The Anthomyiidae (Diptera) of the Canary Islands

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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. Pegormyacanariensis, Anthomyia confusa, Leucophora canariensis and L. subsponsa. In addition, Pegomyalateropunctata sp. n. is described from Madeira. Pegomya saedivora Hering (type locality: France) is synonymized with P. saeae Hering (syn. n.). Deliactilis 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) endemic to the Canaries. Apparently endemic Canarian species are Pegomyacanariensis sp. n., P. vititiorax (Stein). Hylennyaloveitlarata Stein, Leucophora canariensis sp. n., Delia carinrierrsis Hennig and D. cillatis Hennig.

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The Canarian archipelago consists of seven volcanic main islands situated 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 much 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 continent.

Systematic treatment

Generic concepts employed in the following deviate from those of Hennig (1966-1976) as follows: Anthomyia Meigen (syns: Craspedochoeta Mac-
quart. *Chelisia* Rondani; Botanophila Liou (syn. *Pegosophyle* 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 latevitata* Stein and *Delia ciliatissima* Henning. Bigot (1891) added *Adia cinerea* (Fallén).

The more important contributions of the present century are those by Stein (1908), Hering (1927), Frey (1937), Henning (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 misidentifications and should be deleted from the Canarian list:

*Pegomya hysocyami* (Panzer. 1809)
*Anthomyia inbrida* (Rondani, 1866)
*A. liturata* (Robineau-Desvoidy. 1830) (syn: *pullula* Zetterstedt)
*A. pluvialis* (Linnaeus, 1758)
*A. procurrens* (Rondani, 1866)
*Hylemya variata* (Fallén. 1823)
*Facella fucorum* (Fallén. 1819)
*Botanophila fugax* (Meigen. 1826)
*Egle clivata* (Walker. 1549) (syn: *muscaria* auct. nec Fabricius)
*Leucophora sp.* (Meigen. 1826)
*Delia albula* (Fallén. 1823)
*D. florilago* (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 about 650 specimens made by M. Báez in 1973–84. Supplementary material in the British Museum (Natural History). London (BMNH): Museums National D’Histoire Naturelle. Paris (MNHN): museum für Naurherkunde 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.


Diagnosis. ♂. Black, sparsely dusted with grey and dark brown: antenna, palpus and legs fuscous brown to black; prementum 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 bare.

Description

MALE. Black, thinly dusted with grey and dark brown. Antenna black; 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. 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 ocellus; interfrons at narrowest point of frons 2–3× as wide as each parafrenal; frons considerably widened downwards. About 6 pairs of frontals. Flagellomere about 1.7× as long as broad, rounded at apex.
aristal hairs are 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 posthumral 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.

Distribution

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)

*Pegomya cunicularia* Stein. 1908a; (Tenerife); Hering 1927:441 (Fuerteventura); Santos Abrué 1976: 43 (Tenerife).


**Distributiori and biornomics**

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 glaucua*, *Atriplex* sp. and *Betaprocumbens*.

**Systematic remarks**

Two structurally identical but differentially colored 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 suaeae* Hering, 1927

Figs. 6–15.


Distribution and bionomics

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

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

Systematic remarks

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

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

Hering (1944) described *P. suaedivora* from France: Loire-Inf., La Baule, emerged 9.X.1943. H. Buhr (MNHU: examined). Hennig (1973) saw the holotype and stated that it differs from *P. suaedae* ♀ by having yellow, dark-tipped
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 those of a pale-legged E from Fuerteventura that we examined.

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

*P. suaeae* 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 (see Michelsen 1980a), which is
represented on the Canaries by two species, viz. *P. cuniciliaria* and *P. vittithorax*.

**4. Pegomya vittithorax** (Stein, 1908)

Figs. 16–22.


**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 calypterae tinged with dark brown. Legs black, slightly brownish at knees.

Head broader and eyes larger; in consequence gena in profile narrower, less than one-quarter eye-height, parafacial only about one-third width flagellomere, and upperfrons narrower, only 1.1–1.5× diameter of an 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. Surstyl (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. calypterae 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 somewhat thickened. Scutellum with discal hairs fewer. Terminalia (Figs. 21, 23): tergite VI more reduced, bare: tergite VII with 1 + 1 bristle only; sternite VII not markedly convex: sclerites of sternite VIII smaller.

**SIZE.** Wing length 4.2–5.3 mm.

Figs. 21, 22. *Pegomya vittithorax* (Stein); ♀, Fuerteventura: terminalia. — 21. Segments VI–VII. left lateral view. — 22. Sternite VIII. — Scale: 0.34 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 ꞌ terminalia, viz., the reduction of tergite VI to some lateral sclerite pieces (Fig. 21), suggests that P. beta (a serious pest on spinach and beet in many places of Europe) and P. vittitiorax are sister-species. Thus it is surprising that P. vittitiorax, apart from its colour pattern and ꞌ terminalia, appears structurally more plesiomorphic than the widely distributed P. beta. It could be that P. vittitiorax has just been overlooked in the Mediterranean area.

5. Fucellia maritima (Haliday, 1838)


Distribitori 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, 1845)


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Distribitori

A very common, nearly cosmopolitan inhabitant of seashores.

7. Anthonyia confusanea Michelsen, sp. n.

Figs. 23–27.

[Hyilemyia pullula (Zetterstedt); Stein 1908: 106 (Tenerife). Misident.] [Choristophila longula (Fallén); Santos Abréu 1976: 36 (La Palma, Gomera). Misident.] [Craspedochoeta pullula (Zetterstedt); Baez 1979: 556. Misident.] [Craspedochoeta pullula (Zetterstedt); Baez 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).


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

Description

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

MALE. Prealar weaker, as a rule shorter than p notopleural. Mid tibia with 1 ad which in ♀ does not exceed half length of mid tarsomere 1. Terminalia as in Figs. 23–27 (cf. A. littirata, Figa. 28–33). Lobes of sternite V non-converging: median process of sternite VI (phallic stabilizer?) unpaired:
epandrium less deep: membranized area between surstgylus and cercal plate narrower; cercal plate more gradually tapering and extensively pubescent. only distal to middle convex in profile view: gonocoxal lobe and gonostyle of different shape; and distithallus less strongly arched backward apically.

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

Distribution 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 liturata (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 from Corsica, viz. A. confusanea as "Pegomyia (Anthomyia) pullula (Zetterstedt)", and A. liturata as "P. (A.) kunitzei 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 Abreú 1976: 41 (La Palma, Gomera, Tenerife). 42. 171 fig. 6 [var. frontata Santos Abreú (invalid name)] (La Palma). 43. [var. V-migrum Santos Abreú (invalid name)] (Tenerife). Misident.)


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


Distribution

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


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

Distribution

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-form with nonconfluent black markings on the mesonotum.

10. Anthomyia xanthopus (Hennig, 1974)

_Craspedochoeta xanthopus_ Hennig, 1974: 928 (Gomera).

_Craspedochoeta xanthopus_ Hennig; Báez 1979: 556, 1982; 259 (Fuerteventura).


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; interfemetal broader, scarcely narrower than width of _a_ ocellus.

Hennig (1974: 930) described _vein C_ as bare on _v_ face. This is misleading, as in _O_ _O_ vein _C_ is extensively setulose on _v_ face and in _A_ _A_ has at least some _v_ setulae distal to apex of _vein Sc_.

11. _Hylyemia lativeitata_ Stein, 1908


_Hylyemia lativeitata_ Stein. 1908: 105 (Tenerife); Frey 1973: 129 (Gomera, Tenerife. Gran Canaria).

_Hylyemia (Hylyemia) lativeitata_ Stein: Santos Abréu 1976: 20, 171 fig. 2. 22 [var. _nigromaculata_ Santos Abréu (unavailable name)] (La Palma. Tenerife).

_Hylyemia (Hylyemia) variata_ (Fallén); Santos Abréu 1976:19 (La Palma. Tenerife). Misident.


Remarks. Macquart’s record of _rustica_ from the Canaries was based on 26 (in MNHN) belonging to _H. lativeitata_.


Distribution and bionomics

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

Larvae of _Hylyemia_ spp. live as saprophages in decaying substrates like dung and rotten fungi.
Systemic remarks

H. latennata is certainly the apomorphic sister-
species of H. vagans (Panzer, 1798), which is
widely distributed in the Palearctic. 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 ♀. Abdom-
men even in ♀ with broad, blackish bands at tergi-
tal borders.

Structurally, H. latennata 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 4.3–7.4 mm as compar-
ed with 5.6–7.8 mm in H. vagans.

12. Lasionoma anthomyinum (Rondani, 1866)

Lasionoma anthomyinum Rondani; Stein 1907: 726. 1908:
111 (Tenerife).
Opsoasla anthomyinum (Rondani); Frep 1937: 129 (Te-
erife).
Chorschola anthomyinum (Rondani); Santos Abréii
1976: 31, 33 [vars. flavifrons Santos Abréu, rubellipes
Santos Abréu (unavailable names)] (La Palma, Go-
mera, Tenerife).

Lasionoma anthomyinum (Rondani); Báez 1979: 556,
1982: 260 (La Palma, Gomera, 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 Pino, 1♀ (D) 12.vii. 1973. — GOMERA:
Cañada de Jorge. 1♂ (D) 12.vii. 1977. — TENERIFE:
Báez); 1♂ (P) 18.vii. 1974; 1♂ (P) 13.vi. 1976; 1♀ (P)
Joco, 2♀ 2♂ (P) 2.ix. 1973. Mte. Los Silos. 1♂ (D)
17.vi. 1976. San Diego. 1♂ (D) 3.iii. 1968; J.M. Fern-
ández (coll. Báez).

Distribution and biomonics

Distributed in the central and southern part of the
Palaeartic. Conflined to the western region of the
Canaries. The existing colour dimorphism is appar-
ently not determined by season as is known to be
the case for certain other species of Lasionoma.
Rather it appears that the dark form is associated
with the laurisilva zone whilst the pale form
occurs at higher 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 Thaumeto-
poea pityocampa and T. processionea (Lep.:
Thaumetopoeidae).

Systemic remarks

The dark form is characterized in the ♂ 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 para-
median stripes on mesonotum largely reduced to
oblong patches behind the suture and well separa-
ted 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 comple-
tely, very narrow paramedian stripes on mesono-
tum, and a largely or entirely grey scutellum.

L. anthomyinum is, at least in the ♂ sex, simi-
larly 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)

Chorophila cinerella (Fallén); Bigot 1891:276 (Tene-
rife); Stein 1907: 714, 1908: 107 (La Palma, Tenerife.
Gran Canaria).
Hylenia cinerella (Fallén); Frep 1937: 130 (Gran Can-
aria).

Hylenia (Paregle) cinerella (Fallén); Santos Abréii
1976:23 (Canaries. common).

Paregle(cinerella) (Fallén); Henning 1967: 163; Báez 1979:
536. 1987: 260 (Hierro, Gomera, Tenerife. Gran

Material examined. HIERRR: Echero. 1♂ 1♀
1♂ 2♀ 28.viii.1978. — TENERIFE: Bahíadero. 1♀
9.xii.1975. El Moquinal. 1♂ 17.v.1981. La Esperanza,
1♂ 31.vii.1973. Las Cañadas. 1♂ 14.xi.1979. La Cues-
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).

[D. Pareige] *cinerea* (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).


**Distribution and bionomics.**

A holarctic species, common in the Mediterranean subregior.

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

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

[Daviaulthula (Fallén); Báez 1979: 536, 1982: 259 (Fuerteventura). Misident.]
further separable by longer arista hairing and longer prealar, and by upper frons with each parafrontal markedly narrower than interfrons and no wider than diameter of ocellus.

Terminalia 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 remarks**

Closely related to the C and W European* *L. sponsa* (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 (Fuerteventura). Misident.]


**Diagnosis.** Grey to light brownish grey dusted; upper occipit 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 prothoropleural. Mid tibia without ar or bristle.

**Description**

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

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*Sua, M.* (1974) recorded *L. sponsa* (Meigen) from Japan (Ins. matsum. (N.S.)): 4. SOI: Examimation of 1 ♂ from *Sua*'s original series. Hokkaidó, Józankei, 2.v.1969, M. Sua (new coll. D. M. Ackland, Deddington) revealed, however, that this record involves a distinct species. The pale, bluish grey dusting less projected face (large, easily behind frontal angle), stronger genals, longer prealar and finer bristles on mid and hind femur readily distinguish the Japanese species from *L. sponsa*.

MALE. Upper occipit shiny black on small 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 profile projected distinctly in front of frontal angle; face also narrower between vibrissae often no wider than distance between 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 from *L. sponsa♀* by some 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. sponsa♀*), 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 remarks**

Belongs to the *L. sponsa* 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).

19. Delia bracata (Rondani, 1866)


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


Distribution and bionomics

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


Distribution

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

21. Delia ciliaris Hennig, 1974 STAT. N.

Figs. 33, 34


Delia platura ssp. ciliaris Hennig. 1974: 820 (Hierro).

Remarks. hicquat’s record of cana from the Canaries does not refer to D. platura (Xises) as currently believed. The original 1♀ (in MNHN) is the present species.


Distribution

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

Systematic remarks

Hennig (1974) knew D. platura from all Canarian islands except Hierro. As his material of the very similar taxon ciliaris 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. ciliaris is certainly most closely related to D. platura, but is larger, and in the ♂ readily distinguished by the longish bristles on mid tarsomere 1 and by different terminalia (cf. Figs. 33, 34 & 35, 36). D. ciliaris 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.]

[Hyloeis (Delia) florilega (Zetterstedt); Santos Abrú 1976: 27 (La Palma). Misident.]

[Chortophila fugax (Meigen); Stein 1908: 107 (La Palma). Santos Abrú 1976: 33 (La Palma). Misident.]


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

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


Distribuion 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).
**Hylymenia flavigena** (Stein): Frey 1937: 130 (Tenerife, Gran Canaria).


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


**Distribution and bionomics.**

A Mediterranean species, especially common in cultivated areas.

The larvae infest cereal crops.

---

**24. Delia platura** (Meigen, 1826)

Figs. 35–39.

**Choristophila ciliaris** Rondani: Stein 1907: 713. 1908: 107 (La Palma, Tenerife, Gran Canaria).

**Hylymenia ciliaris** (Rondani): Frey 1937: 130 (La Palma, Gomera, Tenerife, Gran Canaria).


**Delia platura** (Meigen); Hennig 1974: 889; Báez 1979: 556, 1982: 260 (Hierro, Gomera, Tenerife, Gran Canaria, Fuerteventura, Lanzarote).


**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 *Pegomya,* entirely black, dusted with grey and brown. Abdomen with triangular brown spots anterolaterally on tergites. *Acrisial* vesic very close-set: prealar developed. Tergite VI scrobe. Terminata, 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; prementurn thinly dusted, yet with blackish sheen. Antenna and palpus black. Mesonotum brownish black on broad median stripe reaching disc of scutellum. and on broad area lateral to dorsocentrals. Wing tinged with dark brown; calyptera pale brownish. Legs entirely black. Abdomen with black stripe narrowly interrupted at tergital hind margins and further colour-
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 1.5x width of 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 stronger than laterally very short postoculars. Pedicel rather slender basally; flagellomere about 1.7x as long as wide, rounded at apex; arista hairing at most 0.5x as long as its greatest diameter.

Hairing of mesonotum short, moderately dense; acrostichals weak, close-set; lateral posthumeral
absent; prealar about two-thirds as long as \( p \) notopleural. Proepimeris \( c \), 3; katepisternals \( 1 + 2 \). Vein \( C \) with spines and spinules weak, bare on \( d \) face; calyptre equally projected.

Hind tibia with \( 1 q v \) (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. Unknown.

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 \( \delta \) terminalia (cf. Figs. 6–13, 40–44) indicate that the seemingly endemic Madeiran *Pegomya lataro-punctata* and the Canarian and W Mediterranean *P. suaeae* 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 distal to apex of vein \( Sc \) .................. 2
   - Vein \( C \) bare on \( v \) face .................. 12
2. Vein \( C \) with scattered \( v \) spinules distal to apex of \( Sc \) ........................................ 3
   - Vein \( C \) only with setulae on \( v \) face ........................................ 4
3. Height of gena in profile exceeding 0.5\( \times \) height of eye; some hairs present in between three pairs of presutural acrostichals. Male with \( v \) process of hind femur pointed .............. .......................... *Fucellaria* maritima
   - Height of gena less than 0.5\( \times \) height of eye; no hairs present between presutural acrostichals. Male with \( v \) process of hind femur rounded .......................... *Fucellaria* tergina
4. Arista plumose; longest hairs much longer than width of flagellomere .......... *Hylemya latiuvittata*
   - Arista pubescent; longest hairs much shorter than width of flagellomere .......... 5
   - Proepisterner bare .................................. 7
6. Longest hairs of arista slightly exceeding its greatest diameter; mid tibia without \( ad \) bristle (Canarian specimens only!). Male with ventral-

\(^{1}\) Female sex unknown for *Pegomya canariensis* sp. n. and *Delta canariensis* Hernig, but will probably key out correctly.
Anthomyiidae of the Canary Islands

(Pego & Báez)

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

<table>
<thead>
<tr>
<th>Species</th>
<th>Zone 1</th>
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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 x
Pegomya cunicularia x x x x x
Pegomya vittithorax x [x] x
Fucellia maritima x x
Fucellia atergiata [x] x x x [x] x
Anthomyia confusa [x] x [x] x x
Anthomyia quinquemaculata x [x] x x
Anthomyia tempestatim x x x x x x
Atithomyia xanthoptus [x] x x
Hylemya latevittata x [x] x x x
Lasiohina anthomyinum x x x
Adia cinerella x x x x x x
Subhylemyia longula x x x x x
Leucophora amicula [x] x x x x
Leucophora canariensis x x x
Leucophora subspansa 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 flavibas x [x] x [x] x
Delia platira 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 (tip to about 400–700 m) characterized by a hot, dry kalediterranean 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 2600 m) subalpine herbs: climate subcontinental.

The zonal distribution is outlined in Table 1. Characteristic of the littoral zone are Pegomya suaeidae (leaf-miner on the halophytic herb Suaeda), the Fucellia spp. (in decaying seaweed), and Anthomyia xanthoptus (possibly a dune species). Most obviously associated with the xerophytic zone are the species of Leucophora (xerophious, 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. flavibas may 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. tempestatim, Subhylemyia longula and Delia cilitarsis. The most common and omnipresent species is Delia platira.

Geographical
The known distribution of the Anthomyiidae in the Canary Islands is depicted in Table 2. The data clearly reflect that the archipelago can be divided into two biogeographical units. The west-
Among the 24 species of Anthomyiidae presently on record from the Canaries, 10 species are only known from the western region, viz. *Pegomya canariensis*, *Anthomyia quinquemaculata*, *Hylemya latevittata*, *Lasiomma anthomyinum*, *Subhylemyia longula*, *Leucophora canariensis*, *Leucophora subspansa*, *Delia antiqua*, *D. cilitarsis* and *D. echinata*. Of the 6 apparently endemic species, 4 are confined to the western region (*Pegomya suaeda*, *Leucophora amica*, *L. subspansa* and *Delia canariensis*), 1 is eastern (*Deliacanariensis*), and 1 occurs in both regions (*Pegomyavittithorax*).

Table 3. Distribution of the Macaronesian Anthomyiidae. Exclamation 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).
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 lymnemorgi Ackland, 1977, unknown elsewhere in Macaronesia.

Madeira has 11 species (55% also Canarian). Two of these are neoeendemic, viz. Pegomya lateropunctata sp. n. which is most closely related to the Mediterranean and Canarian P. suecaedae, and Anthomyia maura (Stein, 1908) standing closest to the Mediterranean and Canarian A. confusa. 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 man. Three obviously introduced species on Madeira, and the Azores, viz. Anthomyia pluvialis (Linnaeus, 1758), Poreglya audacula (Harris, 1780) and the "cabbage maggot" Delia radicim (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 the Atlas Mts. However, the knowledge of a former existence of laurel 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 man and his activities. Among these are Pegomya cucunaria, Delia antiqua, D. echnata, D. platura, D. bracata and D. flavibasis, species all known 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 T. tergina, which should likely be able to survive long-distance transportation on sea-borne items. Other species like Pegomya suedaedae, P. cucunaria (eastern pale form), Anthomyia confusa, A. tempestatum, A. xanthopus, Leucophora amica 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 Lasiomyia anthomyiinum and Subhylemyia longula is more obscure; the former is a fairly cold-adapted species which possibly represents a long-spreading event, the latter is more likely to have been introduced by man.

Some of the native species, e.g. P. suedaedae, A.
santhopus and L. anthomyianum, differ slightly in colour and structure from conspecific individuals from 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 Canary fauna of Anthomyiidae are known solely thencefrom: Pegomya canariensis, P. vititithorax, Hylemya latevittata, Leitiechorn canarieiesis, Delin ennariensis and D. ciliatís. However, the endemic status of several of these is certainly doubtful. Many species of Diptera were described from the Canaries prior to their subsequent discovery elsewhere. Examples from the present family are Pegomya suaeidae, Anthomyia quinquemaculata and A. xanthopus.

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

**Pegomya vititithorax** appears to be sister-group related to *P. beta*e, the well-known beet and spinach leaf-miner. The occurrence of *F. vititithorax* in both Canarian regions (Gomera, Tenerife; Fuerteventura), and the fact that it is overall more plesiomorphic in adult structure than *P. beta*, make it questionable that this is a truly endemic species.

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

**Leitiechorn canarieiesis** is also a neoendemic species of the western Canaries (Gomera, Tenerife, Gran Canaria). A very closely related, neoendemic species, *L. subponsa*, occurs on the eastern islands, yet *L. ciliatís* that the sister-species is *L. sponsa* from central and northern Europe.

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

**Delfia ciliatís**, on the other hand is undoubtedly a genuine western Canarian neoendemic species. The plesiormorphic sister-species is the cosmopolitan *D. platura*, this provides us with a case of sister-species sympathy, and with arguments for believing that *D. platura* was introduced to the archipelago rather recently.

**Acknowledgements.** We are most grateful for the loan of material and information received from Mr D.M. Ackland, Deddington, England: Dr A. Freidberg, DZTU, Israel; Dr L. Matile, MNHN, France: Dr A.C. Pont, BMNH, England: and Dr H. Schumann, MNHU, DDR, Mr R. Nielsen, ZMUC, Denmark, assisted in preparing the illustrations.

This paper was supported by the Danish Natural Science Research Council, and by the Research Project no. 1692-82 of the Comisión Asesora de Investigación Científica y Técnica (Ministerio de Educación y Ciencia, España).

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Manuscript accepted February 1984.