Pacific Insects 4 (3): 661–680 October 10, 1962

NOTES ON THE ORIENTAL AGROMYZIDAE (Diptera)—1

By Kenneth A. Spencer

Since publication of my (1961a) synopsis of Oriental Agromyzidae, important additional material has become available from Burma, Formosa, India and Pakistan, mainly through the British Museum (Natural History) and the Commonwealth Institute of Entomology; and from the Philippines and Thailand through the Bishop Museum, Honolulu. It has now become possible to clarify further a number of known species and in this paper ten new species are described.

Our hitherto limited knowledge of the genus *Japanagromyza* is further extended and two new species are described below. The paucity of Agromyzidae in the Philippines is again confirmed; among 39 specimens examined only ten species were represented. The dominance of the genus *Melanagromyza* remains apparent in the material considered here.

Details of earlier references, not given here, will be found in my (1961a) synopsis.

The scale line of the illustrations represents 0.1 mm, unless otherwise indicated. I wish to thank my wife for preparing these illustrations.

Agromyza burmensis Spencer, n. sp. Fig. 1.

Head: frons broad, 1½× width of eye, not significantly projecting above eye in profile; 2 equal ors, 2 ori, lower somewhat weaker, orbital setulae sparse, reclinate; ocellar triangle small, apex not reaching lower ors, orbits not greatly differentiated, lunule small, low; jowls angular, greatly extended at rear, at deepest point in ratio 9 : 22 with vertical height of eye, cheeks linear, peristomal hairs long, numerous, irregular; antennal segment 3 rounded, arista conspicuously pubescent, long, equal to vertical height of eye. *Mesonotum*: 4+0 dc, 3rd and 4th small; acr coarse, irregular, in 6–8 rows, prsc well developed. *Legs*: mid-tibiae with 2 strong lateral bristles. *Wing*: length in ♂ 3.5, in ♀ 3.6 mm, costa extending strongly to vein m_{1+2}, cross-vein 1 around midpoint of discal cell, last segment of m_4 short, slightly less than 1/2 length of penultimate. *Color*: frons brownish black, jowls similar, face matt black, ocellar triangle and orbits scarcely shining; antennal segments 1 and 2 brownish black, 3 yellowish brown on lower, inner 1/2, black above; mesonotum shining black, abdomen similar, legs black, tarsi only slightly lighter, more brownish black; wing base entirely dark, wing slightly darkened by coarse microtrichia, squamae pale greyish, fringe black, halteres white. *Male genitalia*: aedeagus (fig. 1a, b) with distiphallus cylindrical, moderately chitinized with paler tubular section behind, 2 semicircular side pieces extending back almost to base of aedeagal apodeme (typical of grass-feeders), postgonites small.

Holotype ♂, N. E. Burma, Kambaiti, 2100 m, 23. V. 1934; 1 ♀ paratype, same data (both R. Malaise); holotype in Naturhistoriska Riksmuseum, Stockholm, paratype in British Museum (Nat. Hist.).

This species and also *A. malaisei* described below run to couplet 11 in the author's (1961a) key to Oriental Agromyza species, which should now be amended and extended as follows:

11. Antennae entirely black 12
    Antennae partially pale, brown 13
12. Costa extending to vein m_{1+2} ..... **obesa** Malloch
    Costa ending at vein r_{4+5} ..... **malaisei***
13. Last segment of m_4 only slightly shorter than penultimate, small species, wing length 2.4 mm ..... **panici** de Meij.
    Last segment of m_4 less than 1/2 length of penultimate, large species, wing length 3.5 mm ..... **burmensis***

A. burmensis resembles *infusca* Spencer, 1959 from Tanganyika but is distinguishable by shorter antennal segment 3, more elongated jowls and less yellowish wing base. On the basis of the material before me, there seems little doubt that the 2 are distinct; it will nevertheless be useful to obtain confirmation from genitalia, when a ♂ of *infusca* is available.

Agromyza comosa Spencer, n. sp. Fig. 2.

Head: frons relatively broad, 1.3× width of eye viewed from above, not projecting above eye in profile, except slightly at base of antennae; 2 ors, 2 ori, lower somewhat weaker, orbital setulae relatively long, reclinate; ocellar triangle small, scarcely extending beyond upper ors; jowls angular, extended at rear, at deepest point slightly less than 1/4 vertical height of eye; antennal segment 3 (fig. 2a) distinctive, slightly longer than broad, covered with thick, long pubescence. *Mesonotum*: 5 distinct dc, greatly decreasing in size, the foremost weak (broken, relative lengths indeterminable), pre-scutellars strong, acr coarse, in some 8 rows. *Wing*: length in ♂ 2.7 mm, costa well-defined to vein m_{1+2}, cross-vein 1 slightly before midpoint of discal cell, last segment of m_4 short, 1/2 length penultimate. *Color*: entirely black, frons with tendency to brownish, ocellar triangle and orbits only weakly shining, mesonotum matt from front, only slightly more shining from behind, wings clear, veins dark, squamae grey, fringe black, halteres white. *Male genitalia*: aedeagus as illustrated (fig. 2b).

Holotype ♂, N. E. Burma, Kambaiti, 2100 m, 23. V. 1934 (R. Malaise), Naturhistoriska Riksmuseum, Stockholm.

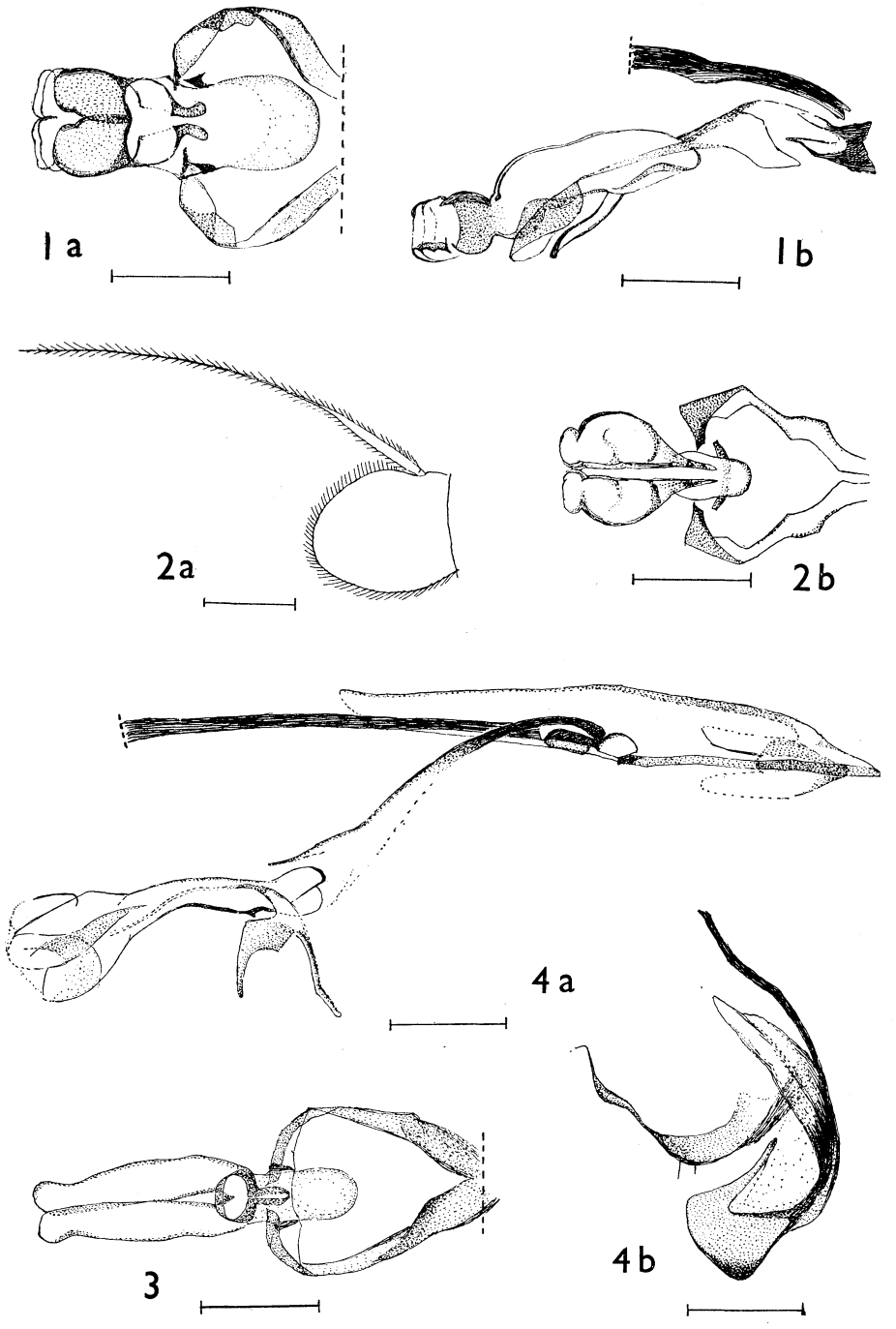
This species runs to couplet 9 in the author's (1961a) key to Oriental species which should now be amended and extended as follows:

9. Antennal segment 3 with conspicuously long pubescence 9a
   Antennal segment 3 normal 10
9a. Mesonotum shining black; small species, wing length 1.9 mm ..... **latipennis** Mall.
    Mesonotum largely matt; larger species, wing length 2.7 mm ..... **comosa***

A. comosa closely resembles the Palaearctic grass-feeder, *A. prespana* Spencer, 1957 which also has a similar antennal segment 3; however, *prespana* is readily distinguishable by having brilliantly shining black mesonotum, only 3 ori and differing genitalia (Griffiths, in press).

---

* Described as new.



Figs. 1–4. 1, *Agromyza burmensis*: a, aedeagus; b, aedeagus, side view. 2, *Agromyza comosa*: a, antennal segment 3; b, aedeagus. 3, *Agromyza malaisei*, aedeagus. 4, *Agromyza maai*: a, aedeagus, side view; b, postgonite.

Agromyza malaisei Spencer, n. sp. Fig. 3.

This species closely resembles *A. burmensis* and it is only necessary to detail the points of difference.

Frons exceptionally broad, 2× width of eye viewed from above, jowls deep but only 1/4 vertical height of eye, antennal segment 3 rounded, rather large, arista pubescent but shorter, little more than 3/4 height of eye. *Wing* length in ♂ 3.2 mm, costa extending only to vein r_{4+5}, last segment of m_4 conspicuously short, in ratio 16 : 40 with penultimate. *Color*: frons matt black, antennae entirely black. *Male genitalia*: aedeagus as illustrated (fig. 3), paired tubules of distiphallus narrow but over 2× length of those in *burmensis*, mesophallus substantially smaller.

Holotype ♂, N. E. Burma, Kambaiti, 2100 m, 23. V. 1934 (R. Malaise), in Naturhistoriska Riksmuseum, Stockholm.

The species is named in honour of Dr. Malaise, whose 1934 material from Burma includes 3 new *Agromyza* species described in this paper.

The genitalia confirm the close relationship of *malaisei* with *burmensis* and it is certainly also a grass-feeder. It can be included in the author's (1961a) key to Oriental species in the extension to couplet 11 given on p. 662.

Agromyza maai Spencer, n. sp. Fig. 4.

Head: frons broad, 1½× width of eye, not projecting above eye in profile; orbital bristles stout but rather short, 2 ors, upper slightly longer; 2 ori, upper equal to lower ors and longer than lower ori, orbital setulae sparse, reclinate; eye large, upright, jowls narrow, 1/12 height of eye, cheeks linear, vibrissa strong, equal to lower ori; antennal segment 3 rounded, without distinctive pubescence, arista long, almost equal to vertical height of eye, only finely pubescent. *Mesonotum*: 3+1 strong dc, 3rd and 4th approximately equidistant each side of suture, pre-scutellars distinct, acrostichals (damaged) apparently in some 4 irregular rows. *Wing*: length in ♂ 3.2 mm, costa extending to vein m_{1+2}, cross-vein 1 well beyond center of discal cell, last segment of m_4 long, only slightly shorter than penultimate, in ratio 25 : 28. *Legs*: mid-tibiae with 2 strong lateral bristles. *Color*: frons matt, sooty black, ocellar triangle and orbits scarcely shining, antennal segment 3 dark brown (not black), mesonotum shining black, pleura black but margins of mesopleura distinctly brown, area between wing base and supra-alar and post-alar bristles above yellowish brown, wing base also conspicuously yellowish brown, legs entirely dark, largely black, tarsi dark-brown, squamae yellowish, fringe black, halteres yellow. *Male genitalia*: aedeagus as illustrated (fig. 4a), pale, lightly chitinized, postgonites large, dark (fig. 4b), sternite 9 rounded at end, without hypandrial apodeme, aedeagal hood long, narrow (slide no. 278).

Holotype ♂ (BISHOP 3256), Thailand (NW), Chiangmai, Fang, 500 m, 12. IV. 1958 (T. C. Maa, No. 357).

The species can be included in the author's (1961a) key to Oriental *Agromyza* species as follows, differentiating it from *flavisquama* Malloch, 1914, the only other Oriental species with a well-defined pre-sutural dc:

Couplet 1, first alternative, delete 4+1 dc, replace *flavisquama* Malloch by 1a; add new couplet:

1a. 4+1 dc, squamal fringe yellow, frons narrow, at most equal to width of eye, tarsi yellowish ..... **flavisquama** Mall.

3+1 dc, squamal fringe black, frons broader, 1.5× width of eye, tarsi dark-brown ..... **maai***

A. maai very closely resembles *flavosquamata* Spencer, 1959 from South Africa but in this species the arista is shorter, the last segment of m_4 is slightly longer than the penultimate and the jowls are slightly broader. Comparison of the genitalia suggests that the species are not closely related.

Agromyza vitrinervis Malloch.

Agromyza niveipennis Malloch, 1914
Agromyza vitrinervis Malloch, 1915, n. name for *niveipennis* Mall., *nec.* Zetterstedt, 1848.
Agromyza albidipennis Hennig, 1941, n. name for *niveipennis* Mall., *nec.* Zetterstedt, 1848.
New Synonymy.

The correct synonymy of this species is given above. Hennig, in renaming *niveipennis*, overlooked Malloch's (1915) paper, in which he himself renamed it. This change of name unfortunately did not come to my notice when preparing my (1961a) synopsis.

Agromyza nr. **graminivora** Spencer, 1960a.

Thailand (N.): Pangmakampom (Pankampawng), nr. Fang, 450 m, 15–16. XI. 1957, 1 ♀ (Gressistt).

This specimen is certainly one of the grass-feeders, but its correct status cannot be established until additional material is available.

Genus **Japanagromyza** Sasakawa

Japanagromyza Sasakawa, 1958, Saikyo Univ. (Agr.), Sci. Rep. **10**: 140.

Two further species are described below, bringing to 23 the species now known in this genus. *J. trientis* forms a clearly defined group with *J. trifida* Spencer from New Hebrides and *J. triformis* Spencer from New Guinea, all having uniformly yellowish halteres and in the ♂ greatly enlarged cerci.

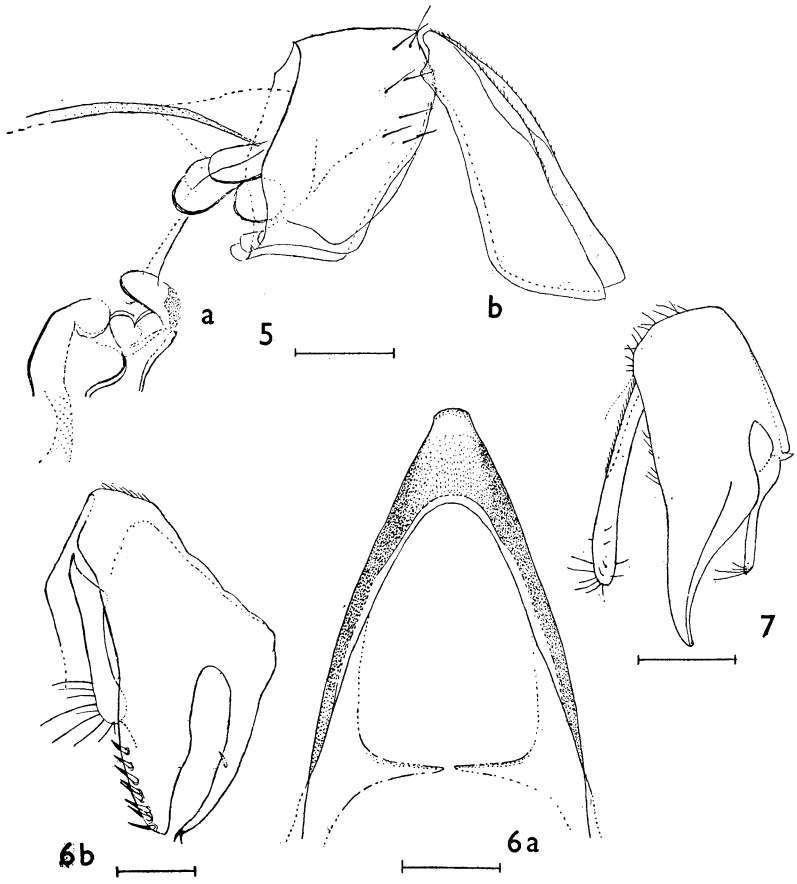
Japanagromyza angustifrons Spencer, 1961a. Fig. 5.

The aedeagus of the holotype from Formosa is shown in fig. 5a. This is far more complex than is normally found in this genus and approaches the form normal in *Melanagromyza*. The greatly enlarged cerci (fig. 5b) are characteristic of many *Japanagromyza* spp.

This species appears to resemble *J. yanoi* (Sas.), 1955 and was described before *yanoi* was transferred from *Melanagromyza* to *Japanagromyza* (Sasakawa, 1961 : 338). The possible synonymy of *angustifrons* with *yanoi* can only be decided when ♂♂ of *yanoi* become available from Japan.

Japanagromyza delecta Spencer, n. sp. Fig. 6.

Head: 2 reclinate ors, upper slightly weaker; 2 ori, upper reclinate, lower incurved;



Figs. 5–7. 5, *Japanagromyza angustifrons*: a, aedeagus; b, cerci. 6, *Japanagromyza delecta*: a, sternite 9; b, surstylus, with tergite and cercus. 7, *Japanagromyza eucalypti*, tergite 9, side view.

jowls narrow; arista long, fine, bare. *Mesonotum*: 2 pairs of strong dc, pre-scutellars well-developed. *Legs*: mid-tibiae with 2 strong bristles, fore-tibiae with 1 well-defined bristle. *Wing*: length in ♂ 2.7 mm; cross-vein 1 well before midpoint of discal cell, last segment shorter than penultimate, in ratio 20 : 28. *Color*: head, mesonotum, pleura, abdomen black; squamae grey, fringe black; head uniformly brownish black. *Male genitalia*: sternite 9 with broad, straight side-arms and short, blunt hypandrial apodeme (fig. 6a); postgonites slight, membranous; aedeagus largely membranous, without distinct form; surstyli distinctive, a long arm with 2–4 short spines at end, a further 2 on inner side at apical 1/3 and 2 or 3 stronger ones at base; tergite 9 with row of similar bristles along lower margin; cerci small, little more than 1/2 length of tergite 9 (fig. 6b).

Holotype ♂, N. E. Burma, Kambaiti, 2100 m, 23. V. 1934 (R. Malaise), in Naturhistoriska Riksmuseum, Stockholm.

This species superficially resembles *J. setigera* (Malloch), 1914 but is immediately dis-

tinguishable by the well-defined pre-scutellars. The form of surstyli, tergite 9 and cerci is highly distinctive. Sternite 9 is similar to that found in *J. elaeagni* (Sas.) (cf. Sasakawa, 1961 : 333) and strikingly different from that in *J. variihalterata* (Mall.) and other species (see fig. 10a).

Japanagromyza eucalypti Spencer, 1962a. Fig. 7.

Java, Semarang, 1 ♂, I. 1906.

This is the specimen which I previously suggested was referable to *Japanagromyza* n. sp. (Micronesia) (Spencer, 1961a : 65). The genitalia have now been examined and the distinctive aedeagus and tergite 9 are identical to those of the holotype of *eucalypti* (Spencer, 1962a : fig. 1). Tergite 9 of this species is distinctive, being conspicuously pointed ventrally (fig. 7).

The species has also recently been confirmed in Micronesia, Palau.

Japanagromyza setigera (Malloch).

Agromyza setigera Malloch, 1914.
Melanagromyza setigera (Malloch): Hennig, 1941.
Japanagromyza setigera (Malloch): Spencer, 1961d

This species, having uniformly dark halteres and known only from Formosa, resembles *J. meridiana* Spencer, 1961d from South Africa in lacking pre-scutellars. The full synonymy is given above.

Japanagromyza trientis Spencer, n. sp. Fig. 8.

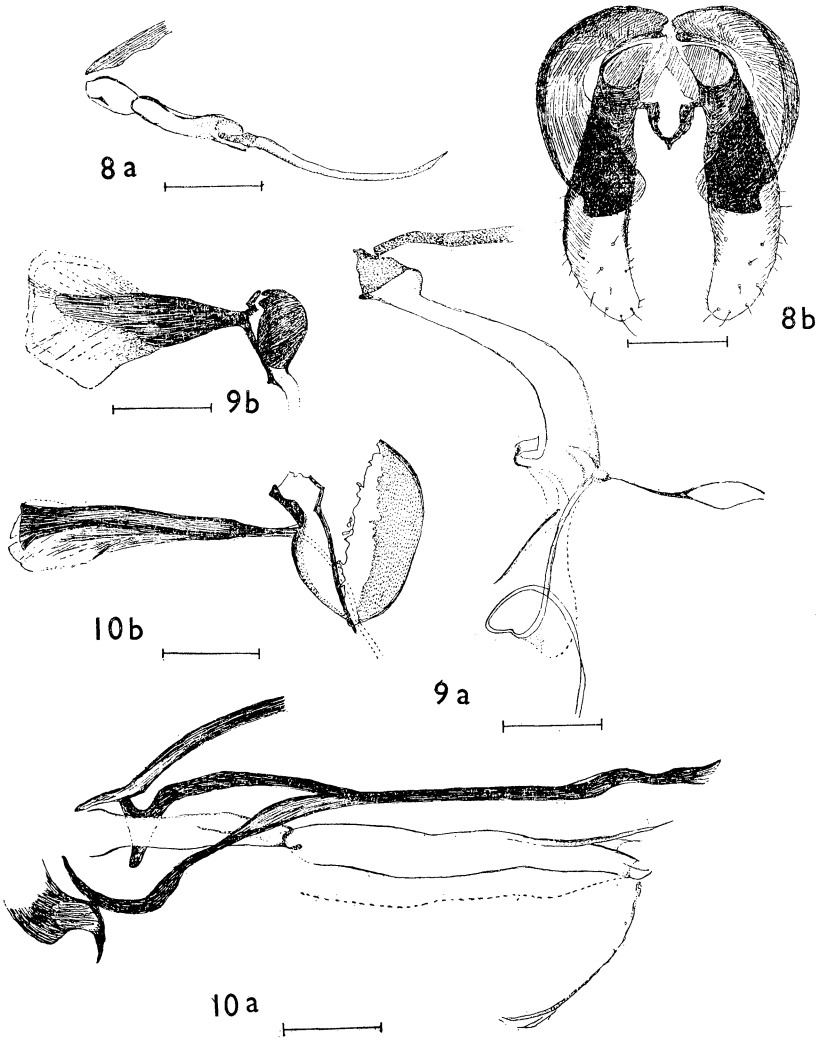
Head: frons equal to width of eye viewed from above; ors and upper ori directed upwards, lower ori inwards; orbital setulae relatively long, forming distinct row, all reclinate; jowls narrow, 1/20 vertical height of eye. *Mesonotum*: 2 strong pairs of dorso-centrals, pre-scutellars well-developed. *Legs*: mid-tibiae with 2 strong postero-dorsal bristles, distinct bristle on fore-tibia. *Wing*: length in ♂ 2.2 mm, cross-vein 1 at basal 1/3 of discal cell. *Color*: frons matt, sooty-black, ocellar triangle only weakly shining, orbits more distinctly shining, lunule silvery-grey; mesonotum black, not conspicuously shining, distinctly matt from front; wings clear, veins dark, squamae dark-grey, fringe black; halteres whitish yellow. *Male genitalia*: aedeagus as illustrated (fig. 8a), distiphallus a relatively stout tubule; cerci in ♂ enormously enlarged (fig. 8b).

Holotype ♂ (BISHOP 3257), Thailand, N. W., Chiangmai, Doi Suthep, 1278 m, 29. III–4. V. 1958 (T. C. Maa, No. 243).

The narrower jowls appear to be the only character separating this species from *J. trifida*; it is also somewhat smaller and this applies particularly to the aedeagus. The form of aedeagus confirms that the 2 species are more closely related than either are to *J. triformis.*

Japanagromyza variihalterata (Malloch), 1914. Fig. 9.

The distinctive aedeagus of this species is shown in fig. 9a (specimen bred from *Glycine soja* on Formosa) and the spermal sac in fig. 9b. It is interesting to note that although the aedeagus closely resembles that of *J. duchesneae* (Sas.), illustrated by Sasa-



Figs. 8–10. 8, *Japanagromyza trientis*: a, aedeagus; b, cerci. 9, *Japanagromyza variihalterata*: a, aedeagus; b, spermal sac. 10, *Japanagromyza* sp. (Philippines): a, aedeagus and sternite 9; b, spermal sac.

kawa (1961, fig. 17), on larval characters the 2 species would be placed in distinct groups, with *duchesneae* having the posterior spiracles in a single circular arrangement of 10 bulbs, whereas in *variihalterata* there is the distinctive trifurcated arrangement found in *elaeagni* (Sas.) (Sasakawa 1961: fig. 18n), *quercus* (Sas.) (Sasakawa, 1961: fig. 21n) and *eucalypti* Spencer (1962a: fig. 2).

Two ♂♂ have been examined from Philippine Is., Palawan, Tarumpitao, 1. I. 1960 (L. W. Quate). The aedeagus is enclosed in a strong membrane and is without the coiled tube characteristic of *variihalterata* (fig. 10a); spermal sac is enormously enlarged (fig. 10b).

It seems likely that this represents a distinct species but the only apparent difference in the adults is the somewhat narrower jowls in the Palawan specimens which are only 1/20 the vertical eye height. I prefer not to describe these specimens as new, until additional material becomes available.

The series from Bonin Is. which I referred to this species (Spencer, 1961a : 65) is now found from examination of genitalia to represent *J. elaeagni* (Sasakawa).

Genus **Melanagromyza** Hendel

Melanagromyza albisquama (Malloch)

Agromyza (*Melanagromyza*) *albisquama* Malloch, 1927.
Melanagromyza leguminum Bezzi, 1928.
Melanagromyza compositarum Spencer, 1961a, **New Synonymy.**

When describing *M. compositarum*, I had not had the opportunity of examining the type of *albisquama* (Malloch). Comparison of the 2 holotypes shows them to be identical, including the ♂ genitalia and I synonymise *compositarum* with *albisquama* herewith. Examination of the genitalia of the ♂ caught on *Eupatorium odoratum* L. in Ceylon (Spencer, 1961a : 71) confirms that this also is identical.

The distinctive aedeagus of this species will be illustrated in a forthcoming paper on the Agromyzidae of Micronesia.

With specimens caught on *Eupatorium* and *Tithonia* it seemed reasonable to assume that the species was an oligophagous feeder on Compositae. However, as *leguminum* Bezzi is accepted as identical with *albisquama* (Malloch), it appears that the species is after all not a Compositae-feeder.

DISTRIBUTION: Australia (N. S. W.), Fiji, Micronesia (Palau), Indonesia (Sumbawa), South Africa, Cape Verde Is.

Melanagromyza atomella (Malloch), 1914.

Philippines, Zamboanga d. Norte, 8 km S. Manucan, 3 ♂♂, 1 sex indet., 12. X. 1959 (C. M. Yoshimoto). Palawan, Tarumpitao Pt., 1–4. I. 1960, 1 ♀ (L. W. Quate).

In addition to occurring throughout the Oriental region and Micronesia to Japan, this species was found by the author to be well represented in Australia as far south as the Sydney area.

I have examined the genitalia of one of the specimens bred from leaf-mines on *Dioscorea* sp. on Java (de Meijere, 1937 : 175) and they appear to be identical to those of *atomella* bred from numerous families of the Dicotyledones. This is the first record of *atomella* on the Monocotyledones.

From the illustration of the leaf-mine on *Coccinia ? Wightiana* Roehm on Java (de Meijere, 1937 : fig. 10), there seems little doubt that the species concerned is also *atomella*.

Melanagromyza beckeri Hendel, 1923.

India, Chandigarh, 1 ♂, bred from leaf-mine on *Launaea nudicaulis* (L). Hook. b. (Compositae), 1961 (Sehgal).

The genitalia of this specimen agree exactly with those of a British specimen. The

species is widespread in Western Europe, particularly in the Mediterranean area, and has also been recorded in South Africa on *Sonchus oleraceus* L. It is a medium-sized, black species, recognizable by the characteristic arrangement of the orbital setulae, which are reclinate below, with a few hairs proclinate above, at the level of the ors. It can be included in an extension to couplet 20 of the author's (1961a) key, as follows: Couplet 20, second alternative, for 21, read 20a; add new couplet:

20. Orbital setulae all reclinate 21
Orbital setulae reclinate in front, distinctly proclinate at rear..... **beckeri** Hendel

Melanagromyza centrosematis de Meij., 1940.

Ryukyu Is., Hirara, Miyako, 23. X. 1952, 1 ♂ (genitalia slide No. 313) (G. Bohart).

The type series from Java, bred from *Centrosema pubescens* Benth. consists of several specimens, in poor condition, and the type is not indicated. I have selected the best specimen, a ♀, which is now designated as lectotype. The distinctive genitalia of the ♂ have been illustrated by Spencer (1961b: fig. 2 and 1962a: fig. 12).

Melanagromyza conspicua Spencer, 1961a.

Philippine Is.: Luzon, Los Baños, 18. IX. 1959, 1 ♂ (C. M. Yoshimoto). Mindanao, Bukidnon, Alanib, 1090 m, 21. X. 1959, 1 ♂ (C. M. Yoshimoto). Negros, L. Balinsasayao, 5. X. 1959 (C. M. Yoshimoto & L. W. Quate).

This is the first record of this species for the Philippines; it has now also been recorded in New Guinea and Australia, in addition to Singapore and Ceylon where it was first discovered. It is believed to feed in the stems or flower-heads of Compositae.

Melanagromyza cuscutae Hering, 1958. Fig. 11.

I have examined 3 specimens, 1 ♂ & 2 ♀♀, which I refer to this species, bred from fruits of *Cuscuta reflexa* Roxb. 4. II. 1961 from Pakistan, Kahuta. The type series was bred from fruits of *Cuscuta europea* L. in Germany.

A ♂ from N. E. Burma, Kambaiti, 2100 m, 30. V. 1934 (R. Malaise) is also referable to the same species (genitalia slide No. 320).

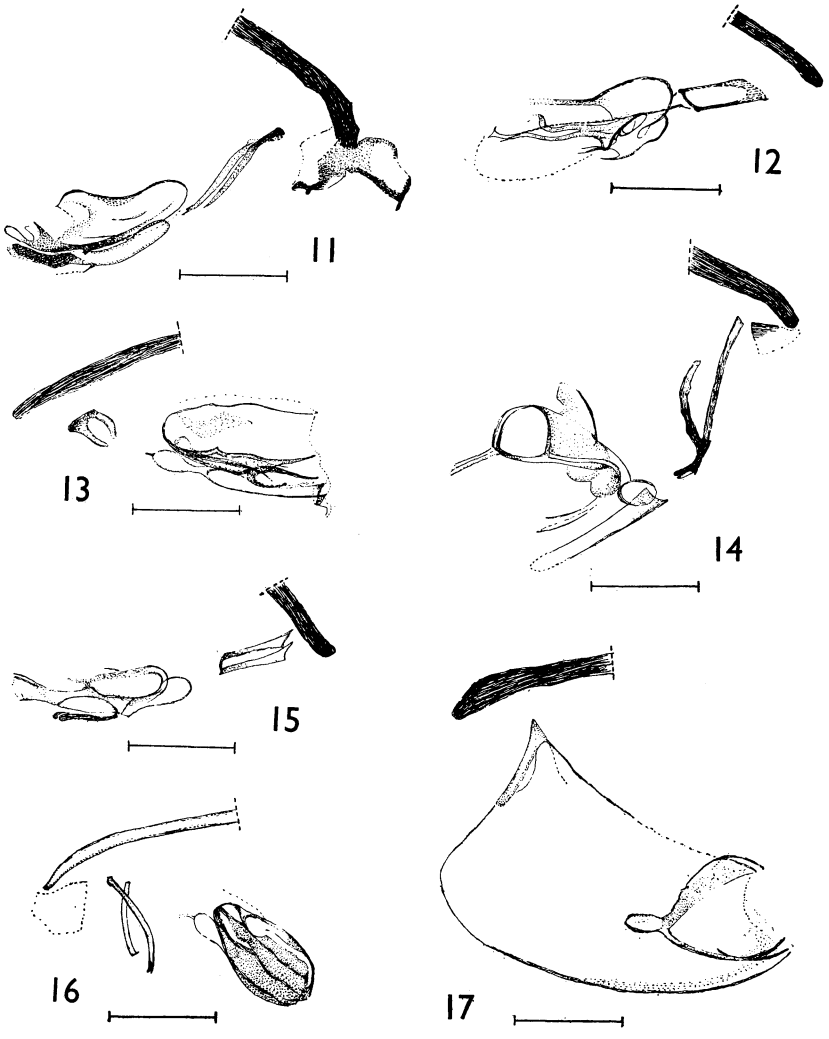
The aedeagus of the ♂ from Kahuta is illustrated in fig. 11. This is in general form very similar to that of a paratype I have examined but there are nevertheless slight differences not normally occurring in individuals of the same species; in particular in the paratype the whole distiphallus complex is conspicuously less chitinized and paler.

The wing length of the Pakistan series is 2.7–2.8 mm which is somewhat longer than the European species with 2.4 mm; jowls are also somewhat more pronounced—1/6 the vertical height of eye as against 1/10.

It is possible that the Pakistan specimens represent a distinct species and it is hoped that larvae can be obtained where specific differences are frequently more apparent.

The species closely resembles *M. ricini* de Meij., 1922.

The species can be included in the following extension to couplet 21 of the author's (1961a) key:



Figs. 11–17. 11, *Melanagromyza cuscutae*, aedeagus, side view; 12, *Melanagromyza dolichostigma*, aedeagus, side view; 13, *Melanagromyza mixta*, aedeagus, side view; 14, *Melanagromyza ricini*, aedeagus; 15, *Melanagromyza superciliata*, aedeagus; 16, *Melanagromyza* sp. (Formosa), aedeagus, side view; 17, *Melanagromyza* sp. (Thailand), aedeagus, side view.

21. Mid-tibiae with 2 bristles 21a
Mid-tibiae at most with 1 bristle; small species, wing length at most 2 mm 22
21a. Jowls narrow, 1/12 height of eye; wing length 2.5 mm ..... **ricini** de Meij.
Jowls broader, 1/6 height of eye; wing length 2.7–2.8 mm ..... **cuscutae** Hg.

Melanagromyza dolichostigma de Meij., 1922. Fig. 12.

The genitalia of a ♂ recently bred from *Glycine* on Formosa (Sung-Yang Lee) have

been examined and the distinctive aedeagus is illustrated in fig. 12.

Melanagromyza metallica (Thomson), 1869.

Philippine Is. Mindanao: Zamboanga (S.), Molave, 17. X. 1959, 2♂♂ (genitalia slide No. 194), 1 ♀, Zamboanga o. N., 10 km S. W. Manucan, 12. X. 1959, 1♀; Bukidnon Prov., Kiwawe, 7. XII. 1957, 1 ♂, 1 ♀; Alanib, 1090 m, 21. X. 1959, 5 ♂♂; Agusan, 10 km SE S. Francisco, 12–17. XI. 1959, 1 ♂; Palawan: 20 km S. Tarumpitao, 500 m, 6–10. I. 1960, 2 ♂♂, 1 ♀; SE Tarumpitao, Ransang R., 100 m, 5. I. 1960, 1 ♀. Negros: L. Balinsasayao, 5. X. 1959, 5 ♂♂ (L. W. Quate & C. M. Yoshimoto).

This species has previously been recorded in the Philippines (Spencer, 1961a : 74); the above records are interesting further evidence of the very wide distribution of this species.

Melanagromyza mixta Spencer, n. sp. Fig. 13.

Head: frons broad, almost 1½× width of eye, orbits very slightly projecting above eye in profile; 2 equal ors, 2 ori, upper equal to ors, lower slightly weaker; orbital setulae short, fine, reclinate, 1 or 2 hairs in front proclinate; ocellar triangle small, apex not extending to lower ors; jowls broad, almost 1/4 height of eye, cheeks forming very narrow ring below eye; eye bare; antennal segment 3 rounded, with distinct whitish pubescence, arista long, only slightly shorter than vertical height of eye, with lateral pubescence. *Legs*: mid-tibia with 2 lateral bristles. *Wing*: length 2 mm, costa extending strongly to vein m_{1+2}, front cross-vein at midpoint of discal cell, last segment of m_4 3/4 length of penultimate. *Color*: frons matt black, orbits and ocellar triangle only weakly shining; mesonotum and abdomen shining blackish green, wings clear, veins dark, squamae dark-grey, margins black, fringe dark, brownish. *Male genitalia*: aedeagus as illustrated (fig. 13).

Holotype ♂ (Bishop 3258), Philippine Is., Mindanao, Agusan, 6 km S. San Francisco, 11. X. 1959 (L. W. Quate), 1 ♂ paratype, Mindanao, Zamboanga, 10 km S. W. Manucan (C. M. Yoshimoto), in author's collection.

This is the only species known to me having a greenish mesonotum and dark squamae and fringe and can be immediately recognized by this combination of characters. It can be included in the author's (1961a) key to Oriental *Melanagromyza* species as follows:

Couplet 1, second alternative, for 16 read 15a. Add new couplet 15a:

15a. Mesonotum and abdomen distinctly greenish..... **mixta***
Mesonotum and abdomen black..... 16

Melanagromyza provecta de Meijere, 1910.

The genitalia of a ♂ from Flores (Rensch, Sunda Expedition)agree exactly with those of a specimen from Abyssinia (Spencer, 1961c: fig. 1) and other parts of Africa identified as *M. communis* Spencer, 1959. *M. communis* is being synonymized with *provecta* by Spencer (1962: in press).

Melanagromyza ricini de Meijere, 1922. Fig. 14.

Philippine Is., Mindanao, Agusan Prov., Bayugan, Esperanza, 300 m, 8. XI. 1959, 1 ♀ (C. M. Yoshimoto).

This specimen is tentatively referred to this species. It agrees closely with the holotype, a ♀ in poor condition; the jowls are characteristically narrow, 1/12 height of eye and the frons also appears conspicuously narrow.

A ♂ from NE Burma, Kambaiti, 2100 m, 30. V. 1934 (R. Malaise) appears to represent the same species. The aedeagus (fig. 14) is distinctive but confirmation of the correct identity of this specimen is desirable from the examination of a ♂ bred from *Ricinus*.

Melanagromyza sojae (Zehntner), 1900.

Melanagromyza producta (Malloch), 1914. **New Synonymy.**

It has now been confirmed from examination of genitalia that the specimens doubtfully referred to this species (Spencer, 1961a : 78) on account of their minute size—wing length 1.6 mm—were correctly identified.

The holotype of *producta* Malloch has been re-examined and it is clear from the genitalia that it is identical with *sojae*, with which it is synonymized herewith.

Melanagromyza superciliata Spencer, n. sp. Fig. 15.

Head: frons broad, only slightly less than 2× width of eye, distinctly projecting as narrow ring above eye in profile; 2 ors and 2 strong ori, all directed upwards, orbital setulae reclinate; jowls relatively broad, 1/6 vertical height of eye, with numerous strong peristomal hairs; antennal segment 3 round, normal, arista distinctly pubescent, long, equal to vertical height of eye; conspicuous horizontal patch of long black hairs extending across central 1/3 of eye slightly above center. *Mesonotum*: 2 strong dc, acr in 10 rows in front, irregularly in some 5 rows at level of first dc. *Legs*: mid-tibiae with 2 strong lateral bristles. *Wing*: length in ♂ 2.9 mm, cross-vein 1 at midpoint of discal cell, last segment of m_4 2/3 penultimate. *Color*: frons matt black, ocellar triangle inconspicuously shining, mesonotum largely matt black, not greyish, abdomen blackish with slightly greenish coppery tinge; squamae grey, fringe black. *Male genitalia*: sternite 9 strong, distinctly curved ventrally, with conspicuously flattened hypandrial apodeme, aedeagus slight, as illustrated (fig. 15).

Holotype ♂, NE Burma, Kambaiti, 2100 m, 30. V. 1934 (R. Malaise), in Naturhistoriska Riksmuseum, Stockholm.

This species is distinguishable from all others known to me by the distinctively haired eyes. It can be included in the author's (1961a) key to Oriental *Melanagromyza* species by adding a new couplet 16 as follows and changing the existing couplet 16 to 16a:

16. Eye in ♂ with conspicuous patch of long black hairs just above center... **superciliata***
Eye at most with scattered whitish hairs..... 16a

Melanagromyza sp. (Brassica).

Three ♀♀ bred from stems of *Brassica alboglabra* L. H. Bailey, Singapore, 5. XI. 1960 almost certainly represent an undescribed species. In the absence of ♂♂, it is not proposed to describe the species but the essential characters are as follows: mesonotum and abdomen predominantly greenish, squamae and fringe white; frons broad, 1½× width of eye, jowls relatively deep, 1/6 vertical height of eye; eye bare, arista largely bare; wing length 2.5 mm.

The species closely resembles *M. cordiophoeta* Spencer, 1961a, and *M. gerberivora*

Spencer, 1960a but until ♂♂ are available it cannot be satisfactorily differentiated from these two species.

A single ♀ bred from cauliflower, at Salisbury, Rhodesia appears to represent the same species; wing length in this specimen is 2.7 mm.

Melanagromyza sp. (Formosa) Fig. 16.

Among the specimens placed as paratypes of *M. atomella* (Malloch) is 1 ♂ in the Hungarian National Museum, Budapest from Taihan, II. 1909 (Sauter), with distinctive genitalia, which appears to represent an undescribed species. It runs to couplet 22 in the author's (1961a) key to Oriental *Melanagromyza* species but in the only available specimen there is apparently no bristle on the mid-tibia. It seems desirable to await further material before attempting to define and describe the species. The aedeagus is shown in fig. 16.

A ♀ from Formosa, Takao, 3. V. 1907 (H. Sauter) appears to belong to this same species.

Melanagromyza sp. (Thailand). Fig. 17.

Thailand (S.), Banna, 109 m, 5–10. V. 1958, 1♂ (T. C. Maa, No. 416), Bishop Museum, appears to represent a distinct species but the specimen is badly damaged and it seems preferable not to describe it until more material is available.

Essential characters are: frons broad, 2× width of eye, not projecting above eye in profile, orbital setulae numerous, reclinate apart from few upright hairs in front, ocellar triangle ill-defined, jowls relatively broad, 1/6 vertical height of eye; mid-tibia apparently with single lateral bristle, wing length 2.5 mm, costa extending to m_{1+2}, cross-vein 1 at midpoint of discal cell, color entirely black, mesonotum strongly shining, abdomen more matt, squamae grey, fringe black.

Aedeagus (fig. 17) highly distinctive, largely membranous, with small chitinized processes on distiphallus; sternite 9 with broad side arms, largely rounded at apex, which bends sharply ventrally; spermal sac small.

The species runs to couplet 21 in the author's (1961a) key to Oriental *Melanagromyza* species; it can be included as follows: second alternative, for 22, read 21a, add new couplet:

21a. Frons broad, 2× width of eye (Thailand) ..... **sp.**
Frons narrow, at most 1½× width of eye 22

Genus **Ophiomyia** Braschnikow

Ophiomyia atralis (Spencer).

Melanagromyza atralis Spencer, 1961a.
Ophiomyia atralis (Spencer), 1962a.

Philippine Is.: Mindanao, Zamboanga (S.), Molave, 17. X. 1959, 1♂ (C. M. Yoshimoto).

This is a particularly interesting record, filling a gap in the distribution of the species between Flores, Indonesia and Palau, Micronesia; its range extends S. E. from Calcutta

to Darwin and it no doubt occurs widely with the food-plant *Vernonia cinerea* Less.

Ophiomyia ingens Spencer, n. sp. Fig. 18.

Head (fig. 18): frons broad, 2× width of eye, distinctly projecting above eye in profile; 2 strong equal ors, directed upwards; 2 weaker ori directed inwards and upwards; orbital setulae reclinate, numerous extending from below lower ori to upper ors; jowls very broad, in ratio 7 : 25 with vertical height of eye, forming angle of 90° in front, cheeks broad below center of eye; antennae separated by distinct but fairly narrow keel, which slightly widens below, without central furrow. *Wing*: length in ♀ 3.8 mm, costa extending strongly to vein m_{1+2}, cross-vein 1 at center of discal cell, last segment of m_4 3/4 length of penultimate. *Color*: an entirely black species, mesonotum entirely matt viewed from front, slightly shining viewed from behind, squamae grey, fringe black.

Holotype ♀, NE Burma, Kambaiti, 2100 m, 23. V. 1934 (R. Malaise), in Naturhistoriska Riksmuseum, Stockholm.

There is no species of comparable size known in the Oriental region; it can be included as follows in the author's (1961a) key:

Couplet 2, first alternative, for 3 read 2a; add new couplet:

2a. Jowls broad, in ratio 7 : 25 with height of eye; very large species, wing length in ♀ 3.8 mm..... **ingens***
Jowls narrower, 1/7 height of eye; smaller species, wing length 2.5 mm.....3

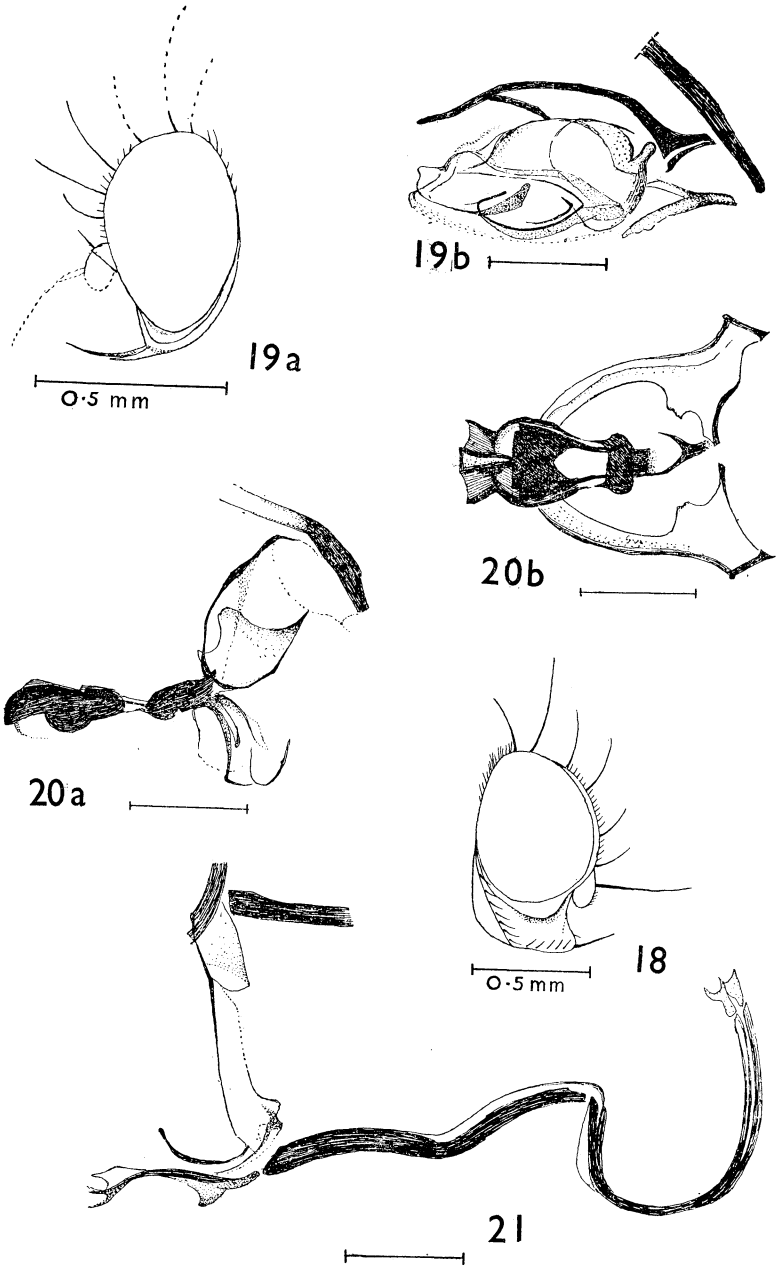
Ophiomyia negrosensis Spencer, n. sp. Fig. 19.

Head (fig. 19a): frons slightly wider than eye, not projecting above eye in profile; 2 ors (upper missing in both specimens), 2 ori, upper similar to ors, lower shorter, directed inwards; orbital setulae distinct, reclinate; ocellar triangle broad, apex extending to lower ors, but ill-defined; orbits narrow but distinct; jowls narrow, 1/9 height of eye, not greatly produced in front, forming angle of 90°, vibrissal horn in ♂ long, fused at base but differentiated apically into distinct hairs; antennal segment 3 small, rounded, arista fine, bare but thickened at base; facial keel dividing antennae narrow, only slightly widening below base of antennae, without central furrow. *Wing*: length in ♂ 1.9, in ♀ 2 mm, costa extending to vein m_{1+2}, rm slightly beyond midpoint of discal cell, last segment of vein m_4 3/4 length of penultimate. *Color*: entirely black, frons matt, orbits and ocellar triangle only very faintly shining, mesonotum and abdomen moderately shining, squamae grey, fringe black, halteres black.

Male genitalia: aedeagus (fig. 19b) highly asymmetric, basiphallus well-developed on one side only, distiphallus unusually large, apparently partially rotated, sternite 9 with narrow side arms and tapering hypandrial apodeme, with distinct ventral curvature.

Holotype ♂ (BISHOP 3259), Philippine Is., Negros, Balinsasayao, 5. X. 1959, 1♀, same data (L. W. Quate & C. M. Yoshimoto).

This species closely resembles *O. cicerivora* Spencer 1961a but is distinguishable by the narrower jowls, differentiated vibrissal horn in the ♂ and less shining ocellar triangle. In *cicerivora* the form of sternite 9 is virtually identical but the aedeagus is entirely different, with the elongated basiphallus found in many species of the genus (Spencer, 1962a: figs.



Figs. 18–21. 18, *Ophiomyia ingens*, head. 19, *Ophiomyia negrosensis*: a, head; b, aedeagus, side view. 20, *Phytobia* (*Amauromyza*) *aliena*: a, aedeagus, side view; b, aedeagus, ventral view and sternite 9. 21, *Phytobia* (*Icteromyza*) *nigricoxa*, aedeagus, side view.

31, 34, 39) and smaller, more regular distiphallus. The species can be included in the following extension to the author's (1961a) key:

Couplet 2, second alternative, replace *cicerivora* by 2a, add new couplet:

2a. Jowls 1/4 height of eye; vibrissal horn entirely fused; ocellar triangle conspicuously shining.....**cicerivora** Spencer
Jowls narrow, 1/9 height of eye; vibrissal horn differentiated into 2 or 3 distinct bristles; ocellar triangle scarcely shining.....**negrosensis***

Ophiomyia sp. (Formosa).

Formosa, Taipei, bred ex stem-mine on *Glycine*, 1♀, XII. 1961 (Sung-yang Lee).

This specimen represents an undescribed species. It may well have been confused with *Melanagromyza phaseoli* (Tryon), 1895 in the past, which it superficially resembles. It has distinctly more forwardly-projecting jowls, a slightly less elongated ocellar triangle (though strongly shining) and a longer second dc. The puparium has extremely long anterior spiracles which project through the leaf-epidermis and posterior spiracles in the form of 2 short parallel projections each bearing 3 bulbs.

Cerodontha sp.

Pakistan, Rawalpindi, 1♀, bred from leaf-mine on *Arundo donax* L.

This specimen closely resembles *C. phragmitophila* Hg., 1935, which is not uncommon in southern Europe as a leaf-miner on *Arundo* and *Phragmites*. Confirmation of its exact status should best be awaited, until ♂ genitalia can be examined.

Genus **Phytobia** Lioy

Phytobia (**Icteromyza**) **floresensis** Spencer, 1961a.

Philippine Is. Negros, L. Balinsasayao, 5. X. 1959, 1♂ (C. M. Yoshimoto).

The ♂ genitalia of this specimen agree exactly with those of the holotype from Flores (Spencer, 1961a: 84).

Phytobia (**Amauromyza**) **aliena** (Malloch), 1914. Fig. 20,

Thailand (N.), Pangmakampon (Pamkampawn), nr. Fang, 450 m, 16. XI. 1957, 1♂ (Gressitt).

This specimen agrees exactly with a ♀ from Paroe, Formosa in Deutsches Entomologisches Institut, Berlin. The holotype and the 2 other known specimens from Formosa (Spencer, 1961a: 85) are all ♀♀. The genitalia of this first ♂ are shown in fig. 20a, b. The distiphallus is conspicuously black and strongly chitinized, sternite 9 small, with relatively broad side arms and rounded, semi-circular at apex; spermal sac is typical of the sub-genus, greatly enlarged, with a distinctive bowl-shaped base, as figured by Spencer for *A. triseta* Spencer from South Africa (1961d: fig. 16c).

Phytobia (**Icteromyza**) **nigricoxa** (Malloch). Fig. 21.

Agromyza longipennis Loew, var. *nigricoxa* Malloch, 1914.
Dizygomyza nigricoxa (Malloch): Hennig, 1941, Ent. Beihefte **8**: 174.

Phytobia (*Icteromyza*) *nigricoxa* (Malloch): Spencer, 1961a: 85.

The genitalia of the ♂ holotype in the Hungarian National Museum, Budapest have now been examined. The distinctive aedeagus is shown in fig. 21. The aedeagus of *I. longipennis* was illustrated by Spencer (1962a: fig. 49) and a key of *Icteromyza* spp. was also given. Comparison of the genitalia confirms the distinctness of the 2 species but also their close relationship.

Genus **Liriomyza** Mik

Liriomyza caulophaga (Kleinschmidt).

Haplomyza caulophaga Kleinschmidt, 1960.
Liriomyza haplomyzina Spencer, 1961a.
Liriomyza caulophaga (Kleinschmidt): Spencer, 1962a.

The full synonymy of this species is given above. Unfortunately the description of *caulophaga* was published in December, 1960 when the description of *haplomyzina* from Flores was already in press. The two type specimens were bred from the stalk of *Beta vulgaris* L. var. *cicla* L. at Nudgee, Queensland and I have also seen specimens from N. S. W.

Genus **Pseudonapomyza** Hendel

Pseudonapomyza asiatica Spencer, 1961a.

Formosa, Taipei, bred ex leaf-mines on rice seedlings X. 1961 (Sung-yang Lee).

This is the first record of this species on rice.

Philippine Is. Mindanao, Agusan, 10 km SE of San Francisco, 12. XI. 1959, 1♂ (C. M. Yoshimoto).

Pseudonapomyza spicata (Malloch), 1914.

Thailand: Banna, Chawang, nr. Nabon, 70 m, 4. IX. 1958, 1♂ (Gressitt).

Apart from its distribution throughout the Pacific area, this species is now known to be common in parts of India and also occurs around Darwin and Sydney in Australia. It is now believed that this is the species causing the mines on maize found by the author at Bangkok and also at Los Baños, Luzon, Philippines (Spencer, 1961a: 99 and fig. 41).

The holotype from Tainan, Formosa—a ♂, not ♀ as stated by Malloch—was unfortunately destroyed in the post. The ♀ paratype from Takao in the Hungarian National Museum, Budapest has been examined and I am satisfied that it is conspecific with the ♂. The aedeagus of the holotype was illustrated by Spencer (1961a: fig. 48). The species is distinguishable from *asiatica* Spencer, 1961a, which also occurs in Formosa, by the finer point to the antennal segment 3 (Spencer, 1961a: fig. 35).

Genus **Phytomyza** Fallén

Phytomyza atricornis Meigen, 1838.

Thailand: Chiangmai, Suthep, 1278 m, 29. III–4. V. 1958, 1♀ (T. C. Maa, No. 182).

This is the first record of this cosmopoliton species known to the author from Thai-

land; it occurs sparsely in India and is widespread in Australia.

Genus **Ptochomyza** Hering, 1942

Ptochomyza sp.

Pakistan, Rawalpindi, stem-miner on Asparagus, 28. I. 1961, 1♂.

This specimen represents the same undescribed species which Hering recently discovered on *Asparagus* at Addis Ababa and which will be described shortly.

REFERENCES

Bezzi, M. 1928. Diptera Brachycera and Atherica of the Fiji Islands, pp. 164–65. London, British Museum (Nat. Hist.).

Griffiths, G. C. D. in press. A revision of the *nigripes* group of the genus *Agromyza* (Diptera, Agromyzidae).

Hendel, F. 1923. Neue europäische *Melanagromyza*-Arten. Konowia **2**: 145.

Hennig, W. 1941. Verzeichnis der Dipteren von Formosa. Ent. Beihefte **8**: 172–76.

Hering, E. M. 1935. Minenstudien 15. Zeit. f. Pflanzenk. u. Pfschutz. **45**: 10.

———— 1942. Ein neuer Spargelfeind (*Ptochomyza asparagi* g. n., sp. n.). Zeit. f. Pfkrankheit **52**: 529–33.

———— 1958. *Melanagromyza cuscutae* sp. n., eine neue fruchtfressende Agromyzide der Seide. Deutsch. Ent. Zeits. N. F. **5**: 217–20.

Kleinschmidt, R. P. 1960. New species of Agromyzidae from Queensland. Qd. Jour. Agr. Sci. **17**: 1–17.

Malloch, J. R. 1914. Formosan Agromyzidae. Mus. Nat. Hung., Ann. Hist.-Nat. **12**: 306–36.

———— 1915. Flies of the genus *Agromyza*, related to *Agromyza virens*. U. S. Nat. Mus., Proc. **49**: 108.

———— 1927. Notes on the Australian Diptera—13. Linn. Soc. N. S. W., Proc. **52**: 423–28.

Meijere, J. C. H. de. 1937. Die Larven der Agromyzinen. Dritter Nachtrag. Tijdschr. Ent. **80**: 167–243.

Sasakawa, M. 1955. A new species of *Melanagromyza* from Shikoku, Japan, Shikoku Ent. Soc., Trans. **4**: 87–89.

———— 1961. A study of the Japanese Agromyzidae. Pacific Ins. **3**: 307–472.

Spencer, K. A. 1957. Two new European species of Agromyzidae (Dipt.). Ent. Monthly Mag. **43**: 35.

———— 1959. A synopsis of the Ethiopian Agromyzidae. R. Ent. Soc. Lond., Trans. **111**: 237–329.

———— 1960a. Records of further Ethiopian Agromyzidae. *ibid.* **112**: 15–36.

———— 1960b. A new species of Agromyzidae (Diptera) from South Africa. Ent. Soc. S. Afr., Jour. **23**: 314–16.

———— 1961a. A synopsis of the Oriental Agromyzidae (Diptera). R. Ent. Soc. Lond., Trans. **113**: 55–100.

———— 1961b. Notes on the African Agromyzidae—1. Stuttgart. Beitr. Naturk. **46**: 1–5.

———— 1961c. Notes on African Agromyzidae—2. Deutsch. Ent. Zeits. N. F. **8**: 415–30.
———— 1961d. Notes on the African Agromyzidae—3. Ent. Soc. S. Afr., Jour. **24**: 322–44.
———— 1962a. A revision of the Australian Agromyzidae.
———— 1962b. Some Agromyzidae (Diptera) from New Guinea, Melanesia and Polynesia. Pacific Ins. **4** (3) : 651–60.
———— in press. Notes on the African Agromyzidae—4.

RECENT LITERATURE ON PACIFIC INSECTS

SIPHONAPTERA-MALLOPHAGA-ANOPLURA

Clay, T. 1959. Mallophaga (Insecta). Part I. pp. 143–49, IN: The Natural History of Rennell Island, British Solomon Islands. Vol. 2 (Invertebrate Pars). Scientific results of the Danish Rennell Expedition, 1951, and the British Museum (Natural History) Expedition, 1953. Published on behalf of the University Copenhagen and the British Museum (Nat. Hist.) London by Torben Wolff. Danish Science Press, Ltd. Copenhagen 1959.

Dunnet, G. M. 1961. Fleas from Macquarie Island, with a description of a new species of *Parapsyllus* Enderlein. R. Ent. Soc. Lond., Proc. **30** (3–4): 43–49, 3, figs.

Emerson, K. C. & R. E. Elbel. 1961. A new species of *Rallicola* (Mallophaga) from southeast Asia. Ent. News **72** (5) : 130–32, 3 figs.

Jameson, Jr., E. W. & K. Sakaguti. 1959. A new flea from the streaked shear-water *Puffinus Leucomelas*, on Kanmuri-Jima, Wakasa Bay. Japan. Jour. Sanit. Zool. **10** (4) : 244–51, 2 figs., 3 pls.

Johnson, P. T. 1959. The rodent-infesting Anoplura (sucking lice) of Thailand, with remarks on some related species. U. S. Nat. Mus., Proc. **110** (3421) : 569–98, 75 figs.

Li, K. C. & D. C. Wang. 1959. The discovery of *Peromyscopsylla himalaica* (Roths. 1915) from China, with a comparison of its three subspecies. Acta Ent. Sin. **9** (6) : 548–54, 1 pl. (in Chinese, summary p. 553).

Nakagawa, H. 1959. A description of a new species of *Rhadinopsylla* from Honshu, Japan (Siphonaptera : Hystrichopsyllidae, Rhadinopsyllinae). Kontyû **27** (2): 109–11, 3 figs.

Sakaguti, K. 1960. On the genus *Peromyscopsylla* of Japan, with description of a subspecies (Siphonaptera). Studies on the Japanese Siphonaptera. VIII. Japan. Jour. Saint. Zool. **11** (3) : 124–36, 35 figs., 2 pls.
———— 1960. A flea, *Chaetopsylla tuberculiceps* from brown bear of Hokkaido. Studies on the Japanese Siphonaptera. IX. *Ibid.*: 137–44, 8 figs., 1 pl. (English summary).
———— & E. W. Jameson, Jr. 1959. A new flea of the genus *Nycteridopsylla* (Siphonaptera). *Ibid.* **10** (4) : 229–31, 6 figs.
———— & H. Nakagawa. 1960. A new flea of the genus *Monopsyllus* from Japan. *Ibid.* **11** (3) : 145–46, 5 figs.

Smit, F. G. A. M. 1960. Notes on the shrew-flea *Doratopsylla dasycnema* (Rothschild) and notes on *Palaeopsylla*, a genus of Siphonaptera. Brit. Mus. (Nat. Hist.), Ent. Bull. **9** (7) : 27–386, 19 figs.