III Taxonomic considerations

Among the material at hand, the newly described species from the Yayeyama Islands of the Ryukyus seems a distinct one as the body colour pattern and the structure of left phallosome are peculiar. This is found isolated in the Yayeyama Islands where a number of endemic insects have been known.*

The other three species, *aenea*, *plagiata* and *dasytoides* (=*zonata*) appear allied very closely to each other, being almost the same in the abdominal colouration and forming a sequence passing from *dasytoides* through *plagiata* to *aenea* in the pattern of the forewing. This sequence agrees with their distribution, Taiwan–South China–Tonkin–Thailand–East India — Nepal, a pattern known as the West Chinese-Himalayan distribution. Besides the body colouration the phallosome L 3 is quite identical in *dasytoides* and *aenea*, while it is more acutely clawed at the apex in *plagiata*. I am now inclined to the opinion that these three forms are neighbouring geographical races, but it is not yet certain whether they form a cline of a single species or not. Further material including the other named species and careful examinations of their genitalia are necessary in order to arrive at a more gratifying conclusion. After all, the three forms and their localites may hypothetically be given as follows.

Eucorydia aenea aenea .....E. India; Burma; Nepal.
Eucorydia aenea plagiata ....India; Burma; Thailand.
Eucorydia aenea dasytoides ....South China; Tonkin; Taiwan.

* Examples of endemic insects to Yayeyama Islands: *Rhinocypha uenoi* Asahina (Odonata, Libellaginidae); *Pachyrrhinchus infernalis* Fairmaire (Coleoptera, Curculionidae).

Kontyû, 1971, **39** (3): 262–272.

NOTES ON THE JAPANESE LEAF-MINERS OF THE GENUS PEGOMYA ROBINEAU-DESVOIDY, WITH DESCRIPTIONS OF TWO NEW SPECIES (DIPTERA: ANTHOMYIIDAE)

Masaaki Suwa

Entomological Institute, Faculty of Agriculture, Hokkaido University, Sapporo

So far as I am aware, of the genus *Pegomya* Robineau-Desvoidy three species, namely *Pegomya bicolor* (Wiedemann, 1817), *Pegomya hyoscyami* (Panzer, 1809) and *Pegomya betae* (Curtis, 1847), have been known to be leaf-miners in Japan (Kato, 1941; Suwa, 1970). On this occasion are added to the fauna of Japan six other leaf-miners, of which two are new to science and the rest new to Japan.

Before going further I have pleasure to express my sincere thanks to Prof. C. Watanabe for his continuous guidance.

1. *Pegomya bicolor* (Wiedemann)

Anthomyia bicolor Wiedemann, 1817, Zool. Mag. 1: 77. *Pegomyia bicolor sapporensis* Kato, 1941, Kontyû 15: 62. **Syn. nov.**

The Japanese form differs from the European and North American ones by the

colouration of the body: – Basal segments of antennae and palpi black; abdomen black in ground colour, rarely yellow.

Specimens examined. A lot of specimens have been taken from the following localities: – Hokkaido – Sapporo, ex *Rumex obtusifolius*; Nopporo; Eniwa, ex *Rumex acetosella*; Shimamatsu; Hiroshima-mura; Hamatombetsu, ex *R. obtusifolius*; Akkeshi; Mt. Apoi, ex *R. acetosella*; Ôno, ex *R. obtusifolius*. Honshu – Siki, Saitama-ken, ex *Rumex* sp.; Tokyo, ex *Rumex* sp.; Kiyosumi-yama, Chiba-ken, ex *Rumex acetosa*. Kyushu–Fukuoka, ex *Rumex* sp.

Host plants. *Rumex acetosa, R. acetosella, R. obtusifolius* & *Rumex* spp. (in Japan).
Distribution. Europe; North America; North Africa; Japan.

2. ***Pegomya hyoscyami*** (Panzer)

Musca hyoscyami Panzer, 1809, Faun. Germ. 108: 13. *Pegomyia hyoscyami*: Bremer, 1929, Arb. Biol. Reichs. Land- u. Forstw. 17: 134. *Pegomyia hyoscyami* var. *betae*: Kato, 1941, Kontyû 15: 56, *partim*. *Pegomya hyoscyami*: Suwa, 1970, Kontyû 38: 146.

The Japanese form is different from the European one in having the following aspects: – In male body black in ground colour and covered with darker pollen; antennae with basal segments brown to dark brown, rarely yellow. In female abdomen black in ground colour; 7th sternite with bristles shorter and erect. Furthermore, the Japanese form has not yet been reared from any plants of Solanaceae and beet, which are the host plants of the European one.

Specimens examined. A lot of specimens have been taken from the following localities: – Hokkaido – Sapporo, Eniwa, Zenibako, Ishikari, Asahigawa, Kenebetsu, Teshikaga, Shibetsu, Kunneppu, Mombetsu, Toyotomi & Rishiri-tô, ex *Chenopodium album, Chenopodium glaucum* & *Spinacia oleracea*. Honshu – Matsubara-ko, Nagano-ken, ex *C. album*; Tokyo.

Host plants. *Chenopodium album, C. glaucum* & *Spinacia oleracea* (in Japan).
Distribution. Europe; North America; North Africa; Asia.

3. ***Pegomya betae*** (Curtis)

Anthomyia betae Curits, 1847, Jour. Roy. Agr. Soc. Engl. 8: 412. *Pegomyia hyoscyami* var. *betae*: Kato, 1941, Kontyû 15: 56, *partim*. *Pegomya betae*: Suwa, 1970, Kontyû, 38: 146.

The Japanese form differs from the redescription of *P. betae* given by d'Aguilar & Missonnier (1957) in having the slender surstyli and tufts of strong bristles on the 5th sternite in the male. Having read the redescription of *Pegomya mixta* Villeneuve, 1922, given by Steyskal (1970), I am inclined to the opinion that the Japanese form may be referred to *P. mixta* rather than to *P. betae*. This problem will be fully discussed in another paper in near future.

Specimens examined. A lot of specimens have been seen, their localities being as follows: – Hokkaido – Sapporo, Zenibako, Ishikari, Oshoro, Kami-no-kuni, Asahigawa, Yamabe, Obihiro, Urahoro, Kushiro, Teshikaga, Shari, Abashiri, Kunneppu, Utanobori & Toyotomi, ex *Atriplex subcordata, Beta vulgaris, Chenopodium album, Chenopodium ficifolium, Chenopodium glaucum* & *Spinacia oleracea*. Honshu–Noheji, Aomori-ken, ex *A. subcordata* & *C. album*; Kuji, Noda & Omoto, Iwate-ken, ex *B. vulgaris, C. album* & *C. glaucum*. Kyushu–Fukuoka, ex *C. album* & *S. oleracea*.

Host plants. *Atriplex subcordata, Beta vulgaris, Chenopodium album, C. ficifolium, C. glaucum* & *Spinacia oleracea* (in Japan).
Distribution. Europe; North America; North Africa; Asia.

4. ***Pegomya dulcamarae*** Wood

Pegomyia dulcamarae Wood, 1913, Ent. Month. Mag. 49: 85. *Pegomya dulcamarae*: Ackland, 1965, Ent. Month. Mag. 101: 21.

This species is new to Japan. The Japanese specimens (1♂, 2♀) examined agree well with the redescription of *P. dulcamarae* given by Ackland (1965) except for the following aspects: – ♂. Interfrontalia black on upper half, reddish brown on lower half; parafacials and cheeks black in ground colour; palpi slightly yellowish at base; thorax with pale grey pollen which is slightly tinged with yellow; hind tibia with 3 *av*, 5 *ad* and 3 *pd*. ♀. Interfrontalia, parafacials and cheeks orange yellow in ground colour; hind tibia with 2 *av*, 4 *ad* and 2 *pd*.

Specimens examined. Hamatombetsu & Utanobori, Hokkaido, 1♂, 2♀, 25~29–VII–1969, Y. Kobayashi, T. Hanada & M. Suwa leg., ex *Solanum tuberosum*.

Host plants. *Solanum tuberosum* (in Japan).
Distribution. England; Japan.

5. ***Pegomya setaria*** (Meigen) (Figs. 1–6)

Anthomyia setaria Meigen, 1826, Syst. Beschr. 5: 178. *Pegomyia polygoni* Seamans, 1923, Can. Ent. 55: 221. *Pegomyia setaria*: Stein, 1906, Wien. Ent. Zeitg. 25: 99; Huckett, 1941, Mem. Amer. Ent. Soc. 10: 121. *Pegomyia* (*Chaetopegomyia*) *setaria*: Ringdahl, 1938, Ent. Tidskr. 59: 196.

This species is new to Japan. On the basis of the present specimens some characteristic aspects will be given as follows: –

♂ & ♀. Antennae and palpi black; mesonotum black in ground colour and densely grey pollinose, with a pair of black vittae between rows of *acr* and *dc* on anterior half, and with black patches laterally, these markings being distinct when viewed from behind; abdomen black in ground colour and grey pollinose; in male, when viewed from behind, abdomen with a black and narrow central vitta; in female abdomen with black patches in some lights, especially when viewed from behind with a black band on hind margin of each tergite and with a black and broad central vitta, these markings being obscure marginally; fore femur more or less darkened, especially in male; mid and hind femora usually blackish at apical part; hind tibia with 1 short and distinct *post* at basal third.

Specimens examined. Hokkaido–Sapporo, 2♂, 4♀, V~VII–1961~68, M. Suwa *et al.* leg.; Chitose, 1♂, 1♀, 4–IX–1967, M. Suwa leg.; Hiroshima-mura, 17♂, 9♀, 23–VI–1967, M. Suwa leg., ex *Polygonum thunbergi* & *Polygonum sieboldi*. Honshu–Tazawa-ko, Akita-ken, 2♂, 2♀, 11–IX–1966, M. Suwa leg., ex *P. thunbergi*; Mt. Kurikoma, Miyagi-ken, 3♂, 7♀, 10–VIII–1969, M. Suwa leg., ex *Polygonum nepalense*; Urabandai, Fukushima-ken, 1♀, 2–IX–1966, M. Suwa leg. Kyushu–Hikosan, Fukuoka-ken, 1♂, 16–V–1967, M. Suwa leg.; Yaku-shima, Kagoshima-ken, 1♀, 22–IV–1967, T. Kocha leg.

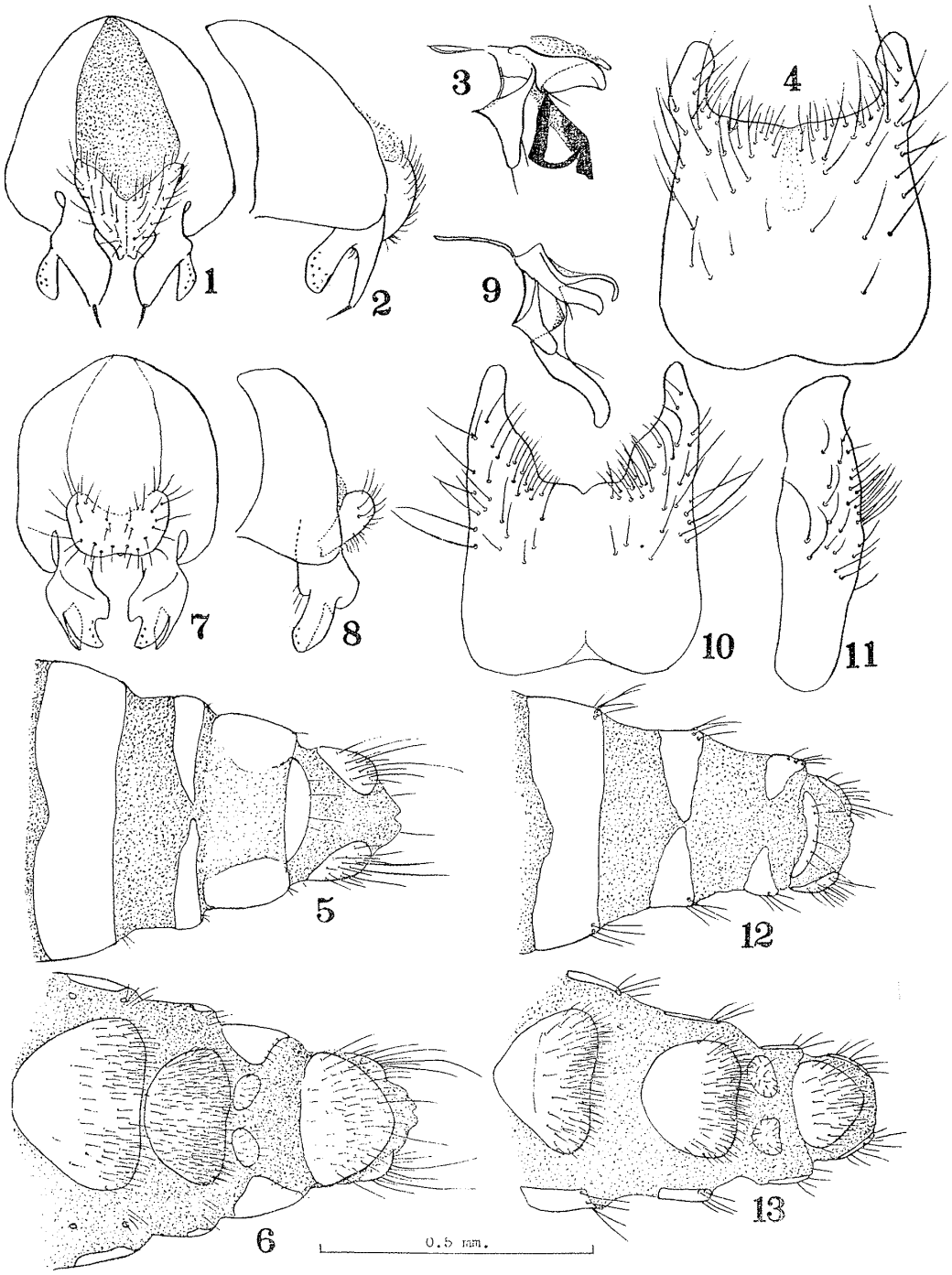
Host plants. *Polygonum nepalense, P. sieboldi* & *P. thunbergi* (in Japan).
Distribution. Europe; North America; Japan.

6. ***Pegomya albimargo*** Pandellé (Figs. 7–13)

Anthomyia (*Pegomyia*) *albimargo* Pandellé, 1901, Rev. Ent. France 20: 296. *Pegomyia albimargo*: Stein, 1906, Wien. Ent. Zeitg. 25: 86; Karl, 1928, Tierw. Deutschl. 13: 132. *Pegomyia* (*Pegomyia*) *albimargo*: Ringdahl, 1938, Ent. Tidskr. 59: 201.

This species is new to Japan, the Japanese form being as follows: –

♂. Antennae and palpi black; interfrontalia orange yellow to black; parafacials and



Figs. 1–6. *Pegomya setaria* (Meigen). 1, ♂ hypopygium, in dorsal view; 2, *ditto*, in lateral view; 3, aedeagus; 4, ♂ 5th sternite, in ventral view; 5, ovipositor, in dorsal view; 6, *ditto*, in ventral view.

Figs. 7–13. *Pegomya albimargo* Pandellé. 7, ♂ hypopygium, in dorsal view, 8, *ditto*, in lateral view; 9, aedeagus; 10, ♂ 5th sternite, in ventral view; 11, *ditto*, in lateral view; 12, ovipositor, in dorsal view; 13, *ditto*, in ventral view.

cheeks orange yellow to black and covered with whitish grey pollen. Thorax and abdomen black in ground colour, with greyish pollen more or less tinged with yellow or brown; mesonotum with four darker vittae when viewed from behind; abdomen with central vitta broad and interrupted at hind margins of tergites. Femora dark brown to black;

tibiae dark yellow to blackish. Wings slightly tinged with yellow at base; calyptrae whitish, somewhat tinged with yellow or brown; halteres yellowish.

♀. Mesonotum with no vittae; abdomen at most with faint brownish markings centrally on 4th and 5th tergites; femora brownish to black; tibiae yellow to blackish.

Specimens examined. Hokkaido–Sapporo, 2♂, 10♀, 19～20–VI–1969, M. Suwa leg., ex *Stellaria media, Stellaria neglecta, Stellaria sessiliflora* & *Melachium aquaticum*; Sapporo, 1♂, 7–V–1959, S. Ueda leg., 1♂, 1♀, 24–IX–1969, M. Suwa leg.; Nopporo, 4♂, 1♀, V～VII–1969～70, M. Suwa leg.; Ôno, 2♂, 1♀, 20–VI–1969, M. Suwa leg., ex *M. aquaticum*. Honshu–Mt. Hakkôda, Aomori-ken, 1♂, 19–VIII–1966, M. Suwa leg.

Host plants. *Melachium aquaticum, Stellaria media, S. neglecta* & *S. sessiliflora* (in Japan).

Distribution. Europe; Japan.

7. ***Pegomya haemorrhoa*** (Zetterstedt) (Figs. 14–19)

Anthomyza haemorrhoa Zetterstedt, 1838, Ins. Lappon. p. 692. *Pegomyia björnssoni* Ringdahl, 1957, Ent. Medd. 28:102. *Pegomyia haemorrhoa*: Stein, 1906, Wien. Ent. Zeitg. 25:102; Huckett, 1941, Mem, Amer. Ent. Soc. 10:58. *Pegomya haemorrhoa*: Ackland, 1964, Ent. Medd. 32:364.

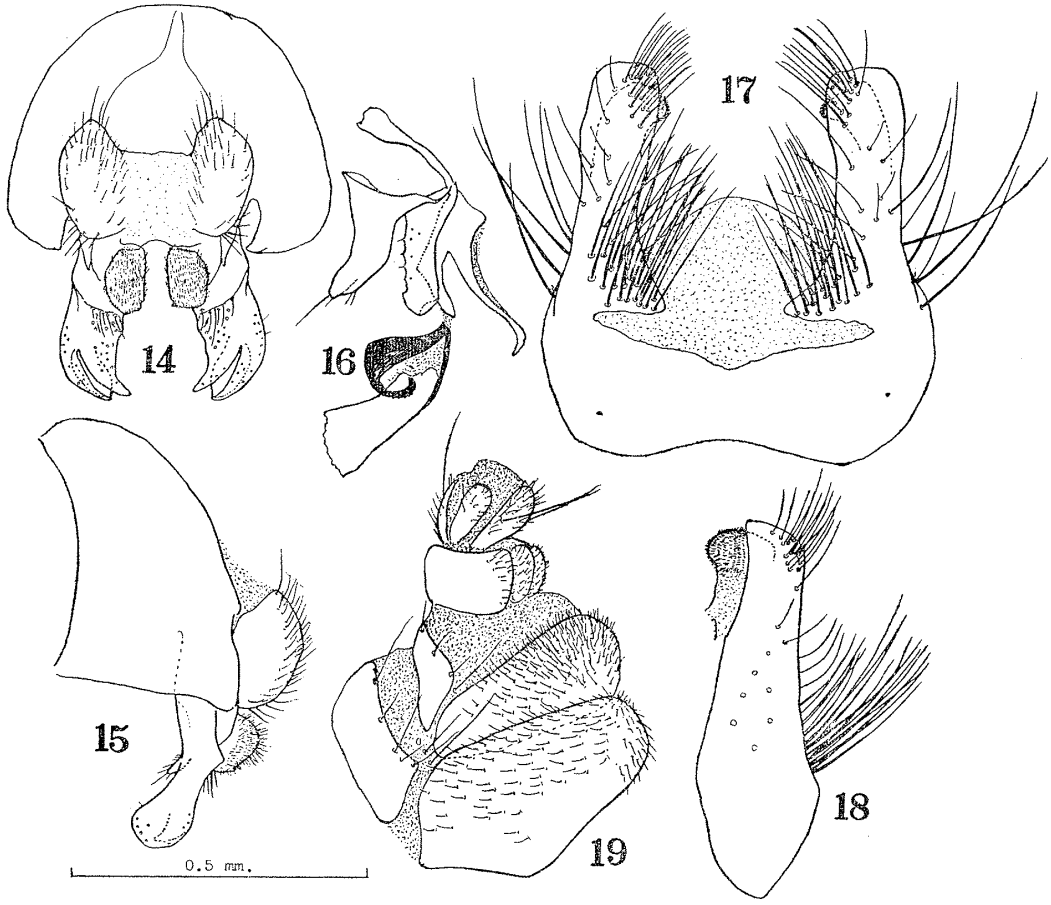
This species is new to Japan. On the basis of the present specimens a brief redescription may be given as follows: –

♂. Interfrontalia brownish to black; parafacials and cheeks brownish to black, densely covered with whitish grey pollen; antennae and palpi black; haustellum blackish and shining. Mesonotum black in ground colour, with bluish or brownish grey pollen, and obscurely vittate, at most with faint darker vittae between rows of *acr* and along rows of *dc*, and with darker patches laterally. Abdomen black in ground colour, with bluish grey pollen which is sometimes slightly tinged with brown, and usually with a distinct central vitta. Femora black; tibiae brownish to black. Wings more or less tinged with yellow or brown, strongly at base; calyptrae tinged with yellow or brown; halteres yellow.

Parafacials at level of lunule about as wide as 3rd antennal segment, slightly narrowing below; cheeks slightly wider than 3rd antennal segment. Mesonotum with 2nd *ph* well developed; *pra* long, about as long as anterior *ntpl*; *stpl* 1:2; lower anterior *stpl* fine and usually undistinguishable from accessory setulae. Abdomen about twice as long as wide, parallel-sided. Fore tibia sometimes with a fine *ad* at apical fourth; mid tibia with a short *ad* at apical third.

♀. Lighter in colour than male. Interfrontalia, parafacials and cheeks yellow to orange; antennae black; palpi yellow with apex blackish. Thorax and abdomen densely covered with grey pollen which is sometimes tinged with brown; mesonotum hardly vittate; abdomen without a central vitta, sometimes yellow on distal half of 5th tergite. Fore femur dark brown to black; mid and hind femora yellow, often darkened at apex; fore tibia dark yellow to dark brown; mid and hind tibiae yellowish, more or less darkened at base. Mesonotum with 2nd *ph* fine; lower anterior *stpl* short and fine. Fore tibia with a distinct *ad*; mid tibia with a strong *ad*.

Specimens examined. Hokkaido–Sapporo, 1♂, 12–V–1968, T. Kocha leg.; Mt. Daisetsu, 1♂, 26–VII–1967, K. Kusigemati leg., 3♂, 20～21–VII–1968, M. Suwa leg.; Mt. Apoi, 2♂, 3♀, 28–VI–1967, M. Suwa leg., ex *Polygonum nakaii*; Rishiri-tô, 4♂, 8♀, 15–VII–1968 & 31–VII–1969, H. Takizawa & M. Suwa leg., ex *Polygonum weyrichii* var. *alpinum*; Kami-no-kuni, 4♂, 3♀, 20–VI–1968, M. Suwa leg., ex *Polygonum sachalinense*. Honshu–Mt. Chôkai, Yamagata-ken, 1♂, 9–VIII–1970, M. Suwa leg.; Mt. Shirouma, Nagano-ken, 1♀, 15–VIII–1970, M. Suwa leg.; Mt. Hodaka, Nagano-ken, 3♂, 3♀, I–VIII–1970, M. Suwa leg., ex *P. weyrichii* var. *alpinum*, & 2♂, 2♀, 1～3–VIII–1970, M. Suwa leg.



Figs. 14–19. *Pegomya haemorrhoa* (Zetterstedt). 14, ♂ hypopygium, in dorsal view; 15, *ditto*, in lateral view; 16, aedeagus; 17, ♂ 5th sternite in ventral view; 18, *ditto*, in lateral view; 19, ovipositor, in ventro-lateral view.

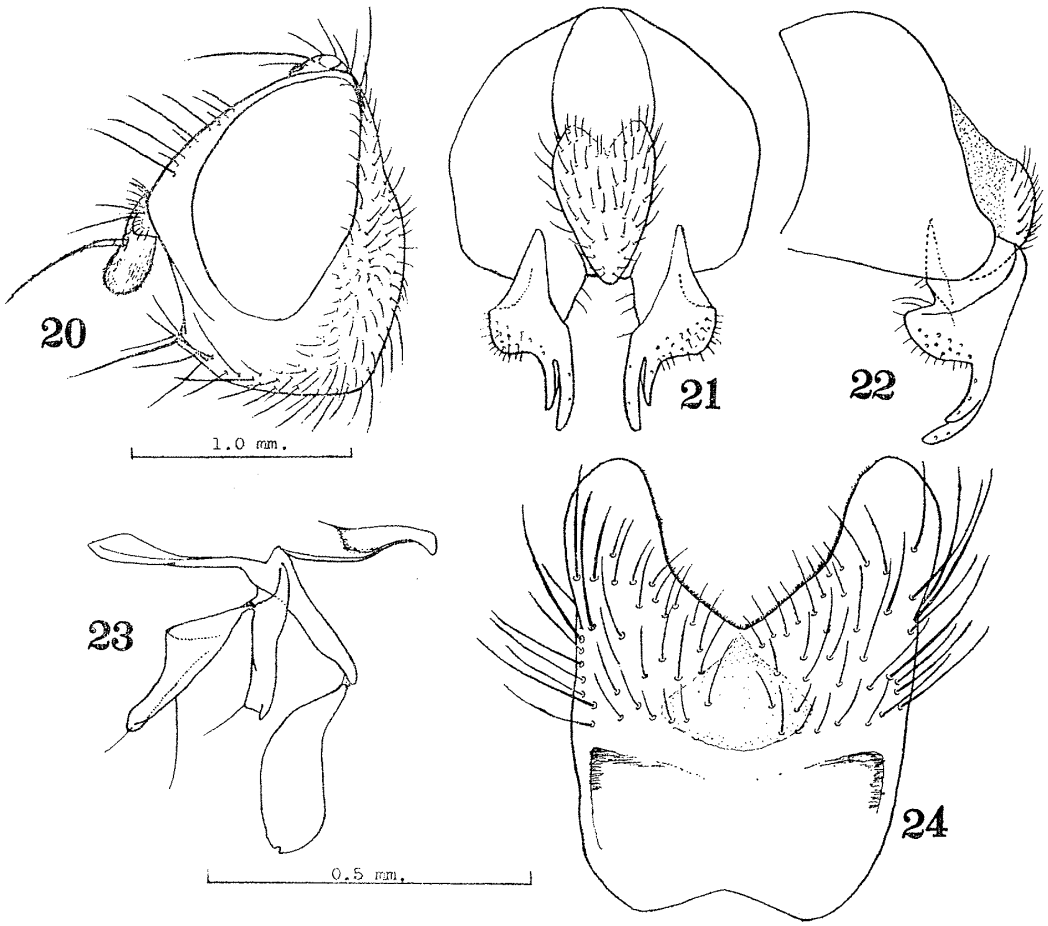
Host plants. *Polygonum nakaii*, *P. sachalinense* & *P. weyrichii* var. *alpinum* (in Japan).

Distribution. Europe; North America; Japan.

8. ***Pegomya falciforcipis*** sp. nov. (Fig. 20–24)

♂. Antennae black; palpi black, somewhat brownish at base; haustellum blackish and slightly grey pollinose; interfrontalia, parafacials and cheeks black in ground colour and whitish grey pollinose, with or without a yellowish tinge in pollinosity; occiput black in ground colour with greyish pollen somewhat tinged with blue. Thorax black in ground colour and greyish pollinose; mesonotum more or less tinged with brown in pollinosity, and when viewed from behind with three darker vittae between rows of *acr* and between rows of *dc* and *ia*; scutellum brownish grey pollinose. Abdomen black in ground colour, with greyish pollen slightly tinged with brown, the central vitta being narrow and distinct when viewed from behind; 5th sternite black, and lustrous on apices of processes. Femora almost blackish, at most brownish at apex; fore tibia brownish yellow to blackish, lighter at base; mid and hind tibiae yellowish to brownish. Wings more or less tinged with brown; veins brownish; calyptrae more or less tinged with yellow; halteres yellow.

Head (Fig. 20) in profile about 1.3 times as high as long; 3rd antennal segment about 1.6 times as long as wide; arista minutely pubescent; distance between eyes at the narrowest part slightly shorter than twice diameter of anterior ocellus, interfrontalia and para-



Figs. 20–24. *Pegomya falciforcipis* sp. nov. 20, ♂ head, in lateral view; 21, ♂ hypopygium, in dorsal view; 22, *ditto*, in lateral view; 23, aedeagus; 24, ♂ 5th sternite in ventral view.

frontals at this part being equal in width; parafrontals with about 5 pairs of strong frontal bristles and with some finer ones; parafacials at level of lunule slightly wider than 3rd antennal segment; cheeks very wide, about 1.6–1.8 times as wide as 3rd antennal segment; occiput swollen on lower part. Mesonotum with 2nd *ph* well developed and about as long as posterior *ntpl*; *acr* as fine as accessory setulae, and irregularly paired, the rows being narrowly separated from each other; *pra* short, about half or two-thirds as long as posterior *ntpl*; *stpl* 1:2; scutellum bare on dorsal centre. Abdomen depressed dorsoventrally, and about twice as long as wide; 5th sternite (Fig. 24) with blade-like processes, of which the apices are bare; surstyli (Figs. 21 & 22) prolonged apically and sickle-shaped in profile. Fore tibia with 1 distinct *post* or *pv* at middle and with preapical *ad* distinct; mid femur with 3–5 *pv* on basal half; mid tibia with 1 *pd* and 2–3 *post*; hind femur with 4–7 long *av* and 2–4 long *pv*, and with some shorter and finer bristles on *av* and *pv* surfaces; hind tibia with 2 *av*, 4 *ad* and 2–3 *pd*, and with preapical *pd* strong. Wings with costal thorns minute and undistinguishable from costal setulae; posterior cross-vein straight and upright; lower calyptra not larger than the upper. Length: body 5.5–5.8 mm., wings 4.9–5.2 mm.

♀. Unknown.

Holotype (♂): Sapporo, Hokkaido, 2-VI-1967, T. Kumata leg., ex *Cirsium* sp. Paratypes: Nopporo, Hokkaido, 2♂, 22-VI-1969, M. Suwa leg., ex *Cirsium* sp.; Sapporo, 1♂, 21-V-1969, M. Suwa leg. The holotype is deposited in the collection of the Entomological Institute, Hokkaido University.

Host plants. *Cirsium* sp.

This species is related to the European *Pegomya steini* Hendel, 1925, and the North American *Pegomya carduorum* Huckett, 1939, both of which are also reared from *Cirsium* spp. (after Hendel, 1925, & Huckett, 1941). The present species may be distinguishable from those species by the blackish body and appendages, by the broader cheeks, and by the strong preapical *pd* of the hind tibia.

9. ***Pegomya auricolor*** sp. nov. (Figs. 25–33)

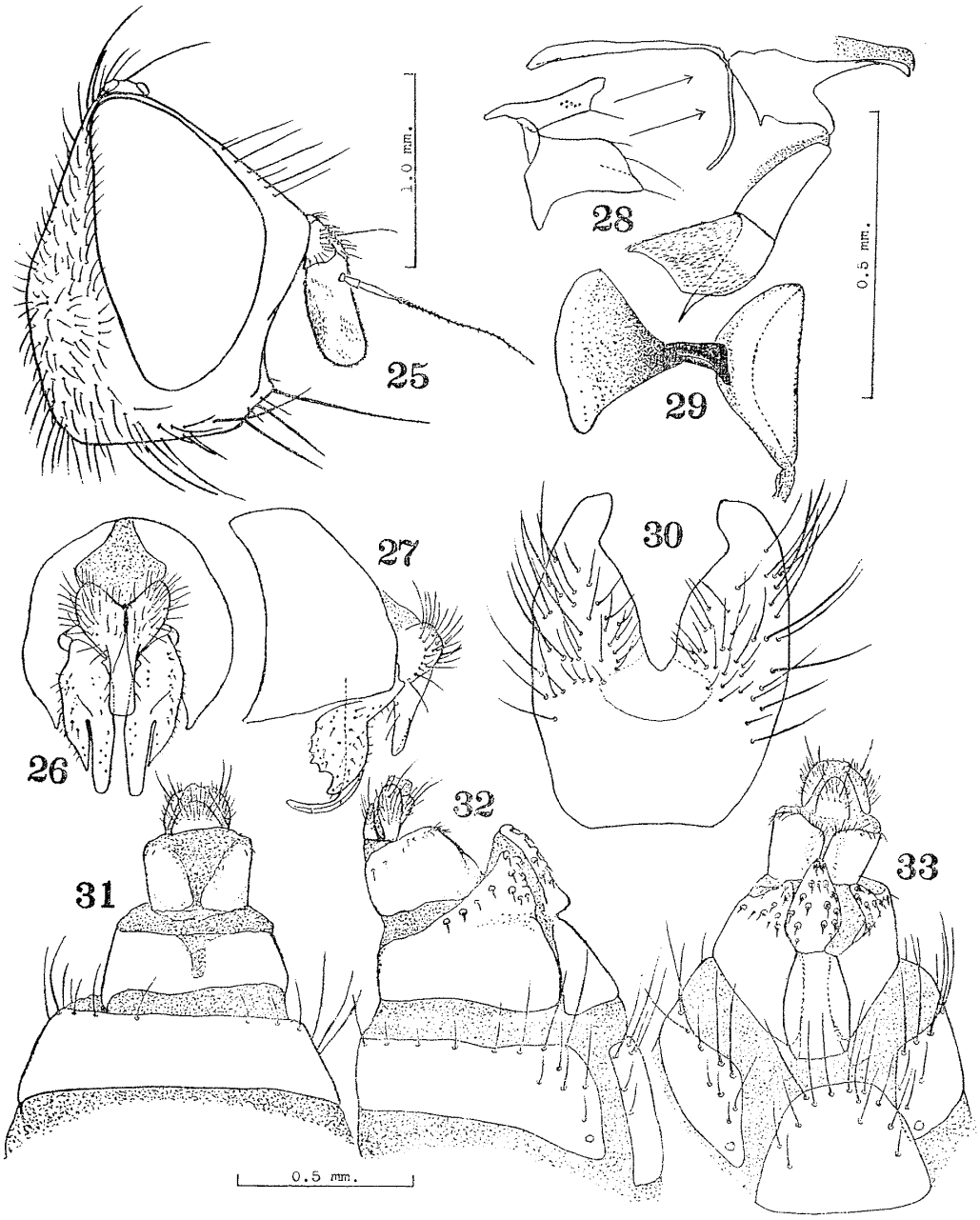
♂. Larger in size and yellowish in pollinosity. Antennae with basal two segments blackish brown, and 3rd segment black; palpi blackish, somewhat brownish at base; haustellum blackish and slightly grey pollinose; interfrontalia, parafacials, cheeks and face orange in ground colour, with whitish grey pollen; occiput black in ground colour and greyish pollinose. Thorax blackish in ground colour and densely yellowish grey pollinose; mesonotum with a golden tinge in pollinosity, when viewed from front blackish with central vitta brownish pollinose, and when viewed from behind with a distinct black central vitta and two black lateral patches; scutellum with a brownish tinge basally in pollinosity. Abdomen dark brown in ground colour, and densely covered with yellowish grey pollen, when viewed from behind with a faint and narrow central vitta; 5th sternite with orange yellow processes. Fore femur dark brown except for lighter apical part; mid and hind femora yellowish, and somewhat darkened dorsally; tibiae yellow. Wings slightly tinged with yellow, strongly at base; veins brownish apically and yellowish basally; calyptrae and halteres yellow.

Head (Fig. 25) in profile about 1.3 times as high as long; 3rd antennal segment about twice as long as wide; arista minutely pubescent; distance between eyes at the narrowest part slightly longer than diameter of anterior ocellus; parafrontals not contiguous, with 5 pairs of frontal bristles; parafacials at level of lunule about as wide as 3rd antennal segment; cheeks slightly wider than 3rd antennal segment; occiput somewhat swollen on lower part. Mesonotum with 3 pairs of distinct presutural *acr*, and distance between the rows about half as long as that between *acr* and *dc*; *pra* short and distinct, about two-thirds as long as posterior *ntpl*; 2nd *ph* about two-thirds as long as 1st *ph*; *stpl* 1:2; scutellum with about 10 accessory setulae on dorsum laterally, and between apical bristles with a few apical setulae. Abdomen depressed dorso-ventrally, about twice as long as wide, and parallel-sided; 5th sternite (Fig. 30) with blade-like processes bare apically; surstyli (Figs. 26 & 27) with an inner projection long and curved inward and with an outer plate expanded, the edge being indented; distiphallus (Fig. 28) with lappets armed with many minute hairs. Fore tibia with 1 *pv* at middle, and with preapical *ad* and *pd* vestigial; mid femur with 5–6 *pv* on basal half, the longest one being about as long as height of femur; mid tibia with 1 *pd* at apical fourth and 2–4 *post*; hind femur with 7–8 *av* and 3–4 *pv*, the longest ones being about as long as height of femur; hind tibia with 2 *av*, 4 *ad* and 2 *pd*, the distal one of 2 *pd* being very long, about two-fifths as long as tibia, and with preapical *ad* strong. Wings with costal thorns distinct; posterior cross-vein slightly curved inward; lower calyptra not larger than the upper.

♀. Body more densely pollinose and paler than that of male. Mesonotum hardly vittate; 2nd *ph* short. Abdomen with no markings; 7th tergite and 8th sternite (Figs. 31–33) with many tubercles armed with a short recurrent spine-like bristle. Mid tibia with 1 strong *ad*, 1 *pd* and 2 *post*; mid femur with 4–5 short *pv* on basal half, the longest one being about half as long as height of femur; hind femur with 4–7 strong *av* and with or without a few fine *pv*.

Length: body 7.4–7.8 mm., wings 7.0 mm.

Holotype (♂): Sapporo, Hokkaido, 27-IX-1957, K. Homma leg., ex *Arctium lappa*.



Figs. 25–33. *Pegomya auricolor* sp. nov. 25, ♂ head, in lateral view; 26, ♂ hypopygium, in dorsal view; 27, *ditto*, in lateral view; 28, aedeagus; 29, ejaculatory apodeme; 30, ♂ 5th sternite in ventral view; 31, ovipositor, in dorsal view; 32, *ditto*, in lateral view; 33, *ditto*, in ventral view. (Figs. 26, 27 and 30–33 magnified at the same rate.)

Paratypes: 2♀, same data as holotype. The holotype is deposited in the collection of the Entomological Institute, Hokkaido University.

This species is relatd to the European *Pegomya genupuncta* Stein, 1906, which is also a leaf-miner of *Arctium lappa* (after Hering, 1921). The present species may be distinguishable from that species by the body yellowish pollinose, by the mesonotum of the male distinctly vittate, by the femora not black at apex, and by the structure of the hypopygium.

The Japanese leaf-miners of the genus *Pegomay* R.-D. mentioned in this paper may be distinguished by the following key: –

Key to the species (♂♂)

1. Mid tibia with 1 *ad* at apical third. 2
– Mid tibia with no *ad*. 7
2. Fore tibia with 1 distinct *ad* at apical third or fourth. 3
– Fore tibia with no *ad*, at most with a fine one. 4
3. Mesonotum with four darker vittae when viewed from behind; mid and hind femora usually blackish at apex; fore tibia with preapical *pd* long; hind tibia with 1 distnct *post* at basal third, and with preapical *pd* fine. .....*setaria* (Meigen)
– Mesonotum with three darker vittae when viewed from behind; mid and hind femora not blackish at apex; fore tibia with preapical *pd* short; hind tibia with no *post*, and with preapical *pd* strong. .....*bicolor* (Wiedemann)
4. Antennae with basal segments yellow to dark brown; palpi yellow with apex blackish.... 5
– Antennae with basal segments black; palpi black. 6
5. Body darker in colour, covered with brownish grey pollen tinged with yellow; antennae with basal segments brown to dark brown, rarely yellow; 5th sternite with no strong bristles at inner base of each process; surstyli with limbs shorter. .....*hyoscyami* (Panzer)
– Body lighter in colour, covered with pale grey pollen tinged with yellow; antennae with basal segments yellow; 5th sternite with many short and strong bristles at inner base of each process; surstyli with limbs longer. .....*betae* (Curtis)
6. Parafacials and cheeks distinctly narrower than 3rd antennal segment; mesonotum with four darker vittae when viewed from behind; *pra* fine; 5th sternite and hypopygium as in Figs. 7–11. .....*albimargo* Pandellé
– Parafacials and cheeks about as wide as 3rd antennal segment; mesonotum with three darker vittae when viewed from behind; *pra* strong, about as long as anterior *ntpl*; 5th sternite and hypopygium as in Figs. 14–18. .....*haemorrhoa* (Zetterstedt)
7. Body darker in colour; femora almost black; 3rd antennal segment about 1.6 times as long as wide; cheeks much wider than 3rd antennal segment; fore tibia with preapical *ad* distinct; 5th sternite and hypopygium as in Figs. 20–24. .....*falciforcipis* sp. nov.
– Body lighter in colour; femora almost yellow except in fore legs; 3rd antennal segment about twice as long as wide; cheeks slightly wider than 3rd antennal segment; fore tibia with preapical *ad* vestigial. 8
8. Body larger in size, about 8 mm. in length, and yellowish grey pollinose; mesonotum strongly vittate; costal thorns distinct; surstyli (Figs. 26 & 27) bifid apically. .....*auricolor* sp. nov.
– Body smaller in size, about 5 mm. in length, and pale grey pollinose; mesonotum weakly vittate; costal thorns minute; surstyli trifid apically. .....*dulcamarae* Wood

Host List (occurring in Japan)

Host	Miner
Caryophyllaceae	
Melachium aquaticum	*P. albimargo* Pandellé
Stellaria media	〃
S. neglecta	〃
S. sessiliflora	〃
Chenopodiaceae	
Atriplex subcordata	*P. betae* (Curtis)
Beta vulgaris	〃
Chenopodium album	〃
	P. hyoscyami (Panzer)
C. ficifolium	*P. betae* (Curtis)
C. glaucum	〃
	P. hyoscyami (Panzer)
Spinacia oleracea	*P. betae* (Curtis)
	P. hyoscyami (Panzer)

Compositae	
Arctium lappa	*P. auricolor* sp. nov.
Cirsium sp.	*P. falciforcipis* sp. nov.
Polygonaceae	
Polygonum nakaii	*P. haemorrhoa* (Zetterstedt)
P. nepalense	*P. setaria* (Meigen)
P. sachalinense	*P. haemorrhoa* (Zetterstedt)
P. sieboldi	*P. setaria* (Meigen)
P. thunbergi	〃
P. weyrichii var. *alpinum*	*P. haemorrhoa* (Zetterstedt)
Rumex acetosa	*P. bicolor* (Wiedemann)
R. acetosella	〃
R. obtusifolius	〃
Solanaceae	
Solanum tuberosum	*P. dulcamarae* Wood

References

Ackland, D.M., 1964. Taxonomic notes on two species of *Pegomya* R.-D. (Dipt., Muscidae) from Iceland. *Ent. Medd.* **32**: 359–366.

————, 1965. *Pegomya dulcamarae* Wood (Dipt., Anthomyiidae); a redescription, with notes on the puparium. *Ent. Month. Mag.* **101**: 21–24.

Hendel, F., 1925. Neue europäische Minierfliegen. (8. Beitrag zur Blattminenkunde Europas). *Konowia* **4**: 301–309.

Hering, M., 1921. Minenstudien II. *Deutsch. Ent. Ztschr.* **1921**: 123–147.

————, 1924. Minenstudien IV. *Zeit. Morph. Ökol. Tiere* **2**: 217–250.

————, 1925. Minenstudien V. *Zeitschr. wissensch. Ins. -Biol.* **20**: 125–174.

Huckett, H.C., 1941. A revision of the North American species belonging to the genus *Pegomyia* (Diptera: Muscidae). *Mem. Amer. Ent. Soc.* **10**: 131 pp.

Karl, O., 1928. Muscidae *in* Dahl's Tierw. Deustchl. **13**: 232 pp.

Kato, S., 1941. Taxonomic notes on *Pegomyia hyoscyami* Panzer (Dip., Muscidae) and its allied species in Nippon. *Kontyû* **15**: 55–68 (in Japanese).

Ringdahl, O., 1938. Översikt av svenska *Pegomyia*-arter (Diptera: Muscidae). *Ent. Tidskr.* **59**: 190–213.

Seamans, H.L., 1923. An undescribed Anthomyid in the Canadian National Collection (Diptera). *Can. Ent.* **65**: 221–222.

Séguy, E., 1923. Diptères Anthomyides. Faune de France **6**: 393 pp.

Stein, P., 1906. Die mir bekannten europäischen *Pegomyia*-Arten. *Wien. Ent. Zeitg.* **25**: 47–107.

Suwa, M., 1970. Preliminary notes on beet-flies, *Pegomya* spp. injurious to beet (Diptera: Anthomyiidae). *Kontyû* **38**: 146–161 (in Japanese with an English summary).

Wood, J.H., 1913. Four unrecorded British Anthomyidae: two of them at the same time being new to science. *Ent. Month. Mag.* **49**: 84–87.