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A revision of European species of the genera  
*Melanagromyza* HENDEL and *Hexomyza* ENDERLEIN,  
with a supplement on the genus *Ophiomyia* BRASCHNIKOV

(Diptera: Agromyzidae)

With 91 textfigures

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**I. Introduction**

The genus *Melanagromyza* was erected by HENDEL (1920: 126) for species having black or dark-brown halteres and lacking a pre-sutural dorso-central bristle, differentiated from the genus *Ophiomyia* BRASCHNIKOV by the absence of a pronounced facial keel dividing the antennae. Nine species were originally included in the genus and this number was later increased to 21 (HENDEL, 1931—6). Additional European species have since been described by FROST (1934), GRIFFITHS (1963), HERING (1933, 1942, 1944, 1958), ROHDENDORF (1953) and SPENCER (1957, 1960 a, 1961 b). SPENCER (1964 b) transferred four species to *Ophiomyia* and in the present paper four new species are described, seven new synonymies are established and four further species — *simplex* (LOEW), *longilingua* HENDEL, *rostrata* HENDEL and *inaequabilis* HENDEL — are transferred to *Ophiomyia*. ENDERLEIN (1936 a) erected a number of new genera including *Hexomyza*, which FRICK (1952) synonymised with *Melanagromyza*. This genus is

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now revived with amended concepts to include the four gall-causing species — *sarothamni* HENDEL, *schineri* (GIRAUD), *salicis* (MALLOCH) and *simplicoides* HENDEL. Twenty-five European species are now included in the restricted concept of *Melanagromyza* discussed below. SASAKAWA (1961) records five species not known outside Japan but it has not been possible to consider these in this study.

HENDEL's genera, including *Melanagromyza*, were based almost exclusively on external characters of the adults and were largely limited to European material. Considerable information is now available on the Agromyzidae from all other zoogeographical regions and many new *Melanagromyza* species have been described from Australia (SPENCER, 1963 a), the Ethiopian Region (SPENCER, 1959, 1960 b, 1961 c, 1961 d, 1961 e, 1963 c, 1964 a), the Oriental Region (SPENCER, 1961 a, 1962 a and SASAKAWA, 1963 a), New Guinea and the Pacific Islands (SPENCER, 1962 b, 1963 b and SASAKAWA, 1963 b, c) and the Neotropical Region (SPENCER, 1963 d). It is now difficult, if not impossible, to define genera exclusively on external morphology. Larval characters are of particular significance in the genera *Melanagromyza*, *Hexomyza* and *Ophiomyia* and phylogenetic relationships are frequently immediately apparent from an examination of male genitalia. These additional criteria have been given full weight in the new generic concepts established below.

Until a detailed assessment can be made of world species placed in *Melanagromyza*, caution is required in the erection of new genera and in particular of sub-genera. Even a cursory survey of the illustrations of male genitalia now available clearly indicates the astonishing variety of form, especially in the aedeagus, but with substantial synapomorphy of other essential characters, there seems little justification at this stage in giving every aberrant form generic or even sub-generic status. A confusing multiplicity of names would result, which would certainly very soon require amending, as our knowledge of the world fauna further increases. I therefore propose to treat aberrant forms of essentially monophyletic groups merely as species-groups, without giving them higher rank and thus avoiding the necessity of adding yet further names.

It is already clear, however, that the diminutive epidermal leaf-miners, represented by the *passiflorae* HERING group in Africa and by the *thaeae* GREEN (= *atomella* MALLOCH) group in the Oriental and Australian regions does deserve separate generic status. But it is not yet obvious where the non-epidermal leaf-miners belong, such as *M. wikstroemiae* KLEINSCHMIDT in Australia (cf. SPENCER, 1963 a: 321), *M. pfaffiae* SPENCER in Venezuela (SPENCER, 1963 d: 320) or *M. clutiae* SPENCER in South Africa (SPENCER, 1963 c: 100). There appears to be no justification for the retention of the separate genus *Carinagromyza* for the single leaf-mining species *heringi* SASAKAWA, 1953: 23; the larval characters and genitalia indicate that this species belongs in *Ophiomyia*.

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**III. Key to genera of sub-family Agromyzinae**

Existing keys to genera of the sub-family Agromyzinae (HENDEL, 1931—6: 16; FRICK, 1952: 365) need amendment to incorporate changes in generic concepts discussed here and to include the new genera *Japanagromyza* SASAKAWA, 1958, and *Penetagromyza* SPENCER, 1959. The genus *Shizukoa* SASAKAWA, 1963c has recently been synonymised with *Phytobia* LLOYD s. s. by SPENCER, 1965.

- 1 Post-vertical bristles absent; costa ending at vein  $r_{4+5}$ , second crossvein lacking; mid-tibiae without lateral bristles . . . . . *Penetagromyza* SPENCER
- Divergent post-verticals present . . . . . 2
- 2 Two pairs of dorso-centrals; if three or four pairs, halteres black . . . . . 3
- At least three pairs of dorso-centrals, pre-scutellars always present; halteres normally white or yellow, at most brown . . . . . *Agromyza* FALLÉN
- 3 Either pre-scutellars or fore-tibial bristle present or halteres yellowish . . . . . *Japanagromyza* SASAKAWA
- Halteres invariably black (white in *Ophiomyia aberrans* SPENCER), pre-scutellars lacking (occasionally present in *Hexomyza salicis* (MALLOCH)) . . . . . 4
- 4 Mesonotum or abdomen frequently with some metallic coloration, greenish, bluish or coppery; costa extending strongly to vein  $m_{1+2}$ ; mid-tibiae with one to three strong lateral bristles; larval posterior spiracles with numerous bulbs, from 6 to 20, normally surrounding a strong black horn (rarely atrophied to a mere scar); antennae not separated by raised keel, male never with vibrissal horn; aedeagus with basiphallus U-shaped.  
 Biology: internal stem-borers or seed-feeders . . . . . *Melanagromyza* HENDEL
- Uniformly black species; costa ending at  $r_{4+5}$  or continuing to  $m_{1+2}$ ; mid-tibiae without lateral bristles (weakly present in *O. simplex*, *O. pulicaria* group, *O. pinguis* group); posterior spiracles of larva normally on distinct stalks, each process either with three or more normally with numerous bulbs, never with spiracular horn; aedeagus with basiphallus having conspicuously diverging side-arms . . . . . 5

- 5 Antennae normally separated by conspicuous facial keel; male frequently with distinct vibrissal horn; larval posterior spiracular processes normally with between 6 and 12 or in a single species, *O. heracleivora* SPENCER, 30–40 bulbs (in *O. curvipalpis* only 3 bulbs present).  
Biology: stem- or leaf-miners . . . . . *Ophiomyia* BRASCHNIKOV
- Antennae adjoining; vibrissal horn never present; larval posterior spiracles always with 3 bulbs on each process.  
Biology: gall-causers . . . . . *Hexomyza* ENDERLEIN

#### IV. Genus *Melanagromyza* HENDEL

##### 1. Genus *Melanagromyza* HENDEL

*Melanagromyza* HENDEL, 1920: 126. Type of genus *Agromyza aeneoventris* FALLÉN, 1823.

Adult: robust species, wing length 2–4 mm, mesonotum largely black or outside Europe frequently greenish, abdomen rarely entirely black, normally shining, greenish, bluish, coppery or purple; squamae and fringe variable, white or black, but constant in individual species; frequently two ors and two ori but sometimes up to five ori; orbital setulae either entirely proclinate, entirely reclinate or in two or more rows, some proclinate, some reclinate; ocellar triangle variable in size and degree of shine; orbits normally well differentiated; jowls variable, from extremely narrow to conspicuously broad, one-third vertical height of eye; antennae of medium size, occasionally with conspicuously long pubescence, arista appearing either bare or distinctly plumose; eye frequently partially pilose in male, invariably bare in female; mesonotum with two de (four in *tetrae* MALLOCH, Chile), acrostichals variable, with some six to 12 rows; pre-scutellars lacking; costa extending to vein  $m_{1+2}$ , second cross-vein always present; halteres black or dark-brown.

Male genitalia: aedeagus showing great uniformity in European species (cf. Figs. 2, 27 etc.) apart from *M. pubescens* HENDEL (Fig. 43), basiphallus U-shaped, mesophallus and distiphallus forming a compact complex with mesophallus represented by characteristic ventral bladder; central tubule of distiphallus sometimes distinctly elongated (Fig. 49), normally shorter, enclosed by the larger, symmetrically paired distal process; spermal sac with blade normally large, black; ninth sternite normally with short hypandrial apodeme (cf. Fig. 16), occasionally uniformly triangular (cf. Fig. 32); surstyli somewhat variable but always with some stout spines and hairs on inner margin (cf. Fig. 33); in world species substantial variation of form occurs within an acceptable monophyletic framework (cf. *M. compositana*, Cape Verde Is., SPENCER, 1961e: Fig. 5; *M. verdescens*, Australia, SPENCER, 1963a: Fig. 26a; *M. lini*, Chile, SPENCER, 1963d: Fig. 29; *M. cussoniae*, South Africa, SPENCER, 1964a: Fig. 18). Larva: slender, up to 6 mm long, anterior spiracles on two short stalks, each with 10 or more minute bulbs in two rows, posterior spiracles in form of oval, flat, chitinized plates, each bearing an ellipse of between 6 and 20 bulbs, surrounding a characteristic spiracular horn, which is rarely reduced to a mere scar or prominence; mandibles of larva asymmetric, the right one with one small



tooth, the left with a substantially larger tooth and a second smaller one; discussed and well illustrated by HERING (1957: 75 and Figs. 2—7).

Biology: of the 25 European species, the biology is known for 21 and all are internal stem-borers, with *M. cuscutae* HERING occurring also as a seed-feeder; oviposition takes place in young stems in early summer, the larva pupating before autumn and remaining in the centre of the stem, with emergence taking place the following spring. *M. cunctans* (MEIGEN) has a modified feeding habit, causing a slender gall on the stem of *Lotus* spp. The host distribution of European species is as follows:

Compositae	9
Umbelliferae	5
Leguminosae	2
Boraginaceae	} 1 each
Convolvulaceae	
Polemoniaceae	
Scrophulariaceae	
Urticaceae	

Distribution: entirely typical species occur throughout the world, for example, in Australia *M. seneciophila* SPENCER, 1963a: 319; in Brazil *M. erigeronis* SPENCER, 1963d: 311; in Chile *M. chenopodii* SPENCER, 1963d: 308; in Jamaica, Hawaii and North America *M. virens* (LOEW), cf. SPENCER, 1963d: 322; in South Africa *M. gerberae* SPENCER, 1960b: 25. The number of described species in the different regions is shown below but further study will certainly indicate transference of a number of these to *Ophiomyia* and one or more new genera:

Region	Number of described species		
	Endemic	Occurring elsewhere	Total
Australian	16	8	24
Ethiopian	95	8	103
Nearctic	15	3	18
Neotropical	25	1	26
Oriental/Pacific	37	8	45
Palearctic	21	4	25
Total described world species:			225

## 2. Phylogeny

The phylogeny of the genera *Melanagromyza* HENDEL, *Hexomyza* ENDERLEIN and *Ophiomyia* BRASCHNIKOV is indicated in Figs. 1 and 77. *Melanagromyza*, as restricted in this paper, represents an extremely homogeneous group, many species being so close, that positive identification, either by external characters or even by male genitalia, is virtually impossible. Larval characters, particularly the arrangement of the posterior spiracles, show a greater degree of differentiation and the genus itself is most clearly defined on the apomorph characters of the larvae. The elliptical arrangement of numerous posterior spiracular bulbs,

and the possession of a strong black horn enclosed by these spiracular bulbs does not occur elsewhere. The proliferation of species found here is obviously of relatively recent origin. The gall-causing species now placed in the genus *Hexomyza* ENDERLEIN have a number of apomorph characters, such as the stalked posterior spiracles in the larva, the loss of the mid-tibial bristles, the tendency to a reduction of the costa, and, in the male genitalia, the diverging side-arms of the basiphallus, which clearly indicate monophyly with *Ophiomyia* rather than with *Melanagromyza*.

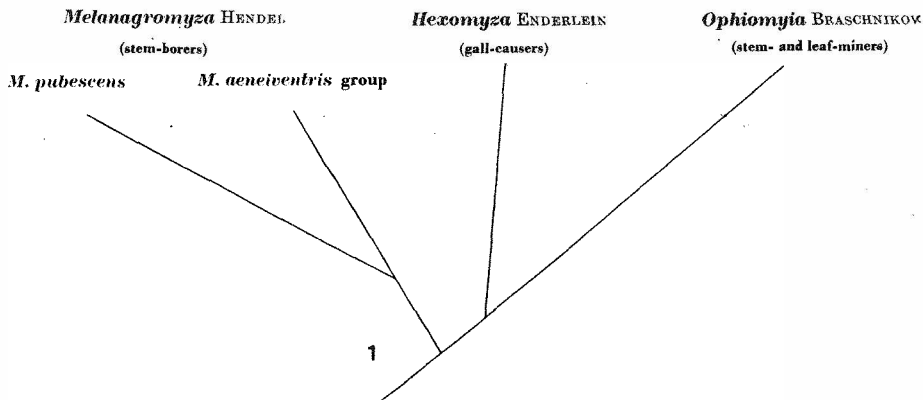


Fig. 1. Phylogenetic tree of genera *Melanagromyza* HENDEL, *Hexomyza* ENDERLEIN and *Ophiomyia* BRASCHNIKOV

*M. pubescens* HENDEL forms a well-defined group with *M. luthulii* SPENCER, 1964a, *M. ruandae* SPENCER, 1959, *M. pubescentis* SPENCER, 1959 (cf. SPENCER, 1964a: Fig. 26) and *M. prosecta* de MEIJERE, 1910 (cf. SPENCER, 1963c). The biology of none of these species is known and any decision on possible higher rank for this group must be deferred until larval characters can be considered. *M. pubescens* in Europe is therefore left at the present time as an aberrant offshoot of *Melanagromyza*.

**3. Species recently synonymised or transferred from *Melanagromyza* to other genera**

Species	New genus	Prior name
<i>beckeri</i> HENDEL	<i>Ophiomyia</i>	—
<i>cagliostro</i> ROHDENDORF-HOLMANOVÁ	<i>Ophiomyia</i>	<i>orbiculata</i> (HENDEL)
<i>secidogena</i> HERING	<i>Hexomyza</i>	<i>salicis</i> (MALLOCH)
<i>cirsii</i> (RONDANI)	—	<i>aeneoventris</i> (FALLÉN)
<i>cunctata</i> HENDEL	<i>Ophiomyia</i>	—
<i>euphorbiae</i> HENDEL	<i>Ophiomyia</i>	<i>beckeri</i> (HENDEL)
<i>fuscociliata</i> HENDEL	—	<i>aenea</i> (MEIGEN)
<i>goniaea</i> HENDEL	<i>Ophiomyia</i>	<i>beckeri</i> (HENDEL)

Species recently synonymised or transferred from *Melanagromyza* to other genera (continuation)

Species	New genus	Prior name
<i>gymnosporivora</i> SPENCER	<i>Hexomyza</i>	—
<i>hexachaeta</i> HENDEL	<i>Ophiomyia</i>	<i>orbiculata</i> (HENDEL)
<i>inaequabilis</i> HENDEL	<i>Ophiomyia</i>	—
<i>knauliae</i> HERING	<i>Ophiomyia</i>	<i>longilingua</i> (HENDEL)
<i>leucoptera</i> (CZERNY)	—	<i>aeneoventris</i> (FALLÉN)
<i>longilingua</i> HENDEL	<i>Ophiomyia</i>	—
<i>multiseta</i> RYDÉN	—	<i>lappae</i> (LOEW)
<i>nitens</i> ROHDENDORF-HOLMANOVÁ	—	<i>lappae</i> (LOEW)
<i>nostradamus</i> HERING	<i>Ophiomyia</i>	<i>orbiculata</i> (HENDEL)
<i>orbiculata</i> HENDEL	<i>Ophiomyia</i>	—
<i>paracelsus</i> HERING	<i>Ophiomyia</i>	<i>orbiculata</i> (HENDEL)
<i>pulicaria</i> (MEIGEN)	<i>Ophiomyia</i>	—
<i>rostrata</i> HENDEL	<i>Ophiomyia</i>	—
<i>salicis</i> (MALLOCH)	<i>Hexomyza</i>	—
<i>sarothamni</i> HENDEL	<i>Hexomyza</i>	—
<i>schineri</i> (GIRAUD)	<i>Hexomyza</i>	—
<i>simplex</i> (LOEW)	<i>Ophiomyia</i>	—
<i>simplicoides</i> HENDEL	<i>Hexomyza</i>	—
<i>torilidis</i> SPENCER	—	<i>sativae</i> SPENCER

4. Key to European *Melanagromyza* species

- 1 Squamal margin and fringe essentially pale, white or ochreous . . . . . 2
- Squamal margin and fringe dark, brown or black . . . . . 18
- 2 Orbital setulae entirely proclinate . . . . . 3
- Orbital setulae entirely reclinate or appearing irregular, in two rows, both proclinate and reclinate . . . . . 6
- 3 Very small species, wing length 1.9–2.2 mm; mesonotum entirely black without any metallic sheen . . . . . *rohdendorfi* sp. n.
- Larger species, wing length 2.4–3.6 mm; mesonotum with slight coppery, greenish or bluish sheen . . . . . 4
- 4 Squamae and fringe conspicuously silvery-white, margin pale yellowish . . . . . *tripolii* SPENCER
- Squamal margin darker, orange or brownish . . . . . 5
- 5 Last section of vein  $m_4$  relatively long, two-thirds penultimate . . . . . *angelicae* (FROST), *artemisiae* SPENCER
- Last section of  $m_4$  shorter, little more than half penultimate . . . . . *eriolepidis* SPENCER
- 6 Orbital setulae in two distinct rows, the inner predominantly proclinate, the one nearer eye margin reclinate . . . . . 7
- Orbital setulae reclinate . . . . . 14
- 7 Frons not projecting above eye in profile, squamal fringe ochreous . . . . . *dettmeri* HERING
- Frons distinctly projecting above eye . . . . . 8
- 8 Two lower orbital bristles (*ori*) . . . . . *aeneoventris* (FALLÉN)
- Three to five *ori* . . . . . 9
- 9 Squamae distinctly greyish, fringe ochreous, sometimes almost brownish *sativae* SPENCER
- Squamae and fringe white . . . . . 10
- 10 Orbits not greatly differentiated, not significantly widening at base of antennae, only slightly projecting above eye in profile . . . . . 11

- Orbits strongly differentiated and greatly widening below, strongly projecting above eye in profile . . . . . 13
- 11 Mesonotum conspicuously shining black; large species, wing length 2.7 mm . . . . . *symphyti* GRIFFITHS
- Mesonotum distinctly mat viewed from front, slightly shining, greenish or bluish, from behind; small species, wing length 2.4—2.6 mm . . . . . 12
- 12 Frons twice width of eye . . . . . *foeniculi* SPENCER
- Frons one and a half times width of eye . . . . . *nibletti* SPENCER
- 13 Host-plant *Arctium* spp.; aedeagus as in Figs. 37, 38 . . . . . *lappae* (LOEW)
- Host-plant *Angelica* spp. (rarely other Umbelliferae); aedeagus as in Figs. 7, 8 . . . . . *angelicae* (FROST)
- Host-plant *Verbascum* spp.; aedeagus as in Figs. 58, 59 . . . . . *verbasci* SPENCER
- 14 Squamae and fringe silvery-white, margin pale yellow . . . . . 15
- Squamae pale grey, margin brownish, fringe ochreous . . . . . 17
- 15 Ocellar triangle large, broad, shining, apex extending beyond level of lower *ors* . . . . . 16
- Ocellar triangle smaller, less shining, apex not reaching level of lower *ors* . . . . . *albocilia* HENDEL
- 16 Larval posterior spiracles with six bulbs surrounding short, truncate horn (Fig. 51); stem-borer in Leguminosae . . . . . *sojae* (ZEHNTNER)
- Larval spiracles without developed horn (Fig. 17); gall-causer on *Lotus* spp. . . . . *cunctans* (MEIGEN)
- 17 Mesonotum conspicuously black; orbits broad . . . . . *polemonii* ROHDENDORF
- Mesonotum more obviously greyish; orbits narrower . . . . . ***submetallescens* sp. n.**
- 18 Orbital setulae thick, proclinate . . . . . 19
- Orbital setulae reclinate, or in two rows, both proclinate and reclinate . . . . . 21
- 19 Abdomen essentially black . . . . . *eupatorii* SPENCER
- Abdomen distinctly greenish or bluish . . . . . 20
- 20 Squamae and fringe jet black . . . . . *aenea* (MEIGEN)
- Squamae pale grey, fringe greyish-black . . . . . ***ferulae* sp. n.**
- 21 Orbital setulae all reclinate . . . . . 22
- Orbital setulae in two rows, both proclinate and reclinate . . . . . *arnicarum* HERING
- 22 Frons not significantly projecting above eye . . . . . *cuscutae* HERING
- Frons strongly projecting above eye . . . . . 23
- 23 Mesonotum distinctly mat, greyish-black . . . . . *pubescens* HENDEL
- Mesonotum shining, bluish-black . . . . . ***siciliensis* sp. n.**

5. Discussion of Species

*Melanagromyza aenea* (MEIGEN)

*Agromyza aenea* MEIGEN, 1830: 169. Lectotype ♀, designated below, in Naturhistorisches Museum, Vienna.

*Melanagromyza aenea* (MEIGEN), HENDEL, 1931—6: 158, as *aeneiventris* (FALLÉN).

*Melanagromyza aeneiventris* (FALLÉN), sub-species *fuscociliata* HENDEL, 1931—6: 158, **syn. nov.** Syntypes in Naturhistorisches Museum, Vienna.

Adult: wing length 2.7—3.1 mm., last section of *m*<sub>4</sub> variable, substantially shorter or almost equal to penultimate; orbits not significantly projecting above eye, with two *ors* and three or four *ori*; orbital setulae long, numerous, proclinate; jowls broad, one-quarter vertical height of eye, cheeks forming broad ring below eye; mesonotum appearing mat from front, moderately shining from behind, black; abdomen brilliantly shining green; squamae grey, fringe black.

Male genitalia: aedeagus as in Figs. 2, 3.

Larva: posterior spiracles separated by approximately own diameter, each process with elongated ellipse of about 13 bulbs surrounding the strong central horn (cf. DE MEIJERE, 1943: 66, as *fuscociliata* HENDEL, SPENCER, 1957: Fig. 9 and HERING, 1957: 76, both as *aeneiventris* FALLÉN).

Host-plant/Biology: *Urtica* spp.; internal stem-borer.

Distribution: Western Europe.

Material seen:

AUSTRIA: Kirchberg-Thürnau, 1 ♂, 26. vi. 1962 (HERING). —

DENMARK: Maribo, 1 ♂, 2 ♀♀, emerged spring, 1941 ex stem *Urtica dioica* (SÖNDERUP). —

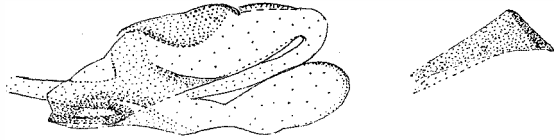
ENGLAND: Mddx., Scratch Wood, 1 ♀, 22. iv. 1955, ex stem *Urtica dioica* LINNAEUS; 1 ♂, 3. vi. 1955; 2 ♂♂, 1 ♀, 22. v. 1956; Surrey, Godalming, 1 ♀, 11. vi. 1955 (all K.A.S.); Somerset, Portishead, 1 ♀, 24. v. 1947 (FONSECA). —

FINLAND: Sund, 1 ♂, no date (FORSIUS, 478). —

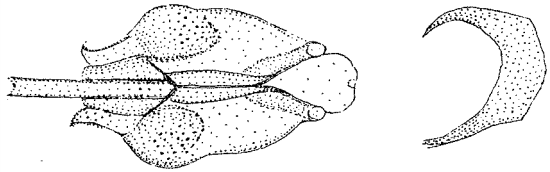
GERMANY: Lausitz, Rotstein, 2 ♀, 8. vi. 1954; 1 ♀, Löbauer Berg, 3. vi. 1954 (HERING). —

ITALY: Chiasso, 1 ♂, 6 ♀♀, 8. v. 1955, swept on *Urtica* (K.A.S.). —

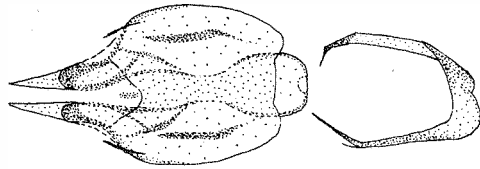
SWITZERLAND: Diablerets, 1 ♂, 13. vi. 1957 (K.A.S.).



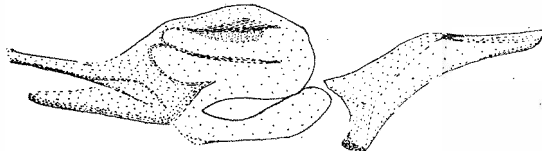
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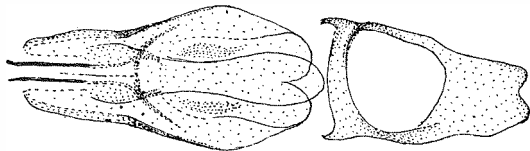
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4



5



6

Plate 1

Fig. 2—3. *Melanagromyza aenea* (MEIGEN): 2, aedeagus, side view; 3, same, dorsal view. —

Fig. 4. *Melanagromyza aeneoventris* (FALLÉN): aedeagus, dorsal view. —

Figs. 5—6. *Melanagromyza albocilia* HENDEL: 5, aedeagus, side view; 6, same, ventral view.

(Scale line = 0.1 mm.)

HENDEL (1931—6:158) synonymised *aenea* with *aeneiventris* (FALLÉN), which in HENDEL's concept represented a complex of numerous species with a white squamal fringe. *M. fuscociliata* was named as a new sub-species with a dark squamal fringe.

I have now examined three female syntypes of *aenea* from the coll. WINTHEM, Vienna and the species is unmistakably identical with *fuscociliata*.

FALLÉN (1823:4) refers to *A. aeneo-ventris* as "semel in *Urtica* capta". This however does not necessarily mean that the species was bred from *Urtica* but in fact clearly means that it was caught on *Urtica*. SPENCER (1957:184) incorrectly synonymised *fuscociliata* HENDEL with *aeneiventris* FALLÉN, on the false assumption that *aeneiventris* represented the *Urtica* stem-borer. *M. fuscociliata* is immediately recognisable by the black squamal fringe, distinctly greenish abdomen and rather long, proclinate orbital setulae.

#### *Melanagromyza aeneoventris* (FALLÉN)

*Agromyza aeneo-ventris* FALLÉN, 1823:4. Holotype ♀ in Naturhistoriska Riksmuseum, Stockholm.

*Agromyza cirsii* RONDANI, 1875:180. Holotype ♀ in Museo de Zoologia, Florence.

*Agromyza leucoptera* CZERNY<sup>2</sup>, 1910:264. Holotype ♂ in coll. STROBL, Admont.

*Melanagromyza aeneiventris* (FALLÉN), HENDEL, 1920:126; 1931—6:158.

*Melanagromyza cirsii* (RONDANI), HENDEL, 1931—6:158.

*Melanagromyza leucoptera* (CZERNY), HENDEL, 1931—6:158 (as sub-species of *aeneiventris*).

Adult: large species, wing length from 2.4 mm in male to 3.5 mm in female, last section of  $m_4$  about two-thirds penultimate; frons broad, almost twice width of eye; orbits pronounced, conspicuously projecting above eye in profile, with two closely adjoining *ors* and two widely spaced *ori*; upper *ori* and the two *ors* equidistant, distance between these bristles less than half that between *ori*; orbital setulae numerous, in two rows, proclinate and reclinate; jowls one-fifth vertical height of eye; mesonotum distinctly shining, greenish-coppery, abdomen more so; squamae and fringe white, margin pale yellowish-brown.

Male genitalia: aedeagus (Fig. 4) with basiphallus (illustrated in side view by SPENCER (1961b: Fig. 2)) forming complete or almost complete ring and closely adjoining distiphallus complex.

Larva: posterior spiracles each with 14—18 distinct bulbs surrounding the black central horn, which may be entire or jagged and truncate; each process separated by slightly less or slightly more than own diameter; puparium pale whitish or slightly more yellowish.

Host-plant/Biology: *Cirsium arvense* (LINNAEUS) SCOPOLI; *C. palustre* (LINNAEUS) SCOPOLI; *C. vulgare* (SAVI) TEN. [*C. lanceolatum* (LINNAEUS)]; *Carduus acanthoides* (LINNAEUS); ? *Inula* sp.; internal stem-borer.

Material seen:

ENGLAND: Devon, Studland, 1 ♂, 11. vi. 1956, ex Composite (K.A.S.); Hunts., Woodwalton Fen, 1 ♂, 2 ♀♀, spring, 1961, ex *Cirsium palustre* (GRIFFITHS); London, Hampstead,

<sup>2</sup> Published in CZERNY & STROBL, 1910.

1 ♂, spring, 1950, ex *C. arvense* (K.A.S.); Middlesex, Scratch Wood, 2 ♀♀, 30. v. 1955, ex *Cirsium vulgare* (K.A.S.); Surrey, Bookham, 1 ♂, 22. iv. 1950, ex *C. palustre* (K.A.S.); Selsdon, 1 ♂, 1 ♀, May, 1958, ex ? *Inula* sp. (K.A.S.). —

FINLAND: Helsinki, 1 ♀, no date (FREY, 1156). —

GERMANY: Dortmund, 1 ♂, 1 ♀, May, 1956, ex *C. palustre* (K.A.S.); Mühlhausen, 1 ♀, 20 iv. 1958, ex *C. arvense*; 3 ♂♂, 5 ♀♀, spring, 1958, ex *Carduus acanthoides* (BUHR); Berlin-Frohnau, 1 ♂, 2 ♀♀, spring, 1927, ex *C. arvense* (HERING); Soritz, Bautzen, 2 ♂♂, 1928, ex *C. vulgare* (K. T. SCHÜTZE). —

ITALY: Florence, Fiesole, 2 ♂♂, 5 ♀♀, spring, 1958 ex *C. vulgare*; Forlì, 1 ♀, spring, 1958, ex *C. vulgare* (K.A.S.); 1 ♀, no date, holotype of *cirsii*. —

SPAIN: Algeciras, 1 ♂, 25. iv. 1955 (K.A.S.).

FALLÉN refers to a single female, caught on *Urtica dioica* LINNAEUS.

HENDEL (1931—6: 158) lumps under *aeneiventris* species from numerous host-plants. SPENCER (1957) showed that HENDEL's concept represented a complex of species. In HENDEL's species the squamal fringe is white and he proposed the name *fuscociliata* for a new sub-species of *aeneiventris*, in which the squamal fringe is dark. This clearly refers to the species feeding as a stem-borer in *Urtica* and as FALLÉN's specimen was caught on *Urtica*, SPENCER (loc. cit.) incorrectly accepted *fuscociliata* as a synonym of *aeneiventris* FALLÉN; the next valid name for the *Cirsium* stem-borer is *cirsii* RONDANI and this name has been used by GRIFFITHS, HERING and SPENCER since 1957.

I have now examined FALLÉN's holotype which is in very poor condition but it is possible to see that the squamal fringe is white. It is thus not the species feeding in *Urtica*. Most of the abdomen is missing and the chaetotaxy of the head is largely destroyed. There seems little doubt, however, that the species represents the common stem-borer in *Cirsium* and other Compositae and in the interests of stability it is proposed that this is accepted. This also follows HENDEL's concept. I have also seen RONDANI's type specimen in Florence, bred from the stem of *C. arvense*, and this clearly represents the same species.

The species is immediately distinguishable from the other large species with projecting orbits by consistently having only two, widely-spaced lower orbital bristles.

There is slight variation in the larval hind-spiracles and also in the aedeagus but the differences noted are not constant either for host-plant or locality and I am thus satisfied that on the evidence available they cannot be considered of specific significance.

#### *Melanagromyza albocilia* HENDEL

*Melanagromyza albocilia* HENDEL, 1931—6: 161. Lectotype ♂ in Naturhistorisches Museum, Vienna.

Adult: small species, with shining black mesonotum, green abdomen, white squamae and fringe, exactly as in *M. cunctans* (MEIGEN), except for slightly smaller ocellar triangle, with apex not reaching level of lower *ors*.

Male genitalia: aedeagus as in Figs. 5, 6, basiphallus with side-arms joining to form an enclosed circle.

Larva and host-plant: unknown,

Distribution: Austria, Hungary.

Material seen:

AUSTRIA: Marchfeld bei Wien, 1 ♂, 1 ♀, in cop, 22. vi. 1923, paralectotypes. —

HUNGARY: Budapest, 1 ♂, 29. vii. 1896 (KERTÉSZ), lectotype; 1 ♀, 28. vi. 1964 (K.A.S.).

HENDEL (1931—6: 161) refers to three specimens in his description; all three are labelled "Typus". The specimen from Budapest stated to be a female is in fact a male and is designated herewith as lectotype.

I am unable to confirm the points of difference given by HENDEL between this species and *cunctans* (MEIGEN). The two are extremely similar and the only constant difference appears to be the substantially larger ocellar triangle in *albocilia*.

#### *Melanagromyza angelicae* (FROST)

*Agromyza angelicae* FROST, 1934: 40. Holotype ♂ at present in coll. FROST, University of Pennsylvania, although in the description it is stated "The holotype will be deposited in the United States National Museum, Washington, D. C."

*Melanagromyza angelicae* (FROST), FRICK, 1952: 377.

Adult: essentially as in *M. lappae* (LOEW), only apparent external difference being in the orbital setulae which are frequently largely proclinate; wing length 2.6—3.2 mm in male, 2.7—3.6 mm in female.

Male genitalia: aedeagus as in Figs. 7, 8, unusually long gap between distiphallus complex and U-shaped basiphallus.

Larva: described in detail by HERING (1957: 80; also as *Melanagromyza* spec., 1957: 81), posterior spiracles adjoining, each process with an ellipse of 16—20 bulbs around the strong central horn (cf. SPENCER, 1957: Fig. 7).

Host-plants/Biology: *Angelica* spp.; occasionally found in *Heracleum sphondylium* LINNAEUS and *Pastinaca sativa* LINNAEUS; internal stem-borer.

Distribution: Widespread in W. Europe; E. United States.

Material seen:

DENMARK: Maribo, 1 ♂, 11. x. 1939, ex *Angelica* (SÖNDERUP). —

ENGLAND: Surrey, Boxhill, 1 ♂, 6 ♀♀, May—June, 1954 ex *Angelica sylvestris*; Bookham, 2 ♀♀, emerged April, 1957, ex *Angelica*; 1 ♂, 4 ♀♀, emerged March, 1957, ex *Heracleum sphondylium*; 1 ♂, emerged March, 1957, ex *Pastinaca sativa*; Headley, 2 ♂♂, emerged March, 1957, ex *Heracleum*; Mddx., Scratch Wood, 3 ♀♀, June, 1954, ex *Angelica*. —

FRANCE: Verson, nr. Caen, 1 ♂, 1 ♀, 19. iii. 1943, ex *Angelica* (BUHR). —

GERMANY: Bautzen, Soritz, 1 ♂, 1 ♀, 1928, ex *Angelica* (K. T. SCHÜTZE); Thuringia, Mühlhausen, 2 ♂♂, 2 ♀♀, May, 1955, ex *Angelica* (BUHR). —

U.S.A.: N. Y., Ithaca, 1 ♂, 27. iii. 1926, ex stems *Angelica atropurpurea* LINNAEUS (A. S. MILES), paratype.

A female from the Azores: San Miguel, San Roque, 13—15. v. 1938 (FREY) seems possibly referable to this species.

The orbital setulae are distinctly variable in this species, sometimes being almost entirely proclinate or with the inner row distinctly reclinate, as in *lappae* (LOEW). The species has therefore been included in both couplets 5 and 13.



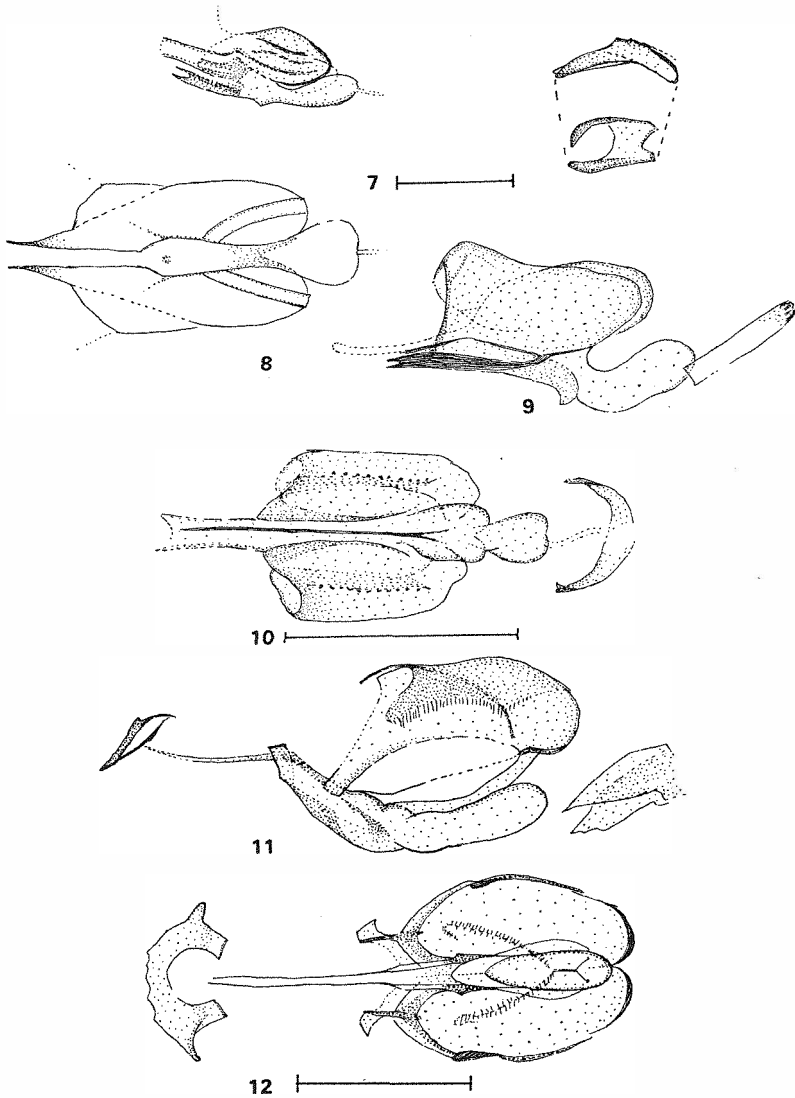


Plate 2

Figs. 7—8. *Melanagromyza angelicae* (FROST): 7, aedeagus, side view; 8, distiphallus, ventral view. —

Figs. 9—10. *Melanagromyza arnicarum* HERING: 9, aedeagus, side view; 10, same, dorsal view. —

Figs. 11—12. *Melanagromyza artemisiae* SPENCER: 11, aedeagus, side view; 12, same, dorsal view.

(Scale line = 0.1 mm.)

*Melanagromyza arnicarum* HERING

*Melanagromyza arnicarum* HERING, 1942: 66. Holotype ♀ in Zoologisches Museum, Berlin. Adult: wing length 2.6 mm; last section of vein  $m_4$  little more than half length of penultimate; orbits distinctly projecting above eye, with two *ors* and two widely-spaced, incurved *ori*; orbital setulae in two rows, those nearest eye margin largely reclinate, those on inner orbits proclinate; cheeks forming broad ring below eye, jowls rounded, deepest in front, one-fifth vertical height of eye; mesonotum distinctly shining, predominantly black, abdomen greenish; squamae grey, fringe black.

Male genitalia: aedeagus distinctive, as in Figs. 9, 10.

Larva: posterior spiracles separated by slightly more than own diameter, each process consisting of a complete ring of some 16 well-defined, raised bulbs surrounding the short central horn; also described by DE MELJERE (1943: 65).

Host-plant/Biology: *Arnica montana* LINNAEUS; stem-borer.

Distribution: Denmark, Germany.

Material seen:

DENMARK: Sonderby (?), 1 ♂, 7. iv. 1944, ex *Arnica* (SÖNDERUP). —

GERMANY: Erzgebirge, Oberwiesental, 1 ♂, emerged 5. iii. 1962, ex *Arnica* (BUHR).

This is a distinctive species, recognisable by the combination of raised orbits, two rows of orbital setulae, shining mesonotum and black squamal fringe.

*Melanagromyza artemisiae* SPENCER

*Melanagromyza artemisiae* SPENCER, 1957: 186. Holotype ♀ in author's collection.

Adult: large species, wing length 3.4 mm., last section of vein  $m_4$  two-thirds penultimate; orbits distinctly projecting above eye, two *ors*, four *ori*; orbital setulae in two rows, predominantly proclinate; jowls one-sixth vertical height of eye; mesonotum mat, slightly coppery, abdomen more shining; squamae white, margin pale brown, fringe ochrous.

Male genitalia: aedeagus entirely distinctive, as in Figs. 11, 12, also illustrated by SASAKAWA (1961: Fig. 23).

Larva: posterior spiracles separated by own diameter, each process with an ellipse of 12 bulbs surrounding a short, strong horn.

Host-plant/Biology: *Artemisia vulgaris* LINNAEUS; internal stem-borer.

Distribution: Germany, Japan.

Material seen:

GERMANY: Hessen, Pfungstadt, 4 ♂♂, 2 ♀♀, all emerged March, 1957, ex stems *Artemisia vulgaris* (K.A.S.).

This species is extremely similar to *M. eriolepidis* and the two species cannot be reliably distinguished on external characters.

*Melanagromyza cunctans* (MEIGEN)

*Agromyza cunctans* MEIGEN, 1830: 178. Lectotype ♂ in Naturhistorisches Museum, Vienna, designated by SPENCER, 1958.

*Melanagromyza cunctans* (MEIGEN), HENDEL, 1920: 127; 1931—6: 163.

Adult: small species, wing length 2—2.4 mm.; costa extending to vein  $m_{1+2}$ , last section of  $m_4$  variable, normally about two-thirds penultimate; frons narrow, little over width of eye, not projecting above eye in profile; two *ors*, two *ori*, orbital setulae sparse, in single row, reclinate; ocellar triangle large, apex extending below level of lower *ors*, distinctly but not brilliantly shining; jowls rounded, deepest in centre below eye or slightly more forwards, about one-seventh vertical height of eye; eyes bare in both sexes; mesonotum shining black, a abdomen shining greenish; squamae and fringe white, margin pale, yellowish, scarcely differentiated.

Male genitalia: aedeagus as in Figs. 13, 14, 15; ninth sternite broadly fused at apex, postgonites bearing distinctive short spine (Fig. 16).

Larva: posterior spiracles separated by slightly less than own diameter, the two processes arising from a distinctly raised, almost spherical protuberance, each process with a ring of six to eight ill-defined bulbs around the low protuberance replacing the normal horn (Fig. 17); puparium reddish-brown, spiracular bulbs similar; described by DE MEIJERE (1938: 67).

Host-plant/Biology: *Lotus corniculatus* LINNAEUS; *L. ornithopodioides* LINNAEUS, *L. rectus* LINNAEUS; the larva feeds in the upper part of the stem, forming a slender, cylindrical gall (Fig. 18) immediately below the inflorescence.

Distribution: Corsica, England, France, Germany, Spain; apparently widespread throughout Europe.

## Material seen:

AUSTRIA: Bisamberg, nr. Vienna,, 1 ♂, 5. August, 1 ♀, July; Luftenberg, nr. Linz, 1 ♂, 2. ix. 1960 and Marchtrenk, 1 ♂, 25. vi. 1962 (HERING). —

CORSICA: Ajaccio, 2 ♂, ex stem-galls on *Lotus rectus* and *L. ornithopodioides*, 3. ix. 1933 (BUHR). —

ENGLAND: Berks, Ivinghoe, 1 ♀, 16. viii. 1958; Surrey, Boxhill, 1 ♀, 18. vii. 1956 (both K.A.S.). —

GERMANY: Kunnersdorf bei Görlitz, 2 ♂♂, 11. vii. 1955 (HERING). —

ITALY: Sestriere, 1 ♂, 6. vii. 1960 (K.A.S.). —

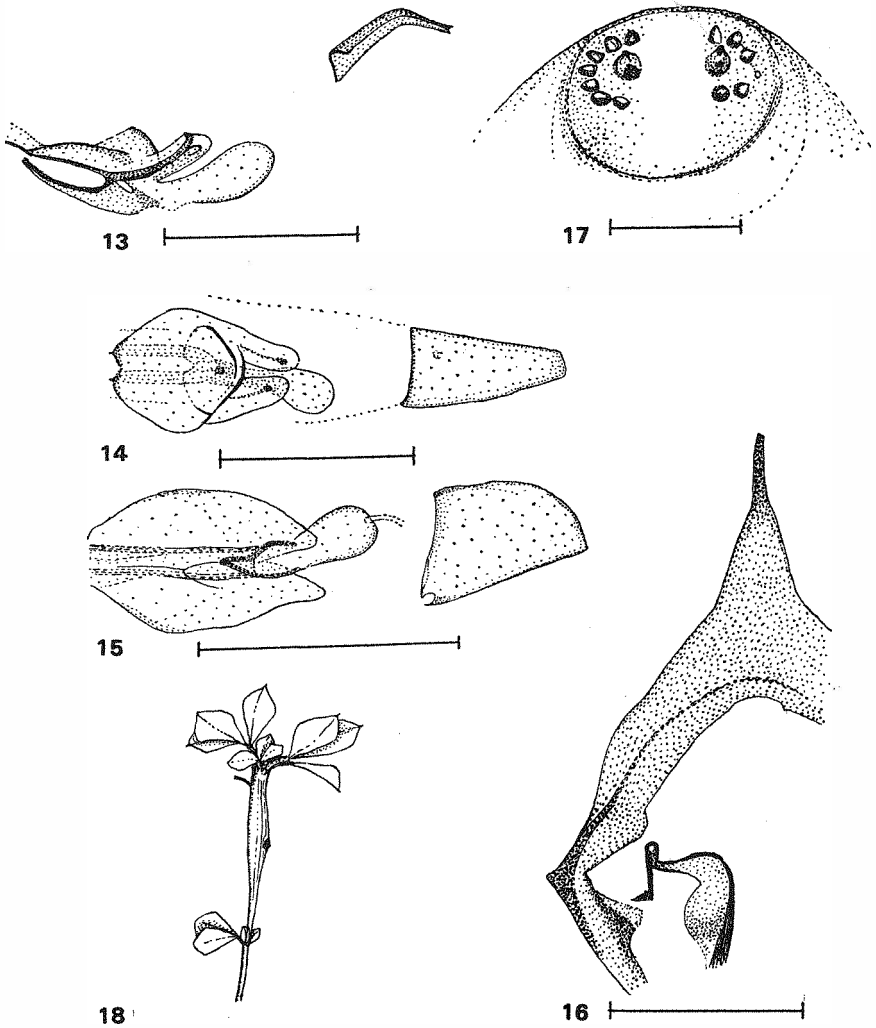
SPAIN: Madrid, 1 ♂, 28 July, lectotype; Barcelona, 1 ♀, 20. iv. 1955 (K.A.S.); Albarracín, 1 ♀, June, 1933 (HERING). —

YUGOSLAVIA: Solin, 1 ♂, 7. viii. 1954 (NOVAK).

This species cannot be distinguished morphologically or by male genitalia from *M. sojae* (ZEHTNER). However, the differences in larval spiracles and the biology of the two species are distinctive.

The only known bred specimens are those from Corsica but HOUARD (1913: No. 6949) refers to galls of *Agromyza cunctans* MEIGEN on *Lotus tenuis* KITABEL in the Mediterranean area and also (1922: No. 1385) illustrates the typical galls

of *cunctans* on *Lotus creticus* LINNAEUS, probably from North Africa. HENDEL (1931—6: 163) confused this species with *sojæ*. I now follow DE MEIJERE (1938: 67) and HERING in associating the name *cunctans* MEIGEN with the *Lotus* gall-causer. This is somewhat arbitrary, as a positive identification of the caught ectotype as between the *Lotus* feeder and *sojæ* (ZEHNTRNER) is not possible.



### Plate 3

Figs. 13—18. *Melanagromyza cunctans* (MEIGEN): 13, aedeagus, side view (ex *Lotus*); 14, same, dorsal view (ex *Lotus*); 15, same, ventral view (lectotype); 16, ninth sternite; 17, posterior spiracles of puparium; 18, stem-gall on *Lotus*. (Scale line = 0.1 mm.)

Although *M. sojae* occurs commonly in many parts of tropical Asia and has been caught in large numbers on cultivated *Phaseolus* in Egypt, no confirmed, bred specimens are known from Western Europe. The association of *cunctans* with the *Lotus* feeder is thus plausible and certainly desirable in the interests of nomenclatural stability.

*Melanagromyza cuscutae* HERING

*Melanagromyza cuscutae* HERING, 1958. Holotype ♂ in author's collection, presented by Prof. HERING.

Adult: wing length from 2.4 mm in male to 2.7 in female, costa extending to vein  $m_{1+2}$ , last section of  $m_4$  two-thirds penultimate; orbits not projecting above eye in profile, with two *ors* and two *ori*; orbital setulae all reclinate, sparse, in single row; frons almost one and a half times width of eye; jowls narrow, one-sixth vertical height of eye; mesonotum mat viewed from front, moderately shining from behind, entirely black, without metallic coloration; abdomen somewhat shining, greenish-coppery; squamae whitish-grey, margin and fringe black.

Male genitalia: aedeagus as in Fig. 19, basiphallus with distinctively narrow and extended side-arms; the aedeagus of a specimen from Pakistan was illustrated by SPENCER (1962a: Fig. 11).

Larva: illustrated by HERING (1958: 218), posterior spiracles separated by own diameter, each process elongated, with 15–19 somewhat irregular bulbs around the black central horn, which is normally reduced to a mere scar. Puparium normally dark-brown, but occasionally paler.

Host-plant/Biology: *Cuscuta europaea* LINNAEUS and *C. reflexa* ROXB.; seed-feeder and internal stem-borer.

Distribution: Germany, India, Pakistan.

Material seen:

GERMANY: Offenbach, 6 ♂♂, 6 ♀♀, spring 1957, ex seeds *Cuscuta europaea* (SCHERF). — INDIA: Namkum, 1 ♂, 1 ♀, 14. ii. 1963 and 1 ♂, 2. xi. 1963, ex stem *C. reflexa* (SEHGAL). — PAKISTAN: Kahuta, 1 ♂, 2 ♀♀, 4. ii. 1961, ex seeds *C. reflexa* (GHANI).

Although this species appears to occur primarily as a seed-feeder, it is also found in stems and the genitalia are typical of stem-boring species. Feeding indiscriminately in seeds and stems is unusual but other cases are known, for example, *Phytomyza orobanchia* KALTENBACH in *Orobanche* and *Napomyza lateralis* (FALLÉN)<sup>3</sup> in *Digitalis*.

*M. cuscutae* is no doubt distributed widely with its food-plant.

<sup>3</sup> Shortly being described as *Napomyza* sp. n. by SPENCER (in press).

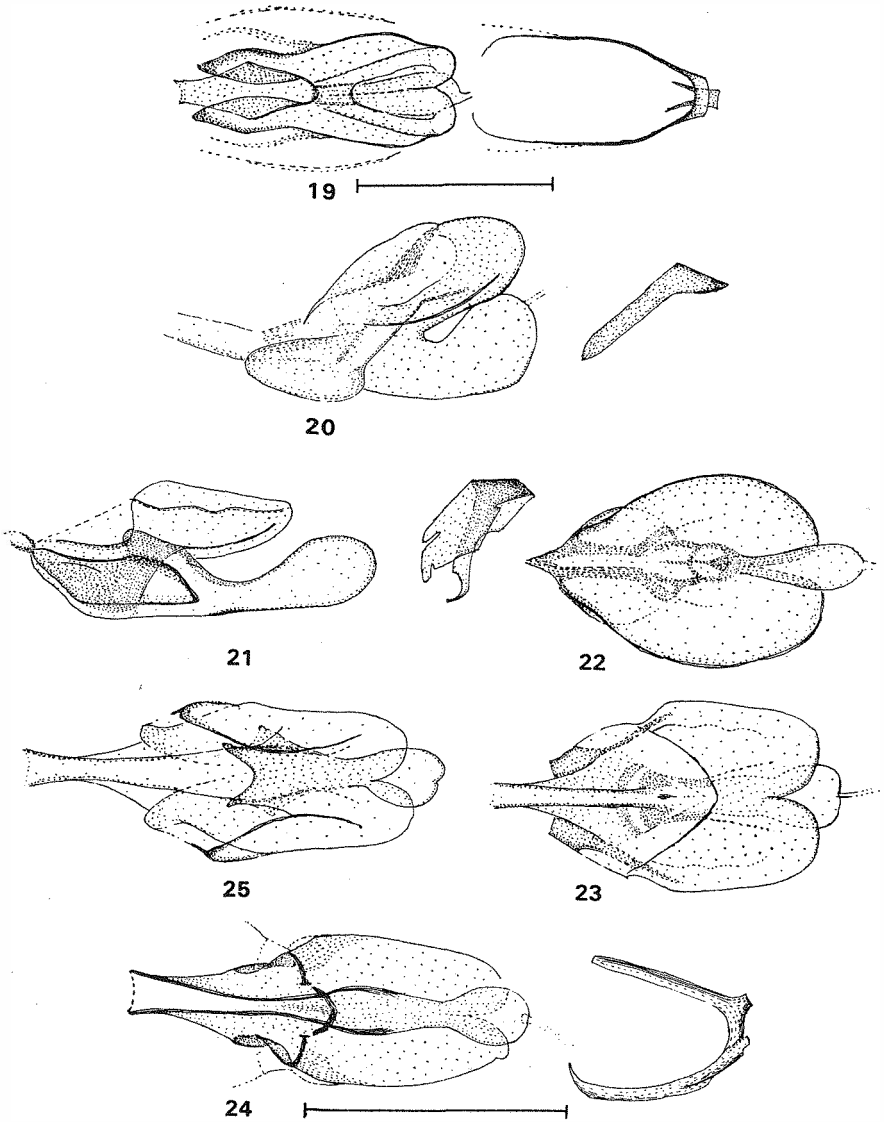


Plate 4

Fig. 19. *Melanagromyza cuscutae* HERING: aedeagus. —

Figs. 20—25. *Melanagromyza dettmeri* HERING: 20, aedeagus, side view (ex *Senecio jacobaea*); 21, same (ex *Centaurea jacea*); 22, same, ventral view (ex *C. jacea*); 23, same, dorsal view (ex *Artemisia vulgaris*); 24, same, ventral view (ex *C. nigra*); 25, same, dorsal view (ex *Crepis biennis*).

(Scale line = 0.1 mm.)

*Melanagromyza dettmeri* HERING

*Melanagromyza dettmeri* HERING, 1933. Holotype ♂ in author's collection, presented by Prof. HERING.

Adult: wing length from 2.7 mm in male to 3.2 mm in female; frons consistently not projecting above eye in profile; two *ors*, from two to four largely incurved *ori*; orbital setulae in two rows, those nearest eye margin reclinate, the row on inner orbits proclinate or upright, thus forming a criss-cross effect; jowls one-sixth vertical height of eye; mesonotum somewhat mat, faintly greenish or coppery, abdomen distinctly shining, variably coppery, greenish or bluish; squamae white, margin pale brown, fringe off-white to ochrous; last section of vein  $m_4$  two-thirds length of penultimate.

Male genitalia: aedeagus somewhat variable, as shown in Figs. 20 to 25, but essential form identical, tube of distiphallus distinctly projecting.

Larva: posterior spiracles adjoining, each with a regular ellipse of 15 bulbs surrounding the central horn; spiracular processes distinctly raised above puparium, generally dark but paler than base of horn; described by HERING (1957: 90) and discussed by SPENCER (1957: 186). The species discussed by HERING (1957: 79) as *Melanagromyza* sp. ex *Senecio* stems appears to belong here.

Host-plants/Biology: *Achillea*, *Artemisia*, *Centaurea*, *Crepis*, *Hieracium*, *Senecio*, one record in *Heracleum sphondylium*; internal stem-borer.

Distribution: Western Europe.

Material seen:

DENMARK: Maribo, 1 ♂, 4. v. 1941, ex *Centaurea jacea* LINNAEUS; 1 ♀, 7. vi. 1937, caught on *Centaurea* (SÖNDERUP). --

ENGLAND: Ex *Achillea millefolium* LINNAEUS: Surrey, Buckland, 1 ♀, 13. v. 1957 (K.A.S.). Ex *Artemisia vulgaris* LINNAEUS: Surrey, Betchworth, 1 ♂, 4 ♀♀, 4. v. 1958 (K.A.S.). Ex *Centaurea nigra* LINNAEUS: Middx., Scratch Wood. 2 ♂♂, 20. v. 1950 and 6. v. 1954, 14 ♀♀, May, 1949–1955 (K.A.S.); N. Wales, Cefn-y-bedd, nr. Wrexham, puparia in stems, Nov. 1964. Ex *Centaurea scabiosa* LINNAEUS: Surrey, Banstead, 1 ♀, 16. vii. 1938; Riddlesdown, 1 ♂, 1 ♀, June, 1951 (NIBLETT). Ex *Hieracium umbellatum* LINNAEUS: Surrey, Walton Heath, 1 ♀, 23. v. 1950 (NIBLETT). Ex *Senecio jacobaea* LINNAEUS: Middx., Scratch Wood, 2 ♂♂, May, 1955 and 1957, 7 ♀♀, May, 1956 and March, 1957 (K. A. S.).

Caught: Cambs., Chippenham Fen, 1 ♂, 5. vi. 1955; Derby, Millers Dale, 1 ♀, 1. vi. 1956 (K. A. S.). --

GERMANY: Thuringia, Mühlhausen, 1 ♂, 1 ♀, emerged Feb. 1932, ex *Crepis biennis* LINNAEUS (BUHR). --

HOLLAND: Valkenburg, 1 ♂, 7. vi. 1930, ex *Centaurea jacea* (DETTMER), holotype.

This species is distinctive and easily recognisable by the non-projecting frons and the two differently inclined rows of orbital setulae.

Although the ten male genitalia examined show definite variations, this is not constant between different food-plants and on the material so far available there is no justification in considering this as a species complex. The adults and larval characters are in all cases identical. The record on *Heracleum* is puzzling. It is just possible that a mistake was made in the data but this seems unlikely and the record must be accepted as one of xenophagy.

***Melanagromyza eriolepidis* SPENCER**

*Melanagromyza eriolepidis* SPENCER, 1961b: 94. Holotype ♂ in author's collection.

Adult: Large species, wing length from 3 mm in male to 3.6 mm in female, last section of  $m_4$  short, less than two-thirds, sometimes almost half length of penultimate; frons broad, twice width of eye; orbits conspicuously projecting above eye in profile, with two *ors* and four *ori*; orbital setulae long, numerous, in several rows, largely proclinate; jowls one-fifth vertical height of eye; mesonotum shining blackish-green, abdomen more strongly shining, greenish-coppery; squamae whitish-grey, margin pale brownish-orange, fringe whitish.

Male genitalia: aedeagus as in Fig. 26, with distinct gap between basiphallus and distiphallus complex.

Larva: described by HERING (1957: 77, as *M. cirsii* RONDANI), anterior spiracles each bearing 10–11 bulbs, posterior spiracles separated by less than own diameter, each process with a circle of 20–25 rather irregular bulbs around the black central horn; puparium distinctly orange.

Host-plant/Biology: *Cirsium eriophorum* (LINNAEUS) SCOPOLI; internal stem-borer.

Distribution: Germany.

Material seen:

GERMANY: Thuringia, Mühlhausen, 50 ♂♂ and ♀♀, emerged spring, 1958 ex stems *Cirsium eriophorum* (BUHR).

This species is substantially larger than *M. aeneoventris* (FALLÉN) and is distinguishable by the more numerous lower orbital bristles. It most closely resembles *M. artemisiae* from which it cannot be satisfactorily distinguished on external characters but the genitalia of the two species are entirely distinctive.

***Melanagromyza eupatorii* SPENCER**

*Melanagromyza eupatorii* SPENCER, 1957: 187. Holotype ♂ in author's collection.

Adult: wing length 2.5–2.7 mm in male, last section of vein  $m_4$  two-thirds penultimate; orbits slightly projecting above eye in profile, with two *ors* and four incurved *ori*; orbital setulae numerous, proclinate; jowls one-sixth vertical height of eye, cheeks narrow; mesonotum conspicuously mat, greyish-black; abdomen predominantly black, with only slightest greenish tinge; squamae grey, fringe black.

Male genitalia: aedeagus as in Figs. 27, 28, basiphallus closely adjoining distiphallus complex.

Larva: posterior spiracles separated by own diameter, each process with a ring of 10–12 distinctly raised, clearly-defined bulbs surrounding the minute central horn (cf. SPENCER, 1957: Fig. 8).

Host-plants/Biology: *Eupatorium cannabinum* LINNAEUS, *Senecio erucifolius* LINNAEUS, *S. jacobaea* LINNAEUS, *Inula conyza* LINNAEUS, *Chrysanthemum leucanthemum* LINNAEUS; internal stem-borer.



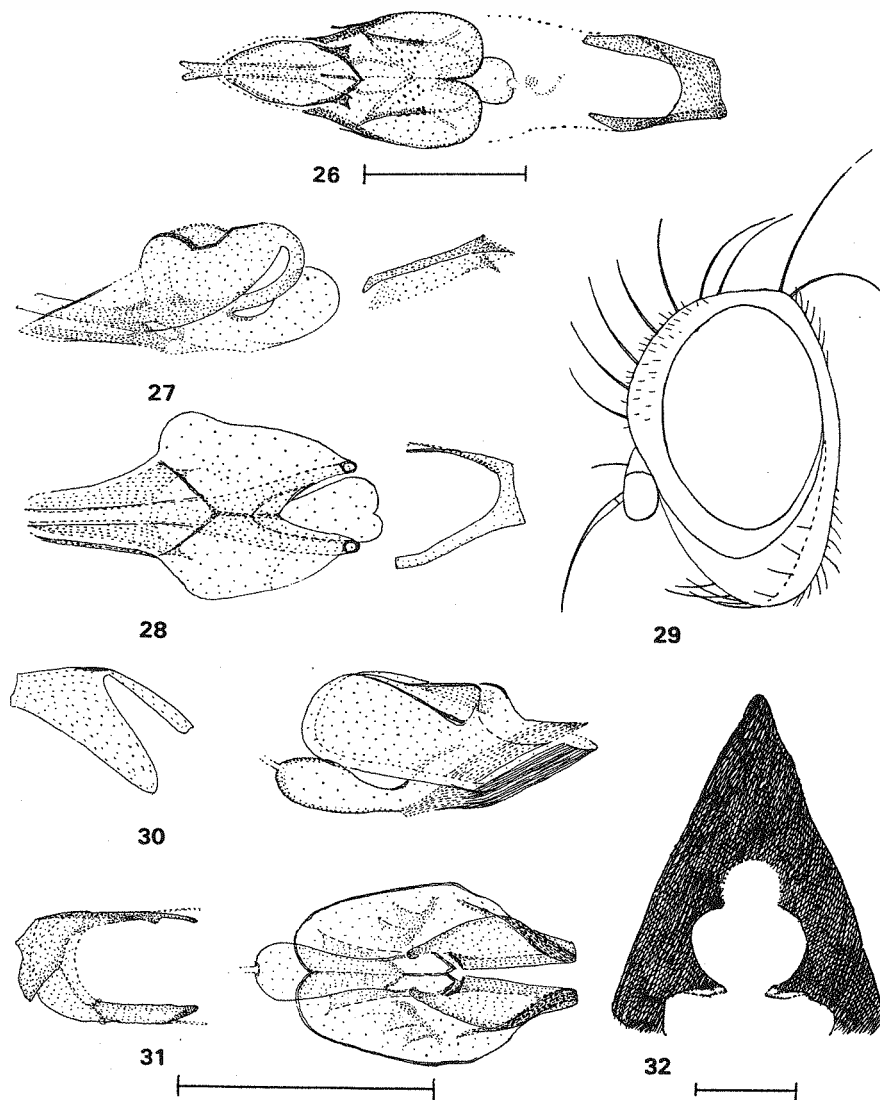


Plate 5

Fig. 26. *Melanagromyza eriolepidis* SPENCER: aedeagus. —

Figs. 27–28. *Melanagromyza eupatorii* SPENCER: 27, aedeagus, side view; 28, same, dorsal view. —

Figs. 29–32. *Melanagromyza ferulae* sp. n.: 29, head; 30, aedeagus, side view; 31, same, dorsal view; 32, ninth sternite.  
(Scale line = 0.1 mm.)

Distribution: Germany, England.

Material seen:

AUSTRIA: Styria, 1 ♂, 8 June (STROBL, identified as "*Agromyza pinguis* F. Rd."). —  
 ENGLAND: Cambs., Chippenham Fen, puparia found in *Eupatorium* Sept., 1958 (K. A. S.);  
 Hunts., Woodwalton Fen, 1 ♂, 1961 ex *Eupatorium*; 1 ♂, 1 ♀, spring 1961, ex *Senecio jacobaea* (GRIFFITHS). —  
 GERMANY: Heidelberg, 2 ♂♂, emerged 2. v. 1956 and 10. ii. 1957, ex stems *Eupatorium*  
 (K. A. S.); Thuringia, Mühlhausen, 1 ♂, emerged spring, 1963 ex stem *Senecio erucifolius*;  
 Kng Lobdeburg, 1 ♂, emerged spring, 1959 ex stem *Inula conyza*; Vogtland, Jocketal, 1 ♂,  
 emerged spring, 1961 ex stem *Chrysanthemum leucanthemum* (all BUHR).

***Melanagromyza ferulae* sp. n.**

Head (Fig. 29): Frons conspicuously broad, slightly over twice width of eye; orbits broad, distinctly raised and projecting above eye in profile; two *ors*, five incurved *ori*; orbital setulae predominantly proclinate, a few nearest eye margin reclinate; ocellar triangle indistinct; lunule large, semicircular; jowls deepest in centre, one-quarter vertical height of eye, cheeks forming broad ring below eye; eye small, oval, upright; antennae separated by low, narrow keel, arista short, appearing bare.

Mesonotum: two strong dorso-centrals, second at level of supra-alar, acrostichals in some 10 rows, some hairs extending to level of first *dc*.

Wing: length in male 2.7 mm; costa extending strongly to apex of vein  $m_{1+2}$  last section of  $m_4$  approximately two-thirds length of penultimate.

Colour: frons mat black, ocellar triangle only faintly shining; mesonotum black, slightly shining viewed from behind, mat viewed from front; abdomen with slight bluish-coppery sheen; squamae pale grey; margin and fringe brown.

Male genitalia: aedeagus as in Figs. 30, 31; ninth sternite conspicuously strong and black as in Fig. 32; surstyli rather long and narrow, with a number of short spines above and longer hairs below (Fig. 33); cerci (Fig. 34) with some seven or eight long spines on inner margin.

Holotype: ♂, Sicily, Mt. Etna, Linguaglossa, caught 8. iv. 1964 on *Ferula communis* LINNAEUS (K.A.S.), in author's collection.

This species is distinguishable by the broad frons, small eye, numerous *ori* and proclinate orbital setulae. The aedeagus is of a form normal in stem-borers; there is little doubt that the species is an internal stem-borer in *Ferula*.

***Melanagromyza foeniculi* SPENCER**

*Melanagromyza foeniculi* SPENCER, 1960a: 376. Holotype ♂ in author's collection.

Adult: wing length from 2.4 to 2.6 mm, last section of  $m_4$  variable, from two-thirds to only slightly shorter than penultimate; frons broad, almost twice width of eye, orbits distinctly projecting above eye in profile, with two *ors* and three or four *ori*; orbital setulae sparse, irregular, but essentially in two rows, those nearest eye margin proclinate, inner row reclinate; jowls one-fifth vertical

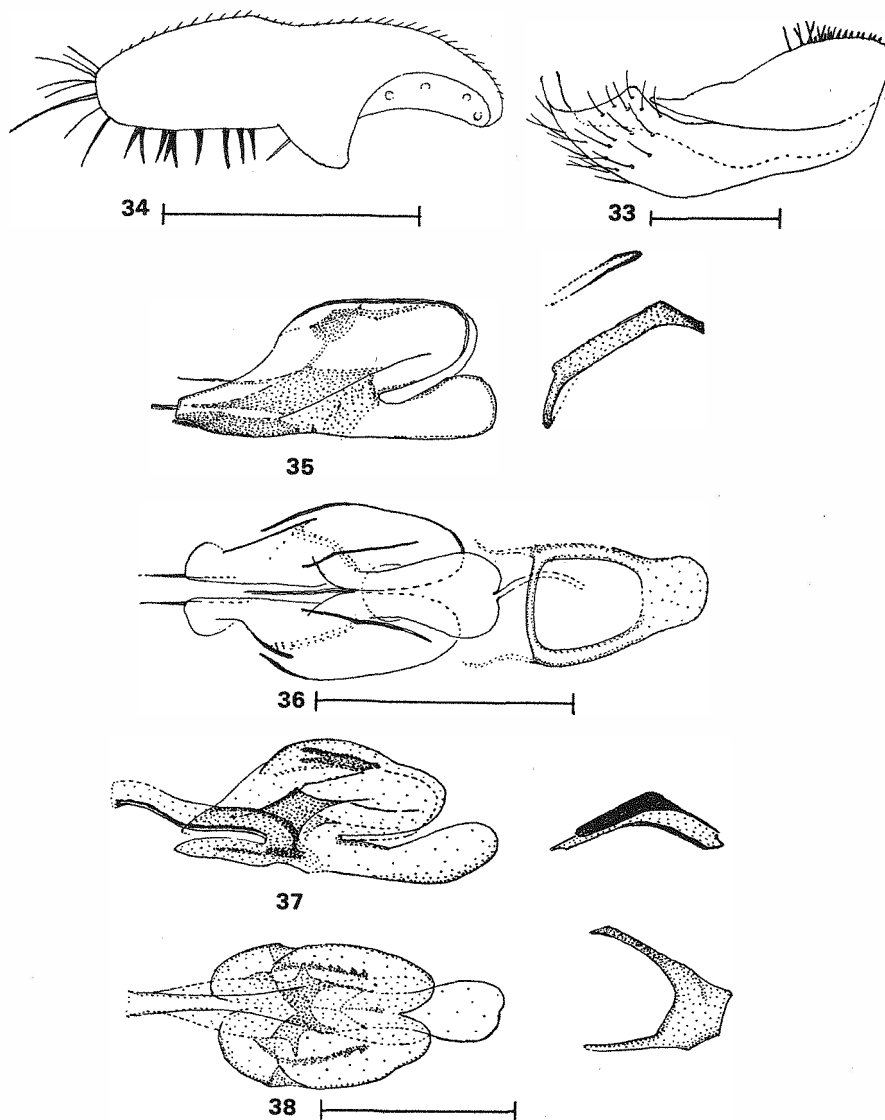


Plate 6

Figs. 33—34. *Melanagromyza ferulae* sp. n.: 33, surstylus; 34, cercus. —

Figs. 35—36. *Melanagromyza foeniculi* SPENCER: 35, aedeagus, side view; 36, same, ventral view. —

Figs. 37—38. *Melanagromyza lappae* (LOEW): 37, aedeagus, side view; 38, same, dorsal view.

(Scale line = 0.1 mm.)

height of eye; mesonotum mat viewed from front, distinctly shining from behind, predominantly black but with slight bluish tinge; abdomen shining, bluish-green to coppery; squamae white, margin pale brown, fringe silvery-white.

Male genitalia: aedeagus as in Figs. 35, 36, basiphallus distinctive, arms joined at end to form complete ring with an additional U-shaped process above, distiphallus complex of pattern normal in genus.

Larva: posterior spiracles separated by own diameter, each with circle of ten well-defined, raised bulbs, surrounding the minute central horn (cf. SPENCER, 1960a: Fig. 1).

Host-plant/Biology: *Foeniculum vulgare* LINNAEUS; internal stem-borer.

Distribution: Spain.

Material seen:

SPAIN: Castelldefels, nr. Barcelona, 3 ♂, 1 ♀, May, 1958, ex stems *Foeniculum*; Sitges, August, 1963, numerous puparia in stems of *Foeniculum* but no adults obtained.

This species closely resembles *M. nibletti* but is distinguishable by the distinctly broader frons.

#### *Melanagromyza lappae* (LOEW)

*Agromyza lappae* LOEW, 1850: 380. Types not in LOEW's collection in Zoological Museum, Berlin, apparently lost.

*Melanagromyza lappae* (LOEW), HENDEL, 1920: 126 (as *aeneiventris* FALLÉN); 1931—6: 167.

*Melanagromyza multiseta* RYDÉN, 1949: 87, **syn. nov.** Holotype ♀ in Zoological Institute, University, Lund.

*Melanagromyza nitens* ROHDENDORF-HOLMANOVÁ, 1958: 384, **syn. nov.** Holotype ♀ in coll. E. ROHDENDORF, Prague.

Adult: a large, robust species, wing length 2.6 to 3.5 mm; frons and orbits strongly projecting above eye; orbital bristles irregular, normally two *ors*, from three to six *ori*; orbital setulae in several rows, those nearest eye margin largely reclinate, those on inner orbits more proclinate, frequently rather sparse; jowls deepest in centre below eye, one-fifth eye height; colour: mesonotum faintly greenish or coppery, abdomen frequently brilliantly green or bluish; squamae white with pale brown margins and white fringe.

Male genitalia: aedeagus as in Figs. 37, 38, basiphallus closely adjoining distiphallus complex.

Larva: described by HERING (1957: 81) and discussed by SPENCER (1957: 186), posterior spiracles adjoining, each process with 16—22 bulbs around the strong central horn.

Host-plant/Biology: *Arctium lappa* LINNAEUS, *A. minus* (HILL) BERNHARDI; internal stem-borer.

Distribution: Europe.

Material seen:

ENGLAND: Middx., Scratch Wood, 3 ♂♂, 9 ♀♀, May, 1956; Bucks., Sarratt, 1 ♂, 4 ♀♀, May, 1954, all bred from *Arctium lappa* (K. A. S.). —

GERMANY: Thuringia, Mühlhausen, 6 ♂♂, 6 ♀♀, April, 1955, ex *A. lappa*: puparia ex *A. minus*, leg. 3. x. 1964 (all BUHR). —

FINLAND: Helsinki, 1 ♀, April, 1942, ex *Arctium lappa* (NORDMAN). —

RUMANIA: Bessarabia, Tichina, 2 ♂♂, 2 ♀♀, April, 1931, ex *A. lappa* (HERING). —

SWEDEN: Hittarp, nr. Hälsingborg, 1 ♀, 23. vii. 1947 (RYDÉN), holotype of *multiseta*. —

U.S.S.R.: Moscow Dist., Dedinovo, 2 ♀♀, 24 and 25. vii. 1955 (including holotype of *nitens* ROHDENDORF-HOLMANOVÁ); Bitza, 3 ♂♂, 22. vii. 1936, 1 ♀, 28. viii. 1936; Sofrino, 1 ♂, 29. vi. 1947 (B. ROHDENDORF).

LOEW's description was based on specimens bred from stems of *Arctium lappa* while he was working at Posen. Although none of this original material can now be traced, the identity of the species is not in doubt and designation of a neotype is not called for.

Examination of the holotypes of *multiseta* RYDÉN and *nitens* ROHDENDORF-HOLMANOVÁ shows them to represent typical *lappae*.

*M. lappae* resembles *M. angelicae* (FROST) so closely that positive identification of single caught specimens may not be possible. In size and coloration the species are identical. The only slight difference can be seen in the orbital setulae which in *lappae* normally appear predominantly reclinate, while in *angelicae* they appear predominantly proclinate. However, even with this character there is considerable overlapping. The posterior larval spiracles are also not distinguishable in the two species. The genitalia of the two species, however, are quite distinct.

#### *Melanagromyza nibletti* SPENCER

*Melanagromyza nibletti* SPENCER, 1957: 180. Holotype ♂ in author's collection.

Adult: small species, wing length 2.5 mm, frons one and a half times width of eye, orbits projecting above eye in profile, with two *ors* and three *ori*; orbital setulae sparse, largely proclinate, a few nearest eye margin reclinate; jowls almost one-quarter height of eye; last section of  $m_4$  two-thirds penultimate, mesonotum and abdomen shining, greenish or coppery; squamae and fringe silvery-white, margin pale brown.

Male genitalia: aedeagus as in Figs. 39, 40.

Larva: posterior spiracles separated by own diameter, solidly chitinized, black, with 10–12 bulbs around the strong horn (cf. SPENCER, 1957: Fig. 1).

Host-plant/Biology: *Silium silaus* (LINNAEUS) SCHINZ and THELL; internal stem-borer.

Distribution: England.

Material seen:

ENGLAND: Surrey, Bookham, 2 ♂♂, 2 ♀♀, 6–8. vii. 1951, ex stems *Silium* (NIBLETT); same locality, 1 ♂, 2 ♀♀, April, 1957 and 1 ♂, May, 1958, all ex *Silium* (K.A.S.).

This species closely resembles *M. foeniculi* but is distinguishable by the narrower frons.

*Melanagromyza polemonii* ROHDENDORF

*Melanagromyza polemonii* ROHDENDORF, 1953: 65. Holotype ♂ in Zoological Institute, Academy of Sciences of U.S.S.R., Leningrad.

Adult: wing length 2.5–2.9 mm, last section of vein  $m_4$  two-thirds penultimate; frons broad, twice width of eye; orbits distinctly projecting above eye in profile, conspicuously broad at level of ocellar triangle, narrowing anteriorly, with two *ors* and three *ori*; orbital setulae predominantly reclinate, with a few hairs proclinate on inner row; jowls broadest in centre below eye, one quarter vertical height of eye; mesonotum largely black, distinctly shining, abdomen brilliantly shining green or bluish; squamae greyish, margin dark-brown, fringe ochrous.

Male genitalia: aedeagus entirely distinctive, as in Figs. 41, 42.

Larva: no description available.

Host-plant/Biology: *Polemonium coeruleum* LINNAEUS and other *Polemonium* species. Internal stem-borer; up to 15 larvae have been found in a single stem.

Distribution: U.S.S.R.

Material seen:

U.S.S.R.: Moscow Dist., Bitza, 1 ♀, 2. viii. 1949, caught on *Polemonium* (paratype); same locality, 1 ♂, 1950–51, bred ex *Polemonium* (TIMOSHKOW).

*Melanagromyza pubescens* HENDEL

*Melanagromyza pubescens* HENDEL, 1923: 144; 1931–6: 170. Holotype ♀ in Naturhistorisches Museum, Vienna.

Adult: large species, wing length 2.7–3.1 mm; costa extending to vein  $m_{3+4}$ , last section of  $m_4$  two-thirds penultimate; frons broad, almost double width of eye, characteristically projecting above eye in profile, more strongly anteriorly, four or five strong orbital bristles, largely equal; orbital setulae sparse, in single row, reclinate; jowls broad, deepest at rear, one-quarter height of eye, cheeks forming broad ring below eye; two strong dorso-centrals; mesonotum mat from front, shining black from behind, abdomen shining black; squamae grey, margin and fringe black.

Male genitalia: aedeagus distinctive, as in Figs. 43, 44; ninth sternite with hypandrial apodeme conspicuously flattened ventrally (cf. SPENCER, 1964a: Fig. 23, of *M. luthulii*).

Biology: unknown.

Distribution: Austria, Denmark, England, Germany.

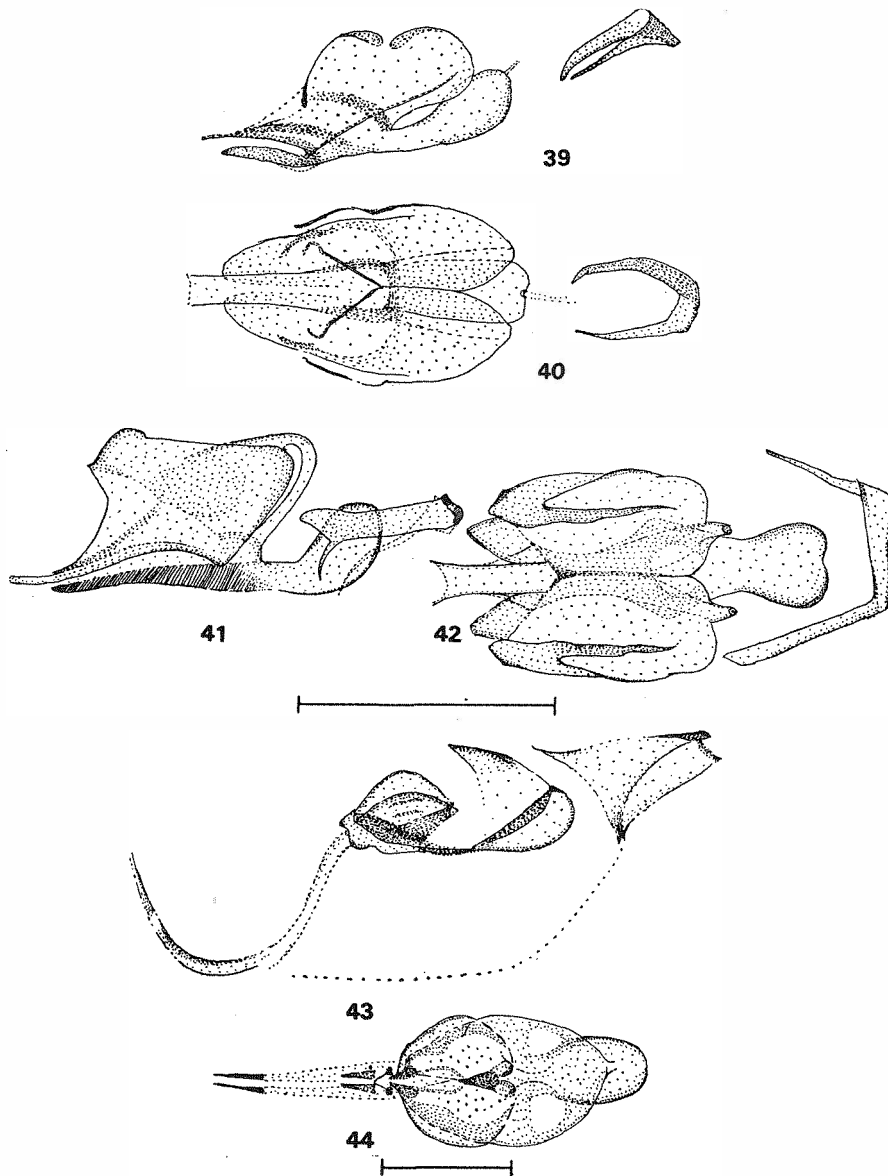
Material seen:

AUSTRIA: Vienna, 1 ♀, 18. vi. 1922 (holotype), 1 ♂, 1 ♀, June; Lower Austria, Pressbaum, 1 ♀, 1 June (all HENDEL). —

DENMARK: Hörsholm, 1 ♂, 1 ♀, 12. viii. 1953, caught on *Artemisia* (HERING). —

ENGLAND: Putney Heath, London, 1 ♂, June, 1921 (C. G. NURSE). —

FINLAND: Jontseno, Sa., 1 ♂, 15. vii. 1954 (THUNEBERG). —



**Plate 7**

Figs. 39–40. *Melanagromyza nibletti* SPENCER: 39, aedeagus, side view; 40, same, dorsal view. —

Figs. 41–42. *Melanagromyza polemonii* ROHDENDORF: 41, aedeagus, side view; 42, same dorsal view. —

Figs. 43–44. *Melanagromyza pubescens* HENDEL: 43, aedeagus, side view; 44, same, dorsal view (foreshortened).

(Scale line = 0.1 mm.)

GERMANY: Berlin-Buch, 1 ♂, 18. vii. 1933; B.-Tempelhof, 1 ♀, 6. vi. 1936, on *Artemisia vulgaris*; Kunnersdorf bei Görlitz, 1 ♀, 22. vi. 1955 (all HERING). —

MONGOLIA: Central aimak, Songino, 1300 m, 24 km, SW of Ulan-Bator, 1 ♂, 13. vii. 1963 (Exp. Dr. Z. KASZAB).

This is a distinctive species, recognisable by the strongly projecting frons, sparse orbital setulae, deep jowls and black squamal fringe. It has frequently been confused with *Ophiomyia orbiculata* (HENDEL), but this is generally smaller, the frons is less projecting and there is invariably a third or even fourth small additional dorso-central.

The species was described from a single caught female, which is thus the holotype. However, subsequently HENDEL labelled two additional specimens as "Typus" and one as "P.T.". It is believed that this was done when the species was redescribed by HENDEL for the Monograph on the family (1931—6).

*M. pubescens* has genitalia which are entirely distinctive among Palaearctic species but which very closely resemble those of *M. luthulii* SPENCER (1964a) from South Africa. In this species the frons is not projecting and the jowls are significantly narrower. The two species are obviously closely related and the genitalia show they are somewhat removed from the typical stem-borers.

#### *Melanagromyza rohdendorfi* sp. n.

Head: frons one and a half times width of eye, orbits distinct, slightly projecting above eye in profile, with two *ors* and two or three *ori*; orbital setulae long, predominantly proclinate; jowls one-fifth vertical height of eye, cheeks forming narrow ring below eye; third antennal segment small, with inconspicuous pubescence, arista appearing bare.

Mesonotum: second dorso-central long, at level of supra-alar, acrostichals in some eight rows in front, three or four rows extending behind level of first *dc*.

Wing: length 1.9—2.2 mm, costa extending strongly to vein  $m_{1+2}$ , last section of  $m_4$  two-thirds penultimate, first cross-vein beyond centre of discal cell.

Colour: orbits and ocellar triangle weakly shining, mesonotum conspicuously shining black with faint bluish undertone, abdomen shining bluish, scarcely less so viewed from front; squamae greyish-white, margin yellowish-brown, fringe ochrous.

Male genitalia: aedeagus distinctive, as in Figs. 45, 46.

Holotype: ♂, U.S.S.R., Crimea, Alushta, swept 2. vii. 1955; paratypes: 1 ♂, 17. viii. 2 ♀♀, 29 and 31. vii. 1955 (all B. B. ROHDENDORF).

Holotype and one paratype in coll. E. ROHDENDORF, Prague, one paratype in Dept. of Zoology, Moscow State University, two paratypes in author's collection.

This species generally resembles *M. tripolii*, but is substantially smaller, the mesonotum is more shining-black and the squamal fringe darker. I have pleasure in naming the species after Prof. B. B. ROHDENDORF, who has shown an active interest in the Russian Agromyzidae.



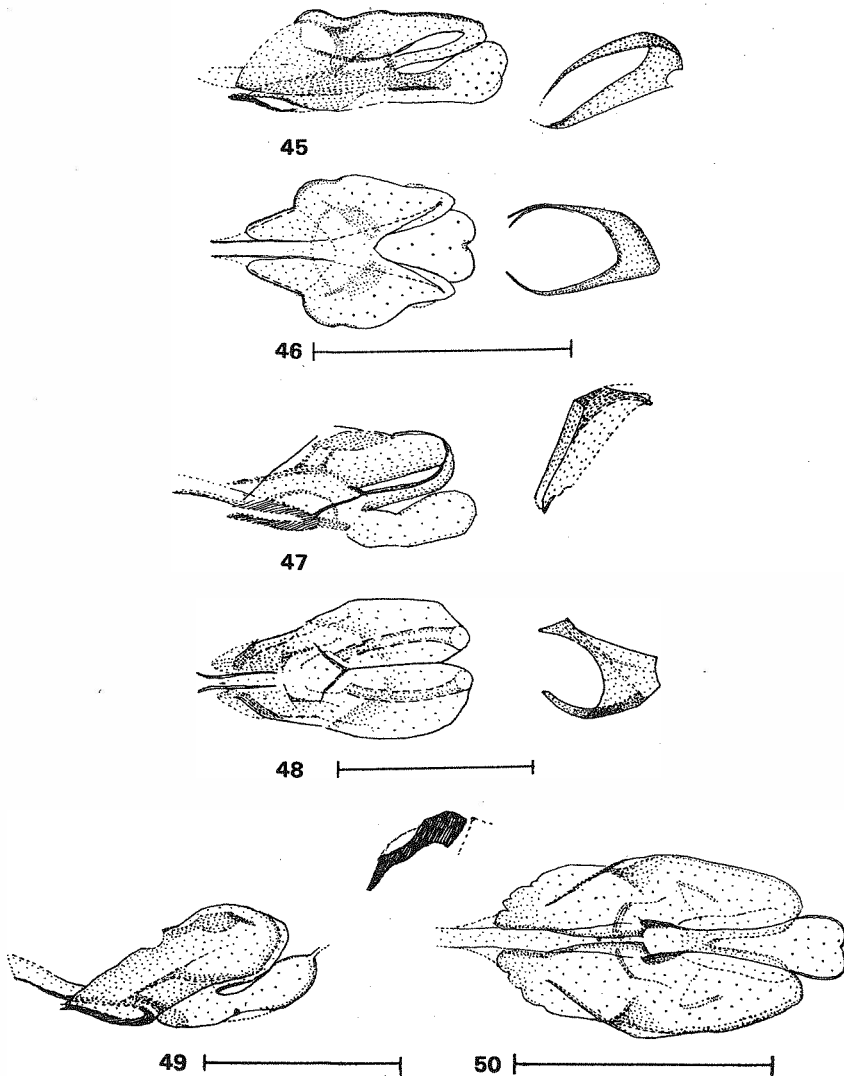


Plate 8

Figs. 45—46. *Melanagromyza rohdendorfi* sp. n.: 45, aedeagus, side view; 46, same, dorsal view. —

Figs. 47—48. *Melanagromyza sativae* SPENCER: 47, aedeagus, side view; 48, same, dorsal view. —

Figs. 49—50. *Melanagromyza siciliensis* sp. n.: 49, aedeagus, side view; 50, distiphallus, ventral view.  
(Scale line = 0.1 mm.)

***Melanagromyza sativae* SPENCER**

*Melanagromyza sativae* SPENCER, 1957: 180. Holotype ♂ in author's collection.

*Melanagromyza torilidis* SPENCER, 1957: 182; GRIFFITHS, 1964: 78. Holotype ♂ in author's collection.

Adult: medium to large species, wing length 2.5–3 mm, costa extending to vein  $m_{1+2}$ , last section of  $m_4$  two-thirds penultimate; frons broad, twice width of eye, orbits distinctly projecting above eye, with two *ors* and three or four *ori*, orbital setulae short, fine, in two rows, those nearest eye margin reclinate but majority proclinate; mesonotum only moderately shining, blackish-coppery, distinctly mat viewed from front, abdomen shining-greenish; squamae grey, margin pale brown, fringe ochrous.

Male genitalia: aedeagus as in Figs. 47, 48.

Larva: posterior spiracular processes black, strongly chitinized (illustrated by SPENCER, 1957: Fig. 3), separated by own diameter, each process with 14 or sometimes less bulbs around the strong central horn.

Host-plants/Biology: *Pastinaca sativa* LINNAEUS, *Pimpinella affinis* LEDERBOUR, *Torilis japonica* (HOULT.) DC; internal stem-borer.

Distribution: England, N. W. Persia.

## Material seen:

ENGLAND: Surrey, Bookham and Betchworth, 10 ♂♂, 8 ♀♀, ex stems *Pastinaca*, May and June, 1956; Bookham, 3 ♂♂, 1 ♀, May, 1956, ex stems *Torilis* (K. A. S.). —

PERSIA: Majanderan Forest, nr. Calus, 2 ♂♂, 2 ♀♀, emerged spring, 1961 ex stems *Pimpinella*, found 15. viii. 1961 (GRIFFITHS).

It was originally thought that this species was host-specific on *Pastinaca*; however, it is now established that it feeds also on *Torilis* and *Pimpinella* and it may well also occur on other genera of the Umbelliferae. It no doubt occurs widely throughout Europe and W. Asia with its food-plants.

***Melanagromyza siciliensis* sp. n.**

Head: frons just over one and a half times width of eye, distinctly projecting above eye in profile; two *ors*, three (sometimes four) *ori*; orbital setulae numerous, slightly irregular, predominantly reclinate; orbits slightly widening below lower *ori*, adjoining lunule; ocellar triangle with apex extending to level of lower *ors*; jowls broadest in centre below eye, cheeks forming narrow ring below eye; eye large, oval, upright, with distinct patch of white hairs in male on upper third; third antennal segment small, rounded at end, arista appearing largely bare.

Mesonotum: two strong *dc*, second at level of supra-alar; *acr* in some 10 rows, a few hairs extending almost to margin of scutellum.

Wing: length 2.6–2.8 mm, costa extending strongly to vein  $m_{1+2}$ , last section of  $m_4$  two-thirds penultimate.

Colour: frons mat black, ocellar triangle only weakly shining; mesonotum slightly shining from behind, with a faint coppery-bluish tinge; abdomen mode-

rately shining, bluish-green; squamae grey, margin and fringe black; halteres black.

Male genitalia: aedeagus as in Figs. 49, 50; distiphallus ending in distinct tubule, mesophallus extending slightly behind whole distal complex, basiphallus normal, U-shaped; surstyli with short teeth at end; ninth sternite with narrow side arms; sperm sac with almost circular blade.

Holotype ♂, Sicily, Mt. Etna, roadside 1 km. E. of Sinofsi, 600 m, 9. iv. 1964, caught on Composite, probably *Achillea* sp.; paratypes: 2 ♂♂, 3 ♀♀, same data; 1 ♂, roadside 1 km. S. of Trecastagni, 500 m., 8. iv. 1964, all in author's collection.

There is little doubt that this species is a stem-borer in the Composite on which it was caught.

#### *Melanagromyza sojæ* (ZEHTNER)

*Agromyza sojæ* ZEHTNER, 1900. Holotype ♂ in Zoological Museum, Amsterdam.

*Melanagromyza sojæ* (ZEHTNER), DE MEIJERE, 1922: 18.

*Agromyza prolifica* MALLOCH, 1914; SPENCER, 1961a: 77. Holotype in Hungarian National Museum, Budapest.

*Agromyza producta* MALLOCH, 1914; SPENCER, 1962a: 673. Holotype ♂ in Hungarian National Museum, Budapest.

*Agromyza squamata* BECKER, 1903, **syn. nov.** Two ♀♀ syntypes in Zoologisches Museum der Humboldt-Universität, Berlin.

Adult: small species, with shining black mesonotum, green abdomen, white squamae and fringe, essentially as in *M. cunctans* (MEIGEN).

Male genitalia: as in *M. cunctans* (cf. Figs. 13–15); also illustrated by SPENCER (1963b: Fig. 7, c, d and SASAKAWA 1961: Fig. 31).

Larva: posterior spiracles separated by more than own diameter, each process arising separately and consisting of normally six raised bulbs around the central, truncated horn (Fig. 51); previously illustrated by DE MEIJERE (1922: Fig. 2) and SPENCER (1959: Fig. 20), as *cunctans*; also by SASAKAWA (1961: Fig. 31). Known hosts are *Glycine*, *Phaseolus*, *Cajanus*, *Indigofera*, *Flemingia*, *Aeschynone*; oviposition takes place in an upper leaf and the larva quickly moves into the mid-rib and then down the stem to the root; pupation takes place either in the root or the stem.

Distribution: U.S.S.R., Japan, Egypt, India, Malaya, Indonesia, Formosa, Australia, Micronesia.

Material seen:

U.S.S.R.: Crimea, Kasrem, 18 ♂♂, 7 ♀♀, 9–16. ix. 1958; Alushta, 1 ♂, 2 ♀♀, 2. viii. 1955 (B. ROHDENDORF).

Also numerous specimens from Egypt, Formosa, India, Indonesia, Australia, Micronesia.

HENDEL (1931–6: 168) synonymised *squamata* BECKER with *cunctans* MEIGEN. I have examined BECKER's syntypes from Egypt and in the light of the additional material now known from Egypt, it is clear that *squamata* should be correctly synonymised with *sojæ* (ZEHTNER).

VAN DER GOOT (1930) discusses the biology of this species very fully and comments on its occurrence in large numbers with its various foodplants. *M. sojae* is primarily tropical in distribution but the numerous specimens caught on *Phaseolus* sp. in Egypt are certainly referable to this species. It is reasonable to assume that the series of 28 specimens from the Crimea also represent *sojae*. The isolated caught specimens, from various parts of Eastern and Western Europe are more probably referable to *M. cunctans*, although a positive identification is not possible except from larval characters. So far no bred specimens are known from Europe.

*M. sojae* has been discussed previously by SPENCER (1961a: 77; 1962a: 673; 1963a: 320; 1963b: 152) and by SASAKAWA (1961: 350).

***Melanagromyza submetallescens* sp. n.**

Head: frons broad, twice width of eye, orbits slightly raised, forming narrow ring above eye; two *ors*, three or sometimes four *ori*; orbital setulae fine, sparse, largely reclinate; jowls deepest in centre below eye, with cheeks one-quarter to one-fifth vertical height of eye, cheeks forming narrow ring below eye; third antennal segment small, rounded, with slight pubescence, arista appearing largely bare.

Mesonotum: two strong dorso-centrals, acrostichals extending almost to margin of scutellum.

Wing: length 2.5 mm, costa extending to vein  $m_{1+2}$ , last section of  $m_4$  two-thirds penultimate.

Colour: orbits and ocellar triangle only faintly shining, mesonotum conspicuously dull, greyish when viewed from front, slightly shining blackish-blue seen from behind; abdomen shining, blackish-blue; squamae pale, whitish-grey, margin dark, brown or blackish, fringe ochrous.

Male genitalia: aedeagus as in Figs. 52, 53, tube of distiphallus rather elongated, sides of mesophallus relatively straight, U-shaped basiphallus closely adjoining mesophallus.

Holotype ♂, Germany, Harz, Stempeda, 21. vi. 1927, 1 ♀ paratype, same data (HERING), both in author's collection. Further paratypes: U.S.S.R., Bitza, nr. Moscow, 2 ♂♂, 9 and 16. vi, 1 ♀, 6. vi. 1936 (all B. B. ROHDENDORF); Finland, Sund, 2 ♂♂, 28. v. 1906 and 11. vii. 1942 (FREY, 2228 and 3583); Kuusamo, 1 ♂, 30. vi. 1936 (FREY, 1120); Helsinge, 1 ♂, May, 1910, 1 ♀, 14. vi. 1940 (FREY, Nos. 194, 191).

Two paratypes in coll. E. ROHDENDORF, Prague, three in Zoological Museum of the University, Helsinki, one in Naturhistorisches Museum, Vienna.

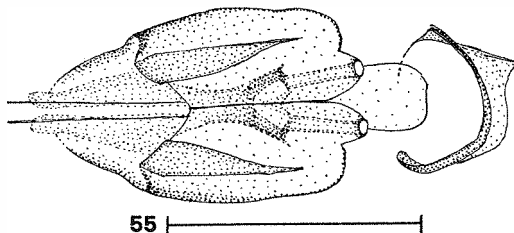
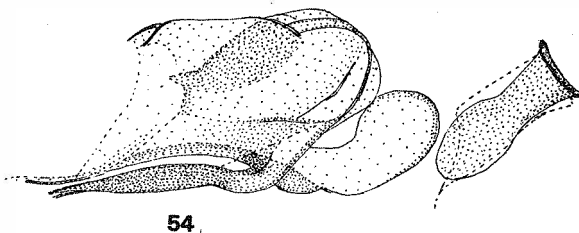
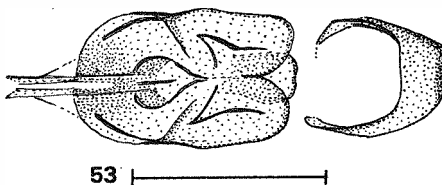
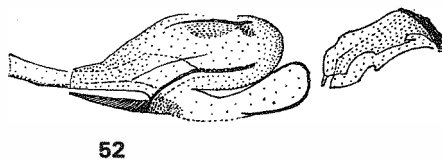
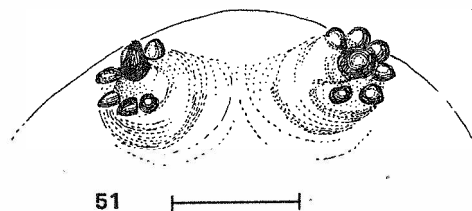
The characteristic features of this species are the arrangement of orbital setulae, the mat mesonotum and distinctive coloration of the squamae. The male genitalia indicate that the species is a stem-borer.

*Melanagromyza symphyti* GRIFFITHS

*Melanagromyza symphyti* GRIFFITHS, 1963: 155. Holotype ♂ in coll. GRIFFITHS, London. Adult: wing length 2.7 mm, last section of  $m_4$  two-thirds penultimate; frons not significantly projecting above eye; two *ors*, normally three *ori*; orbital setulae sparse, in two rows, those nearest eye margin reclinate, inner row proclinate; jowls one-fifth vertical height of eye; mesonotum distinctly shining from behind, largely black, abdomen somewhat greenish or bluish; squamae and fringe silvery-white, margin pale brown.

Male genitalia: aedeagus as in Figs. 54, 55.

Larva: posterior spiracles separated by own diameter, each process covered irregularly with some 30 minute, raised, well-defined bulbs surrounding the small central horn (illustrated by GRIFFITHS, 1963: Fig. 8); the puparium is dark reddish-brown in contrast to the whitish-yellow colour of most other species in the group.



## Plate 9

Fig. 51. *Melanagromyza sojae* (ZEHNTNER): posterior spiracles of puparium. —

Figs. 52–53. *Melanagromyza submetallescens* sp. n.: 52, aedeagus, side view; 53, same, dorsal view. —

Figs. 54–55. *Melanagromyza symphyti* GRIFFITHS: 54, aedeagus, side view; 55, same, dorsal view. (Scale line = 0.1 mm.)

Host-plant/Biology: *Symphytum officinale* LINNAEUS; internal stem- and leaf-stalk borer.

Distribution: England.

Material examined:

ENGLAND: Hunts., Woodwalton Fen, 1 ♂, 1 ♀ (holotype and allotype), and 16 paratypes bred ex *Symphytum officinale*, spring, 1962 from larvae found 17. ix. 1961 (GRIFFITHS).

#### *Melanagromyza tripolii* SPENCER

*Melanagromyza tripolii* SPENCER, 1957: 182. Holotype ♂ in author's collection.

Adult: wing length 2.8–3 mm, last section of  $m_4$  two-thirds penultimate; frons broad, almost twice width of eye, strongly projecting above eye in profile; orbits with two *ors* and three or four *ori*; orbital setulae numerous, proclinate; jowls up to one-quarter vertical height of eye; mesonotum distinctly shining, greenish, abdomen similar; squamae and fringe silvery-white, with pale yellowish-brown margin.

Male genitalia: aedeagus distinctive as in Figs. 56, 57.

Larva: posterior spiracular processes separated by own diameter, each with 14–18 well-defined, raised bulbs surrounding the small central horn (cf. SPENCER, 1957: Fig. 6 and HERING, 1957: 78); puparium orange-brown.

Host-plant/Biology: *Aster tripolium* LINNAEUS; internal stem-borer.

Distribution: England, N. Germany, Denmark.

Material seen:

DENMARK: Maribo, 1 ♀, no date, ex stem *Aster tripolium* (SÖNDERUP). —

ENGLAND: Kent, Faversham, 8 ♂♂, 2 ♀♀, swept on *Aster tripolium*, 27. vi. 1954; 1 ♂, 2 ♀♀, bred ex stem *A. tripolium*, Apr.—May, 1955; Essex, Mersea, 3 ♂♂, 5 ♀♀, on *A. tripolium*, 17. vii. 1961 (all K.A.S.).

This species closely resembles *M. rohdendorfi* from the Crimea but is distinguishable by its larger size, broader frons, greenish mesonotum and paler squamae.

#### *Melanagromyza verbasci* SPENCER

*Melanagromyza verbasci* SPENCER, 1957: 188. Holotype ♀ in author's collection.

Adult: large species, wing length 3.5 mm, frons distinctly projecting above eye with two *ors* and four inclined *ori*; orbital setulae in two rows, inner predominantly proclinate, outer predominantly reclinate; mesonotum distinctly shining black, with faint bluish undertone; abdomen bluish or greenish, squamae and fringe white, margin pale brown.

Male genitalia: aedeagus as in Figs. 58, 59, with developed distal tubule and distinct gap between basiphallus and distiphallus complex.

Larva: posterior spiracles adjoining, pale brown, with 12 to 14 irregular bulbs surrounding the strong, black horn (cf. SPENCER, 1957; Fig. 10).

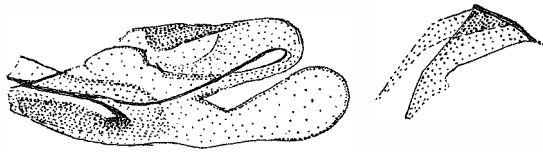
Host-plant/Biology:

*Verbascum phlomoides* LINNAEUS, *V. boerhavi* LINNAEUS; internal stem-borer.

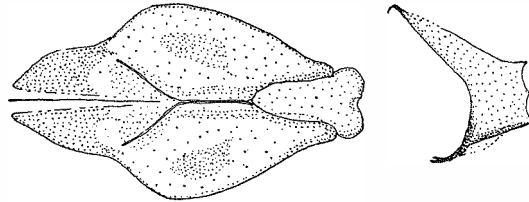
Distribution: Germany, Spain.

Material seen:

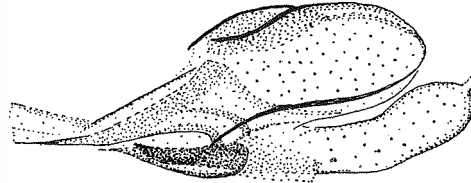
GERMANY: Hessen, Pfungstadt, 4 ♂♂, 5 ♀♀, spring, 1956 and 1957; Darmstadt, 1 ♀, 17. iv. 1958, all ex stems *Verbascum phlomoides* (K.A.S.). — SPAIN: Blanes, June, 1959, puparia in stems *Verbascum boerhavi*, no adults obtained (K.A.S.).



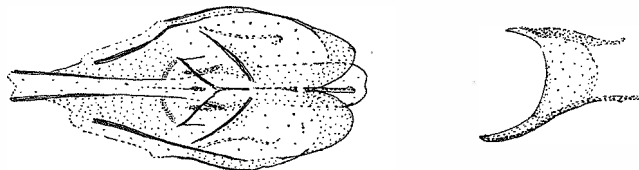
56



57



58



59

Plate 10

Figs. 56—57. *Melanagromyza tripolii* SPENCER: 56, aedeagus, side view, 57, same, dorsal view. —

Figs. 58—59. *Melanagromyza verbasci* SPENCER: 58, aedeagus, side view; 59, same, dorsal view.

(Scale line = 0.1 mm.)

The shining mesonotum differentiates this species from *M. angelicae* and *M. lappae* and the larval spiracles are distinctive and characteristic.

*Melanagromyza* sp. (Budapest)

HUNGARY: Budapest, Harmoshatahed, 1 ♀, caught on Crucifer, 27. v. 1954 (K.A.S.).

This appears to represent an undescribed species. Distinctive features are: long, proclinate orbital setulae, mesonotum largely black, abdomen shining, bluish-green, squamae pale grey, margin black, fringe ochrous.

The species is possibly an internal stem-borer on the Crucifer on which it was caught but more material is required before it can be satisfactorily described.

V. Genus *Hexomyza* ENDERLEINI. Genus *Hexomyza* ENDERLEIN

*Hexomyza* ENDERLEIN, 1936a: 178. Type of genus *H. sarothamni* HENDEL (ENDERLEIN, 1936b: 42).

ENDERLEIN erected this genus for three species he split off from *Melanagromyza*, in which the costa ends at vein  $r_{4+5}$  and a third dorsocentral bristle is present. HENDEL (1931–6: 570) rejected this genus and FRICK (1952: 376) synonymised it with *Melanagromyza*. Two of the species placed here by ENDERLEIN — *hexachaeta* (HENDEL) and *orbiculata* (HENDEL) — are synonymous and correctly belong in *Ophiomyia* (SPENCER, 1964b: 799).

Although the genus *Hexomyza* in ENDERLEIN's concept is based on artificial characters, the four palaeartic gall-causers<sup>4</sup> — *sarothamni* (HENDEL), *salicis* (MALLOCH) [= *cecidogena* HERING], *schineri* (GIRAUD) and *simplicoides* (HENDEL) — form a clear monophyletic group and the genus is now revived with an extended concept as follows:

Adult: sub-costa distinctly ending in vein  $r_1$  and not continuing direct to costa; halteres black; adult robust, wing length from 2–3 mm, costa ending at vein  $r_{4+5}$  or continuing to  $m_{1+2}$ ; two dorso-centrals (*simplicoides*) or frequently three; pre-scutellars normally lacking but frequently present in *salicis*; proboscis short, broad; in male genitalia basiphallus with two distinctly diverging side-arms.

Larva: posterior spiracles each with three bulbs, on raised stalks (Fig. 73), except in *sarothamni* where the stalk is largely reduced.

Biology: an oval gall is caused in the twig cortex, the larva pupating within the gall but in *salicis* with anterior spiracles projecting through the epidermis.

The chaetotaxy of the species in this genus is less stable than in any other group of the Agromyzidae. MALLOCH (1913: 326) first noticed this when discussing *Agromyza* (= *Hexomyza*?) *websteri*, a gall-causer on *Wistaria* and comments on "the amount of variation in the number of bristles on head, mesonotum and scutellum. In many cases the normal bristle is duplicated and the number on any one part is not so consistent as in the other species of *Agromyza*".

The phylogeny of the genus is indicated in Figs. 1 and 77. With clearly-defined apomorph characters in common — bristles lacking on mid-tibiae, costa in some species reduced to vein  $r_{4+5}$ , in male genitalia basiphallus with diverging side-arms, larva feeding as leaf- or stem-miner (here modified to gall-causer), pupating with anterior spiracles projecting through the epidermis, and with posterior spiracles on raised stalks — this genus is clearly monophyletic with *Ophiomyia*, rather than with *Melanagromyza*. Divergence from the mainstream of *Ophiomyia*, however, probably began soon after *Ophiomyia* itself had differentiated from *Melanagromyza*.

<sup>4</sup> I have recently examined a further species in this genus bred from the upper stem of *Centaurea solstitialis* LINNAEUS at Rome; this will be described in the next issue of this journal.



The South African species *Hexomyza gymnosporivora* (SPENCER), comb. nov., forming twig-galls on *Gymnosporia buxifolia* (LINNAEUS) SZYZZL (SPENCER, 1963c: 103) is transferred to this genus from *Melanagromyza* herewith.

## 2. Discussion of species

### *Hexomyza salicis* (MALLOCH), comb. nov.

*Agromyza salicis* MALLOCH, 1913: 314; SHEWELL, 1953: 464. Holotype ♂ in U.S. National Museum, Washington.

*Melanagromyza salicis* (MALLOCH), FRICK, 1952: 379; 1959: 365.

*Melanagromyza cecidogena* HERING, 1927: 319, syn. nov. Holotype ♂ in author's collection, presented by Prof. HERING.

Adult: essentially as in *H. simplicoides* (HENDEL) but slightly smaller, wing length from 1.9 mm in male to 2.8 mm in female; costa variable, normally obviously ending at  $r_{4+5}$  but sometimes apparent, though weak, almost up to  $m_{1+2}$ ; second cross-vein present, last and penultimate section of  $m_1$  approximately equal; lunule distinctly lower, upper margin rounded; jowls rounded, deepest in centre below eye; mesonotum with normally two dorso-centrals, third occasionally present, in one case strong pre-sutural *dc* on one side only; acrostichals in some six rows, frequently but not invariably weak pair of pre-scutellars; mesonotum black, distinctly shining, abdomen more so.

Male genitalia: aedeagus as in Figs. 60, 61; spermal sac conspicuously large.

Larva: front segments rounded, normal, posterior spiracular processes in form of two closely-adjointing, narrow stalks, each with three bulbs above; puparium greyish-white, with conspicuous scar bands at segment borders.

Host-plant/Biology: *Salix* spp.; the larva forms a small, cylindrical twig-gall, pupating near the surface with the front segments projecting through the epidermis.

Distribution: Austria, Denmark, Germany, Italy, Japan, U.S.A.

#### Material seen:

AUSTRIA: Banks of Danube, 1 ♂, 2 ♀♀, 15–25 May, ex galls on *Salix purpurea* (GIRAUD). — DENMARK: Jyll., Hansted reservatet: Syvklit, 2 ♂♂, 1 ♀; øf. Hanstholm ralleje, 2 ♂♂, 3 ♀♀; Vest for Ørgaard, 1 ♂, 1 ♀; Torkaer ml. Torkaer og Blegso, 2 ♂♂; Praestekaer ved Blegso, 1 ♀; Fladekaer ml. Langso og Store vaud, 1 ♂; all 8–11. vi. 1960 (leg. Zool. Mus. Exp.). —

GERMANY: Berlin-Frohnau, 1 ♂, 1 ♀, 1. v. 1927, ex galls on *Salix aurita* LINNAEUS (HERING), holotype and paratype of *cecidogena*; Berlin-Buch, 1 ♀, 12. vi. 1932 (HERING); Mecklenburg, Gr. Lüsewitz, 2 ♀♀, May, 1960, ex *Salix repens* LINNAEUS (STELTER); Rostock, 1 ♀, 15. vi. 1960, ex *S. rehderiana* C. K. SCHNEIDER (STELTER); Karlsfeld bei München, 1 ♂, 1 ♀, 9. v. 1954, ex *Salix* sp. (GROSCHKE). —

ITALY: Fano, 1 ♂, 9. v. 1933 and 1 ♂, 1 ♀, 20. v. 1935, ex galls on *Salix* sp. (VENTURI).

The single male referred to by MALLOCH in his description was bred from "willow", together with an additional male with the same data. The genitalia of this second male have been examined by G. STEYSKAL and the drawings he kindly prepared confirm that *H. salicis* is identical with the species subsequently

described from Germany by HERING as *cecidogena*. SASAKAWA (1961: Fig. 30d) illustrates the genitalia of what is clearly the same species in Japan, bred from galls on *Salix bakko* KIMURA, but he incorrectly identifies the species as *schineri* (GIRAUD). The reference given by SASAKAWA to *Populus* spp. as a further host is merely taken from European literature and does not refer to confirmed records in Japan.

This species is extremely close to *H. simplicoides* both in external morphology and in the form of genitalia. The most significant differences are found in the larvae. The key characters used by HENDEL (1931—6: 158) to separate the two species are not individually reliable. *H. salicis* is generally smaller, the lunule is smaller and lower; a weak pair of pre-scutellars is frequently found and a third dorso-central occasionally, both of which do not occur in *simplicoides* and the mesonotum is somewhat more black and shining.

#### *Hexomyza sarothamni* (HENDEL)

*Melanagromyza sarothamni* HENDEL, 1923: 143; 1931—6: 173. Holotype ♂ in Naturhistorisches Museum, Vienna.

*Hexomyza sarothamni* (HENDEL), ENDERLEIN, 1936a: 178.

Adult: wing length from 2.2 mm in male to 3 mm in female, costa extending strongly to vein  $m_{1+2}$ ,  $m_2$  sections equal; frons broad, almost twice width of eye, orbits distinctly projecting above eye in profile with four long orbital bristles; orbital setulae somewhat irregular, long, reclinate; jowls one-quarter height of eye, generally rather flat below and distinctly projecting forwards (Fig. 62); mesonotum normally with two dorso-central bristles, rarely with three, sometimes a third on one side only; colour entirely black, mesonotum and abdomen conspicuously shining; squamae grey, margin and fringe black.

Male genitalia: distiphallus with conspicuous black paired arms, mesophallus somewhat variable, oval (Fig. 63), almost circular (Fig. 64) or narrower and more elongated (Fig. 65); aedeagus in side view as in Figs. 66, 67.

Larva: posterior spiracles only slightly raised, each process with three distinct bulbs (Fig. 68); puparium whitish-grey to greyish-black, with conspicuous scar bands at segment borders (Fig. 69).

Host-plant/Biology: *Cytisus* spp., *Genista aetnensis* DC; larva forms oval twig galls (Fig. 70).

Distribution: Austria, England, France, Germany, Sicily.

#### Material seen:

AUSTRIA: Mödling, nr. Vienna, 1 ♂, 25. vi. 1913, ex gall on *Sarothamnus* (HENDEL), holotype. —

FRANCE: La Baule, Loire, 2 ♂♂, 1 ♀, June, 1944, ex galls on *Cytisus scoparius* LINNAEUS (BUHR). —

SICILY: Mt. Etna, Sinofsi, 7 ♂♂, 15 ♀♀, 18—30. iv. 1964, ex galls on *Genista aetnensis*, leg. 8. iv. 1964 (K. A. S.). (Also recorded on same host in Sicily by HOUARD (1908, No. 3340, as *Agromyza schineri* (GIRAUD)).

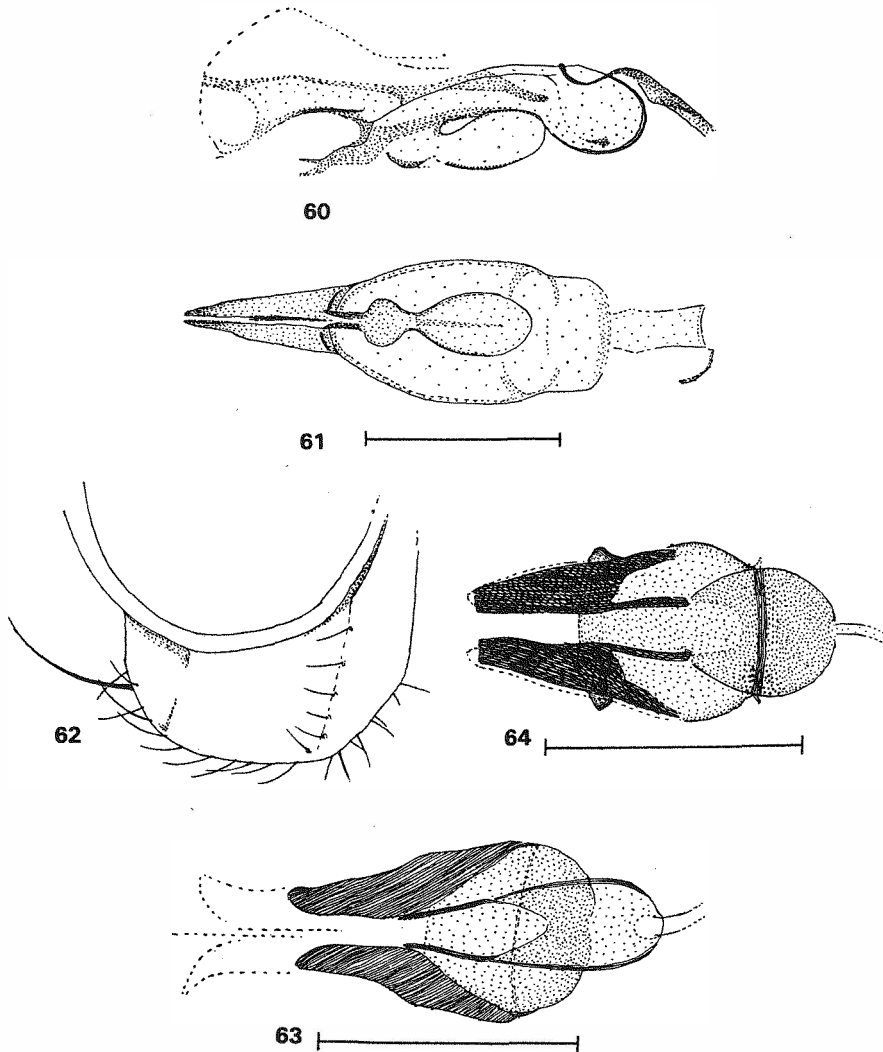


Plate 11

Figs. 60—61. *Hexomyza salicis* (MALLOCH): 60, aedeagus, side view; 61, same, ventral view. —

Figs. 62—64. *Hexomyza sarothamni* (HENDEL): 62, head; 63, aedeagus, ventral view (Holotype); 64, same (ex *Genista aetnensis*). (Scale line = 0.1 mm.)

The species has also been bred from galls on *C. scoparius* in England: Berks., Silwood Park Field Station, by Prof. O. W. RICHARDS.

HENDEL described this species from a single male having a well developed third dorso-central and he used this as an essential key character. It is clear from the additional material I have been able to examine that this third *dc* is present only rarely. *H. sarothamni* is readily distinguishable from *H. schineri* (GIRAUD) by the flatter, more projecting jowls, the equal  $m_4$  sections and the more shining mesonotum.

The extremes of variation found in the aedeagus (Figs. 64, 65) might suggest two distinct species but with the intermediate form (Fig. 63) represented by the holotype it seems unjustified to split this species further. The adults and puparia associated with the extreme limits of variation in the aedeagus are entirely identical.

It has unfortunately not been possible to examine any specimens of *Agromyza kiefferi* TAVARES (1901), which was bred from twig galls in Portugal on *Cytisus albus* LINK and *C. patens* WEBB and I have recently received confirmation from Portugal that the type specimens are lost, presumably destroyed. Both squamae and halteres are stated to be white in this species and, accepting this as an accurate description, HENDEL (1931-6: 127) retains it in the genus *Agromyza*. I think it is more probable that the specimen examined by TAVARES was teneral and in my opinion *A. kiefferi* almost certainly represents a prior name for *sarothamni* HENDEL. However, it is now no longer possible to establish this synonymy and the name *kiefferi* must be discarded.

***Hexomyza schineri* (GIRAUD), comb. nov.**

*Agromyza schineri* GIRAUD, 1861: 484. Lectotype ♂, designated below, in Naturhistorisches Museum, Vienna.

*Melanagromyza schineri* (GIRAUD), HENDEL, 1920: 128; 1931-6: 174.

Adult: wing length 2.7-3.1 mm, costa extending strongly to vein  $m_{1+2}$ , last section of  $m_4$  normally about two-thirds penultimate, position of first cross-vein somewhat variable; head as in *H. cecidogena*; normally two pairs of dorso-centrals but frequently third pair also found; pre-scutellars lacking but last pair of acrostichals may resemble *prsc*.

Male genitalia: aedeagus as in Figs. 71, 72, basiphallus with two distinct, widely-diverging arms; blade of spermal sac frequently greatly reduced.

Larva: posterior spiracles in form of two short, stout projections, each with three bulbs (Fig. 73); puparium greyish-brown, with conspicuous scar bands at segment borders, referred to by HENDEL (1920: 171) as „schwarzbraune Dörnchen“, and an area of strong, black chitinization on the lower half of the first segment.

Host-plant/Biology: *Populus alba* LINNAEUS, *P. tremula* LINNAEUS; the larva forms twig-galls which are somewhat more spherical than those of *salicis* and *simplicoides*.

Distribution: Western Europe, N. America.

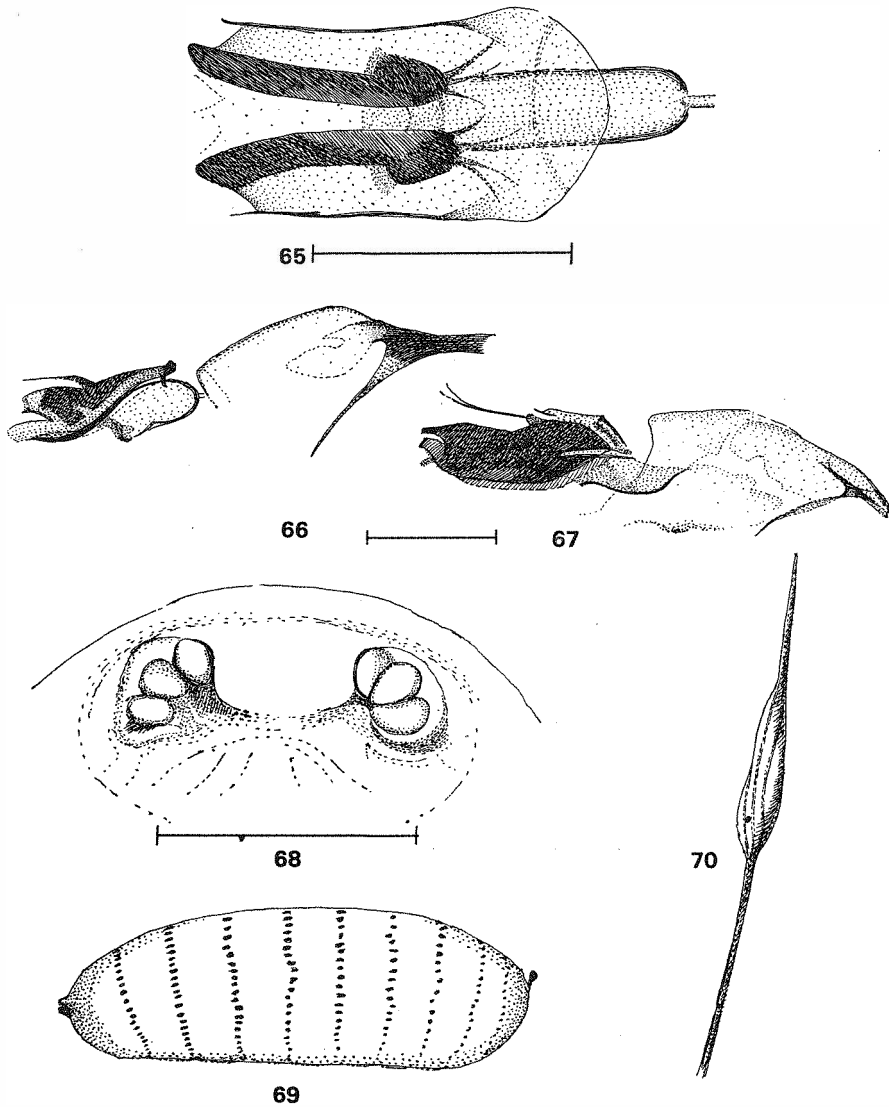


Plate 12

Figs. 65—70. *Hexomyza sarothamni* (HENDEL): 65, aedeagus, dorsal view (ex *Cytisus*); 66, same, side view (ex *Genista*); 67, same, side view (ex *Cytisus*); 68, posterior spiracles of puparium; 69, puparium; 70, gall on *Genista*. (Scale line = 0.1 mm.)

## Material seen:

AUSTRIA: Banks of Danube, 1 ♂, 15–25 May, ex gall on *Populus alba* (GIRAUD), lectotype. —

ENGLAND: Herts., Hoddesden, 1 ♂, 1 ♀, 5. vi. 1932, ex galls on *P. tremula* (NIBLETT). —

FRANCE: Loire, La Baule, 1 ♀, 10. vi. 1944, ex gall on *P. alba* (BUHR). —

GERMANY: Württemberg, Pleidelsheim, 1 ♂, 2 ♀♀, 4–6. v. 1954, ex galls on *P. tremula* (SÜSSNER). —

SPAIN: Torre del Mar, Malaga, 1 ♂, April, 1933, ex gall on *P. alba* (HERING). —

U.S.A.: New Mexico, Tucumari, 2 ♂♂, May, 1911, ex galls on poplar (J. R. HORTON);

Colorado, Fort Collins, 1 ♂, 5. ix. 1914, ex gall on cotton-wood twig (*Populus*) (GILLETTE).

I have examined four specimens labelled as *schineri* by SCHINER, representing part of GIRAUD's original material which he presented to SCHINER. One only agrees with our current concept of *schineri* and is designated herewith as lectotype. The other three represent *salicis* (MALLOCH). GIRAUD's description — prepared by SCHINER — specifically mentions specimens bred from galls on *Populus alba* but he also refers to "spécimens identiques" bred from somewhat different galls on *Salix purpurea* LINNAEUS. A plausible assumption is that of the four specimens now preserved in Vienna, the one male was from *Populus alba* and the other three, representing *salicis*, were from *Salix purpurea*.

The two American specimens I have examined agree in all respects with the lectotype. SASAKAWA's (1961: 349) reference to this species is a misidentification for *H. salicis* (MALLOCH).

The only satisfactory character for distinguishing this species from *salicis* is the extension of the costa to vein  $m_{1+2}$ . In Europe and N. America it seems established that the host is exclusively *Populus*, not *Salix*.

There appears to be no consistent difference between specimens from *Populus alba* and *P. tremula*.

***Hexomyza simplicoides* (HENDEL), comb. nov.**

*Melanagromyza simplicoides* HENDEL, 1920: 128; 1931–6: 178. Lectotype ♂, designated below, in Naturhistorisches Museum, Vienna.

*Melanagromyza kirgizica* ROHDENDORF-HOLMANOVÁ, 1959: 695, **syn. nov.** Holotype in coll. E. ROHDENDORF, Prague.

Adult: large species, male wing length 2.5–3 mm, female up to 3.8 mm; costa normally distinctly ending just beyond  $r_{4+5}$ ; second cross-vein often lacking, sometimes on one side only, when present position variable, so that last  $m_4$  section may be longer, shorter or equal to penultimate; frons wide, twice width of eye, orbits broad, conspicuously projecting above eye in profile; either four or five orbital bristles, strong but rather short; orbital setulae conspicuously long, irregular, either slightly reclinate, largely incurved or a few in front proclinate; lunule conspicuously broad and high, upper margin frequently straight; jowls broad, up to a third vertical height of eye, cheeks forming broad ring below eye; third antennal segment small, largely bare, arista slightly pubescent; mesonotum with normally two dorso-centrals, the second close to the first and well behind level of supra-alar, frequently additional third *dc*

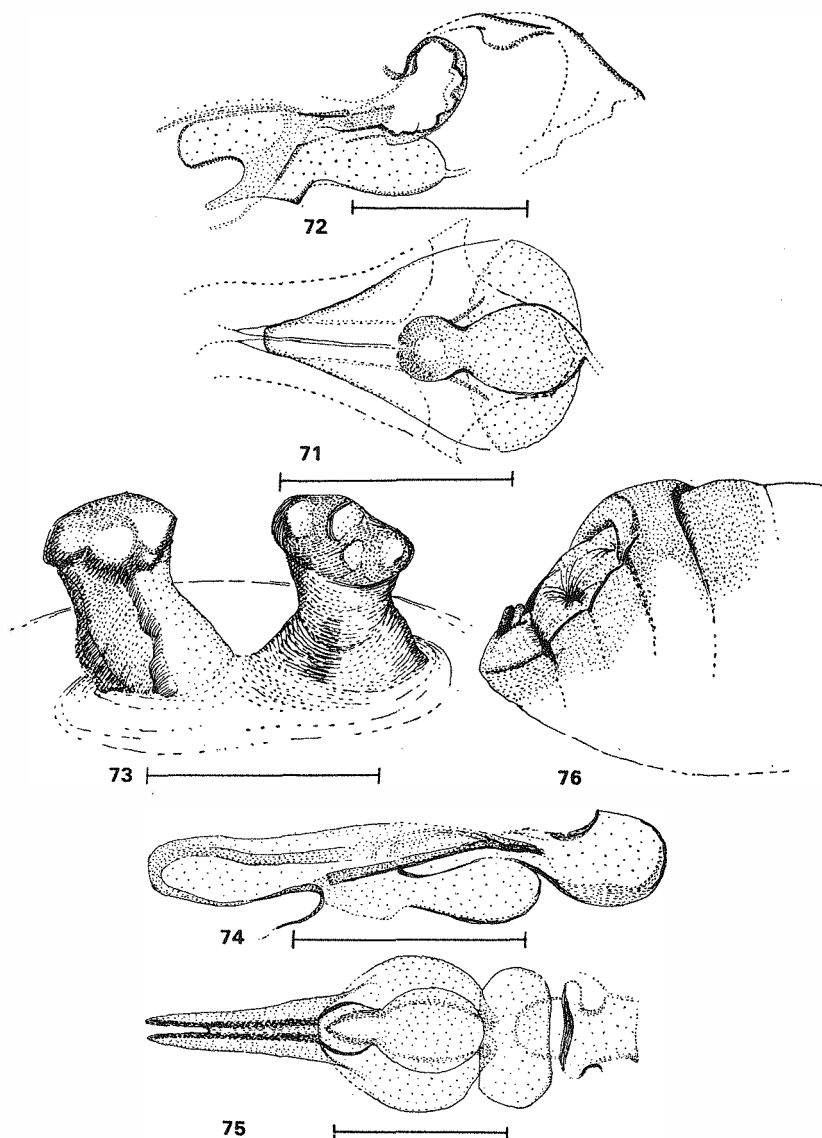


Plate 13

Figs. 71–73. *Hexomyza schineri* (GIRAUD): 71, distiphallus, ventral view; 72, aedeagus, side view (lectotype); 73, posterior spiracles of puparium. --

Figs. 74–76. *Hexomyza simplicoides* (HENDEL): 74, distiphallus, side view; 75, aedeagus, ventral view; 76, front end of puparium.  
(Scale line = 0.1 mm.)

present, occurring irregularly beyond or even closely-adjoining second; acrostichals variable between ten and six rows, extending irregularly to level of first *dc*; orbits and ocellar triangle largely mat, mesonotum slightly variable from dull-greyish to more blackish and distinctly shining; abdomen black, moderately shining.

Male genitalia: aedeagus as in Figs. 74, 75; in side view distiphallus rounded at end.

Larva: posterior spiracles with each process having three minute bulbs on a short, broad stalk, front segments conspicuously cut away and in puparium bright reddish-brown (Fig. 76); described in detail by DE MEIJERE (1925: 246).

Host-plant/Biology: *Salix* spp.; records on *Populus* doubtful; oval twig galls.

Distribution: Western Europe, incl. S. Spain, U.S.S.R., N. America.

Material seen:

AUSTRIA: Wienerwald, 1 ♂, no date (P. Löw), holotype; 1 ♂, no date; Vienna, Donauauen, 1 ♂, 1 ♀, 1–2. vi. 1920, ex *Salix* sp.; Vienna 1 ♀, 18. vi. 1875 (MIK). —

ENGLAND: Surrey, Box Hill, 1 ♂, 1 ♀, emerged 10 and 12. vi. 1952 ex galls on *Salix caprea* LINNAEUS (K.A.S.); Effingham, 1 ♂, 7 ♀♀, June, 1954, ex galls on *S. atrocinerea* BROTERO (GRIFFITHS). —

FINLAND: Helsinki, 1 ♀, no date. —

GERMANY: Mecklenburg, Gr. Lüsewitz, 1 ♂, 3 ♀♀, 21. v. 1955 ex galls on *Salix aurita* (H. STELTER). —

HUNGARY: Deliblat, 2 ♂♂, 1 ♀, 18.–19. vi. 1897 (KERTÉSZ), paratypes. —

SPAIN: Algeciras, 2 ♂♂, 4 ♀♀, emerged May and June 1955 ex galls on *Salix pedicillata*, collected 24. iv. 1955 (K. A. S.). —

SWITZERLAND: Engadin, 1 ♂, 1905. —

U.S.A.: Ohio, Wooster, 1 ♂, no date, ex willow (HAUSER); New York, Albany, 1 ♂, 7. v. 1909, ex willow, both collection J. M. ALDRICH. —

U.S.S.R.: Kirghiz Republic, Frunze, 3 ♂♂, 2 ♀♀, 16. vi. 1955, ex galls on *Salix niedzweckii* GÖRZ (K. IBRAIMOVA), paratypes of *M. kirgizica* ROHDENDORF-HOLMANOVÁ.

HENDEL refers to seven specimens from Austria and Hungary in his original description (1920: 128) and a male from Vienna is labelled "Typus". HENDEL later (1931–6: 179) writes "In Austria the flies were bred on 18 June from *Populus alba* LINNAEUS and a *Salix* species". The only specimen in Vienna with the date 18 June is the female bearing MIK's label. It carries no label confirming it was bred from *Populus alba* and in my opinion this host must be treated as doubtful until additional records can be established.

I have examined paratypes of *M. kirgizica* ROHDENDORF-HOLMANOVÁ and synonymise this species with *simplicoides* herewith.

Two males from New York and Ohio, bred from "willow" and identified as *M. salicis* (MALLOCH) are without question identical with *simplicoides*.



VI. Supplement to Revision of genus *Ophiomyia* BRASCHNIKOV  
(SPENCER, 1964b)

1. Introduction

Since completing my Revision of the genus *Ophiomyia* (SPENCER, 1964b) examination of all described European *Melanagromyza* species has shown that four further species correctly belong in *Ophiomyia* and three further species represent synonyms of *Ophiomyia* species. These species are discussed below. Three further new species are also described.

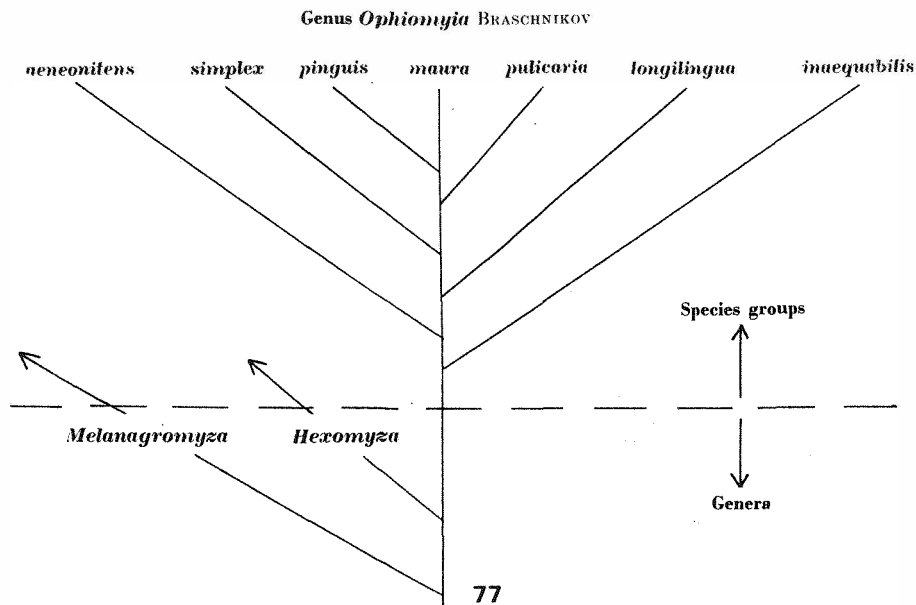


Fig. 77. Phylogenetic tree of palaeartic species groups of genus *Ophiomyia* BRASCHNIKOV

The phylogeny of this genus is now tentatively indicated in Fig. 77. The *O. maura* (MEIGEN) group comprises numerous, extremely similar species but with distinctive differentiation in male genitalia. Among European species six divergent groups (in three cases so far represented by single specimens) are detectable. These include *O. simplex* (LOEW), *O. inaequabilis* (HENDEL) and the *O. longilingua* HENDEL group, all of which have hitherto been included in *Melanagromyza*. Detailed study of all world species in the genera *Melanagromyza* and *Ophiomyia* will be necessary before the erection of further taxa higher than species-group can be justified. It is already clear, however, that a number of non-European species originally described in *Melanagromyza* are in fact monophyletic with *Ophiomyia* but it is not proposed to consider such species here.

## 2. Additional species now transferred from *Melanagromyza* to *Ophiomyia*

### *Ophiomyia beckeri* (HENDEL)

*Melanagromyza beckeri* HENDEL, 1923: 145.

*Ophiomyia beckeri* (HENDEL), SPENCER, 1964b: 782.

*Melanagromyza euphorbiae* HENDEL, 1923: 145, **syn. nov.** Holotype ♂ in Naturhistorisches Museum, Vienna.

*Melanagromyza goniaea* HENDEL, 1931–6: 165, **syn. nov.** Holotype ♀ in Naturhistorisches Museum, Vienna.

Examination of the holotypes of *M. euphorbiae* and *M. goniaea* satisfies me that they are synonymous with *O. beckeri* (HENDEL).

MIK, according to the data labels, bred the specimen subsequently described by HENDEL as *M. euphorbiae* from a small blotch-mine in one of the upper leaves of *Euphorbia gerardiana* JACQUIN. The specimen has the characteristic orbital setulae of *O. beckeri* and the male genitalia also agree in all respects with this species. No other *Melanagromyza* species is known to make a blotch mine of this type (which is still preserved in Vienna) nor is any *Melanagromyza* sp. known to leave its mine to pupate. It seems clear therefore that the particular specimen concerned did not cause the mine in question. Confusion of data can occur easily enough and in my opinion "*Melanagromyza euphorbiae*" can only be explained in this way.

The holotype of *M. goniaea* is a female caught at Bisamberg, nr. Vienna. This specimen clearly represents *O. beckeri*. Other specimens from the Canary Islands identified by HENDEL as *M. goniaea* also represent the same species; *O. beckeri* is particularly common on Tenerife and Gran Canaria.

### *Ophiomyia improvisa* sp. n.

Head: frons one and a quarter times width of eye, not projecting above eye in profile; two equal *ors*, two somewhat weaker *ori*, the lower incurved; orbital setulae sparse, reclinate; ocellar triangle rather large, apex extending about to level of upper *ori*; lunule semicircular, without central furrow; jowls somewhat square, one-seventh vertical height of eye; third antennal segment small, round, arista fine, bare, distinctly swollen at base; very narrow low keel dividing base of antennae; proboscis short, not greatly elongated.

Mesonotum: two dorso-centrals, second at level of supra-alar, acrostichals in six rows in front, ending midway between first and second *dc*.

Wing: length 1.9 mm, costa ending abruptly at vein  $r_{4+5}$ , last section of  $m_4$  about double penultimate, in ratio 23: 13, first cross-vein at anterior third of discal cell.

Legs: mid-tibiae without lateral bristles.

Colour: entirely black; ocellar triangle conspicuously shining, orbits weakly so; mesonotum largely shining black, but with slight brownish undertone; abdomen entirely shining black; squamae grey, fringe black.

Male genitalia: aedeagus entirely distinctive, as in Figs. 78, 79; ninth sternite (Fig. 80) strikingly elongated; surstyli large, oval, with four short teeth along upper margin.

Holotype ♂, Yugoslavia, Macedonia, Lake Ochrid, hill scrub above lake c. 500 ft., 4–7. vi. 1955 (R. L. COE), in British Museum (Natural History); paratype ♀, Hungary, Višegrad, 25. vii. 1921 (UJHELYI).

This holotype was previously determined by me as *Melanagromyza inaequalis* HENDEL (COE, 1955: 201). Only following a recent examination of the genitalia was it apparent that it represents a distinctive new species. The female paratype was determined by HENDEL as *M. inaequalis* but can now be satisfactorily associated with the holotype of *improvisa* on the basis of the differing wing venation.

The genitalia confirm the close relationship between *O. improvisa* and *O. inaequalis* and there seems little doubt from their genitalia that *O. aeneonitens* (STROBL) from Europe (cf. SPENCER, 1964b: Figs. 1 and 2), *Melanagromyza dianellae* KLEINSCHMIDT (cf. SPENCER, 1963a: Fig. 14) and *M. paramonovi* SPENCER (1963a: Figs. 18a–c) from Australia belong to the same group. *M. dianellae* is known as a leaf-miner on the genera *Dianella* and *Eustephus* (Liliaceae). The synonymy of these two species is thus as follows:

***Ophiomyia dianellae* (KLEINSCHMIDT), comb. nov.**

*Melanagromyza dianellae* KLEINSCHMIDT, 1961.

***Ophiomyia paramonovi* (SPENCER), comb. nov.**

*Melanagromyza paramonovi* SPENCER, 1963a: 317.

*O. improvisa*, together with *O. inaequalis*, *O. simplex* and *O. suavis*, can be included in the author's (1964b) key to Palaearctic *Ophiomyia* species in an extension of couplet 2, as follows:

- 2 Frons not projecting above eye . . . . . 2a
- Frons conspicuously projecting above eye . . . . . 2c
- 2a Costa extending to vein  $m_{1+2}$  . . . . . *pulicaria* (MEIGEN)
- Costa ending at vein  $r_{4+5}$  . . . . . 2b
- 2b Last section of vein  $m_4$  little longer than penultimate . . . . . *inaequalis* (HENDEL)
- Last section of vein  $m_4$  almost twice length of penultimate. . . . . ***improvisa* sp. n.**
- 2c Costa ending at vein  $r_{4+5}$  . . . . . *simplex* (LOEW)
- Costa extending to vein  $m_{1+2}$  . . . . . 2d
- 2d Frons projecting only as narrow ring above eye; third and fourth dorso-central normally short, position irregular . . . . . *orbiculata* (HENDEL)
- Frons strongly projecting above eye (Fig. 89); . . . . .
- third *dc* long, at suture . . . . . ***suavis* sp. n.**

The lack of the mid-tibial bristle, the termination of the costa at vein  $r_{4+5}$  and the distinctive genitalia exclude the possibility of these two species being monophyletic with *Melanagromyza* and indicate a direct relationship with typical *Ophiomyia* species. The genitalia however differ substantially from those of typical *Ophiomyia* species and the group is therefore treated as an early offshoot from the main line of *Ophiomyia*.

***Ophiomyia inaequabilis* (HENDEL), comb. nov.**

*Melanagromyza inaequabilis* HENDEL, 1931—6: 166. Lectotype ♂, designated below, in Naturhistorisches Museum, Vienna.

Adult: small species, wing length 2 mm, costa ending at vein  $r_{4+5}$ , last section of  $m_4$  equal to or slightly longer than penultimate, in ratio 18:15; frons not projecting above eye in profile, two *ors*, two *ori*, orbital setulae sparse, reclinate; jowls rather broad, one-fifth vertical height of eye; mid-tibiae without lateral bristles; entirely black species, squamae grey, fringe black.

Male genitalia: aedeagus distinctive, as in Fig. 81; ninth sternite with substantially elongated hypandrial apodeme.

Larva and host-plant: unknown.

Distribution: Turkey.

Material seen:

TURKEY: Karabag, 1 ♂, 1 ♀, May, 1912 (NÁDAY).

I designate herewith the male of HENDEL's two type specimens as lectotype.

The genitalia confirm the close relationship of this species with *O. improvisa* described above.

***Ophiomyia longilingua* (HENDEL), comb. nov.**

*Melanagromyza longilingua* HENDEL, 1920: 127; 1931—6: 168. Lectotype ♂, designated below, in Naturhistorisches Museum, Vienna.

*Aulomyza longilingua* ENDERLEIN, 1936a: 179.

*Melanagromyza knautiae* HERING, 1944: 56, **syn. nov.** Holotype ♀ in author's collection, presented by Prof. HERING.

Adult: small but robust species, wing length 2.5 mm, costa extending to vein  $m_{1+2}$ , last and penultimate sections of  $m_4$  variable but last shorter, between half and three-quarters penultimate, discal cell large (cf. HENDEL, 1931—6: Fig. 192); orbits only slightly projecting above eye in profile with two *ors* and two *ori*, upper *ors* strong; cheeks forming narrow ring below eye, jowls projecting forwards, one-quarter vertical height of eye; proboscis greatly elongated, significantly longer than distance between lower margin of jowls and upper eye margin, in ratio 32:26 (cf. HENDEL, 1931—6: Fig. 191); mesonotum jet black, shining, abdomen brilliantly shining, distinctly bluish.

Male genitalia: aedeagus as in Fig. 82; distiphallus a strong, black, cylindrical tube, becoming membranous at extreme end, mesophallus forming continuation of distiphallus, spherical basally; hypophallus distinct, irregular; two side-pieces of basiphallus asymmetric; ninth sternite short, broad, with distinct hypandrial apodeme (Fig. 83); surstyli with a few stout teeth at end and some longer hairs basally.

Larva: unknown.

Host-plant/Biology: *Knautia arvensis* (LINNAEUS) COULT.; larva forms a shallow, reddish stem-mine, leaving a mass of black frass at end of mine and pupating externally.

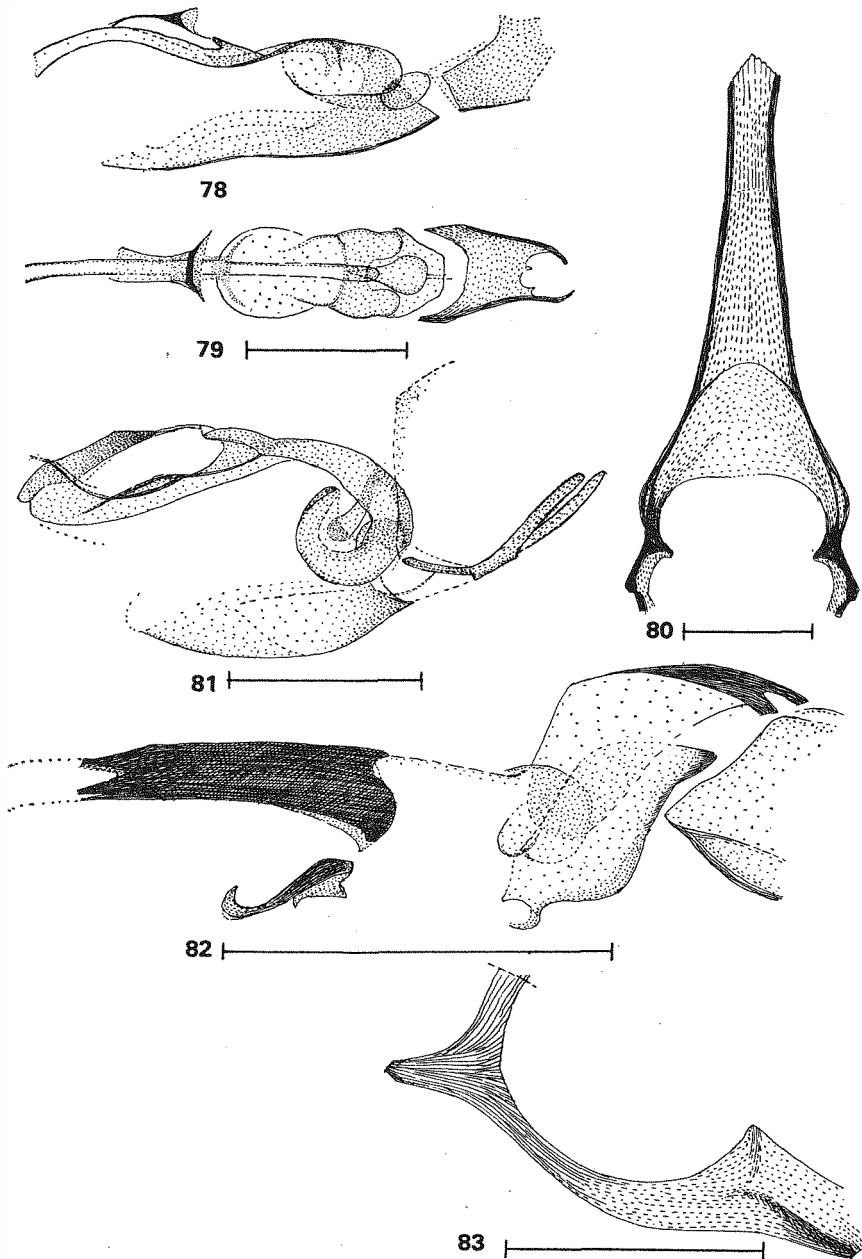


Plate 14

Figs. 78–80. *Ophiomyia improvisa* sp. n.: 78, aedeagus, side view; 79, same, dorsal view; 80, ninth sternite. —

Fig. 81. *Ophiomyia inaequabilis* (HENDEL): aedeagus. —

Figs. 82–83. *Ophiomyia longilingua* (HENDEL): 82, aedeagus; 83, ninth sternite. (Scale line = 0.1 mm.)

Distribution: Austria, Finland, France, Greece, Latvia (Curland), Switzerland.

Material seen:

AUSTRIA: Admont, 2 ♀♀, 25 May (STROBL). —

FINLAND: Löparö, 1 ♀, 7. vii. 1940 (FREY, No. 1602). —

FRANCE: Caen, 1 ♀, emerged 6. iv. 1943 from stem-mine on *Knautia arvensis*, leg. 21. viii. 1942 (BUHR), holotype of *knautiae* HERING. —

GREECE: Corinth, 1 ♂, April (BECKER), lectotype. —

LATVIA: "Curland" (Libau), 1 ♂, no date (C. SIEBERT). —

SWITZERLAND: Sils, Engadin, 6000 ft., empty stem-mine on *K. arvensis*, 3. viii. 1964 (K.A.S.).

ENDERLEIN (1936a: 179) erected the genus *Aulomyza* for this species, based on its elongated proboscis. FRICK (1952: 376) synonymised *Aulomyza* with *Melanagromyza*. The elongated proboscis is a conspicuous apomorph character of *Ophiomyia* and *longilingua* is transferred to this genus herewith. The clarification of its biology by the synonymy of *knautiae* HERING further justifies the transfer to *Ophiomyia*. *O. longilingua* forms a clear species-group with *rostrata* HENDEL but there seems little justification in giving these two species any higher taxonomic rank. The phylogeny of the group is illustrated in Fig. 77.

In his brief description of this species HENDEL (1920: 127) mentions three specimens from Austria and Greece. The male from Greece is in perfect condition and is designated herewith as lectotype. A male from Curland labelled by HENDEL "*rostrata* n. sp." is clearly identical with *longilingua*. STROBL (1910: 298) identified two females from Admont as "*pulicaria* MEIGEN?". HENDEL correctly identified these specimens as *longilingua* but misleadingly referred to them as *pulicaria* STROBL, synonymising this "species" with *longilingua* (HENDEL, 1920: 127; 1931—6: 168). I have carefully examined the female holotype of *Melanagromyza knautiae* HERING and am satisfied that this also represents *longilingua*. It agrees in all essential characters, except the slightly longer palps but this alone does not justify treating it as a distinct species.

*O. longilingua* is immediately distinguishable from *O. rostrata* by the longer proboscis, its larger size, the larger discal cell and the more shining, somewhat bluish mesonotum and abdomen.

#### *Ophiomyia ononidis* sp. n.

Adult: essentially as in *O. curvipalpis* ZETTERSTEDT (cf. SPENCER, 1964b: 786), facial keel forming more conspicuously raised, oval protuberance immediately below base of antennae; male genitalia: aedeagus (Fig. 84), largely symmetrical, distiphallus black, with distinctive extension behind.

Puparium: posterior spiracles each with 6 or 7 minute bulbs (Fig. 85).

Holotype ♂, Thuringia: Mühlhausen Forstberg, emerged 2. xii. 1964 (in room temperature) from stem-mine on *Ononis spinosa* LINNAEUS, 3. ix. 1964 leg. Dr. H. BUHR (No. 2355). —

Paratypes: 3 ♂, 2 ♀, same locality, emerged Nov. 1964—Feb. 1965; 1 ♂, Jenzig bei Jena, emerged 26. i. 1965, leg. 10. x. 1964, HANS JÜRGEN BUHR (No. 2354); England: Portland, Dorset, 1 ♂, 5. vi. 1963 (K.A.S.).

Holotype and paratypes in author's collection, presented by Prof. E. M. HERING.

This species is certainly distinct from *O. curvipalpis*, in view of the differences in larval spiracles and male genitalia. The adults, however, are so similar that it will not be possible to identify with certainty individual caught specimens.

*O. ononidis* can be included in an extension to couplet 17 of the author's (1964) key to Palearctic *Ophiomyia* species, as follows:

First couplet, for *curvipalpis* (ZETTERSTEDT) read 17a; add new couplet:

- 17a Facial keel broad but relatively flat below antennae; larval hind-spiracles each with 3 large bulbs. . . . . *curvipalpis* (ZETTERSTEDT)  
 — Facial keel forming conspicuous protuberance below antennae; larval hind-spiracles each with 6 or 7 minute bulbs . . . . . ***ononidis* sp. n.**

I am grateful to Prof. HERING for drawing my attention to this new species, for allowing me to describe it and for presenting me with the German type specimens. The male from Dorset was previously identified as *curvipalpis* (SPENCER, 1964b: 787) but the genitalia confirm that it represents *ononidis*.

#### ***Ophiomyia orbiculata* (HENDEL)**

*Melanagromyza orbiculata* HENDEL, 1931—6: 169.

*Melanagromyza hexachaeta* HENDEL, 1931—6: 166.

*Melanagromyza nostradamus* HERING, 1933: 39.

*Melanagromyza cagliostro* ROHDENDORF-HOLMANOVÁ, 1958: 385.

*Ophiomyia orbiculata* (HENDEL), SPENCER, 1964b.

*Melanagromyza paracelsus* HERING, 1933: 40, **syn. nov.** Holotype ♀ in Zoologisches Museum, Berlin.

Comparison of the holotype of *M. paracelsus* with numerous specimens of *O. orbiculata* satisfies me that it represents the same species. In the description of *paracelsus* the differences from *nostradamus* cited are largely superficial and of little significance in this variable species. The additional synonymy given above was established by SPENCER (1964b).

#### ***Ophiomyia rostrata* (HENDEL), **comb. nov.****

*Melanagromyza rostrata* HENDEL, 1920: 127; 1931—6: 173. Lectotype ♀, designated below, in Naturhistorisches Museum, Vienna.

*Solenomyza rostrata* (HENDEL), ENDERLEIN, 1936a: 179.

Adult: small, slight species, wing length in female 2.6 mm, costa extending to vein  $m_{1+2}$ , last and penultimate sections of  $m_4$  equal, orbits distinctly projecting in front, with two *ors* and two *ori*, all rather slender; cheeks forming broad ring below eye, jowls conspicuously broad, almost one-half vertical height of eye, projecting in front (cf. HENDEL, 1931—6, Fig. 197), antennae small, separated by distinct, low keel; palps long, half length of mesonotum; proboscis distinctly elongated, equal to vertical height of head from lower margin of jowls to upper eye margin; mesonotum and abdomen blackish-grey, only moderately shining.

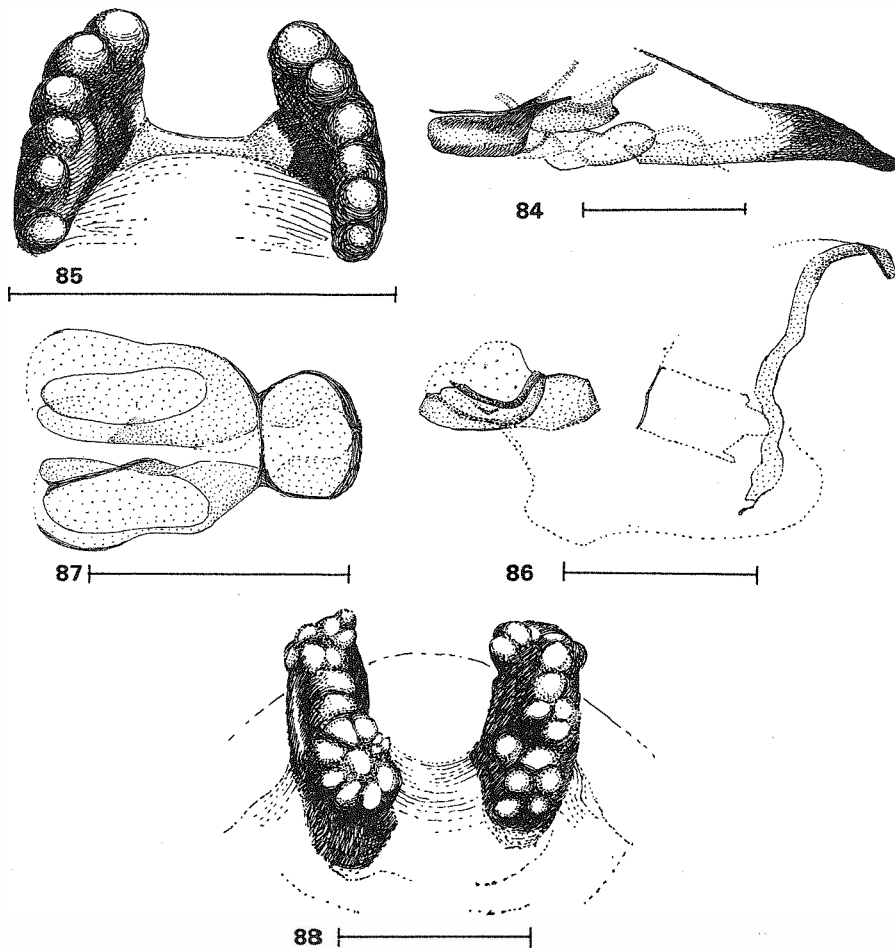


Plate 15

Figs. 84—85. *Ophiomyia ononidis* sp. n.: 84, aedeagus; 85, posterior spiracles of puparium. —

Figs. 86—88. *Ophiomyia simplex* (LOEW): aedeagus, side view; 87, distiphallus, ventral view; 88, posterior spiracles of puparium.  
(Scale line = 0.1 mm.)

Larva: unknown.

Host-plant/Biology: unknown.

Distribution: Austria, Germany (Silesia), England.

Material seen:

AUSTRIA: Vienna, Prater, 1 ♀, 2. vii. 1909, lectotype. —

ENGLAND: Cornwall, Padstow, 1 ♀, July, 1911 (C. G. LAMB).



Hendel (1920: 127) refers to seven specimens from Austria and Silesia in his description. Later (1931—6: 173) he states „Ich besitze nur ein ♂ aus der Liegnitzer Gegend von BECKER“. A specimen from Curland labelled as *rostrata* by HENDEL clearly represents *longilingua*. It seems clear that HENDEL had difficulty in satisfactorily separating these two species; in 1920 he used as a key character the different degree of shine on the mesonotum and this is in fact a reliable character. However, in the key in the Monograph (1931—6: 157) this character is not mentioned and instead HENDEL uses the number of acrostichals — which I have found to vary considerably — and the possession of a third dorso-central in *rostrata*. This character was no doubt present in the specimen from Liegnitz, which now cannot be found either in BECKER's collection in Berlin, whence it originally came, or in Vienna; however the two specimens of *rostrata* I have seen have the normal arrangement of two *dc*. The only specimen of *rostrata* now in HENDEL's collection is a female from Vienna labelled as "Typus" and this was no doubt one of the original seven specimens on which the species was described. I therefore designate this female as lectotype.

ENDERLEIN (1936a) erected the monotypic genus *Solenomyza* for *rostrata*, considering the supposed possession of a third dorso-central as of generic significance. This cannot be accepted; FRICK (1952: 376) synonymised *Solenomyza* with *Melanagromyza*.

As discussed under *O. longilingua* (p. 52) the elongated proboscis, forwardly projecting jowls and lack of mid-tibial bristles clearly indicate monophyly between *rostrata* and the stem-mining *Ophiomyia* species. It is unfortunate that no male can now be found to confirm from genitalia the close relationship with *longilingua*, which is apparent from the general habitus. However, it seems correct at the present time to treat *rostrata* as forming a species group with *longilingua*, with relatively recent divergence from the other stem-mining *Ophiomyia* species, as indicated in the phylogenetic tree on p. 47.

The lectotype agrees exactly with the specimen from Cornwall in the Zoological Museum, Cambridge, which was correctly identified by GRIFFITHS (1961: 123).

***Ophiomyia simplex* (LOEW), comb. nov.**

*Agromyza simplex* LOEW, 1869. Holotype now lost (FRICK, 1957: 200; SHEWELL, 1953: 465).

*Melanagromyza simplex* (LOEW), HENDEL, 1920: 128; 1931—6: 176.

Adult: wing length from 2.2 mm in male to 3 mm in female, costa ending at or shortly behind vein  $r_{4+5}$ , last and penultimate sections of  $m_4$  approximately equal; frons broad, almost twice width of eye, orbits conspicuously shining and distinctly projecting above eye in profile; normally five strong orbital bristles, orbital setulae strong, reclinate; jowls broad, almost quarter height of eye, cheeks forming broad ring below eye; mesonotum and abdomen entirely shining black, squamae grey, margin and fringe black.

Male genitalia: aedeagus as in Figs. 86, 87, basiphallus with elongated side-arms typical of the genus.

Larva: described in detail by BARNES (1937: 576—8); posterior spiracles on two raised processes, each bearing a semicircle of some 16 irregular bulbs (Fig. 88), not three as stated by HENDEL (1931—6: 178), DE MEIJERE (1925: 245) and CHITTENDEN (1911: Fig. 2c); puparium dark reddish-brown.

Host-plant: *Asparagus officinalis* LINNAEUS.

Distribution: Europe, N. America.

Material seen:

ENGLAND: Harpenden, Beds., July, 1934 (BARNES). —

GERMANY: Crossen a. O., 1 ♂, 1 ♀, 18. v. 1932 bred ex *Asparagus*; 4 ♂♂, 4 ♀♀, 17. vi. 1934, caught on *Asparagus* (HERING). —

U.S.A.: California, Prosser, Benton Co., 2 ♂♂, 13. viii. 1950, ex *Asparagus officinalis* (FRICK); Michigan, E. Lansing, 1 ♂, 1. vi. 1929, on *Asparagus* (R. W. PETTIT).

The male lacks the vibrissal horn normally found in *Ophiomyia* but larval characters, biology and male genitalia confirm that the species correctly belongs in this genus.

HENDEL and DE MEIJERE followed CHITTENDEN (1911) in stating that the larval hind-spiracles have three bulbs on each process, HENDEL (1931—6: 177) reproducing CHITTENDEN's original illustrations. No explanation can be offered of CHITTENDEN's error on this point. The genitalia of an American specimen I have examined are identical in all respects with those of European specimens.

The most valuable of the many papers discussing this species is that by BARNES (1937).

#### *Ophiomyia suavis* sp. n.

Head (Fig. 89): frons broad, twice width of eye, conspicuously projecting above eye in profile; orbits not greatly differentiated, with two long, equal *ors* and two (on one side three) *ori*; upper *ori* exceptionally long, equal to *ors*, lower two shorter; orbital setulae reclinate, sparse but long; ocellar triangle only faintly indicated, apex extending to midway between *ors*; lunule large, semicircular; cheeks forming conspicuous ring below eye, jowls almost one-third vertical height of eye, rather flat, vibrissa long; third antennal segment small, slightly angular at upper corner, bases of antennae separated by very narrow keel.

Mesonotum: three strong *dc*, third just behind suture, second at level of supra-alar; acrostichals irregularly in four rows in front, only scattered hairs at level of first *dc*.

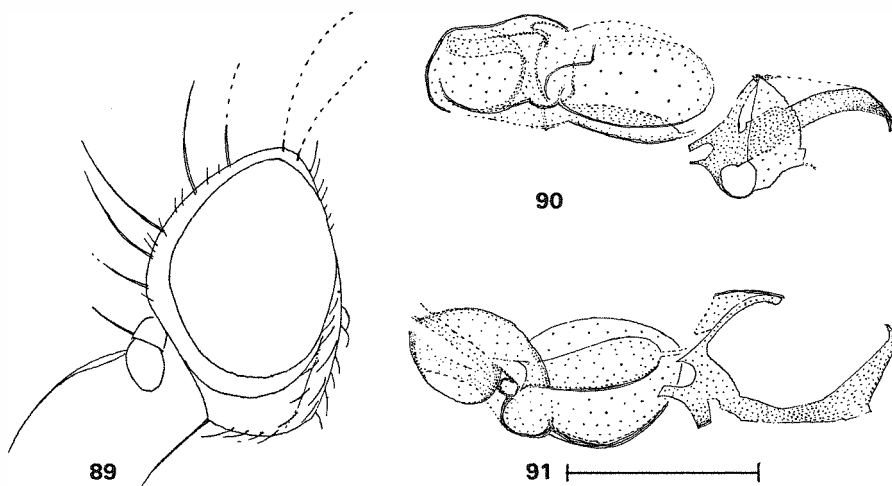
Wing: length 2.2 mm, costa extending weakly to vein  $m_{1+2}$ , last and penultimate sections of  $m_4$  equal, first cross-vein well beyond mid-point of discal cell.

Legs: mid-tibiae with one weak lateral bristle on one side, none on other.

Colour: entirely black, ocellar triangle and orbits only weakly shining, mesonotum greyish-black, abdomen somewhat mat; squamae grey, margin and fringe black.

Male genitalia: aedeagus as in Figs. 90, 91, highly asymmetric; basiphallus with one side-arm bending upwards, as in other species of the *pulicaria*-group.

Holotype ♂, Yugoslavia: Montenegro, Zabliak, 1400–1500 m, 27. vi. 1958, (F. MIHÁLYI), in Hungarian National Museum, Budapest.



### Plate 16

Figs. 89–91. *Ophiomyia suavis* sp. n.: 89, head; 90, aedeagus, side view; 91, aedeagus, ventral view.  
(Scale line = 0.1 mm.)

This species clearly belongs to the *beckeri-cunctata-pulicaria*-group but is immediately distinguishable by the reclinate orbital setulae and strongly projecting frons. The third dorso-central is an inconstant character in many species and with the single specimen now available, it is advisable at this stage not to consider it as of specific significance.

### Summary

All Palaearctic species described in or subsequently transferred to the genus *Melanagromyza* HENDEL have been examined. On the basis of this study the generic concept of *Melanagromyza* has been restricted and the genus *Hexomyza* ENDERLEIN is revived with amended concepts. Twenty-five species are now included in *Melanagromyza*, including four new species, and for these an entirely new key is given. Four gall-causing species are included in *Hexomyza*. In a Supplement to the author's recent (1964) Revision of *Ophiomyia* species three new species are described, four further species are transferred to *Ophiomyia* from *Melanagromyza* and three new synonymies are established. Illustrations are given of the male genitalia of all but two species, of which only the female is known.

### Zusammenfassung

Es wurden alle paläarktischen Arten überprüft, die in der Gattung *Melanagromyza* HENDEL beschrieben oder ihr später zugerechnet wurden. Auf Grund dieser Untersuchung

wird der Gattungsbegriff *Melanagromyza* eingeschränkt und die Gattung *Hexomyza* ENDERLEIN in einer verbesserten Fassung wiedereingeführt. Unter *Melanagromyza* werden jetzt 25 Arten zusammengefaßt, darunter vier neue Arten, und für sie wird ein völlig neuer Bestimmungsschlüssel aufgestellt. Vier gallenbildende Arten werden zu *Hexomyza* gezählt. Als Ergänzung zu der kürzlichen Revision der *Ophiomyia*-Arten durch den Verfasser (1964) werden drei neue Arten beschrieben, vier weitere Arten werden von *Melanagromyza* zu *Ophiomyia* übertragen und drei neue Synonymien festgestellt. Die Arbeit enthält Abbildungen der männlichen Genitalien aller Arten außer zweien, von denen nur das Weibchen bekannt ist.

### Резюме

Были проверены все палеарктические виды, описанные в роде *Melanagromyza* HENDEL или позже причисленные к этому роду. На основании этой проверки понятие рода *Melanagromyza* сужено и в несколько улучшенном виде вновь введен род *Hexomyza* ENDERLEIN. В род *Melanagromyza* включаются теперь 25 видов, среди них 4 новых. Для этого рода составлен совершенно новый определительный ключ. Четыре вида, образующие галлы отнесены к роду *Hexomyza*. Как дополнение к недавней ревизии видов *Ophiomyia*, сделанной автором (1964) описываются три новых вида, четыре вида из рода *Melanagromyza* переведены в род *Ophiomyia* и установлены три новых синонима. В работе приводятся изображения мужских половых органов всех видов, за исключением двух, у которых известны только женские экземпляры.

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