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SUPPLEMENTARY NOTES ON THE FAMILY ANTHOMYIIDAE OF JAPAN (DIPTERA), III

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Abstract

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Ten Japanese anthomyiid species belonging to *Delia* and *Pegomya* are dealt with. Of them 4 species, *D. pectinator, D. seticauda, P. nigricrus* and *P. latifrons*, are described as new to science and 2 others, *D. bacilligera* Hennig and *P. valgenovensis* Hennig, are recorded as new to Japan. *D. robustiseta* Judin and *P. centaureodes* Hsue are suppressed as synonyms of *D. takizawai* Suwa and *P. valgenovensis* Hennig respectively. Some supplementary notes are given on *D. angustitarsis* (Malloch), *P. spiraculata* Suwa and *P. kusigematii* Suwa.

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INTRODUCTION

The genus *Delia* Robineau-Desvoidy is a large group in the family Anthomyiidae and at present, so far as I am aware, represented by more than one hundred species in the Palaearctic region. It is well known that some species, e.g. the seed-corn maggot *Delia platura* (Meigen), are serious pests on agricultural crops. The genus *Pegomya* Robineau-Desvoidy is also a large group and represented by about one hundred species in the region. *Pegomya hyoscyami* (Panzer) and its allied species are notorious pests injurious to beet and spinach as leaf-miners. In Japan 18 and 32 species of *Delia* and *Pegomya* respectively have been known to occur. In this paper are dealt with 5 species of *Delia,* of which 2 are new to science and 1 new to Japan, and 5 species of *Pegomya,* of which 2 are new to science and 1 new to Japan. Almost all of the specimens used in this study, including all the holotypes of the new species, are deposited in the collection of Entomological Institute, Hokkaidô University.

Before going further I wish to express my sincere thanks to Prof. S. Takagi, Hokkaidô University, for his constant guidance. My cordial thanks are also due to the following entomologists for their kind help in offering the invaluable material for this study : - Prof. T. Saigusa, Kyûshû University, Dr. K. Kanmiya, Kurume University, Dr. H. Kurahashi, National Institute of Health, and Messrs. K. Ôhara, N. Kôda and T. Gotô, all of Kyûshû University. Particular acknowledgement is made to Mr. D.M. Ackland, Oxford, England, for his kindness in sending me an English translation of Judin's paper on *Delia.*

ENUMERATION

1. *Delia pectinator* sp. nov.

(Figs. 1-5)

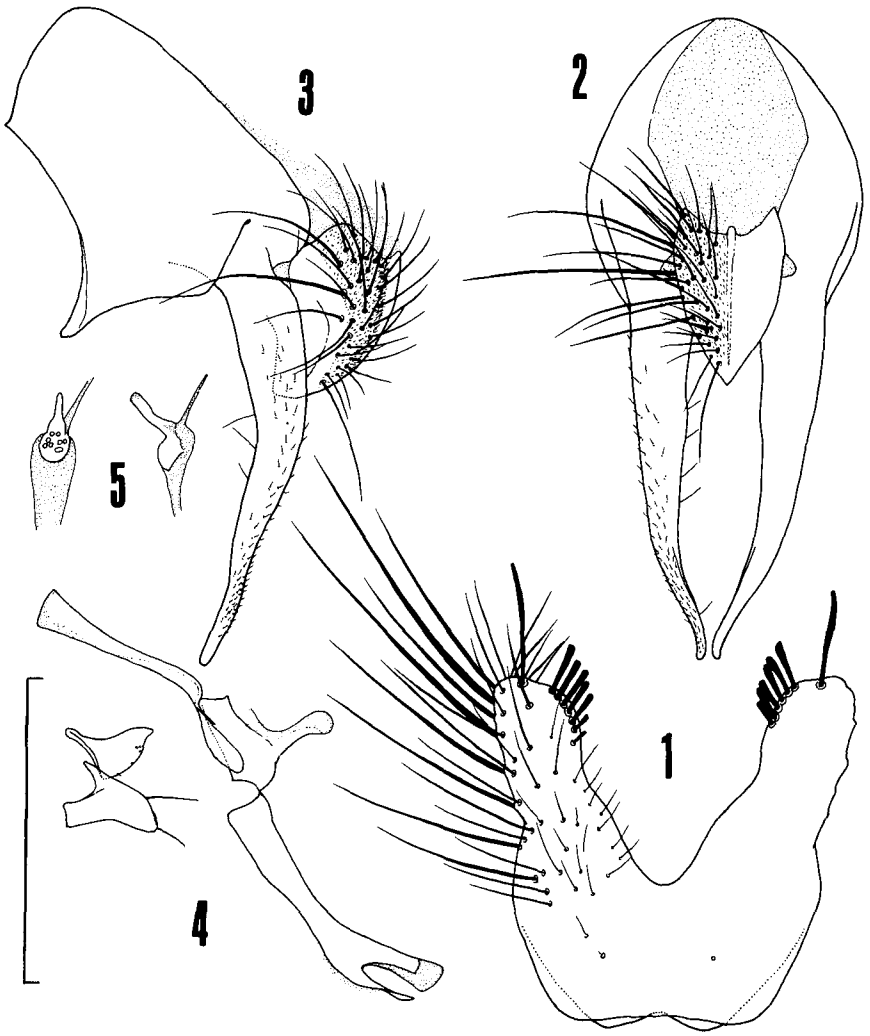
Material. Honshû : - Mt. Shibutsu, Ozegahara, Gumma-ken, 2 ♀ (one the holotype), 28-30. viii. 1978 (H. Kurahashi).

♀. Body-length 6 mm ; wing-length 5.2-5.3 mm. Body blackish in ground colour and pale grey in pollinosity. Interfrontalia near lunule and profrons-tip brownish in ground colour ; antennae blackish, A_2 slightly brownish apically ; palpi blackish or dark brown ; haustellar mentum dark brownish, rather thinly pollinose. Mesonotum brownish pollinose along rows of *acr* and on lateral declivities. Abdomen brownish pollinose on median vitta, the latter sharp and distinctly wider than height of t_3 ; fore-marginal bands absent. Legs blackish, or dark brownish especially on tibiae. Wings faintly tinged with yellow, with veins yellowish basally and brownish apically ; calyptrae pale, slightly yellowish ; halteres brownish yellow basally and yellow apically.

Head about 1.3-1.4 times as high as long ; frons wider than anterior ocellus, 1.6-1.7 times of the latter in width ; interfrontalia slightly narrower than anterior ocellus, with *if* about as strong as secondary ocellar setae ; parafrontals with 4 *ori* and no *ors* ; A_3 about 1.7 times as long as wide ; arista distinctly pubescent, the longest hairs twice or slightly less than twice as long as basal diameter of arista ;

profrons slightly wider than A_3; cheeks somewhat higher than profrons-width, with genal setae arranged in 1 row (1 or 2 additional setae present above the row in 1 specimen); epistoma situated behind profrons-tip; occiput with some (6-9) setulae on each lateral side of upper plane.

Mesonotum with 7-8 *pre-acr* arranged in 2 approximated rows and with 1 (holotype) or 4 (paratype) accessory setulae between the rows; distance between the rows of *pre-acr* about half as long as that to *dc*-rows; *ph* not duplicated; *pra* as long as or slightly shorter than posterior *ntpl*; notopleura with no accessory setulae; mesopleura with no distinct anterior *mpl*, and with 1 strong and 1 weak *pstg* and some (3-5) associated fine setulae; *stpl* 1 : 2, below the posteriors with 1 additional seta more or less differentiated from adjacent setulae; scutellum on dorsal surface



Figs. 1-5. *Delia pectinator* sp. nov., ♂. 1, 5th sternite; 2, hypopygium, dorsal view; 3, ditto, lateral view; 4, aedeagus; 5, ejaculatory apodeme. Holotype from Mt. Shibutsu, Gumma-ken. Scale 0.5 mm for Figs. 1-4, and 0.25 mm for Fig. 5.

with a few accessory setulae towards lateral margin.

Abdomen depressed on basal half, half-depressed on the rest, nearly parallel-sided or loosely narrowing caudad, and 2.2-2.3 times as long as wide; 5th sternite and hypopygium as in Figs. 1-5; processes of 5th sternite with a comb-like series of strong and apically blunt setae near apex along inner margin, and with strong seta at apex (the tip of the apical seta on each process is broken off in both of the present specimens); cercal plate shield-shaped, with median keel rather prominent; surstyli stick-like, and gradually narrowing apicad.

Fore tibia with 1 *ad* (indiscernible on right t_1 in holotype) and 1 (holotype) or 2 *pv*, and with apical *pv* strong and blunt; f_2 with 5-6 *pv* on basal half; t_2 with 2 *ad*, 1-2 *pd* and 2 *pv*; f_3 with 8 *av* except near base, and with 1 weak *pv* near base, about 3 strong *pv* in middle third and 1-2 strong *pv* near apex; t_3 with 2-3 *av*, 4-6 *ad*, 3 *pd* and 2-4 *pv*. Wings with costal thorns rather strong, as long as or a little longer than *h*; costa from base to costal thorns setulose on ventral surface near the lower row of spicules; *m-m* oblique and a little sinuate.

♀. Unknown.

In the characters of the hypopygium and aedeagus this species is similar to *D. setigera* (Stein, 1920), which is widely distributed in the Holarctic region. It is, however, readily distinguishable from the latter by the larger body, longer aristal hairs, longer *pra* and the different chaetotaxy of t_3. Moreover, it is quite different from *D. setigera* in the preapical inner-marginal setae of the 5th sternite much stronger and more numerous.

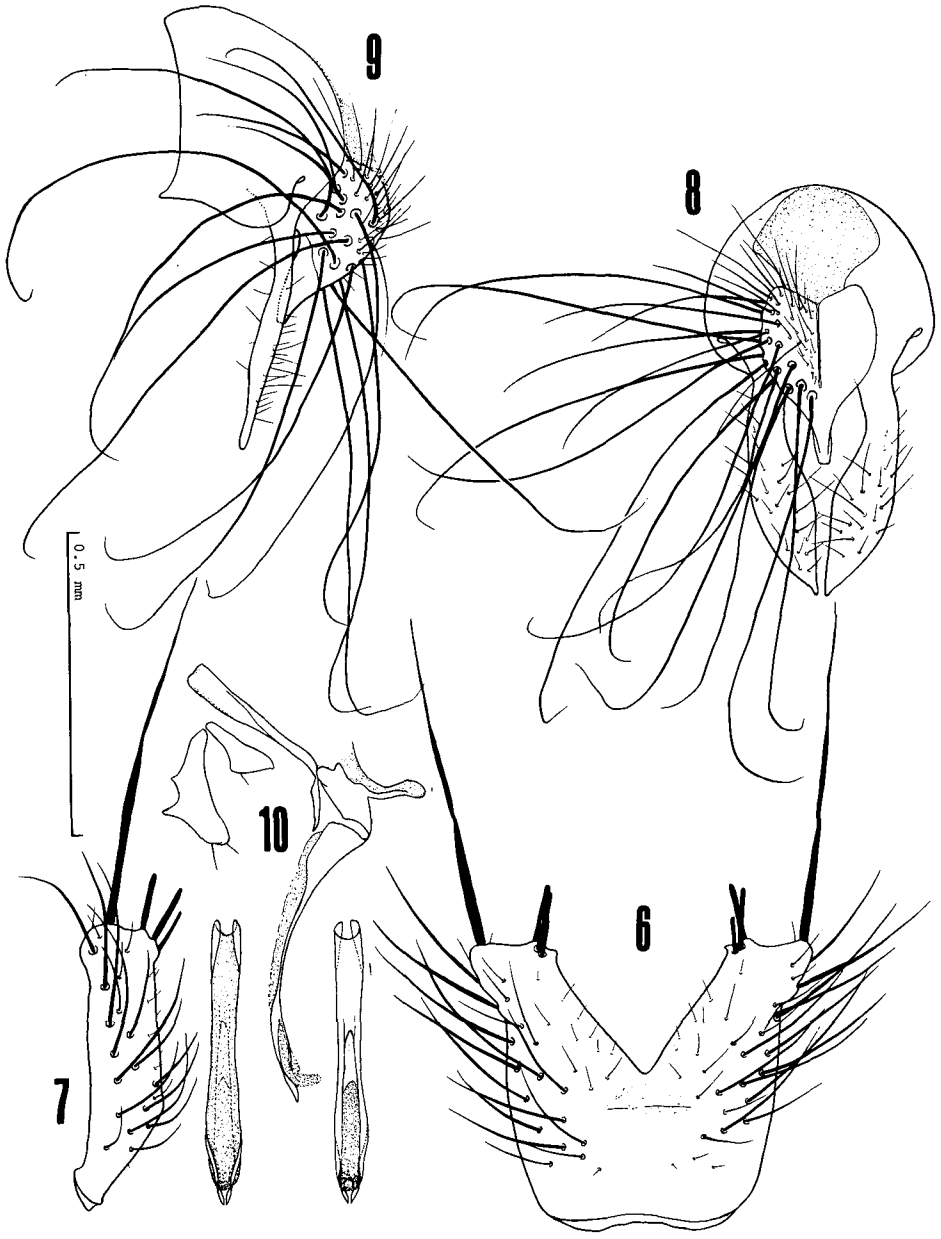
2. *Delia seticauda* sp. nov.

(Figs. 6-10)

Material. Kyûshû: - Yakushima, Kagoshima-ken, 5 ♂ (one the holotype) & 11 ♀, 12. v. 1974 (T. Saigusa); Takachiho-kyô, Miyazaki-ken, 1 ♂, 8. iv. 1969 (H. Kurahashi); Chôjabaru, Ôita-ken, 1 ♂, 18. v. 1970 (K. Kanmiya); Hikosan, 700 m, Fukuoka-ken, 3 ♂ & 5 ♀, 18-30. iv. 1969-72 (Kyûshû Univ., Malaise trap). Honshû: - Sunodani, Komatsu, Ishikawa-ken, 1 ♂, 12. v. 1973 (H. Kurahashi).

♂. Body-length 4.5-5.5 mm; wing-length 4.1-4.7 mm. Body including appendages blackish or dark brown (probably due to the teneral condition of the specimens) in ground colour. Interfrontalia and orbits brownish to black in ground colour and whitish grey in pollinosity; orbits with silvery reflection in pollinosity; haustellar mentum pollinose. Thorax pale grey and slightly brownish in pollinosity on lateral sides, on humeral callosities and on notopleura; mesonotum brownish grey pollinose (paler in the specimen from Honshû), in caudal angle of view with median and paramedian vittae and lateral patches obscurely visible. Abdomen pale grey and more or less brownish in pollinosity, with median vitta moderate in width and narrowly interrupted at hind margin of each tergite. Wings more or less tinged with brown; calyptrae pale, slightly tinged with yellow.

Frons 1.3-1.8 times as wide as anterior ocellus; interfrontalia linear caudad, with *if* distinct and a little longer than half length of ocellar setae; parafrontals with 3-4 *ori* and a few minute associated setulae, and with no *ors*; A_3 1.8-2 times as long as wide; arista shortly pubescent, with the longest hairs as long as basal diameter of arista; profrons a little wider than A_3; cheeks usually a little higher



Figs. 6-10. *Delia seticauda* sp. nov., ♀. 6, 5th sternite, ventral view ; 7, ditto, lateral view ; 8, hypopygium, dorsal view ; 9, ditto, lateral view ; 10, aedeagus. Paratype from Takachiho-kyô, Miyazaki-ken.

than profrons-width, with genal setae in 1 row ; epistoma situated distinctly behind profrons-tip ; occiput bare or nearly so on upper plane.

Mesonotum with a pair of distinct or rather strong *pre-acr,* the setae much closer to each other than to *dc*-rows, and sometimes with a single (in 2 specimens), 2 (in 1 specimen) or 3 (in 1 specimen) additional fine *pre-acr* ; *ph* not duplicated ; *pra* usually

well developed and about as long as anterior *ntpl,* sometimes about as long as (in 1 specimen from Kyûshû) or slightly shorter than (in 1 specimen from Honshû) posterior *ntpl* ; notopleura with no accessory setulae ; mesopleura with no distinct anterior *mpl,* and with 1 strong and 1 weak *pstg* and usually no associated setulae ; *stpl* 1 : 3, the lowest posterior much weaker than the uppers ; scutellum with no accessory setulae on dorsal surface.

Abdomen depressed especially on basal half, loosely narrowing caudad, and 2.1-2.6 times as long as wide ; 5th sternite and hypopygium as in Figs. 6-10 ; processes of 5th sternite with apical seta prominently long and strong, and with preapical inner-marginal setae strong, blunt apically, and usually 3 in number ; cercal plate with many conspicuously long setae, and with apical part prolonged caudad ; surstyli blade-like, with base attenuated ; distiphallus very slender.

Fore tibia with 1 *pv* and no *ad* or *pd,* and with apical *pv* strong and blunt apically ; f_2 with no distinct *av* and with some (5-7) strong *pv* on basal half or more ; t_2 usually with 1 or 2 *av* (3 in 1 specimen from Chôjabaru and none in 3 specimens from Hikosan), 2 (sometimes 1) *ad,* 2 *pd* and 2 or sometimes 3 *pv* ; f_3 with a row of *av* except near base and 1 strong *pv* near apex, and with basal *pv* usually distinguishable from adjacent setulae ; t_3 with 4-9 *av*, 5 and often 1-2 additional *ad*, 3 and sometimes 1 additional *pd* and 4-9 (usually 4-5) *pv*. Wings with costal thorns distinct or rather strong ; costa bare ventrally ; *m-m* hardly or slightly sinuate.

♀. Body-length 4.5-5.7 mm ; wing-length 4.3-5 mm. Frons about two-fifths of head in width ; interfrontalia about half as wide as frons ; parafrontals with 2 or sometimes 3 *ori* and 3 *ors*. Mesonotum with no *pre-acr,* or sometimes with only a single or paired fine ones ; *stpl* 1 : 2. Fore tibia with 1 *ad,* 1 or sometimes no *pd* and 1 *pv*, with apical *pd* strong, and with apical *pv* strong and pointed apically ; f_2 with 1-3 (usually 2) rather fine *pv* near base and no strong ones ; t_2 with 1 or sometimes 2 *av*, 2 *ad*, 2 *pd* and 2 or sometimes 3 *pv* ; f_3 with 4-6 *av* on apical half to two-thirds ; t_3 with 3 or sometimes 4 *av*, 4-5 *ad*, 3 or sometimes 4 *pd* and no *pv* (1 *pv* present in 2 specimens from Hikosan). Wings with costal thorns strong, much longer than *h* ; costal spicules prominent.

Judging from the great similarity in the male genital structures, this species is very closely related to *D. uralensis* Hennig, 1974 from S. Ural and to *D. gracilibacilla* Cheng, 1982 from Shanghai and Hunan, China. From *uralensis* it is distinguishable by the shorter A_3, shorter aristal hairs and fewer *pre-acr,* and from *gracilibacilla* by the longer *pra* and slightly broader surstyli. Nevertheless, the possibility cannot be eliminated that the 3 supposed species are conspecific and the differences mentioned above are due to mere individual or local variations. Further material is necessary for a precise comparison.

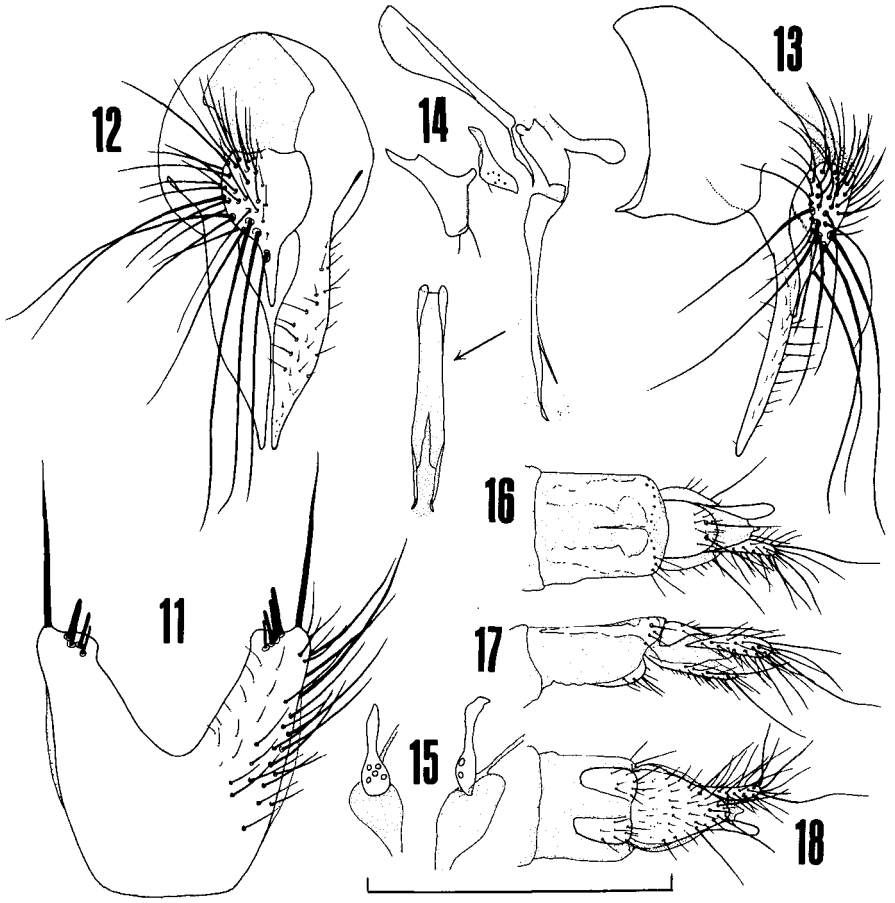
3. *Delia bacilligera* Hennig
(Figs. 11-18)

Delia bacilligera Hennig, 1974 : 743.

Material. Hokkaidô : - Kenebetsu, 2 ♂ & 1 ♀, 2-3. viii. 1936 (S. Kuwayama), and 1 ♀, 3. viii. 1971 (T. Kumata).

Distribution. Japan ; China (Manchuria). New to Japan.

♂. Body-length 4.5-5.2 mm ; wing-length 4.3-4.7 mm. Antennae dark brown-



Figs. 11-15. *Delia bacilligera* Hennig, ♂. 11, 5th sternite; 12, hypopygium, dorsal view; 13, ditto, lateral view; 14, aedeagus; 15, ejaculatory apodeme. Figs. 16-18. *Delia bacilligera* Hennig, ♀, ovipositor. 16, dorsal view; 17, lateral view; 18, ventral view. Kenebetsu, Hokkaidô. Scale 0.8 mm for Figs. 16-18, 0.5 mm for Figs. 11-14, and 0.25 mm for Fig. 15.

ish, more or less paler on A_2 dorso-apically. Legs dark brownish; tibiae brownish, paler on t_3. Wings distinctly tinged with yellow.

Frons twice, or slightly more, as wide as anterior ocellus; interfrontalia about 1.5 times as wide as anterior ocellus; A_3 a little longer than twice of the width; arista plumose, with the longest hairs somewhat shorter than A_3-width. Mesonotum with 5 (a single and 2 pairs) *pre-acr* in 1 specimen (broken in the other), setae of the 1st pair being rather distinct and the others very fine; *pra* completely suppressed. Abdomen nearly parallel-sided or loosely narrowinng caudad, 2.2-2.6 times as long as wide.

Fore tibia (missing in 1 specimen) with 1 *ad* and 1 *pv*, and with apical *pv* rather weak and pointed apically; f_2 with 3-4 *pv* on basal third; t_2 with 1 *ad*, 2 *pd* and 1-2 *pv*; t_3 with 2 *av*, 3 *ad*, 3 *pd* and 1-2 weak *pv*. Wings with costal thorns rather strong.

♀. Frons about 0.4 times as wide as head ; interfrontalia about half as wide as frons. Mesonotum with *pra* visible on right body-side in 1 specimen though fine as accessory setulae. Fore tibia with 2 *ad,* 1 *pv* and no *pd*, and with apical *pv* strong and pointed apically ; f_2 with 2 *pv* in basal fourth ; t_2 with 1-3 *av,* 2 *ad,* 2 *pd* and 2 *pv* ; t_3 with 2-3 *av,* 4 *ad,* 3 *pd* and no *pv*. Wings with costal thorns strong, much longer than *h.*

The present specimens agree well with the original description of *D. bacilligera* except for a slight difference in the little wider male frons and in the absence of *pd* on the female t_1. By having the male genital structures of the same type as those of the preceding *D. seticauda* and its allies the present species seems closely related to them, from which it can, however, be easily distinguished by the plumose arista and the absence of *pra.*

4. *Delia takizawai* Suwa

Delia takizawai Suwa, 1974 : 155. *Delia robustiseta* Judin, 1974 : 23, syn. nov. *Delia takizawai koreana* Suwa, 1983 : 38.

Distribution. Japan ; Kuriles ; Korea ; Siberia

On the basis of 2 Siberian specimens (2 ♂, Ussuri and Zabaikal) Judin (1974) described *Delia robustiseta* as new to science. Having read the description of the species (the original and an English translation) I have noticed a few differences from *D. takizawai* : - Haustellar mentum shining, mesonotum not vittate, and wings with costal thorns strong. My understanding of *robustiseta* may be insufficient, but I have been inclined to the opinion that *D. robustiseta* is a synonym of *D. takizawai* especially by having the same male genital structures with the latter.

Recently the Korean form of *D. takizawai* was described as a subspecies distinct from the nominate one under the name *D. takizawai koreana* by Suwa (1983). Judging from the figure of hypopygium given by Judin (l.c.) the Siberian form might be more similar to the nominate one in having the surstyli slightly curved ventrad at apex.

5. *Delia angustitarsis* (Malloch)
(Fig. 19)

Hylemyia angustitarsis Malloch, 1920 : 277. *Hylemyia* (*Leptohylemyia*) *conversata* Tiensuu, 1935 : 23. *Delia angustitarsis* : Hennig, 1974 : 733. *Delia conversata* : Suwa, 1974 : 162 ; id., 1981 : 5.

Distribution. Holarctic region.

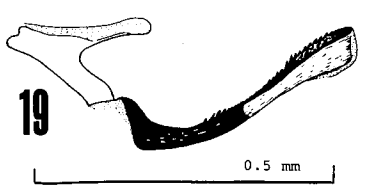


Fig. 19. *Delia angustitarsis* (Malloch), ♂, aedeagus. Alaska.

The distiphallus of the N. American form of *angustitarsis* figured by Malloch (1920) seems to be a little more elongated than that of the European form figured by Hennig (1974). Therefore, I supposed that the European form, once named *conversata,* is distinct from the N. American *angustitarsis.* In comparing the Japanese specimens at hand, referred to *conversata* by myself (Suwa, 1974 & 1981), with

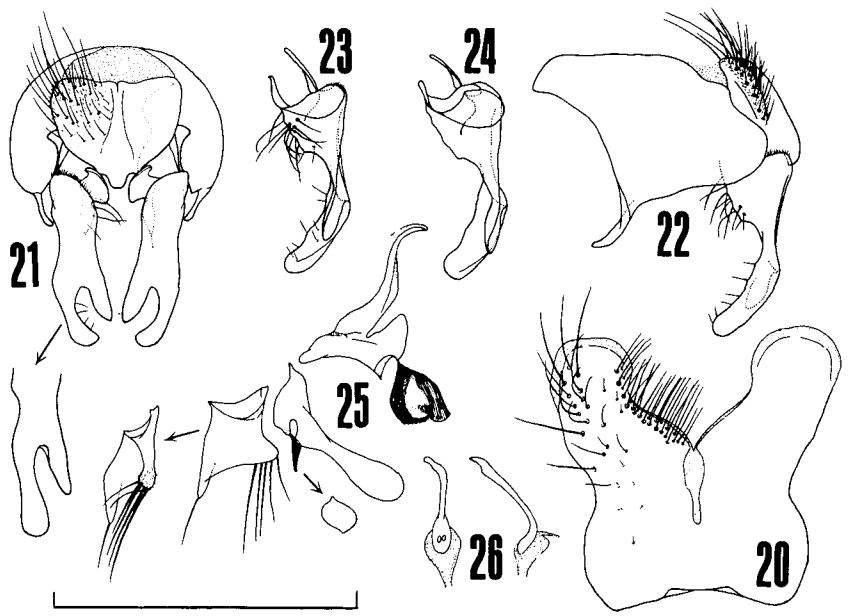
some N. American specimens (2 ♂ & 2 ♀, Alaska) and a European one (♂, Finland) determined as *angustitarsis* by Huckett and Michelsen respectively, I have found that there are no significant differences among them in most features including the distiphallus. Now I follow Hennig (1974) in his opinion that Tiensuu's *conversata* is a synonym of Malloch's *angustitarsis*.

6. *Pegomya nigricrus* sp. nov.
(Figs. 20-26)

Material. Honshû: - Hirogawara, Yamanashi-ken, 1 ♂ (holotype), 28. v. 1973 (T. Saigusa).

♂. Body-length 4.5 mm ; wing-length 4.2 mm. Body blackish in ground colour and rather thinly greyish pollinose, more or less tinged with brown in the pollinosity. Interfrontalia brownish in ground colour and whitish grey pollinose ; orbits brownish in ground colour, darker along eye-margins, and silvery grey and hardly yellow in pollinosity ; cheeks brownish in ground colour, and whitish grey and faintly yellow in pollinosity ; antennae and palpi blackish ; haustellar mentum blackish and shining, only a little pollinose basally. Mesonotum thinly pollinose, in frontal angle of view mostly blackish and in caudal angle broadly and obscurely darkened medianly and laterally. Abdomen (blurred in the specimen examined) with median vitta broad. Legs blackish or dark brownish. Wings rather distinctly tinged with brown ; veins dark brown ; calyptrae tinged with yellow ; halteres yellow apically.

Frons narrower than anterior ocellus ; parafrontals contiguous to each other,



Figs. 20-26. *Pegomya nigricrus* sp. nov., ♂. 20, 5th sternite ; 21, hypopygium, dorsal view ; 22, ditto, lateral view ; 23, surstylus (right), inside view ; 24, ditto, slightly different view ; 25, aedeagus ; 26, ejaculatory apodeme. Holotype from Hirogawara, Yamanashi-ken. Scale 0.5 mm for Figs. 20-25, and 0.25 mm for Fig. 26.

with 5 *ori* (1 additional seta present on left parafrontalia) and no *ors*; A_3 shrunk, probably shorter than twice the width; arista with the longest hairs shorter than basal diameter of arista; profrons narrower than A_3; cheeks slightly less high than profrons-width, with genal setae arranged in 1 row; epistoma situated behind profrons-tip.

Mesonotum with 3 pairs of *pre-acr*, and with a few (3 in the specimen) setulae between the rows; distance between the rows at 2nd pair nearly equal to that between *dc* and *acr*; 2nd *ph* well developed, about as long as the 1st; *pra* about two-thirds as long as posterior *ntpl*; *stpl* 1 : 2, below the anterior and the posteriors respectively with 1 additional seta distinguishable from adjacent setulae; scutellum on dorsal surface with a few setulae towards lateral margin.

Abdomen depressed, nearly parallel-sided and about twice as long as wide; 6th tergite not setose; 5th sternite and hypopygium as in Figs. 20-26; processes of 5th sternite maintained broad apicad, with inner-marginal setae arranged in about 2 dense rows, and with outer-marginal setae short and sparse; praegonites with 4 or 5 setae on dorso-apical corner; postgonites with a strong and discoid seta near base ventrally, and just beyond the seta with a deep notch.

Fore tibia with 1 weak *ad* and 1 *pv*, and with 2 strong apical setae (*d* and *pv*); f_2 with no distinct *av* and with a row of *pv* (weaker on apical half); t_2 with 1 *ad*, 1 *pd* and 2 *p-pv*; f_3 with a row of about 7 long and strong *av* on apical two-thirds, and with 1 weak *pv* near base and a row of 8-9 *pv* on apical two-thirds, a few *pv* near middle being rather strong and about as long as f_3-height; t_3 with 1 *av*, 3 *ad* and 2 *pd*, with apical *ad* rather weak and about half as long as apical *d*, and with apical *pd* indistinguishable from adjacent setulae. Wings with costal thorns minute; *m-m* slightly oblique and hardly sinuate; lower calyptra smaller than the upper.

♀. Unknown.

The characters of the 5th sternite and aedeagus indicate that the present species is closely related to *Pegomya transgressa* (Zetterstedt, 1846) known from Europe and N. America. However, it differs from the latter in the blackish legs and in the details of genitalia.

7. *Pegomya latifrons* sp. nov.
(Figs. 27-34)

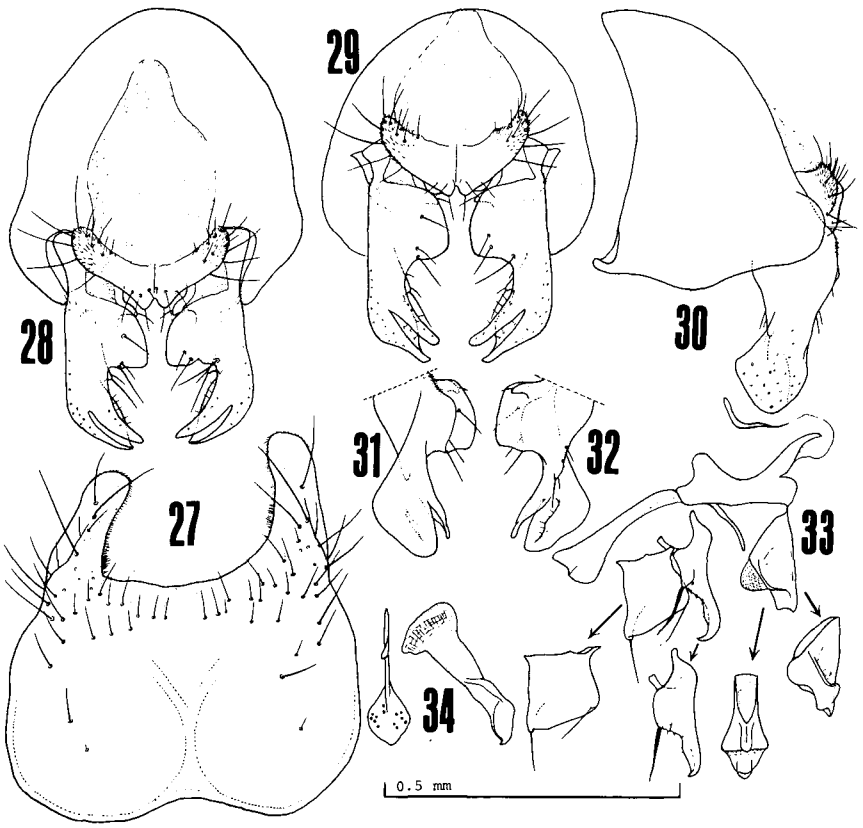
Material. Hokkaidô: - Tomakomai, 1 ♂ (holotype), 6. vi. 1975 (T. Hattori). Kyûshû: - Myôken-Onsen, Mt. Kirishima, Kagoshima-ken, 1 ♂, 1. iv. 1977 (K. Ôhara).

The paratype seems a little teneral. So that the description as to the ground colour in the following lines is based on the holotype only.

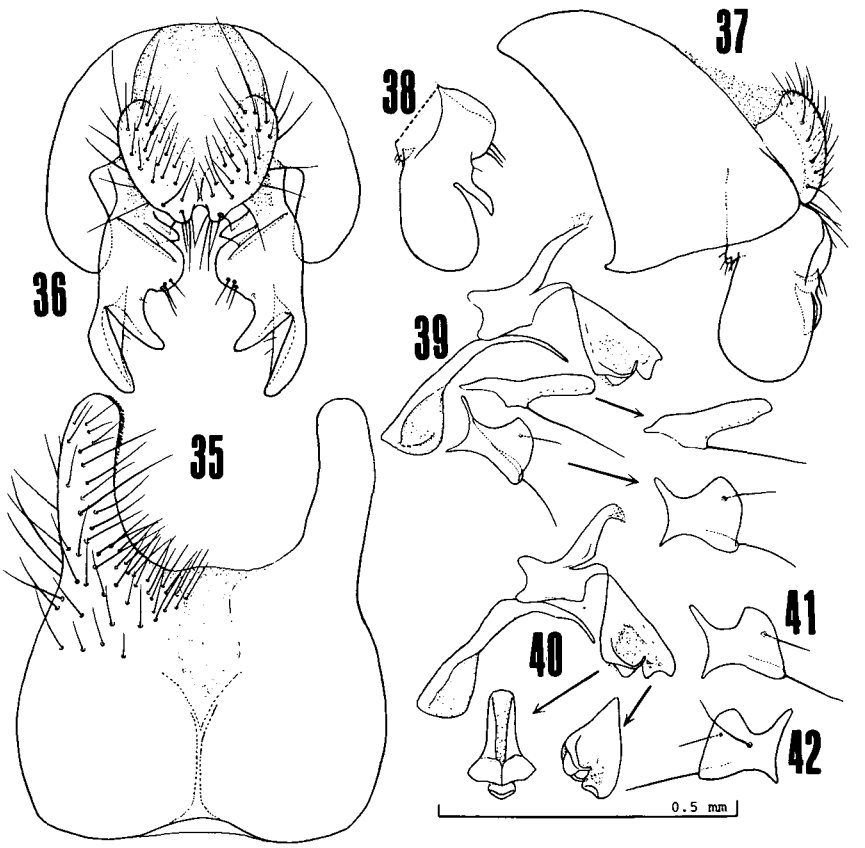
♂. Body-length 4.3-4.6 mm; wing-length 3.8-4.1 mm. Body mainly blackish in ground colour and rather thickly whitish grey pollinose, a little bluish in the pollinosity. Interfrontalia in ground colour brownish near lunule, darkening caudad and blackish on caudal half, and in pollinosity whitish grey; parafrontals blackish in ground colour and whitish grey in pollinosity; parafacials brownish in ground colour, darkened along eye-margins, and in pollinosity silvery white; cheeks dark brown in ground colour and whitish grey in pollinosity; antennae blackish, more or less brownish on A_2 apically; palpi blackish; haustellar mentum blackish, thinly

pollinose. Mesonotum in frontal angle of view wholly pollinose and not vittate, and in caudal angle rather obscurely vittate, with rather broad median vitta, narrow and intermittent paramedian vittae along *dc*-rows, and lateral patches. Abdomen faintly brownish in ground colour at base ventrally, and with fine texture in pollinosity, shining in some lights; median vitta broad and sharp, narrowly interrupted at hind margin of each tergite, each section on 3rd (or 4th) to 5th tergites slightly broadened posteriorly; 5th sternite brownish along inner margin of processes. Coxae dark brown, partly blackish; trochanters dark brown; femora dark brown, narrowly yellow at apex; tibiae yellow; tarsi blackish. Wings with veins yellowish basally, and with membrane nearly hyaline; calyptrae whitish, hardly or very faintly tinged with yellow; halteres yellow, a little darkened basally.

Frons wide, 0.26–0.28 times as wide as head, and a little wider than twice the distance between posterior ocelli inclusive; interfrontalia narrowest just before anterior ocellus and about as wide as distance between posterior ocelli inclusive, without *if*; parafrontals with 3–4 *ori* (mingled with a few minute or fine setulae), and with (in paratype) or without a rather strong reclinate *ors*; A_3 about twice as



Figs. 27-34. *Pegomya latifrons* sp. nov., ♀. 27, 5th sternite; 28, hypopygium, dorsal view; 29, ditto, dorsal (slightly caudal) view; 30, ditto, lateral view; 31, surstylus (left), dorso-lateral view; 32, ditto, inside (ventro-lateral) view; 33, aedeagus; 34, ejaculatory apodeme. Holotype from Tomakomai, Hokkaidô (Figs. 27-33) and paratype from Mt. Kirishima, Kagoshima-ken (Fig. 34).



Figs. 35-42. *Pegomya bicolor* (Wiedemann), ♀. 35, 5th sternite; 36, hypopygium, dorsal view; 37, ditto, lateral view; 38, surstylus (left), dorso-lateral view; 39-40, aedeagus; 41, praegonite (left); 42, ditto (right). Shôdo-shima, Kagawa-ken (Figs. 35-39) and Harima, Hyôgo-ken (Fgs. 40-42).

long as wide; arista short pubescent, with the longest hairs somewhat shorter than basal diameter of arista; profrons slightly or rather distinctly narrower than A_3; cheeks about as high as profrons-width, with genal setae in 1 row; epistoma situated distinctly behind profrons-tip.

Mesonotum with 4 regular (paratype) or 7 irregular (holotype) pairs of *pre-acr*, and with 3 accessory setulae between the rows in the paratype; distance between the rows of *pre-acr* about half as long as that to *dc*-rows; 2nd *ph* as weak as adjacent setulae; *pra* shorter than posterior *ntpl*, about two-thirds (holotype) or three-fourths (paratype) of the latter in length; mesopleura with 1 strong and 0-1 weaker anterior *mpl*, and with 1 strong and 1 weaker *pstg* and no associated setulae; *stpl* 1 : 2, in holotype with 1 additional weak seta below the anterior; scutellum on dorsal surface with a few or some setulae towards lateral margin and mainly bare.

Abdomen half-depressed and ovoid, 1.5-1.6 times as long as wide; tergites with no distinct discal setae; 6th tergite almost or completely hidden under 5th tergite in dried condition, with no setulae; 5th sternite and hypopygium as in Figs. 27-34; 5th sternite membranous along inner margin, with no strong setae; surstyli broadly

expanded near inner base, and thereon with a few setae ; postgonites broadened on basal half and much narrowed on apical half, with a strong seta at ventral corner.

Fore tibia with 1 *ad* and 1 *pv*, and with 3 strong apical setae (*d, p* and *pv*) ; f_2 with no *av* and in basal third with 2-3 *pv* ; t_2 with 1 *ad*, 1 *pd* and 1*p* ; f_3 with 4-5 strong and a few weaker *av* except near base, and 1 weak *pv* near base, 1 strong *pv* near middle and 1 strong *pv* near apex ; t_3 with 1 *av*, 3 *ad* and 2 *pd*, and with apical *pd* well developed and as long as or a little longer than apical *d*. Wings with costal thorns small, though easily distinguishable from costal spicules ; *m-m* nearly erect and hardly sinuate ; lower calyptra smaller than the upper.

♀. Unknown.

This species is closely related to *Pegomya bicolor* (Wiedemann, 1817) by having the following male characters : - Hind tibia with strong apical *pd* ; 5th sternite with no strong setae, and with processes rod-like and widely set aprt from each other by nearly straight posterior margin of basal plate ; surstyli with a setose inner expansion ; postgonites with a strong seta on basal expansion. *P. latifrons* is, however, readily distinguished from *bicolor* by the wider male frons and different details in the genital structures. On this occasion the male genital characters of *bicolor* based on Japanese material are given in Figs. 35-42.

8. *Pegomya valgenovensis* Hennig

(Figs. 43-64)

Pegomya valgenovensis Hennig, 1973 : 622 ; Griffiths, 1982 : 106. *Pegomya centaureodes* Hsue, 1981 : 92, syn. nov.

Material. Hokkaidô : - Goshikigahara, 1700-1800 m, Mt. Taisetsu, 1 ♂, 28. vii-3. viii. 1975 (M. Suwa) ; Mt. Furano, ca. 1800 m, 1 ♂ (emerged 30. iii. 1976, shrunk) & 3 ♂ (pharate), 9-10. viii. 1975 (M. Suwa), ex *Saussurea* sp., as a leaf-miner. Honshû : - Shimashima-dani, Nagano-ken, 1 ♂, 22-24. v. 1975 (A. Nakanishi & J. Emoto) ; Kanayama, Masutomi, Yamanashi-ken, 1 ♂, 26. v-4. vi. 1975 (T. Saigusa et al.).

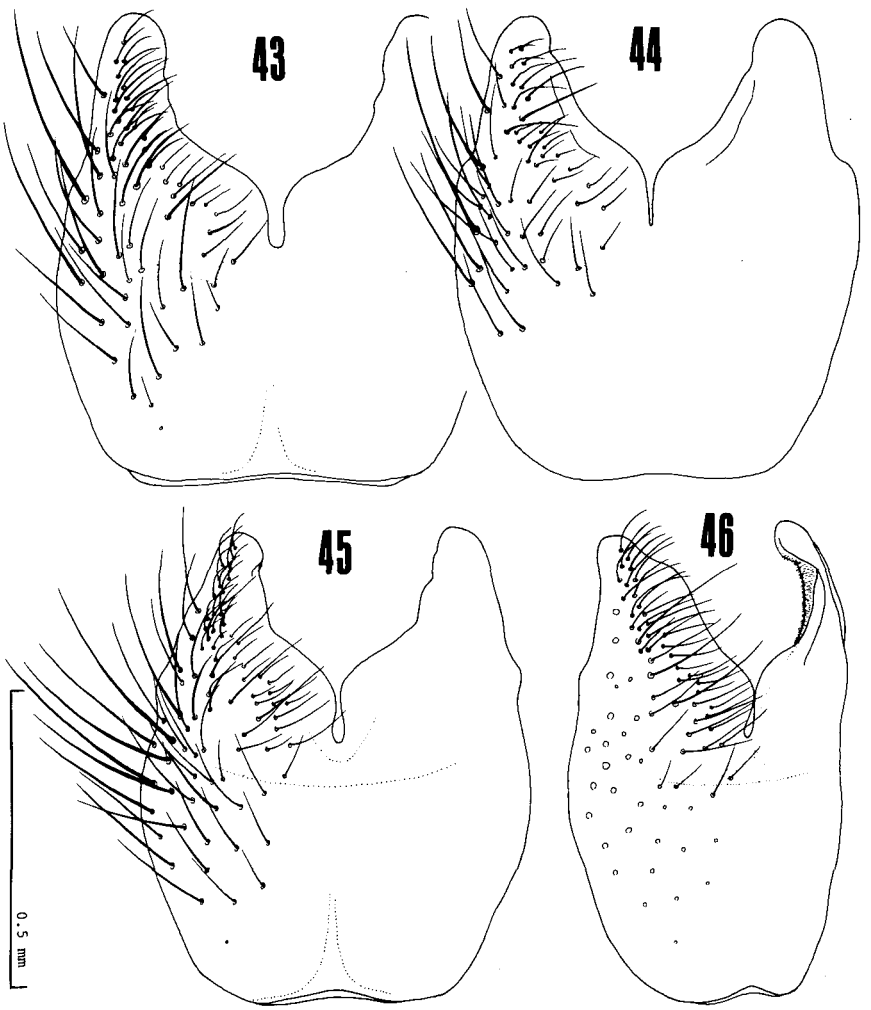
Distribution. Japan ; N.E. China (Liaoning) ; Europe (Alps) ; N. America (Alaska and Yukon). New to Japan.

♂. Body-length 5.7-6 mm ; wing-length 5-5.5 mm. Body blackish in ground colour. Head in ground colour : - Interfrontalia dark brownish to blackish ; parafrontals blackish ; parafacials and cheeks brownish to blackish ; antennae blackish ; palpi dark brownish to blackish, somewhat paler basally ; haustellar mentum blackish and polished ; occiput blackish. Thorax in pollinosity greyish, tinged with brown faintly or slightly on lateral sides and distinctly on mesonotum ; mesonotum in frontal angle of view wholly pollinose, and in caudal angle obscurely vittate. Abdomen almost wholly blackish in ground colour, and in pollinosity pale grey and more or less bluish, half-shining in some lights ; median vitta narrow to rather broad, brownish pollinose in frontal angle of view and blackish in caudal angle ; 5th sternite with processes brownish yellow on inner half ; cercal plate brownish yellow. Coxae blackish, and partly brownish ; trochanters brownish, more or less darkened ; f_1 largely dark brown to blackish, paler on anterior surface, and narrowly yellow at base and apex, in 1 specimen from Nagano-ken yellowish on ventral half of apical half ; f_2 and f_3 yellow, slightly or rather distinctly darkened at apex dorsally ; tibiae yellow ; tarsi blackish. Wings rather distinctly tinged with brownish yellow, at base

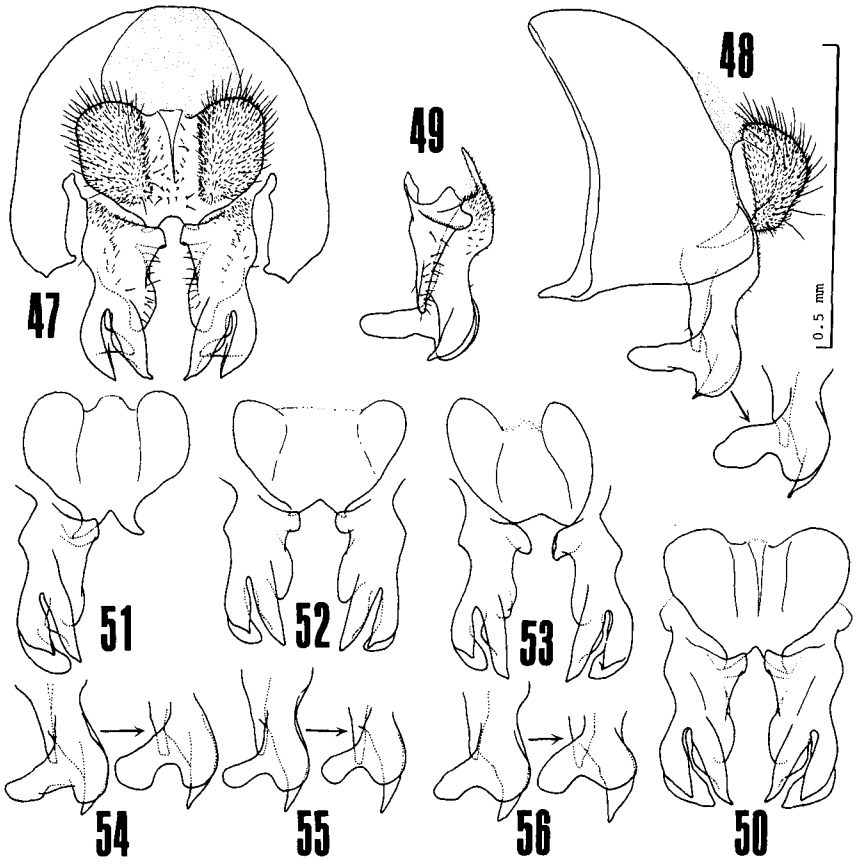
strongly yellow; calyptrae slightly or rather distinctly tinged with yellow.

Frons narrower than anterior ocellus; parafrontals contiguous to each other, with 5-7 *ori* (mingled with a few fine or micro-setulae), and with no *ors* (1 micro *ors* present in 1 specimen from Mt. Taisetsu); A_3 1.7-1.8 times as long as wide; arista minutely pubescent, with the longest hairs shorter than basal diameter of arista, and with basal swelling gradually attenuating apicad (rather spherical in 1 specimen); epistoma situated behind profrons-tip.

Mesonotum rather densely covered with slender accessory setulae; *pre-acr* 2-4 pairs in approximated rows, 0-4 fine setulae present between the rows; *ph* duplicated, the 2nd about as strong as the 1st; *pra* rather well developed, variable in length, being a little shorter to a little longer than posterior *ntpl* (completely lacking on left body-side in 1 specimen); *stpl* 1 : 3, the lowest posterior much weaker than the



Figs. 43-46. *Pegomya valgenovensis* Hennig, ♀, 5th sternite. 43-45, ventral view; 46, ventro-lateral view. Mt. Taisetsu, Hokkaidô (Fig. 43), Mt. Furano, Hokkaidô (Fig. 44) and Shimashima-dani, Nagano-ken (Figs. 45-46).



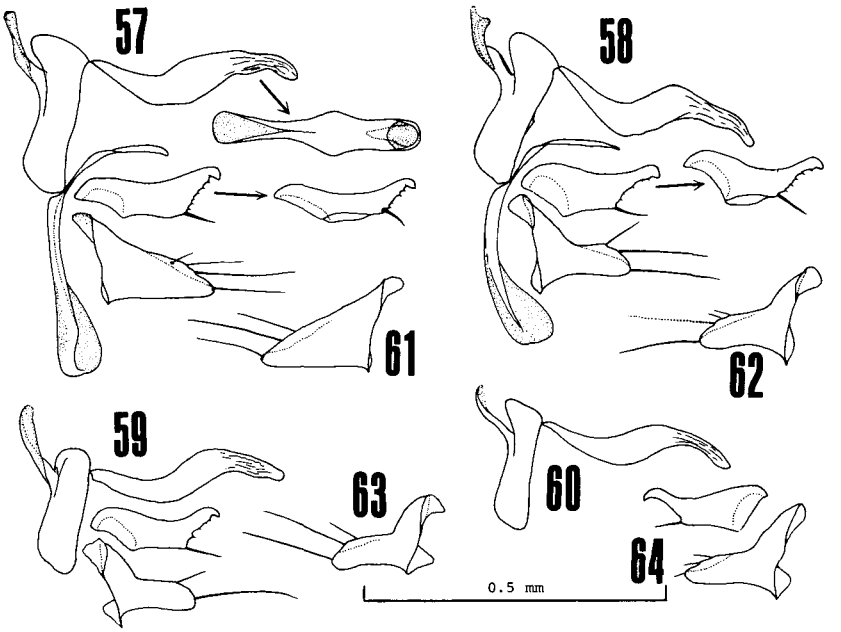
Figs. 47-56. *Pegomya valgenovensis* Hennig, ♂. 47, hypopygium, dorsal view ; 48, ditto, lateral view ; 49, surstylus (right), inside view ; 50-53, hypopygium, dorsal (slightly caudal) view, epandrium omitted ; 54-56, surstylus (left), lateral view. Shimashima-dani (Figs. 47-50), Mt. Taisetsu (Figs. 51 & 54) and Mt. Furano (Figs. 52 & 55, pharate ; Figs. 53 & 56, pharate).

uppers ; scutellum on dorsal surface bare centrally.

Abdomen depressed, long-ovoid or nearly parallel-sided, and 1.7-1.8 times as long as wide ; 6th tergite not setose ; processes of 5th sternite blade-like, and with inner setae arranged in a few irregular rows (Figs. 43-46) ; surstyli with outer process rather variable, especially in the shape of ventral lobe (Figs. 48-49, & 54-56).

Fore tibia with 1 *pv* and no *ad*, and with apical *p* well developed (in 2 specimens from Honhû) or indistinguishable from adjecent setuale ; f_2 with 4-6 *pv* on basal half ; t_2 with 1 *ad*, 1 *pd* and 3 (2 on left t_2 in 1 specimen) *p-pv* ; f_3 with a row of *av*, 1 *pv* near base (weaker than other *pv*, though rather strong), 2-4 *pv* in middle third and 1-2 *pv* near apex, and on basal half with some strong *p* besides the ordinary row of *p-pd* ; t_3 with 2-3 *av*, 3-4 *ad*, and 2 strong and 1-3 additional *pd*, and with apical *pd* weak (in 1 specimen from Mt. Taisetsu) or well developed. Wings with *m-m* slightly oblique and a little or rather distinctly sinuate ; lower calyptra smaller than the upper.

♀. Unknown to me.



Figs. 57-64. *Pegomya valgenovensis* Hennig, ♀. 57-60, aedeagus; 61-63, praegonite (right); 64, praegonite and postgonite (right). Shimashima-dani (Figs. 57 & 61), Mt. Taisetsu (Figs. 58 & 62) and Mt. Furano (Figs. 59 & 63, pharate; Figs. 60 & 64, emerged).

Host plants. *Saussurea* sp. (in Japan) and *Saussurea angustifolia* (Willd.) var. *yukonensis* (Pors.) (in N. America, after Griffiths, 1982). *P. valgenovensis* is a leaf-miner on these plants.

The present Japanese specimens agree with the original description of *P. valgenovensis* except in having the arista less swollen basally, palpi darker, femora (especially f_1) darker, and t_1 with only 1 *pv*. According to Griffiths (1982) *P. valgenovensis* is also found in N. America and variable in colour. Recently *Pegomya centaureodes* Hsue, 1981 was described on the basis of some male specimens from N. E. China as new to science. In the description of *centaureodes* I have failed to find any differences significant enough to recognize it as distinct from *valgenovensis*.

9. *Pegomya spiraculata* Suwa

Pegomya spiraculata Suwa, 1974: 207; Suwa & Park, 1982: 502.

Material. Hokkaidô: - Kaminokuni, 1 ♀ (holotype), 20. vi. 1968 (M. Suwa). Honshû: - Mt. Hakusan, Ishikawa-ken, 1 ♀, 12. vii. 1959 (K. Hori), and 1 ♀, 6. viii. 1970 (K. Kanmiya); Ozegahara, Gumma-ken, 1 ♀, 9-13. vii. 1979 (H. Kurahashi). Kyûshû: - Mt. Hakuchô, 1300 m, Kumamoto-ken, 1 ♀, 5-7. vi. 1980 (M. Suwa).

Distribution. Japan; Korea (Jeju-Do=Quelpart I.).

This species was originally described on the basis of a single male specimen from Hokkaidô, Japan. Further specimens are now available as listed above. In the following lines some notes are given as supplement to the original description: -

♀. Body-length 6.9-7.3 mm; wing-length 6.4-6.8 mm. Antennae dark brownish,

with A_2 at apex and A_3 at base hardly or slightly paler brownish; palpi yellow to brown, darkened apically. Abdomen in ground colour yellowish in various degrees, most broadly in holotype (largely yellow on 1st and 2nd tergites, partly so on the 3rd, and blackish on the 4th and 5th) and most narrowly in a specimen from Mt. Hakusan (mainly blackish and only a little yellowish on 2nd tergite laterally). Femora partly darkened as in the original description.

A_3 long and reaching to epistoma or nearly so, about 2.7 times as long as wide in 1 good-conditioned specimen from Mt. Hakusan; parafrontals with 4-6 *ori* (mingled with a few minute or fine setulae) and no *ors*. Mesonotum with rows of *pre-acr* widely set apart from each other, the distance at 2nd pair of *acr* being 1.3-1.5 times as long as that to *dc*-rows; 2nd *ph* as long as or slightly longer than the 1st; *pra* about as long as anterior *ntpl*; mesopleura with 1 strong *pstg* and many (10-17) associated setulae; scutellum with usually 2 setulae between apical setae.

Mid femur on basal half with some (5-6) strong *pv*, the longent one as long as or slightly longer than twice the femur-height, and on apical half with a row of much finer *pv*; t_2 with 1 *ad*, 1 *pd* and 2 *p-pv*; f_3 with 7-9 strong *av* except near base, the longest one as long as or slightly longer than twice the femur-height, 1 rather strong *pv* near base (much longer than height of the femur), 1 or 2 strong *pv* near middle and a row of fine *pv* on apical half, 1 or 2 *pv* near apex usually developed and rather strong, and with a row of *p* slightly towards postero-ventral surface except near apex, the setae on basal half long and rather strong and those on the rest fine, the ordinary row of *p-pd* being composed of fine and slender setae; t_3 with 1 (2 on right t_3 in 1 specimen) *av*, 2-4 (usually 3) *ad*, and 2 (4 on right t_3 in 1 specimen) *pd*.

10. *Pegomya kusigematii* Suwa

Pegomya kusigematii Suwa, 1974: 208.

Material. Hokkaidô: - Sapporo, 1 ♀, 2. ix. 1958 (S. Takagi), and 1 ♀, 8. ix. 1967 (K. Kusigemati); Jôzankei, 1 ♀, 19. viii. 1967 (M. Suwa); Rebun I., 1 ♀, 2. viii. 1958 (S. Takagi); Mt. Rausu, 1 ♀, 25. viii. 1977 (K. Ôhara); Mt. Soranuma, 1 ♂ (holotype), 29. viii. 1965 (K. Kusigemati); Mt. Shokambetsu, 1 ♂ (paratype), 1. vii. 1971 (M. Suwa). Honshû: - Mt. Hayachine, Iwate-ken, 1 ♀, 30. vii. 1970 (K. Kanmiya); Iozen, Ishikawa-ken, 1 ♂ & 1 ♀, 14. v. 1969 & 15. vi. 1973 (H. Kurahashi); Bijodaira, Toyama-ken, 1 ♂, 29. viii. 1959 (S. Takagi); Sugenuma, Gumma-ken, 1 ♂, 27. vii. 1978 (E. Kanda). Kyûshû: - Mt. Hakuchô, 1300 m, Kumamoto-ken, 2 ♂, 5. vi. 1979 (N. Kôda), 2 ♀, 9. vii. 1978 (T. Saigusa & K. Ôhara), and 6 ♂, 5-7. vi. 1980 (T. Gotô & M. Suwa).

Distribution. Japan.

This species was originally based on 2 male specimens from Hokkaidô. Recently I have examined some additional material of both sexes as listed above. On this occasion a brief comment will be added to the original description: -

♂. Body-length 5.3-6.8 mm; wing-length 4.9-6.8 mm. Body in ground colour partly yellow as shown in the original description (some specimens are teneral and much more broadly yellow); abdomen in ground colour on 4th and 5th tergites wholly blackish or partly yellow to brown.

Head comparatively short, 1.6-1.8 times as high as long; parafrontals with 3-5 *ori* (usually mingled with 1-2 fine setulae); A_3 long, reaching to epistoma or nearly

so ; occiput on upper plane hardly to rather sparsely setulose. Mesonotum with setae of 2nd pair of *pre-acr* separated from each other by a distance 1.3-1.8 times as long as that to *dc*-rows ; mesopleura with 1 strong and 1 weak *pstg* and 5-10 associated fine setulae, the weak *pstg* often indistinguishable from associated setulae. Abdomen nearly parallel-sided or long-ovoid, and 1.8-2.2 times as long as wide.

Fore tibia with 1 *ad* and 1 *pv*, the *ad* being minute and often indistinguishable from adjacent setulae ; f_2 in basal half with 2-4 (usually 3) *pv* ; f_3 with 5-8 *av* on apical two-thirds, 1 *pv* near base and 1-2 *pv* near middle, a few or some setae near apex on postero-ventral surface being more or less developed and 1 or 2 of them often strong ; on posterior surface with a row of some (4-7) rather strong setae in basal fourth to third, the ordinary row of *p-pd* being composed of fine and slender setae.

♀. Body-length 5.3-6.4 mm ; wing-length 4.9-5.8 mm. Body in ground colour more broadly yellow than in male : - Occiput yellow near oral cavity ; thorax on lateral sides largely yellow to brown and partly dark brown to blackish, and on metanotum blackish ; mesonotum blackish except on yellowish peripheral region ; scutellum slightly or faintly darkened only mid-basally ; abdomen wholly yellow, with narrow black hind-marginal bands on 2nd to 4th tergites. Legs including coxae wholly yellow though darkened apically on f_2 and f_3.

Head 1.4-1.5 times as high as long ; frons 0.36-0.38 (0.33 in 1 specimen) times as wide as head ; interfrontalia about two-thirds of frons in width, with a pair of strong *if* ; parafrontals with 2-3 (usually 2) *ori* and 3 *ors* ; occiput setulose on upper plane. Thorax less densely setulose than in male ; 2nd *ph* shorter than the 1st and often weak or fine. Fore tibia with *ad* strong ; f_2 with *pv* usually 2 in number. Wings with *m-m* less oblique and less sinuate than in male.

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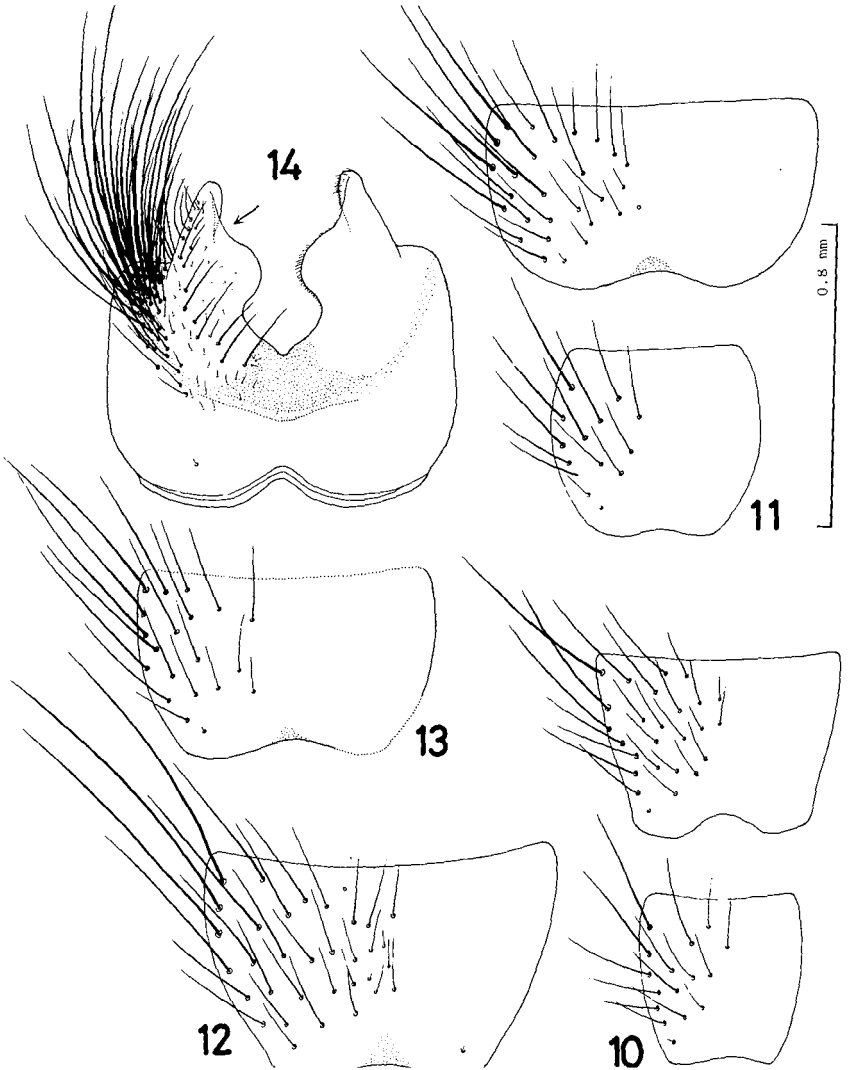
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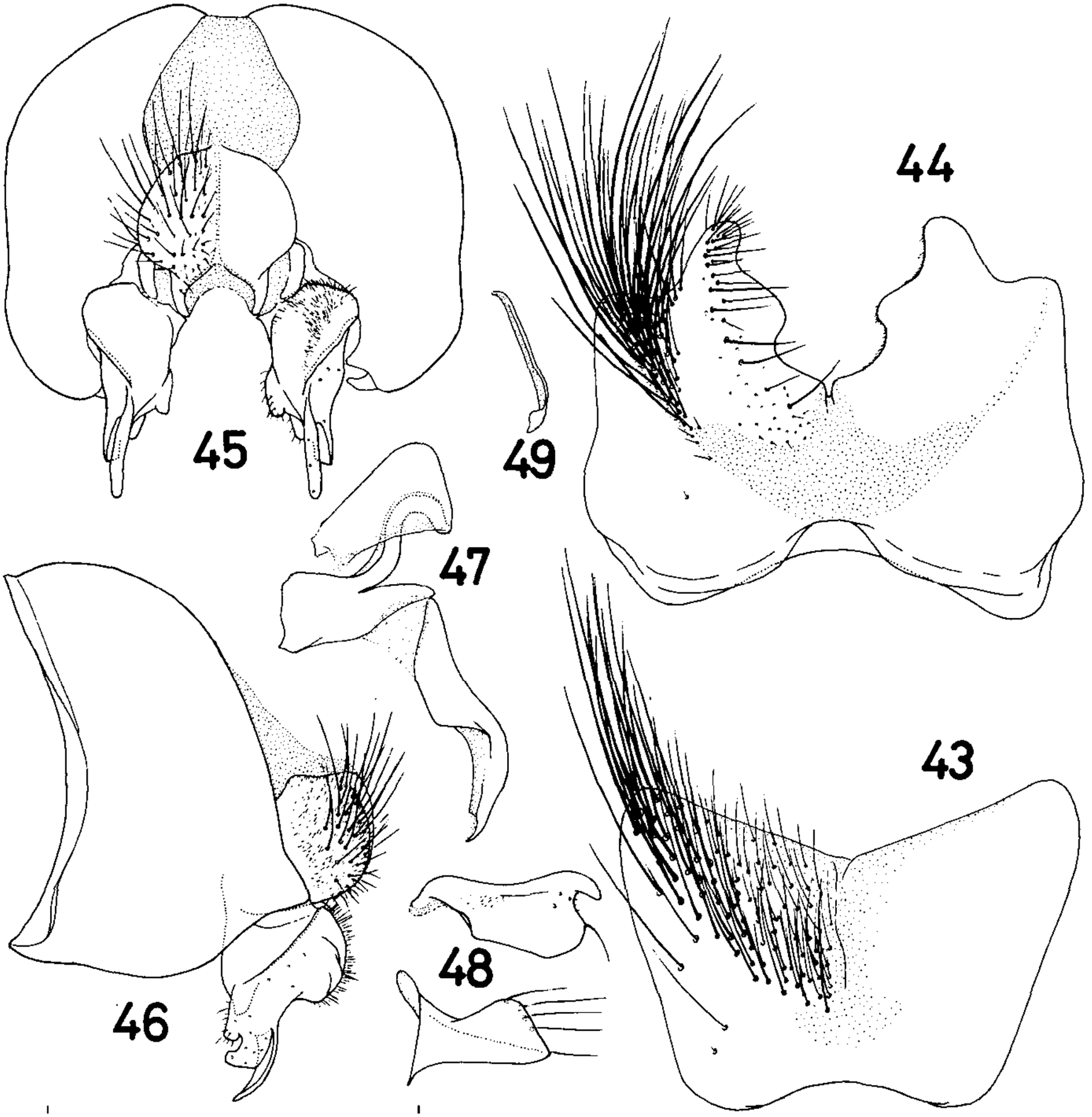
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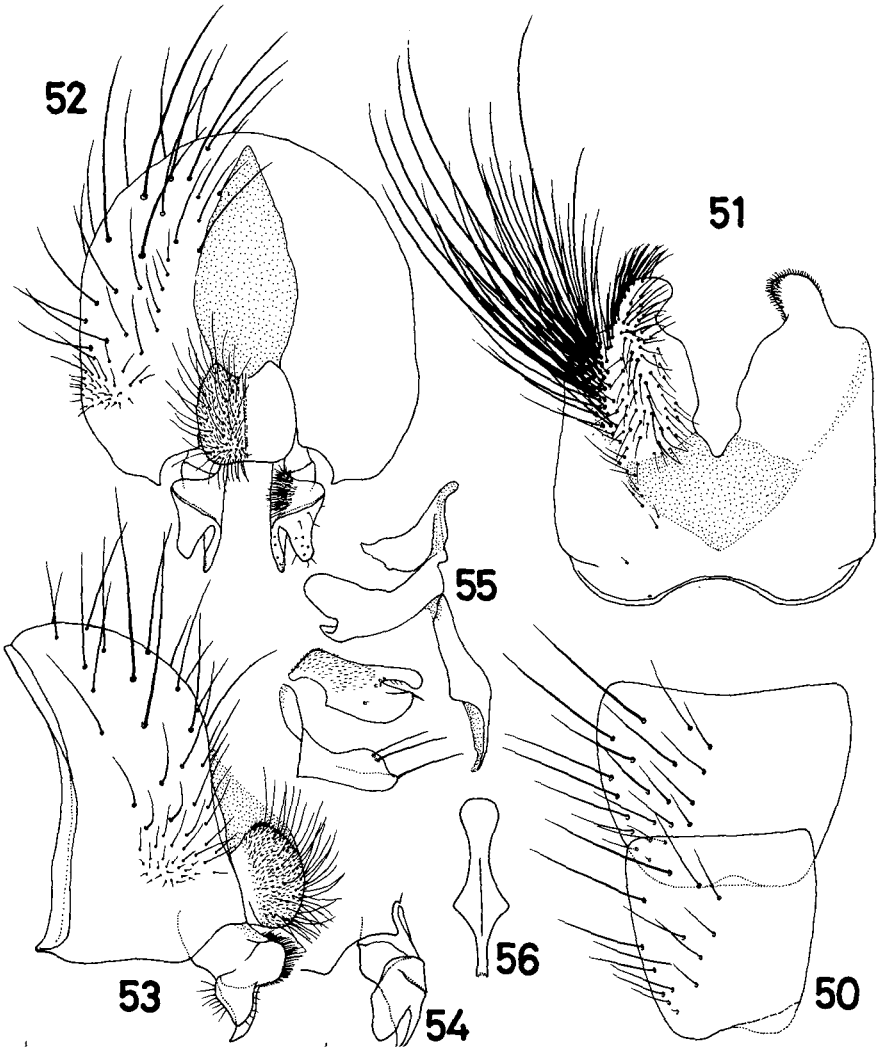
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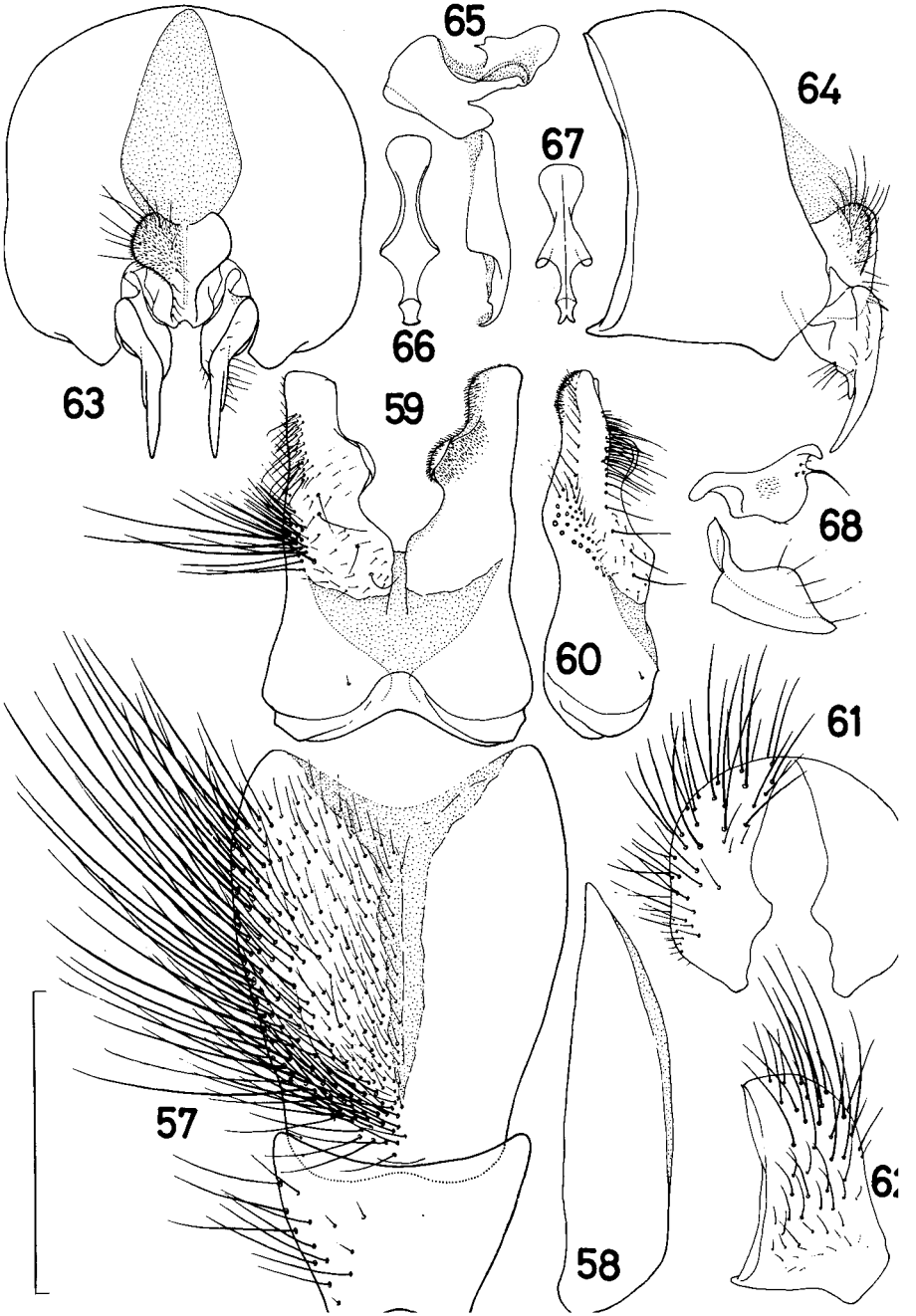
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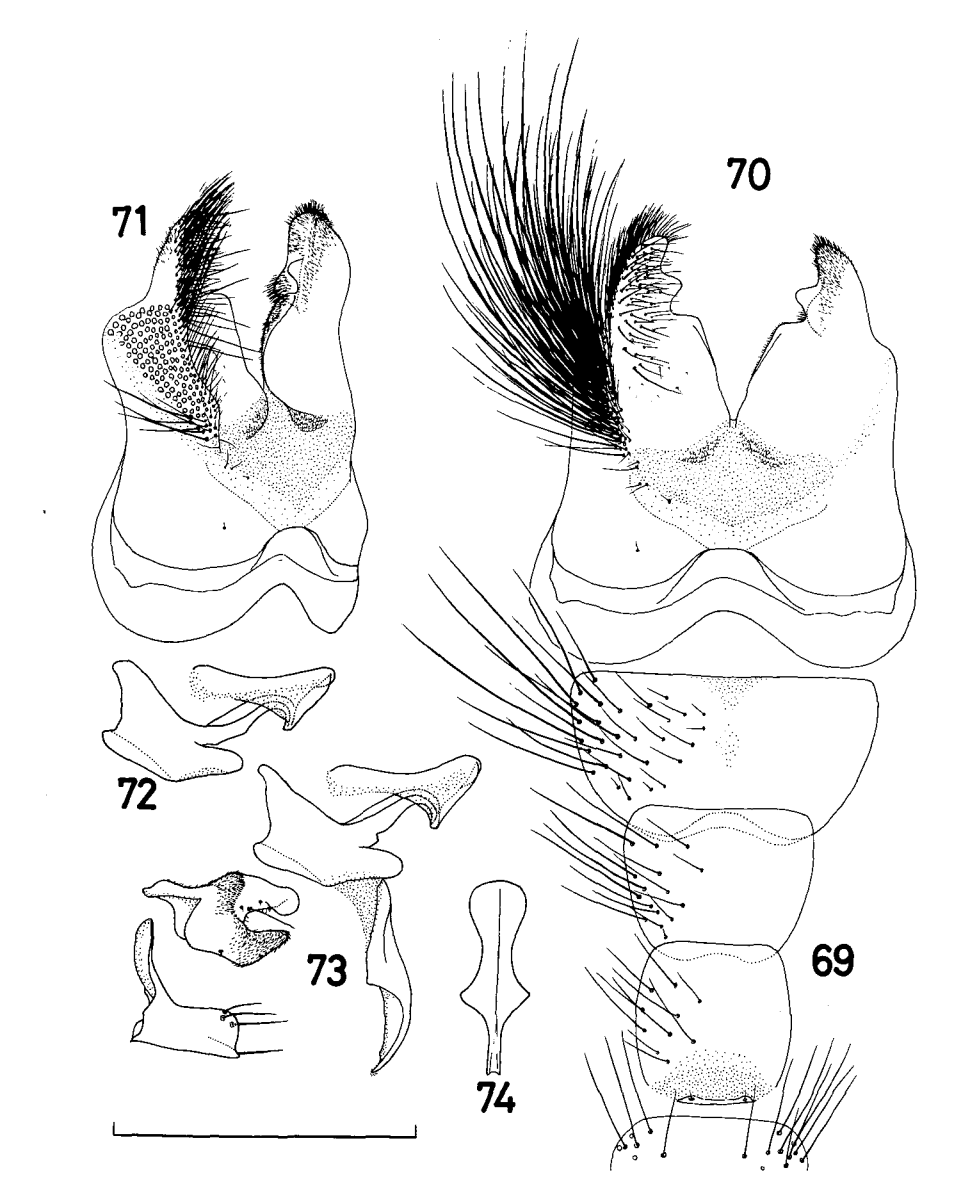
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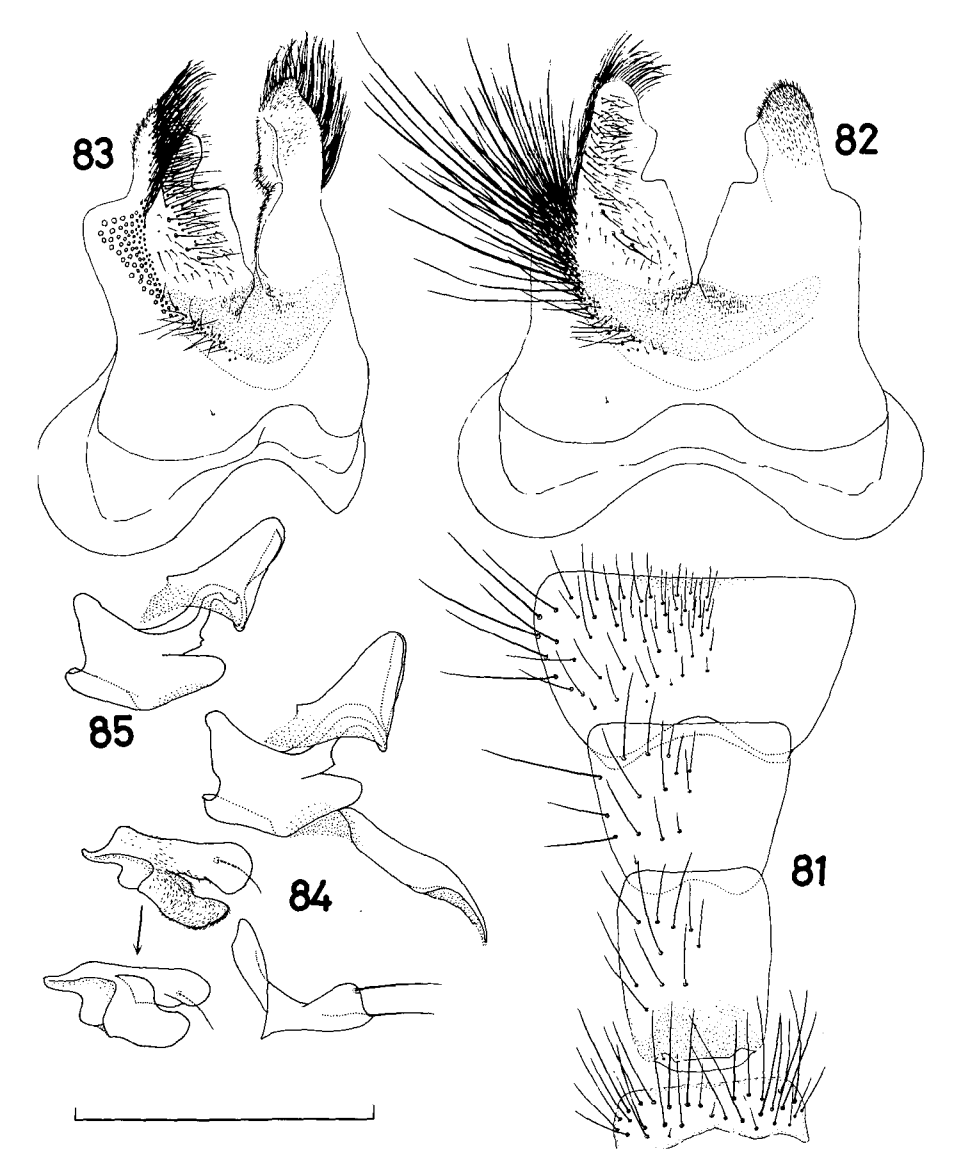
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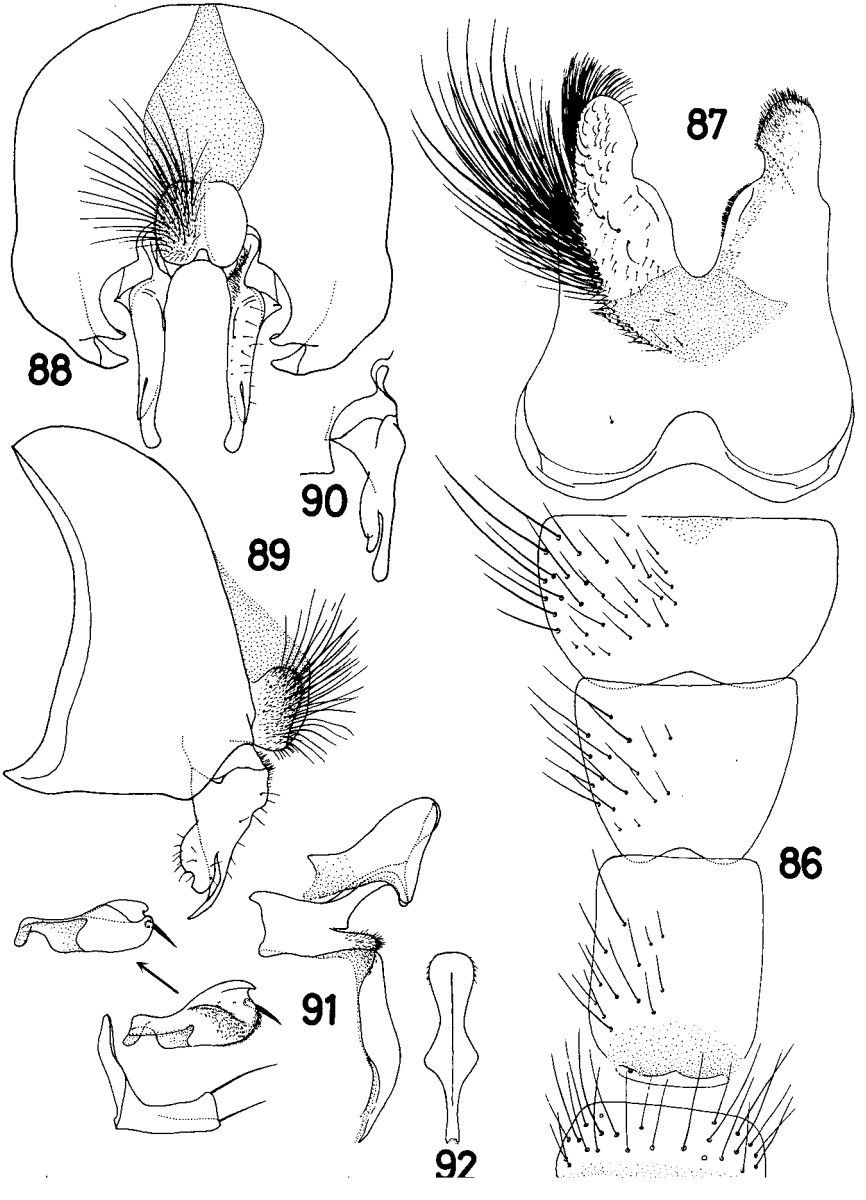
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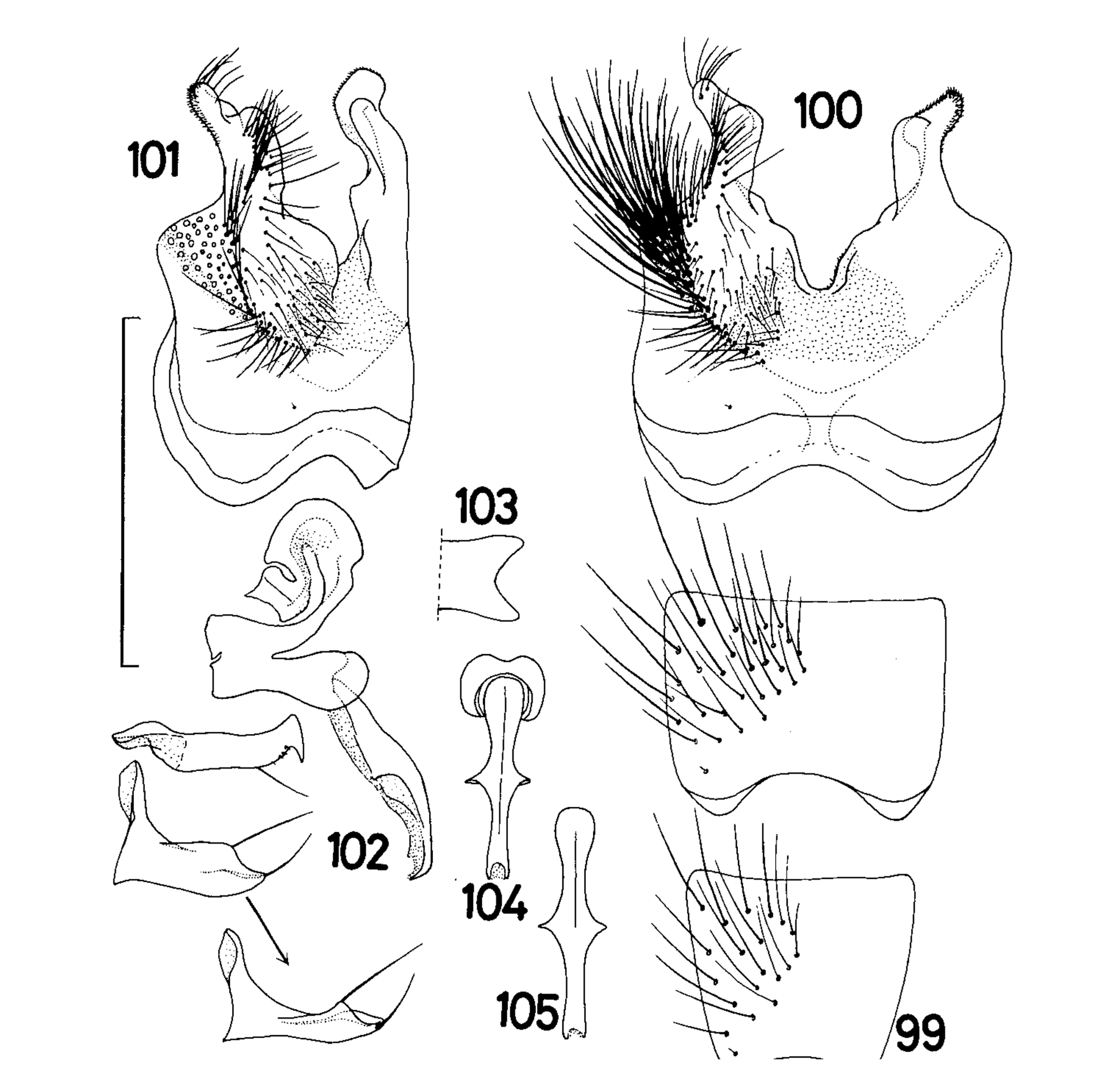
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