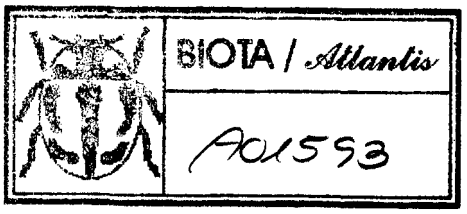
The Anthomyiidae (Diptera) of the Canary Islands

VERNER MICHELSEN and MARCOS BAEZ"



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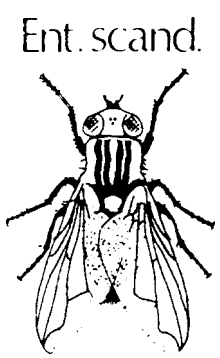

The Anthomyiidae (root-maggot flies) of the Canaries are revised. Altogether 24 species in 9 genera are recorded. Four species are described as new, viz. *Pegomya canariensis*, *Anthomyia confusanea*, *Leucophora canariensis* and *L. subsponsa*. In addition, *Pegomya lateropunctata* sp. n. is described from Madeira. *Pegomya suaedivora* Hering (type locality: France) is synonymized with *P. suaedae* Hering (syn. n.). *Delia cilitarsis* Hennig is regarded a distinct species, not a subspecies of *D. platura* (Meigen). A key to males and females is provided.

Local distribution of the species. both ecological and geographical. is considered. and the anthomyiid fauna of the other Macaronesian archipelagos is reviewed.

The origin of the Canarian anthomyiid fauna is discussed. The species all seem to be descended from the fauna of the Mediterranean subregion and can be regarded either as (1) introduced. (2) indigenous. or (3) endernic to the Canaries. Apparently endemic Canarian species are *Pegomya canariensis* sp. n., *P. vittithorax* (Stein). *Hylemya latevittata* Stein, *Leucophora canarierisis* sp. n.. *Delia carinrierrsis* Hennig and *D. cilitarsis* Hennig.

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The Canarian archipelago consists of seven vulcanic main islands sitiiated 90–380 km off the coast of southern Morocco. The climate is warm-temperate, and as a result of the strong oceanic influence has mean temperatures inuch below those on the adjacent African continent. The warmest and driest climate is found on Lanzarote and Fuerteventura, closest to the continent; rainfall is here about 140 mm/year but increases westwards to 585 mm/year on the most remote island, La Palma.

The Canaries were built up by lava shields during the Miocene-Pliocene. Finds of leaf impressions and dolomitized trees on Gran Canaria date back to the Lower Pliocene, and very likely the archipelago was extensively colonized by plants and animals in the Miocene. A remarkable richness of endemic species in the present biota of the Canaries in combination with the relict occurrence of an evergreen laurel forest community (the laurisilva; now largely destroyed by man) indicate that a stable environment has persisted there since the Tertiary. The laurisilva represents a now virtually extinct wet Mediterranean climax flora which occupied the Tethyan region 40–15 million years ago.

The Anthomyiidae largely occupy colder climatic zones. Thus we did not expect to find Tertiary relict species during the present study, because any intrusion of species on the Canaries would be unlikely prior to the end of the Tertiary epoch, when a colder and drier climate led to the development of the modern Mediterranean biota on the adjacent continents.

Systematic treatment

Generic concepts employed in the following deviate from those of Hennig (1966–1976) as follows: *Anthomyia* Meigcn (syns: *Craspedochoeta* Mac-

*The responsibility for this manuscript is as follows:
V.M.: taxonomy and identifications, writing-up of manuscript.
M.B.: collection of species, local distribution and ecology data.

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quart. *Chelisia* Rondani); *Botanophila* Lioy (syn: *Pegohylemyia* Schnabl); *Adia* Robineau-Desvoidy (syn: *cinerella* group of *Paregle* Schnabl).

The first record of Anthomyiidae from the Canaries dates back to Macquart (1839). He listed four species, three of which can today be recognized as *Anthomyia quinquemaculata* Macquart, *Hylemya latevittata* Stein and *Delia ciliatarsis* Hennig. Bigot (1891) added *Adia cinerella* (Fallén). The more important contributions of the present century are those by Stein (1908), Hering (1927), Frey (1937), Hennig (1966–1976) and Báez (1979, 1982). A posthumous work by the first entomologist of the Canaries, Elías Santos Abréu (1856–1937), which deals with the present families Fanniidae, Anthomyiidae and Muscidae, was published in 1976. This work is seriously outdated and should preferably never have been published. Santos Abréu's collection is presently the property of the late Mr E. Santos Pinto's family, La Palma. The collection was examined by M. Báez some years ago and found partly destroyed by insect pests.

The present study showed that the following species of Anthomyiidae, which from time have been recorded from the Canaries, are based upon misidentifieations and should be deletcd from the Canarian list:

Pegomya hyoscyami (Panzer, 1809)
Anthomyia imbrida (Rondani, 1866)
A. liturata (Robineau-Desvoidy, 1830) (syn: *pullula* Zetterstedt)
A. pluvialis (Linnaeus, 1758)
A. procellaris (Rondani, 1866)
Hylemya variata (Fallén, 1823)
Fucellia fucorum (Fallén, 1819)
Botanophila fugax (Meigen, 1826)
Egle ciliata (Walker, 1549) (syn: *muscaria* auct., nec Fabricius)
Leucophora sponsa (Meigen, 1826)
Delia albula (Fallén, 1823)
D. florilega (Zetterstedt, 1845)

We have not been able to check the records of "*Anthomyia muscaria*" (Macquart 1830: 117, "Canaries") and "*Egle muscaria*" (Santos Abréu 1976: 38, La Palma, Tenerife), but it is unlikely that a species of *Egle* Desvoidy is involved. Santos Abréu (1976: 49) further recorded *Anthomyia monilis* (Meigen, 1826) (as "*Chelisia monilis* Rond."), but this is merely an error for *Fannia monilis* (Haliday, 1838) [Fanniidae].

The following revision of Canarian Anthomyiidae is primarily based upon a collection of some 650 specimens made by M. Báez in 1973–84. Supplementary material in the British Museum (Natural History), London (BMNH); Muséum National d'Histoire Naturelle, Paris (MNHN); Museum für Naturkunde der Humboldt-Universität, Berlin (MNHU); and the Zoological Museum, University of Copenhagen (ZMUC) has also been inspected. Other relevant material from the Mediterranean area has been borrowed from the Department of Zoology, Tel Aviv University (DZTU).

If not stated otherwise, the material examined was collected by M. Báez, and is deposited in coll. Báez, La Laguna, Tenerife, with some duplicates in ZMUC.

1. **Pegomya canariensis** Michelsen, **sp.** n.

Figs. 1–5.

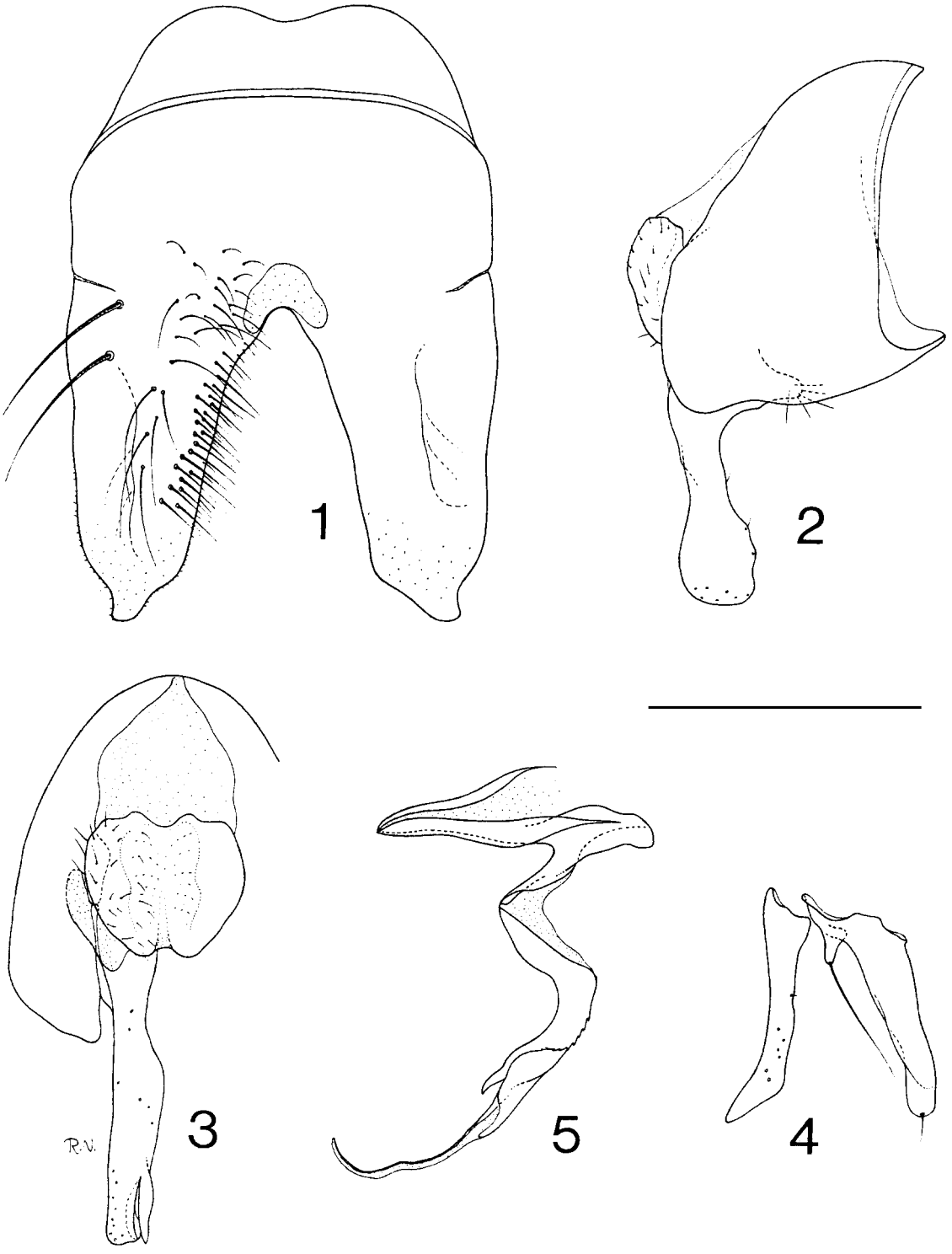
Type material. Holotype ♂, CANARY ISLANDS: HIERRO: Frontera, 1.ii.1978, M. Báez (coll. Báez). — Paratypes: TENERIFE: Bco. San Andrés, 1♂ 16.i.1977, **M.** Báez. Icod, 2♂ 12.iv.1976, M. **Báez.** In coll. Báez and ZMUC.

Diagnosis. ♂. Black, sparsely dusted with grey and **dark** brown; antenna, palpus and legs fuscous brown to black; prernentum polished black. Prealar shorter than *p* notopleural. Vein C setulose in *v* face, bare on *d* face. Hind tibia with 2 *pd* bristles. Tergite VI bnre.

Description

MALE. Black, thinly diisted with grey and dark brown. Antenna blaek; palpus black with fuscous brown basal part; prementum virtually without dust, shiny black. Thorax and abdomen with distinct sheen. Mesonotum in dorsal view rather uniformly brownish black, in hind view appearing lighter brown with traces of darker stripes. Wing tinged with dark brown, calyptrae more faintly tinged with brown; haltere yellow. Legs black. Abdomen dorsally dusted as mesonotum, in hind view with narrow median black stripe.

Face short, in profile lying far behind frontal angle; parafacial downwards inflexed, about 0.7× as wide as flagellomere; gena in profile short, broad, rounded at lower margin. Upper part of frons about 1.5× width of *n* ocellus; interfrons at narrowest point of frons 2–3× as wide as each parafrontal; frons considerably widened downwards. About 6 pairs of frontals. Flagellomere about 1.7× as long as broad, rounded at apex;



Figs. 1–5. *Pegomya canariensis* sp.n.: paratype ♂, Tenerife; terminalia. —1. Sternite V. —3.3. Epandrial complex, profile and hind views. —4. Gonocoxital lobe (right)and gonostylus. —5. Phallus. —Scale: 0.34 mm.

aristal hairing extremely short. Proboscis short: palpus longer than prementum.

Mesonotum sparsely haired. without hairs between dorsocentral rows. Acrostichals not close-set, in three pairs before suture, middle pair enlarged. Lateral posthumsral strong; prealar shorter than *p* notopleural. Proepimerals 2–3. Vein C setulose throughout on *v* face. bare on *d* face.

Mid femur without *av*, with *pv* on basal half: mid tibia with 1 *ad*, 1 *pd*, 1–2 *p*. Hind femur with complete row of *av* and with *pv* on basal half only; hind tibia with 1 *av*, 2–3 *ad*. 3 *pd*.

Abdomen rather short and broad, flattened, moderately thickened behind. Tergites III–V with marginals, but without discals; tergite VI bare. Terminalia (Figs. 1–5) very distinctive.

FEMALE. Unknown.

SIZE. Wing length 4.1–4.8 mm.

Distributiori

Apparently an endemic Canarian species, known so far from the western islands of Hierro and Tenerife.

Systematic remarks

P. canariensis is seemingly most closely related to *P. provecta* (Villeneuve, 1923), a European species (♀♀ and larval biology unknown) solely recorded from France, West Germany and England (see Hennig 1973), but we have also seen material from Czechoslovakia and Denmark. Also the European *P. meridiana* (Villeneuve, 1923) may be fairly close; as a larva it attacks flowers of *Hypericum* spp. *P. meridiana* has a very peculiar, laterally compressed ovipositor; thus it would be of considerable interest to find out if this organ is similarly modified in the other two species.

2. **Pegomya cunicularia** (Rondani, 1866)

Pegomyia tristriata Stein. 1908:106 (Tenerife); Hering 1927:441 (Fuerteventura); Santos Abréu 1976: 43 (Tenerife).

[*Pegomya hyoscyami* (Panzer): Hennig 1973: 577. Misident.]

Pegomya cunicularia (Rondani): Michelsen 1980a: 302.

Material examined. HIERRO: Eshedo, 1♂ 29.i.1978, La Pena. 1♂ 27.v.1976. — GOMERA: Tecina, 1♀ 28.iii.1978. — TENERIFE: El Socorro. 1d 1.xii.1973. Pto. de la Croz. 1♀ 19.ii–5.iii.1975, A.E. Stubbs (BMNH). — FUERTEVENTURA: Cumbres Jandia. Id 15.ii.1977. La Asomada. 33 3♀ 21.ii.1980. La Oliva. 2♂ 1♀ 13.ii.1977. Pto. de la Peña. 1d 20.ii.1980. Vallebrón. 11♂ 12♀ 21.ii.1980. Vega de Rio Palmas. id 26.ii.1980. Villaverde. 1♂ 21.ii.1980. Tesjuate. 1♀ 22.ii.1980. — LANZAROTE: Haría. 1♂ 1♀ 20.ii.1979. hláguez. 1♀ 21.ii.1979. Mala. Id 21.ii.1979.

Distribiitiori and bionomics

Widely distributed in the Palearctic region.

P. cunicularia and some nearly related species are serious leaf-mining pests on spinach and beet crops, but they also attack weeds *(Chenopodium, Atriplex)*. Hering (1927) recorded *P. cunicularia* from Fuerteventura as a larval miner on *Atriplex glauca, Atriplex* sp. and *Beta procumbens.*

Systematic remarks

Two structurally identical but differently coloured forms of *P. cunicularia* occur on the Canaries. A light form (same as in the Mediterranean subregion) is found on the eastern islands (Fuerteventura, Lanzarote): mid and hind femur and most of abdomen light orange-brown in ground colour; mesonotum and abdomen pale brownish grey dusted with faint darker striping. The dark form (same as in C and NW Europe) is found in the western region of the Canaries: all femora and abdomen predominantly black in ground colour; dusting darker grey and striping on mesonotum and abdomen stronger. It remains to be demonstrated whether these colour forms are determined by climatic differences, or whether they represent regional variants. In the latter case it seems likely that the dark form was introduced to the islands quite recently.

Michelsen (1980a) showed that the Canarian taxon *P. tristriata* Stein belongs to the dark form of *P. cunicularia.*

3. **Pegomya suaedae** Hering, 1927

Figs. 6–15.

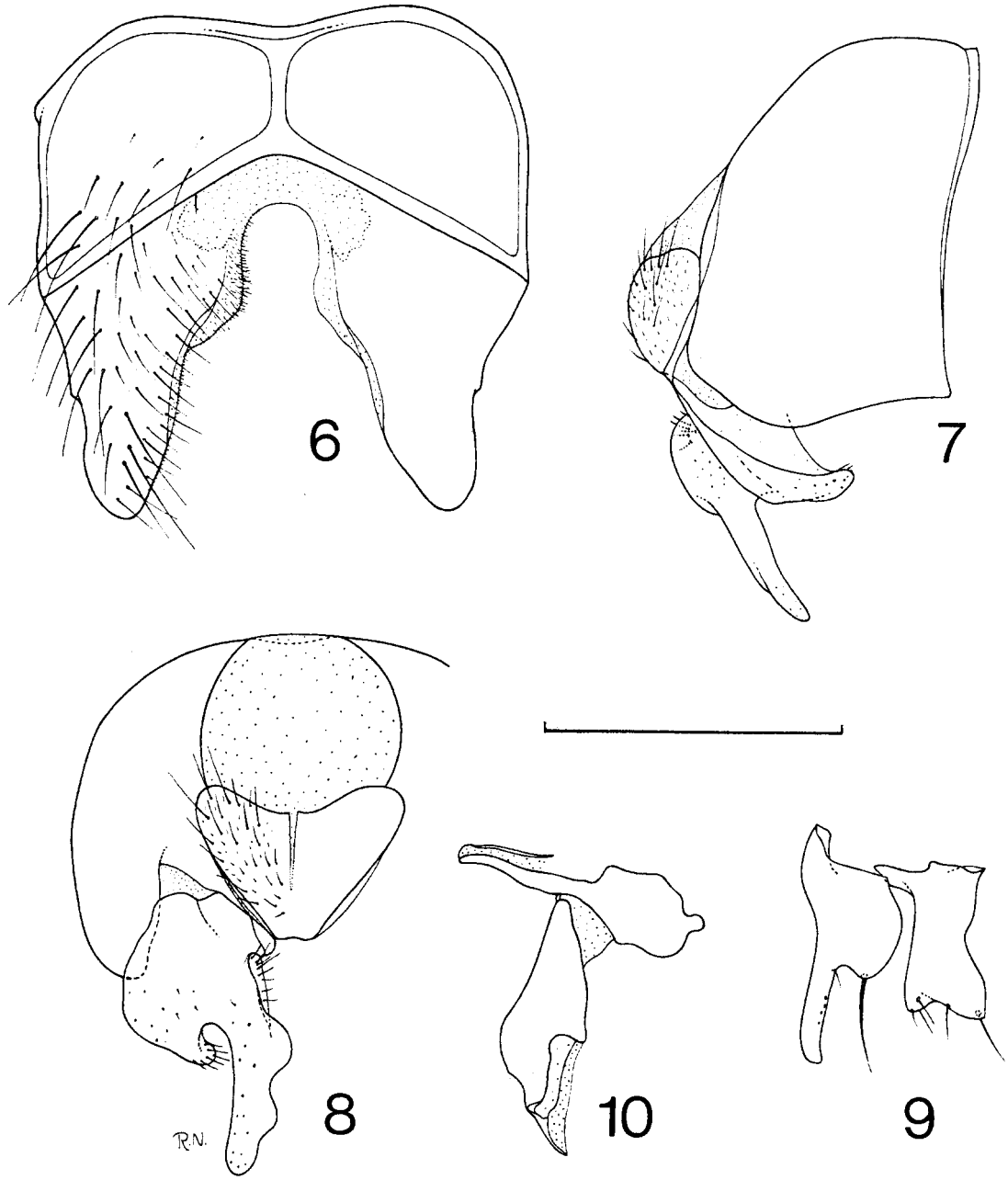
Pegomyia suaedae Hering, 1927: 412 (Fuerteventura).

Pegomyia suaedivora Hering. 1944: **43** (France). SYN. N.

Pegomya suaedivora Hering; Hennig 1973: 613.

Pegomya suaedae Hering: Hennig 1973:641; Báez 1979: 556, 1982: 260 (Fuerteventura).

Material examined. FUERTEVENTURA: Morro Jable, 1♂ 15.ii. 1977. Playa Blanca. 1d 11.ii 1977. Taralejo, 1♀ 14.ii.1977; 1♀ 19.ii.1977.



Figs. 6–10. *Pegomya suaedae* Hering; ♂, Fuerteventura; terminalia. — 6. Sternite V. — 7. 8. Epandrial cornplex. profile and hind views. — 9. Gonocosital lobe (right) and gonostylus. — 10. Phallus. — Scale: **0.34 rnrn.**

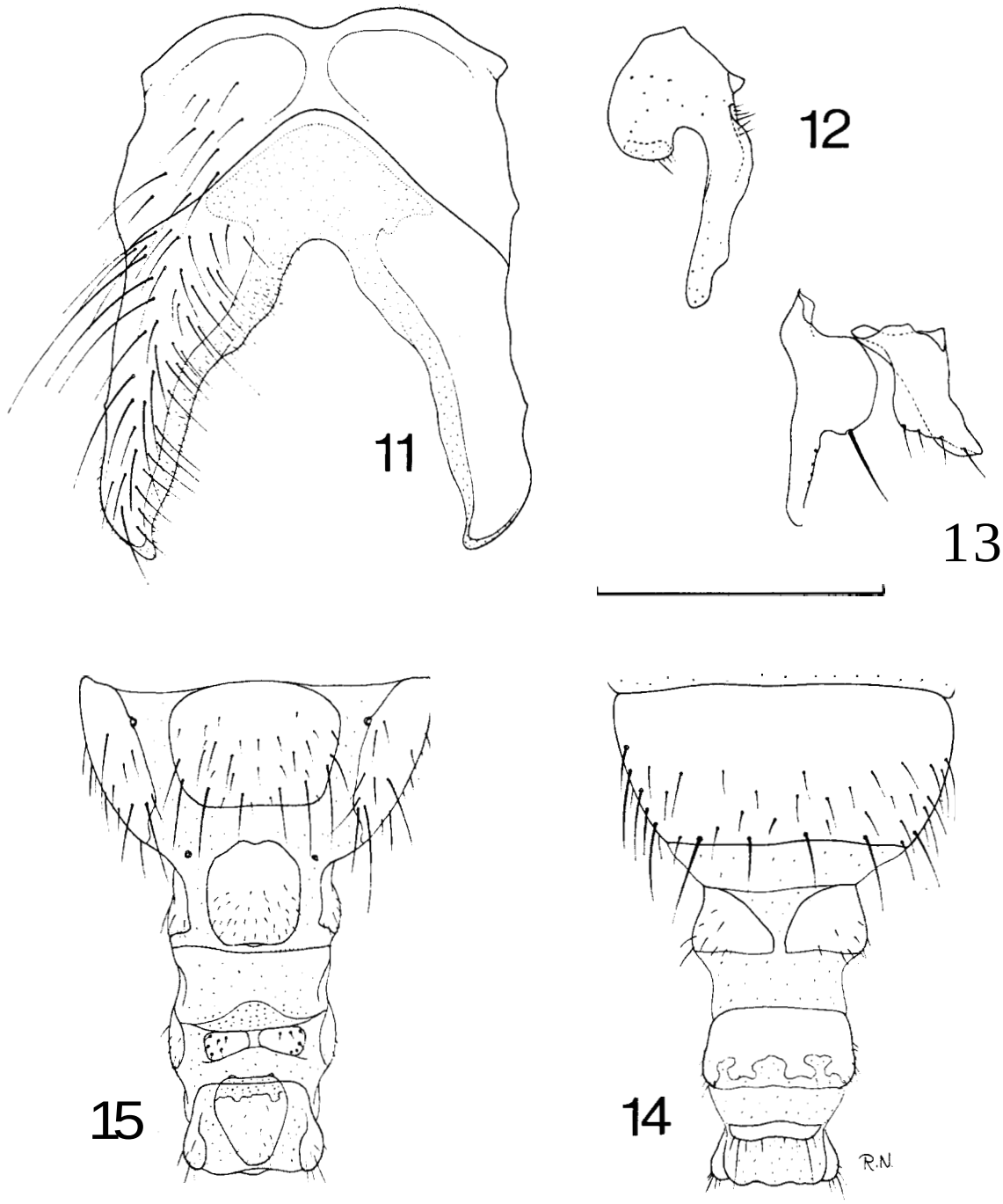
Distribution and bionomics

Known from France (see below). Spain, Tunisia, and Fuerteventura Island.

Known as a larval leaf-miner on *Suaeda fruticosa* and *Beta vulgaris*. Thus *P. suaedae* may primarily be a species associated with coastal habitats. but it is not known if the specics is also of any importance as a pest on beet crops.

Systematic remarks

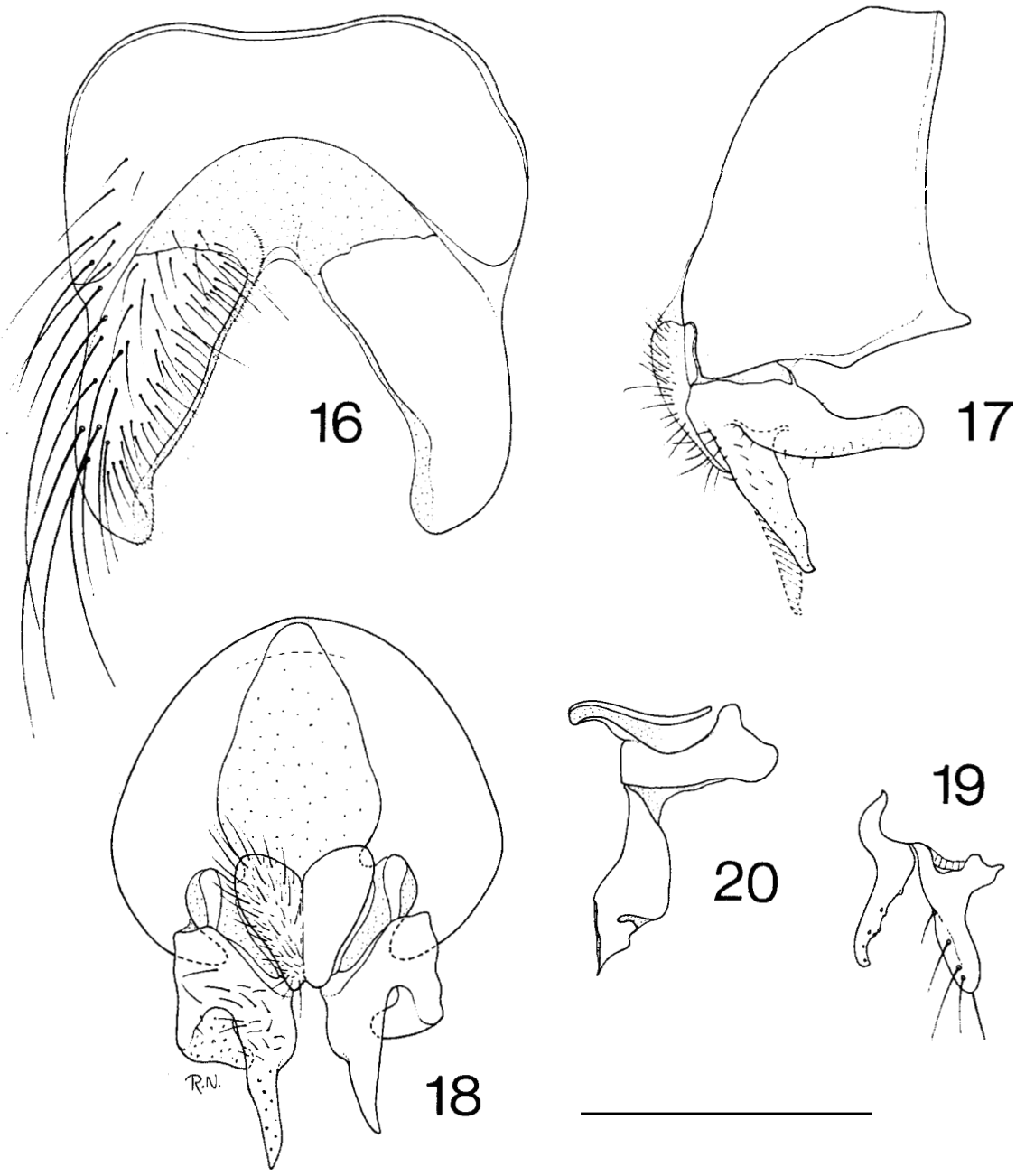
Hering (1927) described *P. suaedae* from 1♂: Fuerteventura, Pto. de Cabras, emerged 29.iii. 1926 from a larva in leaf-mine on *Suaeda fruticosa*. He stated the holotype ♂ to have all the femora yellow, whilst Hennig (1973) described both scxes from Tunisia as having mid and hind feniur largely dark. Our material of ♂♂ from



Figs. 11–15. *Pegomya suaedae* Hering. — 11–13. ♂. Spain, Almeria: terminalia. — 11. Sternite V. — 13. Left surstylus, hind view. — 13. Gonocoxital lobe (right) and gonostylus. — 14, 15. Holotype ♀ of *P. suaedivora* Herinp (France): terminalia in dorsal and ventral views. — Scale: 11–13. 0.34 mm; 14, 15, 0.5 mm.

Fuerteventura has darkened feniora like ♂♂ seen from Spain. Therefore, the difference described by Hering must be due to the teneral condition of the holotype. However, a real geographical difference in colour of the femora is apparent in ♀♀ : all yellow (Fuerteventura), or mid and hind femur mainly brownish black (Mediterranean).

Hering (1944) described *P. suaedivora* froni 1♀: France, Loire-Inf., La Baule, emerged 9.ix.1943, H. Buhr (MNHU: examined). Hennig (1973) saw thic holotype and stated that it differs froni *P. suaedae* ♀ by having yellow, dnrk-tipped

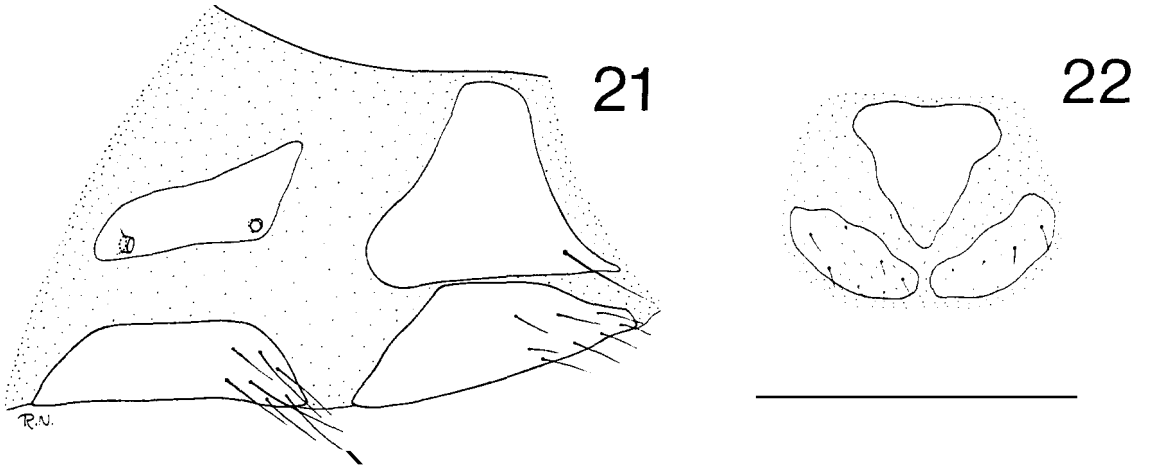


Figs. 16–20. *Pegomya vittithorax* (Stein): ♂, Fuerteventura: terrninaiia. —16. Sternite V. — 17. 18. Epandrial com-**pies,** profiie and hind views. — 19. Gonocoxital lobe (right) and gonostylus. —20. Phallus. —Scale: **0.34**mm.

femora. **A** reexamination of the holotype revealed. however. that all the femora are actually black with yellowish tips. The terminalia (Figs. **13.** 15) agree with thosc of *a* pale-legged **E** from Fuerteventura that we *esa*mined.

Thc ♂ terminalia show some (geographical?) infraspecific variation (cf. Figs. 6–10 & 11–13).

P. suaedae is most closely related to the Madeiran endemic species *P. lateropunctata* sp. n. (see below). These two species probably form the sister-group of the spinach and beet leaf-mining *P. hyoscyami* group (sec Michelsen 1980a), which is



Figs. 21. 22. *Pegomya vittithorax* (Stein); ♀, Fuerteventura: terminalia. — 21. Segments VI–VII. left lateral view. — 22. Sternite VIII. — Scale: 0.34 mm.

represented on the Canaries by two species, viz. *P. cuniciilaria* and *P. vittithorax.*

4. Pegomya vittithorax (Stein, 1908)

Figs. 16–22.

Chortophila vittithorax Stein, 1908: 108 (Tenerife).
Pegomya vittithorax (Stein); Hennig 1973: 674.

Material examined. GOMERA: Hermigua, 2♂ 9.iv. 1974. — FUERTEVENTURA: Bentancuria, 1♂ 12.ii.1977. Cumbres Jandia, 26 10 15.ii.1977. Vallebrón, 1♂ 1♀ 5.iii.1984, G. Ortega (coll. Báez). Vega de Rio Palmas, 1♂ 2♀ 6.iii.1984, G. Ortega (coll. Báez).

Redescription

Only the holotype ♀ from Tenerife, Sta.Cruz, was hitherto known of this species. The material of both sexes now available reveals that *P. vittithorax* belongs to the *P. hyoscyami* group (see Michelsen 1980a) and is possibly the sister-species of *P. betae* (Curtis, 1847) (see below). *P. vittithorax* differs from *P. betae* as follows:

MALE. Very differently coloured: Black, dusted with light greyish: mesonotum with three broad. contrasting brownish black stripes (median stripe reaching onto disc of scutellum, lateral ones extending downward to base of wing); abdomen with broad brownish black stripe surrounded by diffuse light brown dusting and interrupted posteriorly on tergite II. Antenna black. or fuscous brown on scape and pedicel; palpus black. turning brown towards base. Wing and calyptrae tinged with dark brown. Legs black. slightly brownish at knees.

Head broader and eyes larger; in consequence gena in profiie narrower, less than one-quarter eye-height. parafacial only about one-third width flagellomere, and upperfrons narrower, only 1.1–1.5× diameter of *a* ocellus and with subcontiguous parafrontalia.

Mesonotum with ground-hairing longer but finer, and sparser between dorsocentral rows and on disc of scutellum.

Hind tibia usually with only 2 *av* and longestpd not as long as hind tarsomere 1.

Abdomen shorter, with terminalia (Figs. 16–20) proportionally smaller: epandrium not projecting behind sternite VIII. Surstyli (asymmetrical) and cercal plate slightly different.

FEMALE. With striking colour pattern as in ♂, but dusted with paler whitish grey; dark stripes on mesonotum slightly narrower with median one turning brown on scutellum and lateral ones not extending to wing base; abdomen with narrower and more greyish stripe. Head orange-red in ground colour on interfrons, parafacial and gena. Wing tinged with paler brown. calyptrae whitish.

Differs structurally from *P. betae* ♀ as follows: head broader and eyes larger; thus gena in profile only about one-quarter of eye-height and parafacial narrower than flagellomere. Haustellum soinewhat thickened. Scutellum with discal hairs fewer. Terrninalia (Figs. 21. 23): tergite VI more reduced, bare: tergite VII with 1 + 1 bristle oniy: sternite VII not markedly convex: sclerites of sternite VIII smaller.

SIZE. Wing length 4.2–5.3 mm.

Distribution and bionomics

Apparently endemic for the Canaries but here occurring in both the eastern (Fuerteventura) and western (Gomera, Tenerife) region.

Larval habits unknown. However. this is certainly a leaf-mining species. and most likely on species of Chenopodiaceae.

Systematic remarks

One apomorphic trait of the ♀ terminalia. viz. the reduction of tergite VI to small lateral sclerite pieces (Fig. 21). suggests that *P. berae* (a serious pest on spinach and beet in many places of Europe) and *P. vittithorax* are sister-species. Thus it is surprising that *P. vittithorax,* apart from its colour pattern and ♀ terminalia. appears structurally more plesiomorphic than the widely distributed *P. betae.* It could be that *P. vittithorax* has just been overlooked in the Mediterranean area.

5. **Fucellia maritima** (Haliday, 1838)

Fucellia maritima (Haliday); Frey 1937: 129 p.p (Gran Canaria: teste Tiensuu 19-29: 42); Báez 1979: 556 p.p., (Tenerife, Fuerteventura, Lanzarote).
[*Fucellia fucorum* (Fallén); ?Santos Abréu 1976: 46 (La Palma. Gomera). Misident.]

Material examined. TENERIFE: La Tejita. 1♂ 1♀ 25.i.1976. Las Galletas. 1♂ 16.iii.1974. Los Gigantes, 2♂ 2♀ 13.vi.1976. Pto. de la Cruz, 1♂ 19.ii–5.iii.1975, A.E. Stubbs (BMNH). — FUERTEVENTURA: Corralejo, 1♂ 7.v.1974. Coti, 1♀ 7.v.1965, K.M. Guichard (BMNH). Playa Blanca, 1♀ 11.ii.1977. Pto. del Rosario, 1♀ 6.v.1974. — LANZAROTE: El Golfo. 3 3 3♀ 4.ix. 1976. Janubio. 1♂ 4.ix. 1976.

Distribiitiori and bionomics

Found along the coasts of W Europe and NW Africa.

This and the following species of *Fucellia* are inhabitants of the seashore. The larvae live in and seemingly feed on decaying seaweed.

6. **Fucellia tergina** (Zetterstedt, 18-45)

[*Fucellia maritima* (Haliday); Frey 1937: 12Y p.p. (La Palma. Gomera. Tenerife. Gran Canaria: teste Tiensuu 1949: 42): Santos Abréu 1976: 45; Báez 1979: 556 p.p., 1982: 260 p.p. (Hierro. Gomera, Tenerife. Fuerteventura). **hl**isident.]
Fucellia intermedia Lundbeck: Tiensuu 1949: 42.
Fucellia tergina (Zetterstedt); Hennig 1966: 21.

Material examined. HIERRO: La Restinga, 3 6 4♀ 28.v. 1976. — GOMERA: Hermigua. 1♀ 9.iv.1974. — TENERIFE: El Medano, 1♂ 19.ii–5.iii.1975, A.E. Stubbs (BMNH). Playa de San marcos. 3 3 28.iii.1974. Pto. de la Cruz. 1♂ 4♀ 19.ii–5.iii.1975, A.E. Stiibbs (BMNH); 2♀ 21–26.iv.1979. C.E. Dyte (BMNH). — FUERTEVENTURA: Villaverde. 1♀ 18.iii. 1980.

Distribiitioti

A very common. nearly cosmopolitan inhabitant of seashores.

7. **Anthomyia confusanea** Michelsen, **sp.** n.

Figs. 23–27.

[*Hylemyia pullula* (Zetterstedt); Stein 1908: 106 (Tenerife). Misident.]
[*Chortophila longula* (Fallén); Santos Abréu 1976: 36 (La Palma, Gomera). Misident.]
[*Craspedochaeta pullula* (Zetterstedt); Báez 1979: 556. Misident.]
[*Craspedochoeta pullula* (Zetterstedt); Báez 1982: 259 (Fuerteventura). Misident.]

Type material. Holotype ♂, SPAIN: CUENCA PROV., Cuenca, 1000 m, 1–2.vii.1984, V. Michelsen (ZMUC). — Paratype ♀, same data as for holotype (ZMUC).

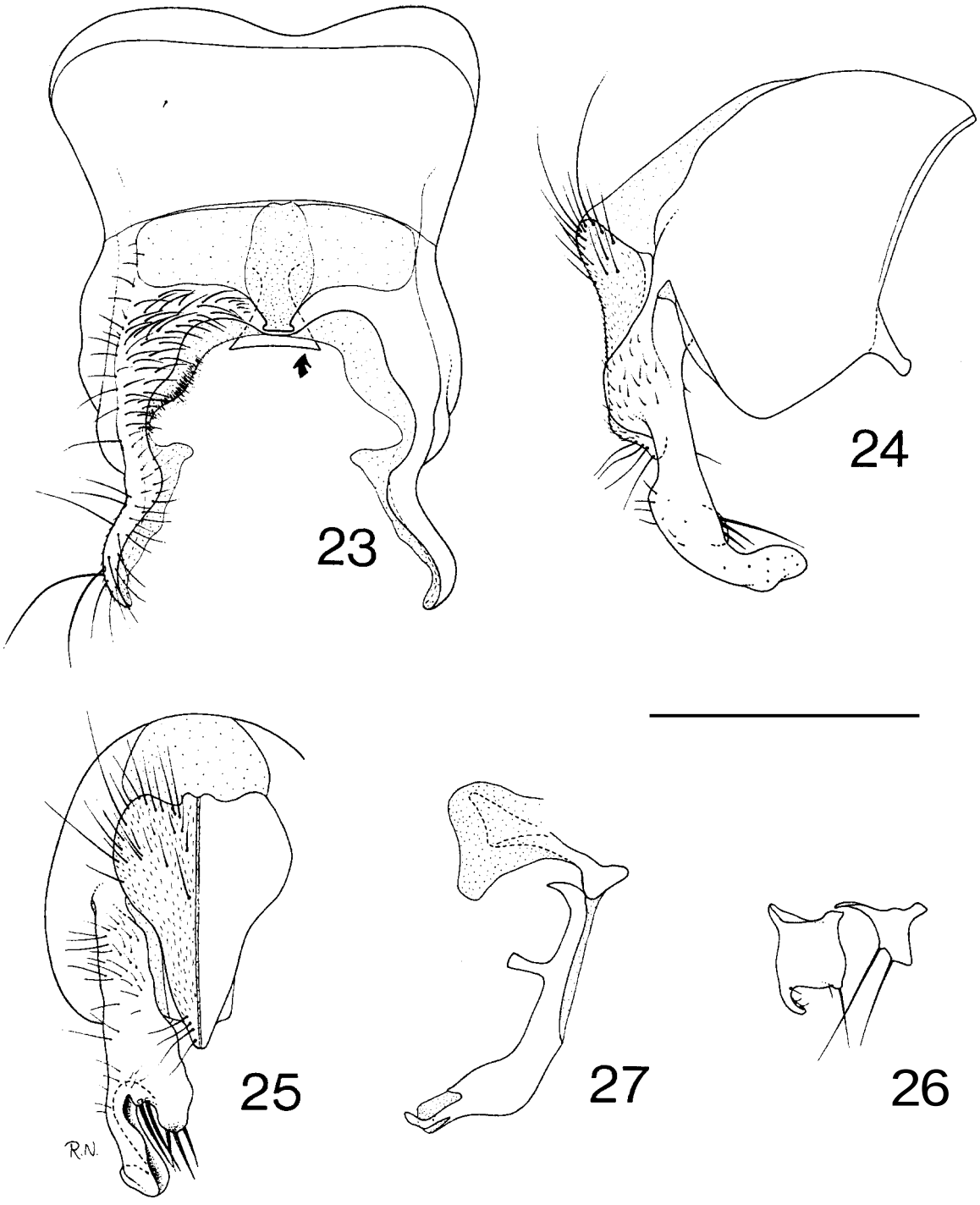
Material examined. FUERTEVENTURA: Betancuria, 1 6 12.ii.1977; 1 6 20.ii.1980. La Asomada, 1 6 21.ii.1980. Vega de Rio Palmas. 1♂ 1♀ 12.ii.1977; 3 6 2♀ 20.ii.1900. Villaverde. 2 6 21.ii.1980. Tefía, 1♂ 16.ii.1977. Tindaya. 2♂ 1? 16.ii.1977. Vallebrón, 1♀ 21.ii.1980. — LANZAROTE: Haría, 6 6 3 9 20.ii.1979. Los Valles, 3 6 3♀ 20.ii.1979. Mágues, 1 6 21.ii.1979. Nazaret, 1♀ 23.ii.1979.

Diagnosis. Dusted with greyish; wing infuscate around cross-veins. Hind tibia with apical *pv* bristle. Prealar subequal or shorter than p notopleural. Mid tibia with 1 *ad* which in 3 does not exceed half length of rnid tarsomere 1; 0 with mid and hind tibia more or less extensively yellow in middle.

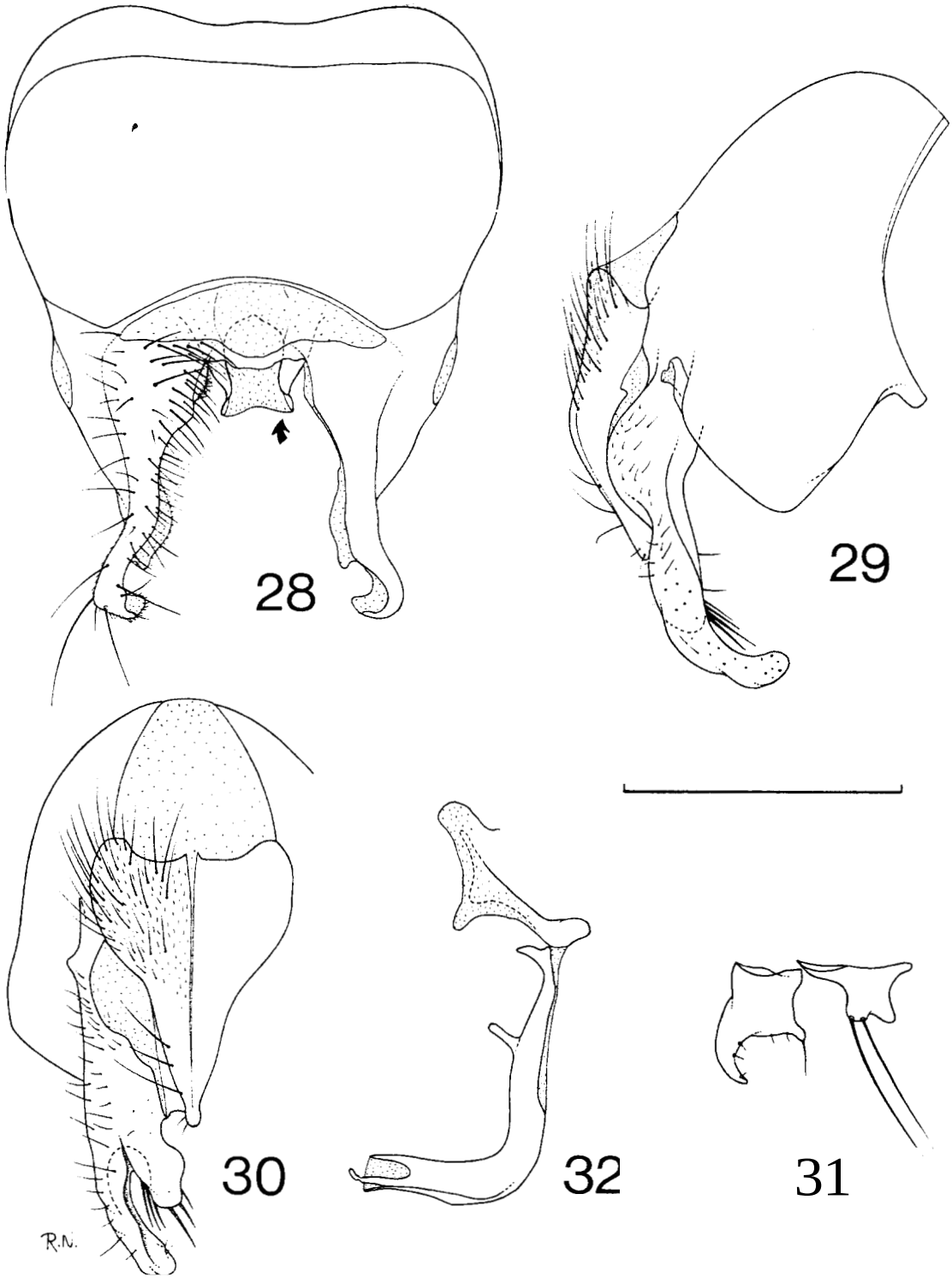
Description

Very similar to the European ***A. liturata*** (Robineau-Desvoidy) (syn: *pullula* Zetterstedt) but differing as follows:

MALE. Prealar weaker, as a rule shorter than *p* notopleural. Mid tibia with 1 *ad* only not exceeding half Icngth of mid tarsomere 1. Tcrminalio as in Figs. 23–27 (cf. ***A. liturata***, Figa. 28–33). Lobcs of sternitc V non-converging: median process of stcrnite VI (phallic stabilizer?) unpaired:



Figs. 23–27. *Anthomyia confusanea* sp.n.: ♂, Denmark; terminalia. — 23. Sternite V, and process of sternite **VI** (arrow). — 24, 25. Epandrial complex, profile and hind views. — 26. Gonocoxital lobe (right) and gonostylus. — 27. Phallus. — Scale: 0.34 mm.



Figs. 28–32. *Anthomyia liturata* (Desvoidy): ♂. Denmark; terminalia. —28. Sternite V, and process of sternite **Vi** (arrow). — 29.30. Epandrial cornples. profile and hind views. —31. Gonocoxital lobe (right) and gonostylus. — 32. Phallus. —Scale: 0.34 mm.

epandrium less deep: rnembranized area between surstylus and cercal plate narrower; cercal plate more gradually tapering and extensively pubescent. only distal to rniddle convex in profile view; gonocoxal lobe and gonostyle of different shape; and distiphallus less strongly arched backward apically.

FEMALE. Mid and hind tibia orange-yellow with dark apical part and extreme basal part. Prealar at rnost as long as *p* notopleural. Mid tibia with 1 *ad* only; hind femur normally without any *pv* in middle.

Disrriburion and bionomics

One of us (V.M.) has long been aware that "*pullula* Zetterstedt" of European authors, e.g. Hennig (1966: 44), is indeed two distinct species. True "*pullula*", which should be known by the senior name *Anthomyia liturara* (Robineau-Desvoidy), is a common species throughout C and N Europe but extends into the Mediterranean subregion at higher altitudes. The other species, *A. confusanea* sp. n., is the more common species in S Europe; eastwards it reaches Kashmir and northwards the southern provinces of Fennoscandia (along the Norwegian west coast further north to Troms). Incidentally, Schnabl (1911: 83) recorded both species frorn Corsica, viz. *A. confusanea* as "*Pegomyia (Anthomyia) pullula* (Zetterstedt)", and *A. liturata* as "*P. (A.) kuntzei* sp. n." (cf. Schnabl & Dziedzicki 1911: figs. 295,296,802 & 293,294, 801).

As far as is known, the larvae of *Anthomyia* species live as saprophages or scavengers in decaying substrates. Several species have been reared from birds' and mammals' nests.

8. **Anthomyia quinquemaculata** Macquart, 1839

Anthomyia quinquemaculata Macquart. 1839: 116 (Canaries); Michelsen 1980b: 287.

[*Anthomyia pluvialis* (Linnaeus); Stein 1907: 728. 1908: 108 (La Palma, Tenerife); Frey 1937: 129 (La Palma. Tenerife. Gran Canaria); Kirchberg 1967: 333 (La Palma, Hierro, Gomera. Tenerife): Hennig 1968: 213 (Gomera): Santos Abréu 1976: 41 (La Palma. Gomera. Tenerife). 42. 171 fig. 6 [var. *frontata* Santos Abréii (iinavailable name)] (La Palma). 43 [var. *V-nigrum* Santos Abréu (iinavailablename)] (Tenerife). Misident.]

[*Anthomyia pluvialis* var. *imbrida* Rondani; Santos Abréii 1976: *41* (La Palma). Misident.]

[*Anthomyia pluvialis* var. *procellaris* Rondani: Santos Abréu 1976: 42 (La Palma). Misident.;

[*Anthomyia procellis* [sic] Rondani: Báez 1979: 556. Misident.]

[*Anthomyia procellaris* Rondani: Báez 1982: 259 p.p. (La Palma. Gomera. Tenerife. Gran Canaria). Misident.]

Remarks. The *above* records of "*pluvialis* Linnaeus" from the Canaries may in part refer to the next species. *Anthomyia tempestatum* Wiedemann.

Material examined. LA PALMA: Bco. del Río, 1♀ 1.viii.1974. — GOMERA: Agulo, 2♂ 1P 10.viii.1974. El Cedro, 1000 rn, 1♂ 25.vii.1984, Olsen. Stadel & Stolze (ZMUC). Garajonay, 1d 3.viii. 1977. Herrnigua, 2d 9.iv.1974. Laguna Grande. 1♀ 9.ix.1977. Llanos de Crispín. 1♀ 13.viii.1977. Los Infantes, 1♀ 21.viii.1977. Vallehermoso. 1♂ 19.ix. 1977. — TENERIFE: Bajamar. 1♂ 1♀ 3.ii.1980; 1♂ 18.xii.1973. Bco. San Andrés, 3d 1♀ 16.i.1977. Bco. Santos, 1♂ 2.iii.1963. J.M. Fernández (coll. Báez). Las Cañadas, 1♂ 5.vi.1980. Las Mercedes, 1♀ 3.vii.1974; 1♀ 14.iii.1984; 1♀ 29.vi.1973. Masca, 1♀ 21.xi.1975. Mte. Los Silos, Id 17.vi.1976; 1♂ S.iv.1984. — GRAN CANARIA: Bandama, 1♀ 14.ix.1976. Brezal de Moya, 6♂ 1♀ 10.iii.1977. Tejeda, 1♀ 16.ix. 1976.

Disrribution

The present species was originally described from the Canaries but soon sunk as a synonym of *A. pluvialis.* However, Michelsen (1980b) resurrected *quinquemaculata* as a valid species which actually is widely distributed in the southern parts of the Palearctic region and even in Africa.

Systematic remarks

A. quinquemaculata is a regionally variable species but the Canarian material agrees well with the Mediterranean form except that both sexes lack the usual *ad* bristle on the mid tibia.

9. **Anthomyia tempestatum** Wiedemann, 1830

[*Anthomyia pluvialis* (Linnaeus); Kirchberg 1967: 333 p.p. (Tenerife: teste Hennig 1968: 213). Misident.]

Anthomyia tempestatum Wiedernann; Hennig 1968: 213; Báez 1979: 556, 1982: 259 (Tenerife).

[*Anthomyia procellaris* Rondani: Báez 1982: 259 p.p. (La Palma. Gomera, Tenerife. Gran Canaria. Fuerteventiira). Misident.]

Remarks. Canarian records of "*pluvialis* Linnaeus", as cited iinder the preceding species. may in part refer to the present species.

Material examined. LA PALMA: Bco. del Rio, 1♀ 14.vii.1973. — HIERRO: Hoya del Juez. 1♀ 27.v.1976. La Lajura, 2♂ 28.v.1976. El Pinar. Id 30.i.1978. — GOMERA: El Cedro. 1000 m, 1♀ 25.vii.1984, Olsen, Skule & Stadel (ZMUC). Igualero, 3♂♀ 20.viii.1977. El Paso. 3♀ 16.viii.1977. — TENERIFE: Las Cañadas. 6♂3♀ 5.vi.1980. Chio to Tamaimo. 1♀ 19.ii–5.iii.1975, A.E. Stubbs (BMNH). Las Lagunetas. 1♂ 12.v.1973. Mirador de D. Martin. 1♀ 19.ii–5.iii.1975, A.E. Stubbs (BMNH). Mte. Los Silos. 1♂ 17.vi.1976. — GRAN CANARIA: Guayadeque, 1♂ 2♂♀ 28.xii.1980. Tejeda, 3♀ 16.ix.1976. — FUERTEVEXTURA: Betancuria. 1♂ 12.ii.1977. Tindaya. 1♀ 16.ii.1977.

Distribiition

Known from Spain and Morocco, and in a differently coloured form from many places in the Afrotropical region. The Canarian material belongs to the Mediterranean colour-forrn with nonconfluent black markings on the mesonotum.

10. **Anthomyia xanthopus** (Hennig, 1974)

Craspedochoeta xanthopus Hennig, 1974: 928 (Gomera).
Craspedochaeta xanthopus Hennig; Báez 1979: 556, 1982: 259 (Fuerteventura).

Material examined. FUERTEVENTURA: Isla de Lobos. 1♂ 11.v.1974. Joró. 1♀ 19.ii.1980. La Oliva. 1♀ 13.ii.1977. Playa Blanca. 1♀ ll.ii.1977. Pto. Guadalupe. 1♀ 9.v.1974.

Distribution

Hitherto only recorded from the Canaries. However, we also know the species from ISRAEL: Kalia [Kallia], 1♂ 6.ii.1978, A. Freidberg; 1♂ 2.xii.1982.1. Yarom. Ein Feshcha, 1♀ 22.xi.1978, A. Freidberg (in DZTU and ZMUC).

Systematic remarks

A. *xanthopus* is a very distinctive species of *Anthomyia*. The Israeli specimens differ from the Canarian as follows: brown stripes on mesonotum faded or missing; bristles on mesonotum weaker. e.g. prealar shorter than ***p*** notopleural and lateral posthumeral reduced; interfrontal broader, scarcely narrower than width of *a* ocellus.

Hennig (1974: 930) described vein C as bare on v face. This is misleading. as in ♀♀ vein C is extensively setulose on v face and in ♂♂ has at least some v setulae distal to apcx of vein Sc.

11. **Hylemya latevittata** Stein, 1908

[*Hylemyia rustica* Robineau-Desvoidy; Macquart 1839: 116. Misident.]
Hylemyia latevittata Stein. 1908: **105** (Tenerife); Frey 1937: 129 (Gomera. Tenerife. Gran Canaria).
Hylemyia (Hylemy[i]a) latevittata Stein; Santos Abréu 1976: 20, 171 fig. 2. 22 [var. *nigromaculata* Santos Abréu (unavailable name)] (La Palma. Tenerife).
[*Hylemyia (Hylemyia) variata* (Fallén); Santos Abréu 1976: 19 (La Palma. Tenerife). Misident.]
Hylemya latevittata Stein: Hennig 1969: 243 (La Palma, Hierro. Gomera. Tenerife); Báez 1979: 556. 1982: 260 (La Palma. Gomera. Tenerife. Gran Canaria).

Remarks. Macquart's record of *rustica* from the Canaries was based on 26 (in MNHN) belonging to *H. latevittata.*

Material examined. LA PALMA: Barlovento, 1♂ 19.v.1983. Bco. del Rio. 1♀ 1.viii.1974. Fuencaliente, 1♂ 27.i.1973. La Galga. 1♀ 17.v.1983. Los Tilos, 2♂6♀ 10♀ 28.vii.1973; 3♂♀ 12.x.1973; 3♂ 5♀ 17.v.1983. — GOMERA: Agua de los Llanos, 1♀ 15.ix.1977. Bco. de Majona. 1♂6♀ 7.iv.1974. Chorros de Epina, 7♂ 12.iv.1975. Cuadernas. 1♀ 16.viii.1977. El Cedro, 1♂6♀ 1♀ 17.ix.1977; 1♀ 10.vii.1974; 2♂♀ 22.viii.1977; 1000 m, 1♀ 25.vii.1984, Olsen, **Skule** & Stadel (ZMUC). Los Gallos 2♂ 1♀ 14.ix.1977. Las Mesetas, 1♀ 13.viii.1977. Meriga. 1♂ 2♂♀ 10.viii.1974; 2♂♀ 15.viii.1977. Mora de Gaspar, 2♂ 2.viii.1977. — TENERIFE: Anaga, 1♂6♀1♀ 25.v.1974. Bailadero, 2♂ 13.vii.1984; 1♂6♀ 23.iii.1964, J.M. Fernández (coll. Báez); 1♂ 6.iii.1981. Bajamar, 1♀ 3.ii.1980. Bco. del Infierno. 1♂ 3O.iii.1974. Bco. de Ijuana, 3♂ 26.vi.1984. Bco. de Ruiz, 1♂ 6.iv.1975. Bco. San Andrés. 2♂ 16.i.1977. Bco. Tahodio, 1♀9♂ 14.ix.1973. El Batán, 4♂ 1♀ 13.iii.1981. El Cantillo, 1♀9♂ 28.i.1974. El Moquinal, 1♀ 17.v.1981. Las Mercedes, 1♂ 1♀9♂, R. Storå (ZMUC); 5♂d 2S.xi.1973; 2♂♀ 30.ix.1973; 1♀ 16.ix.1973; 2♀ 23.vi.1984; 12♂ 2♀ 19.ii–5.iii.1975, A.E. Stubbs (BMNH). Los Rodeos, 2♀ 30.iii.1908. Mte. Aguirre, 2♂6♀ 1♀ 14.ix.1973; 1♂6♀ 2l.vi.1976: 4♂ 6♀ 26.viii.1979; 2♂6♀ 14.iii.1984. Mte. del Agua, 1♂ 1♀E 24.viii.1973. Mte. de Pedro Alvarez. 12♂6♀ 1♀ 14.vi.1981. Mte. Los Silos, 1♂6♀ 5.iv.1984. Mtña. Grande. Esperanza, 1400 m, 1♀ 28.vii.1984, Olsen, Skule & Stadel (ZMUC). — GRANCANARIA: Bco. Virgen de Moya. 400 m. 1♂d 20.vii.1984, Olsen, Skule & Stadel (ZMUC). Brezal de Moya. 2♂♀ 10.iii.1977. Jardín Canario. 1♂ 23.ix.1973. Tafira Alta. 1♂ 10.iii.1977. Tiles de Moya. 1♂ 3♂♀ 24.ix.1977. — "CANARIES": 2♂ (MNHN).

Distribution and bionomics

Certainly an endemic species of the wcstern Canary Islands. Exclusively found in the laurisilva zone. or in places whcre this type of forest is now destroyed by man.

Larvae of *Hylemya* spp. live as saprophages in decaying substrates like dung and rotten fungi.

Systematic remarks

H. latevittata is certainly the apomorphic sister-species of *H. vagans* (Panzer, 1798), which is widely distributed in the Palearctic region. The Canarian species is different as follows: Both sexes are darker, bluish grey dusted, and on mesonotum with three very broad brownish black stripes. Wing darker brown tinged. Tibiae and femora entirely black in ♂, and only yellow on basal quarters of mid and hind femur in ♀. Abdomen even in ♀ with broad, blackish bands at tergital borders.

Structurally, *H. latevittata* differs very little from *H. vagans*, but usual *ad* bristle of mid tibia vestigial or missing in ♂. Further, it varies more in size, with a wing length of 4.5–7.4 mm as compared with 5.6–7.8 mm in *H. vagans*.

12. **Lasiomma anthomyinum** (Rondani, 1866)

Lasiops anthomyina Rondani; Stein 1907: 726. 1908: 111 (Tenerife).
Opsolasia anthomyina (Rondani); Frep 1937: 129 (Tenerife).
Chortophila anthomyina (Rondani); Santos Abréii 1976: 31, 33 [vars. *flavifrons* Santos Abréu. *rubellipes* Santos Abréu (unavailable names)] (La Palma, Gomera. Tenerife).
Lasiomma anthomyinum (Rondani): Báez 1979: 556, 1982: 260 (La Palma. Gornera, Tenerife).

Material examined. This species occurs on the Canaries in two colours forms, a dark an a pale one indicated in the following with a "D" and a "P" respectively. — LA PALMA: El Paso. 1♀ (D) 12.vii. 1973. — GOMERA: Cañada de Jorge. Id (D) 12.viii.1977. — TENERIFE: Las Cañadas, 1♂ (P) 23.v.1969. J.M. Fernández (coll. Báez); 1♀ (P) 18.vii.1974; 1♂ (P) 13.vi.1976; 1♂ (P) 5.vi.1980. La Esperanza. 1♀ (D) 24.vi.1976. Fuente Joco, 2 0 2P (P) 2.ix.1973. Mte. Los Silos. id (D) 17.vi.1976. San Diego. Id (D) 3.iii.1968, J.M. Fernández (coll. Báez).

Distribution and bionomics

Distributed in the central and southern parts of W Palearctic. Confined to the western region of the Canaries. The existing colour dimorphy is apparently not determined by season as is known to be the case for certain other species of *Lasiomma*. Rather it appears that the dark form is associated with thc laurisilva zone whilst thc pale form occurs at highcr altitudes in the subalpine zone, but this needs further investigation.

The larvae are scavengers or saprophages in birds' nests and in the larval nests of *Thaumetopoea pityocampa* and *T. processionea* (Lep.: Thaumetopoeaidae).

Systematic remarks

The dark forni is charactcrized in the d as follows: mesonotum light grey with broad blackish stripes (median and paramedian) more or less confluent just behind suture, and with an oblique blackish patch connecting with paramedian stripe at suture and reaching to base of wing: scutellum brownish black with only tiny patches of grey at lateral corners; abdomen with blackish bands at tergital borders broad. The ♀ is essentially the same colour.

The pale form differs in the ♂ by having paramedian stripes on mesonotum largely reduced to oblong patches behind the suture and well separated from median stripe and from tiny dark spot near wing base; further, the scutellum is grey with a median dark stripe, and the abdomen with dark bands narrower. The ♀ is similar but with complete, very narrow paramedian stripes on mesonotum, and a largely or entirely grey scutellum.

L. anthomyinum is, at least in the ♂ sex, similarly dimorphic as to colour in the Mediterranean subregion, whilst ♂♂ from C and NW Europe all seem to be of a very dark form with a mainly brownish black mesonotum.

13. **Adia cinerella** (Fallén, 1825)

Chortophila cinerella (Fallén); Bigot 1891:276 (Tenerife); Stein 1907: 714, 1908: 107 (La Palma. Tenerife. Gran Canaria).
Hylemyia cinerella (Fallen); Frep 1937: 130 (Gran Canaria).
Hylemyia (Paregle) cinerella (Fallén); Santos Abréii 1976: 23 (Canaries. common).
Paregle cinerella (Fallén); Hennig 1967: 163; Báez 1979: 536. 1987: 260 (Hierro, Gornera. Tenerife. Gran Canaria. Fuerteventura. Lanzarote).

Material examined. HIERRO: Echedo, 1♂ 1♀ 29.i.1978. El Pinar. 1♀ 27.v.1976: 2♂ 30.i.1978. El Sabinar. 1♂ 29.v.1976. Frontera, 1♀ 26.v.1976; 1♀ 29.xi.1978. Jinamar, 2♀ 28.v.1976. Valverde, 1♀ 27.v.1976. — GOMERA: Alajeró, 1♀ 11.iv.1975. Argumame, 1♀ 16.viii.1977. El Cedro. 1000 ni. 1♂ 1♀ 25.vii.1984, Olsen, Skule & Stadel (ZMUC). Tecina, 3♂ 1♀ 28.iii.1978. — TENERIFE: Bailadero, 1♀ 4.x.1984. Bajaniar. Id 8.xii.1973. Bco. Añavingo, 10 9.iii.1975. El Moquinal, 1♂ 17.v.1981. La Esperanza, 1♀ 31.viii.1973. Las Cañadas, 1♂ 14.vi.1979. La Cuestii. 1♀ 6.v. 1973. La Laguna. 1♀ 30.iv.1973. Las Lagune-

tas. 1 d 2♀ 12.v.1973. Las Hlercedes. c. 500 m. 1♂ 3♀ 14.vi.1964 K.M. Guichard (BMNH). La Vega. 1♂ 12.iv.1976. Mte. Los Silos. 2♂ 22.vi.1984; 2 3 1♀ 17.vi.1976. Orotava. 1♀ 1909. Graham Smith (BMNH). Pto. de la Cruz. 2♂ 19.ii–5.iii.1975. A.E. Stubbs (BMSH). Santa Ursula. 13 14.iv.1976; 1 d 1.vii.1979. — GRANCANARIA: Pinos de Galdar. 1200m. 1 d 3♀ 22.vii.1984; 1 E di.vii.1984. Olsen. Skule & Stadel (ZMUC). — FUERTEVENTURA: Betancurin, 1 E 12.ii.1977; 1♂ h.iii.1984. G. Ortega (coll. Báez). Corralejo. 3♂ 1 E 7.iii.1984. G. Ortega (coll. Báez). La Asomacla. 1♂ 21.ii.1980. La Oliva. 1♂ 11.v.1974; 1♀ 7.v.1974; 6♂ 13.ii.1977; Id 1♀ 5.iii.1984. G. Ortega (coll. Báez). Pto. de la Peña. 1♂ 1♀ 20.ii.1980. Vallebrón. Id 21.ii.1980; 5♂ 1♀ 5.iii.1984. G. Ortega (coll. Báez). Vega de Rio Palmas. 1♀ 20.ii. 1980. Villaverde. 1♂ 2♀ 18.ii.1980. Tetir. Id 1♀ 13.v.1974; 2♂ 21.ii.1980. — LANZAROTE: Los Fariones. 1d 15.iv.1974. Los Valles. 1 d 2O.ii.1979.

Distribution and bionomics

A conimon Holarctic species associated with pasture land. Next to *Delia platura* the most common Canarian species of anthomyiid.

The larvae develop in bovine droppings.

14. **Subhylemyia longula** (Fallén, 1824)

Chortophila longula (Fallén); Stein 1907: 720, 1908: 107 (La Palma, Tenerife).
Hylemyia longula (Fallén); Frey 1937: 130 (La Palma. Tenerife, Gran Canaria).
[*Hylemyia (Paregle) cinerella* (Fallén); Santos Abréu 1976: 21, 171 fig. 3 [var. *erythrocephala* Santos Abréu (unavailable name)] (La Palma). Misident.]
Subhylemyia longula (Fallén): Hennig 1974: 687; Báez 1979: 556. 1982: 260 (Hierro. Gomera, Tenerife).

Material examined. HIERRO: Echedo, 2♀ 29.i.1978. Jinamar. 10 28.v.1976. — GOMERA: Apartacaminos. 1 E 13.viii.1977. Argumame, 1♀ 16.viii.1977. Los Gallos. 1 P 13.is.1977. Raso de la Bruma, 1♀ l.viii.1977: 2♀ 9.is.1977. — TENERIFE: Aguamansa, 2♂ 29.ix.1976. Las Lagunetas. 3♂ 4♀ 12.v. 1973. Las Mercedes. c. 500 ni. 1♀ 14.vi.1964, K.M. Guichard (BMNH). Mte. Los Silos. 13 17.vi. 1976. Realejo Alto. 400 m. 1♂ 27.vii.1984, Olsen. Skule & Stadei (ZMUC).

Distribution and bionomics

A Holarctic species. common in the Mediterranean subregiori.

The larvae are scavengers. known to feed on dead snails.

15. **Leucophora amicula** (Séguy, 1928)

[*Delia albula* (Fallén); Báez 1979: 536, 1982: 259 (Fuerteventura). Misident.]

Material examined. FUERTEVENTURA: Betancuria. Id 12.ii.1977.

Distribution and bionomics

A little-known species previously only rccorded from thc Tunisia (see Hennig 1967: 115), but we also know the species from Israel (in DZTU and ZMUC).

Larvae of *Leucophora* spp. live as cleptoparasites in the nests of ground-living bees.

16. **Leucophora canariensis** Michelsen. sp. n.

Type material. Holotype d. CANARY ISLANDS: GOMERA: Alajero. 11.iv. 1975. M. Báez (coll. Báez). — Paratypes: TENERIFE: Güímar. Mirador de D. Martin, 1♂ 19.ii–5.iii.1975, A.E. Stubbs (BMNH). **Las** Cañadas. Id 1.v.1962, J.M. Fernández (coll. Báez). Teno, 1♀ 10.iii.1974 (ZMUC). — GRANCANARIA: Fataga, 1 d 9.iii. 1977. **M.** Báez (ZMUC).

Diagnosis. Black, bluish grey dusted, with contrasting broad brownish black stripes on mesonotum. Aristal hairing reaching length of greatest aristal diameter. Interfrontal devcloped but weak. Mid tibia without *av* or *v* bristle. Prealar longer than *p* notopleural.

Description

Similar to *L. sponsa* (Meigen, 1826) but with following differences:

MALE. Body dusted with bluish grey rather than with pale brownish grey; mesonotum with three conspicuous brownish black stripes: median one very widened for some distance immediately behind suture and reaching scutellum, which is brownish black except for a grey patch at anterolateral corners; lateral stripes very broad throughout. Abdomen with more sheen. with black median stripe and quite broad dark brown bands along tergital transitions. Wing darker brown tinged.

Frons at narrowest point with each parafrontal narrower than interfrons and narrower than diameter of *a* ocellus. Hairing of arista longer. reaching its greatest diameter.

Prealar stronger. nearly as long as *a* notopleural.

FEMALE. Coloured as male, except that abdomen is with even more shcen. with tessellating **dark** patches laterally on tergites, and without distinct brownish black bands. From **E** *L. sponsa*

further separable by longer aristal hairing and longer prealar, and by upper frons with each parafrontal markedly narrower than interfrons and no wider than diameter of *a* ocellus.

Terminaiia in both sexes virtually as in *L. sponsa.*

Distribution

Apparently a Canarian endemic species. known only from the western islands of Gomera. Tenerife and Gran Canaria.

Systematic reninrks

Closely related to the C and W European* *L. sponsn* (Meigen). and to the S European and E Canarian *L. subsponsa* sp. n.

17. Leucophora subsponsa *Michelsen*, sp. *n.*

[*Leucophora sponsa* (Meigen); Báez 1979:556, 1982:260 (Fuerteventiira). Misident.]

Type material. Holotype ♂, CANARY ISLANDS: FUERTEVENTURA: Vallebrón, 7.iii.1984, M. Báez (coll. Báez). — Paratypes: FUERTEVENTURA: Vega de Rio Palmas, 3♀ 12.ii.1977, M. Báez; La Oliva. 1♂ 13.ii.1977, M. Báez; Tetir, 1♀ 18.ii.1980, 1♀ 21.ii.1980. M. Báez; Betancuria. 1♂ 6.iii.1984, G. Ortega. — LANZAROTE: Los Valles, 1♀ 20.ii.1979, M. Báez: Teguise, 2 8 20.ii.1979. M. Báez: Uga. 1♀ 22.ii.1979, M. Báez. In coll. Báez and ZMUC.

Additional material. SPAIN: TERUEL PROV.: Alcañiz, 18 2P 10.iv.1974, J.P. Dear (BMNH).

Diagnosis. Grey to light brownish grey dustsd; upper occiput on each side of vertex with small polished black spot. Interfrontal developed. Prementum as long as fore tarsomere 1. Prealar weak, about as long as *p* notopleural. Mid tibia without *av* or *v* bristle.

Description

The present species has previously been confused with *L. sponsn* (Meigen). but differs in the following:

MALE. Upper occiput shiny black on srnall area on each side of vertex. Mesonotum without brown median stripe. and abdomen not banded with brown stripes at tergital transitions.

Head with face in profilc projected distinctly in front of frontal angle; face also narrower: between vibrissae often no wider than distance bctween outer margins of *p* ocelli. A pair of short orbitals present on upper frons (rarely seen in *L. sponsa* ♂). Arista shorter, equal in length to remaining antenna. Proboscis longer: prementum as long as fore tarsomere 1.

Abdomen more robust, practically cylindrical. FEMALE. Separated frorn *L. sponsn* ♀ by same characters as for ♂♂, except that mesonotum often has developed a dark median stripe. Further with narrower frons: about 1.5× as wide as distance between outer margins of *p* ocelli (about 2× that distance in *L. sponsn* ♀), and upper frons with 1–2 pairs of short orbitals (0–1 pair present in *L. sponsa* P).

Terminalia in both sexes virtually as in *L. sponsa.*

Distribution

Presently only known from the eastern Canarian islands of Fuerteventura and Lanzarote, and from Spain, but *L. subsponsa* is probably widely distributed in the Mediterranean subregion.

Systematic reninrks

Belongs to the *L. sponsn* species-complex which also includes the western Canarian *L. cannriensis* and an unnamed species in Japan.

18. Delia antiqua (Meigen, 1826)

Delia antiqua (Meigen); Báez 1979: 556, 1982: 259 (Tenerife).

Mnterinl examined. TENERIFE: La Cuesta, 1♂ 13.v.1973; 1♀ 21.vi.1973.

*Suwa, M. (1974) recorded *L. sponsa* (Meigen) from Japan (Ins. matsum. (N.S.) 4: SO). Examination of 1♂ from Suwa's original series: Hokkaidô, Jôzankei, 2.v.1968, M. Suwa (now in coll D. M. Ackland, Deddington) revealed. however, that this record involves a distinct species. The pale bluish grey dusting, less projected face (lying clearly behind frontal angle), stronger genals, longer prealar and finer *av/pv* bristles on mid and hind femur readily distinguish the Japanese species from *L. sponsa.*

Distributiori and bionomics

This is the cosmopolitan "onion maggot", a serious pest on cultivated onion, garlic and leek.

19. **Delia bracata** (Rondani, 1866)

Delia bracata (Rondani): Hennig 1974: 750 (Tenerife): Báez 1979: 556. 1982: 260 (La Palma. Tenerife).

Remarks. Canarian records of "*flavibasis* Stein" by earlier authors may in part refer to present species.

Material examined. LA PALMA: La Dehesa, 1♂ 2♀ 13.vii.1973. — GOMERA: Tecina. 33 3♀ 28.iii.1978. Vallehermoso, 16 1♀ 19.ix.1977. — TENERIFE: El Sauzal. 1♂ 3.vi.1979. La Cuesta. 2♀ 21.ix.1972; 1♀ 21.x.1973. Los Cristianos, 4P 26.xii.1973. "Tenerife", 1♀, Duurlo (ZMUC). — GRAN CANARIA: Bandama. 3♀ 21.ix.1973. — LANZAROTE: Teguise, 161♀ 20.ii.1979.

Distribution and bionoiiics

Widely distributed in the Mediterranean subregion.

Seemingly a common species in cultivated areas, and suspected to be a pest on cereal crops in much the same way as the closely related *D. flavibasis* (Stein).

20. **Delia canariensis** Henning, 1974

Delia canariensis Hennig, 1974: 765 (Fuerteventura); Báez 1979: 556. 1982: 260 (Fuerteventura).

Material examined. FUERTEVENTURA: Coti. holotype ♂. 7.v.1964. K.M. Guichard (BMNH). Morro Jable, 1d 15.ii.1977.

Distribution

This distinctive *Delia* species is so far only known from the eastern region of the Canaries (Fuerteventura). However. the speciesis likely to eventually show up in the Mediterranean subregion.

21. **Delia cilitarsis** Hennig, 1974STAT. N.

Figs. 33. 34

[*Anthomyia cana* hlacquart: Macquart 18-39:117 (Canaries). Misident.]
Delia platura ssp. *cilitarsis* Hennig. 1974: HYO (Hierro).

Remarks. híacquart's record of *cana* from thc Canaries does not refer to *D. platura* (Xísigen).as currently believed. The original 1♀ (in MNHN)is the present species.

Material examined. HIERRO: Echedo. 1E 30.i. 1978. Frontera. 1♀ 1.ii.1978. — GOMERA: **El** Cedro. 1000 m. 1♂ 3♀ 25.vii.1984, Olsen. Skule & Stadel (ZMUC). Laguna Grande 1E 9.ix.1977. — TENERIFE: Aguamansa. 1E 11.iv.1976. Hortigal. 1♀ 16.v.1976. Las Cañadas. 1♂ 19.viii.1973, J.M. Fernández (coll. Bhez): 1♀ 2.ix.1973; 1♀ 5.vi.1980. Los Rodeos. 1♀ 30.iii.1980. — "CANARIES": 1♀ (MNHN).

Distribution

An endemic Canarian species. known only from the western region (Hierro. Gomera. Tenerife). The type material came from Hierro: Sabinosa.

Systematic remarks

Hennig (1974) knew *D. platura* from all Canarian islands except Hierro. **As** his material of the very similar taxon *cilitarsis* came from this island, he concluded the latter to be a geographical subspecies of *platura*. However, the presently available material shows these two taxa as coexisting on at least three of the western islands. viz. Hierro, Gomera and Tenerife.

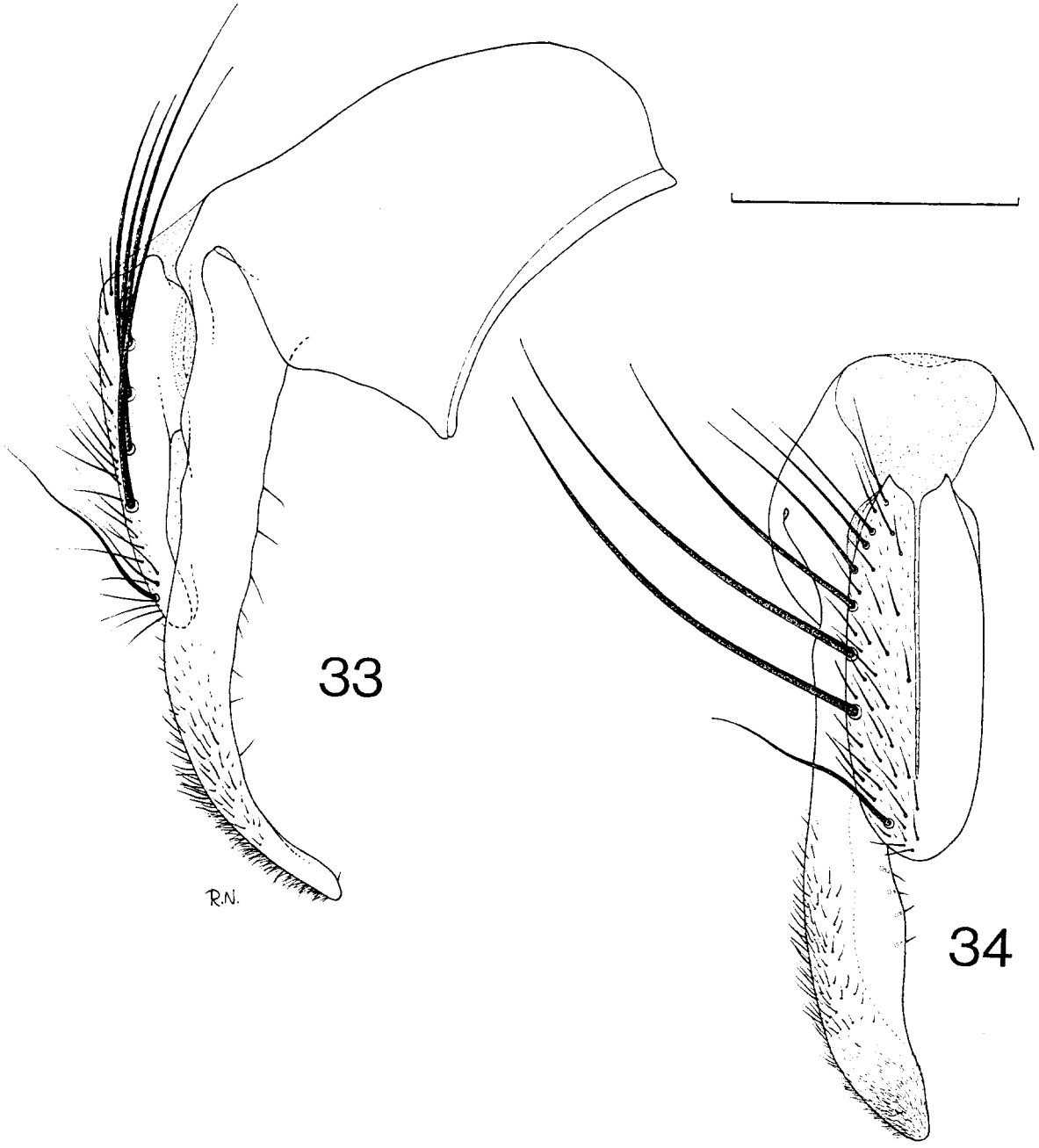
D. cilitarsis is certainly most closely related to *D. platura*, but is larger, and in the ♂ readily distinguished by the longish *d* bristles on mid tarsomere 1 and by different terminalia (cf. Figs. 33.34 & 35, 36). *D. cilitarsis* is more difficult to separate from *D. platura* in the ♀ . but it is dusted grey/bluish grey rather than pale brownish grey. and has a more pronounced pattern of brownish black on mesonotum and abdomen; this in combination with a larger size and frequent presence of *apd* on fore tibia should enable safe recognition in most cases.

22. **Delia echinata** (Séguy, 1923)

[*Chortophila florilega* (Zetterstedt); Stein 1907: 716. 1908: 107 (Tenerife: teste Henning 1971: 800, 827). Misident.]
[*Hylemyia (Delia) florilega* (Zetterstedt); ?Santos Abréu 1976: 27 (La Palma). Misident.]
[*Chortophila fugax* (Meigen): Stein 1908: 107 (La Palma); ?Santos Abréu 1976: 33 (La Palma). Misident.]
Delia echinata (Séguy); Hennig 1974: 800 (Tenerife): Bhez 1979: 556. 1982: 260 (Tenerife).

Remarks. Stein's record of *fugax* from the Canaries was based on 1♂, in MNHU (examined), belonging to *D. echinata*.

Material examined. LA PALMA: "La Palma", Id. T. Becker (MNHU). — HIERRO:Echedo. 2♂ 29.i.1978.



Figs. 33, 34. *Delia cilitarsis* Hennig; ♂, Tenerife: terminalia: epandrial complex in profile and hind views. — Scale: 0.31mm.

El Julan. 1♂ 31.i.1978. El Pinar. 1♂ 30.i.1978. — TENERIFE: Las Lagunetas, 2 6 2♀ 12.v.1973. Los Rodeos. 1♂ 30.iii.1980. Mtria Grande. Esperanza. 1400 m. 4♀ 28.vii.1984, Olsen. Skule & Stadel (ZMUC).

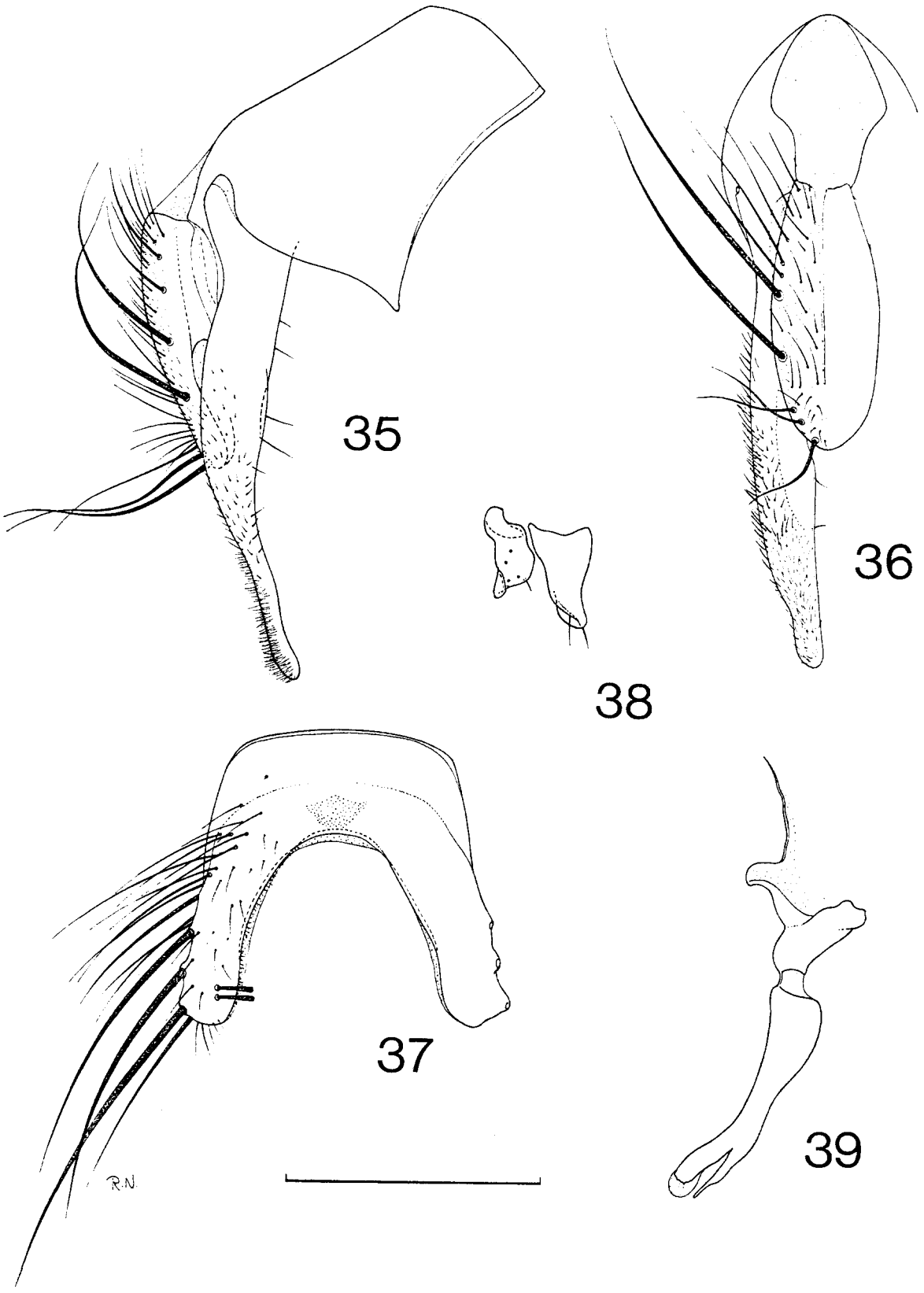
Distribution and bionomics

A widespread Holarctic species ranging from arctic to warm-temperate areas.

The species has been reported as a larval pest on spinach ("spinach stem fly") and carnation.

23. **Delia flavibasis** (Stein, 1903)

Chortophila flavibasis Stein: Stein 1907: 716, 1908: 107 (La Palma, Tenerife, Gran Canaria); **Santos** Abréu 1976: 35, 170 fig. 4 (La Palma, Gomera, Tenerife, Gran Canaria, Lanzarote).



Fips. 35–39. *Delia platura* (Meigen): ♂. Gran Canaria: terminalia. —35, 36. Epandrial complex, profile and hind views. —37. Sternite V. —38. Gonocoxital lobe (right) and gonostylus. —39. Phallus. —Scale: 0.34 mm.

Hylemyia flavibasis (Stein): Frey 1937: 130 (Tenerife. Gran Canaria).
Delia flavibasis (Stein): Hennig 1974: 808; Báez 1979: 556, 1982: 260 (Tenerife).

Remarks. Some of the above records certainly refer to *D. bracatn.*

Material examined. TENERIFE: El Moquinal. 1d 17.v.1981. La Cuesta. 10♂ 4♀ 25.xii.1975; Id 30.v.1977. La Laguna, 1♂ 30.iv.1973.

Distribution and bionomics

A Mediterranean species, especially common in cultivated areas.

The larvae infest cereal crops.

24. Delia platura (Meigen, 1826)

Figs. 35–39.

Chortophila cilicrura Rondani: Stein 1907: 713. 1908: 107 (La Palma, Tenerife, Gran Canaria).
Hylemyia cilicriira (Rondani); Frey 1937: 130 (La Palma, Gomera, Tenerife, Gran Canaria).
Hylemyia (Crinura) cilicruza [sic] (Rondani); Santos Abréu 1976: 25 (Canaries, common). 27 [var. *rubriceps* Santos Abréu (unavailable name)] (La Palma, Tenerife).
Delia platura (Meigen); Hennig 1974: 889; Báez 1979: 556, 1982: 260 (Hierro, Gomera. Tenerife. Gran Canaria, Fuerteventura, Lanzarote).

Material examined. HIERRO: Echedo, 1♂ 29.i.1978. El Julan, 6 3 30.i.1978. El Pinar, 3♂ 30.i.1978. Frontera, 36 1♀ l.ii.1978. Jinamar, 3♂ 28.v.1976: 1 ♂ l.xi.1975. Monte del Golfo, 1♂ 28.v.1976. San Andrés. 2P 28.v.1976. San Lázaro, 1 3 27.v.1976. — GOMERA: Agando. 2♀ 15.viii.1977. Alajeró. 1P 20.viii.1977; 1♂ 11.iv.1975. Apartacaminos, 2♀ 13.viii.1977. Bailadero, 1♀ 21.viii.1977. Cañada Amaya. 2♀ 20.viii.1977. Cañada de Jorge. 1♀ 12.viii.1977. El Cedro, 2P 11.iv.1974. Garajonay, 2E 3.viii.1977. Hermigua, 3♂ 7.iv.1974. Igualero. 1♀ 20.viii.1977. Laguna Grande, 1P 16.viii.1977. Los Gallos. 3♀ 14.ix.1977. Los Infantes. 1♀ 21.viii.1977. Raso de la Bruma. 1♀ l.viii.1977. — TENERIFE: Aguamansa. 3♂ 49 11.iv.1976. Araya de Candelaria. 1♀ 18.xi.1979. Bajamar. 1♂ 1♀ 3.ii.1980. Bco. Añavingo, 2♂ 1♀ 9.iii.1975. Bco. Badajiz. 1♂ 1♀ 27.iii.1975. Bco. Gainbuesa, 2♂ 3♀ 14.iii.1976. El Cantillo, 1♀ 28.i.1974. El Moquinal. 1♂ 17.v.1984. Fasnia. Id 24.ii.1974. Güímar, 2♂ 1.v.1973; Mirador de D. Martin. 2♂ 1♀ 19.ii–5.iii.1975, A.E. Stubbs (BMNH): East of Güímar, Id 1♀ 19.ii–5.iii.1975, A.E. Stubbs (BMNH).Izaña, 1♂ 30.v.1982. Las Calladas. 1♀ 5.vi.1980; Id 1♀ 23.v.1976. La Cuesta, Id 17.vii.1974. La Esperanza. 1♀ 8.iii.1972. La Laguna. 2♂ 22.i.1977. Las Lagiinctas. 3♀ 12.v.1973. Los Rodeos. 2 3 2♀ 30.iii.1980. María Jirnenez. 1♀ 2.iii.1975. Mte. Aguirre. 1♀ 14.iii. 1981. Mtc. Agua García. 13 2.viii.1981. Mtc. Los Silos. 1♀ 16.x.1984. Pto. de la Cruz, 5♂ 5♀ 19.ii-5.iii.1975. A.E. Stiibhs (BMNH). San Andrés, 1P 9.xi.1980. Santa Ursiila. 1P 14.iii.1976. Sauzal, 1♀ 3.vi.1979. Teno, 1♀ IO.iii.1974. Vilaflor. 3P 2.ix.1973. — GRAN CANARIA: Bandama, 13 8.iii. 1977. Bco. Virgen, Moya. 400 m. id 1♀ 20.vii.1984, Olsen. Skule & Stadel (ZMUC). Cazadores. 1 Q 3.iv.1983. El Cedro. 1000 m. 1♂ 1♀ 25.vii.1984, Olsen. Skule & Stadel (ZMUC).Guayadeque. 131♀ 28.xii.1980. Tafira Alta. 1♂ 8.iii. 1977. Tejeda, 2♂ 9.iii. 1977. Pinos de Galdar, 1200 m. 2♀ 31.vii.1984, Olsen, Skule & Stadel (ZMUC). — FUERTEVENTURA: Betancuria, 1♀ 20.ii.1980; 1♀ 6.iii.1984; 350 m, 2 3 3.v.1964, K.M. Guichard (BMNH). Pto. de la Peña. 1♀ 20.ii.1980. Vallebrón. 13 S.iii.1984. G. Ortega (coll. Báez). Valle de Ortega. 1♂ 8.v.1974. Vega de Rio Palmas. 4d 3P 20.ii.1980. — LANZAROTE: Haría. 1♂ 2♀ 20.ii.1979, Los Fariones. 1P 12.iv.1974. Teguise. 1d 1♀ 2O.ii.1979.

Distribution and bionomics

Delia platura is undoubtedly the world's most common and widespread anthomyiid.

Highly abundant in cultivated fields and gardens. The larvae infest a number of vegetables, yet the economic importance of the species does not seem to be clearly worked out.

Addendum: A new species of *Pegomya* Robineau-Desvoidy from Madeira

Pegomya lateropunctata Michelsen, sp. n.

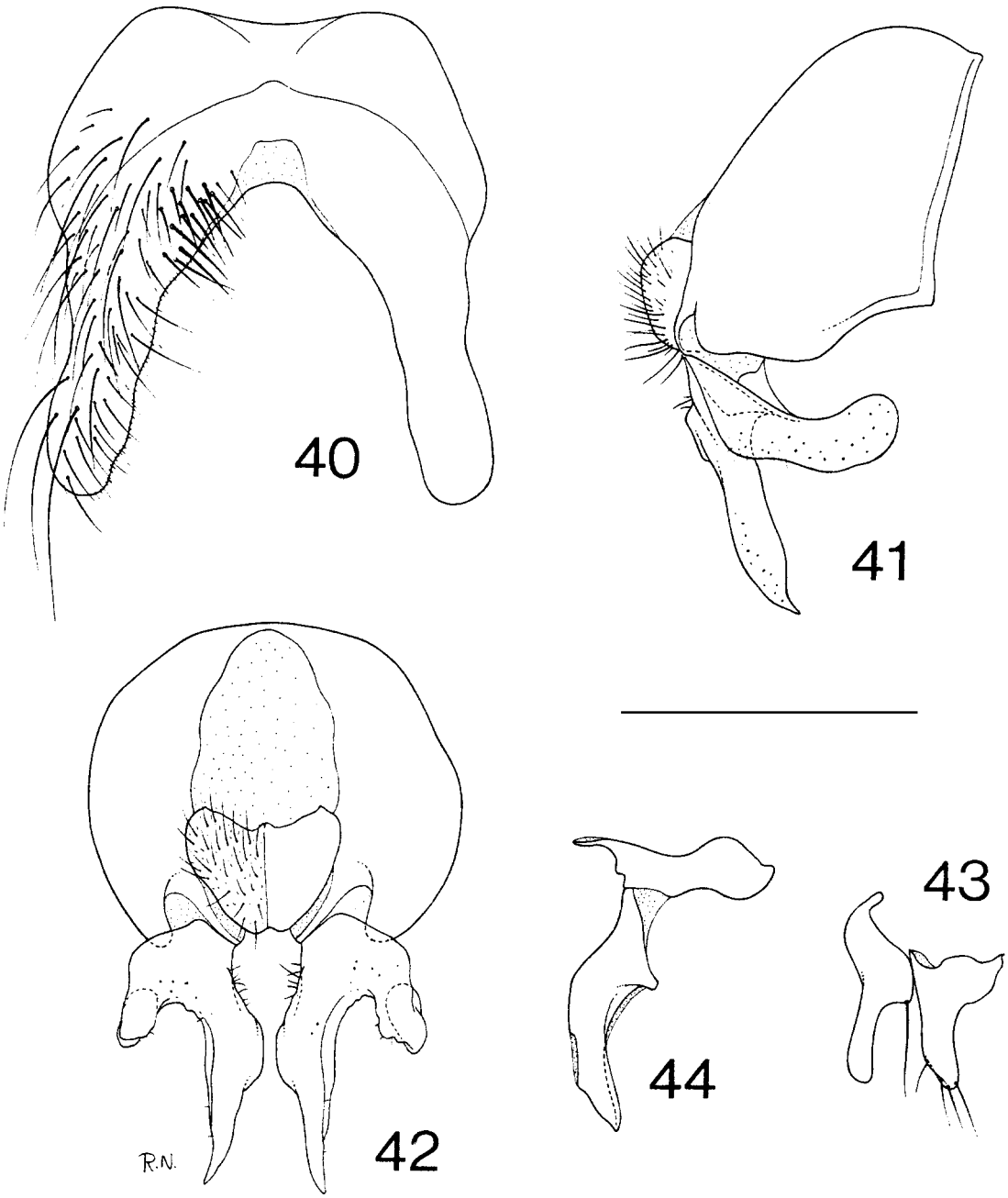
Figs. 4041.

Type material. Holotype d , MADEIRA: Funchal. coastal grassland, 17–23.ii. 1977. A.E. Stubbs (BMNH).

Diagnosis. ♂ : A medium-sized *Pegomyn*, entirely black, dusted with grey and brown. Abdomen with triangular brown spots anterolaterally on tergites. Acrostichals weak and very close-set: prealar developed. Tergite VI setose. Terminalia, see Figs. 40–44.

Description

MALE. Wholly black. dark greyish dusted, rather shining on thorax and abdomen. Parafrontal and parafacial matt brownish grey. without usual light sheen; prernenturn thinly dusted, yet with blackish sheen. Antenna and palpus black. Mesonotum brownish black on broad median stripe reaching disc of scutcllum. and on broad area lateral to dorsocentrals. Wing tinged with dark brown; calyptrae pale brownish. Legs entirely black. Abdomen with black stripc narrowly interrupted at tergital hind margins and further colour-



Figs. 40–44. *Pegomya lateropunctata* sp.n.; holotype ♂, Madeira; terminalia. —40. Sternite V. —41, 42. Epandrial complex, profile and hind views. —43. Gonocosital lobe (right) and gonostylus. —44. Phallus. —Scale: 0.5 mm.

ed brown along margins of black stripe and on triangular spots at anterolateral corners of tergites.

Frontal angle prominent. in profile lying far in front of face; postgena somewhat dilated; gena in profile deep with rounded lower margin. Upper frons with narrow parafrontalia separated by interfrons about 1.5× width *a* ocellus. Parafacial in middle same width as flagellomere. About 6 pairs of frontals on lower two-thirds of frons; genals in front uniserial. Inner vertical stronper than laterally very short postoculars. Pedicel rather slender basally; flagellomere about 1.7× as long as wide, rounded at apex; aristal hairing at most *0.5* x as long as its greatest diameter.

Hairing of mesonotum short, moderately dense; acrostichals **weak,** close-set; lateral posthumeral

absent; prealar about tuo-thirds as long as *p* notopleural. Proepimerals c. 3; katepisternals 1 + 2. Vein C with spines and spinules weak, bare on *d* face; calyptrae equally projected.

Hind tibia with 1 *av* (short), only 1–2 *ad*, and 2 *pd*.

Abdomen weakly flattened: tergites III–V with marginals but without discals; tergite Vi with several marginal hairs and bristles. Terminalia as in Figs. 40–44.

FEMALE. Unknoun.

SIZE. Wing length 5.8 mm.

Distribution

Only the holotype from Madeira is **known.**

Systematic remarks

The close-set acrostichals, and the structure of the ♂ terminalia (cf. Figs. 6–13 & 40–44) indicate that the seemingly endemic Madeiran *Pegomya lateropunctata* and the Canarian and W Mediterranean *P. suaedae* are sister-species.

Key to male and female" Anthomyiidae of the Canary Islands

1. Vein C with setulae or spinules on *v* face. at least distai to apex of vein Sc 2
– Vein C bare on *v* face 12
2. Vein C with scattered *v* spinules distal to apes of s c 3
– Vein C only with setulae on *v* face 4
3. Height of gena in profile esceeding 0.5× height of eye: some hairs present in between three pairs of presutural acrostichals. Male aith *v* process at base of hind fernur pointed ..... *Fucellia maritima*
– Height of gena less than 0.5× height of eye; no hairs presrnt between presutural acrostichals. Male with *v* process of hind femur rounded ..... *Fucellia tergina*
4. Arista plumose: longest hairs much longer than width of flagellomere ..... *Hylemya latevittata*
– Arista pubescent: longest hairs miich shorter thnn width of flagellomere 5
5. Proepisternum hairy. Thoras and abdomen whitisti grey-dusted with contrastiiip black markings 6
– Proepisternuni bare 7
6. Longest hairs of arista slightly exceeding its greatest diameter; rnid tibia without *ad* bristle (Canarian specimens oniy!). Male with ventrally projected process on each lobe of sternite V ..... *Anthomyia quinquemaculata*
– Aristal hairing shorter than its greatest diameter: mid tibia with 1 *ad*. **Male** without distinct *v* process on lobes of sternite V ..... *Anthomyia tempestatum*
7. Fore tibia with apical *pd* bristle; interfrontal uith pair of hairs (♂) or bristles (♀) 8
– Fore tibia without apical *pd;* interfrontal bare 9
8. All femora biack: hind tibia with apical *pv* bristle; wing fuscous around cross-veins r-m and drn-cu ..... *Anthomyia confusanea*
– At least mid and hind femora yellow; hind tibia without apical *pv;* wing not fuscous around cross-veins ..... *Anthomyia xanthopus*
9. Legs black. at most brownish at knees 10
– All tibiae yellow 11
10. Mesonotum light grey with threc broad black stripes: prementiim thinly grey-dusted ..... *Pegomya vittithorax*
– Mesonotum rather uniformly blackish grey; prementum undusted. shiny ..... *Pegomya canariensis*
11. Prealar missing; acrostich*al* rows very close-set ..... *Pegomya suaedae*
– Prealar present; acrostichal rows normally spaced ..... *Pegomya cunicularia*
12. Prealar niissing 13
– Prealar present 14
13. Fore tibia with 1 *pv* bristle; mid tibia with 1–2 short *av* ..... *Delia bracata*
– Fore tibia with 2 *pv;* mid tibia without *av* ..... *Deliri flavibasis*
14. Mid tibia with 1*av* bristle 15
– Mid tibia without *av* 16
15. Face strongly produced forwards; mouthparts long: prementum longer than fore tarsomere 1 ..... ***Adia cinerella***
– Face not produced; mouthparts short: prementum much shorter than fore tarsomere 1 ..... *Subhylemyia longula*
16. Legs chiefly yellow ..... ***Delia** canariensis*
– Legs black 17
17. Parafacial broader than flagellomere 18
– Parafacial slightly to markedly narrower than flagellomere 21
18. Interfroiital bare. Small: wing length 2.8–3.8 mm; body whitish grey dusted: both sexes uith very broad parafrontals narrowly separated above lunule ..... *Leucophora amicula*
– Iiiterfrontal with pair of hairs or bristies 19
19. Male with coarse obtuse apical *pv* bristle on foretibia: female uith 2–4 *ad* on rnid tibia ..... *Delia antiqua*
– Both sexes with normal apical *pv* on fore tibia and only 1 *ad* mid tibia 20
20. Bluish grey-diisted. with broad brownish black stripes on mesonotum and bands on abdomen: arista with uith longest hairs equal to its greatest diameter: upper occipiit entirely grey-dusted ..... *Leucophora canariensis*

[*] Female sex unknown for *Pegomya canariensis* sp. n. and *Delia canariensis* Hennig, but will probably key out correctly.

Pegomya canariensis			x			
Pegomya cunicularia		x	s			
Pegomya suaedae	x	x				
Pegomya vittithoras		x	x			
Fucellia maritima	x					
Fucellia tergina	x					
Anthomyia confusanea			x			
Anthomyia quinquemaculata			x	x		x
Anthornyia ternpestaturn			x		x	x
Anthornyia xanthopus	x	x				
Hylemya latevittata				x		
Lasiornrna anthornyinum				x	x	x
Adia cinerella			x	x		
Subhylemyia longula				x	x	
Leucophora amicula			x			
Leucophora canariensis		x	x			
Leucophora subsponsa		x	x			
Delia antiqua			x			
Delia bracata			x		x	
Delia canariensis		x				
Delia cilitarsis			x	x	x	x
Delia echinata					x	
Delia flavibasis			x	x		
Delia platura	x	x	x	x	x	x

Table 1. Ecological distribution of the Canarian Anthornyiidae. See the text for details on zones.

– Pale brownish grey-dusted, without blackish stripes and bands; hairing of arista rnuch shorter than its greatest diarneter; upper occiput to each side of vertex with srnall. polished black spot ..... ***Leucophora** subsponsa*

21. Lateral posthumeral developed. Male eye with long, dense hairing **22**

– Lateral posthiimeral missing. Eye virtually bare in both sexes 23

23. ♂. Mesonoturn with lateral blackish patch reaching frorn suture to base of wing: scutellum largely black. ♀. Mesonoturn with rather broad brownish black stripes; scutellurn with concolourous median stripe .... *Lasiomma anthomyinum* (dark)

– ♂. Mesonoturn without lateral patch (only with median and paramedian dark stripes); scutellum grey-dusted with blackish median stripe. ♀. Mesonoturn uith only three (median and paramedian) stripes which are narrow and brown-dusted: scutellurn entirely grey-dusted ..... *Lasiomma anthomyinum* (paie)

33. Fore femur with short row of fine *a* bristles. Male with several very long bristles on lateral borders of sternites III–IV. Fernale without apical *pd* on fore tibia ..... *Delia echinata*

– Fore femur without o bristles. Male with lateral bristles on sternites III–IV of normal length. Fernale with apical *pd* bristle on fore tibia ... **24**

24. Larger, wing length 5.1–6.0 mm. Male with longish d bristles on rnid tarsomere 1. Fernale pale grey-/bluish grey-dusted with contrasting rnarking of dark brown on mesonotum and abdomen ..... ***Delia cilitarsis***

– Smaller, wing length 3.4–5.4 mrn. Male with *d* hairs on rnid tarsornere 1 at rnost as long as tarsornere diarneter, normally shorter. Fernale pale brownish grey with inconspicuous rnarking of dark brown on rnesonotum and abdomen ..... ***Delia platura***

Local distribution of the Canarian Anthomyiidae

Ecological

For purposes of roughly characterizing the ecological distribution of the Anthomyiidae, the terrestrial environment of the Canaries may conveniently be divided into 6 ecological zones (cf. Báez 1979):

Pegomya cariariensis		x		x			
Pegomya cuniciilaria		x	x	x		x	x
Pegomya suaedae						x	
Pegomya vittithorax			x	[x]		x	
Fucellia maritima				x	[x]	x	x
Fucellia tergina	[x]	x	x	x	[x]	x	
Anthomyia confusanea	[x]		[x]	[x]		x	x
Anttiomyia quinquemaculata	x	[x]	x	x	x		
Anthomyia tempestatiim	x	x	x	x	x	x	
Anthoniyia xanthopus			[x]			x	
Hylemya latevittata	x	[x]	x	x	x		
Lasiomma anthomyinum	x		x	x			
Adia cinerella	[x]	x	x	x	x	x	x
Subaylemyia longiila	[x]	x	x	x	[x]		
Leucophora amicula						x	
Leucophora canariensis			x	x	x		
Leucophora subsponsa						x	x
Delia antiqua				x			
Delia bracata	x		x	x	x		x
Delia canariensis						x	
Delia cilitarsis		x	x	x			
Delia echinata	x	x		x			
Delia flavibasis	[x]			x	[x]		
Delia platura	[x]	x	x	x	x	x	x

Table 2. Geographic distribution of the Canarian Anthomyiidae. Brackets indicate that no authentic material has been seen by us.

(a) *Littoral zone.* The beach proper. fore dunes, and coastal areas with halophytic vegetation.
(b) *Xerophytic zone.* Lower slopes (iip to about 400–700 m) characterized by a hot, dry klediterranean climate and by succulent and tree heath vegetation.
(c) *Cultivated zone.*
(d) *Laurisilva zone.* Evergreen forest (up to about 1300 m) dominated by species of laurel. largely on wetter N–NW slopes (now extensively destroyed by man).
(e) *Pine forest zone.* Open savanna-like forest (up to about 2000 m) dominated by the endemic *Pinus canariensis.*
(f) *Subalpine zone.* Montane heath and at higher altitudes (above 2600m) subalpine herbs: climate subcontinental.

The zonal distribution is outlined in Table 1. Characteristic of the littoral zone are *Pegomya suaedae* (leaf-miner on the halophytic herb *Suaeda*), the *Fucellia* spp. (in decaying seaweed), and *Anthomyia xanthopus* (possibly a dune species). Most obviously associated with the xerophytic zone are the species of *Leucophora* (xerophiious, with larvae living on pollen balls of ground-nesting, solitary bees); also *Delia canariensis* may belong to this zone. *Pegomya cunicularia, Adia cinerella, Delia antiqua, D. bracata,* and *D. flavibasis* rnay all be typical for the cultivated zone. Of particular interest is *Hylemya latevittata,* which is only found in the laurisilva, or in places where the laurel forest has disappeared relatively recently.

Among the more ubiquitous species. yet avoiding the hottest lower altitudes, are *Anthomyia quinquemaculata, A. tempestatum, Subhylemyia longula* and *Delia cilitarsis.* The most common and ornnipresent species is *Delia platura.*

Geographical

The known distribiition of the Anthomyidae in the Canary Islands is depicted in Tabic 2. Thc data clearly reflect that thc archipelago can be divided into two biogeographical units. The west-

Pegomya canariensis		x!			
Pegomya cunicularia		x			
Pegornya lateropunctata				x!	
Pegomya lyneborgi			x		
Pegomya suaedae		x			
Pegomya vittithorax		x			
Fucellia maritima		x			
Fucellia tergina		x		x	x
Anthoniyia confusanea		x!			
Anthoniyia fasciata	[x]				
Anthomyia maura				x	
Anthornyia pluvialis				x	[x]
Anthomyia quinquemaculata		x			
Anthornyia ternpestaturn		x			
Anthornyia xanthopus		x			
Hylernya latevittata		x			
Lasiornrna anthornyinurn		x			
Paregle audacula				x	[x]
Adia cinerella		x		x	x
Subhylemyia longula		x			
Leucophora arnicula		x!			
Leucophora canariensis		x!			
Leucophora subsponsa		x!			
Delia antiqua		x			
Delia bracata		x		x!	
Delia canariensis		x			
Delia cilitarsis		x			
Delia echinata		x		x!	
Delia flavibasis		x		x!	
Delia platura		x		x	x
Delia radicurn				x!	x

Table 3. Distribution of the Macaronesian Anthornyiidae. Exclarnation marks indicate new records; brackets indicate that no authentic material has been seen by **us.** — Sources: Cape Verde (Emden 1959); Salvage (Ororní et al. 1978; Báez 1982); Madeira (Becker 1908; Tiensuu 1938, 1919): and Azores (Séguy 1936; Frey 1945).

ern islands of La Palma, Hierro, Gomera, Tenerife and Gran Canaria, forming one region, have elevations above 1400 m, oceanic climatic conditions, and thus the fuli range of ecological zones. The eastern islands of Fuerteventura and Lanzarote, forrning the other region, have a much lower elevation and a climate influenced by Saharan conditions. Forest and montane zones are absent on these islands.

Among the 24 species of Anthornyiidae presently on record frorn the Canaries. 10 species are only known from the western region, viz. *Pegomya canariensis, Anthomyia quinquemaculata, Hylemya latevittata, Lasiomma anthomyinum, Subhylemyia longula, Leucophora canariensis, Delia antiqua, D. cilitarsis, D. echinata* and *D. flavibasis;* 4 species only from the eastern region, viz. *Pegomya suaedae, Leucophora amicula, L. subsponsa* and *Delia canariensis.* Of the 6 apparently endemic species, **4** are confined to the western region *(Pegomya canariensis, Hylemya latevittata, Leucophora canariensis, Delia cilitarsis),* 1 is eastern *(Delia canariensis),* and 1 occurs in both regions *(Pegomya vittithorax).*

Review of the Macaronesian Anthomyiidae

The Anthomyiidae and their distribution on the Macaronesian archipelagos are shown in Table 3. Leaving aside Cape Verde. which belongs in the Afrotropical region and has a single Afrotropical species on record: *Anthomyia fasciata* (Walker, 1858). the faunal affinity of the Macaronesian Anthomyiidae is obviously with the Mediterranean subregion.

The Salvage Islands, which are some slightly emergent rocks in the ocean between the Canaries and Madeira. have only 1 species on record, but this is a rare Mediterranean species, *Pegomya lynehorgi* Ackland, 1977, unknown frorn elsewhere in Macaronesia.

Madeira has 11 species (55% also Canarian). Two of these are neoendemic. viz. *Pegomya lateropunctata* sp. n. which is most closely related to the Mediterranean and Canarian *P. suaedae,* and *Anthomyia maura* (Stein, 1908) standing closest to the Mediterranean and Canarian *A. confusanea.* The Azores have 6 species which all occur also on Madeira (50% also Canarian).

All the Madeira and Azores species of Anthomyiidae, apart from the kelp-fly *Fucellia tergina* and the two Madeiran endemics, are likely to have been introduced by the activity of rnan. Three obviously introduced species on Madeira and the Azores. viz. *Anthomyia pluvialis* (Linnaeus, 1758). *Paregle audacula* (Harris, 1780) and the "cabbage maggot" *Delia radicum* (Linnaeus, 1758), apparently have not reached the Canaries.

Origin of the Canarian Anthomyiidae

The Anthomyiidae are chiefly a group of cold-adapted flies: greatest generic and specific diversity are thus found in areas of the North Hemisphere with temperate to subarctic climates. The Canarian fauna presently consists of 24 species in 9 genera, and we do not expect these figures to increase significantly during future research. This rather poor representation cannot be explained from the local climatic conditions alone, as the forest and subalpine zones of the western islands certainly should be tolerated by a lot more species. The effect of isolation seems more important: a long-persisting barrier. some 500 km wide. of arid land and open sea isolates the fauna of the western islands from the richer anthomyiid fauna of thc Atlas Mts. Houever. the knowledge of a former existence of laural forest on the eastern islands shows that the chances of natural spreading from time to time in the past have been better than today.

The Anthomyiidae are poorly represented in the Afrotropical region. and occur mainly in the eastern and southern mountainous parts of the continent. Thus it is not surprising that the Canarian Anthomyiidae. without exceptions, are Mediterranean species. or descendants thereof.

Introduced species

We have reasons to suppose that there are more species of anthomyiids on the Canaries today than prior to the Spanish settlement at the end of the 15th century. This because a number of species found on the islands seem obvious candidates for spreading by rnan and his activities. Among these are *Pegomya cunicularia, Delia antiqua, D. echinata, D. platura, D. bracata* and *D. flavibasis,* species all known a larval feeders on garden vegetables, cereal crops or introduced weeds. Also *Adia cinerella,* the common breeder in bovine dung. very likely belongs to the introduced species.

Indigenous species

A number of Mediterranean anthomyiids have probably colonized the Canaries by means of accidental spreading. Among these are the kelp-flies, *Fucellia maritima* and *F. tergina,* which should likely be able to survive long-distance transportation on sea-borne iterns. Other species like *Pegomya suaedae, P. cunicularia* (eastern pale form), *Anthomya confusanea, A. tempestatum, A. xanthopus, Leucophora amicula* and *L. subsponsa* must be fairly resistant to heat and drought, as they all occur on the arid eastern islands. and thus would only have to cross a sea-barrier of 90–120 km which separates Fuerteventura and Lanzarote from the Moroccan coast. Also *Anthomyia quinquemaculata* may belong in this group. as its presence on the eastern islands can be expected. The origin of the W Canarian *Lasiomma anthomyinum* and *Subhylemyia longula* is more obscure; the former is a fairly cold-adapted species which possibly represents a remote spreading event. the latter is more likely to have been introduced by man.

Some of the native species. e.g. *P. suaedae, A.*

xanthopus and *L. anthomyinum*, differ slightly in colour and structure from conspecific individuals frorn the Mediterranean area. These indications of beginning speciation suggest that successful natural spreadings are exceptional events.

Endemic species

The following 6 species (25%) of the Canarian fauna of Anthornyiidae are known solely therefrorn: *Pegomya canariensis, P. vittithorax, Hylemya latevittata, Leiicophorn canarieiisis, Delin cnnariensis* and *D. cilitarsis*. However, the endemic status of several of these iscertainly doubtful. Many species of Diptera were described frorn the Canaries prior to their subsequent discovery elsewhere. Examples from the present farnily are *Pegomya suaedae, Anthomyia quinquemaculata* and *A. xanthopus*.

Pegomya canariensis frorn the western region (Hierro. Tenerife) is seerningly rnost closely, yet rernotely, related to the European *P. provecta* and *P. mediterranea* and, provided it does not show up elsewhere, possibly a Tertiary relict species.

Pegomya vittithorax appears to be sister-group related to *P. betae,* the well-known beet and spinach leaf-miner . The occurrence of *P. vittithorax* in both Canarian regions (Gornera. Tenerife; Fuerteventura), and the fact that it isoverall more plesiornorphic in adult structure than *P. betae,* make it questionable that this is a truly endernic species.

Hylemya latevittata of the western Canaries is a typical neoendernic island species. The overall plesiornorphous sister-species is *H. vagans*, a common western Palearctic species.

Leiicophora canariensis is also a neoendernic species of the western Canaries (Gomera. Tenerife. Gran Canaria). A very closely related. nonendernic species, *L. subsponsa,* occurs on the eastern islands, yet it seems that the sister-species is *L. sponsa* from central and northern Europe.

Delin cnnnriensis shows no obvious affinities with other species or species-groups of this species-rich genus. It is probably a xero- and psamrnophilous species and is only known from Fuerteventura. We find it very unlikely that *D canariensir* will retain its present endernic status.

Delia cilitarsis, on the other hand, is undoubtedly a genuine western Canarian neoendemic species. The plesiornorphic sister-species is the cosrnopolitan *D. platura;* this provides us with a case of sister-species syrnpatry, and with argurnents for believing that *D. platura* was introduced to the archipelago rather recently.

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