

**Some Heleomyzidae, Opomyzidae, Sphaeroceridae, Diastatidae, Drosophilidae, Scatophagidae and Hippoboscidae (Diptera)
collected in Southern Spain,
with description of a new species
of Acantholeria.**

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The major part of the present material was collected in the provinces of Almeria and Granada by the Danish-Finnish Expedition in March—May 1966. The specimens collected by the author are indicated with (W. H.) and are in the Zoological Museum of Helsinki. The other specimens from 1966 were collected by Dr. Leif Lyneborg and his two assistants and are in the Zoological Museum of Copenhagen. The names of these collectors are not given to save space. Further, a collection made by Dr. J. R. Vockeroth in the Granada province in 1960 was included in this study. This 1960 material is indicated (J. R. V.) and is in the Canadian National Collection, Ottawa.

The combined collections number 13 species of Heleomyzidae, of which one is described as new to science (*Acantholeria vockerothi* n. sp.). A further three, *Suillia pallida* Fall., *Scoliocentra caesia* Meig., and *Heleomyza captiosa* Gor., are new to Spain. The Opomyzidae numbers 3 species, of which *Geomyza breviseta* Cz. and a *Geomyza*-species of the *combinata*-group are new to Spain.

Nine of the 28 species of Sphaeroceridae are new to Spain, viz. *Sphaerocera* (*I.*) *vaporariorum* Hal., *Limosina silvatica* Meig., *L. pullula* Zett., *L. fungicola* Hal., *L. bifrons* Hal., *L. penetralis* Coll., *L. beckeri* Duda, *Leptocera caenosa* Rond. and *L. modesta* Duda. It may be mentioned that the generic system of the Sphaeroceridae

is under revision. The genus *Leptocera* in its widest sense is obviously not a monophyletic taxon (paraphyletic if not polyphyletic), and some of the old *Leptocera* subgenera are here treated as genera.

One of the 3 species of Diastatidae, viz. *Euthychaeta spectabilis* Lw., and 2 of the 13 species of Drosophilidae, viz. *Cacoxenus indagator* Lw. and *Leucophenga maculata* Duf., are new to Spain. Further, 3 species of Scatophagidae and 1 species of Hippoboscidae are recorded.

HELEOMYZIDAE

Suillia variegata (Loew, 1862).

Material. — ALMERIA: Rioja, 50—200 m, 1 ♀, 7 March 1966 (W.H.); Same locality, 3 ♂ 3 ♀, 25 March 1966; Alhama 5 km W, 200—500 m, 7 ♂ 1 ♀, 17 March 1966 (W.H.); Same locality, 1 ♀, 21 March, 1 ♂, 28 March 1966. — GRANADA: Barranco de Algarrobo 12 km SW Orgiva, 300 m, 1 ♂, 25 April 1966; Barranco de Miranda 8 km SW Orgiva, 300 m, 2 ♀, 16 April 1966; Rio Guadalefo, Orgiva, 300 m, 1 ♀, 4 April, 3 ♂ 2 ♀, 11 April 1966; Granada, 700 m, 2 ♂ 4 ♀, 9—10 July, 7 ♂ 5 ♀, 13—14 July, 21 ♂ 21 ♀, 19 July 1960 (J.R.V.); N slope Veleta, Sierra Nevada, 2200 m, 1 ♂ 2 ♀, 30 July 1960 (J.R.V.).

Distribution. — Recorded from England, France, Germany, Austria, Italy, Tunisia and Asia Minor by Czerny (1924). Further from Portugal: several localities (leg. Lindberg), Cyprus: near Kykko (leg. Lindberg), Algeria (coll. Frey), the Azores and Madeira (leg. Frey & Storå). Earlier records from Southern Spain by Czerny & Strobl (1909).

Suillia notata (Meigen, 1830).

Material. — GRANADA: Barranco de Miranda 8 km SW Orgiva, 300 m, 3 ♂ 4 ♀, 16 April, 7 ♂ 4 ♀, 20 April 1966; Rio Lanjaron near Lanjaron, 600 m, 1 ♂ 1 ♀, 28 April 1966; N slope Veleta, Sierra Nevada, 2200 m, 1 ♀, 30 July 1960 (J.R.V.).

Distribution. — *S. notata* including 'var.' *hilaris* Zetterstedt is widely distributed from South Sweden in the north to North Africa in the south, eastwards to Crete and Rhodos (Czerny, 1924). The type locality is in Portugal. Recorded from Southern Spain by Czerny & Strobl (1909).

Remarks. — The name: var. *hilaris* Zett. has been used for populations of *notata* in England and North Europe, where darker

forms seem to be missing. The Spanish specimens in the present collections are rather variable in mesonotal colour, but if *hilaris* is to be considered as a subspecies, then the Iberian specimens should be named *notata notata*.

Suillia flagripes (Czerny, 1904).

Material. — GRANADA: Granada, 700 m, 9 July 1960 (J.R.V.).

Distribution. — Switzerland, France, Algeria (Czerny, 1924). I have seen a specimen from Corsica (leg. H. Lindberg). Recorded from Spain (Pardo) by Czerny & Strobl (1909).

Suillia bistrigata (Meigen, 1830).

Material. — GRANADA: N slope Veleta, Sierra Nevada, 2200 m, 3 ♂ 3 ♀, 30 July 1960 (J.R.V.).

Distribution. — Central and Southern Europe, Algeria, Asia Minor (Czerny, 1924; Séguy, 1934). Czerny & Strobl (1909) record the species from Montserrat and Escorial in Spain.

Suillia pallida (Fallén, 1820).

Material. — GRANADA: N slope Veleta, Sierra Nevada, 2200 m, 1 ♂ 3 ♀, 30 July 1960 (J.R.V.).

Distribution. — In most parts of Europe except arctic and sub-arctic areas, in the south mainly in mountains. Known from the French Pyrenees (Séguy, 1934). New to Spain.

Heteromyza atricornis Meigen, 1830.

Material. — GRANADA: Sierra Nevada Highway, 1800 m, 1 ♂, 27 July 1960 (J.R.V.).

Distribution. — Germany, Holland (Maastricht, leg. Schmitz), France, Austria, European U.S.S.R., Yugoslavia, Italy, Spain, Algeria, Madeira (Czerny, 1924; Séguy, 1934).

Heteromyza rufiventris Meigen, 1830.

Material. — ALMERIA: Alhama 5 km W, 200—500 m, 1 ♂, 17 March 1966, 1 ♂, 19 March 1966 (W.H.). — GRANADA: N slope Veleta, Sierra Nevada, 2200 m, 1 ♀, 30 July 1960 (J.R.V.).

Distribution. — Most parts of Europe; Siberia; Madeira. Strobl (1906) mentions the species from Southern Spain.

Remarks. — *H. rufiventris* is a rather variable species and I have considered *H. laeta* Meigen and probably *H. lapponica* Czerny as aberrant forms of this species. Strobl (1906) mentions Spanish specimens with dark abdomen.

Oecotheca fenestralis (Fallén, 1820).

Material. — ALMERIA: Rioja, 50—200 m, in *Pitymys*-burrows (Hackman, 1967). — GRANADA: Rio Guadalfeo, Orgiva, 300 m, 1 ♀, 19 April 1966.

Distribution. — Europe, Asia, North and South America, New Zealand (Harrison, 1959; Gorodkov, 1959). Spanish record by Strobl (1906).

Eccoptomera nigricornis Strobl, 1906.

Material. — ALMERÍA: Pechina and Rioja, data published by Hackman (1967).

Distribution. — Spain, type locality Malgrat NW of Barcelona (Strobl, 1906).

Remarks. — A dominant fly in the burrows of *Pitymys duodecimcostatus* in Rioja March—April 1966.

Morpholeria limbinervis (Czerny, 1909).

Material. — GRANADA: N slope Veleta, Sierra Nevada, 2300—2550 m, 2 ♀, 22 July, 2 ♀, 25 July, 1 ♀, 27 July, 1 ♂ 1 ♀, 30 July 1960 (J.R.V.).

Distribution. — Spain: Tarifa and Moreda (Czerny & Strobl, 1909).

Acantholeria vockerothi n. sp.

Material. — GRANADA: N slope Veleta, Sierra Nevada, 2550 m, ♂ holotype, 21 July 1960 (J.R.V.); same locality 2500 m, 4 ♀ paratypes, 25 July 1960 (J.R.V.). Types in Canadian National Collection, Ottawa.

Description. — Holotype, male. — Body length 5 mm, wing length 5.6 mm. General shape of head and its chaetotaxy as in *A. cineraria* Loew. Frons longer than wide (median length: median width = 3:2.5), yellowish-brown, hairy in front. Anterior orbital bristle very small, about a fourth the length of the posterior one. Occiput greyish pollinose. Genae wide, about half of the diameter of the eye, yellow as is also the face. Antennae yellow, arista almost naked, black. Palpi yellow.

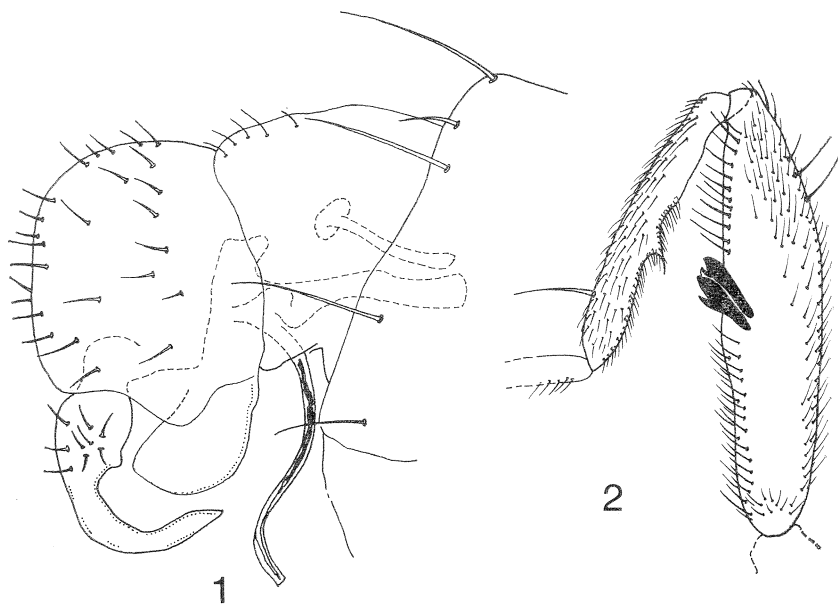
Mesonotum and scutellum pale grey, pollinose with brown spots at the insertion points of the dorsal bristles. Chaetotaxy as normal for the genus: dc 1 + 3, all strong bristles, one pair of praescutellars. Basal scutellars shorter than the apical ones (ratio 3:4). Pleura greyish pollinose, mesopleuron with a brownish shade in

the middle. Sternopleuron with scattered hairs and a prominent sternopleural bristle in usual position.

Wings yellowish hyaline, without any shadows at the cross-veins. Anterior cross-vein (ta) almost directly beneath the apex of r_1 . Costal spines of normal size. Halteres yellow.

Legs yellow. First femur slightly swollen and with an antero-dorsal row of 5—6 long bristles, a few long bristles in a medio-dorsal row, a posterior row of smaller bristles, and finally 4—5 longer and less regularly spaced postero-ventral bristles. First tibia slender and with a prominent, dorsal, preapical bristle. Second femur with two ventral rows of small bristles and a few antero-lateral bristles of which two are more prominent. Second tibia with only one dorsal, preapical bristle and the usual group of spurs. Third femur (Fig. 2) postero-ventrally with two modified bifurcate, scale-like bristles and apically to these two ventral rows of small bristles. Third tibia with a ventral tooth just opposite the conspicuous modified bristles of the femur, and further a dorsal preapical bristle and two antero-ventral spurs.

Abdomen grey with yellowish hypopygium. Male genitalia (Fig.



Figs. 1—2. Male genitalia and hind femur of holotype to *Acantholeria vockerothi* n. sp.

1) of the same general type as in *A. caucasica* Gorodkov as figured by Gorodkov (1962: 321).

Female. — Body length about 5 mm, wing length 5.5—6 mm. Head, thorax and wings as in the male. First and second legs mainly as in the male. Third femur without any postero-lateral bristles, antero-dorsally with two prominent bristles in the apical fourth. Abdomen grey, but yellow from the fifth segment and onwards. Second to fifth tergites with long marginal bristles. Cerci short and round, almost hidden by the seventh tergite.

Remarks. — The species differs in the male sex from *A. cineraria* Loew, *caucasica* Gorodkov and *dentitibia* Oldenberg by the modification of the two conspicuous postero-ventral bristles of third femur, and from the first two species by the tooth on third tibia. The females of all these species seem difficult to separate. The cerci of *vockerothi* have the same small spines as in *caucasica*.

***Scoliocentra caesia* (Meigen, 1830).**

Material. — GRANADA: Sierra Nevada, Alb. Universitaria, 2600 m, 2 ♀, 6 May 1966.

Distribution. — Germany, France, Holland, England, Sweden, Moravia, the Pyrenees (Séguy, 1934). No previous records from Southern Spain.

***Heleomyza modesta* Meigen, 1838.**

Material. — GRANADA: Rio Lanjaron 9 km NW Orgiva, 1600 m, 1 ♂ 1 ♀, 22 April 1966; Sierra Nevada, Alb. Universitaria, 2600 m, 5 ♂ 3 ♀, 6 May 1966.

Distribution. — Central, Eastern and Southern Europe. Because of confusion with *H. borealis* Holmgren (*czernyi* Collart) old records in the literature are not reliable.

Remarks. — The male genitalia of the species of the *modesta*-group have been figured by Gorodkov (1962).

***Heleomyza captiosa* (Gorodkov, 1962).**

Material. — GRANADA: Rio Lanjaron 9 km NW Orgiva, 1600 m, 1 ♀, 22 April 1966; Sierra Nevada near Padul, 1300 m, 2 ♂ 1 ♀, 1 May 1966; Sierra Nevada, Alb. Universitaria, 2600 m, 1 ♂ 2 ♀, 6 May 1966.

Distribution. — Germany (Heidelberg), Hungary, Italy (Gorodkov, 1962). I have seen a series of this species from Yugoslavia (Laibach, leg. J. A. Palmén). New to Spain.

Remarks. — The species is rather similar to *H. serrata* L., which is a common species in North Europe, but the male genitalia are distinctly different (characteristic parts visible without dissection).

OPOMYZIDAE

Geomyza sp. (*combinata*-group).

Material. — GRANADA: Maitena, 900 m, 2 ♀, 11 July 1960 (J.R.V.).

Distribution. — None of the several species confused under the name of *G. combinata* Linné has been recorded from Spain.

Remarks. — As shown by Vockeroth (1961) and the author (Hackman, 1958), several species have been confused under the name *G. combinata* Linné. The above specimens might possibly belong to *G. balachowskyi* Mesnil, but no characters have yet been found for separating the females of this group.

Geomyza breviseta Czerny, 1928.

Material. — GRANADA: Sierra de Contraviesa, Rabite, 1300 m, 1 ♂, 2 May 1966; Maitena, 900 m, 1 ♂, 11 July 1960 (J.R.V.).

Distribution. — Described from North Germany and reported from Macedonia by Coe (1958) and from England by Collin (1945). A little known but obviously widely distributed species. New to Spain.

Geomyza tripunctata Fallén, 1823.

Material. — ALMERÍA: Alhama 5 km W, 200—500 m, 1 ♂, 17 March 1966 (W.H.), 1 ♂ 1 ♀, 28 March 1966. — GRANADA: Barranco de Algarrobo 12 km SW Orgiva, 300 m, 3 ♂, 25 April 1966; Rio Guadalfeo, Orgiva, 300 m, 6 ♂ 3 ♀, 2—5 April, 2 ♂, 11 April, 3 ♂ 1 ♀, 18 April 1966; Rio Lanjaron near Lanjaron, 600 m, 1 ♂ 2 ♀, 28 April 1966; Maitena, 900 m, 2 ♂ 1 ♀, 11 July 1960 (J.R.V.); Granada, 700 m, 1 ♂, 9 July, 2 ♂, 13—14 July, 4 ♂ 6 ♀; 18—19 July 1960 (J.R.V.); Rio Lanjaron 9 km NW Orgiva, 1600 m, 2 ♀, 7 May 1966; Sierra Nevada near Alb. Universitaria, 2600 m, 1 ♂, 6 May 1966; N.slope Veleta, Sierra Nevada, 2300—2550 m, 5 ♂ 7 ♀, at 2400 m, 4 ♂ 10 ♀, 27 July; at 2200 m, 1 ♀, 30 July 1960 (J.R.V.).

Distribution. — Most parts of Europe, Cyprus, Turkmenia, North Africa (Hackman, 1958). The commonest species of the genus in the Mediterranean area. Previously known from Southern Spain (Strobl, 1906; Czerny & Strobl, 1909).

SPHAEROCERIDAE

Sphaerocera (s. str.) curvipes Latreille, 1805.

Material. — GRANADA: Rio Guadalfeo, Orgiva, 300 m, 10 ♂ 6 ♀, 2 April 1966; Pampineira, 900 m, 2 ♂ 1 ♀, 9 April 1966; Sierra Nevada, Alb. Universitaria, 2600 m, 1 ♀, 6 May 1966.

Distribution. — Europe, N America, East Africa, Japan, Australia. Spanish records: Strobl (1906).

Remarks. — Synanthropic species.

Sphaerocera (Ischiolepta) pusilla (Fallén, 1820).

Material. — GRANADA: Rio Guadalfeo, Orgiva, 300 m, 1 ♂ 2 ♀, 2 April 1966.

Distribution. — Europe, N. America, Central Africa. Spanish records by Strobl (1906).

Remarks. — Synanthropic species.

Sphaerocera (Ischiolepta) vaporariorum Haliday, 1836.

Material. — GRANADA: Rio Guadalfeo, Orgiva, 300 m, 1 ♂ 3 ♀, 2 April 1966.

Distribution. — Europe, U.S.A. Not earlier reported from Spain.

Copromyza (Crumomyia) glabrifrons (Meigen, 1830).

Material. — ALMERÍA: Alhama 5 km W, 200—500 m, 1 ♂, 19 March 1966. — GRANADA: Rio Guadalfeo, Orgiva, 300 m, 1 ♂; Rio Chico 8 km NE Orgiva, 1800 m, 1 ♀, 7 April 1966; Rio Lanjaron 9 km NW Orgiva, 1600 m, 2 ♂, 6 April 1966; Sierra Nevada, Alb. Universitaria, 2600 m, 8 ♂ 6 ♀, 6 May 1966.

Distribution. — Europe, Asia Minor. Recorded from Spain as *Borborus limbinervis* by Czerny & Strobl (1909).

Copromyza (s. str.) equina Fallén, 1820.

Material. — GRANADA: Rio Guadalfeo, Orgiva, 300 m, 1 ♂ 2 ♀, 2 April 1966; Pampineira, 900 m, 1 ♂, 9 April 1966.

Distribution. — Europe, Canary Islands, Azores, Siberia, Japan, Central Africa, Hawaii. Spanish records by Strobl (1906).

Remarks. — Synanthropic species.

Copromyza (Borborillus) costalis (Zetterstedt, 1847).

Material. — GRANADA: Rio Guadalfeo, Orgiva, 300 m, 2 ♀, 2 April 1966.

Distribution. — Europe, Siberia.

Remarks. — Strobl (1906) mentions *Borborus vitripennis* from Southern Spain, but includes *costalis* Zetterstedt as a synonym. There are various opinions on the interpretation of *vitripennis* Meigen but that of Collin (in litt. 1965 to the author) is obviously the correct one: *vitripennis* Meigen = *nitidifrons* Duda; *longipennis* Haliday = *vitripennis* auctt. (incl. Hackman, 1965) nec Meigen. Strobl's Spanish record might refer to *costalis* Zetterstedt = *vitripennis* Haliday nec Meigen.

Copromyza (Olinea) atra (Meigen, 1830).

Material. — ALMERÍA: Rioja, 50—200 m, 2 ♂, 12 March 1966 (W.H.); Alhama 5 km W 200—500 m, 1 ♀, 19 March 1966. — GRANADA: Rio Guadalfeo, Orgiva, 300 m, 12 ♂ 7 ♀, 2—18 April 1966; Rio Lanjaron 9 km NW Orgiva, 1600 m, 5 ♂ 2 ♀, 6—22 April 1966; Pampineira, 900 m, 6 ♂ 2 ♀, 9 April 1966; Rio Mulhacén 5 km N Capileira, 1500 m, 3 ♀, 9 April 1966; Sierra Nevada, Alb. Universitaria, 2600 m, 1 ♂, 6 May 1966; Granada, 700 m, 2 ♂ 2 ♀, 14 July 1960 (J.R.V.).

Distribution. — Europe, Canary Islands, Azores, Afghanistan, N. America. Recorded from Spain by Strobl (1906).

Remarks. — Synanthropic species.

Coproica vagans (Haliday, 1833).

Material. — ALMERÍA: Almería, 0—50 m, 1 ♀, 11 March 1966 (W.H.); Same locality, 2 ♀, 22 March 1966; Rioja, 50—200 m, 1 ♂, 7 March 1966 (W.H.); El Albufera, 0—50 m, 1 ♂ 2 ♀, 23 March 1966; Adra, 0—50 m, 4 ♀, 23 March 1966.

Distribution. — Cosmopolitan. Recorded from Spain as *Limosina albipennis* by Strobl, 1906.

Remarks. — Synanthropic species.

Coproica ferruginata (Stenhammar, 1854).

Material. — GRANADA: Rio Guadalfeo, Orgiva, 300 m, 7 ♂ 9 ♀, 2 April 1966; Sierra de Contraviesa, Rabite, 1300 m, 1 ♀, 2 May 1966.

Distribution. — Cosmopolitan. Recorded from Spain by Czerny & Strobl (1909).

Remarks. — Synanthropic species.

Limosina silvatica (Meigen, 1830).

Material. — GRANADA: Granada, 700 m, 1 ♂, 24 April 1966 (W.H.).

Distribution. — Most parts of Europe. Collected in Sierra Nevada by H. Lindberg in 1926 (not earlier published).

***Limosina plumosula* Rondani, 1880.**

Material. — ALMERÍA: Rioja, 50—200 m, 1 ♂, 7 March 1966 (W.H.). — GRANADA: Maitena, 900 m, 2 ♀, 10 July 1960 (J.R.V.).

Distribution. — Most parts of Europe, Canary Islands, Azores, Madeira, Central Africa. Several Spanish records (Duda, 1918).

***Limosina flavipes* (Meigen, 1830).**

Material. — ALMERÍA: Almería, 0—50 m, 1 ♂, 11 March 1966 (W.H.); Same locality, 1 ♂, 22 March 1966.

Distribution: Most parts of Europe, North and South Africa, Juan Fernandez Island, New Zealand. Recorded from Spain as *Limosina minutissima* by Strobl (1906).

Remarks. — Synanthropous species.

***Limosina heteroneura* Haliday, 1836.**

Material. — ALMERÍA: Almería, 0—50 m, 1 ♀, 11 March 1966 (W.H.); Same locality, 2 ♂ 3 ♀, 22 March 1966; Rioja, in and outside *Pitymys*-burrows (Hackman, 1967); El Albufera, 0—50 m, 4 ♂ 5 ♀, 8 March 1966; Adra, 0—50 m, 1 ♂, 23 March 1966. — GRANADA: Torrenueva E of Motril, 0—50 m, 1 ♀, 12 April 1966; Rio Guadalfeo, Orgiva, 300 m, 2 ♀, 3 April 1966; Rio Chico 8 km NE Orgiva, 1800 m, 1 ♂, 7 April 1966.

Distribution. — Almost cosmopolitan. Records from Spain by Strobl (1906).

Remarks. — Synanthropous species.

***Limosina fungicola* Haliday, 1836.**

Material. — GRANADA: Rio Lanjaron near Lanjaron, 600 m, 1 ♀; N slope Veleta, Sierra Nevada, 2400 m, 2 ♀, 26 July 1960 (J.R.V.).

Distribution. — Most parts of Europe, Central and South Africa. Mentioned by Strobl (1906) from Spain, but this record refers to *Leptocera (Opacifrons) coxata* Stenhammar.

***Limosina brevicostata* Duda, 1918.**

Material. — GRANADA: Rio Guadalfeo, Orgiva, 300 m, 2 ♂ 2 ♀, 2 April 1966.

Distribution. — Central and Southern Europe, East Mediter-

ranean, Canary Islands, Madeira, Africa, Formosa, New Guinea, Micronesia. Records from Spain by Duda (1918).

***Limosina pullula* Zetterstedt, 1847.**

Material. — GRANADA: Rio Guadalfeo, Orgiva, 300 m, 1 ♀, 3 April 1966.

Distribution. — Most parts of Europe. New to Spain.

***Limosina bifrons* Stenhammar, 1854.**

Material. — GRANADA: Maitena, 900 m, 1 ♀, 10 July 1960 (J.R.V.).

Distribution. — Most parts of the Old World. I have seen no earlier Spanish records.

***Limosina crassimana* Haliday, 1836.**

Material. — GRANADA: Rio Guadalfeo, Orgiva, 300 m, 7 ♂ 8 ♀, 2—11 April 1966; Rio Chico, Orgiva, 450 m, 1 ♀, 2 April 1966; Rio Lanjaron 9 km NW Orgiva, 1600 m, 2 ♀, 15 April 1966; Pampineira, 900 m, 2 ♂ 6 ♀, 9 April 1966; Sierra Nevada, Alb. Universitaria, 2600 m, 1 ♂ 2 ♀, 6 May 1966; 20 km NE of Granada, 2 ♀, 24 April 1966 (W.H.); Granada, 700 m, 1 ♂, 10 July, 1 ♂ 2 ♀, 19 July 1960 (J.R.V.); N slope Veleta, Sierra Nevada, 2800—3000 m, 1 ♀, 20 July 1960 (J.R.V.).

Distribution. — Europe, North America, Central Africa, Seychelles. Recorded from Spain by Strobl (1906).

Remarks. — Synanthropous species.

***Limosina penetralis* Collin, 1925.**

Material. — ALMERÍA: Almería, 0—50 m, 1 ♂, 22 March 1966. — GRANADA: Sierra Nevada near Padul, 1300 m, 1 ♂, 4 May 1966; N slope Veleta, Sierra Nevada, 2500 m, 1 ♀, 24 July 1960 (J.R.V.).

Distribution. — Europe, Afghanistan. New to Spain.

***Limosina talparum* Richards, 1927.**

Material. — ALMERÍA: Rioja, 1 ♂ in a *Pitymys*-burrow, 12 March 1966 (see Hackman, 1967).

Distribution. — In small mammal burrows in Europe and temperate parts of Asia.

***Limosina beckeri* Duda, 1918.**

Material. — GRANADA: N slope Veleta, Sierra Nevada, 2200 m, 1 ♀, 30 July 1960 (J.R.V.).

Distribution. — Canary Islands, Central Africa. New to Spain.

***Limosina spinipennis* Haliday, 1836.**

Material. — GRANADA: Rio Guadalfeo, Orgiva, 300 m, 3 ♂ 3 ♀, 2 April 1966; N slope Veleta, Sierra Nevada, 2500 m, 4 ♂ 3 ♀, 11 July 1960 (J.R.V.).

Distribution. — Holarctic, widely distributed. Recorded from Spain as *Limosina obtusipennis* by Strobl (1906).

Remarks. — Until now the name *Leptocera* (*Halidayina*) *spinipennis* has been used for this species, but I have preferred to treat the species as a *Limosina*. The long bristle at the base of costa is a weak basis for keeping the species in a separate subgenus.

***Leptocera* (*Opacifrons*) *coxata* (Stenhammar, 1854).**

Material. — GRANADA: Rio Guadalfeo, Orgiva, 300 m, 5 ♂ 4 ♀, 2—18 April 1966; Sierra Nevada, Alb. Universitaria, 2600 m, 2 ♂ 3 ♀, 6 May 1966.

Distribution. — Most parts of Europe, Canary Islands, Azores, Madeira, Southern and Eastern Mediterranean, East and South Africa, Congo area, Formosa and Western U.S.A. Recorded from Spain as *Limosina fungicola* by Strobl (1906) (nec *fungicola* Haliday).

***Leptocera* (*Opacifrons*) *humida* (Haliday, 1836).**

Material. — ALMERÍA: Rioja, 50—200 m, 1 ♀, 11 March 1966. — GRANADA: Rio Guadalfeo, Orgiva, 300 m, 1 ♂ 1 ♀, 2—11 April 1966; Granada, 700 m, 1 ♀, 8 July, 2 ♂ 1 ♀, 19 July 1960 (J.R.V.); N slope Veleta, Sierra Nevada, 2300—2550 m, 7 ♂ 2 ♀, 22—25 July, 2200—2400 m, 1 ♂ 1 ♀, 30 July 1960 (J.R.V.).

Distribution. — Most parts of Europe, Canary Islands, Azores, Madeira, Eastern and Southern Mediterranean. Recorded from Spain by Strobl (1906).

Remarks. — I have considered the subgenus *Spinotarsella* Duda as a synonym to *Opacifrons* Duda (Hackman, 1968).

***Leptocera* (s. str.) *fontinalis* Fallén, 1826.**

Material. — ALMERÍA: Rioja, 50—200 m, 1 ♂, 11 March 1966 (W.H.); Rio Andarax, Fondón, 600 m, 1 ♂, 18 March 1966; Alhama 5 km W, 200—500 m, 1 ♀, 28 March 1966. — GRANADA: Torrenueva E Motril, 0—50 m, 1 ♂, 17 April 1966; Rio Guadalfeo, Orgiva, 300 m, 7 ♂ 5 ♀, 3—18 April 1966; Barranco de Algarrobo

12 km SW Orgiva, 300 m, 1 ♂ 1 ♀, 25 April 1966; Rio Chico, Orgiva, 450 m, 1 ♂, 2 April 1966; Pampineira, 900 m, 1 ♀, 9 April 1966; N slope Veleta, Sierra Nevada, 2300—2550 m, 13 ♂ 11 ♀, 20—27 July 1960 (J.R.V.); Sierra Nevada, Alb. Universitaria, 2600 m, 1 ♂ 1 ♀, 6 May 1966; Granada, 20 km NE, 1000—1500 m, 4 ♂ 4 ♀, 24 April 1966 (W.H.); Granada, 700 m, 10 ♂ 11 ♀, 10—19 July 1960 (J.R.V.).

Distribution. — Europe, North and Central America, Central Africa. Recorded from Spain by Strobl (1906).

Leptocera (s. str.) curvipennis (Stenhammar, 1854).

Material. — ALMERÍA: Pechina, 50—200 m, 1 ♀, 5 March, 2 ♀, 9 March 1966 (also W.H.); Rioja, 50—200 m, 1 ♂ 2 ♀, 25 March 1966. — GRANADA: Rio Guadalfeo, Orgiva, 300 m, 3 ♂ 3 ♀, 18 April 1966; Sierra de Contraviesa, Rabite, 1300 m, 1 ♀, 2 May 1966; Sierra Nevada Highway, 1200 m, 5 ♂ 8 ♀, 27 July 1960 (J.R.V.); Sierra Nevada near Padul, 1300 m, 1 ♂, 4 May 1966; Sierra Nevada, Alb. Universitaria, 2600 m, 1 ♂, 6 May 1966; N slope Veleta, Sierra Nevada, 2300—3000 m, 33 ♂ 28 ♀, 20—30 July 1960 (J.R.V.); Granada, 700 m, 5 ♂ 5 ♀, 13—14 July 1960 (J.R.V.); Maitena, 900 m, 7 ♂ 3 ♀, 10 July 1960 (J.R.V.).

Distribution. — Most parts of the Old World, but in Europe not found north of Southern Sweden. A very common species in the Mediterranean area. Recorded from Spain as *Limosina roralis* by Strobl (1906).

Leptocera (s.str.) caenosa (Rondani, 1880).

Material. — ALMERÍA: Almería, 0—50 m, 1 ♀, 22 March 1966. — GRANADA: 20 km NE Granada, 1000—1500 m, 1 ♀, 24 April 1966 (W.H.).

Distribution. — Almost cosmopolitan. New to Spain.

Remarks. — Synanthropic species.

Leptocera (Rachispoda) modesta (Duda, 1923).

Material. — ALMERÍA: Rioja, 50—200 m, 3 ♀, 9—25 March 1966. — GRANADA: Almunecar, 1 ♀, 16 July 1960 (J.R.V.); N slope Veleta, Sierra Nevada, 2400 m, 1 ♂, 25 July 1960 (J.R.V.).

Distribution. — Central, Southern and SE Europe, Afghanistan. New to Spain.

Leptocera (Rachispoda) fuscipennis (Haliday, 1833).

Material. — ALMERÍA: El Albufera, 0—50 m, 2 ♀, 23 March 1966. — GRANADA: Almunecar, 1 ♂, 16 July 1960 (J.R.V.).

Distribution. — Mainly a litoral species and widely distributed in the Holarctic region. Also known from New Zealand. Recorded from Spain by Strobl (1906).

DIASTATIDAE

✓ *Campichoeta grandiloba* McAlpine, 1962.

Material. — ALMERÍA: Rioja, 50—200 m, 1 ♂, 7 March 1966 (W.H.) — GRANADA: Rio Guadalfeo, Orgiva, 300 m, 1 ♂ 4 ♀; 4—11 April 1966; Rio Lanjaron near Lanjaron, 600 m, 1 ♂ 1 ♀, 26 April 1966; Pampineira, 900 m, 1 ♂, 9 April 1966; 2 paratypes from Granada, leg. Vockeroth.

Distribution. — Spain (McAlpine, 1962).

Remarks. — *Campichoeta punctum* Meigen, *C. fumigata* Duda and *C. grandiloba* McAlpine form a close group of allopatric species. The male genitalia are distinctly different in these species. The females are very similar, and the presence or absence of a mesonotal stripe pattern is a less reliable character.

✓ *Campichoeta obscuripennis* (Meigen, 1830).

Material. — ALMERÍA: Rioja, 50—200 m, 1 ♀, 11 March 1966. — GRANADA: Rio Guadalfeo, Orgiva, 300 m, 4 ♀, 5—19 April 1966.

Distribution. — Central and South Europe, England, France, and in Asia from Nepal (Duda, 1934; McAlpine, 1962; Okada, 1966). I have seen specimens from Torino in Italy (leg. Frey). Mentioned by Czerny & Strobl (1909: 282) from the Sierra Nevada: "oberes Genital".

✓ *Euthychaeta spectabilis* Loew, 1864.

Material. — GRANADA: N slope Veleta, Sierra Nevada, 2200 m, 1 ♂ 1 ♀, 22 July 1960 (J.R.V.).

Distribution. — Central and South Europe (Duda, 1934). New to Spain.

DROSOPHILIDAE

✓ *Cacoxenus indagator* Loew, 1858.

Material. — ALMERÍA: Rioja, 10 km N, 200—500 m, 1 ♂, 12 March 1966.

Distribution. — Recorded from localities in Central, West and Southeast Europe. Terra typica: Silesia. New to Spain.

Remarks. — There are reasons to suspect that more than one

species is included under the name: *indagator* (Hardy & Wheeler, 1960). The genitalia of the present specimen (Figs. 3—5) do not fully agree with the figures given by Hardy & Wheeler (op. cit.). More material is needed to show the range of a possible infra-specific variation.

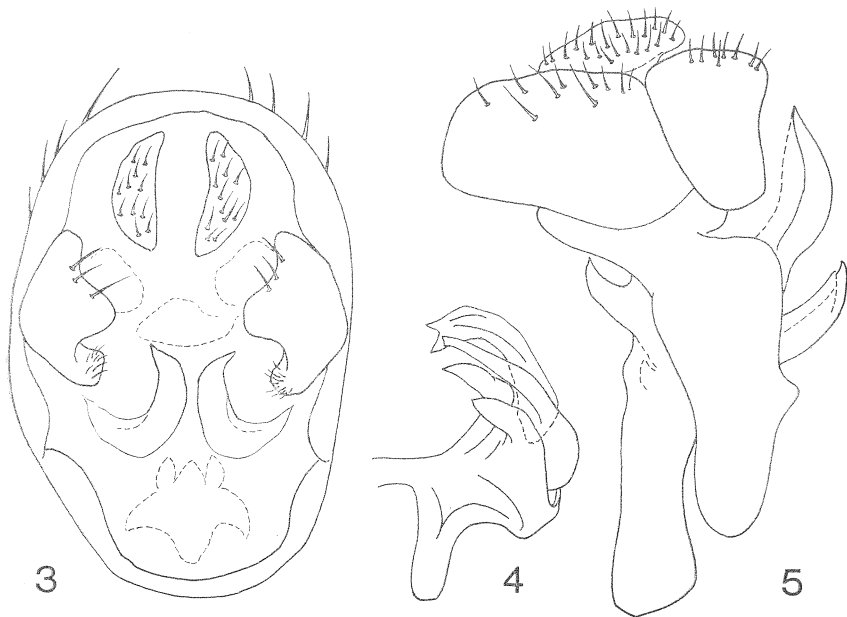
✓ ***Leucophenga maculata* (Dufour, 1839).**

Material. — GRANADA.: Rio Lanjaron near Lanjaron, 600 m, 1 ♂, 28 April 1966.

Distribution. — Widely distributed in Europe, reaching southern Sweden in the North. Most records are from Central Europe and Northern Italy (Oldenberg, 1914; Duda, 1935). It is recorded from Japan by Okada (1956) which indicates a very wide distribution in the Palaearctic Region. New to Spain.

✓ ***Scaptomyza (Parascaptomyza) pallida* (Zetterstedt, 1847).**

Material. — ALMERÍA: Albufera, 0—50 m, 1 ♂, 8 March 1966; Cabo de Gata, 0—50 m, 1 ♀, 31 March 1966; Pechina, 50—200 m, 6 ♂ 14 ♀, 5—9 March 1966; Rioja, 50—200 m, 15 ♂ 61 ♀,



Figs. 3—5. Male genitalia of *Cacozenus indagator* Loew from Spain
1. Ventro-caudal view of hypopygium; 2. Distal parts of phallic organ;
3. Hypopygium in profile.

7 March—4 April 1966; Rioja 10 km N, 200—500 m, 1 ♀, 12 March 1966; Alhama del Almería 5 km W, 200—500 m, 6 ♂ 5 ♀, 17—28 March 1966. — GRANADA: Rio Guadalfeo, Orgiva, 300 m, 8 ♂ 1 ♀, 3 April — 3 May 1966; Rio Lanjaron near Lanjaron, 600 m, 1 ♀, 26 April 1966; Pampineira, 900 m, 1 ♀, 9 April 1966; Granada, 700 m, 1 ♀, 13 July 1960 (J.R.V.).

Distribution. — A cosmopolitan species (Hackman, 1959). The records of *S. graminum* from Southern Spain given by Czerny & Strobl (1909: 279) refer to this species (see also Basden, 1961).

Scaptomys (s. str.) *graminum* (Fallén, 1823).

Material. — ALMERÍA: Pechina, 50—200 m, 1 ♂, 5 March 1966; Rioja, 50—200 m, 1 ♂ 1 ♀, 7 March 1966. — GRANADA: Barranco de Algarrobo 12 km SW Orgiva, 300 m, 1 ♂ 1 ♀, 25 April 1966; Rio Lanjaron near Lanjaron, 600 m, 2 ♂, 28 April 1966; Rio Sucio 5 km NW of Orgiva, 700 m, 1 ♂, 3 April 1966; Pampineira, 900 m, 2 ♀, 9 April 1966; Rio Lanjaron 9 km NW Orgiva, 1600 m, 1 ♂ 4 ♀, 6 April — 7 May 1966; Rio Mulhacén 5 km N Capileira, 1500 m, 1 ♀, 9 April 1966; Sierra Nevada near Padul, 1300 m, 2 ♂, 4 May 1966; Sierra Nevada near Alb. Universitaria, 2600 m, 1 ♀, 6 May 1966; N slope Veleta, Sierra Nevada, 2200—2400 m, 2 ♂ 1 ♀, 26—30 July 1960 (J.R.V.).

Distribution. — A widely distributed, holarctic species (Hackman, 1959; Wheeler & Takada, 1966). I have seen further specimens from Algeciras and Sierra de Cordoba collected by H. Lindberg in 1926. The specimens recorded as *Scaptomys tetras-ticha* Becker by Czerny & Strobl (1909:280) from Algeciras, "oberes Genital", and Moreda probably belong to this species.

Scaptomys (s. str.) *apicalis* Hardy, 1850.

Material. — ALMERÍA: Almería, 0—50 m, 1 ♀, 22 March 1966; Rioja, 50—200 m, 2 ♂ 3 ♀, 7—25 March 1966; Alhama del Almería 5 km W, 200—500 m, 1 ♀, 28 March 1966.

Distribution. — Europe-Siberia, Canary Islands, Azores and Madeira.

Remarks. — I have preferred to use the name *apicalis* Hardy instead of the older, but dubious name *flaveola* Meigen (cf. Basden, 1961). There are both yellow, grey and intermediately patterned specimens in the above material. *S. apicalis* belongs to a difficult complex of species which have not yet been worked out satisfactorily (cf. Hackman, 1959; Wheeler & Takada, 1966).

✓ ***Drosophila (Lordiphosa) andalusiaca* Strobl, 1906.**

Material. — ALMERÍA: Pechina, 50—200 m, 1 ♂, 5 March 1966; Rioja, 50—200 m, 2 ♀, 25 March 1966. — GRANADA: Rio Guadalfeo, Orgiva, 300 m, 1 ♂, 4 April 1966; Rio Lanjaron near Lanjaron, 600 m, 1 ♀, 26 April 1966; Pampineira, 900 m, 1 ♀, 9 April 1966; Rio Lanjaron 9 km NW Orgiva, 1600 m, 1 ♀, 7 May 1966; Granada, 700 m, 1 ♀, 2 July 1960 (J.R.V.); Maitena, 900 m, 4 ♂ 6 ♀, 11 July 1960 (J.R.V.); Sierra Nevada Highway, 1200 m, 1 ♂, 27 July 1960 (J.R.V.).

Distribution. — Spain (Terra typica: Algeciras), Great Britain, Holland, West Germany, Denmark, Yugoslavia, Cyprus, Morocco, Canary Islands Azores and Madeira (Frydenberg, 1956; Coe, 1959; Hackman, 1960).

Remarks. — Strobl's type material was investigated by Basden (1961), who found that *D. forcipata* Collin is a synonym of *andalusiaca*.

↓ ***Drosophila (Sophophora) melanogaster* Meigen, 1830.**

Material. — ALMERÍA: Almería, 0—50 m, 3 ♂ 6 ♀, 22 March 1966; Rioja 10 km N, 200—500 m, 1 ♀, 12 March 1966. — GRANADA: Rio Chico, Orgiva, 450 m, 2 ♀, 2 April 1966; Granada, 700 m, 1 ♂ 1 ♀, 14 July 1960 (J.R.V.).

Distribution. — Cosmopolitan, synanthropous. Reported from Spain by Strobl (1906).

↓ ***Drosophila (Sophophora) subobscura* Collin, 1936.**

Material. — ALMERÍA: Pechina, 50—200 m, 1 ♂ 1 ♀, 9 March 1966; Rioja, 50—200 m, 3 ♀, 7 March 1966; Alhama del Almería 5 km W, 200—500 m, 2 ♂ 1 ♀, 17—28 March 1966; Rioja 10 km N, 200—500 m, 2 ♂ 4 ♀, 12 March 1966. — GRANADA: Rio Guadalfeo, Orgiva, 300 m, 1 ♂ 2 ♀, 4—11 April 1966; Granada, 700 m, 1 ♂ 1 ♀, 9 July, 6 ♂ 7 ♀, 14 July 1960 (J.R.V.).

Distribution. — Most parts of Europe, Canary Islands, Azores, Madeira. Strobl's (1900 and 1906) records of *D. obscura* from Spain refer to *subobscura* (Basden, 1961).

✓ ***Drosophila (s. str.) phalerata* Meigen, 1830.**

Material. — GRANADA: Granada, 700 m, 1 ♀, 19 July 1960 (J.R.V.).

Distribution. — Most parts of Europe. Strobl's (1906) Spanish record of this species (from Malgrat) is probably correct.

✓ ***Drosophila* (s. str.) *funnebris*** (Fabricius, 1787).

Material. — ALMERÍA: Rioja 10 km N, 200—500 m, 1 ♀, 12 March 1966.

Distribution. — A cosmopolitan, synanthropic species. Mentioned from Tarifa in Southern Spain by Czerny & Strobl (1909: 279).

✓ ***Drosophila* (s. str.) *immigrans*** Sturtevant, 1921.

Material. — ALMERÍA: Almería, 0—50 m, 1 ♀, 6 March 1966 (W.H.); Same locality, 1 ♂, 22 March 1966.

Distribution. — Worldwide. Not common everywhere in Europe, and rather sporadic (Burla, 1951).

✓ ***Drosophila* (s. str.) *hydei*** Sturtevant, 1921.

Material. — ALMERÍA: Rioja 10 km N, 200—500 m, 4 ♀, 12 March 1966.

Distribution. — A cosmopolitan species.

Remarks. — The very closely related species: *D. repleta* Wollaston was reported by Czerny & Strobl (1909: 279) from Algeciras, but there are no specimens left in Strobl's collection (Basden, 1961). The record can thus not be checked. *D. repleta* and *hydei* have repeatedly been confused, and in Europe *hydei* seems to be commoner in the free than *repleta* (Burla, 1951).

✓ ***Drosophila* (s. str.) *buzzatii*** Patterson & Wheeler, 1942.

Material. — GRANADA: Granada, 700 m, 1 ♀, 14 July 1960 (J.R.V.).

Distribution. — Described from Argentina. European records from Portugal (Hadorn & al., 1952) and Sicily (Burla, 1951). Some specimens from the Canary Islands in Coll. Frey may belong here.

Remarks. — The species is considered smaller than *repleta* Wollaston but for the rest very close to that species. Sturtevant (1946) mentions that there is some doubt whether the type material of *repleta* (from Madeira) has been interpreted correctly. I am leaving this question open.

SCATOPHAGIDAE***Norellia* sp. (*spinipes* auctt.).**

Material. — GRANADA: Granada, 700 m, 12 ♂ 18 ♀, 19 July 1960 (J.R.V.).

Remarks. — Mr. J. R. Vockeroth has informed me in a letter (1968) that English and Mediterranean specimens of *Norellia spinipes* Meigen differ in certain characters and that probably two species or subspecies are involved. I am therefore leaving the name of the *Norellia* in the present collection open.

***Scatophaga lutaria* (Fabricius, 1794).**

Material. — GRANADA: Granada, 700 m, 10 ♂ 6 ♀, 18—19 July 1960 (J.R.V.).

Distribution. — Widely distributed in Europe. Recorded from Spain as *Scopeuma maculipes* by Czerny & Strobl (1909).

***Scatophaga stercoraria* (Linné, 1758).**

Material. — ALMERÍA: Pechina, 50—200 m, 2 ♀, 5—9 March 1966; Rioja, 50—200 m, 1 ♀, 7 March, 1 ♂ 1 ♀, 25 March 1966; El Albufera, 0—50 m, 1 ♀, 22 March 1966; Alhama 5 km W, 200—500 m, 1 ♂ 2 ♀, 19—29 March 1966. — GRANADA: Torrenueva E Motril, 0—50 m, 2 ♂ 5 ♀, 10—17 April 1966; Rio Guadalfeo, Orgiva, 300 m, 2 ♂ 1 ♀, 3—14 April 1966; Sierra de Contraviesa, Rabite, 1300 m, 6 ♂ 1 ♀, 2 May 1966; Rio Lanjaron 9 km NW Orgiva, 1600 m, 2 ♀, 15 April — 7 May 1966; Sierra Nevada near Padul, 1300 m, 1 ♀, 1 May 1966; N slope Veleta, Sierra Nevada, 2400 m, 2 ♂ 1 ♀, 27 July 1960 (J.R.V.); Granada, 700 m, 1 ♀, 14 July 1960 (J.R.V.).

Distribution. — Most parts of the Holarctic Region, Haiti. Recorded from Spain as *Scopeuma stercorarium* & *merdarium* by Czerny & Strobl (1909).

HIPPOBOSCIDAE

***Hippobosca equina* Linné, 1758.**

Material. — GRANADA: Rio Guadalfeo, Orgiva, 300 m, 3 ♂ 5 ♀, 7—18 April 1966; Rio Lanjaron 9 km NW Orgiva, 1600 m, 1 ♂, 22 April 1966.

Distribution. — Palaearctic Region and western part of the Oriental Region, introduced and established in the Fiji, New Caledonia, New Hebrides and Moluccan Islands (Maa, 1963). Records from Spain by Strobl (1906).

Summary.

The paper presents records of 13 species of Heleomyzidae, 3 species of Opomyzidae, 28 species of Sphaeroceridae, 3 species of Diastatidae, 13 species of Drosophilidae, 3 species of Scatophagidae and 1 species

of Hippoboscidae, all collected in Southern Spain in 1960 and 1966. New taxon is *Acantholeria vockerothi* n. sp. Further 17 species are recorded from Spain for the first time.

References.

- Basden, E. B., 1961: Type collections of Drosophilidae (Diptera), 1. The Strobl Collection. — Beitr. Ent., 11: 160—224.
- Burla, H., 1951: Systematik, Verbreitung und Ökologie der Drosophila-Arten der Schweiz. — Rev. Suisse Zool., 58: 23—175.
- Coe, R. L., 1958: Diptera taken in Yugoslavia from May to July, 1955. — Bull. Mus. Hist. Nat. Belgrade, B, 12: 181—206.
- Collin, J. E., 1943: The British species of Helomyzidae (Diptera). — Ent. mon. Mag., 79: 234—251.
- , 1945: The British species of Opomyzidae (Diptera). — Ent. Rec., 57: 13—16.
- Czerny, L., 1904: Revision der Helomyziden. 1. Theil. — Wien. ent. Ztg., 23: 199—286.
- , & Strobl, G., 1909: Spanische Dipteren. III. Beitrag. — Verh. zool.-bot. Ges. Wien, 59: 121—301.
- , 1924: Monographie der Helomyziden (Dipteren). — Abh. zool.-bot. Ges. Wien, 15: 1—66.
- , 1927: 53. Helomyzidae + Trichoscelidae + Chiromyidae, in Lindner: Die Fliegen der palaearktischen Region, Band 5₂, 56 pp. Stuttgart.
- , 1928: 54 c. Opomyzidae, in Lindner: Die Fliegen der palaearktischen Region, Band 6₁, 15 pp. Stuttgart.
- Duda, O., 1918: Revision der europäischen Arten der Gattung Limosina Macquart (Dipteren). — Abh. zool.-bot. Ges. Wien, 10: 1—240.
- , 1934: 58 e. Diastatidae, in Lindner: Die Fliegen der palaearktischen Region, Band 6₁, 18 pp. Stuttgart.
- , 1935: 58 g. Drosophilidae, *ibid.*, 118 pp.
- Frydenberg, O., 1965: The Danish species of Drosophila (Dipt.). — Ent. Medd., 27: 249—294.
- Gorodkov, K. B., 1959: Revision of the palearctic species of the genus Oecothoa Hal. (Diptera, Helomyzidae). (In Russian). — Revue Ent. URSS, 38: 905—922.
- , 1962a: Revision of the palearctic species of the genus Leria R.-D. (Diptera, Helomyzidae). (In Russian). — Revue Ent. URSS, 41: 643—671.
- , 1962b: New palearctic species of the family Helomyzidae (Diptera). (In Russian). — Trudii Zool. Inst. (Moskva-Leningrad), 30: 310—325.
- Hackman, W., 1958: The Opomyzidae (Dipt.) of Eastern Fennoscandia. — Not. Ent., 38: 114—126.
- , 1959: On the genus Scaptomyza Hardy (Dipt., Drosophilidae) with

- descriptions of new species from various parts of the world. — *Acta Zool. Fennica*, 97: 1—73.
- , 1960: Coelopidae, Drosophilidae, Sphaeroceridae and Scatophagidae from the Azores and Madeira. — *Bol. Mus. Municip. Funchal*, 13: 38: 101—107.
- , 1965: On the genus *Compromyza* Fall. (Dipt. Sphaeroceridae) with special reference to the Finnish species. — *Not. Ent.*, 45: 33—46.
- , 1967: On Diptera in small mammal burrows in Northern Europe and Southern Spain. — *Not. Ent.*, 47: 1—14.
- , 1968: On the subgenus *Opacifrons* Duda of the genus *Leptocera* Olivier (Diptera, Sphaeroceridae) with a description of a new species from Northern Fennoscandia. — *Not. Ent.*, 48: 40—44.
- Hadorn, E., Burla, H., Gloor, H. & Ernst, F., 1952: Beitrag zur Kenntnis der Drosophila-Fauna von Südwest-Europa. — *Zeit. indukt. Abst. u. Vererb.*, 84: 133—163.
- Hardy, D. E. & Wheeler, M. R., 1960: *Paracacoxenus*, new genus, with notes on *Cacoxenus indagator* Loew (Diptera: Drosophilidae). — *Ann. Ent. Soc. Amer.*, 53: 357—359.
- Harrison, R. A., 1959: *Acalypterate Diptera of New Zealand*, 382 pp. Wellington.
- Maa, T. C., 1963: Genera and species of Hippoboscidae (Diptera): types, synonymy, habitats and natural groupings. — *Pacific Insects Monogr.*, 6: 1—186.
- McAlpine, J. F., 1962: A Revision of the genus *Campichoeta* Macquart (Diptera: Diastatidae). — *Canad. Ent.*, 94: 1—10.
- Okada, T., 1956: Systematic study of Drosophilidae and allied families of Japan, 183 pp. Tokyo.
- , 1966: Diptera from Nepal. Cryptochaetidae, Diastatidae & Drosophilidae. — *Bull. Brit. Mus. (Nat. Hist.) Ent., Suppl.* 6: 1—129.
- Oldenberg, L., 1914: Beitrag zur Kenntnis der europäischen Drosophiliden (Dipt.). — *Arch. Naturges.*, 80 A: 1—42.
- Séguy, E., 1934: Diptères (Brachycères) (Muscidae Acalypterae et Scatophagidae). — *Faune de France*, 28, 832 pp. Paris.
- Strobl, G., 1900: Spanische Dipteren. VIII. Theil. — *Wien. ent. Ztg.*, 19: 1—10.
- , 1906: Spanische Dipteren. II. Beitrag. — *Mem. R. Soc. esp. Hist. nat. Madrid*, 3: 271—422.
- Sturtevant, A. H., 1946: On the dot chromosomes of *Drosophila repleta* and *D. hydei*. — *Genetics*, Menasha, 31: 259—268.
- Wheeler, M. R. & Takada, H., 1966: The nearctic and neotropical species of *Scaptomyza* Hardy (Diptera: Drosophilidae). — *Univ. Texas, Publ.* 6615: 37—78.
- Vockeroth, J. R., 1961: The North American species of the family Opomyzidae (Diptera: Acalypterae). — *Canad. Ent.*, 43: 503—522.