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AGROMYZIDAE IN NEW GUINEA

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Abstract: This paper treats 57 species from New Guinea, distributed in 13 of the 26 known world genera. Of these, 17 new species are described and 7 species are reported for the first time from New Guinea. A preliminary assessment of the relationships of species present in New Guinea and a list of known host plants are also given.

Information on Agromyzidae in New Guinea has hitherto been based on 2 purely taxonomic papers by Spencer (1962a) and Sasakawa (1963b). In the 1st of these papers, 52 specimens were examined and 10 species (4 new) were identified in the genera *Melanagromyza, Ophiomyia, Japanagromyza* and *Phytomyza.* In the 2nd larger paper by Sasakawa, 24 further species were identified, of which 11 were new, in 9 genera. No attempt was made in either of these papers to discuss distributional aspects of the family in New Guinea.

It has become clear in recent years that Agromyzidae in SE Asia and in the tropics in general are significantly less numerous than in the temperate areas of the northern hemisphere. However, it seemed reasonably certain that many additional species must be present in New Guinea, particularly as no collection of the family had been done there by specialists. The significance of New Guinea as the probable primary source area for the ancestral colonization of Australia by the Agromyzidae needs no emphasis. For general comment on insect distribution in New Guinea and the geological past of the island, reference may be made to papers by Gressitt (1958), Raven & Axelrod (1972) and Smithers & Thornton (1974). With studies of the distributional relationships of the Agromyzidae of Australia and New Zealand planned (and now well advanced), it seemed highly desirable as a first step to attempt to obtain a fuller understanding of the family in New Guinea. A 2-months' collecting expedition was therefore arranged in October-November 1973 and this paper represents primarily the taxonomic clarification of the material I obtained. A brief preliminary assessment of the relationships of species present in New Guinea and a list of known host plants are also given.

Collecting localities

I arrived at Port Moresby on 13 October at the height of the dry season; collecting in the immediate area was clearly unlikely to be rewarding and I therefore continued immediately to Lae. With dry days and rain at night, vegetation in the Lae area was lush and Agromyzidae were found at a number of localities in and near the town. The Botanical Gardens proved of considerable interest. An unexpected opportunity presented itself to spend 5 days with an Australian Ornithological Expedition at Wagau, 4000 ft (1220 m), near high rain forest east of Lae. This was a rich area but heavy rainfall every day severely limited productive collecting. One week was then spent at the Ecology Institute, Wau, 4000 ft (1220 m), with easy access to Mt Kaindi, 7700 ft (2360 m) and areas at all intermediate altitudes, followed by a day at Bulolo.

I was already finding that relatively few species were present but that some additional species were normally discovered at each new locality visited. It therefore seemed clear that the most representative sample could be obtained by visiting the maximum number of localities for brief periods. From Wau I traveled 300 mi. (480 km) to the Highlands and collected at 15

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different localities in the Eastern, Western and Southern Highlands Districts and also in the Enga District. My main bases were the Kuk Tea Research Institute near Mount Hagen, the Baiyer River Wildlife Sanctuary, Wapenamanda, Sirunki, Wabag, Minj and Goroka. Some further collecting was also done at Lae and Wau towards the end of November and finally 3 days were spent in the Port Moresby area.

Representation of Agromyzidae in New Guinea

The small number of species known prior to my visit might have merely reflected lack of collecting by specialists. However, I am now satisfied that the family is relatively poorly represented in New Guinea, as in all other areas in the southern hemisphere (contrast 313 species known in Britain, cf Spencer 1972). Even in the most suitable collecting areas, the number of species present was always small and normally only about 5 could be obtained on a single day. Populations also appear to be small, the 1 exception being *Melanagromyza metallica.* In 2 months of intensive collecting only 35 species were found, of which 17 proved to be undescribed and 7 new to the island. At the present time, 57 species are known from mainland New Guinea in 13 of the 26 known world genera. Of the 34 species recorded prior to my visit, 2 species, *M. atomella* and *O. lantanae,* represented misidentifications, but the latter has now been confirmed. The generic breakdown, and also the new species and new records from my recent collecting, are shown in TABLE 1 .

TABLE 1. Agromyzidae known on mainland New Guinea.

GENUS	NEW SPECIES	NEW RECORDS	TOTAL
Melanagromyza	2	1	12
Ophiomyia	5	1	10
Tropicomyia	4	1	5
Japanagromyza	1	–	3
Agromyza	–	–	2
Phytobia	1		5
Amauromyza	–	1	1
Cerodontha			
(Icteromyza)	–	1	3
(Poemyza)	–	–	2
(Dizygomyza)	–	–	1
Calycomyza	–	–	1
Liriomyza	1	1	2
Phytoliriomyza	4*	–	5
Pseudonapomyza	–	1	2
Phytomyza	–	–	1
Gen. indet.			
"Praspedomyza" prostrata Sas.	–	–	1
Total	18	7	57*

*Including also 1 species from CSIRO material.

Distribution within New Guinea

There is nothing surprising or puzzling about the generic representation, which essentially reflects a limited fauna of primarily Oriental origin. *Melanagromyza* is well known as the dominant genus in the tropics and more species might have been expected. The relatively high number of species in *Ophiomyia* and *Phytobia* is noteworthy, and the discovery of 4 undescribed species in *Phytoliriomyza* (1 from Australian material) is also of particular interest. This genus has now been found to be of wider distribution in the tropics and the southern hemisphere than was hitherto believed, and 2 species have recently been described from Ceylon (Spencer 1975); 23 others have been seen among Australian material. Northern

elements are represented, but the number of species is small. The most striking example of this is the presence of only a single *Phytomyza,* with over 400 species known, mainly in temperate areas of the northern hemisphere. *Liriomyza* also is present with only a single, possibly endemic species and 1 additional species of wide distribution.

Slightly over ½ the species present are known only from New Guinea. With further collecting, at least some of these will be found in nearby islands or in northern Queensland, but the majority will prove to be endemic and there has thus been a high degree of local speciation. The extent to which such endemic species are restricted to a single limited area cannot at the moment be established. On the other hand, several species have been found to have an unexpectedly wide range within the island. *Liriomyza mikaniae,* n. sp. was found in association with its host, *Mikania cordata,* at Wagau (Morobe Dist.), at the Baiyer River Wildlife Sanctuary (Western Highlands Dist.,) and at Wapenamanda (Enga Dist.); *Amauromyza papuensis* was also found at Wagau and Wapenamanda; *Ophiomyia lutzi,* n. sp. was present at Wagau [4000 ft (1220 m)] and at Sirunki [Enga Dist., 8700 ft (2650 m)]; *Cerodontha (Icteromyza) hardyi,* n. comb. was described from Vogelkop, Irian Jaya and has now been confirmed at Wagau, Morobe Dist.

Several species have a surprisingly wide altitudinal range. Species present in coastal rain forest, such as *Melanagromyza metallica* and *Ophiomyia conspicua,* n. comb., were also found up to 5000 ft (1525 m). Leaf-mines of an undescribed *Tropicomyia* sp. on *Cordyline fruticosa* (known previously as *terminalis)* (of which only a female was reared) were common at sea level in gardens at Lae and were also present at 4000 ft (1220 m) at Wapenamanda. A further undescribed *Tropicomyia* sp., on *Cyrtandra* sp. (Gesneriaceae), appeared to be present wherever its host occurred, in the 4000–6000 ft (1220–1830 m) range and is clearly restricted to this high altitude. Other high-altitude species are *Phytomyza orientalis,* occurring with its hitherto unknown host, *Clematis javana,* at 3000–5000 ft (915–1525m) and the 3 *Phytoliriomyza* spp. – *Phytol. bidensiphoeta,* n. sp. at Goroka, 4000 ft (1220 m), *Phytol. spectata,* n. sp. near Wapenamanda, 4000 ft (1220 m) and *Phytol. sublima,* n. sp. at 2 localities on the Asaro–Chimbu Divide at 8000 ft (2440 m).

Unfortunately, it was not possible to collect above 8700 ft (2650 m). However, between 6000 and 8000 ft (1830 and 2440 m), plants with temperate affinities in families such as Campanulaceae, Compositae, Labiatae and Umbelliferae were seen and in no case was there any evidence of larval feeding. There is, therefore, no reason to believe that at even higher altitudes any sudden increase in species might occur. A few, no doubt highly interesting, species will nevertheless probably be present on temperate plants at high altitudes from 10,000–12,000 ft (3050–3660 m) and further collecting in such areas is clearly desirable.

More intensive collecting was undertaken in rain forest than has been done anywhere in the Old World tropics. Earlier impressions of the poverty of species gained during brief periods of collecting in rain forest in East Africa, Ceylon and the Philippines were confirmed. Many hours were spent in rain forest near Lae, at Wagau, at the Baiyer River Wildlife Sanctuary and at several other localities and, apart from the ubiquitous *M. metallica,* never more than 6–10 specimens would be obtained in any 1 locality.

Relationships with other areas

Endemic species

On present information, 30 of the 57 described species known in New Guinea must be treated as endemic, although some certainly will, in due course, be found elsewhere, particularly on New Britain or in northern Australia. These endemic species are present in 10 genera, as follows:

Melanagromyza bispinosa Sas.

M. geminata Sp.

M. multiplicata Sp.
M. papuensis Sp.
M. sensoriata Sas.

Japanagromyza triformis Sp.

Ophiomyia gressitti Sas.

O. ferox, n. sp.
O. hornabrooki, n. sp.
O. lutzi, n. sp.
O. melanagromyzae, n. sp.

Tropicomyia nuginiensis, n. sp.

T. piperi, n. sp.
T. ponderosa, n. sp.
T. porrecta, n.ssp.

Phytobia hirticula (Sas.)

Phytob. millarae, n. sp.
Phytob. prolata (Sas.)
Phytob. terminalis (Sas.)

Cerodontha (Di.) omissa (Sp.)

Ce. (Po.) curta (Sas.)
Ce. (Po.) longimentula (Sas.), n. comb.

Phytoliriomyza bidensiphoeta, n. sp.

Phytol. lobata (Sas.), n. comb.

Phytol. minima, n. sp.
Phytol. spectata, n. sp.
Phytol. sublima, n. sp.

Pseudonapomyza cingulata Sas.

Ps. kraussi (Sas.)
? Gen. *prostrata* Sas.

Brief comments on the affiliations of the endemic species described below are included with the descriptions, but a partial recapitulation may be helpful.

(1) It was of interest to find the genus *Tropicomyia* well represented, with 4 new species and 3 or possibly 4 more known only from their leaf-mines.

Two of the new species, *T. piperi* and *T. ponderosa*, have male genitalia, indicating relationship with *T. nigriclava* (Bezzi) from Rodrigues (cf Spencer 1973a: Fig. 278, 279). Another new species, *T. porrecta*, is possibly related to *T. theae* (Cotes) from Ceylon.

(2) *Phytobia millerae*, n. sp. appears to be affiliated with *Phytob. diversata* Spencer, 1961 from Formosa, if it is accepted that the yellow coloration of humerus, notopleural area and scutellum is synapomorphic. Further study will be necessary to establish whether species with similar coloration known from Nigeria and Ecuador and elsewhere in South America are truly monophyletic.

(3) Two further species show northern affinities. *Ophiomyia lutzi*, n. sp. is distinctive in having the proboscis elongate. This may possibly be an apomorphic character, shared with its nearest known relatives in Europe or North America. *Cerodontha (Dizygomyza) omissa* is known only from SE New Guinea, but is in all respects typical of northern temperate species, such as *Ce. (Di) bimaculata* (Mg.), feeding on *Luzula* (Juncaceae).

(4) The 4 endemic *Phytoliriomyza* species belong to at least 2 distinct groups. The 2 species of the group formerly treated as *Lemurimyza, Phytol. bidensiphoeta,* n. sp. and *Phytol. sublima,* n. sp., have close relatives in Nepal (Spencer 1965a), Ceylon (Spencer 1975) and Madagascar (Spencer 1963b). Further species in this group have also recently been seen from Australia. The nearest relatives, or possibly the same species, are present in New Britain and New Ireland (Spencer 1966b). The 2 specimens seen from these islands were both females and were tentatively identified as *Phytol. arctica* (Lundbeck), which occurs from northern Europe to Formosa and was the only species in the genus known in SE Asia at that time. There now seems little doubt that this identification was incorrect.

The aberrant genitalia of *Phytol. spectata,* n. sp. indicate a high degree of speciation and *Phytol. minuta,* n. sp. is also most probably a truly endemic species, with some divergence from the group formerly treated as *Lemurimyza.*

WIDESPREAD ORIENTAL/PACIFIC SPECIES

Melanagromyza cordiophoeta Sp.
M. lasiops (Mall.)
M. metallica (Thom.)
M. obtusa (Mall.)
Ophiomyia conspicua (Sp.), n. comb.
O. phaseoli (Tryon)

SPECIES PRESENT IN NEW GUINEA AND OTHER ISLANDS OR AREAS

New Guinea and Thailand

Japanagromyza maai (Sp.)

New Guinea and Ceylon

Cerodontha (Di.) hardyi (Sas.), n. comb.

New Guinea and Java

Tropicomyia coffeae (Kon.)

New Guinea and Flores

Cerondontha (Ic.) floresensis (Sp.)
Phytomyza orientalis Sp.

New Guinea and New Britain

Melanagromyza albisquama (Mall.)
M. cordiophoeta Sp.
M. metallica (Thom.)
Phytobia furcata (Sas.), n. comb.
Cerodontha (Ic.) floresensis (Sp.)
Ce. (Ic.) piliseta (Beck.)
Amauromyza papuensis Sp.
Pseudonapomyza spicata (Mall.)

New Guinea and New Ireland

Melanagromyza cordiophoeta Sp.
M. insignita Sp.
M. metallica (Thom.)
Agromyza papuensis Sas.

New Guinea and New Hebrides

Japanagromyza duchesneae (Sas.)

New Guinea and Australia

Melanagromyza albisquama (Mall.)
M. metallica (Thom.)
Ophiomyia conspicua (Sp.), n. comb.
O. phaseoli (Tryon)

Recent introductions

Ophiomyia lantanae (Frogg.)
Calycomyza humeralis (Ros.)
Liriomyza brassicae (Riley)

In commenting on the patterns of distribution apparent from this analysis, it cannot be too strongly emphasized that any conclusions can only be tentative in view of the fragmentary collecting which has been undertaken in the entire area. For example, only 6 species have been recorded from Irian Jaya. Certain facts do nevertheless emerge.

(1) The affinities of the New Guinea Agromyzidae are diverse, with a preponderance of "Oriental" species. A few are clearly of northern origin and a similarly small number show a close relationship with Australian species.

(2) With 55% of described species not known outside New Guinea, it can be accepted that there has been a high degree of speciation at the species level, even though some of the "endemic" species will in due course be found to occur elsewhere.

(3) There is no clear evolution at the generic level. Only *"Praspedomyza" prostrata* Sas. possibly deserves separate generic status.

(4) The very wide distribution of a number of species confirms the mobility of the Agromyzidae and their ability to cross wide water gaps. This is apparent in such species as *Japanagromyza maai, Cerodontha (Dizygomyza) hardyi, Icteromyza floresensis* and *Melanagromyza insignita,* which are not known to feed on commercial crops and are unlikely to have been introduced from one area to another by man. However, the number of such species is small. At least some other species of wide distribution have almost certainly been introduced in commerce.

(5) The small overlap in distinctive species between New Guinea and New Britain, despite their relatively close proximity, is striking. Apart from species of wide distribution, only *Phytobia furcata* and *Amauromyza papuensis* occur in common to the 2 islands.

(6) A similar lack of overlap is found between species from New Guinea and New Ireland. *Agromyza papuensis* is widespread in New Guinea and has been recorded in New Ireland (Spencer 1966b: Fig. 1, 2), but it is now believed that the New Ireland population may be distinct. The only other distinctive species in common to the 2 islands is *Melanagromyza insignita.*

(7) The 2 large temperate genera *Liriomyza* and *Phytomyza,* even at the highest altitudes visited, are each represented only by the single species *Liriomyza mikaniae,* n. sp. and *Phytomyza orientalis* (apart from *L. brassicae,* which is probably introduced). Both genera are better represented in Australia.

(8) Only 6 species of wide distribution in the area are present. However, examples of slight and presumably recent evolution are seen in *Tropicomyia coffeae* (New Guinea) and *T. polyphyta* (Kl.) (Australia), *T. nuginiensis,* n. sp. (New Guinea) and *T. pisi* (Australia), and *Ophiomyia ferox,* n. sp. (New Guinea) and *O. solanicola* (Australia).

(9) There are no obvious relationships with species in New Zealand, but it is worth noting that, among the New Zealand *Liriomyza* species, 4 have the scutellum black. This character is found in *L. mikaniae,* n. sp. and it is also present in an undescribed endemic Hawaiian species.

The affiliations of New Zealand species are being discussed in a paper currently in preparation.

Host plants of New Guinea Agromyzidae

Virtually no host plants of Agromyzidae have hitherto been known in New Guinea. Special

TABLE 2. Known hosts of New Guinea Agromyzidae.

HOST	AGROMYZIDAE
Dicotyledoneae	
Apocynaceae	
Allamanda oenotherifolia Pohl	*Tropicomyia* sp.
Hoya sp.	*Tropicomyia* sp.
Capparaceae	
Cleome spinosa Jacq.	*Liriomyza brassicae*
Compositae	
Ageratum conyzoides L.	*Melanagromyza metallica*
Bidens pilosa L.	*Melanagromyza metallica*
Crassocephalum crepidioides (Benth.) S. Moore	*Melanagromyza metallica*
Mikania cordata (Burm. f.) B. L. Robbins	*Liriomyza mikaniae*
Convolvulaceae	
Ipomoea ver. *alba* L.	*Tropicomyia coffeae*
Cucurbitaceae	
Melothria sp.	*Tropicomyia*, n. sp.
Gesneriaceae	
Cyrtandra sp.	*Tropicomyia, n. sp.*
? Lauraceae	
gen. and sp. indet.	*? Agromyza sp.*
Leguminosae	
Phaseolus vulgaris L.	*Ophiomyia phaseoli*
Vigna sesquepedalis Fruwirth	*Ophiomyia phaseoli*
sp. indet.	*Melanagromyza obtusa*
Liliaceae	
Cordyline fruticosa (L.) A. Chev.	*Tropicomyia*, n. sp?
Moraceae	
Cudrania amboinensis (Bl.) Miq.	*Tropicomyia?coffeae*
Passifloraceae	
Passiflora foetida L.	*Tropicomyia* sp.
Piperaceae	
Piper gibbilimbum C.D.C.	*Tropicomyia piperi*
Ranunculaceae	
Clematis javana DC	*Phytomyza orientalis*
Rubiaceae	
Coffea arabica L.	*Tropicomyia coffeae*
Sapindaceae	
Halpullia sp.	*Tropicomyia* sp.
Solanaceae	
Solanum ferox L.	*Ophiomyia ferox*
S. verbascifolium L.	*Ophiomyia ferox*
Tropaeolaceae	
Tropaeolum majus L.	*Liriomyza brassicae*
Verbenaceae	
Lantana camara L.	*Ophiomyia lantanae*
Monocotyledoneae	
Cyperaceae	
Fimbristylis dichotoma (L.) Vahl.	*Cerodontha ? (Icteromyza) piliseta*
Dioscoreaceae	
Dioscorea alata L.	*Tropicomyia ? coffeae*
Gramineae	
Ischaemum sp.	*Pseudonapomyza cingulata*
Setaria palmifolia (Koen.) Stapf	*Agromyza papuensis*

attention was therefore given during my collecting to finding larval leaf-mines or puparia in stems, and in this way 28 identified hosts were discovered in 21 families. It was of particular interest to establish the hosts of 2 species described from caught specimens some years earlier. – *Pseudonapomyza cingulata* Sas. on *Ischaemum* sp. (Gramineae) and *Phytomyza orientalis* Sp. on *Clematis javana* (Ranunculaceae).

The lack of leaf-mines on apparently suitable hosts which had previously been noted in tropical areas such as Ceylon and the Philippines was again very obvious in New Guinea. The majority of leaf-mines found belonged to species in *Tropicomyia,* which has clearly replaced *Phytomyza* as the main leaf-mining genus in the tropics. Mines were discovered of 1 species in each of the genera *Ophiomyia, Agromyza* and *Phytomyza* and of 2 species in *Liriomyza.*

A complete list of the known hosts of New Guinea Agromyzidae is given in TABLE 2.

Location of holotypes

Holotypes of new species collected by me will be deposited in the British Museum (Natural History) but are being retained temporarily in my personal collection.

Synonymies

For detailed synonymies of previously described species, reference should be made to the synopsis of Oriental species by Spencer (1961) and the paper on Papuan Agromyzidae by Sasakawa (1963b).

Genus **MELANAGROMYZA** Hondel

Although this is the dominant genus throughout the Oriental Region and also in northern Australia, only 5 species are recorded below, of which 2 are new. Seven additional species are known in New Guinea (Spencer 1962a, Sasakawa 1963b). It is certain that further species remain to be discovered, but my collecting showed that, apart from *M. metallica* which is present virtually everywhere in association with *Bidens* up to 5000 ft (1525 m), populations of this genus are small and local.

Melanagromyza baiyerensis, Spencer, **n. sp.** FIG. 1, 2

Small greenish species with dark squamal fringe. *Head:* frons narrow, equal to width of eye, not projecting above eye in profile; 2 *ors,* 2 *ori,* orbital setulae minute, sparse, reclinate; ocellar triangle extended, apex reaching midway between lower *ors* and upper *ori;* jowls narrow, 1/12 height of eye; eye bare; 3rd antennal segment small, round; arista long, 4/5 eye height, moderately pubescent. *Mesonotum:* 2 *dc, acr* in 8 rows. *Wing:* length in ♂ 2.35 mm, last section of vein M_{3+4} 2/3 penultimate. *Legs:* mid-tibia with 2 lateral bristles. *Color:* frons mat black, ocellar triangle conspicuously, orbits moderately, shining; mesonotum shining, blackish-green, abdomen greenish; squamae gray, margin and fringe black; halteres black. ♂ *genitalia:* aedeagus as in FIG. 1, 2.

Holotype ♂, PNG: New Guinea (NE): W. Highlands Dist., Baiyer River Wildlife Sanctuary, 4.XI.1973.

Remarks: This species belongs to the small group of greenish species having the squamal fringe dark. In the Oriental Region, only *M. cuscutae* Hering, 1958 from Pakistan and Burma (cf Spencer 1962b: 670), *M. mixta* Spencer, 1962b from the Philippines, and *M. surrufa* Sasakawa, 1963b from New Britain have this combination of characters. The male genitalia confirm that *M. baiyerensis* is distinct from *M. cuscutae* and *M. mixta; M. surrufa* differs in having the eye haired and the abdomen reddish.

Melanagromyza hermani Spencer, **n. sp.** FIG. 3, 4

Large species with black squamal fringe. *Head:* frons 2X width of eye, not significantly projecting above eye in profile; 2 *ors,* 2 *ori,* orbital setulae sparse, reclinate; ocellar triangle broad but apex not reaching level of lower *ors;* jowls 1/8 height of eye, with strong vibrissa equal to upper *ori* and a row of short, irregular vibrissal hairs; 3rd antennal segment rounded, arista only finely pubescent. *Mesonotum:* 2 strong *dc* with 3 or 4

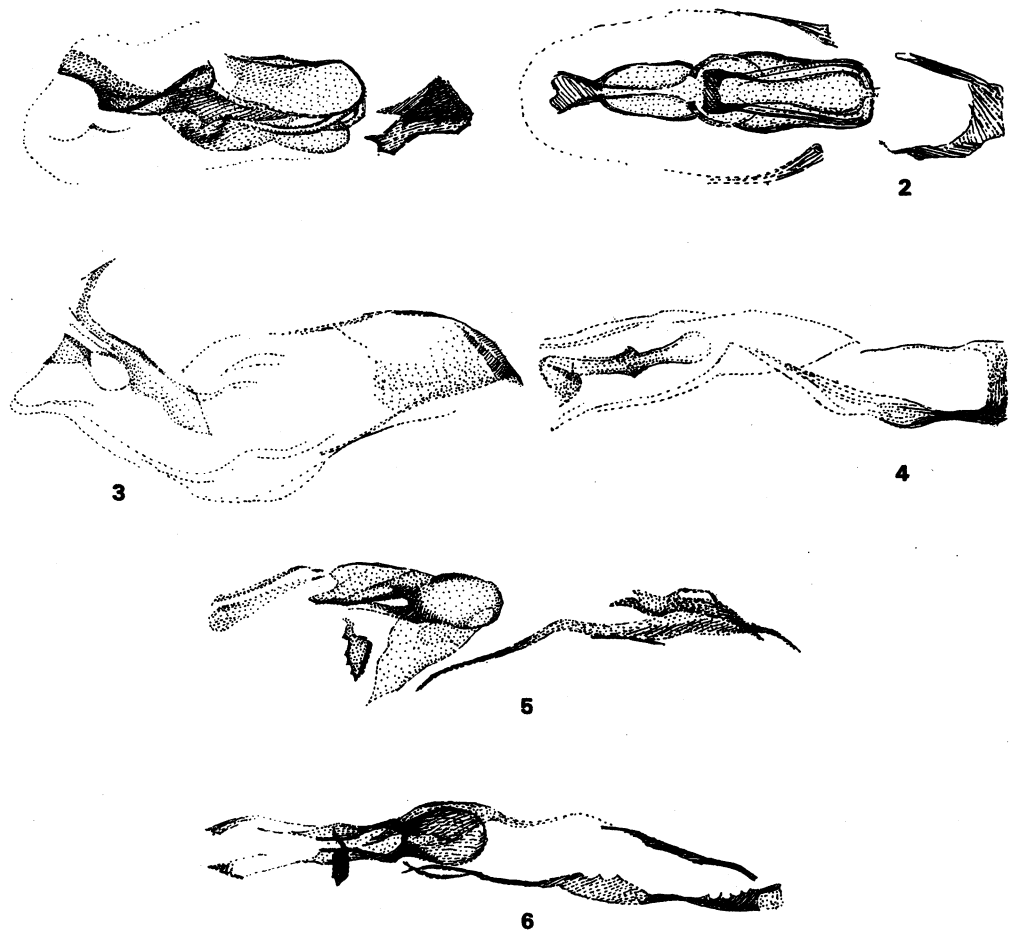

FIG. 1–6. (1–2) *Melanagromyza baiyerensis:* (1) aedeagus, side view; (2) same, ventral view. (3–4) *Melanagromyza hermani:* (3) aedeagus, side view; (4) same, ventral view. (5–6) *Melanagromyza insignita* (5) aedeagus, side view; (6) same, ventral view.

shorter ones extending to suture, less than ½ length of 2nd *dc*, *acr* in 7 or 8 rows at 2nd *dc*. *Wing:* length in ♂ 3.25 mm, costa extending to vein M_{1+2}, last section of M_{3+4} little more than ½ length of penultimate, r-m cross-vein at midpoint of discal cell. *Legs:* fore-tibia with 1, mid-tibia with 2, lateral bristles. *Color:* entirely black; frons mat, ocellar triangle and orbits weakly shining; mesonotum and abdomen conspicuously shining, without any metallic coloration; squamae grayish black, margin and fringe deep black; halteres black. ♂ *genitalia:* aedeagus as in FIG. 3, 4; 9th sternite with short, blunt hypandrial apodeme; surstyli extending inwards, with 2 long hairs and a row of short bristles along inner margin.

Holotype ♂, PNG: New Guinea (NE): Enga Dist., at roadside by waterfall near bridge below Pausa, nr. Wapenamanda, 7.XI.1973.

Remarks: The genitalia of this species are atypical of *Melanagromyza*, but it is best placed in this genus until its generic position can be further clarified from examination of larval characters. It closely resembles *M. insignita* (see below) and the 2 species were caught at similar localities only 5 km apart on succeeding days. Important characters of *M. hermani* are the fore-tibial bristle and the 3 or 4 small, additional *dc* beyond the 2nd.

Melanagromyza insignita Spencer, 1966b FIG. 5, 6.

Material examined: 1 ♂, PNG: New Guinea (NE): Enga Dist., 5 km NE of Wapenamanda, on

damp vegetation near stream at roadside, 6.XI.1973.

Remarks: The only other record of this large black species is the holotype from New Ireland. The aedeagus of the specimen from Wapenamanda is shown in FIG. 5, 6.

The true generic position of this species is not clear. Externally it is a typical *Melanagromyza* and it is tentatively retained in this genus. The fore-tibial bristle has been considered as a generic character of *Japanagromyza* by Sasakawa (1972), but this appears to be merely associated with large size and has been noted in a number of large *Melanagromyza.* The aedeagus differs substantially from that of typical *Melanagromyza* species and is equally atypical of *Ophiomyia.* The correct affiliations will probably only become apparent from larval characters.

No comparable species is so far known in Australia. In the Oriental Region, *Melanagromyza setigera* (Malloch, 1914) also bears the fore-tibial bristle and is only slightly smaller. However, the holotype is a female and no males have been examined.

Melanagromyza metallica (Thomson, 1869)

Material examined: 87 ♂♂, 41 ♀♀ from numerous localities in PNG: New Guinea (NE): Morobe, Enga, W. Highlands, E. Highlands Districts, also 2 ♀♀ from Brown River, nr. Port Moresby, Central District.

Remarks: This is without question the commonest species in New Guinea and has been previously recorded from many localities by Spencer (1962a) and Sasakawa (1963b).

The main hosts are the introduced weeds, *Bidens pilosa* L., *Ageratum conyzoides* L. and *Crassocephalum crepidioides* (Benth.) S. Moore; the larvae feed and pupate in the stem. Almost certainly the species also feeds on other native composite hosts; however, the very large populations now present not only in New Guinea, but also virtually throughout the Oriental Region and the Pacific area and also in northern Australia, have built up in conjunction with the explosive spread of *Bidens, Ageratum* and *Crassocephalum.* Flies were seen, particularly on *Bidens,* from sea level to 5000 ft (1525 m). Above this altitude *M. metallica* seems unable to follow its hosts.

Melanagromyza obtusa (Malloch, 1914)

Material examined: 1 ♂, 1 ♀, PNG: New Guinea (NE): Morobe Dist., Erap, ex pods of native legume, 25.X.1961, C. Edwards; in coll. of D.A.S.F., Port Moresby.

Remarks: This species has previously been recorded from NW New Guinea by Sasakawa (1963b). In India and Ceylon it is a serious pest of *Cajanus indicus* Spreng, and has been recorded feeding also on *Flemingia* sp. (Java) and *Phaseolus radiatus* L. (Ceylon) (cf Spencer 1973a: 46–50).

Genus **OPHIOMYIA** Braschnikov

Eight species are discussed below, of which 5 are described as new. Two, *O. conspicua* and *O. phaseoli,* were earlier treated as *Melanagromyza* species; *O. lantanae* is now confirmed for the first time in New Guinea.

A single male from Wisselmeren, IRIAN: New Guinea (NW), was originally determined as *O. lantanae* by Spencer (1962a: 659) and later by Sasakawa (1963b: 817) as *O. negrosensis* Spencer, 1962b. Re-examination of the specimen satisfies me that both of these determinations are incorrect. Many species in this group have a complex, asymmetrical aedeagus, and identification has been difficult in the past. However, following the study of numerous species throughout the world, it is clear that this species is undescribed. The aedeagus is now badly crushed and cannot be accurately interpreted, and the formal description as a new species is undesirable without additional material. The only other species known in New Guinea is *O.*

gressitti Sasakawa, 1963b. This was described from a single female without any particular distinguishing characters and cannot be properly placed without associated males.

Of the 8 species considered here, 4 – *O. ferox* n. sp., *O. hornabrooki,* n. sp., *O. lantanae* (Froggatt) and *O. lutzi,* n. sp. – have the conspicuous facial keel characteristic of the genus, while the generic position of the other 4 – *O. conspicua* (Spencer), *O. melanagromyzae,* n. sp., *O. papuana,* n. sp. and *O. phaseoli* (Tryon) – is only apparent from the male genitalia or larval characters (*O. phaseoli*).

Only 10 *Ophiomyia* species are known throughout the Oriental Region and 6 have been recorded in Australia (Spencer 1963a). I also have seen 15 additional species among undetermined material from Australia, which will be described in a paper now in preparation.

Ophiomyia conspicua (Spencer), **n. comb.**

Melanagromyza conspicua Spencer, 1961: 71.

Material examined: PNG: New Guinea (NE): 1 ♀, Morobe Dist., Wau, 21.XI.1973; 1 ♂, E. Highlands Dist., Goroka, on *Bidens,* 16.XI.1973; 2 ♂♂, Kwongi, nr Asaro, on *Bidens,* 19.XI.1973; 1 ♂, W. Highlands Dist., Kondapena, nr Mount Hagen, 14.XI.1973; 1 ♂ Enga Dist., Wapenamanda, 7.XI.1973.

Remarks: This species has previously been recorded from widespread localities in New Guinea (Spencer 1962a, Sasakawa 1963b). It is known from Ceylon to Formosa in the Oriental Region and has also been recorded in New Britain, the Bismarcks and New Caledonia, and in Australia from Clyde Mt, N.S.W.

Larvae have been found in stems of *Eclipta alba* L. in India (Spencer 1966a: 5) and, in Australia, specimens were caught on *Sigesbeckia orientalis* L. (Spencer 1963a: 315). In the present series there seems to be a definite association with *Bidens* and it seems clear that the species has a number of composite hosts.

Ophiomyia ferox Spencer, **n. sp.** FIG. 7–10

Small species with vibrissal fasciculus in ♂. *Head* (FIG. 7): frons slightly less than 1½x width of eye, not projecting above eye in profile; 2 *ors* and 2 *ori,* orbital setulae sparse, reclinate; apex of ocellar triangle extending to level of lower *ors;* in ♂ jowls forming angle of 60°, deepest in front, vibrissal fasciculus slender with conspicuous curvature and somewhat membranous at end; facial keel low and narrow. *Mesonotum:* 2 strong *dc, acr* in 6–8 rows. *Wing:* length in ♂ 1.7–1.8 mm, in ♀ up to 2.1 mm; costa extending to vein M_{1+2}, last section of M_{3+4} only slightly shorter than penultimate, r-m cross-vein well beyond midpoint of discal cell. *Color:* head entirely black, ocellar triangle and orbits moderately shining; mesonotum and abdomen shining black; squamae gray, margin and fringe black; halteres black. ♂ *genitalia:* aedeagus asymmetrical, as in FIG. 8, 9; ventral lobe (hypophallus) well developed on 1 side; ejaculatory apodeme large, slightly longer than aedeagus.

Host plants: Solanum ferox L., *S. verbascifolium* L.

Biology: larva forming a long, whitish upper surface mine (FIG. 10), with frass in an almost continuous black line only slightly off center of the channel; pupation takes place at the end of the mine with the anterior spiracles projecting through the epidermis. The puparium is pale brown, with the posterior spiracles each having a line of 5 bulbs at each end of an elongate protuberance.

Holotype ♂, PNG: New Guinea (NE): Morobe Dist., Bulolo, emerged 10.XI.1973 from leaf-mine on *Solanum ferox* 27.X.1973; paratypes: 2 ♀♀, same data; 1 ♂, 2 ♀♀, 12 and 16.XI.1973 ex *Solanum verbascifolium,* leg. 5.XI.1973, W. Highlands Dist., Trauna Valley Farm, nr Baiyer River; 1 ♀, 21.XI.1973, ex *S. ferox* leg. 3.XI.1973, Baiyer River Wildlife Sanctuary. One paratype presented to D.A.S.F., Port Moresby.

Remarks: The distinctive characters of this species are the narrow facial keel and the conspicuous terminal curvature of the male vibrissal fasciculus. In these characters *O. ferox* is not distinguishable from *O. solanicola* Spencer, 1963a, which was bred from *Solanum*

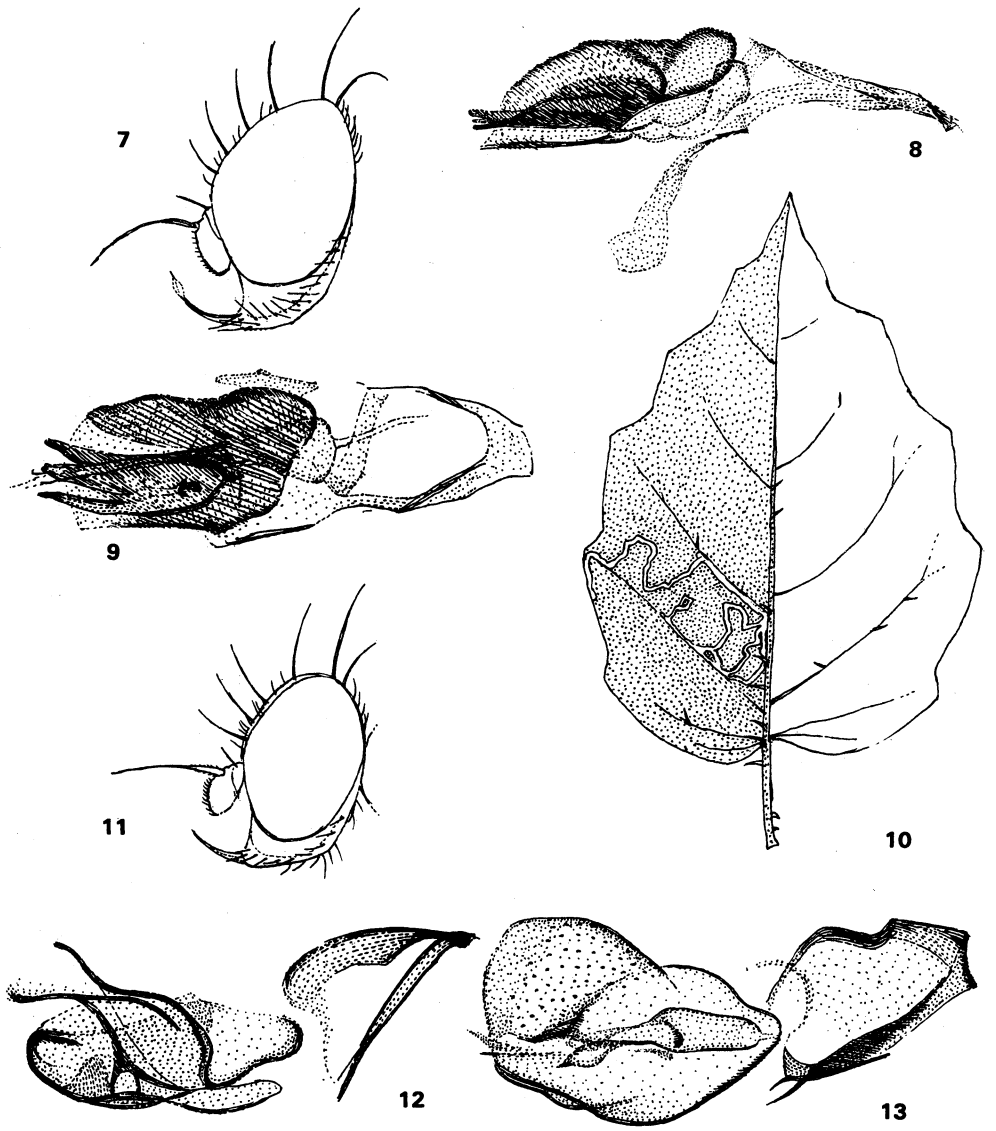

FIG. 7–13. (7–10) *Ophiomyia ferox:* (7) head; (8) aedeagus, side view; (9) same, ventral view; (10) leaf-mine on *Solanum ferox.* (11–13) *Ophiomyia hornabrooki:* (11) head; (12) aedeagus, side view; (13) same, ventral view.

prinophyllum in New South Wales. The male genitalia of the 2 species are of the same general form but different in detail. The larval leaf-mines are also similar, but in *O. solanicola* the posterior spiracles of the larva/puparium each have 3 bulbs, in *O. ferox* 5.

Ophiomyia hornabrooki Spencer, **n. sp.** FIG. 11–13

Medium-sized species with facial keel and vibrissal fasciculus in ♂. *Head:* frons 1½X width of eye, not projecting above eye in profile; 2 *ors,* 2 *ori,* all approximately equal, orbital setulae sparse, reclinate; jowls narrow, about 1/10 height of eye in center, not greatly projecting forwards; vibrissal corner forming angle of 80°, fasciculus in ♂ short, stout (FIG. 11); facial keel low, distinctly widening below base of antennae; arista bare, ¾ height of eye. *Mesonotum:* 2 strong *dc, acr* in 6 rows between 2nd *dc. Wing:* length in ♂ 2.4 mm, in ♀ 2.5mm; costa extending to vein M_{1+2}, last section of M_{3+4} slightly more than 2/3 penultimate, r–m cross-vein well beyond midpoint of discal cell. *Color:* entirely black, ocellar triangle and orbits weakly shining; mesonotum and abdomen conspicuously shining; squamae gray, margin and fringe black; halters black. ♂ *genitalia:* aedeagus as in Fig. 12, 13, asymmetrical.

Holotype ♂, PNG: New Guinea (NE): E. Highlands Dist., at roadside between Asaro and Marsafuga, 7500 ft (2290 m), 17.XI.1973; paratype ♀, same data, in cop. with holotype.

Remarks: This species is typical of the genus, both in external characters and in the male genitalia. In my (1973a) key to Oriental *Ophiomyia* species, it runs to couplet 7, but is clearly distinct both from *O. cicerivora* from Pakistan and *O. negrosensis* from the Philippines.

I have pleasure in dedicating this species to Dr R. W. Hornabrook, Director of the Institute of Medical Research at Goroka, who took me to the interesting and inaccessible type-locality in the mountains above Asaro.

Ophiomyia lantanae (Froggatt, 1919)

Material examined: PNG: New Guinea (NE): 1 ♀, Eastern Highlands Dist., Goroka, on *Lantana camara* in garden, 18.XI.1973; PNG: New Guinea (SE): several specimens on *Lantana,* Northern Dist., Girua, near Popondetta, 10.XI.1973, R. Berena.

Remarks: These are the first confirmed records of this species in New Guinea. Presumably *O. lantanae* has been inadvertently introduced from Australia with seeds of its host.

The record given earlier by Spencer (1962a) was based on a misidentification.

Ophiomyia lutzi Spencer, **n. sp.** FIG. 14

Medium-sized species with elongated proboscis. *Head* (FIG. 14): frons slightly less than 2X width of eye: orbital bristles slender, 2 *ors,* 2 *ori;* orbital setulae sparse, reclinate; ocellar triangle not extended; jowls deep, conspicuously projecting forwards; 3rd antennal segment small, round; facial keel broad but not greatly raised; proboscis elongate. *Mesonotum:* 2 *dc, acr* in 8 rows. *Wing:* length in ♀ 2.4–2.5 mm, costa extending to vein M_{1+2}, last and penultimate sections of M_{3+4} equal, r-m cross-vein well beyond midpoint of discal cell. *Legs:* mid-tibia without lateral bristles. *Color:* frons mat black, orbits distinctly shining; mesonotum only slightly shining, gray-dusted; abdomen shining black; squamae gray, margin and fringe black; halteres black.

Holotype ♀, PNG: New Guinea (NE): Enga Dist., Sirunki, 8700 ft. (2650 m), 8.XI.1973, on *Pyrethrum;* paratype ♀, Morobe Dist., Wagau, 4000 ft (1220 m), 19.X.1973.

Remarks: No other species in this genus are known in the Oriental Region with the proboscis elongate. *O. lutzi* is clearly widespread in New Guinea, although apparently not common. There should be no difficulty in due course in associating males with the 2 female types.

I have pleasure in dedicating this species to Pastor Bernie Lutz of the Lutheran Mission, whose hospitality I was enjoying when I caught the holotype.

Ophiomyia melanagromyzae Spencer, **n. sp.** FIG. 15, 16

Medium-sized black species without facial keel or vibrissal fasciculus. *Head:* frons nearly 1½X width of eye, not projecting above eye in profile; 2 *ors,* 2 *ori,* orbital setulae in single row, reclinate; ocellar triangle

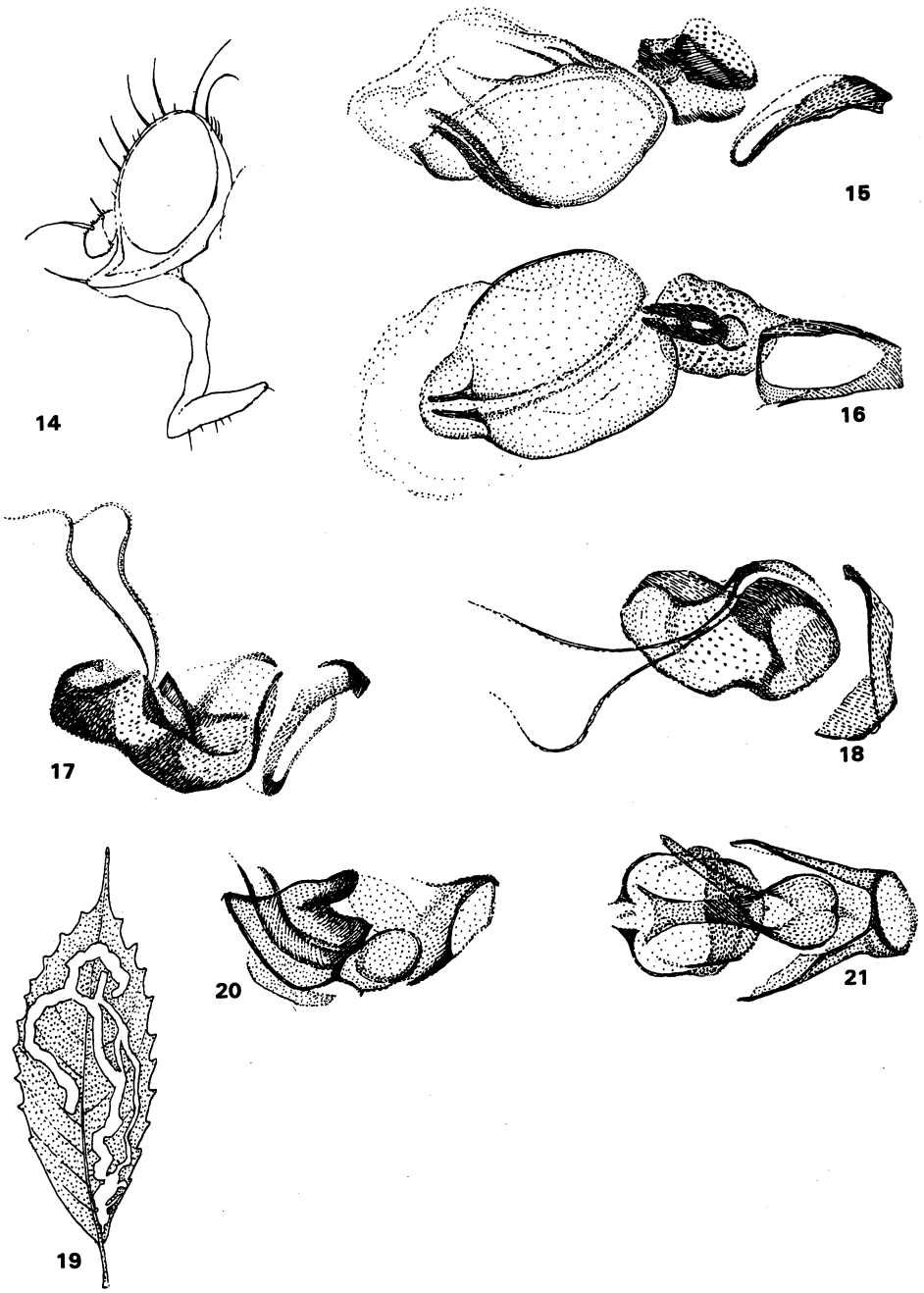

FIG. 14–21 . (14) *Ophiomyia lutzi:* head of ♀. (15–16) *Ophiomyia melanagromyzae:* (15) aedeagus, side view; (16) same, ventral view. (17–18) *Ophiomyia papuana:* (17) aedeagus, side view; (18) same, ventral view. (19) Leaf-mine of *Tropicomyia* sp. on *Cyrtandra* sp. (20–21) *Tropicomyia coffeae:* (20) aedeagus, side view; (21) same, ventral view.

unusually narrow, extending to margin of lunule; jowls rounded, deepest in center below eye, 1/8 height of eye; eye bare; 3rd antennal segment small, round, shortly pilose, arista bare, only slightly shorter than eye height. *Mesonotum:* 2 *dc, acr* in 6 rows. *Wing:* length in ♂ 2.5 mm, costa extending to vein M_{1+2}, last section of M_{3+4} 2/3 penultimate, r–m cross-vein just beyond midpoint of discal cell. *Legs:* mid-tibia with 1 lateral bristle on one side, 2 on other. *Color:* entirely black; ocellar triangle and orbits only weakly shining; mesonotum mat viewed from front, more shining from rear; abdomen shining black; squamae gray, margin and fringe black; halteres black. ♂ *genitalia:* aedeagus asymmetrical, as in FIG. 15, 16, arms of basiphallus joined distally; ejaculatory apodeme with enlarged blade; surstyli curving inwards, clothed with short bristles, with a distinct membranous gap from outer walls of epandrium.

Holotype ♂, PNG: New Guinea (NE): W. Highlands Dist., Trauna Valley Farm, 4000 ft (1220 m), 4 km N of Baiyer River Wildlife Sanctuary, 5.XI.1973.

Remarks: On external characters this is a typical *Melanagromyza.* However, the ♂ genitalia confirm its correct generic position in *Ophiomyia,* although the basiphallus is unusual and is more characteristic of many *Melanagromyza* species.

In Sasakawa's (1963b) key to Papuan *Melanagromyza* species, *O. melanagromyzae* would run to *O. conspicua* in couplet 16, but the 3rd antennal segment is distinctly less pubescent. It also resembles both *O. sordidata* Spencer (1962a: Fig. 5) from New Britain and, among Oriental species, *O. ricini* de Meijere (cf Spencer 1962b: Fig. 14), but the aedeagus of these species is quite distinct.

Ophiomyia papuana Spencer, **n. sp.** FIG. 17, 18

Minute, black species without vibrissal fasciculus. *Head:* frons not projecting above eye, 1½X width of eye; 2 *ors.* 2 *ori;* ocellar triangle narrow, extending to level of lower *ors;* jowls 1/7 height of eye, cheeks forming distinct ring below eye; 3rd antennal segment small, round, arista virtually bare. *Mesonotum:* 2 strong *dc, acr* in 6 rows. *Legs:* mid-tibia without lateral bristle. *Wing:* length in ♂ 1.4 mm, costa extending to vein M_{1+2}, last section of M_{3+4} 2/3 penultimate, r-m cross-vein well beyond midpoint of discal cell. *Color:* frons mat black, orbits and ocellar triangle moderately shining; squamae gray, margin and fringe black; halteres black. ♂ *genitalia:* aedeagus (FIG. 17, 18) asymmetrical, mesophallus finely spinulose, distiphallus with 2 slender tubules; 9th sternite with short, blunt hypandrial apodeme; ejaculatory apodeme long, equal to distance between side-arms of 9th sternite, blade narrow.

Holotype ♂, PNG: New Guinea (SE): Central District, 30 km N of Port Moresby, at roadside in Brown River area, 26.XI.1973.

Remarks: On external characters this species would be mistaken for a *Tropicomyia,* but the asymmetrical aedeagus is typical of normal *Ophiomyia* species. No other species is known either in Australia or the Oriental Region in this group having a dark squamal fringe and lacking both a vibrissal fasciculus and a keel dividing the antennae.

Ophiomyia phaseoli (Tryon, 1895)

Material examined: PNG: New Guinea (SE): Central Dist., Port Moresby, University, 2 ♀♀, 26.XI.1973, on *Vigna sesquipedalis* Fruwirth; 1 ♂, same locality, emerged 8.XII.1973 from puparium 26.XI.1973 in stem of *Phaseolus vulgaris* L.

Remarks: This species has been recorded once in New Guinea (Anon. 1969) and I have seen specimens in the collection of the D.A.S.F., Port Moresby, bearing the data "New Guinea, 1947," J. L. Froggatt.

Genus **TROPICOMYIA** Spencer, 1973a

This genus was erected primarily for the group of minute black epidermal leaf-miners occurring from Africa to northern Australia and southern Japan which had previously been included in *Melanagromyza.* Additional leaf-mining species with a different type of genitalia and without the characteristically serrated larval mouth-hooks were also transferred to *Tropicomyia* on a tentative basis pending further clarification, as they also clearly do not belong in *Melanagromyza* s.s. These species may conveniently be referred to as the *T. pisi* group

(cf Kleinschmidt 1961, Spencer 1973a: 188).

Four new *Tropicomyia* species are described below. Of these, 3 are certainly epidermal miners, 1 having as host *Piper gibbilimbum;* the 4th, *T. nuginiensis,* n. sp., belongs to the *T. pisi* group.

Specimens were bred from epidermal mines on coffee at Wau and these are accepted as *T. coffeae* (Koningsberger 1897) which was described from Java.

Details of 4 further unidentified species, 3 on identified hosts, are as follows:

Cordyline fruticosa (L.) A. Chev. (Liliaceae). Enga Dist., Wapenamanda, 2 ♀♀, 11.XI.1973, ex leaf-mines found 31.X.1973. Mines were also noted at Lae, Botanical Gardens, 16.X.1973; Wau, 24.X.1973 and Kaimantu, 29.X.1973. This species is almost certainly distinct from *T. coffeae;* it is larger and regularly associated with its host. The formal description is best delayed until males are available to confirm its exact status.

Cyrtandra sp. (Gesneriaceae). This bush was seen at several localities on Mt Kaindi, above Wau, from Kunai Creek, 5000 ft (1525 m) to the summit, and virtually all plants had conspicuous greenish yellow, upper surface, linear mines (FIG. 19) with empty puparia in the leaves. Similar mines were found on the same host at Onim, nr. Mendi, S. Highlands Dist., 7400 ft (2260 m) 12.XI.1973. This certainly represents an undescribed species.

Melothria sp. (Cucurbitaceae). Empty mines were found beside the road from Asaro to Marsafuga, E. Highlands Dist., 7700 ft (2350 m), 17.XI.1973. The mines are mainly epidermal, but in places substantially deeper. It seems probable that this represents an undescribed species.

Species, genus and family indet. (young tree, possibly Lauraceae, det. Cutler, Kew). A single epidermal mine with puparium was found at Onim, nr Mendi, S. Highlands Dist., 7400 ft (2260 m), 12.XI.1973. It is doubtful, though not impossible, that *T. coffeae* would occur at this altitude. The highest record is above Minj, 5200 ft (1590 m).

Tropicomyia coffeae (Koningsberger, 1897) FIG. 20, 21

Material examined: PNG: New Guinea (NE): 1 ♂, 1 ♀, Morobe Dist., Wau, 2.XII.1973, ex puparia on coffee 21.XI.1973; Wagau, leaf-mines, 19.XI.1973; W. Highlands Dist., Kuk Tea Research Institute, near Mount Hagen, leaf-mines, 30.X.1973; 20 miles (32 km) E of Mount Hagen, 2 ♂♂ 1.XI.1973 (host unknown); 1 ♂, Kondapena, beside R. Waghi, emerged 24.XI.1973 ex puparium leg. 14.XI.1973 on *Ipomoea* probably *alba* L. (det. Henty, Lae); 1 ♂, caught on host, 14.XI.1973.

Remarks: The status of this species has hitherto been in doubt, as the type series from Java is lost. I consider it reasonable to accept the specimens from New Guinea on coffee as identical with the species from Java. The aedeagus of the male from Wau bred from coffee is shown in FIG. 20, 21.

I can find no significant difference in the aedeagus of the 2 males associated with *Ipomoea alba* or of the further 2 males from near Mount Hagen, and consider these also represent *T. coffeae.* Further splitting may become possible as further hosts are established, but at the moment it appears that *T. coffeae* is a polyphagous species [comparable to *T. flacourtiae* Séguy, 1951, known from Madagascar and Africa, which also feeds on coffee (cf Spencer, 1973a: FIG. 275, 276)].

Empty leaf-mines were found on 6 further hosts which are all probably referable to *T. coffeae:*

Allamanda oenotherifolia Pohl (Apocynaceae): Lae, Botanical Gardens, 16.X.1973.
Cudrania amboinensis (Bl.) Miq.: W. Highlands Dist., Baiyer River, 3.XI.1973.
Dioscorea alata L. (Dioscoreaceae): Bubia, near Lae, 15.X.1973.
Halpullia sp. (Sapindaceae): Lae, Botanical Gardens, 28.X.1973.
Hoya sp. (Apocynaceae): Morobe Dist., Bulolo, 27.X.1973.
Passiflora foetida L. (Passifloraceae): W. Highlands Dist., Minj, 5200 ft (1590 m), 15.XI.1973.

Tropicomyia nuginiensis Spencer, n. sp. FIG. 22, 23

Minute, entirely black species. *Head:* frons not projecting above eye, 1½x width of eye; 2 *ors*, 2 *ori;* ocellar triangle broad, extending to level of lower *ors;* jowls narrow, 1/12 height of eye, this oval, upright; 3rd antennal segment small, round; arista only finely pubescent, 2/3 height of eye. *Mesonotum:* 2 strong *dc, acr* in 6–8 rows. *Legs:* mid-tibia without lateral bristle. *Wing:* length from 1.5 mm in ♂ to 1.6 mm in ♀; costa extending to vein M_{1+2}, last section of M_{3+4} slightly shorter than penultimate; r-m cross-vein well beyond midpoint of discal cell. *Color:* frons mat black, orbits and ocellar triangle distinctly shining; mesonotum and abdomen brilliantly shining; squamae gray, margin and fringe black; halteres black. ♂ *genitalia:* aedeagus (FIG. 22, 23) with basal sclerites slender, symmetrical, joining distally with an additional semicircular sclerite; tubules of distiphallus long, largely fused, but separating and diverging at apex; 9th sternite with extended hypandrial apodeme equal to distance between side-arms; ejaculatory apodeme large, with asymmetrical blade.

Holotype ♂, PNG: New Guinea (NE): Lae, on uncultivated ground near end of Taun Street, 14.XI.1973; paratype ♀, same data.

Remarks: The affiliations of this species are clearly apparent from the male genitalia,which indicate its close relationship with *T. indigoferae* (Kleinschmidt, 1961) and *T. pisi* (Kleinschmidt, 1961) from Australia and with *T. capeneri* (Hering, 1957) from South Africa. The host plant can reasonably be assumed to be in the Leguminosae.

Tropicomyia piperi Spencer, n. sp. FIG. 24, 25

ADULT: agreeing closely with *T. ponderosa* n. sp. (see below), but frons narrower, 1½X width of eye, and generally smaller, wing length in ♂ about 1.9 mm (not fully developed), in ♀ 2 mm. ♂ *genitalia:* aedeagus as in FIG. 24, 25.

Host: Piper gibbilimbum C.D.C., larva forming epidermal mine, pupating in leaf.

Holotype ♂, PNG: New Guinea (NE): E. Highlands Dist., Asaro-Chimbu Divide, 7500 ft (2290 m), 5 km N of Marsafuga, emerged 23.XI.1973 ex leaf-mine found 17.XI.1973; paratype ♀, emerged 19.XI.1973, otherwise same data. Empty leaf-mines were found on the same host at Baiyer River, W. Highlands Dist., 4.XI.1973.

Remarks: This species closely resembles *T. nigriclava* (Bezzi, 1926) from Rodrigues (cf Spencer 1973a: FIG. 278, 279), but the genitalia are sufficiently differentiated to treat it as distinct. In New Guinea it appears to be related to *T. ponderosa,* n. sp. (see below).

Empty leaf-mines found on *Piper* sp. at Bubia, near Lae, 16.X.1973, are possibly referable to this species.

Tropicomyia ponderosa Spencer, n. sp. FIG. 26, 27

Head: frons broad, 2x width of eye, not projecting above eye in profile; 2 *ors,* 2 *ori,* lower *ori* entirely incurved; orbital setulae sparse, reclinate, jowls narrow, about 1/12 height of eye; 3rd antennal segment small, round; arista slightly pubescent, little shorter than height of eye. *Mesonotum:* 2 strong *dc, acr* in 6 rows. *Wing:* length in ♂ 2.3 mm, costa extending to vein M_{1+2}, last section of M_{3+4} short, 2/3 penultimate, r-m cross-vein well beyond midpoint of discal cell. *Legs:* mid-tibia with 1 weak lateral bristle. *Color:* frons mat black, ocellar triangle and orbits only weakly shining; mesonotum shining black, slightly mat viewed from front; squamae dark gray, margin and fringe black; abdomen and halteres black. ♂ *genitalia:* aedeagus as in FIG. 26, 27; ejaculatory apodeme large, slightly longer than aedeagus.

Holotype ♂, PNG: New Guinea (NE): W. Highlands Dist., Kondapena Forestry Station, 50 km E of Mount Hagen, beside River Waghi, 5150 ft (1570 m), 14.XI.1973, caught on *Bidens.*

Remarks: This is one of the largest true *Tropicomyia* species and on this character is distinguishable from the other 4 species known in New Guinea. The aedeagus is distinctive, but clearly belongs to the same group as *T. piperi,* n. sp. and *T. nigriclava* (Bezzi, 1926) from Rodrigues (see above and also Spencer 1973a; Fig. 278, 279).

Although the holotype was caught on *Bidens,* this cannot be taken as a definite indication that this will prove to be the host.

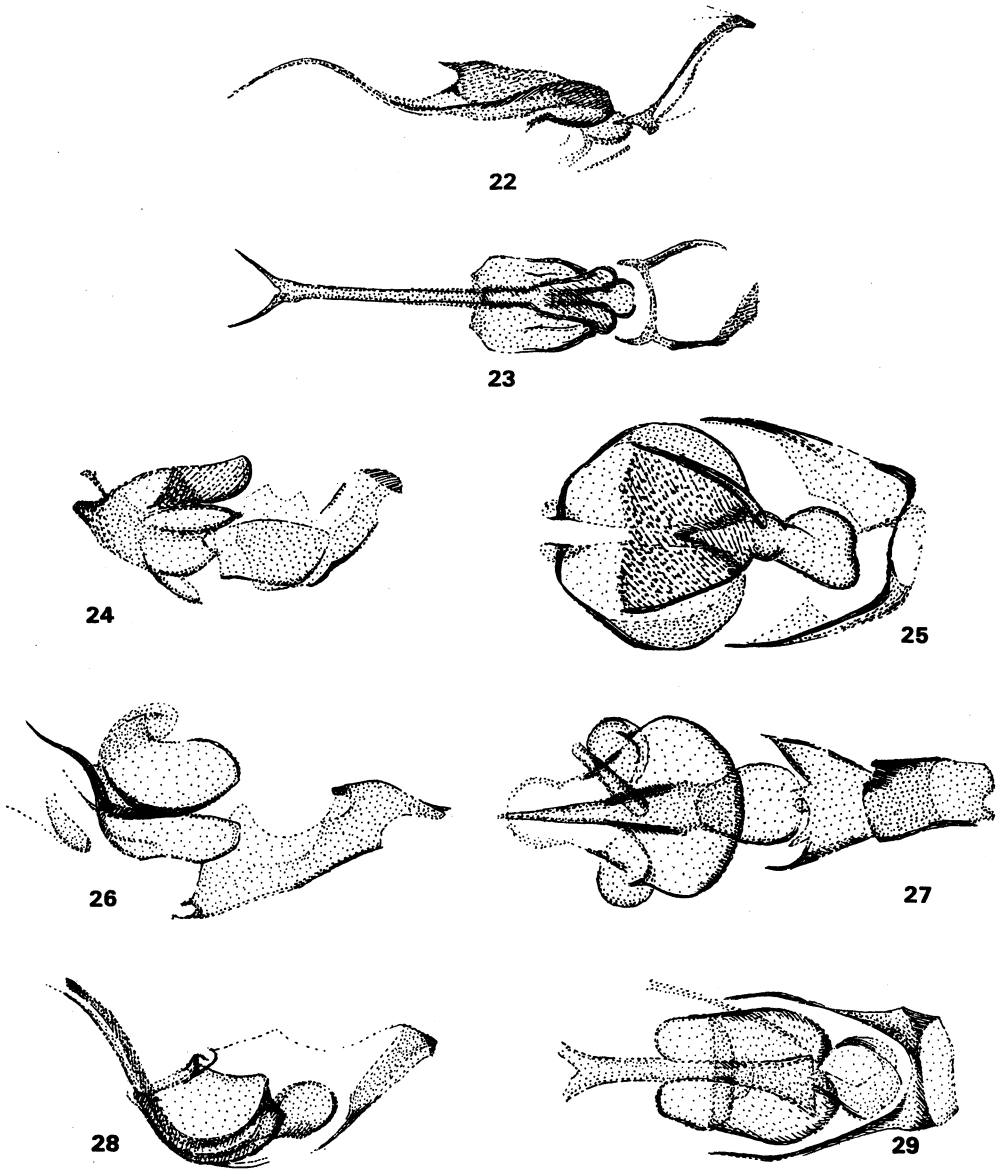

FIG. 22–29. (22–23) *Tropicomyia nuginiensis:* (22) aedeagus, side view; (23) same, ventral view. (24–25) *Tropicomyia piperi:* (24) aedeagus, side view; (25) same, ventral view. (26–27) *Tropicomyia ponderosa:* (26) aedeagus, side view; (27) same, ventral view. (28–29) *Tropicomyia porrecta:* (28) aedeagus, side view; (29) same, ventral view.

Tropicomyia porrecta Spencer, n. sp. FIG. 28, 29

Minute, shining black species. ADULT: on external characters, closely resembling both *T. coffeae* and *T. nuginiensis*, with following small differences: arista longer, equal to height of eye; wing length 1.6 mm in ♂; mid-tibia with 1 weak lateral bristle. ♂ *genitalia:* aedeagus as in Fig. 28, 29; ejaculatory apodeme longer than aedeagus, blade slender; 9th sternite with slender side-arms, with only short hypandrial apodeme.

Holotype ♂, PNG: New Guinea (NE): W. Highlands Dist., Baiyer River Wildlife Sanctuary, 3.XI.1973.

Remarks: The aedeagus of this species most closely resembles that of *T. theae* (Cotes) from Ceylon (cf Spencer 1973a: Fig. 290, 291), but the distal tubule is even longer. It seems probable that the 2 are closely related.

Genus **JAPANAGROMYZA** Sasakawa

Only 3 species are known from New Guinea – *J. duchesneae* (Sasakawa, 1954) from Oriomo, Central District; *J. multiplicata* Sasakawa, 1963b from West Sepik and Northern Districts; and *J. triformis* Spencer, 1962a from Vogelkop, Irian Jaya. One new species is described below and a female is recorded which possibly represents a further undescribed species.

Japanagromyza involuta Spencer, n. sp. FIG. 30, 31

Large species with black halteres and no fore-tibial bristle. *Head:* frons narrow, equal to width of eye, not projecting above eye in profile; orbital bristles short, strong, 2 *ors*, 2 *ori;* orbital setulae lacking; ocellar triangle small, apex not reaching level of lower *ors;* frons above lunule with a row of 5 short hairs; jowls little more than linear, 1/30 height of eye; 3rd antennal segment round, with a fringe of short pubescence; arista long, equal to eye height, finely pubescent. *Mesonotum:* 2 *dc*, pre-scutellars strong, equal to 2nd *dc*, *acr* in 6 rows. *Wing:* length in ♂ 2.5 mm, costa extending to vein M_{1+2}, last section of M_{3+4} short, in ratio 15:35 with penultimate, r-m cross-vein distinctly before midpoint of discal cell. *Legs:* fore-tibia without lateral bristle, mid-tibia with 1 bristle on 1 side, 2 on the other. *Color:* frons mat black; ocellar triangle scarcely shining, bases of orbital bristles distinctly so; lunule slightly grayish; mesonotum and abdomen brilliantly shining black; squamae gray, margin and fringe black; halteres black. ♂ *genitalia:* aedeagus unusually complex, as in FIG. 30, 31; 9th sternite with narrow side-arms, without extended hypandrial apodeme; ejaculatory apodeme greatly enlarged, over 2X length of aedeagus, blade asymmetrical; cerci large, extending below lower margin of epandrium, with a fringe of fine hairs but no bristles.

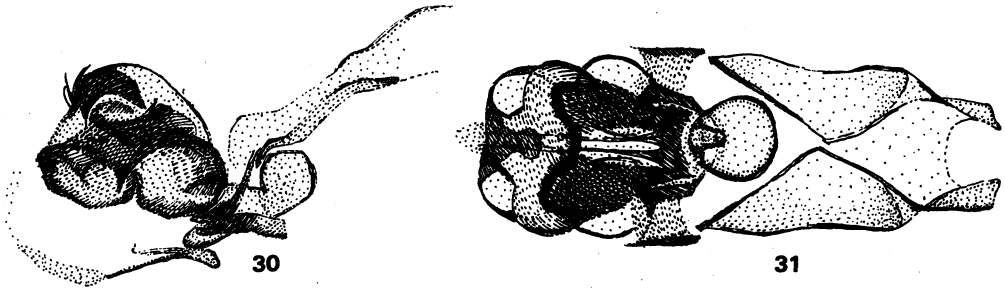

FIG. 30–31. *Japanagromyza involuta:* (30) aedeagus, side view; (31) same, ventral view.

Holotype ♂, PNG: New Guinea (NE): W. Highlands Dist., Baiyer River Wildlife Sanctuary, 2–5.XI.1973.

Remarks: In Sasakawa's (1963b) key to Papuan *Japanagromyza* species, *J. involuta* runs to *J. multiplicata,* which is only known from 2 females from NE New Guinea; however, this has a well-developed fore-tibial bristle and the last section of vein M_{3+4} is substantially longer. The only other species with which it might be compared is *J. delecta* Spencer 1962b from Burma (cf

Sasakawa's 1963b key to Oriental species, couplet 11), but this has a largely membranous aedeagus and the cerci and surstyli are entirely different (cf Spencer 1962b: Fig. 6b).

Japanagromyza sp.

Material examined: PNG: New Guinea (NE): 1 ♀, Eastern Highlands Dist., S. of Okapa, 7000 ft (2130 m), 5.XI.1964, R. Hornabrook, in Australian National Insect Collection, Canberra.

Remarks: This specimen closely resembles *J. triformis* Spencer, 1962a described from the Vogelkop area of Irian Jaya, but at the significantly lower altitude of 75 m. Almost certainly, therefore, it represents an undescribed species, but the formal description is not desirable in the absence of males.

Genus **AGROMYZA** Fallén

Agromyza papuensis Sasakawa, 1963b

Material examined: PNG: New Guinea (NE): 1 ♀, Morobe Dist., Wau, Kunai Creek, 5000 ft, (1525 m), 25.X.1973.

Remarks: Only a single specimen has previously been recorded, from Mendi. I believe the host will prove to be *Setaria palmifolia* (Koen.) Stapf, on which larvae were found on young seedling plants some 10 cm high at Wapenamanda and Wabag, Enga Dist., on 31.X. and 11.XI.1973. Three apparently healthy puparia were obtained, but no adults were bred. The puparium is reddish brown, with the posterior spiracular processes closely adjoining on a large protuberance, each with 12 or more minute pores.

At least 2 larvae can feed together in a single leaf, which is completely eaten out. The mine is greenish when fresh, but turns white when older. Old, empty mines were seen at a number of other localities which were unfortunately not recorded.

The only other *Agromyza* known in New Guinea is *Ag. subantennalis* Sasakawa, 1963b from Vogelkop, Irian Jaya. This is a substantially smaller species.

Genus **PHYTOBIA** Lioy

Four species have hitherto been known in New Guinea (Sasakawa 1963b, as *Shizukoa*) and the genus is also represented in New Britain, Mussau, Borneo, the Philippines and Formosa. Only 1 species, *Phytob. incerta* Spencer, 1963a, has been described in this genus in Australia but 8 further species have recently been seen and will be described in a paper currently in preparation. One new species from Port Moresby is described below.

Phytobia furcata (Sasakawa), **n. comb.** FIG. 32, 33

Shizukoa furcata Sasakawa, 1963b, 819.

Material examined: PNG: New Guinea (NE): 1 ♀, Morobe Dist., Wagau, 20.X.1973; 1 ♂, 1 ♀, W. Highlands Dist., Kondapena, 40 km E of Mount Hagen, 14.XI.1973.

Remarks: This species has previously been known from the 2 type specimens from Morobe Dist., Wau and New Britain. Sasakawa (1963b: Fig. 12) illustrated the female genitalia. The male genitalia are shown in FIG. 32, 33.

Phytobia millarae Spencer, **n. sp.**

Medium-sized black species with yellowish humerus and notopleural triangle. *Head:* frons 1½X width of eye, not projecting above eye in profile; 2 *ors*, 2 *ori* all approx. equal, orbital setulae, minute, sparse, reclinate, ocellar triangle scarcely differentiated; eye round, jowls unusually narrow, 1/20 height of eye; 3rd antennal segment slightly pear-shaped, arista long, equal to vertical height of eye. *Mesonotum:* 3+1 *dc, acr* in 6 rows; *prsc* well-developed. *Wing:* length in ♂ 2.4 mm, costa extending to vein M_{1+2}, last section of M_{3+4} 1½x length of penultimate, r-m cross-vein near midpoint of discal cell. *Legs:* mid-tibia with 1 lateral bristle. *Color:* frons mat black, orbits weakly shining, lunule conspicuously silvery gray; all antennal segments black;

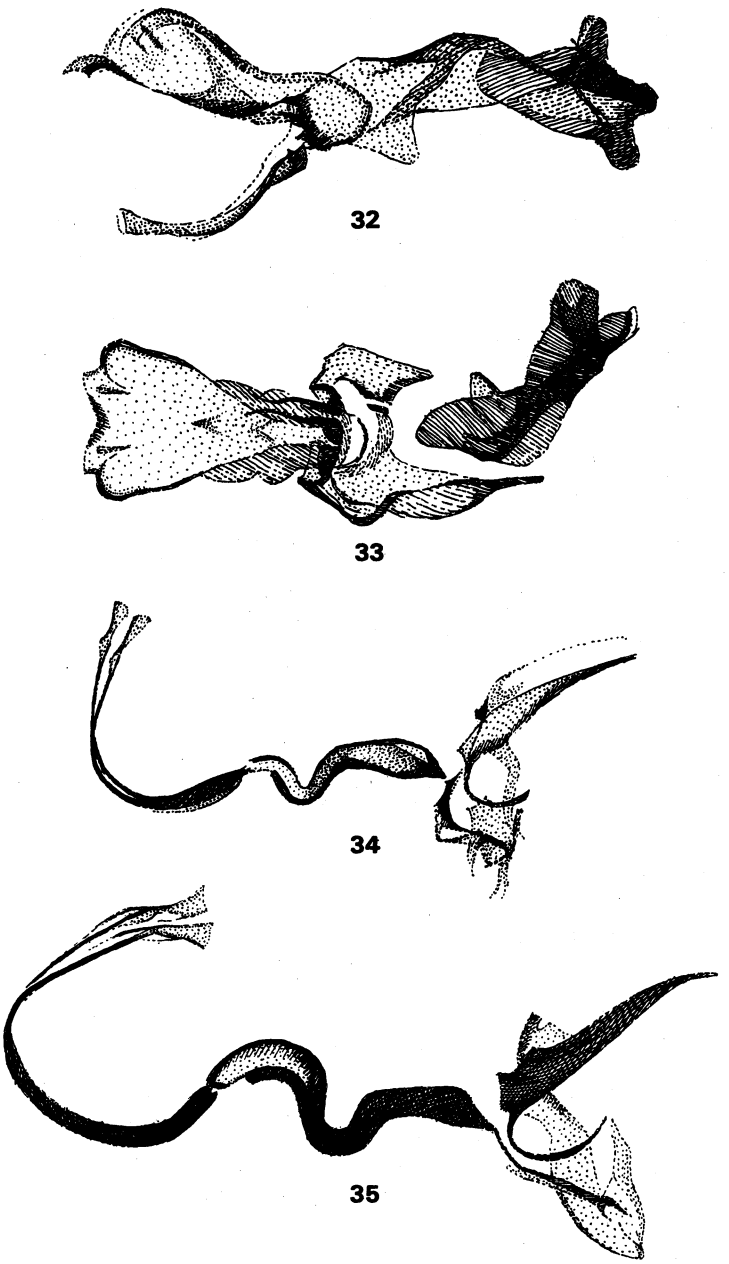

FIG. 32–35. (32–33) *Phytobia furcata:* (32) aedeagus, side view; (33) same, ventral view (Kondapena). (34) *Cerodontha (Icteromyza) floresensis:* aedeagus. (35) *Cerodontha (Icteromyza) hardyi:* aedeagus.

mesonotum mat blackish gray, with waxy yellow patches at hind-corners between inner postalar and 1st *dc;* scutellum black but slightly yellowish between apical scutellars; humerus behind bristle and notopleural triangle yellow, pleura otherwise black; legs entirely black; abdomen with all tergites yellowish-gray laterally, centrally black, 6th tergite broadly yellow at margin; ovipositor sheath entirely gray-dusted; squamae yellowish-gray, margin and fringe black; halteres white.

Holotype ♀, PNG: New Guinea (SE): Port Moresby, University Gardens, 25.XI.1973.

Remarks: This is a distinctive species comparable in the Oriental/Australian Regions only with *Phytob. diversata* Spencer, 1961 from Formosa, which, however, has the scutellum entirely yellow and the yellow mesonotal patches are also substantially larger.

Genus **AMAUROMYZA** Hendel

This small genus is poorly represented in the Oriental Region and Australia and has not previously been known in New Guinea. *Am. caliginosa* Spencer, 1963a was described from New South Wales, *Am. aliena* (Malloch, 1914) is known from Formosa and Thailand and *Am. papuensis* Spencer, 1966b has hitherto been known only from the male holotype from New Ireland. This latter species is now recorded from both the Morobe and Enga Districts.

Sasakawa (1963b: 831) described *Phytol. lobata* from SE New Guinea in the subgenus *Trilobomyza* of the genus *Phytobia.* It is now recognized that *Trilobomyza* belongs in *Amauromyza.* However, examination of the male holotype of *Phytol. lobata* satisfies me that it belongs in *Phytoliriomyza.* Possibly deserving separate generic status is *Phytobia prostrata* Sasakawa, 1963b, also from SE New Guinea. This will be considered further in due course.

Amauromyza papuensis Spencer, 1966b

Material examined: PNG: New Guinea (NE): 1 ♂, Morobe Dist., Wagau, 18.X.1973; 1 ♀, Enga Dist., Wapenamanda, roadside near bridge below Pausa, 31.X.1973.

Remarks: The male genitalia (cf Spencer 1966b: Fig. 26, 27) confirm the close relationship of this species with *Am. aliena* (cf Spencer 1962b: Fig. 20a, b, Thailand) and Sasakawa (1972: Fig. 22–28, Formosa). Both these species have only 3 post-sutural *dc; Am. caliginosa* from Australia differs in having 3+1.

Genus **CERODONTHA** Rondani

The 3 subgenera *Icteromyza, Poemyza* and *Dizygomyza* are represented in New Guinea, with a total of 6 species. One species, *Ce. floresensis,* is recorded below for the first time in New Guinea.

Cerodontha (Icteromyza) floresensis (Spencer, 1961), resurrected from synonymy FIG. 34

Material examined: PNG: New Guinea (NE): 2 ♂♂, Morobe Dist., Wagau, 4000 ft (1220 m), 17 and 19.X.1973; 2 ♀♀, 18 and 19.X.1973.

Remarks: This species has not previously been recorded from New Guinea. It was described from Flores (Indonesia) and I have seen specimens from Negros and Mindanao (Philippines) (Spencer 1962b, 1965b) and New Britain (Spencer 1966b).

Important characters are the consistently dark brown or even black frons and the small size, with wing length of 1.7 mm in the male. The aedeagus of a specimen from Wagau is shown in FIG. 34. The distal tubules are relatively short (contrast *Ce. hardyi* below, FIG. 35). I have re-examined the 3 type specimens from Flores and can see that the illustration given by Spencer (1961: Fig. 45) was not entirely accurate. (This was among the first genitalia preparations I had examined). The aedeagus of the holotype is identical with that of the specimen from Wagau.

Sasakawa (1972: 61) synonymized *Ce. floresensis* with *Ce. duplicata* Spencer, 1961. This synonymy cannot be accepted. The aedeagus of *Ce. duplicata* (Spencer 1961: Fig. 44) differs in having a conspicuous swelling on the distal tubules before the apical processes. The species is larger, with wing length in the male of 2.2 mm and the frons is invariably yellow at least in

front. *Ce. duplicata* was described from Flores and a further series was recorded from Nepal (Spencer 1965a). Sasakawa established this synonymy after examination of specimens from Formosa which have "head yellow but front rarely brown." Presumably this series does represent *Ce. duplicata.*

Cerodontha (Icteromyza) hardyi (Sasakawa), **n. comb.** FIG. 35

Phytobia (Icteromyza) hardyi Sasakawa, 1963b: 829.

Material examined: PNG: New Guinea (NE): 1 ♂, Morobe Dist., Wagau, 4000 ft (1220 m), 19.X.1973.

Remarks: This species was described from Vogelkop, NW New Guinea (Irian Jaya). The specimen from Wagau is the first record for NE New Guinea. Spencer (1966b) synonymized *Ce. harydi* with *Ce. floresensis* before the small differences separating species in this subgenus were fully appreciated. Sasakawa (1972: 62) resurrected *Ce. hardyi,* and this is accepted.

Ce. hardyi is a slightly larger species than *Ce. floresensis,* with wing length in the male of 1.9–2 mm, and the frons is invariably yellowish, at least in front. The distal tubules of the aedeagus (FIG. 35) are significantly longer than in *Ce. floresensis* (cf FIG. 34, drawn to same scale). The single specimen from Wagau was caught together with *Ce. floresensis.* In this series, the 2 species are immediately distinguishable, both on external characters and by the genitalia.

Cerodontha (Icteromyza) piliseta (Becker, 1903)

Material examined: PNG: New Guinea (NE): 1 ♀, Morobe Dist., Wagau, 4000 ft (1220 m), 19.X.1973.

Remarks: This species appears to be not uncommon in NE New Guinea, but is probably local. Sasakawa (1963b: 828) records 38 specimens from the Lae area. The main distinguishing character is the color of the fore-femora, which are largely yellow.

A leaf-mine and puparium possibly referable to this species is discussed below.

Cerodontha (Poemyza) longimentula (Sasakawa), **n. comb.**

Phytobia (Poemyza) longimentula Sasakawa, 1963b: 824.

Material examined: PNG: New Guinea (NE): 1 ♀, Morobe Dist., Lae, beside airport, 14.X.1973.

Remarks: Only 2 specimens have hitherto been known: the male holotype from Sepik Dist. and the female allotype from rain forest 10 km NW of Lae. Distinctive characters are the broad, yellow orbits and the entirely yellow antennae. The nearest relative is probably *Ce. (Poemyza) javana* de Meijere (1934: 266) from Java, which has similarly yellow orbits, but the 3rd antennal segment is black.

Cerodontha (Dizygomyza) omissa (Spencer)

Phytobia (Dizygomyza) omissa Spencer, 1961: 86.

Cerodontha (Dizygomyza) omissa, Spencer, 1966b: 516 (senior synonym of *Phytobia (Dizygomyza) ochreata* Sasakawa, 1963b: 827).

Material examined: PNG: New Guinea (SE): 1 ♂, Central Dist., Ilolo, nr Port Moresby, 1600 ft (490 m), 26.XI.1973.

Remarks: Only the male holotype has previously been known, from Oriomo, 50 mi. (80 km) W of Port Moresby. The greatly enlarged 3rd antennal segment of the male and also the genitalia were illustrated by Sasakawa (1963b: Fig. 16b and 17).

Cerodontha sp.

Material examined: PNG: New Guinea (NE): Morobe Dist., Lae, Botanical Gardens, empty leaf-mine on *Fimbristylis dichotoma* (L.) Vahl., 21.X.1973.

Remarks: The larva of this species forms a long, whitish mine up to 12 cm in length, pupating in the leaf at the end of the mine. The puparium is pale, whitish, flattened and deeply segmented, with the posterior spiracles adjoining, on an almost spherical protuberance, each with 3 bulbs, 1 long and hook-like, recurved and directed orally, with 2 smaller ones fused at its base.

This species represents either a *Cerodontha (Dizygomyza)* or possibly a *Cerodontha (Icteromyza)* sp. *Ce. (Icteromyza) piliseta* is not uncommon in the Lae area and this might prove to be the species concerned.

Genus **CALYCOMYZA** Hendel

Calycomyza humeralis (Roser)

There is a single record from Port Moresby, 21.I.1960, representing an introduction on cultivated asters from Cairns, N. Queensland (Economic Insect Register, D.A.S.F.). It is unlikely that the species has become established.

Genus **LIRIOMYZA** Mik

No species in this essentially northern temperate genus have previously been recorded in New Guinea. Two species have now been confirmed: *L. brassicae* (Riley) certainly represents an introduction and *L. mikaniae,* n. sp is described below.

Liriomyza brassicae (Riley, 1884)

Material examined: PNG: New Guinea (NE): 1 ♂, E. Highlands, Dist., Goroka, 16..XI.1973, on *Tropaeolum;* 1 ♀, Enga Dist., Wabag, emerged 24.XI.1973 ex mine on Tropaeolum, 10.XI.1973; mines also present on *Cleome spinosa* Jacq; W. Highlands Dist., *Kagamuga,* nr. Mount Hagen, leaf-mines on *Tropaeolum,* 14.XI.1973; also on same host at Minj, 15.XI.1973.

Remarks: It seems reasonably certain that this cosmopolitan species has been introduced into New Guinea from Australia, where it is common on *Tropaeolum* in the Sydney area. *Cleome* has been recorded as a host in Singapore, Ceylon and Florida.

The entomologist at the Kuk Tea Research Institute, nr Mount Hagen, Mr Graeme Baker, has found *L. brassicae* infesting *Brassica* spp. at Wapenamanda, Enga Dist. In many parts of the world, *L. brassicae* is considered a potentially serious pest of cultivated *Brassica;* its economic importance and detailed distribution has been discussed by Spencer (1973a).

Liriomyza mikaniae Spencer, **n. sp.** FIG. 36-38

Small species with waxy yellow frons and black scutellum; stridulating mechanism present. *Head:* frons broad, 2X width of eye, orbits normally projecting above eye and always raised above level of frons; 2 *ors,* 2 *ori,* orbital setulae reclinate; eye large, oval, upright; jowls extended at rear, 1/5 height of eye; 3rd antennal segment slightly enlarged, round, with a distinct fringe of pubescence. *Mesonotum:* 3+1 *dc, acr* irregularly in 5 or 6 rows. *Wing:* length 1.75–1.9 mm, costa extending to vein M_{1+2}, last section of M_{3+4} only slightly less than 2X length of penultimate. *Color:* frons waxy yellow or pale brown; orbits normally black but sometimes only slightly darkened; jowls, palps and all antennal segments yellowish orange; face more grayish; mesonotum brilliantly shining black; scutellum essentially black but sometimes with a faint yellowish undertone; pleura largely black but notopleura faintly yellowish; legs and abdomen entirely black; squamae gray, margin and fringe black; halteres yellow. ♂ *genitalia:* aedeagus as in FIG. 36, 37; surstyli with 1 strong spine; ejaculatory apodeme with large, symmetrical blade, narrow stalk and semicircular base.

Host: Mikania cordata (Burm. f.) B. L. Robbins.

Biology: the larva first feeds in a spiral, thus forming a somewhat irregular secondary blotch, finally producing a linear offshoot about 1 cm long (FIG. 38). Pupation takes place outside the mine, with the puparium rather firmly attached to a nearby leaf or section of stem. The deeply

segmented brown puparium has the posterior spiracles each on a large conical projection, with 1 large, hook-like bulb and 4 or 5 minute ones at its base.

Holotype ♂, PNG: New Guinea (NE): W. Highlands Dist., Baiyer River Wildlife Sanctuary, 16.XI.1973, ex leaf-mine on *Mikania cordata* 5.XI.1973; paratypes: 1 ♀, same locality, 19.XI.1973, ex puparium 5.XI.1973; Morobe Dist., Wagau, 1 ♂, 1 ♀, 18–19.X.1973; Enga Dist., Wapenamanda, 1 ♀, 31.X.1973, caught on same host.

Remarks: Despite the black scutellum and raised orbits, the male genitalia and stridulating mechanism clearly indicate the correct generic position of this species in *Liriomyza.*

The first specimen obtained in the present series, a female, was caught on *Mikania cordata* at Wagau; empty leaf-mines and also a puparium attached to a leaf were found on the same plant and it seemed reasonably certain that all were associated. A further female was caught on the same host at Wapenamanda. Two fresh leaf-mines were later found on the same host at Baiyer River, 1 with an adult larva and the other just empty, with the fresh puparium attached to the leaf-stalk. A male and a female were bred, confirming the host of this interesting species.

Genus **PHYTOLIRIOMYZA** Hendel

This genus has not hitherto been represented in New Guinea and 4 new species are described below. Two, *Phytol. bidensiphoeta* and *Phytol. sublima,* belong to the group of species with black halteres known from Madagascar (Malagasy Rep.) and Nepal for which the genus *Lemurimyza* was erected (Spencer 1965a). *Lemurimyza* Spencer was synonymized with *Phytoliriomyza* Hendel by von Tschirnhaus (1971) and was accepted by Spencer (1973b). A 3rd species, *Phytol. minuta* appears also to belong to this group, but is aberrant in several respects. The 4th species, *Phytol. spectata,* also has black halteres, but the genitalia indicate that this belongs to a different group.

The genus *Phytoliriomyza* is widely distributed throughout the world and species have been recorded from Australia (Spencer 1963a), Tahiti (Sasakawa 1963a) and Formosa (cf Sasakawa 1972). Two further species have recently been described from Ceylon (Spencer 1975).

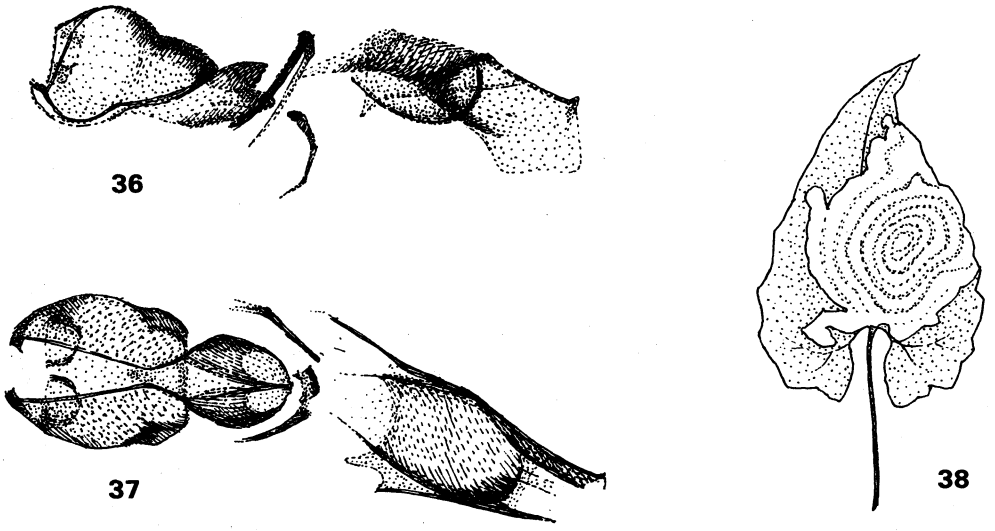

FIG. 36–38. *Liriomyza mikaniae:* (36) aedeagus, side view; (37) same, ventral view; (38) leaf-mine on *Mikania cordata.*

Phytoliriomyza bidensiphoeta Spencer, **n. sp.** FIG. 39, 40

Minute species with black halteres. *Head:* frons 2x width of eye, not projecting above eye in profile; 3 orbital bristles, probably representing 1 *ors* and 2 *ori;* upper *ori* reclinate, the lower incurved; orbital setulae sparse, irregularly proclinate; jowls 1/5 height of eye; 3rd antennal segment small, slightly longer than broad, with conspicuous pubescence; arista long, drooping, pubescent. *Mesonotum:* 3+1 *dc, acr* irregularly in 2 rows. *Wing:* length in ♂ 1.35 mm, costa extending to vein M_{1+2}, 1½x length of penultimate, r-m cross-vein before midpoint of discal cell. *Color:* frons orange-brown in front, darker, blackish behind, orbits largely yellowish gray; lunule and margin of ocellar triangle bright yellow; jowls and face pale yellow; antennae black; mesonotum black, largely mat but somewhat shining from rear; scutellum largely black but narrowly yellow centrally; rear of humerus and upper 1/3 of mesopleura yellow, sides of thorax otherwise black; legs, abdomen and halteres black. ♂ *genitalia:* aedeagus as in FIG. 39; surstyli entirely separated by a suture, with 1 or 2 bristles and several long hairs at end, epandrium internally with a "comb" of 8 strong bristles (FIG. 40).

Holotype ♂, PNG: New Guinea (NE): E. Highlands Dist., Goroka, roadside to Minogere Hostel, on *Bidens pilosa,* 18.XI.1973.

Remarks: This species is closely related to *Phytol. sublima,* n. sp. (see below), but it is substantially smaller and also paler. In its small size it resembles *Phytol. spectata,* but is distinguishable by the bare eyes and presence of acrostichals. The host plant may prove to be *Bidens,* but this cannot be deduced with certainty from the presence of the holotype on this plant.

Phytoliriomyza minuta Spencer, **n. sp.** FIG. 41, 42

Head: frons 2x width of eye (in only available specimen, sunk below eye); 1 *ors,* 2 *ori,* orbital setulae lacking; eye slanting, conspicuously pilose; jowls deepest at rear, 1/7 height of eye; 3rd antennal segment small, round; arista long, equal to height of eye; distinctly pubescent. *Mesonotum:* 3+1 *dc,* with 2 or 3 additional minute hairs beyond 4th; *acr* lacking. *Wing:* length in ♂ 0.75 mm, costa extending to vein M_{1+2}, last section of M_{3+4} nearly 2X length of penultimate, in ratio 12:7. *Color:* frons orange-yellow, orbits slightly paler; all antennal segments and palps yellow; mesonotum and scutellum entirely mat, brownish black; sides of thorax largely yellow; legs: coxae yellow, femora yellow below, brown above, tibiae and tarsi brownish; halteres brownish black. ♂ *genitalia:* aedeagus as in FIG. 41, 42; distiphallus with 2 short, pale symmetrical tubules, 2 strongly developed ventral sclerites, the 1 behind with an additional pair of weakly sclerotized sclerites below; surstyli with a conspicuous black "comb" of 8 spines.

Holotype ♂, PNG: New Guinea (SE): Central Dist., Musgrave River, nr Port Moresby, 25.II.1964, D. H. Colless, (Australian National Insect Collection, Canberra).

Remarks: This is the smallest species known in the genus. Its correct generic position is indicated by the dark halteres and the "comb" of black bristles on the surstyli (cf FIG. 45).

The genitalia show that this is an isolated species and none others are known with 2 independent ventral sclerites. The form of the surstyli indicates some affiliation with *Phytol. spectata,* n. sp. described below (FIG. 45) and with a new species which will be described shortly from New Zealand. The distiphallus and black halteres suggest a relationship with species in the group formerly treated as *Lemurimyza,* including *Phytol. bidensiphoeta* and *Phytol. sublima* from New Guinea.

Phytoliriomyza spectata Spencer, **n. sp.** FIG. 43–45

Minute species with black halteres and pilose eyes. *Head:* frons broad, 2x width of eye, not significantly projecting above eye in profile; 3 orbital bristles, 1 *ors* and 2 incurved *ori*; orbital setulae lacking; eye elongate, conspicuously slanting, with distinct short pilosity; jowls extended at rear, 1/5 height of eye; 3rd antennal segment small, round, with distinct white pubescence; arista longer than height of eye. *Mesonotum:* 3+1 *dc,* 1st, 2nd and 3rd equal, pre-sutural short; *acr* lacking. *Wing:* length in ♂ 1.25 mm,costa extending to vein M_{1+2}, last section of M_{3+4} 1-1/3 times penultimate, r-m cross-vein well before midpoint of discal cell. *Color:* frons orange-yellow, upper orbits more grayish; lower orbits, lunule, jowls and face bright yellow; all antennal segments black; mesonotum entirely mat, brownish black; scutellum black; sides of thorax largely yellowish gray; legs: femora appearing dark, but with distinct yellow sub-tone, tibiae and tarsi brownish black; halteres black. ♂ *genitalia:* aedeagus as in FIG. 43, 44; surstyli entirely separated by a suture, with a "comb" of black bristles on inner margin; inner margin of epandrium with 2 stout bristles (FIG. 45).

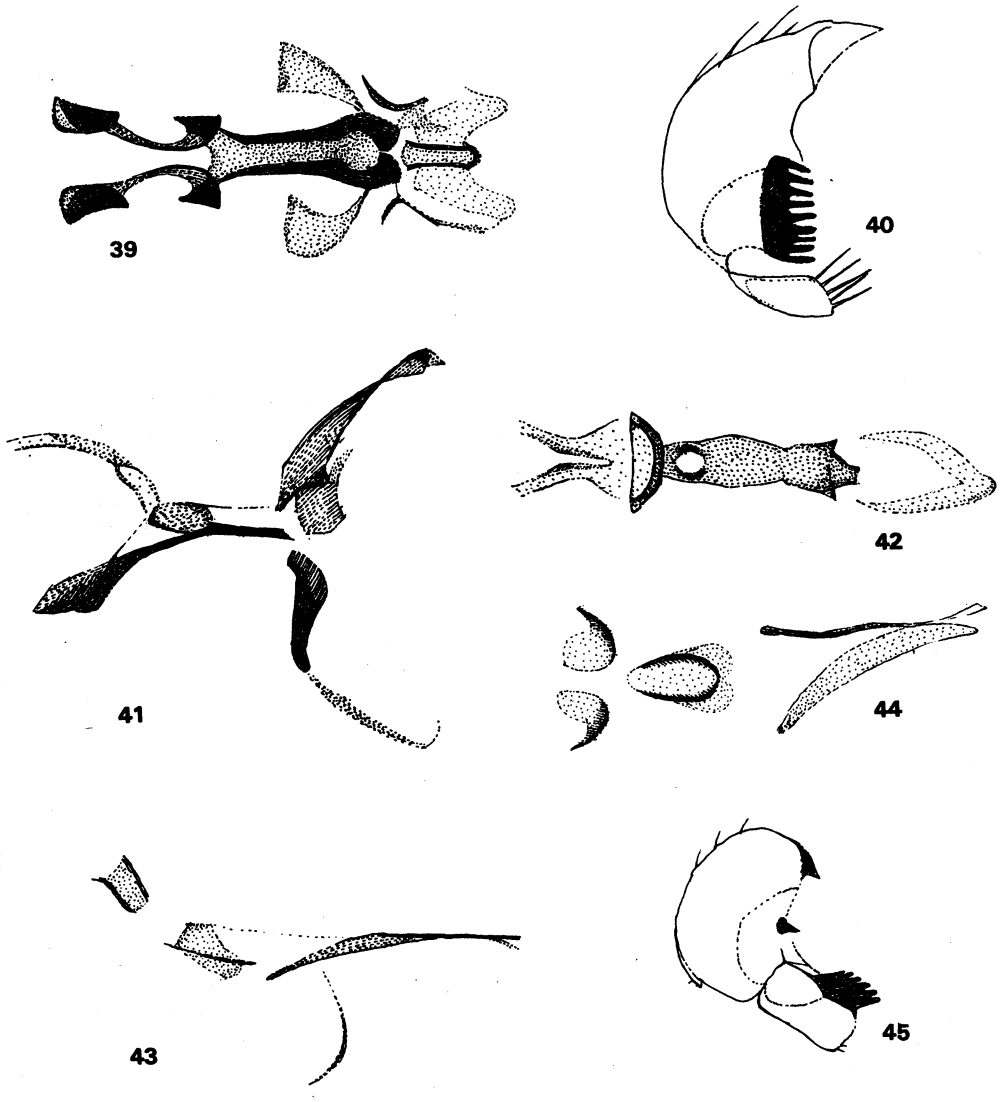

FIG. 39–45. (39–40) *Phytoliriomyza bidensiphoeta:* (39) aedeagus; (40) surstylus and epandrium. (41–42) *Phytoliriomyza minuta:* (41) aedeagus, side view; (42) same, ventral view. (43–45) *Phytoliriomyza spectata:* (43) aedeagus, side view; (44) same, ventral view; (45) surstylus.

Holotype ♂, PNG: New Guinea (NE): Enga Dist., Pausa, nr Wapenamanda, 5000 ft (1525 m), roadside near bridge, on *Desmodium sequax* Wall, 7.XI.1973.

Remarks: Although this species superficially resembles *Phytol. bidensiphoeta,* it is readily distinguishable by the pilose eyes and lack of acrostichals. In the male genitalia, both the aedeagus and surstyli of the 2 species are entirely distinct, clearly indicating that they are not closely related.

The fact that the holotype was caught on *Desmodium sequax* is recorded with some reserve, as this cannot be taken as a positive indication that this is the host.

Phytoliriomyza sublima Spencer, **n. sp.** FIG. 46, 47

Medium-sized species with black halteres. *Head:* frons 1½x width of eye, not projecting above eye in profile; 2 equal, reclinate *ors,* 1 incurved *ori;* orbital setulae sparse, incurved or reclinate; jowls slightly extended at rear, 1/5 height of eye; eye large, oval, only slightly slanting, bare; 3rd antennal segment small, round, arista long, drooping. *Mesonotum:* 3+1 *dc, acr* in 2 rows. *Wing:* length in ♂ 1.75–1.8 mm, costa extending to vein M_{1+2}, last section of M_{3+4} 1½x length of penultimate, r-m cross-vein at midpoint of discal cell. *Color:* frons orange-yellow, darker above, orbits more grayish; lunule, jowls and face yellow; all antennal segments black; mesonotum mat, grayish black; scutellum almost entirely black, but in 1 of 4 specimens slightly yellow at apex; pleura largely black, only upper margin of mesopleura narrowly yellow; legs, abdomen and halteres black. ♂ *genitalia:* aedeagus with symmetrical paired tubules (FIG. 46); surstyli oval, entirely separated by a suture, with 3 or 4 long hairs at end, inner margin of epandrium with a "comb" of 6 to 8 strong bristles (FIG. 47).

Holotype ♂, PNG: New Guinea (NE): E. Highlands Dist., Asaro-Chimbu Divide, 7700 ft (2350 m), roadside 4 km N of Marsafuga, 17.XI.1973; paratypes: 2 ♂♂, same data as holotype; 1 ♂, 19.XI.1973, roadside at Daulo Pass, 8000 ft (2440 m).

Remarks: The male genitalia immediately indicate the close relationship of this species to *Phytol. bidensiphoeta,* n. sp. (see above), but it is significantly larger and generally darker.

Genus **PSEUDONAPOMYZA** Hendel

Two species in this genus are now known in New Guinea. *Ps. spicata* is recorded for the first time, from the Port Moresby area. The host of *Ps. cingulata* Sasakawa has also been established, as larvae have been found on *Ischaemum* sp. (Gramineae).

Pseudonapomyza cingulata Sasakawa, 1963b

Material examined: PNG: New Guinea (NE): 3 ♂♂, 2 ♀♀, Morobe Dist., Wagau, 4000 ft (1220 m), 17–18.X.1973; 1 ♀, emerged 9.XI.1973 ex puparium from *Ischaemum* sp. leg. 20.X.1973.

Remarks: This species has hitherto been known only from the male holotype caught in the Mount Hagen area. Several mines were found on *Ischaemum* at Wagau, which was the dominant grass growing at the roadside between the village and the river crossing 100 m to the NW. A single female was bred and the other specimens in the series were caught on the leaves. The larva first feeds upwards, then turns and forms an irregular linear mine some 5 cm long running down the leaf. Pupation takes place externally; the puparium is brown, with spinules characteristic of many species in the genus (cf. Spencer 1961: Fig. 36).

The characteristic feature of *Ps. cingulata* is the dark squamal fringe; this immediately separates it from *Ps. spicata* (Mall.) with which it overlaps in distribution, in which the squamal fringe is silvery white. The aedeagus was illustrated by Sasakawa (1963b: Fig. 21).

Pseudonapomyza spicata (Malloch, 1914)

Material examined: PNG: New Guinea (SE): 1 ♀, Central Dist.: Brown River area, nr Port Moresby, 26.XI.1973. New to New Guinea.

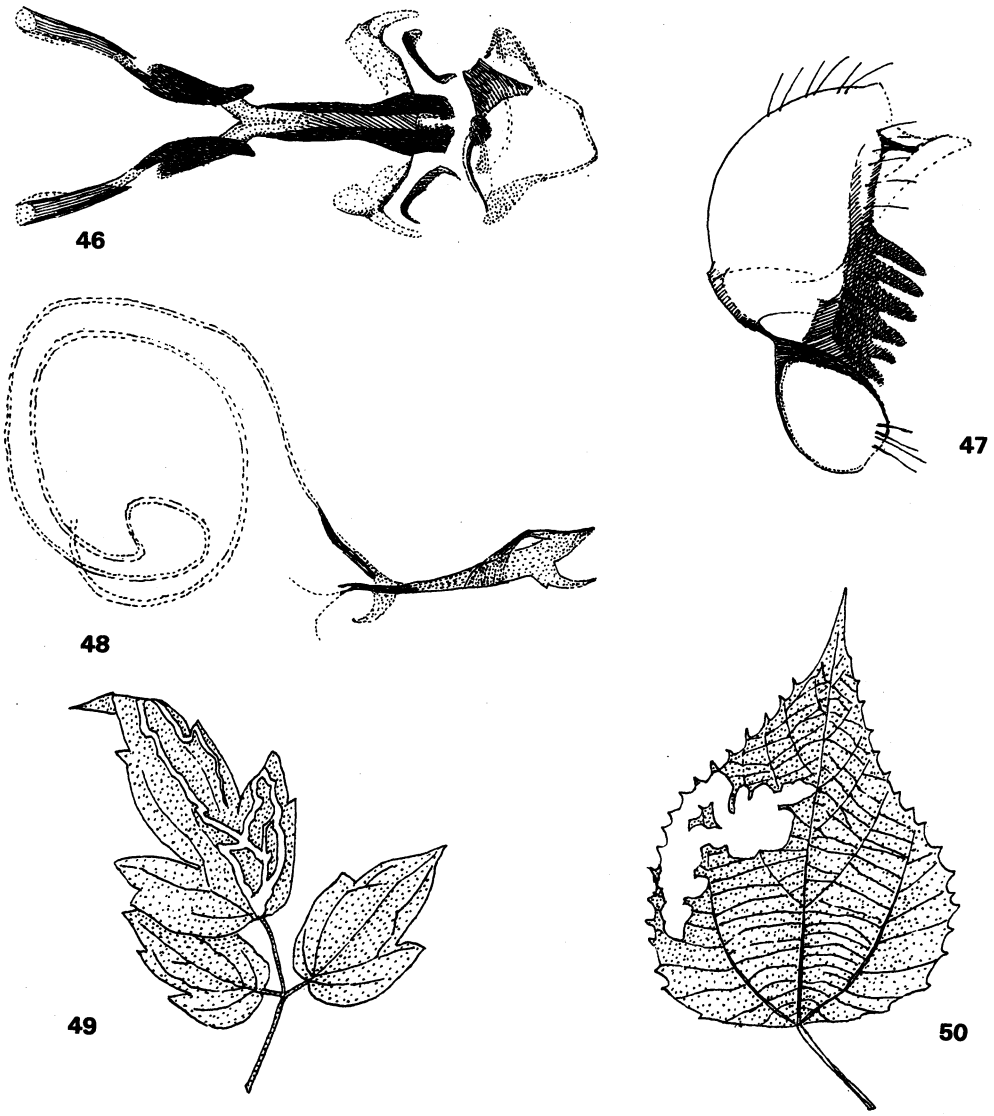

FIG. 46–50. (46–47) *Phytoliriomyza sublima:* (46) aedeagus; (47) surstylus and epandrium. (48–49) *Phytomyza orientalis:* (48) aedeagus; (49) leaf-mine on *Clematis javana.* (50) Leaf-mine of unidentified species on unidentified host.

Remarks: This species occurs widely throughout the Pacific area, but partially overlaps in distribution with *Ps. spinosa* Spencer, 1973a, with which it was until recently confused. The 2 species were clarified by Spencer 1973a: 273–77. The male genitalia of the 2 are entirely distinct. On external characters, *Ps. spicata* is recognizable by the longer costal ratio, with the 2nd section being approx. 1¼X the 4th, while in *Ps. spinosa* the 2nd section is only marginally longer than the 4th.

Ps. spicata is known as a pest of corn (*Zea mays*) and sugarcane and also feeds on many other grasses.

Genus **PHYTOMYZA** Fallén

Phytomyza orientalis Spencer, 1962a. FIG. 48, 49

Material examined: PNG: New Guinea (NE): 1 ♂, Morobe Dist., Wau, side of road to Kaindi near Ecology Institute, emerged 2.XI.1973 ex puparium on *Clematis javana* DC (det. Eichler), 24.X.1973; 1 ♂, 4 ♀♀, caught on host, 24.X.73; 1 ♀, 6 km N of Wau, near Kalolo Creek, emerged 24.X.1973 ex puparium found on host 23.X.1973.

Remarks: This species was described from 2 females in poor condition from Irian Jaya: Wisselmeren; and Indonesia: Flores. The present series agrees closely with the 2 type specimens, particularly in the arrangement of orbital bristles, the enlarged 3rd antennal segment and the yellow coloration of the sides of the thorax, but it can now be seen that the mesonotum is not "largely shining black," but mat gray, only shining when viewed from the rear.

The aedeagus (FIG. 48) is characteristic of many species in the *Phytom. ranunculi*–group, with long, paired, entirely membranous distal tubules. In this group *Phytom. vitalbae* Kalt. is known, apart from Europe, also in Formosa (Sasakawa 1972) and Australia (Spencer 1963a).

The larva forms an irregular, upper surface, linear mine (FIG. 49), pupating externally, with the puparium lightly glued to the leaf near the end of the mine. The puparium is pale brown, deeply-segmented, with the posterior spiracles each on a large conical protuberance, with an ellipse of some 10 bulbs.

UNIDENTIFIED LEAF–MINE

A mine (FIG. 50) with a nearly full-grown larva was found on a young tree at the Baiyer River Wildlife Sanctuary, 3.XI.1973. A positive identification of the host has not been possible but it is believed to be in the Euphorbiaceae, perhaps Acalypheae or Crotoneae (det. Cutler, Kew). The larva failed to pupate but subsequent examination showed from the double upper arm of the cephalo-pharyngeal skeleton that it belongs in the Agromyzinae and will almost certainly prove to represent an undescribed species of either *Agromyza* or *Japanagromyza.*

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