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Notes on world Agromyzidae, with the description of 16 new species

(Diptera: Agromyzidae)

With 59 text figures

This is — for the time being at least — a final paper on the Agromyzidae after 25 years of study of the family throughout the world.

During the past 10 years I have been able to diagnose a number of new species but time has not been available for their formal description, holotypes of other species have been clarified and genitalia drawings prepared but these have never been published. The opportunity is now taken to deal with these species. Sixteen new species from North and South America, West and South Africa and from India and Pakistan are described, and in addition two new synonymies are established and one is indicated. A new subgenus in *Amauromyza* is proposed for the North American leaf-miner on *Catalpa pleuralis* MELANDER.

Material collected at a high altitude in Mexico, mainly in Durango Province, was originally examined nearly 10 years ago and it was clear at that time that it contained a number of species of particular interest. Six new species are now described from this area but unfortunately the full study of this important collection has still not been possible and a number of further interesting new species remain to be described.

Genus *Melanagromyza* HENDEL

1. Five *Melanagromyza* species from Principe Islands, West Africa

Twelve specimens were collected by TAMS during his British Museum expedition to Principe Island and San Thomé in 1932. These represent 5 species, of which three are new and are described below. There is insufficient evidence to indicate whether these may be endemic to these islands.

Melanagromyza albisquama (MALLOCH, 1927)

Principe Island: 2 ♂♂, 2 ♀♀, 19 and 20. xii. 32.

This species is widespread from the Cape Verde Islands to Fiji and also occurs in Australia (type locality: Eccleston, N.S.W.). One known host is *Desmodium frutescens* WALP. (Mauritius). The full synonymy was given by SPENCER (1965b: 241).

Melanagromyza ochrasquamata SPENCER, 1961c

Principe Island: 1 ♂, 27. xii. 32; San Thomé Is.: 1 ♂, 6. xi. 32.

Previously only known from Mozambique and Zululand.

Melanagromyza obscura spec. nov.

Head: frons narrow, equal to width of eye, not projecting above eye in profile; orbital bristles strong, 2 equal *ors*; 2 *ori*, the upper reclinate and equal to *ors*, the lower weak and incurved; orbital setulae short, sparse, reclinate; jowls exceptionally narrow, little more than 1/10 height of eye, this large, upright, bare; ocellar triangle short, apex not extending below level of lower *ors*; lunule small, semicircular; third antennal segment large, rounded, broader than long; arista long, equal to height of eye, only minutely pubescent.

Mesonotum: 2 *dc*, the second unusually strong, only slightly shorter than first; *ac*r in some 8 rows.

Wing: length in male 2.1 mm, costa extending strongly to vein *m*₁₊₂; last section of *m*₃₊₄ 3/5 penultimate, first cross-vein slightly beyond centre of discal cell.

Colour: black; ocellar triangle and orbits weakly shining; mesonotum moderately shining, abdomen more so; squamal fringe deep black.

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Male genitalia: aedeagus as in Figs. 1, 2.

Holotype ♂, Principe Island, 27. xii. 32; paratypes: 2 ♂♂, same data, all in B.M.

Remarks. In the author's (1959) key to African *Melanagromyza* species, *obscura* runs to couplet 59 and is not distinguishable on external characters from *spungaberensis*, known from Mozambique and S. Rhodesia. Unfortunately it has not been possible to examine the male genitalia of *spungaberensis* but it seems unlikely that this will prove to be identical with *obscura*.

The genitalia of *obscura* throw some doubt on its correct generic position but it is best placed in *Melanagromyza*, pending a detailed revision of this genus on a world basis.

Melanagromyza principensis spec. nov.

Head: frons $1\frac{1}{2}$ times width of eye, not projecting above eye in profile; orbital bristles strong, 2 *ors*, 2 *ori*; orbital setulae sparse, reclinate; lunule semicircular, jowls narrow, $1/10$ height of eye; eye upright, with scattered pilosity in male; third antennal segment small, round; arista long, little shorter than height of eye, conspicuously pubescent.

Mesonotum: 2 strong *dc*, *acr* in 10 rows.

Wing: length from 2.25 mm in male to 2.5 mm in female; costa extending to vein m_{1+2} ; last section of m_{3+4} two-thirds penultimate, first cross-vein just beyond midpoint of discal cell.

Colour: mesonotum slightly greenish, abdomen more shining, greenish-coppery with reddish reflections; squamae and fringe white.

Male genitalia: aedeagus as in Fig. 3.

Holotype ♂, Principe Island: 19. xii. 32; paratype ♀, same data, both in B.M.

Remarks. This species will run to *inulivora* SPENCER, 1961c from South Africa in the author's (1959) key, as amended (1961c), and the two may only be separable by their male genitalia.

Melanagromyza tamsi spec. nov.

Closely resembling *principensis* but eyes larger and frons little wider than eye; eye with longer pilosity in male; male genitalia: aedeagus as in Figs. 4, 5.

Holotype ♂, Principe Island: 27. xii. 32; paratype ♀, same data, both in B.M.

Remarks. This species is not reliably distinguishable on external characters from *principensis* but the male genitalia of the two are entirely different.

2. A new synonymy

Melanagromyza provecta (DE MEIJERE, 1910)

Melanagromyza nigrisquama (MALLOCH, 1914b), **syn. nov.**

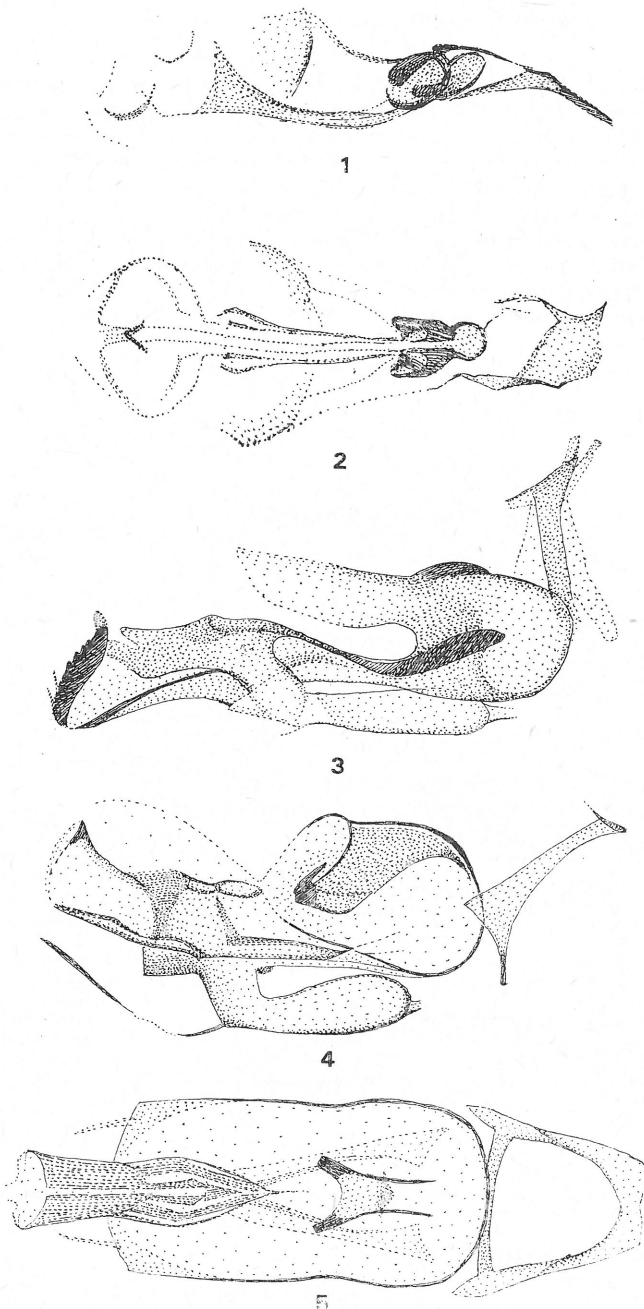
Melanagromyza communis SPENCER, 1959

Both *provecta* and *nigrisquama* were described in *Agromyza*. The former (from Indonesia) was transferred to *Melanagromyza* by DE MEIJERE (1922: 22), the latter (from Formosa) by HENNIG (1941: 174). *M. nigrisquama* was misidentified by SPENCER (1961a: 74) in India as the species forming stem galls on *Abutilon indicum*. This misidentification was repeated by SINGH & IPE (1973: 56). SASAKAWA's (1963: 37) identification of *nigrisquama* from Vietnam requires confirmation (two males in Bishop Museum, Honolulu).

A good series bred from galls on *Abutilon* at Karachi has recently been examined and it seemed desirable at this stage to confirm the identification by checking type specimens of *nigrisquama* from Formosa. Ten specimens from Tainan, the type locality, in the Institut für Pflanzenschutzforschung, Eberswalde were studied and it was found that this species is not the gall-causer on *Abutilon* (which is described below as *Hexomyza abutilonicaulis*) but is identical with *provecta*, which has also been confirmed from Flores (SPENCER 1962: 672) and is present in Africa (SPENCER 1959: 265, Belgian Congo; 1961b: 416, Ethiopia). The synonymy of *communis* with *provecta* was established by SPENCER (1963a: 104); the new synonymy of *nigrisquama* with *provecta* is established herewith.

The sister-species of *provecta*, *pubescentis* SPENCER, 1959: 286 is present in Africa on Mt. Chirinda, S. Rhodesia and the aedeagus was illustrated by SPENCER (1964a: Fig. 26). A new drawing of the aedeagus of *provecta* (from Formosa, as *nigrisquama*) is shown in Fig. 6.

It is clear from the genitalia that *provecta* is related to *conspicua* SPENCER, 1959: 71, which was described from Singapore and Ceylon, and has been confirmed in India, Formosa, New Guinea and Australia. On the basis of its genitalia *conspicua* was transferred to *Ophiomyia* by SPENCER 1977b: and it is believed to form stem-mines on Compositae. However, *provecta* has none of the external characteristics of *Ophiomyia* (facial keel, vibrissal fasciculus in male) and, pending confirmation from early stages, it is tentatively left in *Melanagromyza*.



Figs. 1, 2. *Melanagromyza obscura* spec. nov.: 1, aedeagus, side view; 2, same, ventral view
 Fig. 3. *Melanagromyza principensis* spec. nov.: aedeagus
 Figs. 4, 5. *Melanagromyza tamsi* spec. nov.: 4, aedeagus, side view; 5, same, ventral view

3. A widespread species in South America

Melanagromyza polymniae SPENCER, 1973a

Brazil: Nova Teutonia, 1 ♂, x. 63 (PLAUMANN); Peru: Quincemil, Cuzco, 700 m, 6 ♂♂, 1 ♀, 13.—31. viii. 62; 4 ♂♂, 3 ♀♀, 1.—15. xi. 62; Loromayu, Madre de D., 450 m, 1 ♂, 1 ♀, 7.—15. ix. 62; 1 ♀, Avispos, Madre de D., 400 m, 1.—15. x. 62 (all PENA).

This species has previously only been known from Venezuela, where it was found to be widespread, the larvae feeding in stems of the tall Composite *Polymnia riparia* H.B.K. Its confirmation south of the Amazon is a further interesting example of the wide distribution of many Neotropical species.

The aedeagus of the specimen from Brazil is shown in Figs. 7, 8; it will be seen that this differs in only minor detail from that of the series from Venezuela (SPENCER 1973a: Figs. 44, 45). The surstyli and the conspicuous row of spines within the epandrium are shown in Fig. 9. These have the same form as in *M. mallochi* (HENDEL), now known as a stem-feeder in *Eupatorium odoratum* L. (SPENCER 1963b: Fig. 31c; SPENCER & STEGMAIER 1973: 158).

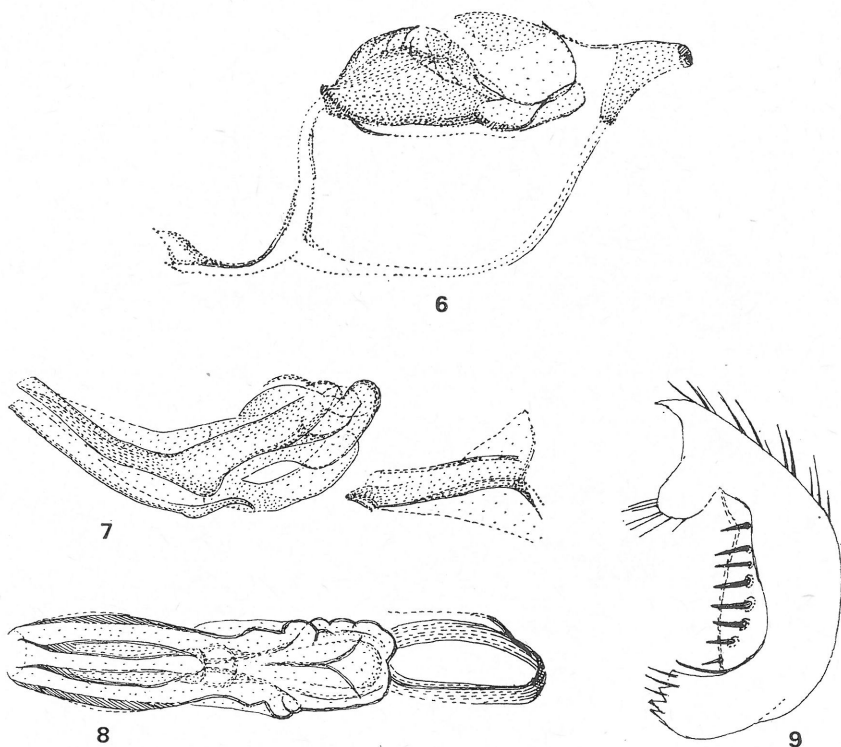


Fig. 6. *Melanagromyza provecta*: aedeagus

Figs. 7—9. *Melanagromyza polymniae*: 7, aedeagus, side view; 8, same, ventral view; 9, surstylus and epandrium

Genus *Hexomyza* ENDERLEIN

A new gall-causing *Hexomyza* spec. from India and Pakistan.

Hexomyza abutilonicaulis spec. nov. ✓

Head (Fig. 10): frons broad, almost twice width of eye, slightly projecting above eye in profile, more so in front; orbits with 2 equal *ors*, 2 *ori*, only the lower *ori* incurved; orbital setulae in several rows in front, reclinate; ocellar triangle short, apex only finely extended to level of lower *ors*; jowls broad, deepest in centre or front, almost 1/3 height of eye; third antennal segment small, round, arista fine, scarcely pubescent.

Mesonotum: 2 *dc*, *acr* numerous, in some 10 rows.

Wing: length from 2,3 mm in male to 2,5 in female; costa extending strongly to vein m_{1+2} , first cross-vein at distal third of discal cell.

Colour: black; ocellar triangle conspicuously, orbits weakly shining; mesonotum moderately shining, more mat viewed from front, abdomen strongly shining, with faint blue or purplish reflections; squamae grey, margin and fringe black.

Male genitalia: aedeagus as in Figs. 11, 12, basal sclerites fused, elongate; ejaculatory apodeme short, with blade slightly asymmetrical — broadening on one side, base strongly chitinated; ninth sternite with short, extended hypandrial apodeme; surstyli rounded, with about 20 short spines and a few longer hairs.

Host-plant/Biology: *Abutilon indicum* LINNAEUS, larvae forming slender stem-galls, pupating internally, with an exit slit prepared by the larva; the puparium is whitish-grey, with the posterior spiracles on two short projections, each with 3 bulbs.

Holotype ♂, Pakistan: Mirpur Khas, 8.i.76, ex galls on *Abutilon* sp.; 1 ♂, 1 ♀, same data; Tando Jam, 1 ♂, 7.i.76; Karachi, 6 ♂♂, 2 ♀♀, 10.—13.i.76, all ex galls on *Abutilon* sp.; India: New Delhi, 1 ♂, 1 ♀, 1958, larvae galling stems of *Abutilon indicum* (C.I.E. coll. 16082). Holotypes and paratypes in British Museum (Natural History), 2 paratypes in author's collection.

Remarks. This species was originally misidentified as *Melanagromyza nigrisquama* (MALLOCH, 1914b) from the two specimens from India (SPENCER 1961a: 56). On recently receiving the longer series from Pakistan, paratypes of *nigrisquama* from Tainan, Formosa were examined and the genitalia showed that the species are distinct and unrelated, despite their superficial similarity (see under *M. provecta* above).

Completely black species in the genera *Hexomyza*, *Melanagromyza* and *Ophiomyia* are frequently not identifiable on external characters but are immediately separable by their male genitalia. No *Hexomyza* sp. has hitherto been known in the Oriental Region. *H. websteri* (MALLOCH, 1913) forms galls on *Wistaria* in Japan and *H. coprosmae* SPENCER, 1976b forms similar galls on *Coprosma propinqua* CUNN. in New Zealand.

Genus *Ophiomyia* BRASCHNIKOV

I have recently received from Mr. STEYSKAL, Systematic Entomology Laboratory, U.S.D.A., Washington a series of an *Ophiomyia* sp. from Tunisia which has a number of apomorphic characters in common with *O. aeneonitens* (STROBL, 1893), which is also known from Tunisia. Mr. STEYSKAL correctly diagnosed this species as distinct.

Ophiomyia tunisiensis spec. nov.

Minute species with white squamae and fringe, costa ending at vein r_{4+5} and second cross-vein lacking.

Head: (frons width not measurable as eye shrunk in all specimens); orbital bristles unusually small and weak, 2 reclinate *ors*, 2 inclined *ori*; orbital setulae sparse, upright or reclinate; lunule conspicuously higher than a semicircle, broadly U-shaped; jowls broad, 1/3 height of eye, projecting forwards, in male vibrissal fasciculus a bunch of only partially fused white hairs at end of a short, stout projection (Fig. 13); antennae divided by a narrow, flattened facial keel.

Mesonotum: 2 weak *dc*, *acr* sparse, in some 4 rows.

Wing (Fig. 14): length in male 1,25 mm, in female up to 1,6 mm; costa strong but ending abruptly at vein r_{4+5} ; r_{4+5} distinctly curving upwards to join costa.

Colour: head black; mesonotum and abdomen shining black; wings conspicuously white; costa and *r* veins brownish, other veins entirely white; squamae and fringe silvery-white; halteres black.

Male genitalia: aedeagus as in Figs. 15, 16; ejaculatory apodeme long, only slightly shorter than aedeagus, blade narrow with distinct central "vein"; base discrete, "handle-bar" type, strongly chitinated.

Holotype ♂, Tunisia: Chaabania, 32 km S. of Medinine, 12. vi. 73; paratypes: 3 ♂♂, 2 ♀♀, same data (all HEATWOLE). Holotype in U.S.N.M., paratypes in U.S.N.M. and B.M.

Remarks. There is obvious synapomorphy between this new species and *aeneonitens* (costa ending at r_{4+5} , pale *m* veins, white squamae and fringe) but the two differ in many other characters. In *aeneonitens*, the male lacks a vibrissal fasciculus, the jowls are narrower, the orbital bristles are stronger, the second costal section is longer, r_{4+5} is straight, not curving up to the costa (HENDEL 1931: Fig. 207) and it is distinctly larger.

O. aeneonitens was described from Austria and subsequently recorded in Tunisia (SPENCER 1964b: 779). It is surprising that both *aeneonitens* and *tunisiensis* should be present in North Africa. How and where speciation occurred can only be a matter of speculation. It is unlikely to have been sympatric. If the original population was present in central Europe, part may well have moved southwards during early Pleistocene and reached North Africa, where a local population could have given rise to *tunisiensis*. Re-colonization of North Africa may have occurred later in the Pleistocene from unmodified *aeneonitens*, with the two species now fully differentiated.

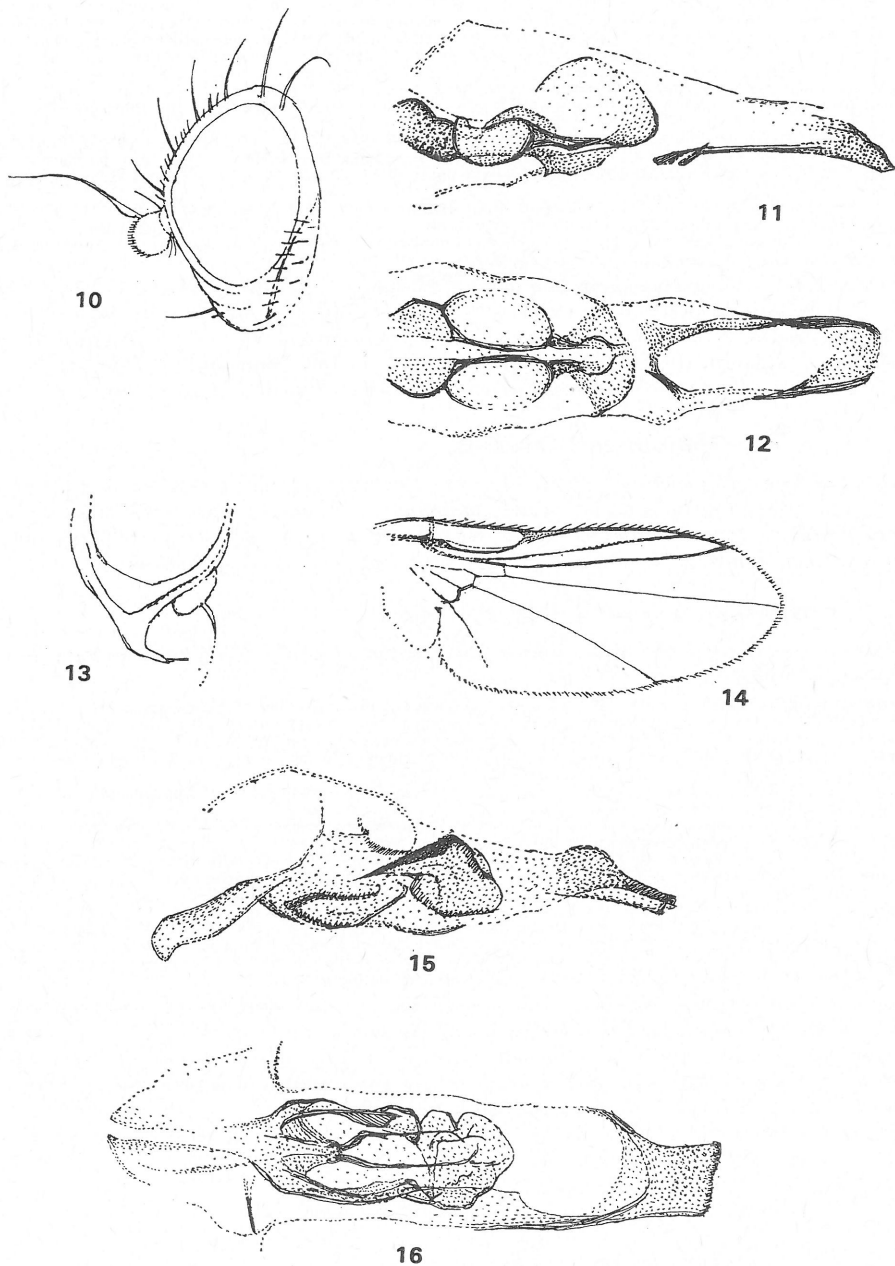
I am grateful to Mr. STEYSKAL for allowing me to describe this interesting species.

Genus *Agromyza* FALLÉN

1. A new *Agromyza* spec. from North America

Agromyza virginiensis spec. nov.

Head: frons 1½ times width of eye, not projecting above eye in profile; orbits narrow, not greatly differentiated; 2 *ors*, the upper reclinate, the lower entirely or partially incurved; 3 *ori*; jowls deeply extended at rear, 1/3 height of eye; third antennal segment distinctly longer than broad, arista only finely pubescent.



Figs. 10—12. *Hexomyza abutilonicaulis* spec. nov.: 10, head; 11, aedeagus, side view; 12, same, ventral view
 Figs. 13—16. *Ophiomyia tunisiensis* spec. nov.: 13, head; 14, wing; 15, aedeagus, side view; 16, same, ventral view

Mesonotum: 4 post-sutural *dc*, the 4th little stronger than *acr*, these in 8 rows; *prsc* strong, almost equal to 1st *dc*.
 Wing: length in male 3 mm; costa extending to vein *m*₁₊₂ but weak beyond *r*₄₊₅; discal cell unusually large, last section of *m*₃₊₄ only half length of penultimate; first cross-vein at midpoint of discal cell.

Legs: mid-tibiae with 2 lateral bristles.

Colour: frons brownish-orange, all antennal segments paler, orange, palps black; mesonotum, scutellum and abdomen shining black, pleura black; legs: femora black, with all knees paler, tibiae and tarsi brownish-orange; wing with all veins conspicuously pale, brownish-orange; squamae whitish-yellow, fringe silvery, halteres white.

Male genitalia: aedeagus as in Fig. 17, exceptionally long (drawn to same scale as Fig. 18), distal tubules fused to slightly beyond midpoint, diverging only near end; ejaculatory apodeme with blade little more than linear; surstyli with a group of about 10 short, black bristles at lower, inner corner; cerci unusually large, longer than height of epandrium.

Holotype ♂, U.S.A.: Virginia, Great Falls, June, 1922 (BANKS), in Museum of Comparative Zoology, Cambridge, Mass.

Remarks. The most distinctive characters of this species are the colour of the frons and antennae, and the unusually pale veins. In the author's key to Canadian *Agromyza* species (SPENCER 1969a: 30), it will run to *varifrons* COQUILLETT in couplet 7 but is immediately distinguishable by the paler legs and veins; the resemblance is superficial and the two are in no way related. The genitalia of *virginiensis* suggest relationship with *A. anthracina* MEIGEN (cf. SPENCER 1976a: Fig. 145), a leaf-miner on *Urtica* in Europe; both have the aedeagus with long, paired distal tubules but these are substantially longer in *virginiensis*.

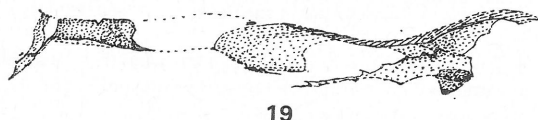
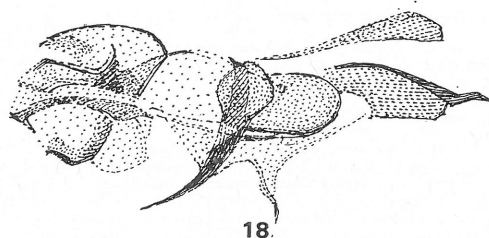
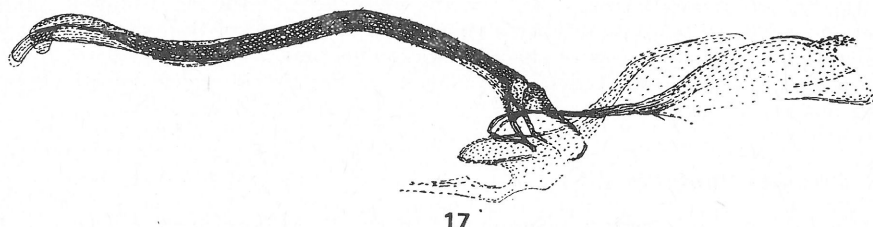


Fig. 17. *Agromyza virginiensis* spec. nov.: aedeagus (same scale as Fig. 18)

Fig. 18. *Agromyza brunnicosa*: aedeagus, side view

Fig. 19. *Agromyza nigrescens*: aedeagus, side view

2. Further clarification of two species from Tenerife, Canary Islands

Agromyza brunnicosa BECKER, 1908

The aedeagus of this species in ventral view was shown by SPENCER (1965a: Fig. 4). By an inexplicable error the ejaculatory apodeme (Fig. 3) was referred to as the aedeagus in side view. This mistake is now corrected with an illustration of the aedeagus in side view (Fig. 18).

BECKER (1908: 170) in his description referred to the holotype as a male but HENDEL (1931: 111) states that this is an error. The only other specimens known are the two I bred from *Malva neglecta* LINNAEUS on Tenerife in March, 1963.

HERING (1927a: 456) refers to the similarity of *brunnicosa* and *nigrescens* (as *heringi* DE MEIJERE), which occur together on Tenerife. However, *brunnicosa* is distinguishable by the more brownish frons and antennae, which are entirely black in *nigrescens*.

Agromyza nigrescens HENDEL, 1920

The aedeagus of the typical form of this species was recently illustrated by SPENCER (1976a: Fig. 219, 220). The strongly sclerotized cylindrical distal section has two entirely membranous extensions directed forwards and slightly ventrally.

A male has recently been examined from the Canary Islands: Tenerife: Añavingo, 9. iii. 75 (BAEZ) with the distal extensions fully sclerotized (Fig. 19). This probably represents incipient speciation in the population isolated on Tenerife. HERING (1927a: 456, as *Agromyza heringi* DE MEIJERE) confirmed that both adults and mines agree completely with those known to him from Germany, Switzerland and Norway.

BEIGER (1972: 48) described *oycoviensis* from Poland, also a leaf-miner on *Geranium*. I consider that this is doubtfully distinct from *nigrescens* but in one paratype I have seen the conspicuous sclerotized area at the distal end of the right-hand basal sclerite is lacking and is replaced merely by a thickening of the end of the sclerite. This in itself can scarcely be considered as of specific significance but, in conjunction with the modification noted above in the Tenerife population, illustrates the speciation which is clearly taking place in this species.

Genus *Phytobia* LIOY

Three new species have been examined from Ecuador, Nigeria and Peru and are described below.

Phytobia ecuadorensis spec. nov.

Head: frons $1\frac{1}{2}$ times width of eye, not projecting above eye in profile; 2 *ors* and 2 *ori*, orbital setulae sparse, reclinate; ocellar triangle scarcely differentiated; eye large, upright, jowls narrow, $1/12$ height of eye; third antennal segment rounded; arista long, equal to height of eye.

Mesonotum: 3 + 1 strong *dc*, *acr* in 6 rows; *prsc* lacking.

Wing: length in male 2.8 mm, last section of m_{3+4} only marginally shorter than penultimate.

Legs: mid-tibia with 2 lateral bristles.

Colour: frons mat black, ocellar triangle scarcely differentiated; bases of orbital bristles weakly shining; lunule grey; all antennal segments black; mesonotum (Fig. 20) black in front, moderately shining, behind 2nd *dc* broadly yellow to scutellum, this entirely bright yellow; humerus, notopleural area, wing base and most of mesopleura bright yellow, the latter black along lower and front margins; legs entirely black; abdomen (Fig. 21) with front tergites completely yellow, tergites 5 and 6 with black markings as illustrated; squamae yellowish-grey, margin and fringe black; halteres yellow.

Male genitalia: aedeagus as in Figs. 22, 23, only right basal sclerite fully developed (viewed dorsally from rear); ninth sternite broad and rounded, typical of the genus.

Holotype ♂, Ecuador: Napo-Pastaza, Bambay, no date (coll. LEVI-CASTILLO), in U.S. National Museum.

Remarks. On external characters, this species runs to *xanthophora* (SCHNER), accepted as occurring in Brazil and Trinidad (SPENCER & STEGMAIER 1973: 178 and Fig. 453; couplet 6). A further female of *xanthophora* has been seen from Brazil: Nova Teutonia, Sept., 1969 (PLAUMANN). The aedeagus of the two species is distinctively different but nevertheless confirms their close relationship.

Both *dorsocentralis* FROST and *picta* COQUILLETT also have similar contrasting black and yellow coloration but the aedeagus of these two species (cf. SPENCER & STEGMAIER 1973) confirms that they are distinct from *ecuadorensis*.

An unfortunate error occurred in the key to Neotropical *Phytobia* species given by SPENCER & STEGMAIER (1973: 174). Couplet 5 should read:

- | | |
|-----------------------------|-------------------------|
| 5' Wings pictured | <i>rabelloi</i> SPENCER |
| 5' Wings clear | 6 |

Phytobia nigeriensis spec. nov.

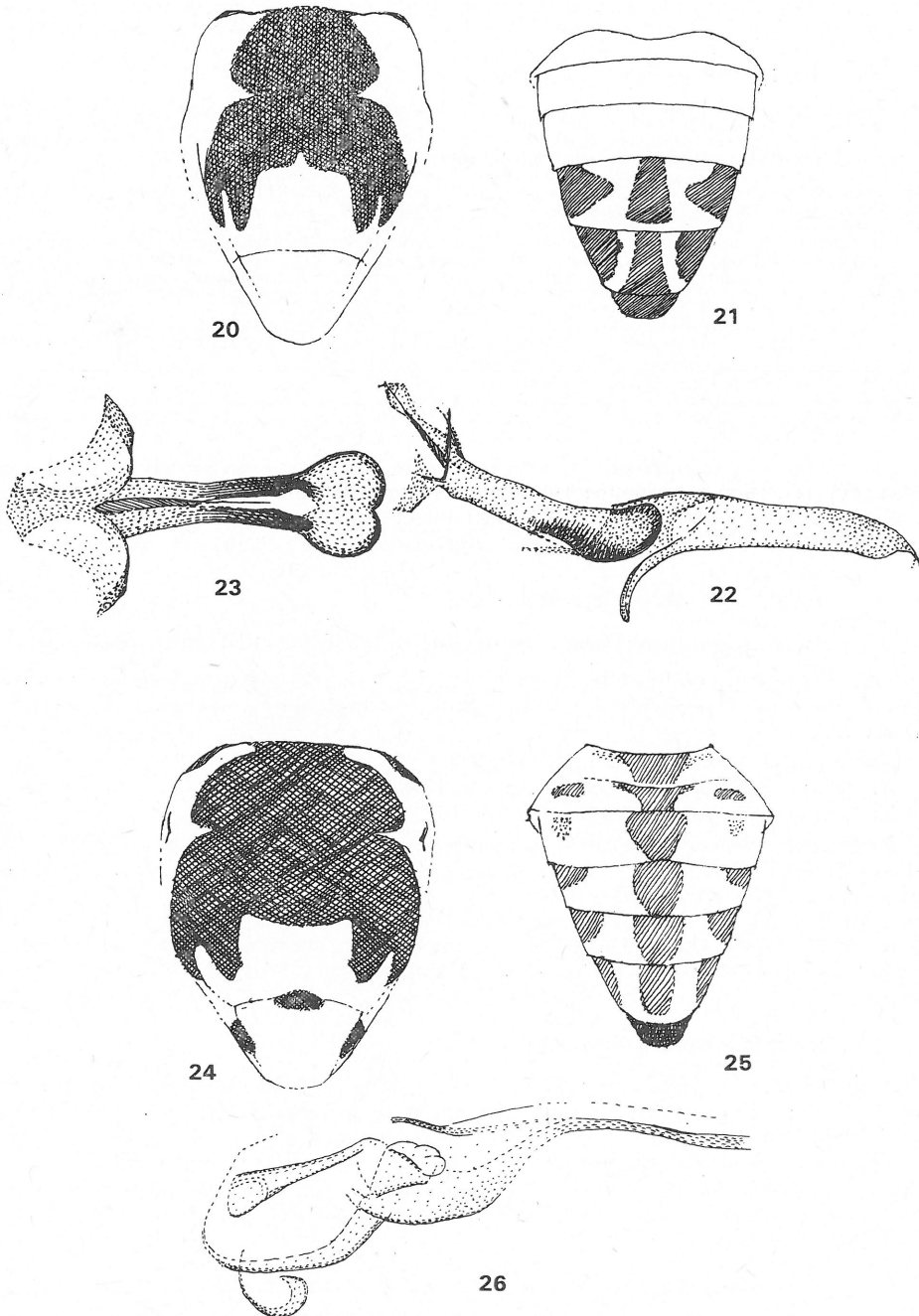
Head: frons $1\frac{1}{2}$ times width of eye, not projecting above eye in profile; orbital bristles strong, 2 *ors* and 2 *ori*; orbital setulae minute, scarcely detectable; ocellar triangle not extended beyond foremost ocellus; eye large, upright, jowls narrow, $1/12$ height of eye; third antennal segment round, arista long, equal to height of eye.

Mesonotum: 3 + 1 strong *dc*, *acr* in 6 rows, *prsc* present.

Wing: length in female 2.75 mm, costa extending to vein m_{1+2} , last section of m_{3+4} slightly longer than penultimate.

Colour: frons orange in front to level of lower *ors*, mat black above, lunule yellow, more greyish viewed from above; jowls and face yellowish-grey; first antennal segment yellow, second and third black on outside, paler, brownish on inside; mesonotum (Fig. 24) deep black but slightly grey-dusted, broadly yellow centrally from 2nd *dc* to margin of scutellum, inner post-alar on yellow ground; scutellum largely yellow but black at sides from base of lateral bristles and a small black patch centrally at margin of mesonotum; rear of humerus, notopleural triangle and wing base bright yellow; mesopleura largely black but broadly yellow along upper and hind-margins, bristle on yellow; pteropleura and upper margin of hypo- and sternopleura yellow; legs entirely black; abdomen (Fig. 25) predominantly yellow, with all tergites narrowly black centrally and black patches laterally; ovipositor sheath entirely grey-dusted; squamae yellowish-grey, margin and fringe black; halteres yellow.

Holotype ♀, Nigeria: Kagoro Forest, 16–17. x. 71 (DEEMING), in British Museum (Natural History).



Figs. 20–23. *Phytobia ecuadorensis* spec. nov.: 20, mesonotum; 21, abdomen; 22, aedeagus, side view; 23, distiphallus, ventral view

Figs. 24, 25. *Phytobia nigeriensis* spec. nov.: 24, mesonotum; 25, abdomen

Fig. 26. *Phytobia peruensis* spec. nov.: aedeagus

Remarks. This is the only yellow and black species in the genus known in Africa. It strikingly resembles species in the *xanthophora* group in the Neotropical Region (cf. SPENCER & STEGMAIER 1973) and possibly has some affinity with *diversata* SPENCER, 1961a from Formosa and *milleræ* SPENCER, 1977b from New Guinea, which are also partially yellow.

***Phytobia peruensis* spec. nov.**

Head: frons broad, almost twice width of eye, not projecting above eye in profile: 4 equal orbital bristles, the two *ori* directed inwards and upwards; orbital setulae minute, sparse, reclinate; jowls narrow, 1/10 height of eye; third antennal segment small, rounded at end, slightly longer than broad; arista long, only slightly shorter than vertical height of eye, only finely pubescent; mouth-margin normal, without epistoma.

Mesonotum: 3 + 1 *dc*, 3rd and 4th short, equal, equidistant each side of suture, *acr* in 8 rows.

Wing: length in male 3.4 mm, costa extending strongly to vein *m*₁₊₂, last section of *m*₃₊₄ only slightly shorter than penultimate, in ratio 28 : 32, first cross-vein at distal third of discal cell.

Legs: mid-tibia with 1 strong lateral bristle.

Colour: dark species; frons uniformly sooty-black; lunule silvery-grey; all antennal segments dark brown; mesonotum and abdomen deep black, moderately shining, sides of thorax and legs black; squamae grey, margin and fringe black. Male genitalia: aedeagus asymmetrical (Fig. 26); ejaculatory apodeme with large blade, rounded on one side, striated on the other, with well-chitinized "handle-bar" type base; ninth sternite with broad sidearms, broadly fused at apex; surstyli rounded, with hairs only, no bristles, on inner margin.

Holotype ♂, Peru: Quincemil, Cuzco, 200 m, 1. - 15. xi. 62 (PENA), in Canadian National Collection.

Remarks. This species can be included in the key to Neotropical species given by SPENCER and STEGMAIER (1973: 174) with the following amendment and extension to couplet 3:

- | | | |
|----|---|-----------------------------|
| 3 | Small species, wing length 2.2 mm; 2 post-sutural <i>dc</i> | <i>unica</i> SPENCER |
| — | Larger species, wing length 3.4–4 mm; 3 + 1 <i>dc</i> | 3a |
| 3a | Frons uniformly mat black | <i>peruensis</i> spec. nov. |
| — | Frons reddish in front | spec. f (C. R.) |

Among entirely dark North American species, *peruensis* most closely resembles *waltoni* MALLOCH (cf. SPENCER 1969a: 109) which is known from New York and Quebec. Only females of *waltoni* are known and it will be of interest when a male is discovered to establish whether it is directly related to *peruensis*.

Genus *Amauromyza* HENDEL

1. *Amauromyza* (*Catalpomyza*) *pleuralis* (MALLOCH, 1914a), *comb. nov.*

There has been considerable uncertainty about the correct generic placing of the leaf-miner on *Catalpa bignonioides* WALTON in North America. Existing synonymy is as follows:

- Agromyza pleuralis* MALLOCH, 1914a: 311
Phytobia (*Trilobomyza*) *pleuralis*, FRICK, 1953: 71
Trilobomyza pleuralis SPENCER, 1969a: 161

Trilobomyza was accepted as a subgenus of *Amauromyza* by SPENCER (1971: 159) and the genitalia of four species known in Europe, were illustrated by SPENCER (1976a; Figs. 294–304). Males of *pleuralis* have only recently become available for study (kindly presented to me by Mr. G. E. SHEWELL, Ottawa) and it is now clear that it correctly belongs in *Amauromyza*. The broad, rounded ninth sternite (Fig. 27) is typical of the genus. However, it cannot be retained in *Trilobomyza* and deserves separate subgeneric status.

***Catalpomyza* subgen. nov.**

Antennae, mesopleura, legs and all bristles yellow; third antennal segment enlarged; 2 (rarely 3) + 0 *dc*; male genitalia: aedeagus as in Figs. 28, 29; ejaculatory apodeme with base greatly enlarged (Fig. 30), 1½ times length of blade.

Type of subgenus: *Agromyza pleuralis* MALLOCH, by present designation.

A. pleuralis forms characteristic blotch-mines on *Catalpa*; the puparium is reddish, with the posterior spiracles on two widely separated projections, each with some 30 minute bulbs.

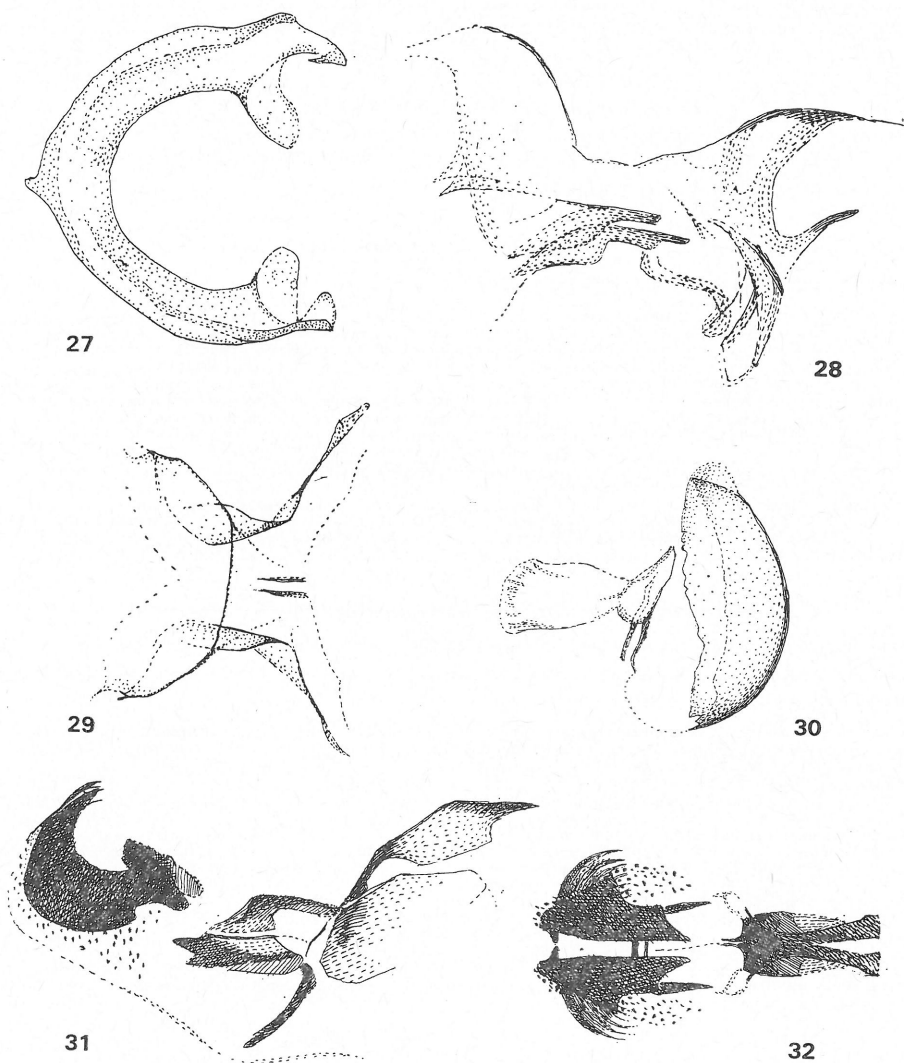
2. *Amauromyza* (*Cephalomyza*) *karli* (HENDEL, 1927)

Mongolia: Central Aimak, Zuun-Chara, 850 m (nr. 281), 1 ♂, 4 ♀♀ 8. vii. 64.

This species was described in the genus *Dizygomyza* and later HENDEL (1931: 34) placed it in the sub-genus *Cephalomyza*, in association with the type species, *luteiceps* HENDEL. Examination of the genitalia of *luteiceps* (SPENCER 1969b: Figs. 16, 17) showed that it correctly belongs in the genus *Amauromyza*. The genitalia of the first male of

karli recorded above confirms its correct generic placing in *Amauromyza*. The aedeagus (Figs. 31, 32) and the ejaculatory apodeme, with its large bowl-shaped base, are entirely typical of the genus.

A. karli is an uncommon holarctic species, known from Eastern Europe and also from Canada: Ottawa (SPENCER 1969a: 158). These further records from Mongolia are thus of the utmost interest in explaining the distribution from Europe to Canada via Beringia.



Figs. 27–30. *Amauromyza* (*Catalpomyza*) *pleuralis*: 27, ninth sternite; 28, aedeagus, side view; 29, distiphallus, ventral view; 30, ejaculatory apodeme

Figs. 31, 32. *Amauromyza* (*Cephalomyza*) *karli*: 31, aedeagus, side view; 32, distiphallus, ventral view

Genus *Cerodontha* RONDANI

Two new species from Mexico and South Africa in the subgenus *Icteromyza* and three new species in the subgenus *Cerodontha* from Mexico are described below.

The Mexican *Cerodontha* species are of particular interest. They have in common the apomorphic character of $2 + 1$ *dc*; all have the distal tubules of the aedeagus fully fused and in two, *trispinella* and *trispinosa*, the aedeagus is conspicuously broadened (Figs. 40, 42). There seems little doubt that this group of related species show an ancestral relationship with *Cerodontha angustipennis* HARRISON, 1959, an endemic species in New Zealand. In a recent review of New Zealand Agromyzidae it was suggested (SPENCER 1976b) that *angustipennis* might be related to *affinis* (FALLÉN) in Europe, in which the tubules of the aedeagus are also fused (cf. SPENCER 1976a: Fig. 317); however, in *affinis* and others in the same group (cf. NOWAKOWSKI 1973: 50) there is the usual arrangement of $3 + 1$ *dc*.

All 9 specimens of these three *Cerodontha* species are from a high altitude, c. 2,000 to 2,500 m, and 8 are from Durango Province, an area which it is believed was never fully glaciated during the Pleistocene. These could thus be relict species which are only slightly modified from their ancestral stock in Eastern Asia which also dispersed to the south to reach New Zealand at some period in the Tertiary.

***Cerodontha (Icteromyza) atrissima* spec. nov.**

Dark species with frons and palps black.

Head: 2 strong, equal *ors*, 2 weaker, incurved *ori*; orbital setulae sparse, reclinate; ocellar triangle extended at most in outline towards upper margin of lunule; orbits distinctly widening below, lunule large, semicircular; jowls extended at rear, $\frac{1}{4}$ height of eye; eye bare; third antennal segment quadrate, longer than broad.

Mesonotum: $3 + 1$ *dc*; *acr* sparse, irregularly in 4 rows in front, reduced to 2 rows behind.

Wing: length from 2.5 mm in male to 2.9 mm in female; last section of m_{3+4} only marginally shorter than penultimate, in ratio 22:25; first cross-vein at midpoint of discal cell, distinctly sloping with upper end nearer wing base.

Colour: frons and orbits largely black but in 1 of 3 specimens seen upper frons dark brownish-ochrous; lunule contrasting yellow; face and jowls ochrous yellow; all antennal segments and palps black; mesonotum mat brownish-grey; sides of thorax similar; legs: black, all knees yellowish, on p_1 more distinctly so; abdomen mat black, in female ovipositor sheath entirely grey-dusted; squamae grey, margin and fringe black; halteres yellow.

Male genitalia: aedeagus as in Figs. 33, 34.

Holotype ♂, Mexico: 10 miles W. of El Salto, Durango, 9,000 ft, 8. vii. 64; paratypes: 1 ♀, same data; 1 ♂, same locality 2. vi. 64 (all MCALPINE). Holotype and paratype in Canadian National Collection, one paratype in author's collection.

Remarks. This species is immediately distinguishable by the black frons and palps. Among North American species only *capitata* (ZETTERSTEDT) has black palps but this has the frons yellow (cf. FRICK 1959: 386; SPENCER 1969a: 137).

***Cerodontha (Icteromyza) stuckenbergiella* spec. nov.**

On external characters not distinguishable from European *geniculata* (FALLÉN), cf. NOWAKOWSKI 1973: 38; SPENCER 1976a: 173 but with specific differentiation in the male genitalia.

Head: frons normally at least slightly projecting above eye in profile, particularly in front; 2 equal *ors*, 2 *ori*, the lower weak; lunule conspicuous, semicircular, at most slightly higher; jowls extended at rear, $\frac{1}{3}$ height of eye; third antennal segment round, arista distinctly pubescent.

Mesonotum: $3 + 1$ *dc*, *acr* in 4 rows.

Wing: length from 2 mm in male to 2.4 mm in female (in 6 specimens seen); last section of m_{3+4} usually slightly longer than penultimate.

Colour: frons and lunule yellow, orbits frequently darkened above, yellow below; jowls, face and palps yellow; third antennal segment black, second slightly yellowish; mesonotum black, only weakly shining; legs black but all femora bright yellow distally for slightly more than their width; squamae yellow, margin and fringe black.

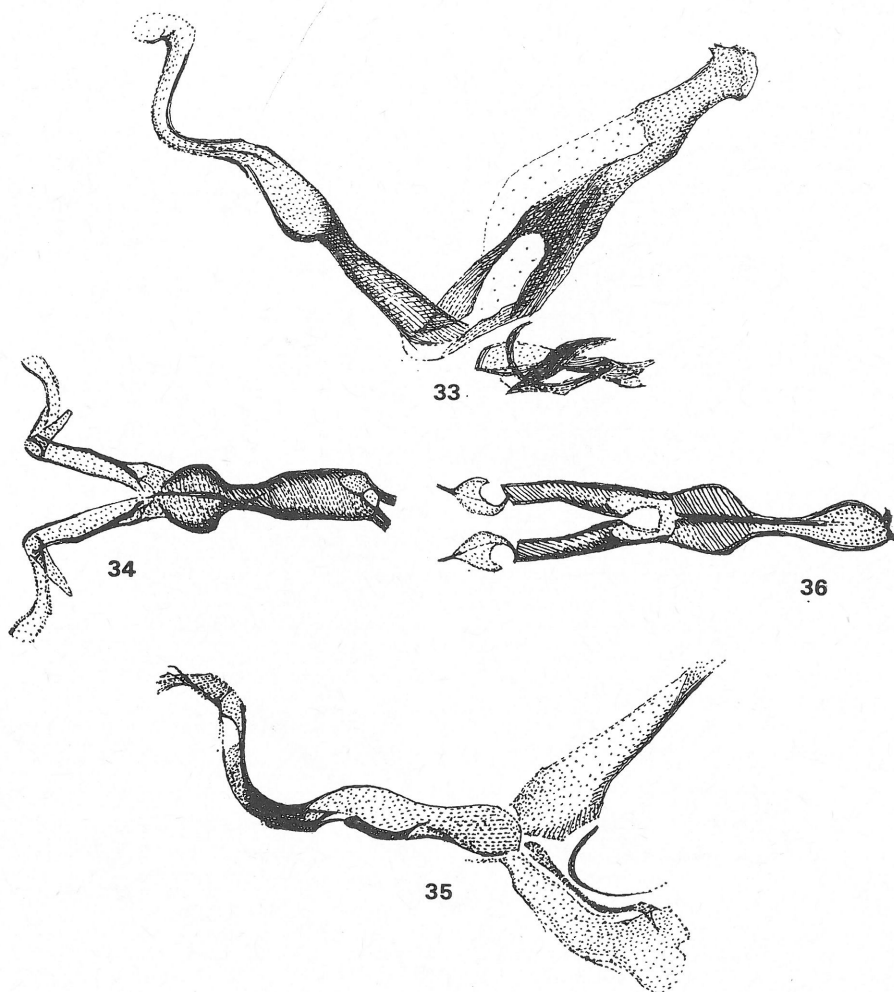
Male genitalia: aedeagus as in Figs. 35, 36, paired tubules of aedeagus S-shaped, the apical section with only a membranous connection to the fully sclerotized tubules below.

Holotype ♂, South Africa: E. Cape Province, Port St. Johns Dist., coastal forest, 16–17. x. 59; paratypes: 1 ♂, 4 ♀♀, Port St. Johns, 20–25. xi. 61 (all B. & P. STUCKENBERG); Pietermaritzburg, 1 ♀, 21. xii. 54 (B. STUCKENBERG). Holotype and 4 paratypes in Natal Museum, 2 paratypes in British Museum (Natural History).

Remarks. This species was originally identified as *geniculata* (SPENCER 1959: 304; 1961c: 339; 1964a: 31) but was recognized as distinct by SPENCER (1969a: 139). The aedeagus of *geniculata* has been illustrated by NOWAKOWSKI (1973: Fig. 108) and by SPENCER (1976a: Fig. 312).

The host of *geniculata* is *Eriophorum latifolium* LINNAEUS (Cyperaceae). This genus is not represented in South Africa but it is certain that *stuckenbergiella* will be feeding on a related genus in the same family; *Scirpus* and *Ficinia* are two possible host genera.

This is a further interesting example of the speciation which has occurred in populations now isolated in South Africa, derived from ancestral immigrants from the Palaearctic Region which have succeeded in crossing the tropics by "mountain hopping". Comparable cases have been noted in a number of genera, for example *Phytoliriomyza oasis* BECKER (North Africa and Europe) and *P. immoderata* SPENCER (South Africa), cf. SPENCER 1963a; *Phytomyza ranunculiivora* HERING in Europe (cf. SPENCER 1976c) and *P. ranunculina* SPENCER, 1963a (South Africa).



Figs. 33, 34. *Cerodontha (Icteromyza) atrissima* spec. nov.: 33, aedeagus, side view; 34, distiphallus, ventral view

Figs. 35, 36. *Cerodontha (Icteromyza) stuckenbergiella* spec. nov.: 35, aedeagus, side view; 36, distiphallus, ventral view

***Cerodontha (Cerodontha) trispinata* spec. nov.**

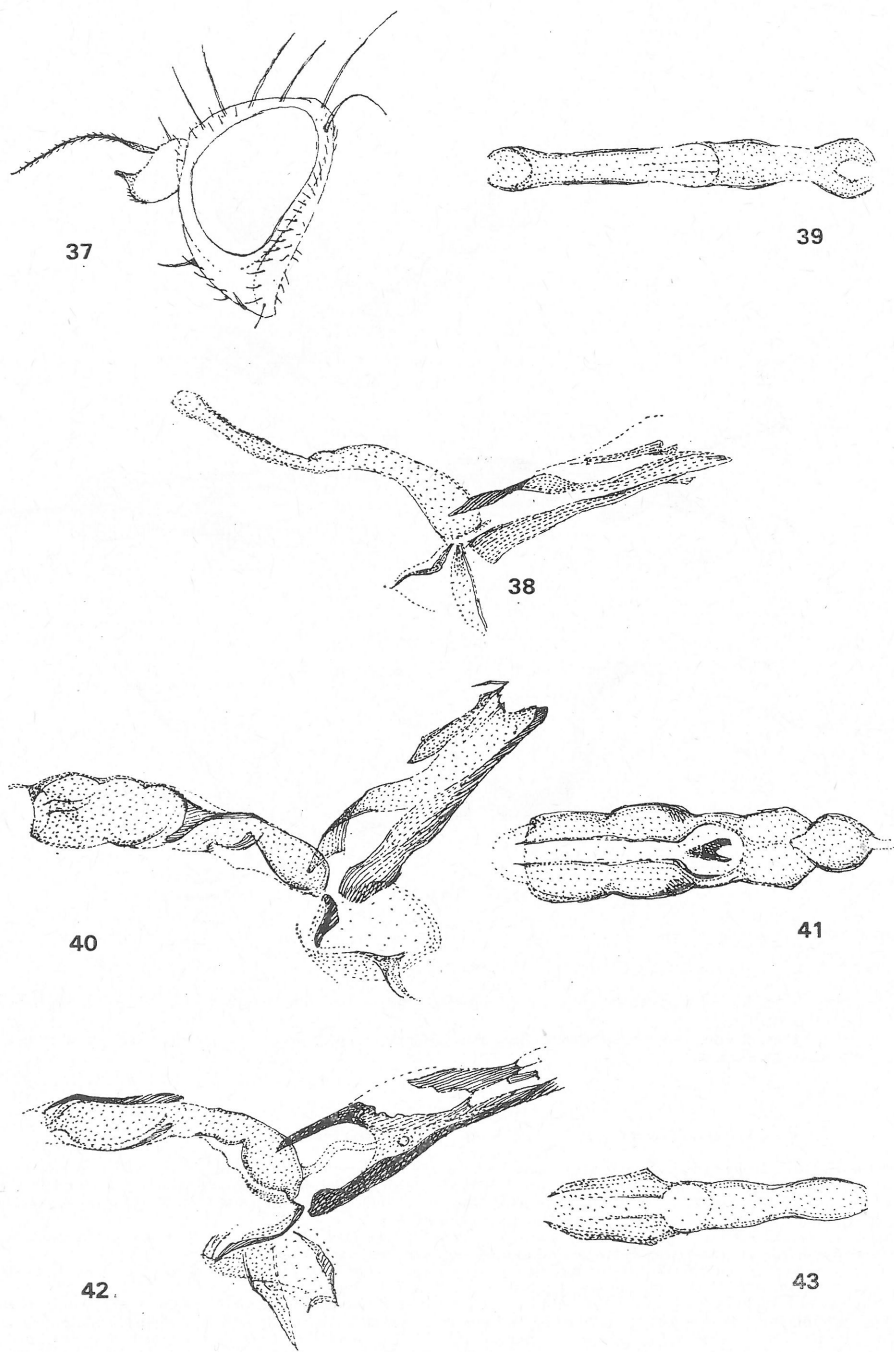
Head (Fig. 37): frons broad, slightly more than twice width of eye, conspicuously projecting above eye in profile; orbital bristles long, slender, 2 equal, reclinate *ors*, 2 inclined *ori*; orbital setulae sparse, mainly in area of *ori*, upright; eye slanting, narrow; jowls extended at rear, $\frac{1}{4}$ height of eye; third antennal segment elongate, concave on upper margin, virtually without hairs but with short, blunt, spine-like projection at apex.

Mesonotum: 2 + 1 fully developed *dc*, 2nd and 3rd equidistant each side of suture, occasionally a small bristle, sometimes on one side only, midway between 2nd and suture; *acr* irregularly in 4 or 5 rows.

Wing: length in male 2.9–3.25 mm; last and penultimate sections of *m*₃₊₄ approximately equal but either may be slightly longer; first cross-vein at or slightly beyond midpoint of discal cell.

Colour: head, including entire hind-margin of eye, all antennal segments and palps bright yellow, only extreme end of third antennal projection darkened, blackish; mesonotum variable, basically mat, greyish-black, in palest form with a well-defined rectangular yellow area adjoining scutellum between *dc* and extending forwards almost to level of 2nd *dc*, in darkest form completely black to margin of scutellum, with an intermediate form having only a yellowish suffusion at rear; sides of thorax predominantly yellow but mesopleura always with a dark band along lower and front margins, in darkest form whole lower three-quarters black; scutellum bright yellow, with small lateral black patches; legs: coxae and femora bright yellow, tibiae and tarsi more brownish; abdomen predominantly yellow, with tergites blackish-brown centrally; squamae and fringe yellow, latter at most ochrous.

Male genitalia: aedeagus (Figs. 38, 39) with distal tubules narrow and fully fused; ejaculatory apodeme with blade large, black, wider than long.



Figs. 37–39. *Cerodontha (Cerodontha) trispinata* spec. nov.: 37, head; 38, aedeagus, side view; 39, distiphallus, ventral view
 Figs. 40, 41. *Cerodontha (Cerodontha) trispinella* spec. nov.: 40, aedeagus, side view; 41, distiphallus, ventral view
 Figs. 42, 43. *Cerodontha (Cerodontha) trispinosa* spec. nov.: 42, aedeagus, side view; 43, distiphallus, ventral view

Holotype ♂, Mexico: 28 miles W. of Durango, Durango, 7,500 ft, 8. vi. 64; paratypes: 1 ♂, 30 miles W. of Durango, 8,000 ft, 6. vi. 64 (both pale form); 1 ♂, 11 miles E. of El Salto, Durango, 8,000 ft, 13. vi. 64 (intermediate form) (all MCALPINE); 1 ♂, Toluca, 10 miles E. of Mexico, 8,000 ft, 31. vii. 54 (CHILLCOTT); 1 ♂, 24 miles W. of La Ciudad, 7,000 ft, 8. viii. 64 (MASON) (both dark form). Holotype and 3 paratypes in Canadian National Collection, one paratype in author's collection.

Remarks. Despite the variable colour of the mesonotum, the genitalia are identical in the three colour forms seen. The aedeagus is here conspicuously narrower than in *trispinella* and *trispinosa* described below but with the distal tubules fully fused and the reduction of the dorsocentrals to 2 + 1, the monophyly of the three species is certain.

Cerodontha (Cerodontha) trispinella spec. nov.

Closely resembling *trispinata*, with following essential characters:

Head: as in *trispinata* (cf. Fig. 37) but third antennal segment conspicuously pubescent, with fringe of hairs almost as long as the apical spine, entirely black on outside, black on inside on upper half.

Mesonotum: 2 + 1 strong *dc*, the pre-sutural distinctly nearer suture than the 2nd (a small additional bristle just beyond 2nd on one side only); deep black, mat, with a rectangular yellow patch centrally adjoining scutellum, extending forwards almost to level of 2nd *dc*; scutellum almost entirely bright yellow; mesopleura black on lower two-thirds.

Wing: length in male 3.25 mm, last and penultimate sections of m_{3+4} equal, first cross-vein well beyond midpoint of discal cell.

Legs: coxae and femora bright yellow, tibiae and tarsi contrasting, brownish-black.

Male genitalia: aedeagus as in Figs. 40, 41; distal tubules fully fused, broad, somewhat irregular in outline in side view.

Holotype ♂, Mexico: 30 miles W. of Durango, Durango, 8,000 ft, 6. vi. 64 (MCALPINE), in Canadian National Collection. Remarks. Although this species closely resembles *trispinata*, it is distinguishable by the black, more pubescent third antennal segment and the deeper black mesonotum. The male genitalia indicate that it is the sister-species of *trispinosa*, in which the general colour is markedly different.

Cerodontha (Cerodontha) trispinosa spec. nov.

Morphologically scarcely distinguishable from *trispinata* and *trispinella* but with significant colour differences.

Colour: head yellow, third antennal segment slightly darkened, brownish or even black on outside on upper half; mesonotum variable, from largely brownish, with more yellow central area adjoining scutellum and more blackish patch laterally behind 1st *dc*, to brownish centrally throughout though slightly paler, yellowish, towards scutellum, with 2 distinct black bands laterally from pre-sutural area to scutellum; pleura yellowish-brown; abdomen with tergites mainly black with broad yellow hind-margin; in female basal cone of ovipositor moderately shining; wing length from 3.1 mm in male to 3.5 mm in female.

Male genitalia: aedeagus as in Figs. 42, 43.

Holotype ♂, Mexico: Buenos Aires, 10 miles W. of La Ciudad, Durango, 9,000 ft, 16. vi. 64; paratypes: 1 ♀, same data; 1 ♀, 24 miles W. of La Ciudad, 7,000 ft, 8. vii. 64 (all MCALPINE). Holotype and one paratype in Canadian National Collection, one paratype in author's collection.

Remarks. Differences in the genitalia of this species and *trispinella* are slight but in association with the colour differences of the two, clearly indicate speciation which may be relatively recent.

Genus *Phytoliriomyza* HENDEL

A new species from Mexico is described below.

Phytoliriomyza mexicana spec. nov.

Head: frons appearing *roughened* by minute spinules, orbits slightly projecting above eye in profile; 2 *ors*, the upper slightly stronger, 1 strong *ori*; orbital setulae sparse, proclinate; eye conspicuously slanting, bare; jowls broad, deepest at rear, 1/3 height of eye; third antennal segment rounded, slightly longer than broad; arista distinctly pubescent.

Mesonotum: 3 + 1 *dc*, *acr* sparse, in 2 rows.

Wing: length in male 1.9 mm; discal cell small, last section of m_{3+4} 2 1/2 times length of penultimate.

Colour: frons brownish-yellow; jowls and face dull yellowish; all antennal segments yellowish-brown; mesonotum and scutellum uniformly brownish-grey; lower area of humerus and upper half of mesopleura and pteropleura dull yellow-white, otherwise grey; legs: fore-coxae yellow, femora, tibiae and tarsi largely brown but with yellowish undertone; halteres yellowish but knob brown above.

Male genitalia: aedeagus asymmetrical, as in Fig. 44; ejaculatory apodeme minute, with blade little more than linear; ninth sternite with narrow sidearms, rounded at end; surstylus large, with a fringe of hairs along inner margin, hind-corner epandrium with a group of bristles (Fig. 45).

Holotype ♂, Mexico: Popocatepetel, N. Slope, 13,000 ft, 11. viii. 54 (CHILLCOTT), in Canadian National Collection.

Remarks. This species has the characteristically asymmetrical aedeagus of the *oasis* BECKER group and is the first representative of this group confirmed in North America, (although it appears that *P. floridana* SPENCER, 1973, in SPENCER & SRENGMATER 1973: 114 also belongs here). *P. oasis* is known from the Mediterranean area and S. Sweden (SPENCER 1976a: 300), *P. immoderata* SPENCER, 1963a was described from South Africa, a new species has recently been confirmed in Nepal (SPENCER 1977a) and two species, *striatella* SPENCER, 1977c and *tricolor* MALLOCH (cf. SPENCER 1977c: Figs. 275–281) have recently been confirmed in Australia. Among North American species it most closely resembles *arctica* LUNDBECK (cf. SPENCER 1969a: 202) and examination of male genitalia may be necessary for a positive identification.

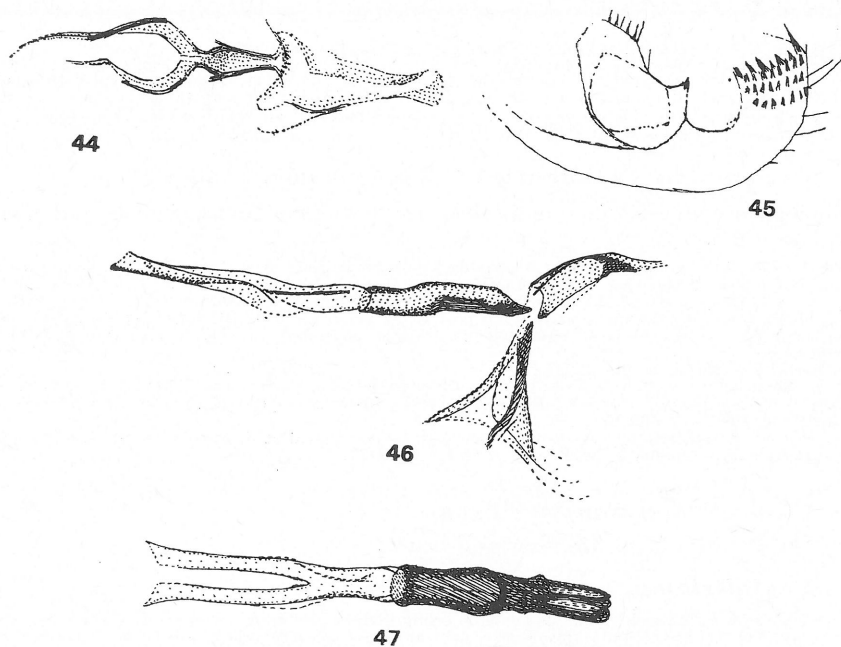
This species, or its immediate ancestors, has clearly reached North America from Asia via Beringia and provides a clearer picture of the origin of the two Australian species. I consider that the focus of speciation of this group, as with many others, was the Himalayan range in mid- to late Tertiary, with dispersal westwards to Europe and thence to North and South Africa; north-eastwards to Beringia and North America; and southwards to reach Australia.

At 13,000 ft, this is the highest altitude known for any species in this genus, although *arctica* is known from 12,000 ft in Bolivia.

Genus *Calycomyza* HENDEL*Calycomyza gigantissima* SPENCER, 1959

The aedeagus of the holotype from the Congo is shown in Figs. 46, 47. This species is also known from South Africa: East London, 1 ♂, 26. iv. 24 (MUNRO) and Pretoria, 1 ♀, 3. xii. 61 (K. A. S.). The aedeagus of the male from East London agrees in structure with that of the holotype but the paired distal tubules do not lie horizontal but are directed upwards at an angle of 45°.

This species is clearly related to *C. flavomaculata* (SPENCER, 1960) from Spain, of which the aedeagus was illustrated by SPENCER 1972: Fig. 3, and to *C. gigantea* FRICK from North America (cf. SPENCER 1969a: Fig. 262).



Figs. 44, 45. *Phytoliriomyza mexicana* spec. nov.: 44, aedeagus; 45, surstylus and epandrium
Figs. 46, 47. *Calycomyza gigantissima*: 46, aedeagus, side view; 47, distiphallus, ventral view

Genus *Liriomyza* MIK

1. A striking new species from Mexico

Liriomyza antiquaria spec. nov.

Head (Fig. 48): frons broad, 3 times width of eye, very conspicuously projecting above eye, increasingly so in front; 5 strong, equal orbital bristles, all largely incurved; orbital setulae minute, sparse, limited to a few below lower *ori*; lunule raised, almost at right angles to plane of upper frons, from midpoint frons rising up to upper margin of lunule; jowls angular, extended at rear, slightly more than 2/3 height of eye, cheeks forming broad ring below eye; third antennal segment unusually small, round; very high epistoma present, almost equal to depth of jowl at lower corner.

Mesonotum: 3 + 1 normal *dc*; *acr* numerous, in some 6 rows extending almost to margin of scutellum; hairs in intra-alar area extending almost to level of 1st *dc*.

Wing: length in male 3.4 mm; discal cell large and last section of m_{3+4} only 1 1/2 times length of penultimate.

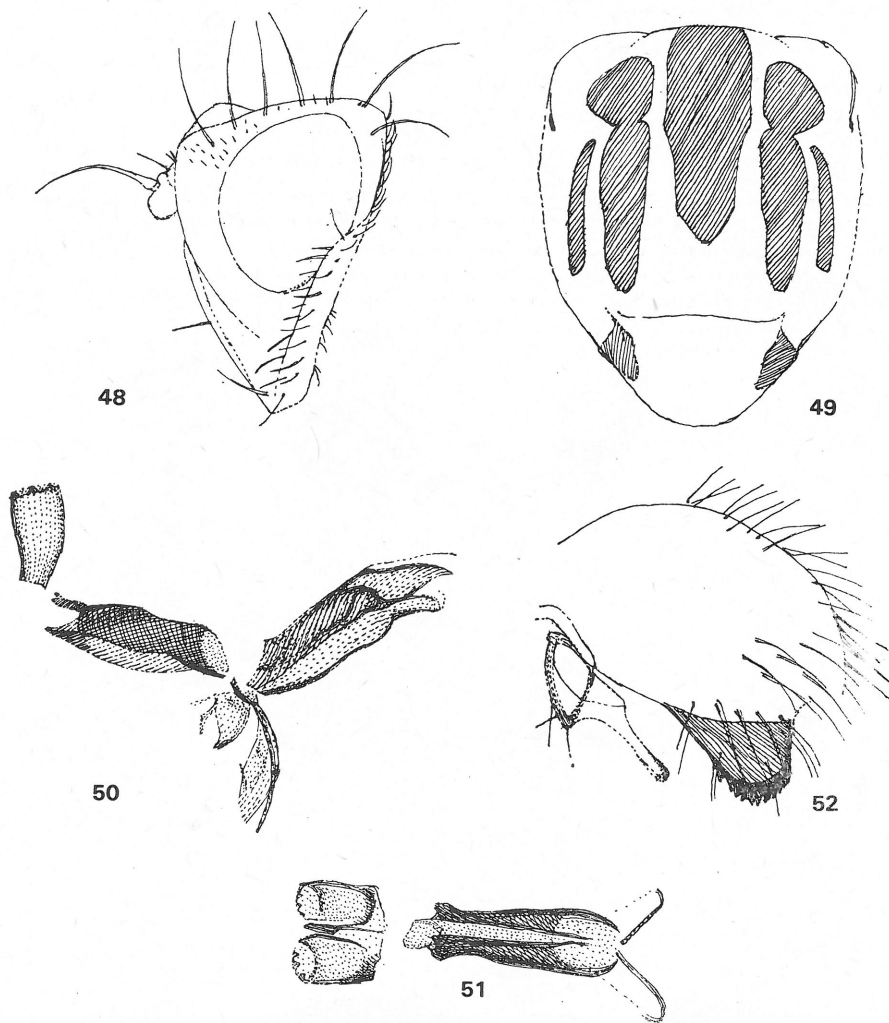
Legs: no lateral bristles on mid-tibiae but stridulating mechanism clearly present.

Colour: head dull yellow, including antennae, palps and entire hind-margin of eye, frons slightly darkened in front; mesonotum with yellow background but with five clearly-defined black bands (Fig. 49); scutellum largely bright yellow but with small black patches laterally; thorax largely yellow, with mesopleura black on lower half; legs: femora yellow but black at base and with variable dark striations extending forwards, tibiae and tarsi yellowish-brown, darker on p_2 and p_3 ; abdomen with tergites black in front and yellow hind-borders; squamae pale grey, margin and fringe black; halteres yellow.

Male genitalia: aedeagus as in Figs. 50, 51; ejaculatory apodeme small, with triangular blade and shallow, bowl-shaped base; surstyli discrete, small, with blunt spine at end, hind-margin of epandrium with a group of short but stout black spines (Fig. 52).

Holotype ♂, Mexico: 10 miles W. of El Salto, Durango, 9,000 ft., 19. vi. 64 (McALPINE), in Canadian National Collection. Remarks. In the author's key to Canadian *Liriomyza* species (SPENCER, 1969 a: 164) *antiquaria* runs to *conspicua* SEHGAL in couplet 10; however, in *conspicua* the black of the mesonotum is solid, not divided into bands, and the male genitalia (SPENCER 1969 a: Figs. 295, 296) show that the two species are not related.

L. antiquaria is clearly an ancient, possibly relict, species which has survived in isolation in the high Mexican mountains. The large size and strongly projecting frons are accepted as primitive characters. The patch of bristles at the hind-corner of the epandrium are particularly significant; they represent an important generic character in the genus *Calycomyza* HENDEL and are retained in some species of *Phytoliriomyza*. I believe they can be considered as a ground-plan character of this group of genera.



Figs. 48—52. *Liriomyza antiquaria* spec. nov.: 48, head; 49, mesonotum; 50, aedeagus, side view; 51, distiphallus, ventral view; 52, surstylus and epandrium

2. Clarification of *Phytobia* (*Praspedomyza*) *cisti* SPENCER, 1960

This species was caught on *Cistus crispus* LINNAEUS at Tibidalo, in the hills above Barcelona. The scutellum is entirely black and the species was thus placed in *Phytobia*

(in the sense of FRICK 1952). Illustrations of the head and wing were given by SPENCER (1960: Fig. 2).

Re-examination of the male genitalia shows that *cisti* is in fact a *Liriomyza*, related to *pseudopygmina* HERING, 1933 (= *sisymbriacaulis* HERING, 1962, cf. SPENCER, 1976a: 262 and to *alyssi* HERING, 1960, cf. SPENCER 1974: 147). Confusion in the generic placing of these *Liriomyza* species with the scutellum black was inevitable, before their correct status became apparent from study of their genitalia.

I am now satisfied that *cisti* in fact represents *xanthocera* CZERNY, which was also described from Spain. Unfortunately only two females are known. The close relationship of *xanthocera* to *alyssi* was pointed out by SPENCER (1974: 149). The full synonymy of *xanthocera* is thus as follows:

***Liriomyza xanthocera* (CZERNY, 1910), comb. nov.**

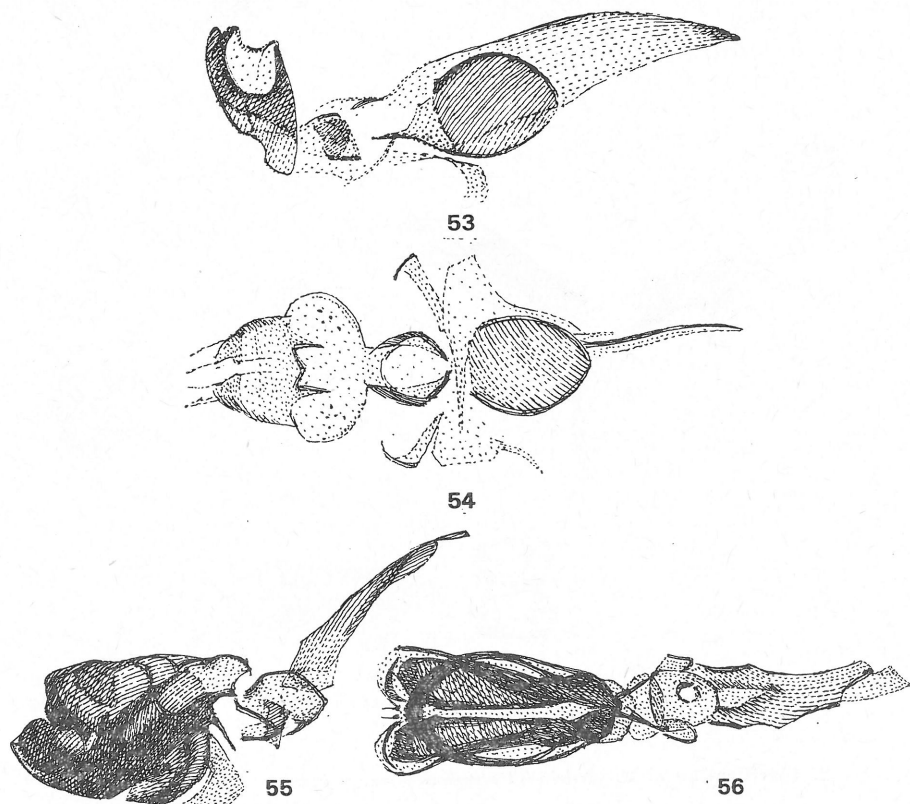
Agromyza xanthocera CZERNY, 1910: 263

Dizygomyza xanthocera HENDEL, 1920: 133

Dizygomyza (Praspedomyza) xanthocera HENDEL, 1931: 35

Phytobia (Praspedomyza) cisti SPENCER, 1960: 377, **syn. nov.**

The aedeagus of the holotype of *cisti* is shown in Figs. 53, 54. The similarity with that of *pseudopygmina* (SPENCER, 1976a: Figs. 465, 466, illustrated from a paratype of *sisymbriacaulis*) is unmistakable. I now consider that *alyssi* HERING is doubtfully distinct from *pseudopygmina* but I am unable to investigate this further at the present time. It seems reasonably certain that the series of *cisti* caught on *Cistus* were not feeding but merely resting on the plants.



Figs. 53, 54. *Liriomyza xanthocera*: 53, aedeagus, side view; 54, same, ventral view (both holotype of *cisti*)
Figs. 55, 56. *Pseudonapomyza* spec. nov. (India): 55, aedeagus, side view; 56, same, ventral view

Genus *Pseudonapomyza* HENDEL

I have recently examined specimens from several localities in Gujarat State, India which externally appear indistinguishable from *asiatica* SPENCER, 1961a, which occurs widely in the Oriental Region as a leaf-miner on a number of grasses. However, the male genitalia confirm that this is a further new species in this large complex (cf. SPENCER 1973b: Figs. 393–437). The aedeagus is shown in Figs. 55, 56. The formal description is being prepared and published in India by Prof. PATEL of the Gujarat Agricultural University.

Genus *Phytomyza* FALLÉN

1. Clarification of *Phytomyza medicaginis* HERING, 1925

HERING (1925) described *Phytomyza medicaginis* as a leaf-miner on *Medicago sativa* LINNAEUS. No details of the mines were given, as the single specimen was reported to have emerged from a batch of mines which primarily represented *Agromyza frontella* RONDANI. This species has never been found again and now after nearly 50 years it has been possible to establish that this "species" was merely a result of a mix-up in breeding records which has been reconstructed from data of relevant specimens and a study of HERING's 1922 collecting diary.

In the summer of 1922 HERING spent some weeks collecting at Güntersberg/Oder in eastern Germany (now Osiecznica in Poland). On 28 August and 1 September mines were found on *Symphytum officinale* which produced flies on 4 and 30 September. HENDEL's description of *symphyti* is based on these specimens but the description was delayed for 13 years until 1935. NOWAKOWSKI (1959: Fig. 20) illustrated the genitalia of a paratype of this species.

On 30 August HERING found mines on *Medicago sativa* from which he bred a series of *Agromyza frontella* (RONDANI). Among this series he records that a single *Phytomyza* emerged on 26.iii.23 which he described as *P. medicaginis* (HERING, 1925). This single male has been examined and it is clearly one of the series of *P. symphyti*. Such confusion in breeding records is all too easy when large numbers of specimens are being handled simultaneously.

It is not clear why HERING passed the specimens from *Symphytum* to HENDEL for description, but himself described the single male he believed to have been bred from *Medicago*. *Phytomyza symphyti* thus now represents a junior synonym of *medicaginis*. This would be a most inappropriate and misleading name for the common miner on *Symphytum* and at this time I merely draw attention to this synonymy, without formally establishing it. Perhaps some younger worker can find the time to put a case to the Zoological Commission on Nomenclature for the suppression of the name *medicaginis*, which would seem the most desirable course.

2. Clarification of two further species

Phytomyza abdita HERING, 1927

This uncommon species has hitherto only been known from the male holotype (now without its head) from Zurich, bred from linear-blotch mines on *Ajuga genevensis* LINNAEUS (Labiatae). In January, 1960 mines were abundant on a Labiate believed to be *Ballota nigra* LINNAEUS in the grounds of the Old Citadel, Istanbul. I obtained only a single female. The puparium is black, with the posterior spiracles on two widely-separated, low, conical projections, each with an ellipse of 20 or more minute bulbs.

The aedeagus of the holotype is shown in Fig. 57.

Phytomyza veronicicola HERING, 1925

This species closely resembles both *plantaginis* ROBINEAU-DESVOIDY and *tenella* MEIGEN (HENDEL 1935: 496). HERING's type series was bred from *Veronica officinalis* LINNAEUS from the Jahngebirge, Havelland (Germ. Dem. Rep.) where many southern elements are found. The only other record known to me is from Czechoslovakia (STARÝ 1930: 231).

The genitalia of the male type, herewith designated as lectotype, have been examined and the aedeagus is shown in Figs. 58, 59.

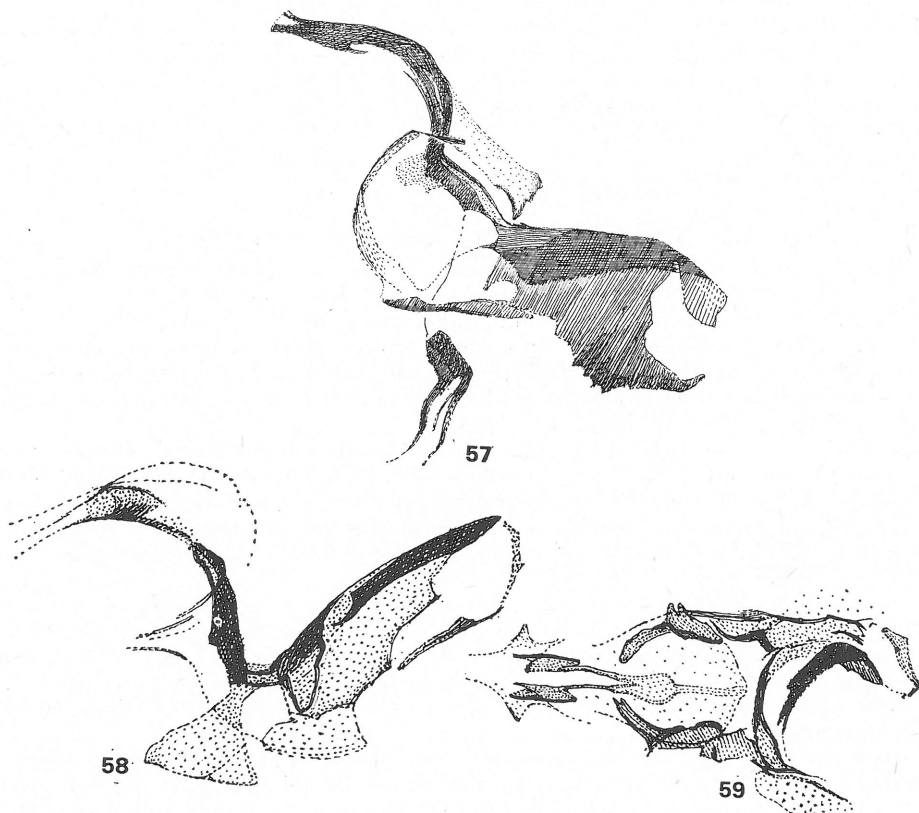


Fig. 57. *Phytomyza abdita*: aedeagus

Figs. 58, 59. *Phytomyza veronicicola*: 58, aedeagus, side view; 59, same, ventral view

Additional Records from Nigeria

Material collected by DEEMING includes a number of interesting species, with several in the genera *Ophiomyia* and *Pseudonapomyza* still undescribed. *Phytobia nigeriensis* spec. nov. is described above and records are now given of five further species.

Melanagromyza nigrimaculata SPENCER, 1959: 282

Zaria, 4 ♂♂, 26. ix. 71; Niger Prov., Mokwa, Zugurma, 2 ♂♂, 29. vii. 71. Previously known in Nigeria only from single specimen from Ibadan; also present in Congo and Uganda.

Agromyza penniseti SPENCER, 1959: 248

Zaria, Samaru, 1 ♂, 1 ♀, ex *Pennisetum pedicellatum*, 2. ix. 70. Previously known in West Africa from Cameroons and Senegal.

Agromyza ? spec. nov., near *intermittens* BECKER, 1907: 406

24 miles from Zaria on Jas road, 1 ♀, emerged 22. v. 68 ex larva coll. on millet, 7. v. 68 (LANGHORN).

Cerodontha (*Cerodontha*) nr. *abyssinica* SPENCER, 1961b: 420

Mambilla Plateau, Ngel Nyaki, "overgrown cocoyam plots in village", 6 ♂♂, 28. xi. to 3. xii. 68. The aedeagus in this population differs slightly from that of the type series

from Ethiopia. A species accepted as *abyssinica* is widespread in South Africa (SPENCER 1963a: 112) but unfortunately no males are known.

Pseudonapomyza matopi SPENCER, 1965b: 269

Zaria, Samaru, 1 ♂, 1 ♀, 6 and 13. ii. 66. Previously only known from male types from Rhodesia.

Summary

Sixteen new species from North and South America, West and South Africa and from India and Pakistan are described; two new synonymies are established and a new subgenus in *Amauromyza* is proposed. In addition, holotypes of 4 species are clarified with drawings of the male genitalia and notes with drawings are given on 5 further species. Five species collected in Nigeria are recorded.

Zusammenfassung

Sechzehn neue Arten aus Nord- und Südamerika, West- und Südafrika, Indien und Pakistan werden beschrieben, zwei neue Synonymien festgestellt, und es wird eine neue Untergattung bei *Amauromyza* vorgeschlagen. Außerdem werden die Holotypen von vier Arten mit Zeichnungen der Genitalien des Männchens geklärt und Mitteilungen mit Zeichnungen zu fünf weiteren Arten gemacht. Fünf Arten werden mit Funden in Nigeria verzeichnet.

Резюме

Описываются 16 новых видов Северной и Южной Америки, Западной и Южной Африки, а также из Индии и Пакистана. Были определены 2 новые синонимии, и предлагается новый подрод *Amauromyza*. В дальнейшем описываются голотипы 4 видов на примере рисунков мужских гениталий. Относительно 5 других видов приводятся замечания и даются рисунки. 5 видов, собранных в Нигерии, были зарегистрированы.

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Besprechungen

Hentschel, E. & Wagner, G. Tiernamen und zoologische Fachwörter unter Berücksichtigung allgemein-biologischer, anatomischer und physiologischer Termini. VEB GUSTAV FISCHER VERLAG, Jena. 1976; 507 S. Preis 14,00 M.

Dieses Taschenwörterbuch macht mit seinen über 10000 Begriffen mit der zoologischen Terminologie und Nomenklatur bekannt. Sehr zu begrüßen ist eine Einführung in die Terminologie und Nomenklatur vor dem lexikalischen Hauptteil. Sie geht aus von einer Einteilung der Zoologie, behandelt Herkunft und Entwicklung der zoologischen Fachsprache, die philologischen Grundlagen der Terminologie, die Grundlagen und Prinzipien der taxonomischen Nomenklatur, die Symbole und Abkürzungen. Dem Hauptteil, der Erklärung von Tiernamen und zoologischen Fachwörtern folgen Verzeichnisse der deutschen Namen, der Autorennamen, der Literatur und eine Übersicht über das zoologische System bis zu den Unterordnungen. — Allen Zoologen, die der griechischen und lateinischen Sprache nicht mächtig sind, wird der Abschnitt über die philologischen Grundlagen der Terminologie eine gute Hilfe sein, gibt er doch Auskunft über die Schreibweise und Transkription von Buchstaben, über Betonung, Silbentrennung und die wichtigsten Prä- und Suffixe in Komposita. Im Hauptteil sind die Wörter alphabetisch angeordnet, jedem Wort folgt das griechische oder lateinische Stammwort, danach die Bedeutung der Termini. Natürlich kann ein Taschenwörterbuch nur eine Auswahl der zoologischen Nomina enthalten. Ob eine solche Auswahl repräsentativ ist, wird stets Anlaß zur Diskussion sein. Jeder Zoologe wird es von seiner Warte aus sehen. Mein Vorschlag wäre, solche Anregungen an die Autoren weiterzuleiten, die, dessen bin ich sicher, davon bei der 2. Auflage gern Gebrauch machen werden.

ROHLFEN

Opler, P. A. Biology, ecology, and host specificity of Microlepidoptera associated with *Quercus agrifolia* (Fagaceae). University of California Publications in Entomology, vol. 75. UNIVERSITY OF CALIFORNIA PRESS, Berkeley-Los Angeles-London. 1974; 17,5 × 25,9 cm; 83 S., 7 Taf., 39 Fig. Preis 5,25 U.S.\$.

An *Quercus agrifolia* wurden im Untersuchungsgebiet (Pazifikküste des US-Staates California) 35 Mikrolepidopteren-Arten festgestellt. Die Biologie jeder Art wird ausführlich behandelt, die einzelnen Entwicklungsstadien werden beschrieben. Ein gesondertes Kapitel ist den Adaptationen der Lebenszyklen der Arten gewidmet, ein weiteres behandelt die unterschiedliche Wirtsspezifität der einzelnen Arten. Untersuchungen zur Evolution der Fagaceae und der Mikrolepidopteren ergaben keine Coevolution. Die vorliegende Monographie ist ein gutes Beispiel dafür, wie und in welchem Umfang Untersuchungen über den Schädlingsbestand einzelner Pflanzenarten oder -gruppen gemacht werden müssen, um fundierte Ergebnisse zu erhalten.

GAEDIKE

Proceedings of the First International Symposium on Trichoptera. Lunz am See (Austria), September 16–20, 1974. (Editor: H. MALICKY). Dr. W. JUNK B. V. PUBLISHERS, The Hague. 1976; 4°; XIII + 213 S., 71 Abb., 12 Tab. Preis 70,00 Hfl.

Die Erforschung der aquatischen Insekten hat in den letzten Jahrzehnten im Weltmaßstab einen beachtlichen Aufschwung genommen. Diese positive Entwicklung manifestiert sich unter anderem im Erscheinen spezieller Referateorgane („Eatonia“ für Ephemeroptera, „Perla“ für Plecoptera, „Odonatologica“ und „Trichoptera Newsletter“) sowie in der Durchführung internationaler Symposien. — Eine Zusammenkunft der Trichopteren-Spezialisten der Welt hatte bislang noch nicht stattgefunden. Das I. Trichopteren-Symposium in Lunz am See stellt somit ein Novum in der Geschichte der Entomologie dar, das sich sicher positiv auf die weitere Entwicklung der Trichopterologie auswirken wird. — An der Tagung nahmen 39 Spezialisten aus 18 Ländern teil. In fünf Sektionen (Systematik und Evolution, Zoogeographie, Ökologie, Morphologie und Ethologie) wurden 31 Vorträge in englischer, französischer und deutscher Sprache gehalten. — Neben zusammenfassenden Beiträgen über den jeweiligen Forschungsstand und die Verbreitung der Trichopteren in den einzelnen tiergeographischen Regionen (FLINT: Neotropis), einzelner Gebiete (NEBOISS: Tasmanien; BOTOSANEANU: Karpatobalkanischer Raum; MALICKY: Ostmediterrane Inseln) oder Länder (BADCOCK: Hydropsychidae in Großbritannien; MARINKOVIC-GOSPODNETIC: Gattung *Drusus* in Jugoslawien) standen Vorträge zur Systematik (ROSS: Helicopsychidae Neukaledonien; WIGGINS: Beschreibung der Jugendstadien und des ♀ von *Goereilla baumannii*; VAILLANT: Zur Kenntnis einiger Philopotamidae Frankreichs; HILEY: Bestimmbarkeit der britischen Limnephiliden- und Sericoatomiden-Larven), der Phylogenie (SMITH: Phylogenie der *Rhyacophila*-Larven) sowie der Ökologie (BOUVET: Höhlenbewohnende Trichopteren aus der *Stenophylax*-Gruppe; MORETI et al.: Trichopteren-Population in einem temporären Ökosystem in den Umbrischen Apenninen/Italien; JONES: Emergenz und Entwicklung von *Tinodes waeneri*; WALLACE: Entwicklung und Nahrung der nordamerikanischen *Macronema*-Larve/Hydropsychidae; CRICHTON: Trichopteren-Fang mittels Lichtfallen in Großbritannien; NIELSEN: Ergänzungen zu seiner Arbeit von 1942 über die „Quelltrichopteren Himmerlands“; RESH: Veränderungen innerhalb der Trichopteren-Fauna des Erie-Sees und des Rock-Flusses im Verlaufe von über 50 Jahren) im Vordergrund des Interesses. Außerdem wurde unter anderem über das Köcherbauverhalten einzelner Arten (HANSELL und desgleichen SMART: *Lepidostoma hirtum*; ZINTL: *Potamophylax latipennis*), über die Osmoregulation bei Trichopteren-Larven (WICHARD) sowie über die funktionelle Morphologie der Genitalien (STATZNER: Cheumatopsyche/Hydropsychidae) gesprochen. — Diese Vorträge einschließlich der Diskussionsbeiträge, die einen repräsentativen Querschnitt der gegenwärtigen Aktivitäten auf dem Gebiet der Trichopteren-Kunde vermitteln, liegen jetzt in gedruckter Form vor. Der recht ansprechende Band zeigt auf der Rückseite des Frontispiz 36 Teilnehmer im Bild, die auf der folgenden Seite an Hand numerierter Vignetten namhaft gemacht werden. Danach schließen sich das Inhaltsverzeichnis, die Einleitung, ein Adreßverzeichnis der Teilnehmer, das durch einige weitere Photos von Köcherfliegen-Spezialisten ergänzt wird und der Hauptteil des Bandes mit den Fachbeiträgen an. Ein alphabetischer Autorenindex sowie ein Sachregister beschließen den Symposiumsbericht.

JOOST