-ōshima, 1♀, 13. iii. 1970 (H. Takizawa).

This species has been confused with *oriens*. However, some stable differences in the males have convinced me that it is distinct from *oriens*.

♂. Much resembling both *grisea* and *oriens*. Body-length 5.8-6.7 mm; wing-length 5.2-6.1 mm. Colour pattern based on the specimens from Kyūshū: — Mesonotum in pollinosity strongly tinged with brown in large area, paler anteriorly around rows of *acr*. Abdomen in pollinosity strongly and almost wholly tinged with brown on 3rd to 5th tergites, paler on the preceding tergites; median vitta reaching to marginal row of setae on each tergite, and broader than  $t_3$ -height on 3rd tergite. Wings and calyptres strongly tinged with brownish yellow. Colour pattern in the specimens from Otofuke, Hokkaidō (somewhat teneral): — Mesonotum in pollinosity a little paler than in the Kyūshū-type, though distinctly tinged with brown. Abdomen in pollinosity pale brownish grey, with a strong brown tinge narrowly discernible around median vitta on 3rd to 5th tergites; median vitta very narrow and linear, disappearing on 2nd tergite posteriorly and, in part of the specimens examined, also on 3rd tergite anteriorly.

Head 1.6-1.7 times as high as long; frons narrow, at most as wide as semi-diameter of anterior ocellus; parafrontals with 3-5 *ori*;  $A_3$  2.8-3.1 times as long as wide; arista with the longest hairs 3-4 times as long as basal diameter of arista. Mesonotum with rows of *pre-acr* separated by a distance longer than 1.5 times distance to adjacent *dc*-row, between the rows of *acr* with about 4 setulae abreast anteriorly and 2-3 posteriorly; 2nd *ph* fine, at most only a little stronger than adjacent setulae; *pra* usually shorter than posterior *ntpl*, at most as long as the latter.

Abdomen 1.7-2 times as long as wide, subparallel-sided or long-ovoid; 4th sternite (Fig. 77) much broadening caudad and wider than long, all or most of the



Figs. 4-8. *Emmesomyia similata* sp. nov., ♂. 4, hypopygium, dorsal view; 5, ditto, lateral view; 6, basiphallus and distiphallus; 7-8, praegonite and postgonite. Paratypes from Yakushima (4-7; 8).

setae of hind-marginal series being much longer than the sternite; 5th sternite (Figs. 518-519, Suwa, 1974, as *oriens*) similar to that of *grisea*, with processes setose to near apices; genital pouch with no sclerites discernible; hypopygium as in Figs. 4-8; surstylus quite similar to that of *oriens* though slightly robuster and with narrower apical cleft; with 4 setae at base ventrally (in all the 9 specimens dissected); praegonite with dorsal and ventral processes more narrowly separated basally than in *oriens*.

Mid femur with 3-5 *pv* on basal half;  $f_3$  with 7-8 *av*, 1 *pv* near base and 2-3 *pv* on median third. Wings usually with 1 to some (up to 5) minute setulae discernible at base of  $R_{4+5}$  on each surface.

♀. As stated under *oriens*, I have examined a lot of female specimens which may belong to *oriens* and *similata*. However, no distinct differences to distinguish the species have been found. The specimens were collected from various localities in Hokkaidō, Honshū and Kyūshū, Japan, yet none of them were captured together with males of *oriens* or *similata*. The following description is based on the material from Kyūshū, where *E. oriens* has not been known to occur. It is, therefore, quite likely that the material belongs to *similata*.

Wing-length 4.5-6.2 mm. Body with pollinosity much paler than in male. Mesonotum a little to rather strongly tinged with brown in pollinosity, paler anteriorly, sometimes with a faint yellowish tinge discernible. Abdomen in pollinosity slightly tinged with brown; 6th tergite (Fig. 84) broadly pollinose posteriorly.

Mesonotum with *pra* shorter to slightly longer than posterior *ntpl*.

Abdomen with ovipositor (Figs. 89-91) differing from that of *grisea* as follows:

— 7th sternite less reduced than in *grisea*, maintaining its width on median part ; 8th tergite with median sclerite prolonged cephalad beyond the outers ; subanal plate with lateral margins slightly concave or nearly parallel, and not convex.

Wings almost always with 1 to some (up to 6) minute setulae at base of  $R_{4+5}$  on each surface.

Distribution. Japan (Hokkaidô, Honshû and Kyûshû) ; Korea.

The male specimen recorded as "*oriens*" from India (Suwa, 1981) agrees well with *similata* in most characters, though differing in having wholly yellow femora. It might be a representative of a different subspecies of *similata*. Further discussion on the species of *Emmesomyia* from Asian countries other than Japan will be given in another paper.

Remarks. The surstylus without a notch on outer process, the narrow dorsal process of the praegonite, and the apically unilobed postgonite — all these features indicate a close relationship between *similata* and *oriens*, which are, however, easily separated by the differences in the 4th and 5th sternites of the males.

This species is more similar to *grisea* than to *oriens* in general appearance of the male, especially in the 4th and 5th sternites. The darker pollinosity, the longer arisal hairs, and the longer distance between rows of *pre-acr* may be useful to distinguish the male of *similata* from that of *grisea*. An examination of genital structures may still often be required for correct identification. In the female *E. similata* (and probably *E. oriens* also) is readily distinguished from *grisea* by the broadly pollinose 6th tergite.

This species is oviparous. The specimens examined from Otofuke were reared from eggs, and eggs are often found in females dissected. In one example, more than 30 eggs were observed in the abdomen.

#### 4. *Emmesomyia hasegawai* Suwa, 1979

(Fig. 92)

*Emmesomyia hasegawai* Suwa, 1979 : 1.

*Emmesomyia koreana* Kwon et Suh, 1982a : 100, synonymized by Kwon & Suh (1982b).

*Emmesomyia hasegawai* : Kwon & Suh, 1982b : 4 ; Suh & Kwon, 1985 : 155 ; Fan et al., 1988 : 376.

Material examined. Hokkaidô : — Otofuke, near Obihiro, 1 ♀, mother of the holotype, 21. viii. 1977, 1 ♂ (holotype), reared from an egg on cow-dung, em. 22. viii. 1978, 2 ♂, 3 ♀, reared from eggs on cow-dung, same broods with the holotype, em. 21-22. viii. 1978, and 1 ♂, reared from an egg on cow-dung, same brood with the holotype?, em. 22. viii. 1978, all collected by M. Iwasa. Honshû : — Shizukuishi, Iwate-ken, 2 ♂ (paratypes), 2 ♀, reared from larvae on cow-dung, em. 10-17. v. 1978 (T. Hasegawa).

♂. Wing-length 5.2-6.2 mm. Mesonotum in pollinosity with a yellowish tinge becoming paler cephalad, and with a brownish tinge weakly discernible medially and laterally or hardly discernible. Abdomen yellowish grey pollinose, paler anteriorly ; median vitta narrow and sharp, reaching to row of marginal setae on each tergite. Femora blackish or dark brown, with apex narrowly yellow ; tibiae yellow ; tarsi blackish or dark brown. Wings weakly tinged with yellow (probably due to teneral

condition); calyptrae whitish, with a yellowish tinge marginally.

Head about 1.7 times as high as long, and slightly wider than mesonotum (1.01-1.07); frons narrower than anterior ocellus; parafrontals with 3-4 *ori*;  $A_3$  2.4-2.8 times as long as wide; longest arista hairs 4-5 times as long as basal diameter of arista in the specimens from Otofuke, yet about twice in those from Shizukuishi; occiput on upper plane almost bare, only with some setulae visible ventrolaterally, yet in 1 specimen from Shizukuishi with a row of setulae just below occipital series.

Mesonotum with rows of *pre-acr* separated by a distance at most 1.5 times as long as that to adjacent *dc*-row; 2-3 rows of setulae present between the rows of *acr*; 2nd *ph* fine or a little developed; *pra* shorter than posterior *ntpl*; 1 *ptpl*.

Abdomen with 3rd to 5th sternites and hypopygium as in Figs. 1-13, Suwa (1979); 4th sternite greatly broadening caudad, concave on hind margin medially, and with some quite long setae posterolaterally; 5th sternite with a patch of very stout spine-like setae at inner base of each process; basal plate of the sternite very large and densely setose, the setae becoming longer and stronger towards lateral and anterior margins of the plate, and those on anterior area conspicuously long; surstylus with 4-6 setae at base ventrally; praegonite with a small median projection developed between dorsal and ventral processes; postgonite much broadened.

Mid femur with 2-5 *pv* on basal half;  $f_3$  with 6-9 *av*, 1 *pv* near base and 1-3 *pv* on median third; tibiae with setae as ordinary;  $t_3$  with 1 additional *ad* present on the right leg in 1 specimen. Wings with *dm-cu* oblique and sinuate;  $R_{4+5}$  usually with 1 to some (up to 5) minute setulae at base on ventral side and often also on the dorsal.

♀. Wing-length 5-5.8 mm. Mesonotum with dark markings appearing as in the case of *grisea*; postsutural submedian vittae in caudal view terminating around 2nd *post-dc*. Abdomen in pollinosity with yellowish tinge paler than in male; median vitta moderate to rather broad, and obscure to rather sharp; marginal bands indiscernible; 6th tergite entirely pollinose (small shining black spots discernible at lateral bases in 1 specimen with well-exposed condition). Calyptrae very faintly yellowish marginally.

Frons as wide as or a little wider than one-third head-width (0.32-0.37); parafrontals with 2-3 *ori*; arista with the longest hairs about 4 times as long as basal diameter of arista in the specimens from Otofuke, yet thrice in those from Shizukuishi. Mesonotum with 2nd *ph* fine, at most only a little stronger than adjacent setulae.

Abdomen shrunk and with 6th segment largely concealed within 5th segment except in 1 specimen, which has the segment wholly exposed; ovipositor (Fig. 92) resembling that of *similata*, with differences as follows: — 8th tergite with median sclerite not protruded cephalad beyond outer ones; subanal plate distinctly concave on lateral margins, and with no setulae discernible except for 4 long ones along apical margin.

Mid femur with 1-2 *av* near base and 2-3 *pv* on basal third;  $t_1$ , in addition to 1 *pv*, usually with 1 *ad* discernible near apex. Wings with  $R_{4+5}$  almost always setulose at base ventrally and usually also dorsally; *dm-cu* slightly sinuate.

Distribution. Japan (Hokkaidō and Honshū); Korea; China.

Remarks. This species is closely related to *similata* in the surstylus with a narrow apical cleft and the ovipositor with concave-sided subanal plate. Besides

some clear differences in the detailed structures of the terminalia, the yellowish tinge in pollinosity, the male 5th sternite with a large and densely setose basal plate, and the entirely pollinose 6th tergite of the female are useful recognition characters of *hasegawai*.

This species is oviparous. All the specimens examined from Otofuke except their mother were reared from eggs, and the mother specimen was observed to retain not a few eggs in its abdomen.

5. *Emmesomyia dorsalis* (Stein, 1915)

(Figs. 9-14, 85, 93)

*Pegomyia dorsalis* Stein, 1915 : 48.

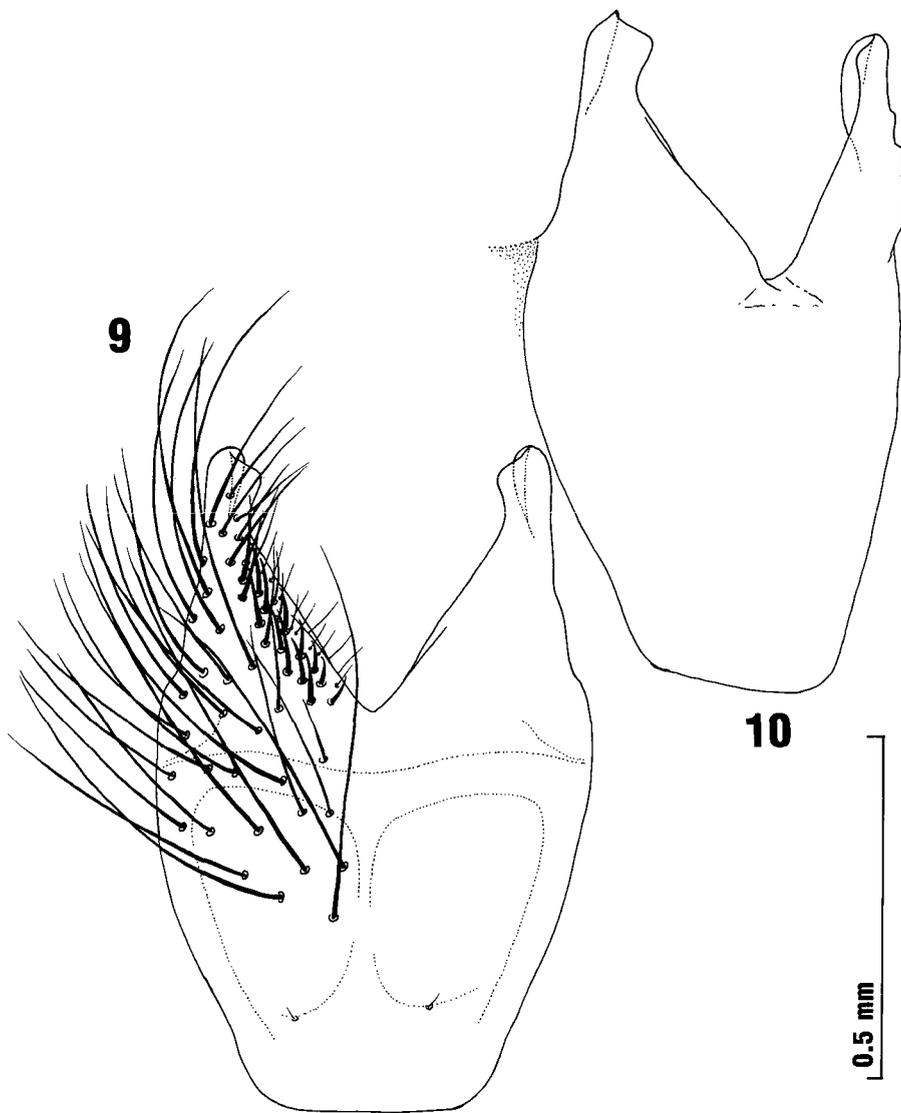
*Emmesomyia dorsalis* : Ackland & Pont, 1977 : 442.

Material examined. Honshû : — Kobugahara, 1,000-1,200 m, Tochigi-ken, 1 ♀, 6. vi. 1991 (M. Suwa). Kyûshû : — Kirishima-jingû, 500-900 m, Kagoshima-ken, 9 ♂, 10-12. vi. 1980 (M. Suwa); Mt. Miyanoura, Yakushima, 1 ♀, 6. v. 1972 (K. Kusigemati), and 1 ♀, 19. x. 1973 (T. Kumata).

♂. Body-length 6-7.6 mm ; wing-length 5.3-6.7 mm. Body blackish in ground colour, with a yellowish tinge in pollinosity. Orbits whitish grey pollinose ; antennae blackish, with A<sub>2</sub> slightly brownish apically ; palpi blackish ; haustellar mentum blackish, thinly pollinose. Mesonotum a little to rather strongly tinged with yellow in pollinosity, becoming paler cephalad ; in frontal view largely blackish, posteriorly with a large prescutellar pollinose patch discernible, the patch triangularly protruding cephalad to near 2nd *post-dc* ; in caudal view almost wholly pollinose, with some dark markings appearing according to angles of view : — presutural lateral patches between *dc* and *prst* and postsutural sublateral vittae between *dc* and *ia* obscurely visible at high angle of view, small lateral patches on declivities rather sharply discernible in caudolateral view, and a large prescutellar median patch rather obscurely discernible at low angle of view. Abdomen densely pollinose, rather weakly to strongly tinged with yellow in the pollinosity ; median vitta narrow and sharp, continuous, or vanishing on 2nd tergite posteriorly and on 3rd anteriorly ; marginal bands absent, at most a narrow hind-marginal one being sometimes discernible on 5th tergite. Legs largely yellow ; coxae mainly blackish and partly brownish ; trochanters brownish yellow to brown ; f<sub>1</sub> yellow, with a blackish or dark brownish area on basal third to half, the darkened area sometimes extending distad to near apex dorsally and to near apical third posteriorly ; other parts of legs all yellow. Wings distinctly tinged with yellow ; calypterae rather distinctly tinged with yellow.

Head slightly wider than mesonotum (1.02-1.1 times), and 1.7-1.8 times as high as long ; frons as wide as, or slightly wider than, semi-diameter of anterior ocellus ; parafrontals with 3-4 (5 in 1 specimen) *ori* ; A<sub>3</sub> 2.6-2.9 times as long as wide ; arista with the longest hairs about thrice as long as diameter of arista base.

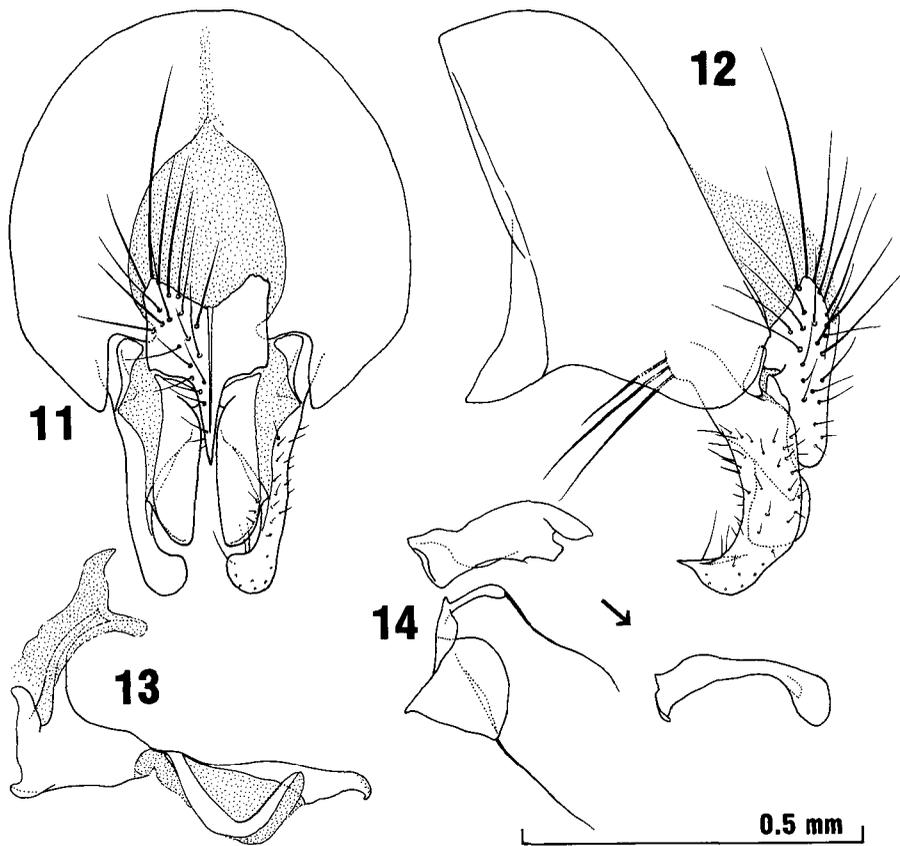
Mesonotum with rows of *pre-acr* very widely separated from each other, the distance 1.5-1.8 times as long as that to adjacent *dc*-row ; between the rows of *acr* densely setulose, 4-5 rows of setulae visible anteriorly ; 2nd *ph* fine, at most only a little stronger than adjacent setulae ; *pra* shorter than posterior *ntpl* ; *stpl* 1 : 2 ; 1



Figs. 9-10. *Emmesomyia dorsalis* (Stein), ♂. 9, 5th sternite, ventral view; 10, ditto, ventrolateral view. Kirishima-jingū.

*ptpl*; scutellum rather sparsely to densely setulose on dorsum laterally (9-23 setulae discernible on each side).

Abdomen slightly thickened, long-ovoid, and 1.6-1.8 times (twice in 1 specimen) as long as wide; 4th sternite quadrate, only a little broadening caudad, and as long as or slightly longer than wide; 5th sternite and hypopygium as in Figs. 9-14 (3 specimens dissected); 5th sternite with basal plate large and not setose on anterior half; each process with about 2 rows of numerous short spine-like setae along inner margin; surstylus with 3-4 setae at base ventrally; praegonite with dorsal process



Figs. 11-14. *Emmesomyia dorsalis* (Stein), ♂. 11, hypopygium, dorsal view; 12, ditto, lateral view; 13, basiphallus and distiphallus; 14, praegonite and postgonite. Kirishima-jingū.

narrow and ventral process much expanded; postgonite with a prominent process near apex ventrally; distiphallus with minute serrations discernible on paraphalli.

Mid femur with 4 or sometimes 5 *pv* on basal half;  $f_3$  with a complete row of about 10 *av* and 4-5 *pv* on basal half, ground setulae on basal fourth to third of posteroventral to posterior surface being lengthened though fine; tibiae with setae as ordinary. Wings with *dm-cu* oblique and sinuate;  $R_{4+5}$  minutely setulose at base ventrally (2-7 setulae discernible) and also dorsally (1-4 setulae).

♀. Wing-length 5-5.8 mm. Mesonotum with blackish markings as follows: — in frontal view, before suture with a broad median patch, and behind suture with rather broad submedian vittae between rows of *dc* and *acr*, terminating around 2nd *post-dc*, and with sublateral patches discernible or not; in caudal view, before suture with lateral patches visible, behind suture with median vitta and sublateral vittae between rows of *dc* and *ia*, the median vitta narrow anteriorly and much broadening caudad to fuse with the sublateral vittae. Abdomen less densely pollinose than in male, pale yellowish grey and faintly brownish in pollinosity, with a bluish tinge hardly or weakly discernible; median vitta broad, and rather sharp at low angle in

caudal view; fore- and hind-marginal bands scarcely or very obscurely discernible; 6th tergite (Fig. 85) polished anteriorly and broadly pollinose on setose area along posterior margin. Fore femur more broadly yellow than in male, though darkened basally. Calyptrae much paler than in male.

Head about as wide as mesonotum (1.02-1.06), and 1.4-1.5 times as high as long; frons slightly narrower than one-third head-width (0.28-0.3); parafrontals with 2-3 *ori*;  $A_3$  about 2.5 times as long as wide; longest arisal hairs more than thrice as long as basal diameter of arista.

Abdomen with 6th segment large and mainly exposed in dried specimens (Fig. 85); ovipositor long (Fig. 93), similar to that of *grisea*; 6th tergite densely setulose on main plate in about 2 rows along marginal series of setae and setulose on posterolateral sclerites wholly; 6th and 7th spiracles close together on 6th tergite laterally, the 6th spiracle on the weakly chitinized fold anteriorly and the 7th on the main plate; 7th tergite with median sclerite sharply prolonged cephalad, posterior lobes very densely spinulose, membranous cleft between outer and inner lobes much extending cephalad almost to separate the outer lobe from the outer longitudinal sclerite; 7th sternite well maintaining its width almost throughout, though weakening cephalad in sclerotization; 8th tergite with outer sclerites crooked inwards near anterior tips as if bundled there; 8th sternite represented by a pair of rather small bare plates; suranal plate longer than wide and acute apically, with a pair of fine setulae near apex; subanal plate acute-angled apically, with a pair of rather long setulae subapically and with some (6-7) finer setulae more apically.

Mid femur with 3-5 *av* on basal fourth to third, and 3-4 *pv* on basal third to half;  $f_3$  with 1 weak *pv* near base and 1-2 stronger *pv* on median third, and with no ground setulae lengthened;  $t_1$  with 1 *ad* discernible. Wings with *dm-cu* somewhat sinuate or curved inwards.

Distribution. Japan (Honshû and Kyûshû); Taiwan.

Remarks. *E. dorsalis* was originally described from Taiwan on the basis of 2 male specimens. Through the courtesy of Mr. Ackland I have had the chance to see figures of the male terminalia drawn by him from one of the type specimens. Having read the original description and compared with the figures by Ackland, I have little doubt about my identification of the Japanese form with *dorsalis*.

The ovipositor of *dorsalis* with spinulose 7th tergite may indicate a close relationship to *grisea* and its allies, though it is easy to distinguish *dorsalis* from others by the yellow femora and the yellow tinge in pollinosity.

Two females from Yakushima were dissected and more than ten large eggs were found in each of them (Fig. 103).

#### 6. *Emmesomyia flavitarsis* Suwa, 1974

(Figs. 15-19, 71, 78, 86, 94-95, 104)

*Emmesomyia flavitarsis* Suwa, 1974: 184; Fan et al., 1988: 372.

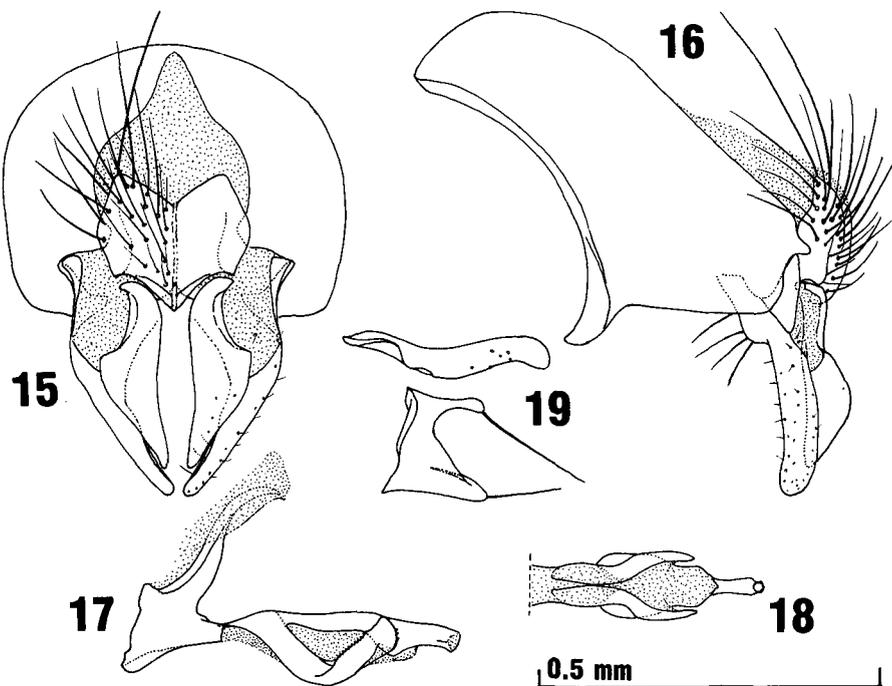
Material examined. Hokkaidô: — Sapporo, 1♂, (paratype), 1. vii. 1966 (M. Suwa), and 1♂ (paratype), 8. viii. 1966 (M. Suwa); Zenibako-tôge, near Sapporo, 1♂, 23-24. vi. 1968 (H. Takizawa). Honshû: — Zatôishi, Hirosaki, Aomori-ken, 1♀, 13. x. 1965 (S. Fukushi); Koiwai [Shizukuishi], Iwate-ken, 1♀, 2. x. 1967 (T. Kocha);

Mt. Bukō, Saitama-ken, 1♂, 24. vii. 1977 (K. Hara); Chichibu-Ontake, Saitama-ken, 1♀, 16. vi. 1974 (K. Hara); Mt. Kariyose, Tōkyō-to, 1♂ (holotype), 16. v. 1968 (H. Takizawa); Mt. Mitake, Tōkyō-to, 1♂ (paratype), 26. v. 1967 (M. Suwa). Kyūshū: — Haki, 700-800 m, Gokanoshō, Kumamoto-ken, 1♂, 12. v. 1978 (T. Gotō).

♂. Wing-length 4.8-6.1 mm. Body blackish in ground colour and pale grey in pollinosity. Antennae blackish, with  $A_2$  slightly brownish apically in some specimens; palpi blackish; haustellar mentum blackish, thinly with pale pollen. Mesonotum more or less tinged with brown in pollinosity; largely blackish in frontal view and almost wholly pollinose in caudal view. Abdomen a little bluish in pollinosity, with a faint brownish tinge discernible in some lights; with median vitta rather broad and sharp. Femora blackish, with apical part yellow; tibiae and tarsi yellow. Wings tinged with yellow; calyptrae pale yellow, with margins distinctly yellow.

Head slightly wider than mesonotum (1.05-1.07 times), and 1.6-1.7 times as high as long; frons narrow, at most as wide as semi-diameter of anterior ocellus; parafrontals with 3-4 *ori*;  $A_3$  2.6-2.7 times as long as wide in a few specimens in good condition; arista with the longest hairs 2-3 times as long as basal diameter of arista.

Mesonotum with rows of *pre-acr* separated by a distance at most 1.5 times of that to adjacent *dc*-row, 2-3 rows of setulae present between the rows of *acr*; 2nd *ph* fine, at most only a little stronger than adjacent setulae; *pra* shorter than



Figs. 15-19. *Emmesomyia flavitarsis* Suwa, ♂. 15, hypopygium, dorsal view; 16, ditto, lateral view; 17, basiphallus and distiphallus; 18, distiphallus, ventral view; 19, praegenite and postgenite. Zenibako-tōge (15-16) and Mt. Bukō (17-19).

posterior *ntpl*; *stpl* 1: 2; 1 *ptpl*; scutellum rather sparsely setulose on dorsum laterally (4-7 setulae discernible on each side).

Abdomen depressed, only a little thickened on caudal segments, long-ovoid or subparallel-sided, and 1.6-1.9 times as long as wide; sternites and hypopygium as in Figs. 15-19, 71, and 78 (see also Figs. 493-500, Suwa, 1974); 5th sternite with some short spine-like setae on inner base of each process and on basal plate medially, these setae not so strong as in *grisea*; cercal plate not much prolonged apicad; surstylus with inner process broadened and not concealed by outer one in lateral view, and with 4 rather weak setae at base ventrally; postgonite narrow on whole length; distiphallus with paraphalli distinctly serrated on apical half dorsally.

Mid femur with 3-5 *pv* on basal half;  $f_3$  with 7-9 *av* and 4-5 *pv* on basal half; tibiae with setae as ordinary. Wings with *dm-cu* a little oblique and slightly to distinctly sinuate;  $R_{4+5}$  usually with 1 to some (up to 4) minute setulae at base ventrally, yet with 0-1 setula dorsally.

♀. Wing-length 4.9-5.6 mm. Mesonotum bluish grey pollinose, hardly or faintly tinged with brown in the pollinosity, and with black markings as follows: — in frontal view, before suture with a large median patch, and behind suture with rather broad submedian vittae between rows of *dc* and *acr*, terminating around 3rd *post-dc*, and with sublateral patches obscurely discernible between *sa* and *ia*; in caudal view, before suture with small lateral patches between *prst* and *dc*, and behind suture with rather obscure median vitta and sharp submedian ones between rows of *dc* and *ia*, the median vitta narrow anteriorly and becoming broader caudad to fuse with the submedians around 3rd *post-dc*. Abdomen pale bluish grey in pollinosity, with brownish tinge medially; median vitta broad and not sharp; fore- and hind-marginal bands obscurely discernible in caudal view; 6th tergite (Fig. 86) almost entirely polished, only pollinose along posterior margin very narrowly. Wings and calyptrae paler than in male.

Head about as wide as mesonotum (1.01-1.03); frons about one-third as wide as head and nearly parallel-sided; parafrontals with 2 *ori*;  $A_3$  about 2.5 times as long as wide in 1 specimen in good condition; longest arisal hairs nearly thrice as long as basal diameter of arista.

Abdomen with 5th and 6th segments continuously narrowing caudad in dorsal view (Fig. 86), the 6th being, however, variously retracted; ovipositor (Figs. 94-95) short; 6th tergite more than thrice as long as wide and uniformly sclerotized, hardly to rather densely setulose medially; 6th sternite gradually narrowing cephalad and almost wholly setose; 7th tergite much wider than long (about twice), widely divided anteriorly, with 4 posterior lobes hardly or weakly developed, and with or without some setae medially in addition to marginal ones; 7th sternite much narrowed anteriorly and wholly setose, a few or some of hind-marginal setae being strong; 8th tergite represented by 2 bare plates, with median sclerite absent; 8th sternite indiscernible, only represented by 1 or 2 sensilla on each side; suranal plate much wider than long, with a pair of rather long setulae near apex and with no additional setulae; subanal plate triangular, with a roundish apex, with numerous fine setulae, becoming denser apicad, and with about 4 long setulae near apex.

Mid femur with 1 *av* near base and 2-5 *pv* on basal fourth to third;  $t_1$  with 1 *ad* discernible in addition to 1 *pv*. Wings with *dm-cu* only a little sinuate;  $R_{4+5}$  with 1-3 minute setulae visible at base ventrally, yet with none (in 2 specimens) or 2 (in 1

specimen) dorsally.

Distribution. Japan (Hokkaidô, Honshû and Kyûshû); China (Shanghai).

Remarks. In the external features other than the terminalia *E. flavitarsis* is quite similar to *E. suwai*, from which it is distinguishable by the male 5th sternite with processes not expanded apically and the female 6th tergite entirely polished.

This species is larviparous. All the 3 females at hand were dissected, and two of them contained a large larva of the 2nd instar with adhering exuviae of the 1st instar (Fig. 104). In one of the two larvae the mouth hooks of the 3rd instar had already been formed.

7. *Emmesomyia suwai* Ge et Fan, 1988, stat. nov.

(Figs. 20-25, 79-80, 96-98, 105-106)

*Emmesomyia villica* (Meigen) sensu Suwa, 1974: 184; Suwa, 1981: 21.

*Emmesomyia socia suwai* Ge et Fan in Fan et al., 1988: 374.

Material examined. Hokkaidô: — Sapporo, 1♂, 10. vi. 1971 (T. Kumata), and 1♀, 15. vii. 1958 (S. Takagi); Jôzankei, 1♀, 19. viii. 1967 (M. Suwa); Nopporo, 2♀, 7. vi & 3. ix. 1976 (Y. Sakamoto); Eniwa, 2♂, 27. v. 1971 (M. Suwa); Bifuka, 2♂, 4♀, 29. vii. 1966 (M. Suwa); Sarobetsu, 1♂, 8. viii. 1969 (A. Nishiyama), and 1♂, 18. viii. 1969 (T. Nakashima); Tomakomai, 1♀, 6. vi. 1983 (M. Suwa); Gamushi, 2♀, 12. vii. 1958; Apoi-dake, 3♀, 10. vii. 1966 (M. Suwa); Obihiro, 3♂, 2♀, reared from cow-dung, 19. vi-2. vii. 1977 (M. Iwasa); Otofuke, near Obihiro, 12♂, 7♀, mostly reared from cow-dung, 17. vi-26. ix. 1977 (M. Iwasa); Nukabira, 1♂, 3♀, 25. vi. 1978 (M. Iwasa); Mt. Obihiro, 4♀, 10. vii. 1978 (M. Iwasa); Tomuraushi-onsen, 1♀, 18. vii. 1976 (M. Suwa); Kenebetsu, 1♀, 3. viii. 1971 (T. Kumata & M. Miyazaki); Kushiro, 1♀, 17. vii. 1966 (M. Suwa); Shirataki, 1♀, 1. viii. 1974 (M. Suwa). Honshû: — Mt. Iwaki, Aomori-ken, 1♀, 21. viii. 1968 (S. Fukushi), and 3♀, 10. vii & 21. viii. 1976 (S. Fukushi); Shizukuishi, Iwate-ken, 10♂, 6♀, reared from cow-dung, em. 8-23. v. 1978 (T. Hasegawa); Kuji, Iwate-ken, 1♀, 26. viii. 1983 (S. Fukushi); Nikkô, Tochigi-ken, 1♀, 9. viii. 1953 (S. Katô); Hachirôgahara, Shiobara, Tochigi-ken, 3♀, 4. vi & 3. ix. 1980 (T. Matsumura), and 18♀, 26. v-22. ix. 1981 (T. Matsumura); Shiga-kôgen, Nagano-ken, 3♀, 30-31. v. 1975 (T. Saigusa et al.); Norikura-kôgen, 1,600-1,700 m, Nagano-ken, 1♂, 1♀, 8. vi. 1975 (T. Saigusa). Kyûshû: — Mt. Sobo-san, Ôita-ken, 1♀, 9. vi. 1978 (A. Nakanishi); Mt. Hakuchô (=Shiratori-yama), 1,300 m, Gokanoshô, Kumamoto-ken, 1♀, 26. v. 1978 (T. Gotô).

♂. Wing-length 5.2-5.6 mm. Body blackish in ground colour (often partly brownish, owing to teneral condition); in pollinosity, pale grey and usually with a slight to rather distinct yellowish tinge especially on abdomen, or sometimes bluish grey, with a brownish tinge in part, and hardly yellowish. Mesonotum in frontal view almost wholly blackish; in caudal view almost wholly pollinose, at rather high angle of view with presutural lateral patches and postsutural sublateral vittae obscurely visible. Abdomen with median vitta narrow and sharp; marginal bands absent; 5th sternite with processes yellow to dark brown according to maturity of specimens. Coxae and trochanters blackish; femora blackish, with apex narrowly yellow; tibiae yellow; tarsi yellow, slightly darkened distally. Wings only a little tinged with yellow, slightly darker basally; calyptrae whitish, with a yellowish tinge

marginally.

Head distinctly wider than mesonotum (1.1-1.18 times) and 1.7-1.8 times as high as long; frons slightly wider than semi-diameter of anterior ocellus; parafrontals with 3-7 (usually 4-5) *ori*;  $A_3$  usually 2.5-2.6 times as long as wide; arista with the longest hairs longer than twice, often nearly 4 times, the diameter of arista base.

Mesonotum with rows of *pre-acr* separated by a distance shorter than 1.5 times of that to adjacent *dc*-row, 2-3 rows of setulae present between the rows of *acr*; 2nd *ph* fine, only a little developed; *pra* shorter than posterior *ntpl*; 1 *ptpl* (2 *ptpl* present on the right pleuron in 1 specimen); *stpl* 1: 3, the lowest posterior much shorter than the uppers and often very fine.

Abdomen depressed and less than twice the width in length; 4th sternite (Figs. 79-80) longer than wide; 5th sternite (Figs. 20-21) with processes much expanded on apical half, each process with a series of fine setulae along inner margin, the distalmost seta longest and usually isolated from the anteriors and leaving the inner margin (cf. Figs. 505-506, Suwa, 1974); genital pouch with no sclerites discernible; surstylus with 5-6 (usually 6) setae at base ventrally; praegonite with dorsal process broadened and armed with 3-5 (usually 4) setae; distiphallus (Figs. 24-25) not expanded on mesophallus.

Mid femur with 2-4 *pv* on basal third to half;  $f_3$  with 5-8 *av*, 1 *pv* near base and 2-3 (rarely 4) *pv* on median third; tibiae with setae as ordinary. Wings with *dm-cu* oblique and sinuate;  $R_{4+5}$  with 1 or a few minute setulae at base on each surface, sometimes with none on one or both surfaces.

♀. Wing-length 4.4-5.4 mm. Body in pollinosity often hardly tinged with yellow. Mesonotum with black markings as follows: — in frontal view, before suture with a broad median and a little narrower submedian vittae visible, the submedian vittae situating along rows of *dc*, anteriorly extending to 1st *ph* and posteriorly fused with the median; behind suture with submedian vittae between rows of *dc* and *acr* and lateral patches outside *ia*, the submedians rather broad or moderate, continuous to near scutellum or terminating near 2nd or 3rd *post-dc*, the lateral patches often grazed and obscure; in caudal view, before suture with narrow submedian vittae between rows of *dc* and *acr* and small lateral patches, the submedians terminating usually near 2nd *acr*; behind suture with median and submedian vittae and lateral patches, the median vitta narrow and sharp or obscurely broadened, the lateral patches easily discernible in a little lateral angle of view. Abdomen with median vitta rather broad and sharp; fore-marginal bands variously appearing, completely lacking to rather broadly visible especially on 3rd and 4th tergites; hind-marginal bands absent or sometimes narrowly discernible especially on 2nd tergite; 6th tergite wholly pollinose.

Head slightly wider than mesonotum (1.05-1.08); frons about one-third as wide as head near vertex and distinctly widening ventrad, the width at lunule about 1.2 times of that at the narrowest part (near vertex) (1.07 times in 1 specimen, yet 1.15-1.22 in the other measured material); parafrontals with 2-4 (usually 3) *ori*. Mesonotum with 2nd *ph* hardly distinguishable from adjacent setulae; *stpl* 1: 2, lower posterior much shorter than the upper.

Abdomen with 6th segment usually concealed within 5th segment; ovipositor (Figs. 96-98) shortened; 6th tergite weakly or scarcely sclerotized around 6th and 7th spiracles and usually completely membranous before the spiracles, which are

situated close together on posterior half of the tergite laterally; the tergite with no posterior lobes developed and with marginal setae forming a continuous row, no additional setae or setulae present before the row; 6th sternite narrowing cephalad, bare on anterior half and setose on posterior half marginally; 7th tergite widely divided anteriorly, with a median projection sometimes weakly developed (Fig. 96), and on posterior part continuously sclerotized, a little membranous along posterior margin medially, the row of marginal setae being interrupted there; 7th sternite setose along posterior margin, with anterior part bare and diminished, often almost disappearing; 8th tergite widely divided into 2 plates, which are usually armed with 1 or a few minute setulae posteriorly; between the plates a narrow sclerite rarely visible; 8th sternite reduced to a pair of very small and bare sclerites, often hardly discernible; suranal plate with a pair of rather long setulae near apex and a few or some short setulae present more apically; subanal plate densely setulose on posterior half, some near apical margin being longer.

Mid femur with 1 *av* near base and 2 or sometimes 3 *pv* on basal fourth;  $f_3$  with 4-5 *av*, 1 *pv* near base and 1 *pv* near basal third. Wings with *dm-cu* slightly oblique and a little sinuate.

Distribution. Japan (Hokkaidō, Honshū and Kyūshū); China; India.

Remarks. This species was once misidentified with *E. villica* (Meigen, 1838) (= *E. socia* (Fallén, 1825)) (Suwa, 1974). For the present study some European specimens (3♂, 2♀) of *socia* are available. On the basis of this material the terminalia and some other characters of *socia* are shown in Figs. 35-43, 74, 82, 101, and 108. The differences between the two forms are so great that they are undoubtedly distinct species as pointed out by Griffiths (1984).

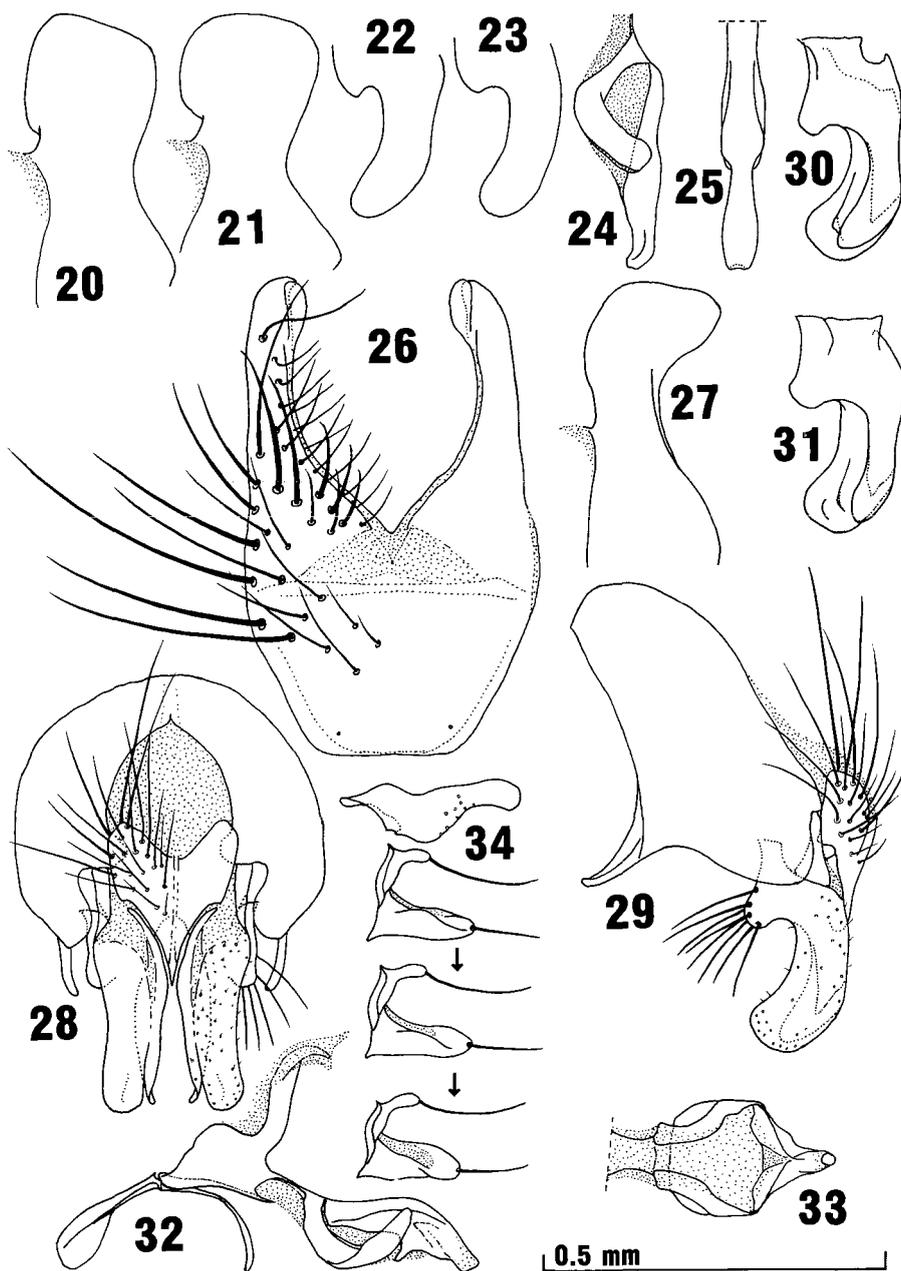
*E. suwai* is a larviparous species. Many specimens of female were dissected. Most of them were found to contain a large larva of the 2nd instar.

#### 8. *Emmesomyia kurahashii* sp. nov.

(Figs. 26-34, 73, 81, 87, 99-100, 107)

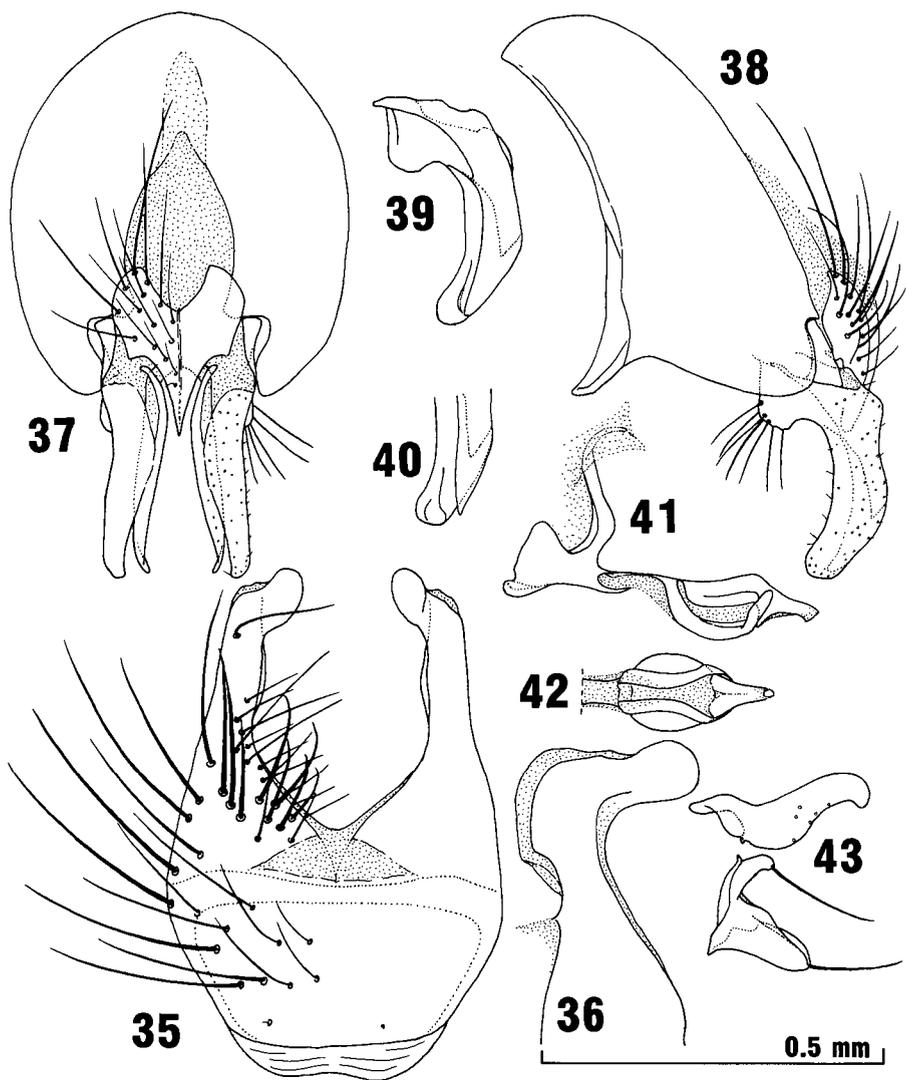
Type material. Honshū: — Kanazawa, Ishikawa-ken, 1♂ (holotype), 10. v. 1970 (H. Kurahashi); Hashidate-gawa, Chichibu, Saitama-ken, 1♂, 11. v. 1974 (K. Hara); Takao-san, Tōkyō-to, 2♀, 31. vii. 1969 (T. Kocha). Kyūshū: — Hikosan, Fukuoka-ken, 1♂, 18. v. 1959 (K. Kamijō); Mt. Hakuchō (= Shiratori-yama), 1,300 m, Gokanoshō, Kumamoto-ken, 1♀, 6. vi. 1980 (M. Yamamoto); Kuruson-kyō, Ebino, Miyazaki-ken, 1♀, 20. iv. 1976 (K. Ōhara).

♂. Wing-length 5-5.6 mm. Body blackish in ground colour and pale grey in pollinosity, with a yellowish tinge. Orbits silvery grey pollinose; cheeks very faintly tinged with brown in pollinosity; antennae blackish, with  $A_2$  more or less brownish apically; palpi blackish; haustellar mentum blackish or dark brown, thinly pollinose. Mesonotum slightly or faintly tinged with yellow in pollinosity; in frontal view almost wholly blackish, with pollinosity discernible only peripherally; in caudal view almost wholly pollinose, at rather high angle of view with presutural lateral patches and postsutural sublateral vittae obscurely appearing. Abdomen rather distinctly tinged with yellow in pollinosity; median vitta narrow; marginal bands indiscernible. Coxae, trochanters and femora blackish or dark brown, with apices of femora narrowly yellow; tibiae and tarsi yellow. Wings more or less



Figs. 20-25. *Emmesomyia suwai* Ge et Fan, ♂. 20-21, process of 5th sternite, ventrolateral view; 22-23, surstylus, lateral view; 24, distiphallus; 25, ditto, dorsal view. Eniwa (20, 24-25), Shizukuishi (21; 22), and Sarobetsu (23).

Figs. 26-34. *Emmesomyia kurahashii* sp. nov., ♂. 26, 5th sternite, ventral view; 27, process of 5th sternite, ventrolateral view; 28, hypopygium, dorsal view; 29, ditto, lateral view; 30, surstylus, inside view; 31, ditto, slightly ventral view; 32, basiphallus and distiphallus; 33, distiphallus, ventral view; 34, praegonite and postgonite. Holotype from Kanazawa.

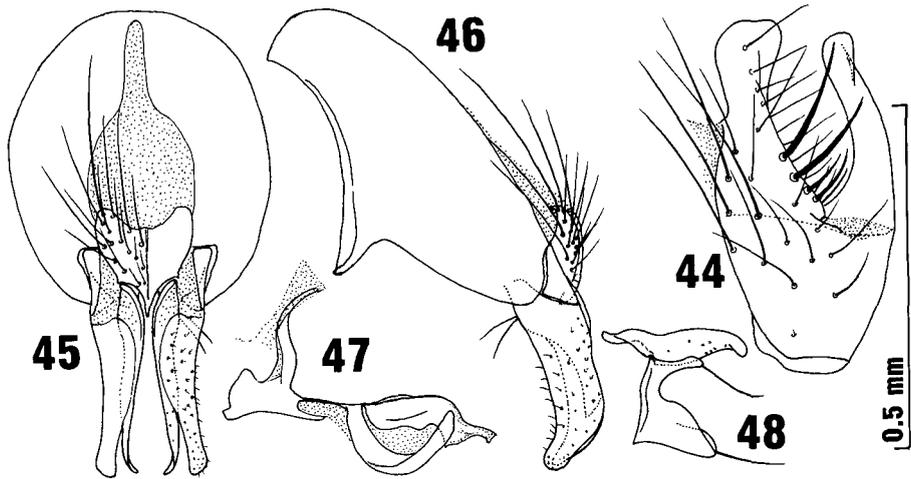


Figs. 35-43. *Emmesomyia socia* (Fallén), ♂. 35, 5th sternite, ventral view; 36, process of 5th sternite, ventrolateral view; 37, hypopygium, dorsal view; 38, ditto, lateral view; 39, surstylus, inside view; 40, ditto, slightly different view; 41, basiphallus and distiphallus; 42, distiphallus, ventral view; 43, praegonite and postgonite. England.

tinged with yellow; calyptae slightly tinged with yellow.

Head distinctly wider than mesonotum (1.13-1.14 times), and 1.7-1.8 times as high as long; frons as wide as or a little narrower than anterior ocellus; parafrontals with 3-4 *ori*, and in 1 specimen with 1 rather long *ors* present on right side in addition to the ordinary microscopical one;  $A_3$  2.5-2.6 times as long as wide; arista with the longest hairs 3-4 times as long as basal diameter of arista.

Mesonotum with rows of *pre-acr* separated by a distance shorter than 1.5 times of that to adjacent *dc*-row, 2-3 rows of setulae visible between the rows of *acr*; 2nd



Figs. 44-48. *Emmesomyia subvillica* Fan, Ma et Mou, ♂. 44, 5th sternite, ventrolateral view; 45, hypopygium, dorsal view; 46, ditto, lateral view; 47, basiphallus and distiphallus; 48, praegonite and postgonite. China.

*ph* fine or slightly developed; *pra* shorter than posterior *ntpl*; *stpl* 1(2): 3, the lowest posterior much shorter than the uppers; scutellum sparsely setulose on dorsum, with 7-9 setulae discernible on each side.

Abdomen depressed, 1.5-1.6 times as long as wide; 4th sternite (Fig. 81) longer than wide; 5th sternite and hypopygium as in Figs. 26-34; 5th sternite with processes expanded downwards at apices, and with a continuous row of fine setae along inner margin of each process, the distalmost seta being much longer than the others; basal plate broadly bare anteriorly; genital pouch with a weakly sclerotized band discernible behind 6th sternite (Fig. 73); surstylus broad and truncated apically in profile, and with 6-9 setae on well-developed basal lobe; the outer process with a shallow depression near apex inside, and with a weak incisure near the depression (Figs. 30-31); praegonite with ventral process hardly expanded dorsally; distiphallus much broadened on mesophallus, and not serrated on paraphalli.

Mid femur with 3-4 *pv* on basal third;  $f_3$  with 5-7 *av*, 1 *pv* near base and 2 *pv* on median third; tibiae with setae as ordinary. Wings with *dm-cu* oblique and sinuate;  $R_{4+5}$  with 0-3 minute setulae at base ventrally and with 0-1 dorsally.

♀. Wing-length 4.4-4.8 mm. Mesonotum and abdomen pale bluish grey pollinose, with a faint or slight brownish or yellowish tinge. Mesonotum with black markings as follows: — in frontal view, before suture with broad median and narrower submedian vittae, the latter running from 1st *ph* to rows of *dc* and fused with the median vitta posteriorly; behind suture with broad or moderate submedian vittae between rows of *dc* and *acr* and lateral patches outside *ia*, the submedians continuous to scutellum or terminating near 3rd *post-dc*; in caudal view, before suture with narrow submedian vittae between rows of *dc* and *acr* and small lateral patches, the submedian vittae terminating near 2nd *dc*; behind suture with narrow median and broader sublateral vittae and lateral patches visible, the median continuous to scutellum. Abdomen with median vitta moderate or rather broad and sharp;

marginal bands obscurely or rather distinctly appearing especially near lateral margins of tergites; in 1 specimens fore-marginal bands reduced to small sublateral spots or patches and hind-marginal ones indiscernible; in another specimen fore-marginal bands protruded caudad sublaterally and hind-marginal ones cephalad, forming a complete vitta on each side of 5th tergite (Fig. 87); 6th tergite wholly pollinose.

Head slightly or rather distinctly wider than mesonotum (1.03-1.1 times); frons one-third as wide as head, and nearly parallel-sided; parafrontals with 2-3 *ori*. Mesonotum with 2nd *ph* fine and appearing like accessory setulae; *stpl* 1: 2, lower posterior much shorter than the upper.

Abdomen with 6th segment exposed (Fig. 87) or retracted within 5th segment; ovipositor (Figs. 99-100) somewhat shortened; 6th tergite weakened in sclerotization near posterolateral corners and with no setae or setulae other than marginal series; 6th sternite setose on posterior half, narrowed and bare on anterior half; 7th tergite anteriorly divided into 2 rather short projections and without median one, and posteriorly continuously sclerotized and with 4 lobes developed along posterior margin, no spinules discernible, marginal setae represented by a few ones at base of each lobe; 7th sternite setose on posterior half, reduced to a narrow strip and bare on anterior half (completely vanished in 1 specimen); 8th tergite divided into 3 longitudinal bare sclerites (1 minute setula discernible on left sclerite in 1 specimen), the median one much narrower than the outers (vestigial in 1 specimen, Fig. 100); 8th sternite represented by a pair of bare plates; suranal plate with a pair of rather long setulae and no other setulae discernible; subanal plate with 4 long setulae along apical margin and no other setulae visible (at most some microtrichia discernible under careful examination).

Mid femur with 1 *av* near base and 2 (3 on the left leg in 1 specimen) *pv* on basal fourth;  $f_3$  with 4 strong and 1-2 weaker *av*, 1 *pv* near base and 1-2 *pv* near basal third or on median third;  $t_1$  near apex with 1 *ad* hardly or weakly developed. Wings with *dm-cu* slightly oblique and a little curved inwards;  $R_{4+5}$  with 2-5 minute setulae at base ventrally and 1-3 (none in 1 specimen) setulae dorsally.

Distribution. Japan (Honshû and Kyûshû).

Remarks. *E. kurashii* among the known species may be most closely related to *E. socia* (Fallén) by the following aspects (3 males and 2 females of *socia* from Europe have been available, and 2 pairs of them were dissected): — In male, 5th sternite with processes expanded downwards at apices, and with a series of strong setae on basal half of each process; surstylus with 6 or more setae on well-developed basal lobe; distiphallus much broadened on mesophallus; praegonite with ventral process not much expanded dorsally; in female, 7th tergite with no spinules; 8th tergite represented by 3 longitudinal sclerites; 8 sternite retained; subanal plate with no setulae other than 4 long ones. *E. socia* is, however, clearly different from *kurashii* as follows: — In male, head only a little wider than mesonotum (1.06-1.08 times in the specimens available); 5th sternite with much more prolonged processes; genital pouch with a U-shaped large sclerite just behind 6th sternite and a small curved sclerite medially (Fig. 74); surstylus with outer process narrowing apicad; distiphallus with narrower mesophallus; in female, frons distinctly wider than one-third head-width; 6th tergite entirely polished; ovipositor longer, with tergites more lengthened. *E. kurashii* is also similar to the Chinese *E. subvillica*

Fan et al., 1982 (2 males examined, the terminalia shown in Figs. 44-48), the latter also having the 5th sternite of the same type and the distiphallus with broadened mesophallus. Nevertheless, *E. subvillica* much differs from *kurahashii* in the surstylus with outer process narrowing apicad and with only a few setae at ventral base, which is not differentiated as a ventral lobe, and in the praegonite with ventral process somewhat expanded dorsally.

In one of the two females dissected of *socia* a small larva of the 1st instar (Fig. 108) was found with no eggs, and about 10 eggs in the other specimen with no larvae though a developing larva was seen through the shell of an egg. These observations and the long ovipositor may indicate that *E. socia* deposits the 1st instar larva. *E. kurahashii* is also larviparous. Among the 4 females dissected one specimen contained a larva of the 1st instar (Fig. 107) and another a large egg.

9. *Emmesomyia megastigmata* Ma, Mou et Fan, 1982

(Figs. 49-69, 83, 102)

*Emmesomyia megastigmata* Ma, Mou et Fan in Fan et al., 1982 : 225 ; Fan et al., 1988 : 369.

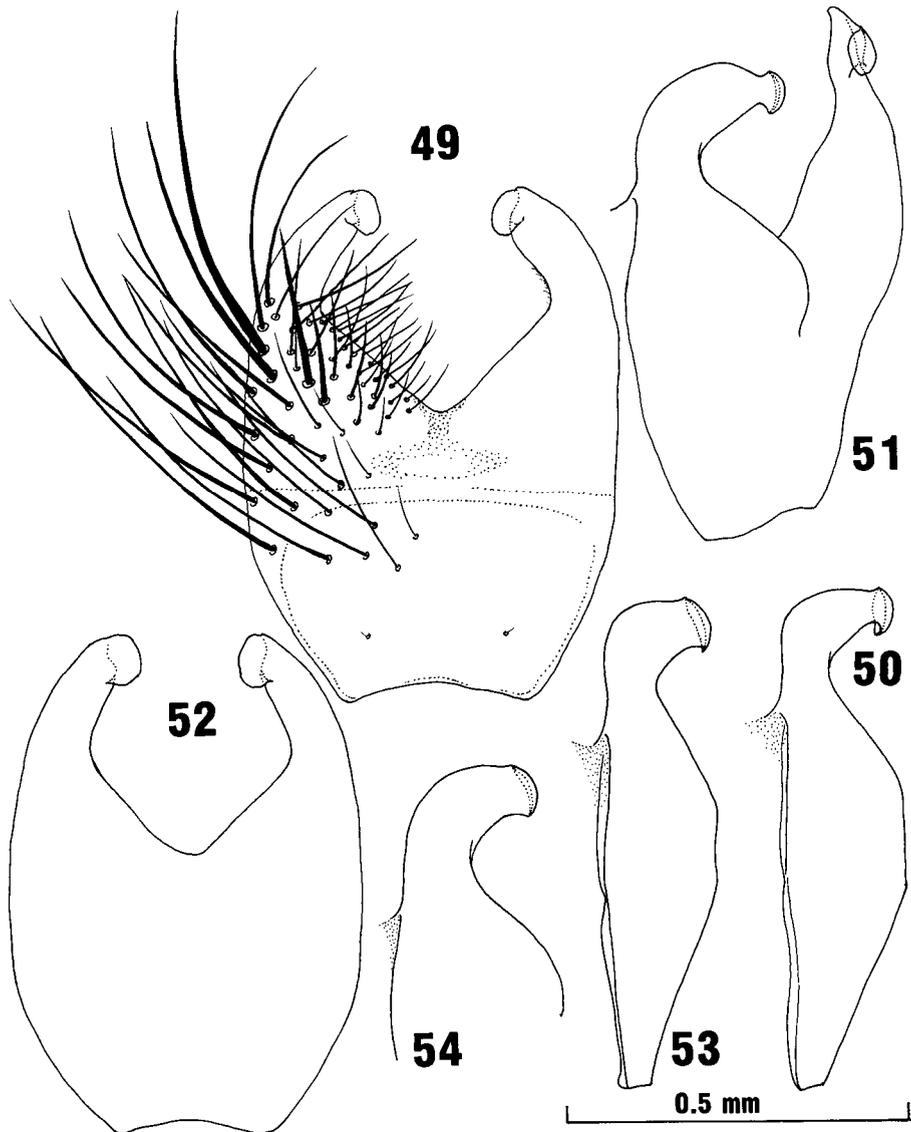
Material examined. Honshû: — Takao-san, Tōkyō-to, 1♀, 1. xi. 1948 (E. Yoshida); Hachiman-yama, Yorii, Saitama-ken, 1♀, 8. x. 1978 (K. Hara); Mt. Osorakan, Hiroshima-ken, 1♂, 10. vii. 1978 (N. Kashiwai). Kyūshū: — Hikosan, Fukuoka-ken, 1♂, 1♀, 5. vii. 1979 (K. Maetō); Mt. Hakuchō (= Shiratori-yama), 1,300 m, Gokanoshō, Kumamoto-ken, 1♂, 1♀, 5-7. vi. 1980 (T. Gotō & M. Yamamoto).

♂. Body-length 6.5-7 mm; wing-length 6.2-6.8 mm. Body blackish in ground colour, pale grey and slightly bluish in pollinosity, faintly tinged with brown. Parafacials and cheeks faintly tinged with brown in pollinosity; antennae blackish, with A<sub>1</sub> and A<sub>2</sub> more or less brownish apically; palpi blackish; haustellar mentum blackish or dark brown and thinly pollinose. Mesonotum in frontal view largely blackish, with a prescutellar pollinose vitta sharply visible between rows of *acr*, the vitta narrowing cephalad and terminating near the part between 2nd *post-dc*; in caudal view almost wholly pollinose, with some black markings as follows: — before suture, at rather high angle, with median patch appearing along anterior margin and with lateral patches also visible, the median patch widening to connect with the laterals and sharply protruding caudad between rows of *dc* and *acr* up to near 2nd *acr* or 2nd *dc*; behind suture, at low angle of view, with 3 narrow prescutellar vittae discernible between rows of *acr* and along rows of *dc*, the outer vittae shorter than the median. Abdomen with median vitta narrow and sharp; marginal bands invisible; 5th sternite with processes shining. Legs largely yellow; fore coxa blackish dorsally and dark brown or dark amber ventrally; mid and hind coxae dark amber and partly blackish; trochanters brownish yellow or amber; f<sub>1</sub> darkened posteriorly except on yellowish apical fourth, paler anteriorly; mid and hind femora and all tibiae yellow; tarsi also yellow, more or less darkened distally. Wings with a brownish yellow tinge, strongly yellow at base; calyptreae tinged with yellow.

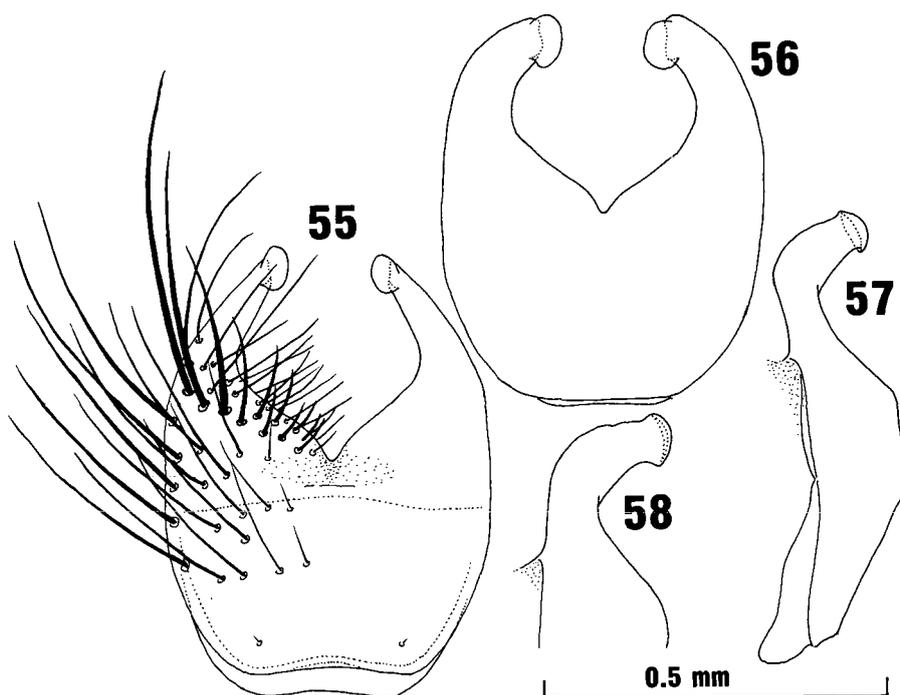
Head not wider than mesonotum (0.96-1), and about 1.6 times as high as long (1.56-1.65); frons very narrow, one-fourth to one-third as wide as anterior ocellus;

parafrontals with 4-5 *ori*, and with 1 microscopical *ors* in 2 specimens as ordinary, yet none in 1 specimen;  $A_3$  2.8-2.9 times as long as wide; arista with the longest hairs 3-4 times as long as basal diameter of arista.

Mesonotum with accessory setulae rather long and fine; rows of *pre-acr* very widely separated at 1st pair by a distance about twice as long as that to adjacent *dc*-row, and densely setulose in between, the setulae arranged 5-6 abreast anteriorly and 2-4 posteriorly; 2nd *ph* well developed, as strong as the 1st; *pra* about as long



Figs. 49-54. *Emmesomyia megastigmata* Ma, Mou et Fan, ♂. 49 & 52, 5th sternite, ventral view; 50 & 53, ditto, lateral view; 51 & 54, ditto, ventrolateral view, only process shown in Fig. 54. Hikosan (49-51) and Shiratori-yama (52-54).



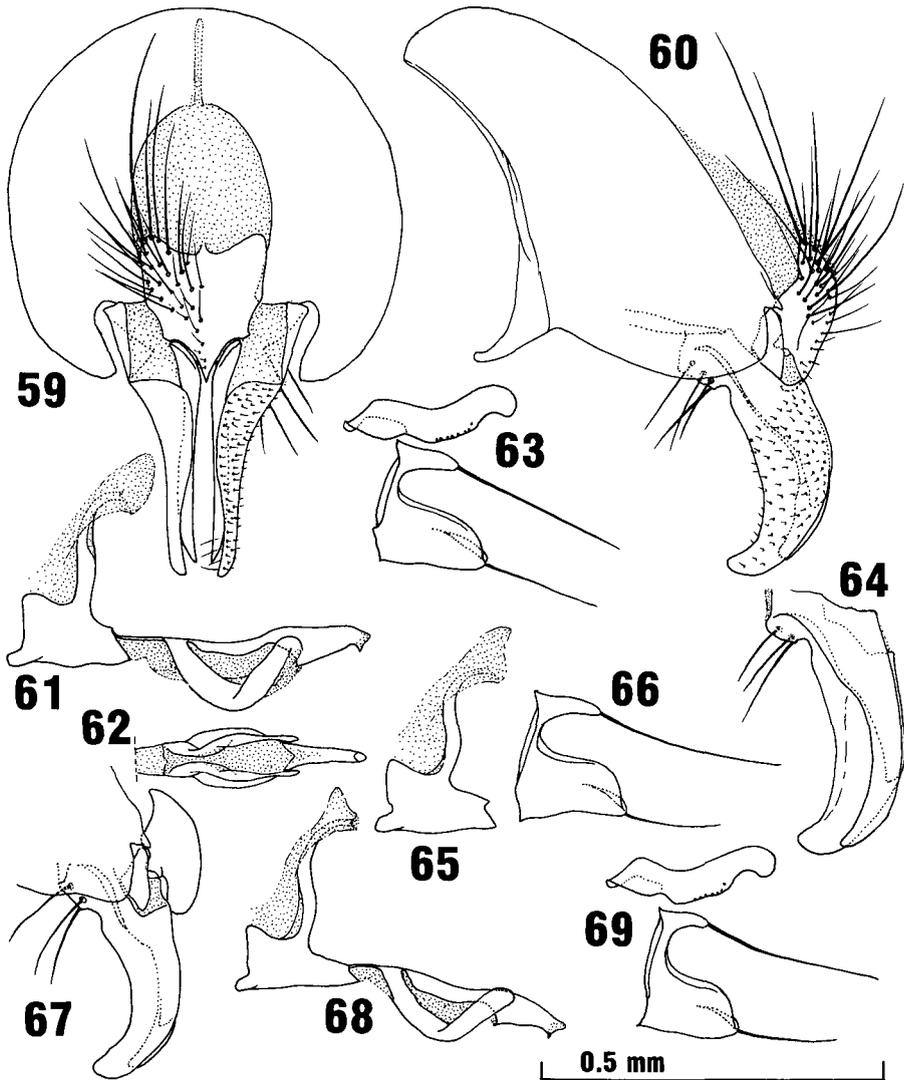
Figs. 55-58. *Emmesomyia megastigmata* Ma, Mou et Fan, ♂. 55, 5th sternite, ventral view; 56, ditto, slightly caudal view; 57, ditto, lateral view; 58, ditto, ventrolateral view, showing process only. China.

as anterior *ntpl*; mesopleuron with numerous (12-16) fine setulae around *psig*; *stpl* 1: 2, below each of anterior and posterior *stpl* with 1-2 setulae a little developed and distinguishable from adjacent setulae; *ptpl* 2-3 (4-5 in 1 specimen); spiracles very large, anterior one with major axis about as long as 2nd and 3rd segments of fore tarsus combined, posterior one much larger than knob of haltere.

Abdomen very thick and ovoid, shorter than thorax; 4th sternite (Fig. 83) longer than wide; 5th sternite and hypopygium as in Figs. 49-54 and 59-66; 5th sternite with processes prolonged downwards and crooked, and thereon with no setae; genital pouch with no distinct sclerites visible, only with a very weakly chitinized band discernible behind 6th sternite, the band being wrinkled to form a frill; surstylus emarginated near base ventrally to differentiate a basal lobe, with 3-4 setae present on the lobe; distiphallus with serration indiscernible on paraphalli.

Mid femur with 5-6 long *pv* on basal half, the longest one 1.4-1.7 times as long as height of the femur, and with some *av*-setulae on basal fourth more or less developed;  $f_3$  with 7-8 long and a few weaker *av*, 1 long *pv* near base and 2-3 long and 0-2 weaker *pv* on median third, the longest *av* and *pv* being about twice as long as height of the femur; tibiae with setae as ordinary;  $t_1$  with 1 additional *pv* on right leg in 1 specimen. Wings with *dm-cu* distinctly oblique and strongly sinuate;  $R_{4+5}$  with 1-4 minute setulae at base on each side.

♀. Wing-length 5.6-5.9 mm. Mesonotum with black markings as follows: —



Figs. 59-69. *Emmesomyia megastigmata* Ma, Mou et Fan, ♂. 59, hypopygium, dorsal view; 60 & 67, ditto, lateral view; 61 & 68, basiphallus and distiphallus; 62, distiphallus, ventral view; 63 & 69, praegonite and postgonite; 64, surstylus, inside view; 65, basiphallus; 66, praegonite. Hikosan (59-64), Shiratori-yama (64-66), and China (67-69).

in frontal view, before suture with large median patch, which is incised anteriorly by wedge-like pollinose vittae between rows of *dc* and *acr*, the pollinose vittae extending to near 2nd *dc*; behind suture with broad submedian vittae between rows of *dc* and *acr* on whole length, and with broad lateral patches, the submedian vittae joining the presutural median patch at suture; these markings not sharply margined and quite easily shifting according to angles of view; in caudal view, before suture with lateral patches and anterior-marginal median patch discernible at rather high angle,

the median patch smaller than in male and connected with the laterals by a narrow strip along each humeral callus; behind suture, at low angle, with 3 vittae discernible between rows of *acr* and between rows of *dc* and *ia* on whole length or nearly so (the median shortened to a wedge-shaped prescutellar vitta in 1 specimen, and the outers shortened in another specimen); in caudolateral view with a vitta or patch discernible on each lateral declivity. Abdomen with median vitta moderate to rather broad, tapering caudad; in caudal view with black markings appearing antero- and posterolaterally on 2nd to 4th tergites and midlaterally on 5th tergite; 6th tergite polished, with no trace of pollinosity. Calyptrae paler than in male.

Head narrower than mesonotum (0.95-0.98); frons a little wider than one-third head width (0.38-0.39), and nearly parallel-sided; parafrontals with 3 (2 on the left in 1 specimen) *ori*. Mesonotum with 2nd *ph* as strong as or somewhat weaker than the 1st; *pra* as long as or shorter than anterior *ntpl*, though always longer than posterior *ntpl*; *stpl* 1: 2, lower posterior much weaker than the upper; spiracles smaller than in male, yet larger than usual, the anterior one with major axis longer than 2nd segment of fore tarsus.

Abdomen with 6th segment exposed or retracted within 5th segment; ovipositor much lengthened (Fig. 102, 2 females dissected); 6th tergite only a little wider than long and divided into main plate and very small posterolateral sclerites by weakly chitinized strips, besides marginal series of setae with some setulae present on each of the lateral sclerites; 6th and 7th spiracles situated close together near posterior third of the tergite laterally; 6th sternite represented by a small plate with some setae marginally, a tiny bare sclerite (anterior part of completely divided 6th sternite) appearing or not before the plate; 7th tergite anteriorly divided into 2 long and narrow strips and a short median projection, and continuously sclerotized posteriorly, with 4 bare lobes developed along posterior margin, and with marginal series of setae divided into 4 sections in accordance with the lobes; 7th sternite completely membranous anteriorly and represented by a small plate with 3 pairs of setae; 8th tergite divided into 3 long bare strips, the median one narrower than the outers and more or less vanishing posteriorly; 8th sternite represented by a pair of rather large bare plates; suranal plate roundish apically and narrowly extending anterolaterally, with a pair of rather short setulae near apex and with no additional ones; subanal plate outwardly curved on lateral margins, with 4 rather long setulae along apical margin, and with no additional setulae discernible except for a few microtrichia.

Femora with setae shorter than in male;  $f_2$  with 2-3 *av* and 4-5 *pv*;  $f_3$  with 5-8 *av* and 2-3 *pv*;  $t_1$  with *ad* indiscernible as in male. Wings with *dm-cu* rather distinctly oblique and strongly sinuate.

Distribution. Japan (Honshû and Kyûshû); China.

Remarks. I have examined 1 male specimen of *E. megastigmata* from Guizhou, China, and found some differences from the Japanese material at hand as follows (terminalia shown in Figs. 55-58 and 67-69): — Body much darker in pollinosity, which is brownish grey on mesonotum; wings and calyptrae tinged with brownish yellow; head about 1.7 times as high as long; mesonotum with *pra* shorter than anterior *ntpl*, though longer than posterior *ntpl*; posterior spiracle with fringes less developed; 5th sternite with processes narrower in profile; praegonite with dorsal and ventral processes more widely separated; femora with setae shorter;  $f_2$  with

the longest *pv* about 1.2 times as long as height of the femur. No female of *megastigmata* is available from China. The differences mentioned above may not be sufficient to separate the two forms as distinct species.

*Emmesomyia* sp. recorded from India by Suwa (1981) is closely related to *megastigmata* in the large spiracles, presence of several *ptpl*, developed 2nd *ph*, and similar genital structures. It is, however, distinct in the shorter head (about 1.8 times as high as long) and also in the genitalia with different details.

*Emmesomyia ovata* (Stein, 1915) is a species described from Taiwan on the basis of 3 males and 1 female. According to the original description and to information on the female from Ackland (in litt., no males of the type-series are now available), this species is also characterized by the ovoid abdomen, presence of several *ptpl*, *pra* longer than posterior *ntpl*, and mainly yellowish legs. It is possible that *megastigmata* or the Indian species is identified with *ovata*.

Although no eggs or larvae were found in the females dissected, the quite long ovipositor suggests oviparity of the species.

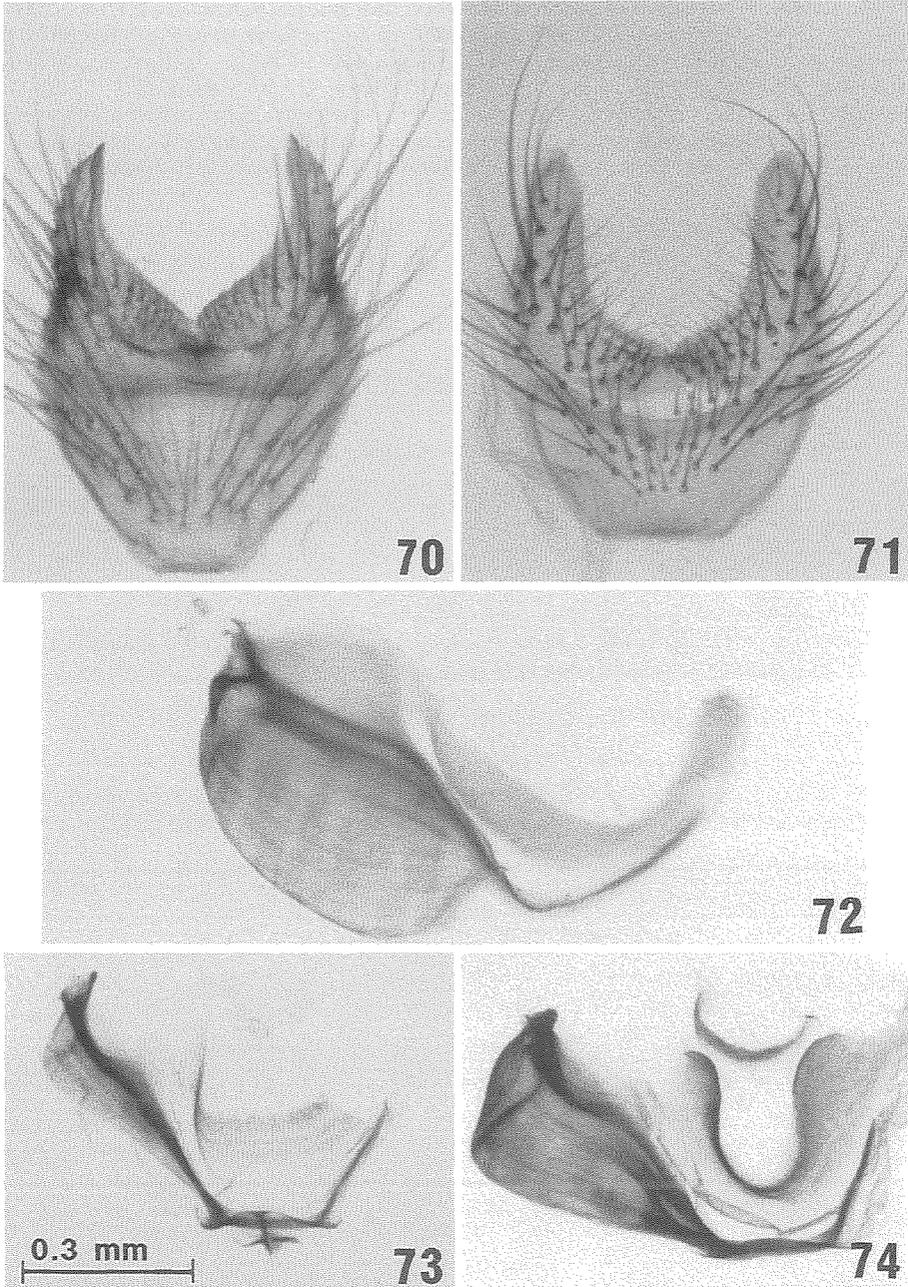
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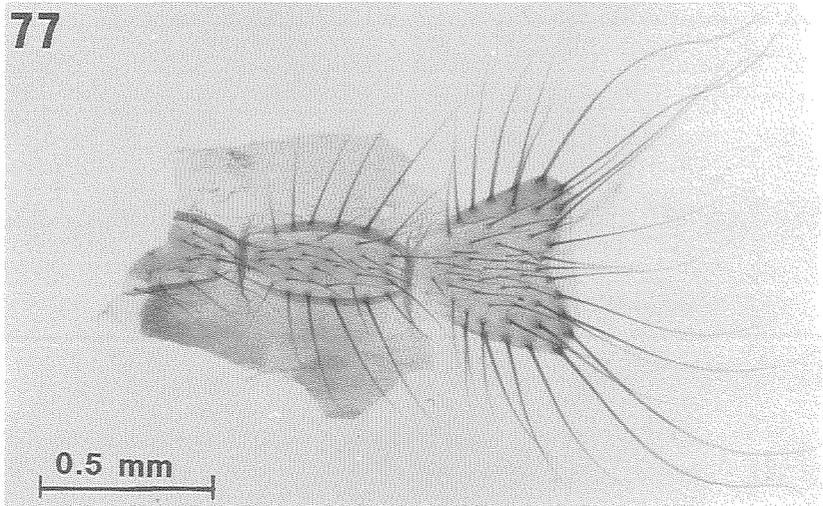
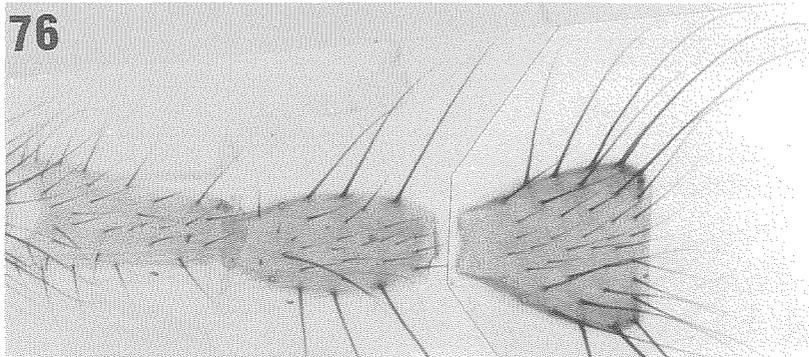
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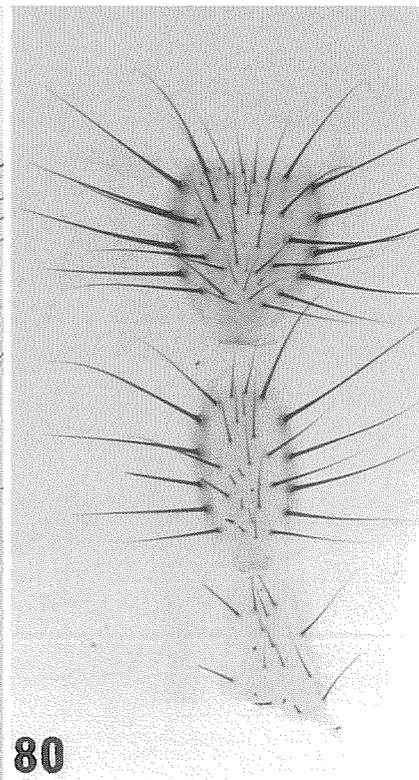
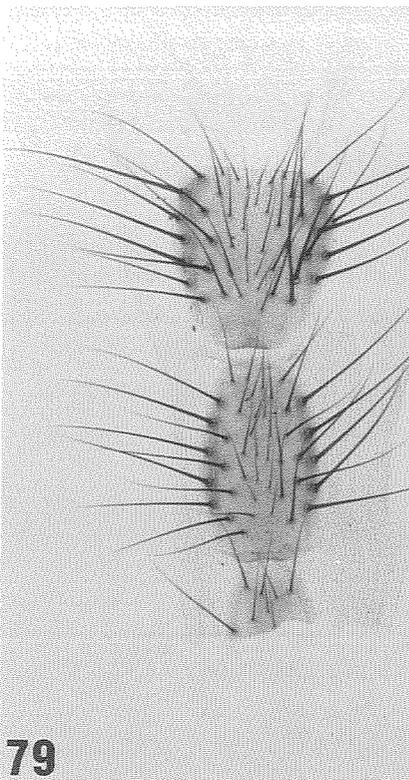
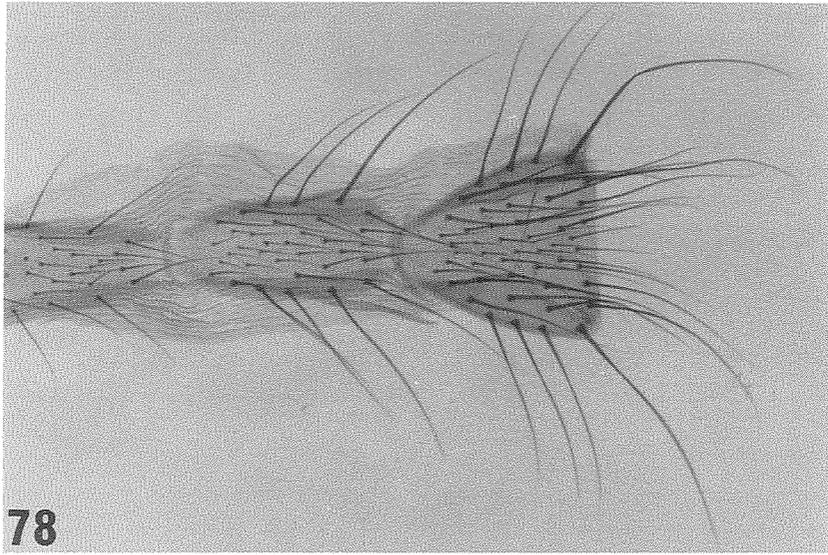


Figs. 70-71. 5th sternite of *Emmesomyia* spp., ♂. 70, *grisea* (Robineau-Desvoidy), Mt. Sobo-san; 71, *flavitaris* Suwa, Zenibako-tôge.

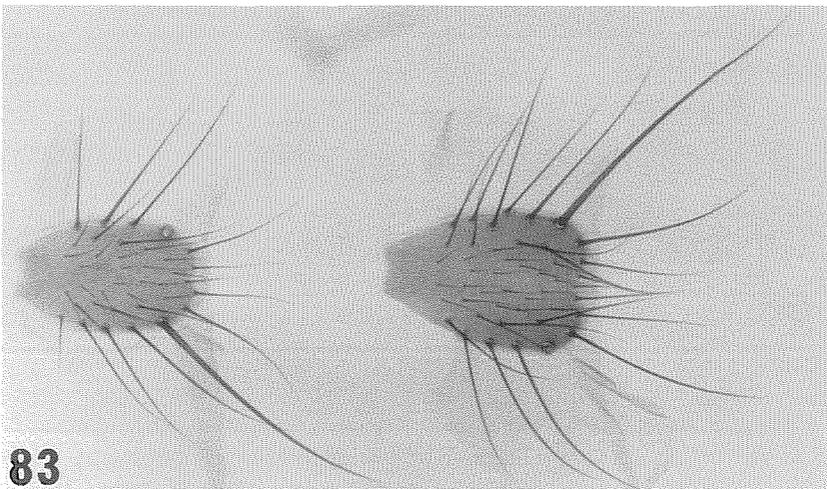
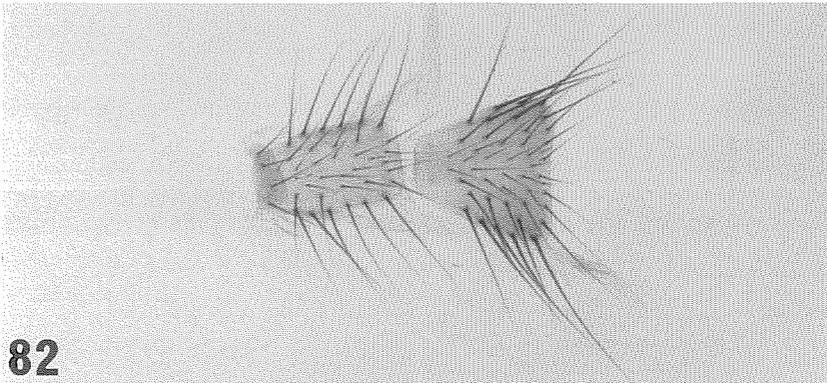
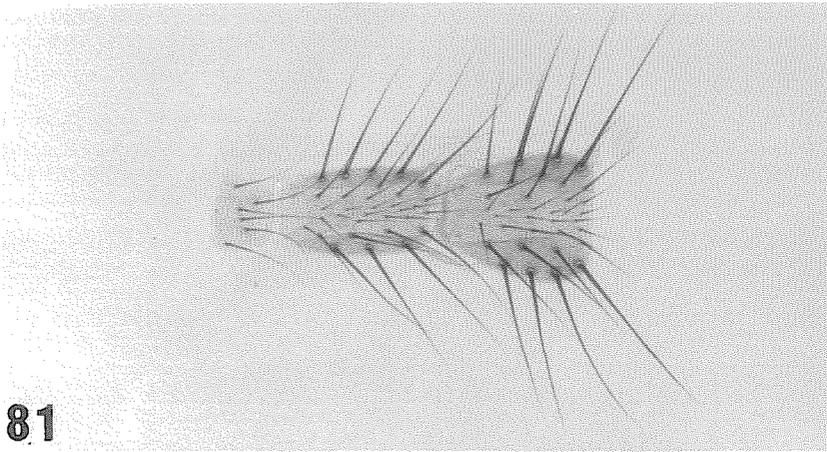
Figs. 72-74. 6th sternite and succeeding area of *Emmesomyia* spp., ♂. 72, *grisea* (Robineau-Desvoidy), Mt. Sobo-san; 73, *kurahashii* sp. nov., holotype from Kanazawa; 74, *socia* (Fallén), England.



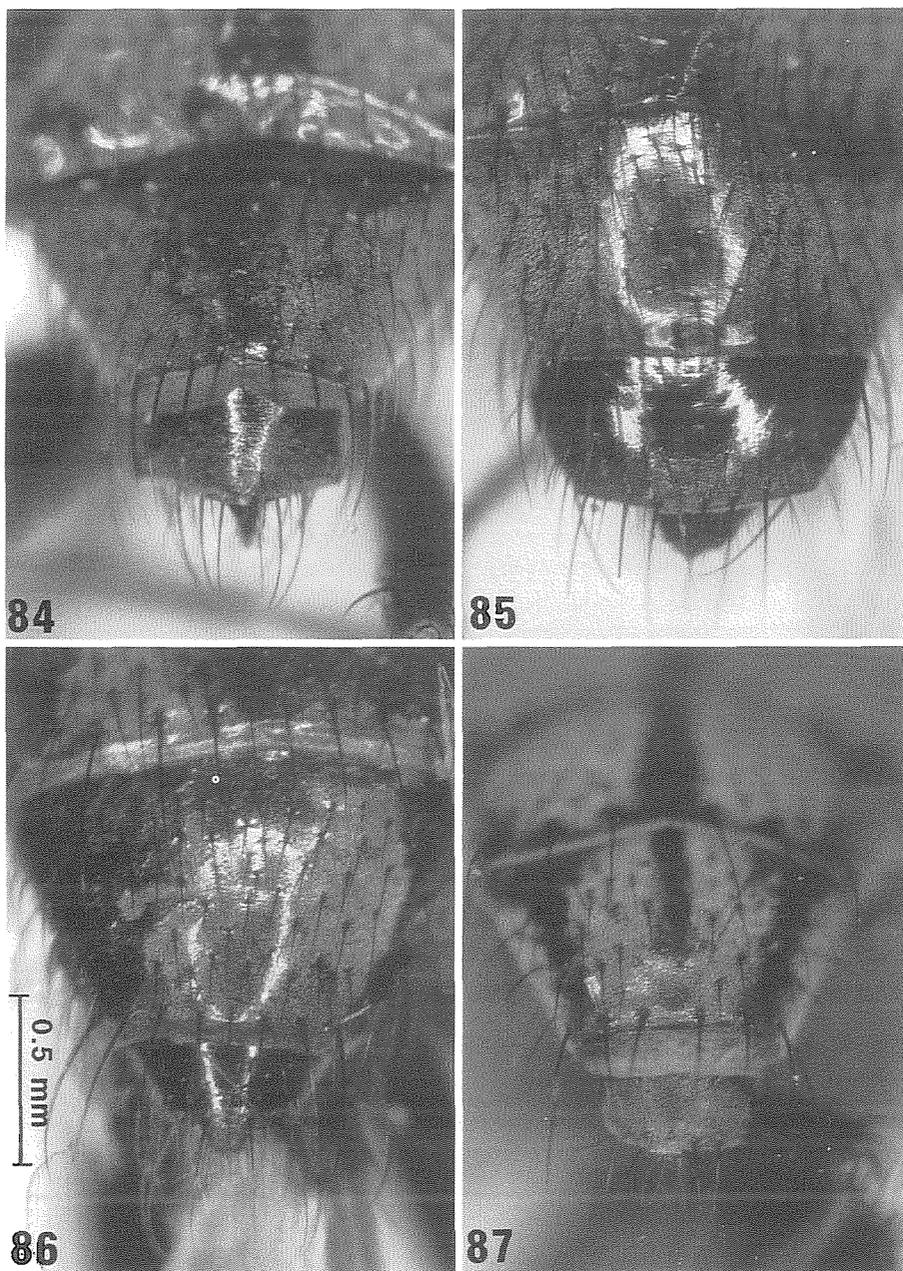
Figs. 75-77. 4th (rightmost) and preceding sternites of *Emmesomyia* spp., ♂. 75, *oriens* Suwa, Mt. Shirouma; 76, ditto, Mt. Kumotori; 77, *similata* sp. nov., paratype from Otofuke. Magnification same for the succeeding figures of male sternites.



Figs. 78-80. 4th (rightmost or uppermost) and preceding sternites of *Emmesomyia* spp., ♂.  
78, *flavitaris* Suwa, Zenibako-tôge ; 79-80, *suwai* Ge et Fan, both from Shizukuishi.



Figs. 81-83. 4th (rightmost) and preceding sternites of *Emmesomyia* spp., ♂. 81, *kurahashii* sp. nov., holotype from Kanazawa ; 82, *socia* (Fallén), Denmark ; 83, *megastigmata* Ma, Mou et Fan, Shiratori-yama.



Figs. 84-87. Caudal segments of abdomen of *Emmesomyia* spp., ♀. 84, *similata* sp. nov., Mt. Kirishima; 85, *dorsalis* (Stein), Yakushima; 86, *flavitarsis* Suwa, Chichibu-Ontake; 87, *kurashii* sp. nov., paratype from Takao-san.

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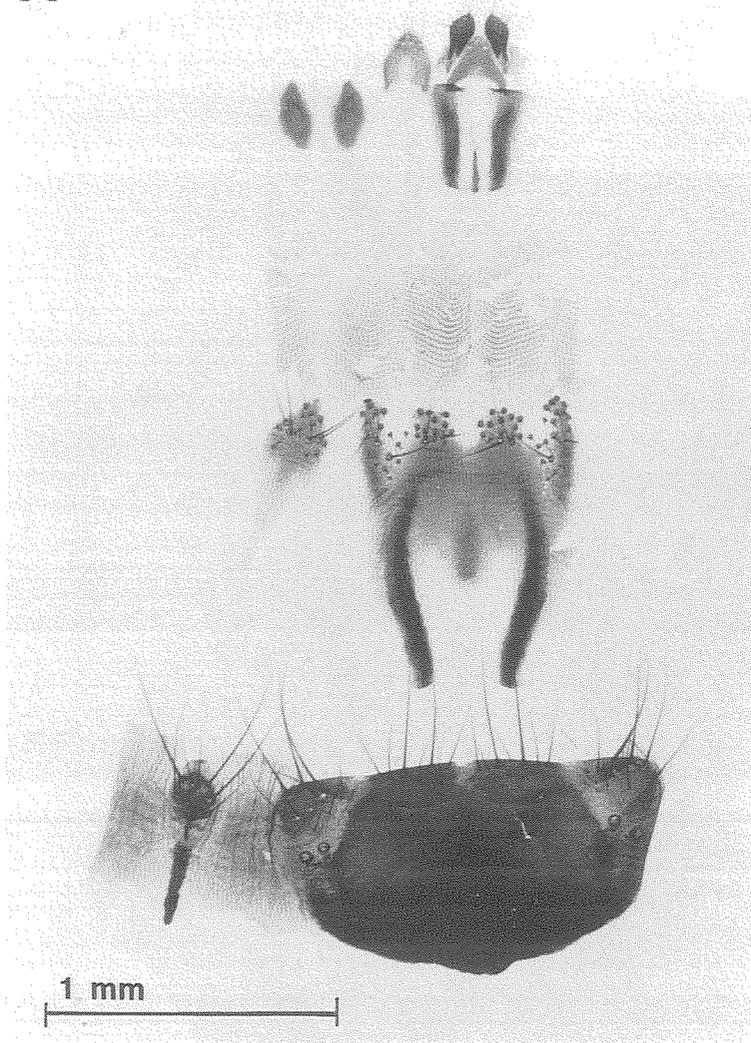


Fig. 88. Ovipositor of *Emmesomyia grisea* (Robineau-Desvoidy). Mt. Kirishima. Magnification same for the succeeding figures of ovipositor unless otherwise mentioned.

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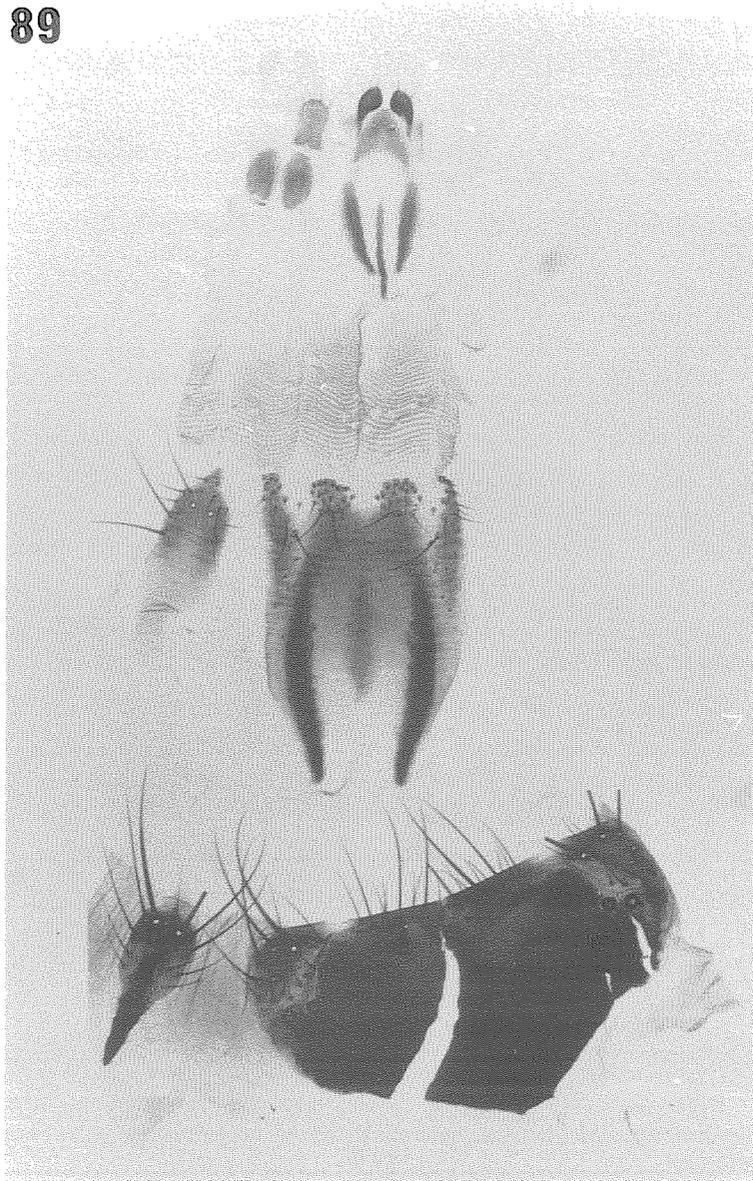
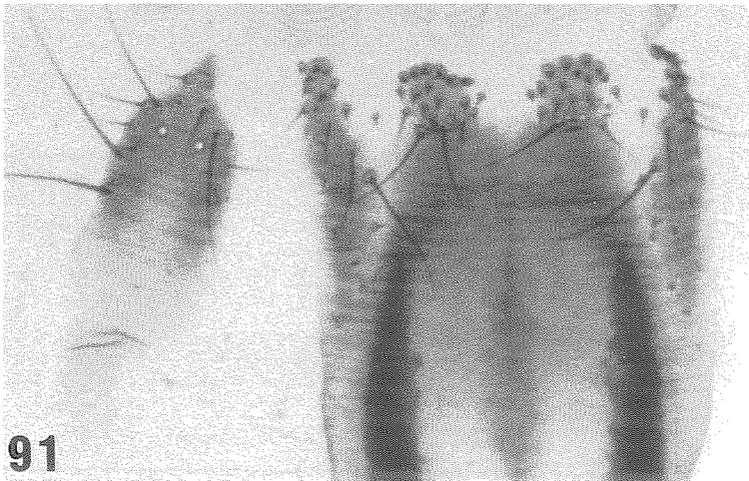
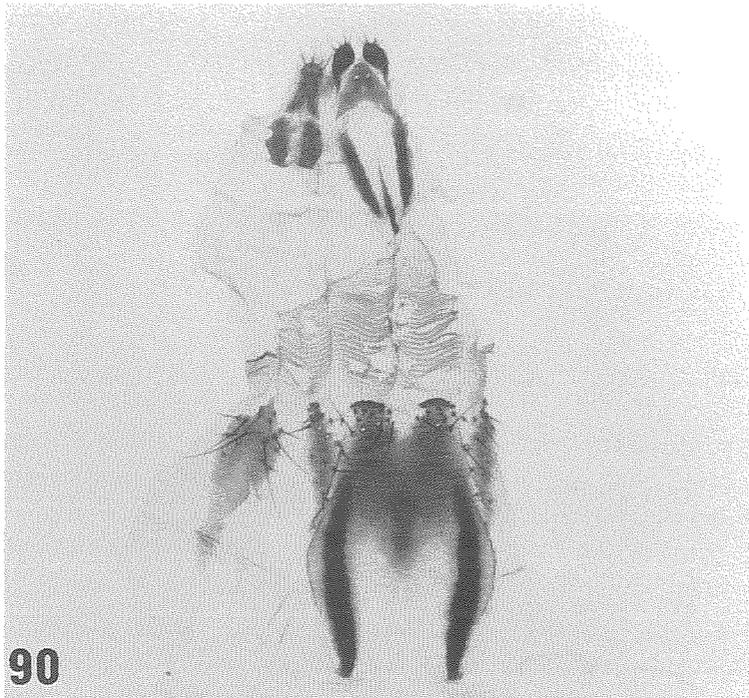


Fig. 89. Ovipositor of *Emmesomyia similata* sp. nov. Tarumizu.



Figs. 90-91. Ovipositor of *Emmesomyia similata* sp. nov. 90, 7th and succeeding segments, Mt. Kirishima ; 91, posterior half of 7th segment, Tarumizu, magnification twice of that in others.

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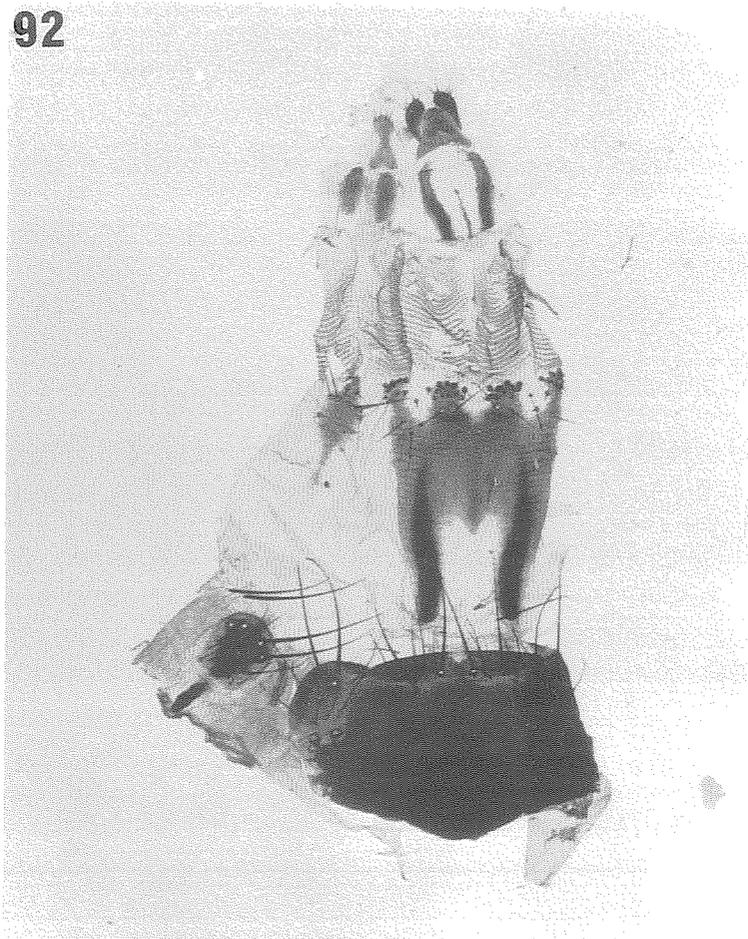


Fig. 92. Ovipositor of *Emmesomyia hasegawai* Suwa. Otofuke.

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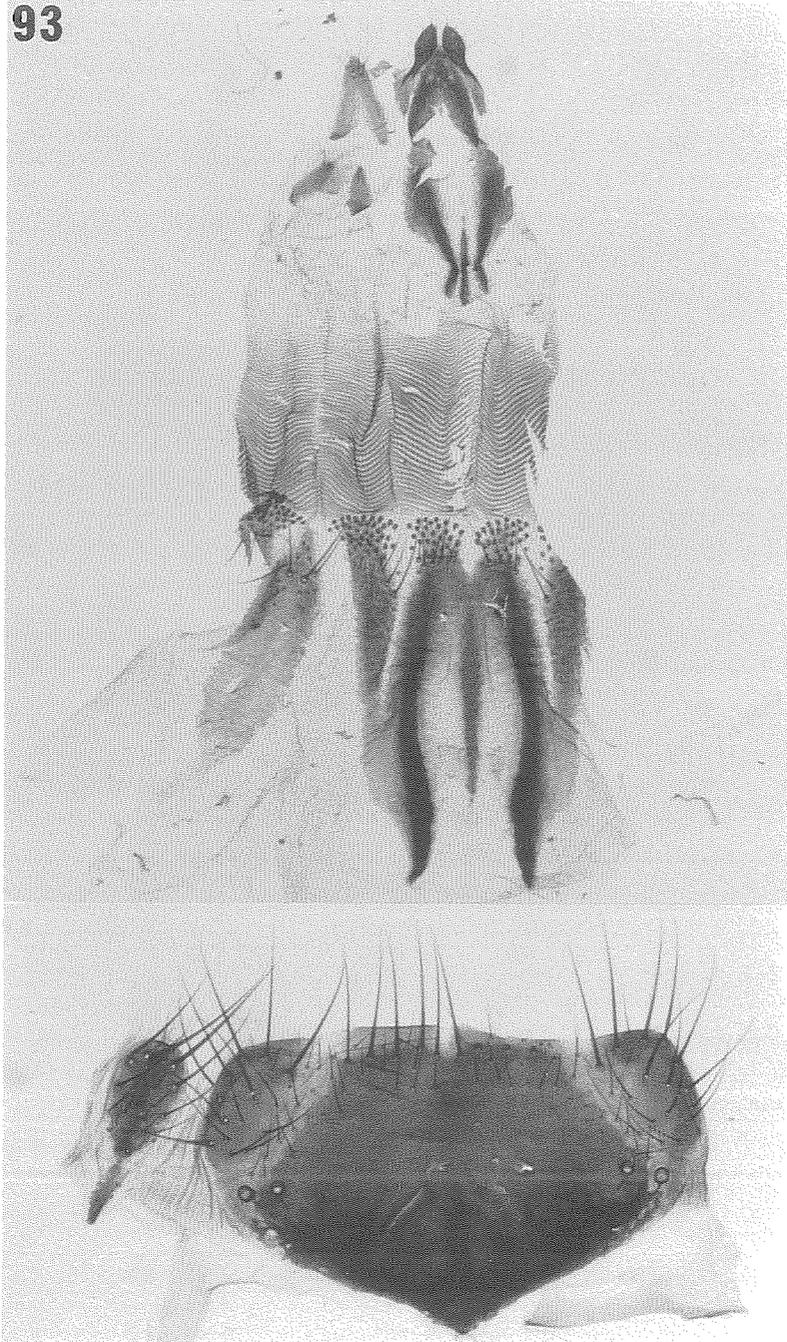
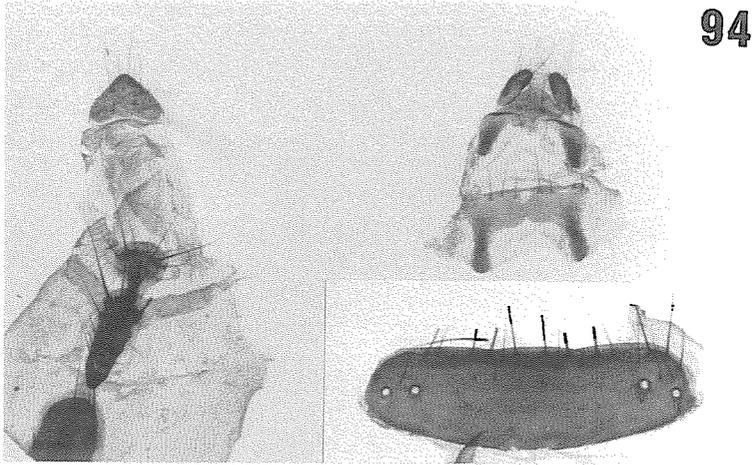
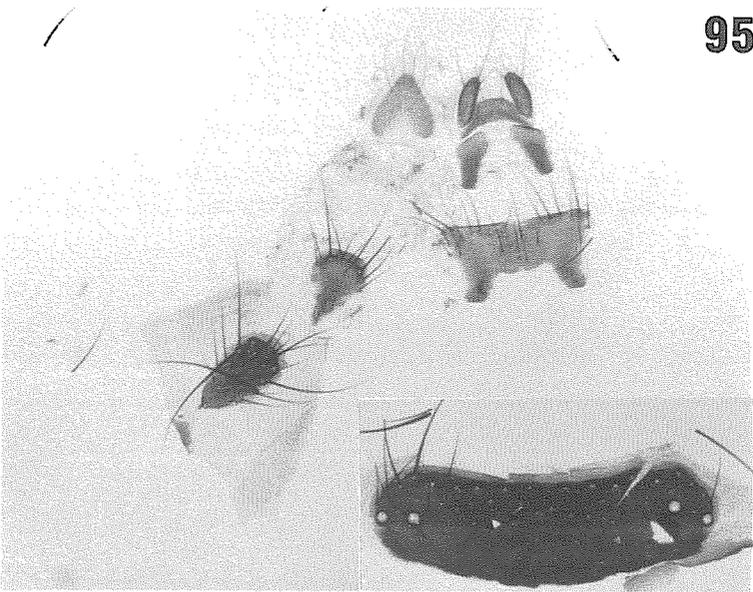


Fig. 93. Ovipositor of *Emmesomyia dorsalis* (Stein). Yakushima.

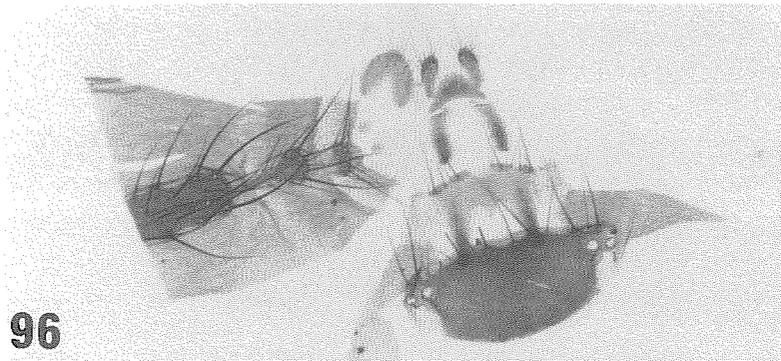


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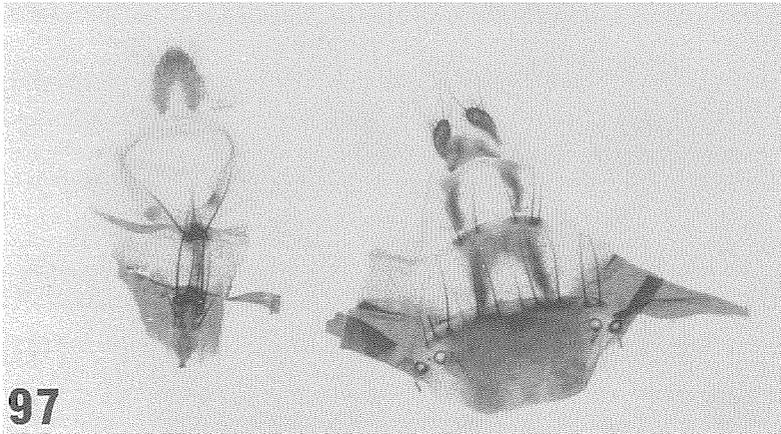


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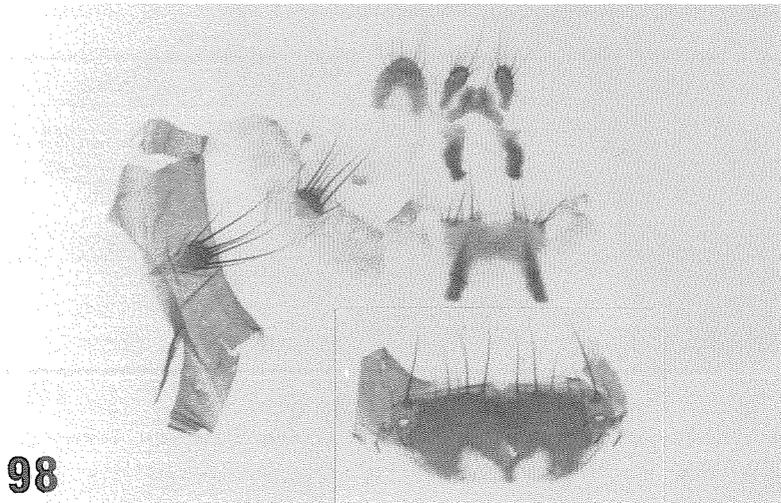
Figs. 94-95. Ovipositor of *Emmesomyia flavitarsis* Suwa. Hirosaki (94) and Chichibu-Ontake (95).



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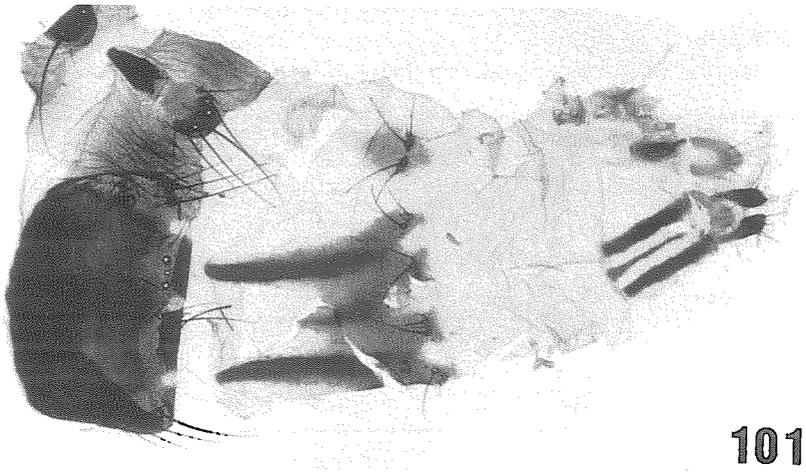
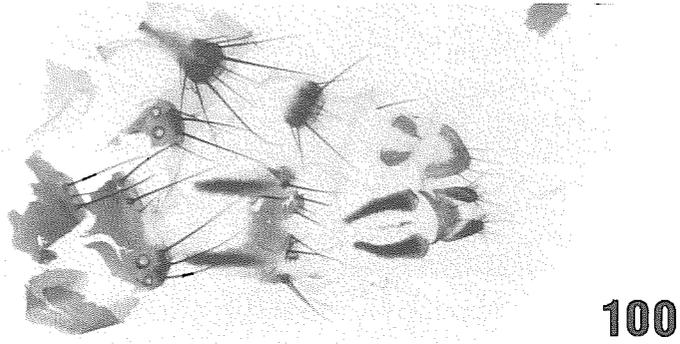
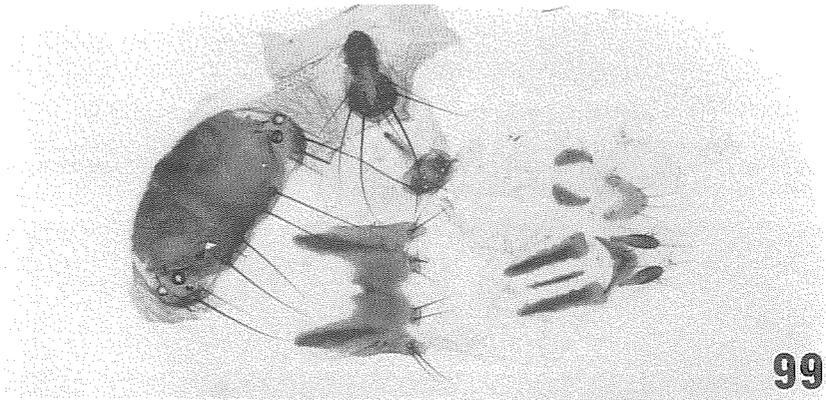


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Figs. 96-98. Ovipositor of *Emmesomyia suwai* Ge et Fan. Bifuka (96), Shiga-kōgen (97), and Nukabira (98).



Figs. 99-101. Ovipositor of *Emmesomyia* spp. 99, *kurashii* sp. nov., Takao-san ; 100, ditto, Ebino ; 101, *socia* (Fallén), England.

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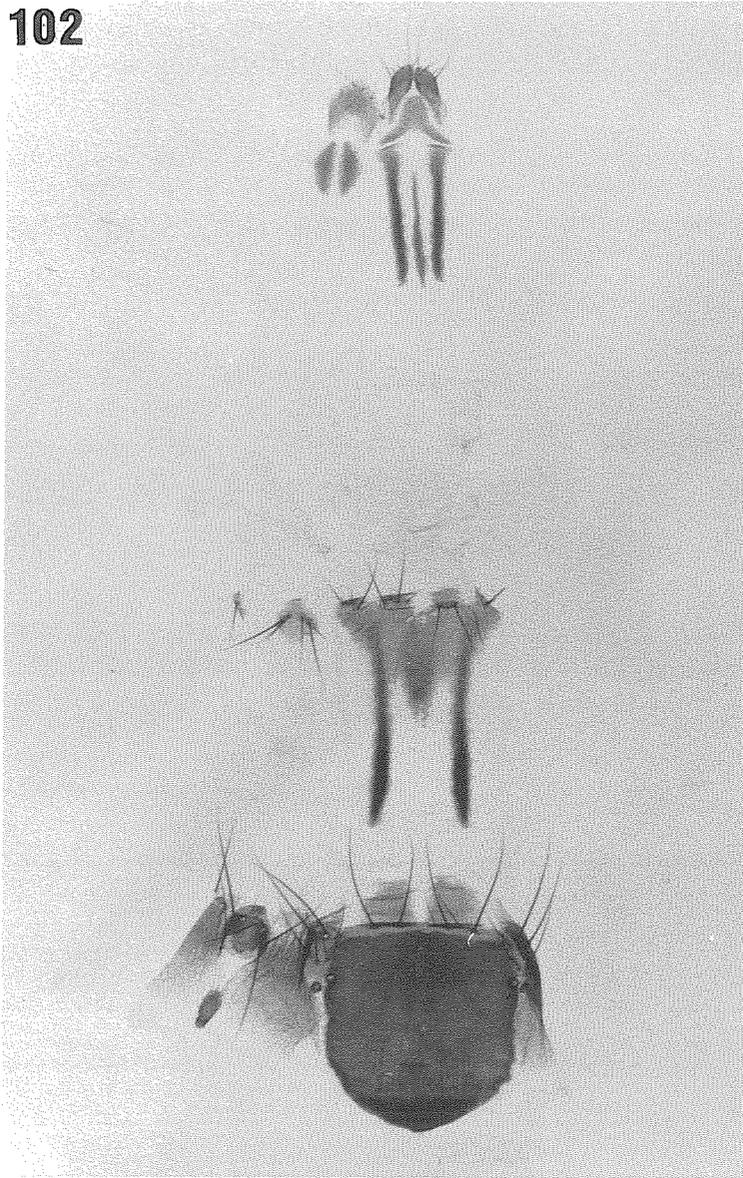


Fig. 102. Ovipositor of *Emmesomyia megastigmata* Ma, Mou et Fan. Hikosan.

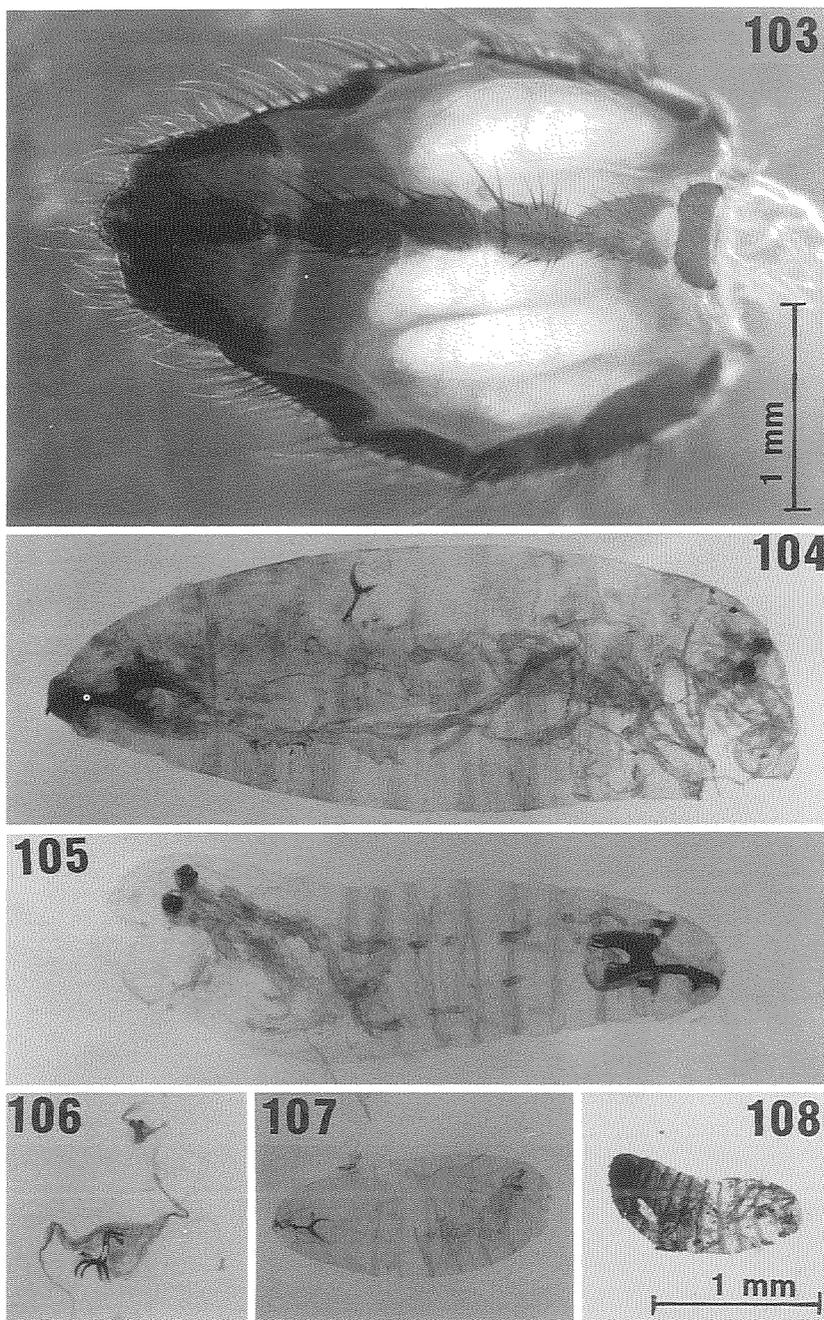


Fig. 103. Abdomen of *Emmesomyia dorsalis* (Stein), showing eggs through abdominal membrane. Yakushima.  
 Figs. 104-108. Larva of *Emmesomyia* spp., found in female abdomen. 104, *flavitarsis* Suwa, 2nd instar, Hirosaki; 105, *suwai* Ge et Fan, 2nd instar, Otofuke; 106, ditto, exuviae of 1st instar, removed from the 2nd shown in Fig. 105; 107, *kurahashii* sp. nov., 1st instar, Takao-san; 108, *socia* (Fallén), 1st instar, England. Magnification same for all the figures of larva.