

THE SPHAEROCERIDAE (DIPTERA) OF ISRAEL

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ABSTRACT

Sixty species of Sphaeroceridae are recorded from Israel, most of them for the first time. Keys for the identification of the subfamilies and genera and for species of two genera are given. *Kimosina ciliata* (Duda) is redescribed and illustrated. **KEY WORDS:** Sphaeroceridae, Israel, taxonomy, faunistics, keys.

INTRODUCTION

The sphaerocerid fauna (Diptera, Sphaeroceridae) of Israel has hitherto been very poorly known. In his monograph on Palaearctic species, Duda (1938) recorded six species from "Palestina", from the area of modern Israel. These are (in their recently used valid names): *Borborillus niveipennis* (Duda, 1923), *Ceroptera aharonii* Duda, 1938, *Ceroptera algira* (Villeneuve, 1916), *Ceroptera alluadi* (Villeneuve, 1917), *Spelobia* (*S.J. villosa*) (Duda, 1918) and *Minilimosina albinervis* (Duda, 1918). These are also the only species listed from Israel in the new Catalogue of Palaearctic Diptera (Papp, 1984).

Valuable material of Sphaeroceridae, comprising about 1100 specimens, collected in Israel, and preserved in the collection of the Department of Zoology, George S. Wise Faculty of Life Sciences, Tel Aviv University (TAU), was sent to us for study by Dr. A. Freidberg. This collection was the major source for this study but it was supplemented by a small collection of 19 specimens, belonging to five species, collected by Dr. Brian R. Pitkin, British Museum (Natural History) (BMNH) on the Sinai Red Sea coast, Egypt.

The sphaerocerid fauna of the Mediterranean and Middle East regions is poorly known. The present study on the fauna of Israel is therefore also of significance for other Middle East countries. It is estimated that the 60 species recorded in this paper represent only about half of the species occurring in the region.

In this paper we give a key for subfamilies and genera, as well as for the species of two genera. The names of those genera and species not found so far in Israel but expected to occur there, are given in square brackets in the keys.

KEY TO SUBFAMILIES AND GENERA

1. Costa reaching to vein M_{1+2} , the latter not shortened and reaching to wing margin. Anal and basal cells complete. Females with 2 spermathecae. Brachypterous and apterous forms with a short ventroapical spur on hind tibia. 2
— Costa reaching only to or somewhat beyond vein R_{4+5} . M_{1+2} abbreviated, not reaching wing margin. Anal cell not developed, basal cell coalescent with discal cell. Females with 3 spermathecae. Brachypterous and apterous forms without strong ventroapical spur on hind tibia. (*Limosininae*) 9
2. Vein M_{4+5} reaching wing margin. Bristles and hairs on mesonotum reduced to short spines or warts. Hind tibia without dorsopreapical hair. (*Sphaerocerinae*) . 3
— Vein M_{3+4} not reaching wing margin. Mesonotum with hairs and bristles. Hind tibia with a long dorsopreapical hairlike seta (*Copromyzinae*) 5
3. Scutellum with only 2 lateral teeth. Mesonotal setae reduced but not wart-like *Sphaerocera* Latreille, 1805
— Scutellum with a row of teeth (tubercles) on posterior margin. Mesonotum and scutellum with warts 4
4. Scutellum with 6 to 9 teeth. Vein M_{1+2} straight or apically slightly recurved *Ischiolepta* Lloy, 1864
— Scutellum with 14 to 16 teeth. M_{1+2} strongly upcurving, parallel with R_{4+5} *Lotobia* Lloy, 1864
5. Hind tibia without ventro-apical spur *Lotophila* Lloy, 1864
— Hind tibia always with ventro-apical spur 6
6. Postocular hairs in a single row. Genal bristle reduced. 7
— Postocular hairs in more than one row, or irregularly placed. Genal bristle strong 8
7. Midtibia with 3-4 anterodorsal bristles. Hind tibia (except for *C. borealis*) without anteroventral bristle *Copromyza* Fallén, 1810
— Midtibia with only one (preapical) anterodorsal bristle. Hind tibia always with long anteroventral bristle *Borborillus* Duda, 1923
8. Inner occipital bristle well developed. Hind tibia with only 1 anterodorsal bristle [*Alloborborus* Duda, 1923]
— Inner occipital absent. Midtibia with a row of anterodorsal bristles *Crumomyia* Macquart, 1835
9. Hind tibia with short but thick ventro-apical spur. Pulvilli and claws enlarged. Head long with numerous interfrontals. Female abdominal segments 6-10 wholly telescoping, chitinization much reduced. *Ceroptera* Macquart, 1835
— Hind tibia with ventro-apical spur reduced to short seta (exceptionally a curved ventroapical spine may occur there). Pulvilli and claws weakly developed. Head shorter with fewer interfrontals. Female abdominal segments normal or more or less telescoping but chitinization stronger. 10
10. Scutellum between apical scutellars with at least 1 pair of small setulae; disc of scutellum more or less setulose. First costal section, Cs_1 , shortly and densely haired 11
— Scutellum without setulae between apical scutellars; disc of scutellum usually bare, if setulose (in some species of *Leptocera* (*Rachispoda*)), than at least 3 pairs of marginal scutellars present and Cs_1 with long and sparse hairs 12

11. Disc of scutellum densely setulose. Anal vein rectangular *Coproica* Rondani, 1861
— Disc of scutellum with only 1-2 pairs of small setulae. Anal vein sinuate. [*Philocoprella* Richards, 1929]
12. Midtibia with distinct ventral pre-apical bristle (sometimes together with a ventro-apical), or without any long bristle ventrally but in these cases mid basitarsus always with a distinct ventral bristle 13
— Midtibia always without ventral pre-apical bristle, ventroapical bristle usually present (but sometimes reduced in males); ventral bristle on midbasitarsus present only in species with long ventro-apical bristle on midtibia. 16
13. Scutellum with 3-4 pairs of marginal bristles, in some species also discal bristles present (*Leptocera* Olivier, 1813) 14
— Scutellum with only 2 pairs of marginal bristles, disc always bare 15
14. First pair of dorsocentral bristles inclinate. Face usually with strong protruding carina between antennae. *Leptocera* (*Rachispoda* Lioy, 1864)
— First pair of dorsocentral bristles reclinate. Face with less protruding carina between antennae (carina never projecting beyond eyes in profile) *Leptocera* (*Leptocera* Olivier, 1813)
15. Only 1 dorsocentral pair. Mid basitarsus without distinct ventral bristle. Midtibia always with a ventral pre-apical bristle, usually together with a ventro-apical one. [*Pteremis* Rondani, 1856]
— Usually at least 2 dorsocentral pairs. Mid basitarsus always with a distinct ventral bristle. Midtibia without ventral pre-apical bristle, or this bristle present in females only, ventral pre-apical bristle always absent . . . *Opacifrons* Duda, 1918
16. Head usually with a row (or at least with 1 longer and 1-2 smaller) of exclinate inner orbitals (setae between interfrontals and orbitals). R_{4+5} strongly curved up to Costa, the latter far extended beyond apex of R_{4+5} . Alula small and narrow. Minute species (0.7 — 1.3 mm) *Trachyopella* Duda, 1918
— Head with a row of inclinate inner orbitals, or only with minute exclinate additional hairs close to orbitals. 17
17. Costa with erect hairs, perpendicular to alar plane. Frons with distinct row of inclinate inner orbitals (between interfrontals and orbitals). Alula large, rounded apically (in contrast to *Trachyopella*). R_{4+5} very strongly curved up to Costa. Anal vein more or less distinctly angular. Very small species (0.6 — 1.2 mm) [*Elachisoma* Rondani, 1880]
— Costa without erect hairs. Anal vein sinuate or reduced. Frons usually with minute additional exclinate hairs arising close to orbitals. 18
18. Dorsum with 4-6 pairs of dorsocentral bristles; 1 or 2 anterior (presutural) dorsocentrals inclinate. Cs_1 with long and sparse hairs. *Thoracochaeta* Duda, 1918
— Dorsum with 1-6 pairs of dorsocentrals; if presutural dorsocentrals present, they are small and directed posteriorly. Cs_1 usually shortly and more densely haired 19

19. Body heavily sclerotized and strongly granulose (particularly abdomen). Prosternum wide triangular posteriorly. Third sternite very long (as long as 3rd and 4th tergite combined). Postgonites asymmetrical *Puncticorpus* Duda, 1918
- Body usually less sclerotized and not granulose. Prosternum linear or at most slightly widened posteriorly. Third sternite approximately as long as 3rd tergite. Postgonites asymmetrical 20
20. Costa basally with a single, long, inclinate bristle. R_{4+5} bisinuate. 1 dorsocentral pair. *Halidayina* Duda, 1918
- Costa basally with 2 shorter, paired bristles, longer one at most twice as long as shorter one. R_{4+5} never bisinuate. 1-6 pairs of dorsocentrals 21
21. Scutellum velvety black dusted. Mid basitarsus with a distinct ventral seta. [*Chaetopodella* Duda, 1920]
- Scutellum not velvety black. Mid basitarsus at most with small ventral setulae. 22
22. Hind tibia with 3 bristles, male midtibia curved and with 2 tufts of sinuate hairs *Limosina* Macquart, 1835
- Hind tibia at most with a dorsal preapical bristle. Male midtibia different. 23
23. Dorsum with 3-6 dorsocentral bristles, the prescutellar being usually small. R_{4+5} very strongly sinuate or almost straight and Cs_1 relatively long haired. Male genitalia complex, without subanal plate below anal fissure and gonostylus bipartite. Female postabdomen short, with 8th sternite reduced to 1-3 minute remnants *Kimosina* Roháček, 1983
- Usually 1-2, rarely 3 dorsocentral pairs (and sometimes some enlarged dorsocentral microsetae). When 3 dorsocentrals present, then R_{4+5} slightly recurved. Cs_1 shortly, densely haired. Male genitalia simpler, with gonostylus sometimes bilobed but never bipartite. Female 8th sternite normal, or sometimes reduced 24
24. Male synsternite 1+2 with a striking convex bulge, male 5th sternite reduced, transverse, stripe-like. Male postabdomen strongly down-curved as a consequence of enlarged 5th tergite and 7th sternite. Female postabdomen telescopically retractile with undivided 8th tergite. Larger species (2.1 – 3.1 mm) with Costa not overpassing apex of R_{4+5} *Herniosina* Roháček, 1983
- Male synsternite 1+2 without bulge, male 5th sternite larger. Male postabdomen not strongly down-curved. Species with telescopic female postabdomen are smaller (less than 2.0 mm) and with Costa distinctly overpassing R_{4+5} 25
25. Epiphallus distinctly developed. Female 10th tergite short, reduced, often fused with cerci. Body heavily pollinose, rather dull, mesonotum often opalescent. *Opalimosina* Roháček, 1983
- Epiphallus not developed. Female 10th tergite distinct, not fused with cerci. Body more or less shining despite some pollination 26
26. Male 4th sternite with large, flat, forked projection, 5th sternite with complex processes. Aedeagal complex with peculiar ventrocaudally-directed process on distiphallus (see Roháček, 1982: Fig. 96). Female postabdomen with ventrocaudally-projected 7th tergite and divided 8th tergite. R_{4+5} sinuate [*Apteromyia* Vimmer, 1929]
- Male 4th sternite without projection, 5th sternite more simple. Aedeagal complex different. Female postabdomen not as above. R_{4+5} variable. 27

27. Costa clearly overpassing beyond apex of R_{4+5} 28
 - Costa not or only slightly extended beyond apex of R_{4+5} 31
28. Female postabdomen long, narrow, (narrower than pre-abdomen at 6th segment), gradually tapering apically and telescoping, retractible. R_{4+5} sinuate or slightly bent up to Costa, gonostylus never long and slender 29
 - Female postabdomen short, as wide as pre-abdomen at 6th segment and strongly tapering apically, not telescopic. R_{4+5} either almost straight (rarely indistinctly sinuate or bent but then gonostylus long and slender) or upcurved to Costa and ending farther from apex of wing than the unpigmented fold of M_{1+2} 30
29. Vein R_{4+5} distally sinuate, discal cell with rounded posterior distal corner, alula large and broad. Periandrium with dorsolateral bristle. Gonostylus medially with a comb of spines. Phallopore short, reduced, frame-shaped
..... [*Terrilimosina* Roháček, 1983]
 - Vein R_{4+5} slightly bent up to Costa or very slightly sinuate, discal cell with angular posterior discal corner, alula small, narrow and pointed. Periandrium without dorsolateral bristle. Gonostylus without medial comb of spines. Phallopore larger and compact [*Minilimosina* Roháček, 1983]
30. Vein R_{4+5} almost straight, very slightly sinuate or indistinctly bent, wing never reduced. Eyes small. Male subanal plate and intraperiandrial sclerite not developed. Gonostylus very long and slender. Postgonites finely pubescent, distiphallus simple. Spectacles-shaped sclerite not developed
..... *Telomerina* Roháček, 1983
 - Vein R_{4+5} curved up to C and ending farther from apex of wing than unpigmented fold of M_{1+2} , or the wing is reduced and R_{4+5} straighter. Eyes larger. Male subanal plate and intraperiandrial sclerite present. Gonostylus subquadrate to triangular. Postgonites without pubescence. Spectacles-shaped sclerite well developed *Pullimosina* Roháček, 1983
31. Vein R_{4+5} straight or apically slightly recurved), when slightly sinuate or apically upcurved then gonostylus with robust ventral bristle and midtibia with anteroventral bristle below middle. Periandrium normally with a long dorsolateral hair-like bristle (absent only in *S. villosa*) and gonostylus always simple
..... *Spelobia* Spuler, 1924
 - Vein R_{4+5} sinuate or strongly bent towards Costa. Gonostylus of complex, bilobed form. Periandrium either uniformly haired or with several (3-4) robust bristles 32
32. Vein R_{4+5} very strongly bent to Costa, which ends very far from the apex of wing. Midtibia with anteroventral bristle below middle. Periandrium with several robust spine-like bristles. Male 5th sternite with posteromedial comb of spines. Gonostylus with internal and external lobe. Female 8th tergite undivided and 8th sternite of complex form. Spermathecae dish-shaped
..... *Spinilimosina* Roháček, 1983
 - Vein R_{4+5} not so strongly bent up to Costa or sinuate and apically straight. Midtibia always without anteroventral bristle below middle. Periandrium simply, uniformly short haired. Male 5th sternite without posteromedial comb of spines. Gonostylus short, with anterior and posterior lobe. Female 8th tergite divided into 2 sclerites, 8th sternite simple and long. Spermathecae never dish-shaped. [*Paralimosina* L. Papp, 1973]

THE SPHAEROCERID SPECIES OF ISRAEL

SPHAEROCERINAE

Sphaerocera Latreille, 1804

Sphaerocera curvipes Latreille, 1805

A common corpophagous species distributed to every continent, by human activity. In Israel it is recorded for the first time.

MATERIAL EXAMINED: Mt. Hermon (2000 m), Neve Ativ, Banyas, N. Dishon nr. Bar'am, Monfort, Tivon, Nahal Tut, 6.III.—4.IX.—, A. Freidberg (7♂♂, 4♀♀).

Ischiolepta Liroy, 1864

Ischiolepta scabricula (Haliday, 1836)

A rare but widely distributed species (Papp, 1984), known also from the Afrotropical and Oriental Regions. New to Israel and to the East Mediterranean.

MATERIAL EXAMINED: El Hamma, 19.IV.76, A. Freidberg (1♀).

Ischiolepta vaporariorum (Haliday, 1836)

A West Palaearctic, coprophagous species, known also from Afghanistan. The commonest species of the genus, *I. pusilla* (Fallén, 1820), probably occurs in Israel, though it has not been collected.

MATERIAL EXAMINED: Caesarea, 12.III.62, on *Arum dioscoridis* (1♂, 1♀), Jiftlik, 11.IV.81, A. Freidberg (2♂♂).

Lotobia Liroy, 1864

Lotobia pallidiventrif (Meigen, 1830)

Lotobia is a genus with numerous Afrotropical species; the only Palaearctic species develops in droppings of hoofed animals on pastures (for distribution, see Papp, 1984). The following Israeli records are the only ones between Tunisia and Afghanistan.

MATERIAL EXAMINED: Qala'at Nemrod, 9.VI.76, 24.IV.82, F. Kaplan (4♂♂, 3♀♀), Hula, 6.VII.77, A. Freidberg (2♂♂, 1♀), Park Hayarden, 16.XI.82, 2.VI.86, A. Freidberg (1♂, 2♀♀), Hadera, 24.V.80, A. Freidberg (14♂♂, 9♀♀), Jiftlik, 11.IV.81, A. Freidberg (1♂).

COPROMYZINAE

Lotophila Liroy, 1864 *Lotophila atra* (Meigen, 1830)

A widely distributed, Holarctic, coprophagous species, not previously recorded between Tunisia and Afghanistan.

MATERIAL EXAMINED: Mt. Hermon (1300–2000 m), Qala'at Nemrod, Banyas, Tel Dan, Hatzbani, 10 Km s. Quneitra, Qusbiya, Bar'am, Sasa, Gonen, Karkara, Monfort, Mt. Meiron, Lower Nahal Amud. Tiv'on. Mahanayim, Park Hayarden, Bteicha, K.Nahum, Kare Deshe, Jordan Valley, Allenby Bridge, Carmel, Haifa, Yagur, Ma'agan Mikha'el, Bat Shlomo, Herzliyya, W. Faria, Rehovoth, Anabta, Bet Guvrin, Kiryat Gat, 31.I.–26.XII, but mainly IV–V, (59♂♂, 58♀♀).

Copromyza Fallén, 1810 *Copromyza equina* Fallén, 1820

A common coprophagous species, known from the Holarctic and Pacific regions but these are the first records for Israel.

MATERIAL EXAMINED: Akko, 3.XII.79, F. Kaplan (1♀), Herzliyya, 3.II.79, A. Freidberg (1♂), Tel Aviv, 16.IV.78, A. Freidberg (1♂), Ma'abarot, 26.II.80, on *Arum dioscoridis*, I. Koah (3♀♀).

Copromyza pseudostercoraria L. Papp, 1976

This species was described from Hungary and is also found in France and Iran (Papp, 1985). It is possibly a southern Palaearctic species. Only one male was found amongst the material examined and this was attributed to this species with some hesitation. Its femora are dark in their mid 4/5 (ventrally in mid 3/5) and legs are less thickened than in *C. pseudostercoraria* males from Hungary but the genitalia, primarily the shape of the surstyli, are very similar to those of the paratypes. The bare area on anepisternum is slightly bigger than in *C. stercoraria*. It is possibly a southern Palaearctic species.

MATERIAL EXAMINED: Golan, Spring nr Nahal Nimrod, 30.X.85, A. Freidberg (1♂).

Alloborborus Duda, 1923

A monotypic genus, including only *A. pallifrons* (Fallén, 1820), which occurs in northern and central Europe (Norrbom and Kim, 1985) and will eventually be found in Israel.

Borborillus Duda, 1923

Six species of this genus were represented in the material examined (*B. niveipennis* was formerly known from Israel), a seventh one, *B. vitripennis* is also included in the key below. All the known species develop in droppings of big hoofed animals (mainly horses and donkeys) on pastures.

KEY TO SPECIES OF *BORBORILLUS*

1. Intracrossvein section of medial vein distinctly longer than its distal section. Male abdominal tergites and perianthrium with numerous long bristles laterally. 1 humeral and 3 dorsocentral pairs. Ventral spur of hind tibia almost as long as hind basitarsus [*vitripennis* (Meigen, 1830)]
- Intracrossvein section of medial vein not or only insignificantly longer than its distal section. Male abdominal tergites with short hairs laterally2
2. Bare area on gena restricted to a subocular line and to a subvertical triangular area. Pleura, including katepisternum, grey dusted. Mesonotum with thick pruinosity and small marbled patches mainly around setal bases. Ventral spur of hind tibia long (about 2/3 of hind basitarsus), dorsal pre-apical bristle of hind tibia longer than its distance from apex of tibia.*marginatis* (Adams, 1905)
- Bare area on gena distinct, 1/3 width of gena, or this bare area triangular with anterior angle above vibrissa. Pleura with bare areas on katepisternum or on anepisternum and katepisternum. Mesonotum shining or less heavily dusted . . .3
3. Only 1 distinct dorsocentral pair. Ventral spur of hind tibia weak, about half as long as hind basitarsus. Dorsal pre-apical bristle of hind tibia as long or only slightly longer than its distance from apex of tibia.4
- Three distinct dorsocentral pairs. Ventral spur of hind tibia thick and about as long as hind basitarsus. Dorsal pre-apical bristle of hind tibia obviously longer than its distance from apex of tibia.5
4. Mesonotum dusted, bronze to brown with 2 longitudinal stripes. Anepisternum and anepimeron dusted, not shining. Frons no red anteriorly*sordidus* Zetterstedt, 1847
- Mesonotum more shining, black, without longitudinal stripes. Anepisternum and anepimeron almost completely shining black. Frons anteriorly with red margin.*hispanicus* (Duda, 1923)
5. Interfrontal plate shining black, mesonotum more shining. Anepisternum shining, with caudal and ventral dusted parts. R_{4+5} and M_{1+2} completely parallel*nitidifrons* (Duda, 1923)
- Interfrontal plate dark dusted, with some greasy shine only. Mesonotum more dusted. Anepisternum dusted with only a small anteroventral bare (shining) area. R_{4+5} and M_{1+2} slightly converging.6
6. Hind tibial spur distinctly longer than hind basitarsus. Bare area below eye on gena in the form of a rose-thorn, microtomentum on anteroventral part of gena light grey. Male perianthrium with several long thick bristles, short bristles are scattered and much shorter than long thicker ones. Wing with darker veins, ochreous or light brown*costalis* Zetterstedt, 1847
- Hind tibial spur is shorter than, or as long as hind basitarsus. Bare area below eye not in the form of a rose-thorn (microtomentose area also wide posteriorly). Microtomentum on gena dark grey. Male perianthrium covered by dense long bristles, the thinner bristles almost as long as the thick ones. Wing veins (including costa) pale, waxy to light yellow*niveipennis* (Duda, 1923)

Borborillus costalis (Zetterstedt, 1847)

A widespread Palearctic species, also known from Egypt.

MATERIAL EXAMINED: Galilee, Safed, 23.IV.56, O. Theodor (1♂).

Borborillus hispanicus (Duda, 1923)

Known from Europe, Kazakhstan and Soviet Middle Asia (Papp, 1984). The larvae develop in horse and donkey droppings.

MATERIAL EXAMINED: Mt. Meiron, 30.IX.76, A. Freidberg (9♂♂, 6♀♀), Caesarea, 12.III.62, on *Arum dioscoridis* (1♂), Tel Aviv, 12.V.71, J. Kugler (1♀), Hazeva, 21.IV.81, A. Freidberg (1♂, 2♀♀).

Borborillus marginatis (Adams, 1905)

This species was described from Southern Rhodesia and has been found in other parts of the Afrotropical region, Cap Verde Is., Canary Is., and in Egypt. Its occurrence in the Oriental region was recently corroborated (L. Papp, unpublished). There are specimens from Rhodes (Greece) in the collection of the Hungarian Natural History Museum. New to Israel.

MATERIAL EXAMINED: Nahal Tut, 18.V.82, A. Freidberg (1♂).

Borborillus nitidifrons (Duda, 1923)

Hitherto known from Europe and Tunisia (Papp, 1977b), new to Israel and to the Asian part of the Palearctic.

MATERIAL EXAMINED: Tiberias, 1.III.35, J. Aharoni coll., "nitidifrons D. ♀" (Duda's handwriting), (1♀), Caesarea, 12.III.62, on *Arum dioscoridis* (1♀), Tel Aviv, 28.III.77, A. Freidberg (1♀), Mishor Rotem, 3-4.III.65, M. Weichselfish (1♂, 1♀), El Arish, 3.II.73, A. Freidberg (1♂).

Borborillus niveipennis (Duda, 1923)

A mediterranean species (see Papp, 1977b, 1984), known also from Israel.

MATERIAL EXAMINED: Caesarea, 12.III.62, on *Arum dioscoridis* (8♂♂, 6♀♀), Mishor Rotem, M. Weichselfish (1♂), Jiftlik, 11.IV.81, A. Freidberg (2♂♂), El Arish, 3.II.73, A. Freidberg (10♂♂, 11♀♀); Egypt, Sinai: Firan, 9.IV.73, A. Freidberg (1♀), Ras Mamlach, 11-15.IV.80, B.R. Pitkin (1♀); "P. 1.XII.43, Com. Inst. Ent., Coll. No. 12720 (1♂).

Ceroptera algira (Villeneuve, 1916)

Known from Algeria, Egypt and Israel (Papp, 1984).

MATERIAL EXAMINED: Tel Aviv dunes, 8.IV.81, A. Freidberg (6♂♂, 3♀♀), Mishor Rotem, 16.IV.80, M. Kaplan (1♀), "16.III. *Scarabaeus sacer*" "*Ceroptera rufitarsis* Macq. Duda det." (a handwriting not that of Duda!) (1♂, 1♀), El Karyatein b. Palmyra, III.21, J. Aharoni leg. "*Ceroptera rufitarsis* Macq. det.", (1♂).

Ceroptera alluaudi (Villeneuve, 1971)

This is a peculiar species in that the female cerci are developed into a pair of long sharp hard blades. Known from Lybia, Sudan and Israel.

MATERIAL EXAMINED: Palmahim, 20.XI.60, on *Scarabaeus* (2♂♂, 7♀♀), Nahr Rubin, 7.III.51, "on scarab", O. Theodor (1♂, 9♀♀), Gedera, 31.VII.41, Com. Inst. Ent., coll. No. 12720 (1♂), El Arish, 20.III.72, J. Kugler (8♀♀).

Limosina Macquart, 1835

Limosina silvatica (Meigen, 1830)

After redefinition (Roháček, 1983), this genus is monotypic, containing only *L. silvatica*. This is a common, phytosaprophagous woodland species. It is Mediterranean (Spain: Roháček, 1983, Tunisia: Papp, 1977b). The previous records from the Nearctic are all erroneous (S.A. Marshall, pers. comm., 1983) and the species was not known before in Asia. New to Israel.

MATERIAL EXAMINED: Mt. Hermon (2000 m), 5.V.77, 14.V.81, 20.V.86, A. Freidberg (2♂♂, 4♀♀), Nemrod (1000 m), 8.XI.86, A. Freidberg (1♂), Banyas, ex *Populus* sp. foliage, 14.IV.83, I. Yarom (1♂), Khispin, 9.II.84, I. Nussbaum (1♂), Sasa, 18.IV.81, A. Freidberg (2♀♀).

Apteromyia Vimmer, 1929

The genus contains only two known species (Marshall and Roháček, 1982). The Holarctic *A. claviventris* (Strobl, 1909) is common and widespread in the West Palaearctic (southernmost record is from Sicily (Strinati, 1962)) and may be expected to occur also in Israel, particularly on mountains and in caves.

Herniosina Roháček, 1983

Only two Palaearctic species are known in this genus (Roháček, 1983). *H. bequaerti* (Villeneuve, 1917) is relatively widely distributed throughout North and Central Europe, *H. horrida* (Roháček, 1978) is known only from Czechoslovakia.

Herniosina sp. nr. *horrida* (Roháček, 1978)

The females examined are most similar to *H. horrida*, including the structure of their postabdomen. A male is necessary to decide whether they represent this species or a different taxon.

MATERIAL EXAMINED: Mt. Hermon (2000 m), 22.V.73, A. Freidberg (2♀♀).

Terrilimosina Roháček, 1983

Three species of this genus occur in the West Palaearctic (Roháček, 1983). None of them has been found in Israel but the Holarctic *T. schmitzi* (Duda, 1918) may occur in the mountains of Israel, though the southernmost record in Europe is Roumania (Duda, 1918). *T. racovitzai* (Bezzi, 1911), a cavernicolous species known from Bulgaria, Yugoslavia (Roháček, 1983), Afghanistan (Richards, 1961), and Turkey (Papp, 1985), probably also occurs there.

Minilimosina Roháček, 1983

No species of this genus were found in the material examined but *M. (Allolimosina) albinervis* (Duda, 1918) has previously been recorded from Palestine (Duda, 1938: without precise locality). It is also known from Central and South Europe (Roháček, 1983, Papp, 1984) and Afghanistan (Papp, 1978). Other *Minilimosina* species, which probably occur in Israel, are as follow: *M. (Svarciella) vitripennis* (Zetterstedt, 1847) nearest records from Italy, Yugoslavia, Bulgaria and Cyprus (Papp, 1985); *M. (M.) fungicola* (Haliday, 1836) and *M. (M.) parvula* (Stenhammar, 1854) (nearest records for both from Bulgaria) and *M. (M.) roháčeki* (Papp, 1978) (described from Afghanistan). For the key to European *Minilimosina* species see Roháček (1983).

Puncticorpus Duda, 1918

Puncticorpus cribratum (Villeneuve, 1918)

All known species of this genus were revised by Roháček and Marshall (1982). Hitherto, *Puncticorpus* was only known from the West Palaearctic and one species was found in Israel. Since the paper of Roháček and Marshall (1982) — recording this terricolous species from Central Europe in a wider sense — the species has been found in the East Mediterranean (Papp, 1985: Turkey, Cyprus and Israel: "Judee: Mevasseret (Besuchet, Löbl)"). The Israeli records are the southernmost ones. While the specimens from the northern latitudes are distinctly brachypterous, the southern populations have longer wings, the specimens from Israel are fully winged.

MATERIAL EXAMINED: Bar'am, 25.XI.77, ex fungus, 17.XII.77, A. Freidberg (4♂♂, 3♀♀), Hatzbani, 24.IV.82, F. Kaplan (1♀), Haifa, 13.V.78, A. Freidberg, (1♂), Carmel, 30.IX.81, 5.V.76, A. Freidberg (2♀♀), Herzliyya, 13,20,28.IV.82, 3,20,24, 26.XII.81, 7.I.82, A. Freidberg, Malaise trap (4♂♂, 4♀♀), Aqua-Bella, 18.V.65, Margalit (3♂♂, 2♀♀); some of the specimens with identification labels of S.A. Marshall.

Paralimosina L. Papp, 1973

The genus includes 6 species in the West Palaearctic (Roháček, 1983). None of them has been found in Israel until now but at least 2 of them may occur there. *P. furcata* (Rondani, 1880) is widespread in Europe, recorded also from Bulgaria and Tunisia. *P. macedonica* (Roháček, 1977) is known from Yugoslavia, Bulgaria, Iran and Afghanistan. For descriptions and key see Roháček, 1983.

Spelobia Spuler, 1924

Roháček (1983) revised the West Palaearctic species of the genus. Six species were found in Israel but as many more can be expected to occur there. The species possibly occurring in Israel are as follows: *Spelobia (Eulimosina) ochripes* (Meigen, 1830) — Holarctic species (nearest records from Bulgaria, Tunisia and Afghanistan); *S. (S.) chunipes* (Meigen, 1830), *S. (S.) pseudosetaria* (Duda, 1918), and *S. (S.) luteilabris* (Rondani, 1880) — semisynanthropic species of cosmopolitan tendency (nearest records are from Bulgaria, Tunisia and Afghanistan); *S. (S.) parapusio* (Dahl, 1909) — West Palaearctic fungivorous species with nearest records from Bulgaria, Yugoslavia and Tunisia. All the West Palaearctic species were keyed by Roháček (1983).

Spelobia (Spelobia) baezi (L. Papp, 1977)

The discovery of this species in Israel is rather surprising because it was described from the Canary Islands (Papp, 1977a) and since then it has only been recorded from southern Spain (Roháček, 1983). Apparently *S. baezi* is a circummediterranean species.

MATERIAL EXAMINED: Mt. Hermon (2000 m), 1.X.75, A. Freidberg (1♂), Mt. Hermon (1600 m), 23.IV.82, F. Kaplan (1♂), Qala'at Nemrod, 24.IV.82, F. Kaplan (1♂), Neve Ativ, 28-29.VIII.81, A. Freidberg (1♂), N. Amud, 6.X.74, A. Freidberg (1♀), Herzliyya, 11.I.82, 21.XII.81, A. Freidberg (1♂, 1♀).

Spelobia (Spelobia) palmata (Richards, 1927)

A species widespread in the West Palaearctic, new to Israel. The nearest previous records are from Tunisia (Papp, 1977b) and Bulgaria (Roháček, 1983). The species is predominantly necrophagous but it can occur also in other kinds of decaying matter.

MATERIAL EXAMINED: Mt. Hermon (1600 m), 23.IV.82, F. Kaplan (1♀), Monfort, 10.III.81, A. Freidberg (1♀), Mt. Meron, 5.X.76, A. Freidberg (14♂♂, 8♀♀).

Spelobia (Spelobia) simplicipes (Duda, 1925)

The species is widespread in the Pontomediterranean area and has penetrated into warmer regions of Central Europe. The mediterranean records nearest to Israel are from Tunisia and Crete but it is also recorded from Soviet Central Asia and Afghanistan (Papp, 1978, 1979). It is a coprophagous species (Roháček, 1983).

MATERIAL EXAMINED: Mt. Hermon (1300 m), 23.IV.82, F. Kaplan (2♂♂, 1♀), Mt. Hermon (800 m), 23.IV.83, D. Furth (1♂), Qala'at Nemrod, 24.IV.82, F. Kaplan (1♂), Majdel Chams, 14.X.82, F. Kaplan (2♀♀), Gonen, 15.III.75, A. Freidberg, F. Kaplan (3♀♀), Monfort, 10.III.81, 14.III.85, A. Freidberg, I. Susman (1♂, 1♀), N. Bezet, 23.IX.86, A. Freidberg (1♀), Safed, 23.IV.56, O. Theodor (1♀), Golan, Khispin, 28.X.83, I. Nussbaum (1♀), Golan, N. Kanaf, 15.I.83, I. Nussbaum (2♀♀), Tiv'on, 6.III.75, A. Freidberg (1♂), Jiftlik, 11.IV.81, A. Freidberg (1♂), Herzliyya, 8,24,28.XII.81, A. Freidberg, Malaise trap, (1♂, 2♀♀), Migdal Zedek, 4.I.82, I. Nussbaum (1♀).

Spelobia (Spelobia) villosa (Duda, 1918)

This is a typical Mediterranean species (see Roháček, 1983). It is previously recorded from Palestine (Rehoboth nr Jaffa — Duda, 1938, Roháček, 1983). Its biology is poorly known but the species seems to be associated with beetles of the genus *Ateuchus*, similarly to *Ceroptera* species (see Heymons, 1943).

MATERIAL EXAMINED: Tiv'on, 6.III.75, A. Freidberg (1♂), Binyamina, 26.I.76, A. Freidberg (1♂, 1♀), Herzliyya, 7,19.II.82, Malaise trap, 28-31.XII.81, A. Freidberg (1♂, 8♀♀), El Arish, 3.II.73, A. Freidberg (1♂).

Spelobia ?manicata (Richards, 1927)

This is a sibling species of *S. chunipes* (Meigen, 1830), with reliable records from Europe (Sweden and England to Hungary). Two males were found among the material examined but their body characteristics are not convincing (safe identifications are based usually on series of specimens, cf. Roháček, 1983), consequently we do not propose to include this species in the list of sphaerocerids in Israel; more material is necessary for a decision in this respect.

MATERIAL EXAMINED: Mt. Hermon (1650 m), 1.X.75, M. Kaplan (1♂), Gonen, 15.III.75, A. Freidberg (1♂) (both specimens bear the identification label: "*Spelobia manicata* ♂ Det. SA Marshall, 1984").

Spelobia (Spelobia) sp. nr talis Roháček, 1983

The specimens examined have genitalia very similar to *S. talis* but differ by having distinctly clavate fore tibiae and larger eyes (their size is intermediate between those of *S. talis* and *S. talparum*). More specimens are necessary to establish the

identity of the Israeli populations.

MATERIAL EXAMINED: Mt. Hermon (1993 m), 10.VI.83, I. Nussbaum (2♂♂).

Spelobia (Spelobia) sp. (talparum-group)

Two females cannot be identified with certainty. They seem to belong to two species, one being probably conspecific with the above two males.

MATERIAL EXAMINED: Mt. Hermon (2000 m), 22.VI.73, A. Freidberg (1♀), Mt. Hermon (1993 m), 10.VI.83, I. Nussbaum (1♀).

Spelobia (Bifronsina) bifrons (Stenhammar, 1854)

The species is now cosmopolitan due to its synanthropy. It is new to Israel but there are records from the adjacent countries (e.g. from Egypt (Hafez, 1949), and Afghanistan (Papp, 1978)). *S. bifrons* develops mainly in manure but also in decaying vegetation (Roháček, 1983).

MATERIAL EXAMINED: N. Bezet, 23.X.86, I. Susman (3♂♂), Akko, swamp, 23.X.86, I. Susman, A. Freidberg (3♂♂, 1♀), Nahal Oren, 22.II.81, A. Freidberg (2♀♀), Herzliyya, 10-19.XII.81, Malaise trap, A. Freidberg (2♂♂, 2♀♀), Herzliyya Beach, on *Polygonum* sp., 18.X.86, A. Freidberg (1♂), Savion, 8.XII.82, Y. Zvik (1♀), Migdal Zedek, 24.IX.81, F. Kaplan (1♂).

Pullimosina Roháček, 1983

The genus includes six species in the West Palaearctic, but only the nominate subgenus is represented in the more southern areas. Only one species was found in Israel but *P. (Pullimosina) moesta* (Villeneuve, 1918), known from the Mediterranean region (Corsica), might possibly occur there. For key and further information on *Pullimosina* see Roháček (1983).

Pullimosina (Pullimosina) heteroneura (Haliday, 1836)

A cosmopolitan species, widespread and common in Europe, particularly so in the Mediterranean subregion, including Bulgaria, Algeria, Tunisia (Roháček, 1983); also known from Afghanistan (Papp, 1978) and from soviet Middle Asia: Tajikistan (Papp, 1979). New to Israel. It is a polysaprophagous species and often forms very successful synanthropic populations.

MATERIAL EXAMINED: Golan, Khispin, 18.XII.83, I. Nussbaum (1♂, 1♀), Kefar Shammai, 14.IX.71, J. Kugler (1♂), Akko, swamp, 23.X.86, I. Susman (1♀), Bteicha, 14.III.75, A. Freidberg (1♂), Haifa, 17.II.73, A. Freidberg (1♀), Nahal Oren, 22.II.81, A. Freidberg (1♀), Kefar Shemaryahu, II.85, A. Eitam (1♂), Herzliyya, 18,25.XII.81, 3-20.I.82, Malaise trap, A. Freidberg (10♂♂, 18♀♀), Ramat Hadar,

7.8.XI.82, A. Freidberg (3♂♂, 2♀♀), Tel Aviv, 16.IV.78, A. Freidberg, 27.IV.71, J. Kugler (1♂, 1♀), Jiftlik, 11.IV.81, A. Freidberg (1♀), Hulda, 6.II.75, A. Freidberg (1♀), Jerusalem, 1.IV.48, O. Theodor (1♂), W. Kelt, 25.III.75, A. Freidberg (1♀), Kalia, 29.III.76, M. Kaplan (1♀), Ashdod, 1.I.75, F. Kaplan (3♀♀), En Tureiba, 27.IV.73, A. Freidberg (1♀), Sederot, 27.II.74, A. Freidberg, (1♀), Devira, 16.I.75, M. Kaplan (1♂), En Mor, 21.XI.83, I. Nussbaum (1♀), Avdat, 31.III.81, F. Kaplan, 19.IV.75, A. Freidberg (1♂, 1♀).

Spinilimosina Roháček, 1983

Only one species of this genus is known in the Palaearctic Region, and this also occurs in Israel.

Spinilimosina brevicostata (Duda, 1918)

The species is widespread in the subtropics of the Old World (also New World and Pacific) but rarely penetrates into more northern areas (Roháček, 1983). It has been frequently recorded from the Mediterranean (see Roháček, 1983), including "Palestine" (Duda, 1938: Rehoboth nr. Jaffa, not seen). *S. brevicostata* occurs on decaying matter of various kinds.

MATERIAL EXAMINED: Herzliyya, 7.I.82, Malaise trap, A. Freidberg (1♀), Tel Aviv, 11.XII.77, A. Freidberg (1♂).

Chaetopodella Duda, 1920

The genus is represented by a single species, *Ch. scutellaris* (Haliday, 1836) in the Palaearctic Region. This species has not been recorded from Israel but it probably occurs there because it is widespread in the Old World (the nearest records are from Bulgaria, Afghanistan and Ethiopia).

Kimosina Roháček, 1983

Seven Palaearctic species of three subgenera of *Kimosina* are known, all occurring also in the West Palaearctic. Only one species, viz. *Kimosina ciliata* (Duda, 1918) has been found in Israel; it is redescribed below with figures of the male genitalia. However, there are a number of other species, known from the neighbouring areas, which could also occur in Israel. These are: *K. (Alimosina) empirica* (Hutton, 1901), a cosmopolitan species introduced into Europe from the Australian Region as a consequence of its synanthropy (but unknown from South Europe until now); *K. (Kimosina) plumosula* (Rondani, 1880), a widespread Holarctic species known also from Italy, Yugoslavia, Roumania and Bulgaria; *K. (Kimosina) pappi* Roháček, 1983 described from Yugoslavia; *K. (Kimosina) glabrescens* (Villeneuve, 1917) known from

southern Europe (Spain, Italy) and Afghanistan, Tajikistan and Mongolia; *K. (Kimosina) longisetosa* (Dahl, 1909), a Palearctic species with southernmost known records from Yugoslavia and Bulgaria (see Roháček, 1983). The Palearctic species were keyed by Roháček (1983: 116-117); however this key must be supplemented, with respect to new findings resulting from the study of this Israeli material, as follows:

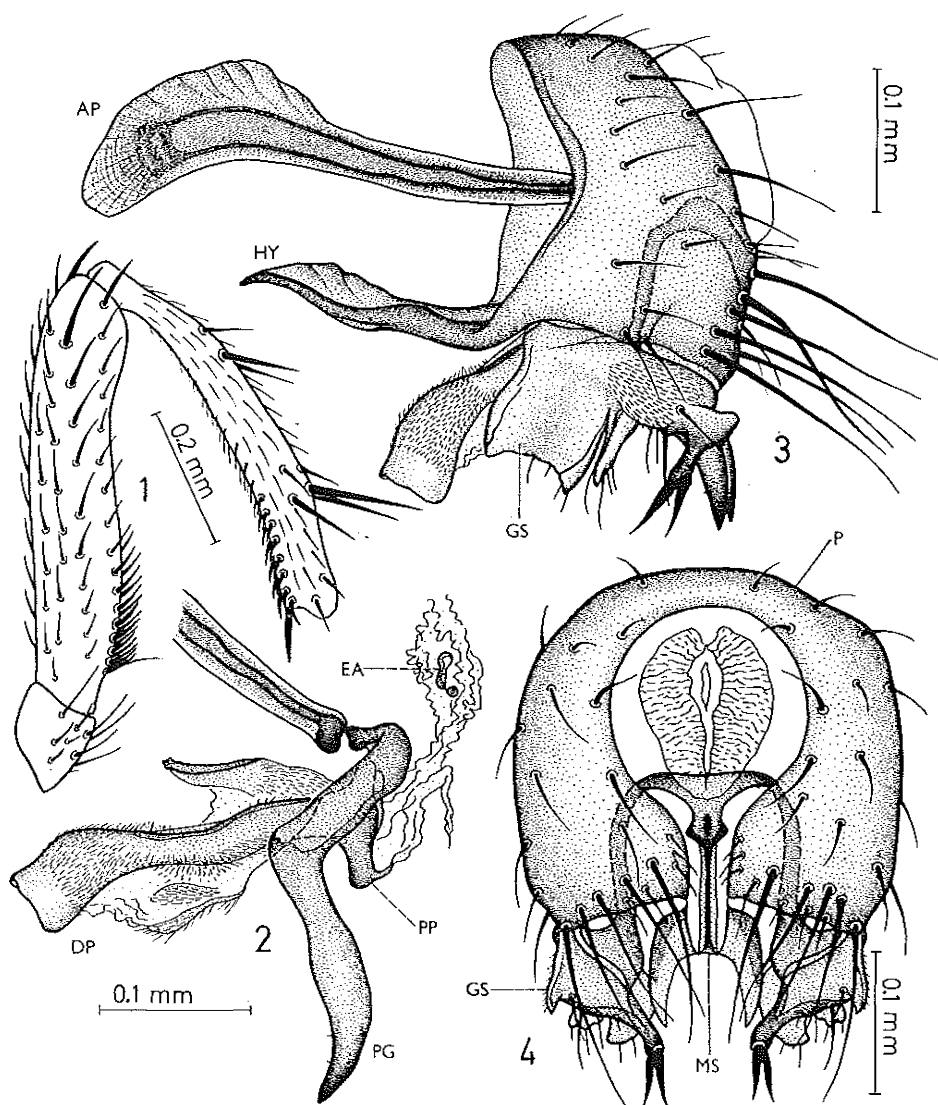
- 6 (3) Arista with medium long ciliation (Roháček, 1985: Fig. 863). Syntergum 1+2 without desclerotized and pale mediobasal area. Male 5th sternum (Fig. 7) with a small, short but wide posteromedial lobe. Male genitalia with cerci fused with perianthrium and reduced, with 5 long caudal setae (Figs 3,4). Gonostylus as in Fig. 6, aedeagal complex as in Fig. 2. Female 8th sternum (Roháček, 1985: Figs 901-902) composed of 2 minute remnants each bearing 2 robust short spines. Female cerci fused with anal plate (Roháček, 1985: Fig. 900). *K. (Kimosina) ciliata* (Duda)
- Arista with short ciliation (Roháček, 1985: Fig. 837). Syntergum 1+2 with a pale pigmented mediobasal triangular area. Male 5th sternum (Roháček, 1985: Fig. 909) with a posteromedial, slender, tongue-shaped process protruding ventrally. Male cerci separated from perianthrium and well developed, each with only 1 long caudal seta (Roháček, 1985: Figs 907, 908). Gonostylus (ibid., Figs 906, 907), aedeagal complex (ibid., Fig. 905) differently shaped. Female 8th sternum (Roháček, 1985: Figs 911, 912) composed of similar minute sclerites but each bearing 2 small, thin setulae. Female cerci separated from supra-anal plate (Roháček, 1985: Fig. 910) *K. (Kimosina) longisetosa* (Dahl)

Kimosina (Kimosina) ciliata (Duda, 1918)
(Figs. 1-7)

Limosina (Scotophilella) ciliata Duda, 1918: 129.

Kimosina (Kimosina) ciliata Roháček, 1983: 127.

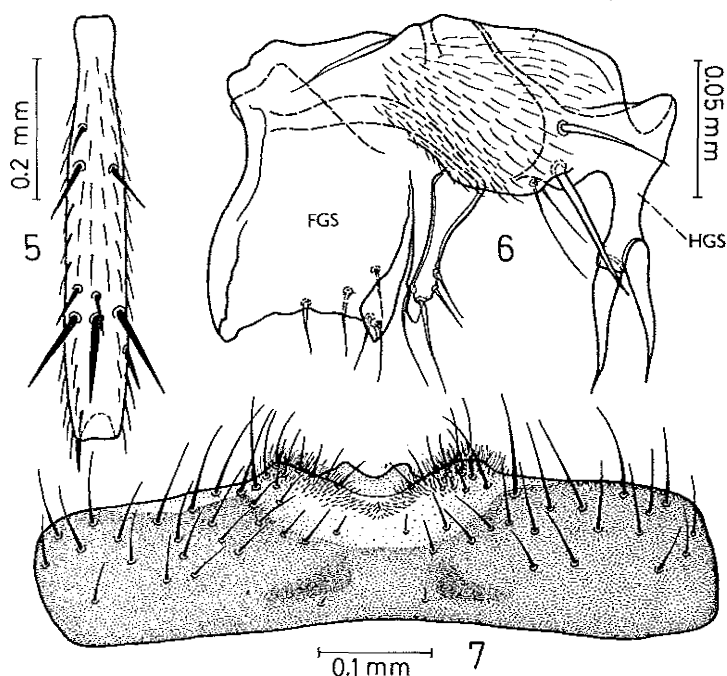
Description: Male. Total body length 1.83-2.15 mm. General colour dark brown, greyish brown pollinose. Head brown, with yellow lunule, facial cavity and genae. Frontal colour variable, entirely brownish (paler anteriorly) to broadly ochreous or yellowish at anterior margin, sometimes yellowish or yellowish brown also between interfrontalia and orbits. 3 (rarely 4) strong and 1 small (most anterior) ifr. g, vibrissae strong and long. Eye not very large, its longest diameter about 2.6 times as long as the smallest genal width. Antennae brown, arista about 3.4 times as long as antenna, with longer ciliation than that of *K. longisetosa*. Thorax dark brown to blackish brown, greyish brown pollinosity but mesonotum rather shining. 4-5 dc becoming shorter anteriorly, 3 postsuturals always strong but 1-2 presutural often reduced and indistinct. 8 rows of ac microsetae on suture; the medial prescutellar ac pair distinctly enlarged. Scutellum large, rounded triangular; sc very long. 2 stpl, the posterior long, the anterior much reduced. Pleurae dull, pollinose. Legs yellowish brown to ochreous, with darker femora and paler tarsi; trochanters yellow. t_2 chaetotaxy rather variable, particularly as regards the arrangements of distal group of dorsal bristles (Fig. 5). f_2



Figs. 1-4. *Kimosina (K.) ciliata* (Duda), male (Israel). 1. mid left leg without tarsus anteriorly, 2. aedeagal complex laterally (right postgonite and apical part of aedeagal apodeme omitted), 3. genitalia laterally, 4. ditto, caudally (aedeagal complex omitted). Abbreviations: AP – aedeagal apodeme, DP – distiphallus, EA – ejaculatory apodeme, GS – gonostylus, HY – hypandrium, ML – mesolobus, PG – postgonite, PP – phalophore.

ventrobasally and t_2 ventrally in apical third with a double row of short curved spinules; ventro-apical bristle of t_2 shortened (Fig. 1). Ratio $t_2:mt_2 = 1.91-2.05$. Mid basitarsus proximovenstrally with a slightly prolonged setula. Wings as described and figured by Roháček (1983: 127, 1985: Fig. 898). Wing measurements: length 1.90-2.18 mm, width 0.81-0.95 mm, C-index = 1.04-1.11, ta-tp:tp = 2.46-2.66. Halteres pale, brownish. Abdomen dark brown pollinose. Terga sparsely setulose, sterna more densely but shortly setulose. Syntergum 1+2 simply pigmented, without mediobasal pale area. 5th sternum (Fig. 7) distinctive, posteromedially with relatively large pale pigmented area and finely and densely haired, particularly laterally to a short, smooth, shallowly emarginated posteromedial lobe.

Genitalia. Periandrium (Figs 3,4) short dorsally, with roughly circular anal fissure and relatively sparsely but rather long haired. Hypandrium and cerci fused with periandrium, the later reduced and each with about 5 very long caudal setae and some small setulae. Hypandrium long and robust. Intraperiandrial sclerite relatively small but projecting ventrally into a long slender mesolobus (see on Fig. 4) bearing 2 wing-shaped sclerites on apex (as in *K. plumosula*); gonostylus connected with



Figs. 5-7. *Kimosina (K.) ciliata* (Duda), male (Israel). 5. left mid tibia dorsally, 6. gonostylus laterally, 7. male 5th sternum. Abbreviations: FGS – fore part of gonostylus, HGS – hind part of gonostylus.

intrapariandrial sclerite by long internal arms. Gonostylus (= telomere, surstylus) of a complex bipartite form (Fig. 6) as is usual in *Kimosina* species. Anterior part of gonostylus (FGS) almost bare, flat, concave externally and posteriorly with a slender projection bearing some setae subapically; hind part of gonostylus (HGS) dorsally connected with anterior part by finely haired sclerite and ventrally projecting in a slender process carrying 2 robust spines on apex. Aedeagal complex (Fig. 2) with relatively small, ventrally projecting phallosome, slender, weakly sclerotized and finely haired distiphallus bearing also small dorsal sclerite at base, and with large, dark (particularly on apex), heavily sclerotized and angularly bent postgonite. Ejaculatory apodeme present but small.

Female: as described by Roháček (1983: 127). Variability of measurements of the specimens examined: total body length 1.87-2.62 mm, $t_2:mt_2 = 1.74-1.88$, wing length 1.91-2.50 mm, wing width 0.75-1.03 mm, C-index = 1.01-1.27, ta-tp:tp = 2.00-2.93. Frons colour and t_2 chaetotaxy as described above for male. Postabdomen figured by Roháček (1985: Figs 900-903).

Discussion. Roháček (1983) redescribed *K. ciliata* (Duda) on the basis of females only, since all recorded males (Duda, 1918, Papp, 1977b) are lost. Three males of this species were found together with several females in the Israeli material which made it possible to redescribe males here. Examination of true males of *K. ciliata* confirmed also the presumption of Roháček (1983) that Duda's (1918) description of males is based on specimens which are not conspecific with *K. ciliata* females and most probably belong to *Spelobia villosa* (Duda) judging from the original description of t_2 chaetotaxy and armature of male genitalia (Duda, 1918, 1938).

K. ciliata seems closest to *K. plumosula* (Rondani, 1880) and *K. pappi* Roháček, 1983 — see the construction of the aedeagal complex, mesolobus, gonostylus and male 5th sternum — thus, not to *K. longisetosa* (Dahl, 1909) as Roháček (1983) supposed. It can be distinguished from the latter species (which has similarly coloured head) by longer ciliate arista, syntergum 1+2 without pale pigmented area, male cerci fused with perianthrium and bearing 5 (not only 1) long caudal setae, very different gonostylus, mesolobus and aedeagal complex, male 5th sternum with small but wide posterior medial lobe, female 8th sternum with robust short spines and female cerci fused with supra-anal plate (= 10th tergum).

K. ciliata is probably a Mediterranean species. It has previously been recorded only from Tunisia (Duda, 1918, 1938, Papp, 1977b) and Algeria (Duda, 1918). The record from Poland (Duda, 1918) is obviously based on a mislabelled specimen (cf. Roháček, 1983: 128); the species surely does not occur in Central Europe. New species to Israel and to Asia.

MATERIAL EXAMINED: Banyas, 24.IV.82, A. Freidberg (1♂), W. Kelt, 25.III.75, A. Freidberg (1♀), En Gedi, 17.I.73, A. Freidberg (1♀), Avdat, 19.IV.75, A. Freidberg (1♀), en Zenifim, 3.V.86, A. Freidberg (1♂); Egypt, Sinai: Wadi Watir, 6.IV.73, A. Freidberg (1), Wadi Tala, 8.IV.73, A. Freidberg (1♀), St. Katharina, 25.V.71, A. Freidberg (2♂♂).

Pteremis Rondani, 1856

Four species of his genus are known from the Palearctic Region (Papp, 1984). At least *P. fenestralis* (Fallén, 1820) may be expected to occur in Israel, particularly in

mountains, because it has been known from similar habitats in Spain and Bulgaria (Roháček, unpublished).

Opacifrons Duda, 1918

The genus is represented by 13 known species in the Palaearctic Region. Roháček (1982a) keyed all these species with references to published figures of genitalia. Only two of the most widespread species occur in Israel (see below) but some of the following four species might also be expected there. *Opacifrons tunisica* (Papp, 1977b) only known from Tunisia; *O. digna* (Roháček, 1982a) from south Bulgaria; *O. maculifrons* (Becker, 1907) recorded from Czechoslovakia, Hungary, Bulgaria, Algeria and Tunisia and *O. moravica* (Roháček, 1975) known from Czechoslovakia, Hungary and Bulgaria.

Opacifrons coxata (Stenhammar, 1854)

A species widely distributed throughout the Old World and North America. It is also common in the eastern Mediterranean (recorded from Yugoslavia, Bulgaria, Greece, Tunisia, Egypt), therefore its occurrence in Israel is no surprise. The larvae develop in mud and the species is very tolerant ecologically, colonizing various wet and boggy habitats.

MATERIAL EXAMINED: Banyas, 14.V.81, A. Freidberg (1♀), Dan, 21.VII.83, I. Nussbaum (1♀), Gonen, 15.III.75, A. Freidberg (1♀), Hula, 28.II.77, F. Kaplan, (1♂), Golan, Khispin, 18.XII.83, I. Nussbaum (1♂), Faza'el, 9.IV.86, I. Susman (1♂).

Opacifrons humida (Haliday, 1836)

The species is widespread in the Palaearctic and Afrotropical Regions. It has not been recorded from Israel until now but there are other records from the Mediterranean (Bulgaria, Yugoslavia, Italy, Corsica, Algeria, Tunisia etc.) and also from Afghanistan (Papp, 1978). The species occurs commonly along muddy shores of water reservoirs; the larvae develop in mud.

MATERIAL EXAMINED: Nemrod (1000 m), 8.XI.84, A. Freidberg (1♀), Banyas, 4.V.77, A. Freidberg (1♀), Avdat, 19.IV.75, A. Freidberg (1♂), Egypt, Sinai: Ras Mamlach, 11-15.IV.80, B.R. Pitkin (1♂, BMNH).

Leptocera (*Leptocera*) Olivier, 1813

The nominate subgenus of *Leptocera* has only 10 species in the Palaearctic Region (Roháček and Papp, 1983). The West Palaearctic species were revised and keyed by Roháček (1982b). Three species were found in Israel; the occurrence of any other described species of *Leptocera* (s. str.) is hardly likely.

Leptocera (Leptocera) caenosa (Rondani, 1880)

The species is cosmopolitan owing to its synanthropy. It has not previously been recorded from Israel; the nearest records are from Yugoslavia, Bulgaria (Roháček, 1982b) and Greece (Roháček, unpublished). *L. caenosa* lives either in caves or burrows of small mammals or in synanthropic populations within human settlements (for details see Roháček, 1982b). The larvae are polysaprophagous and develop in most decaying matter.

MATERIAL EXAMINED: Jerusalem — Scopus, 6.II.31, J. Aharonii coll. — "*Collinella limosina* Fall." Lindner det. (1♀).

Leptocera (Leptocera) fontinalis (Fallén, 1826)

The range of the distribution of this species is not precisely known but it seems widespread, at least in Europe; the Nearctic and East Palaearctic records need revision. Hitherto it has not been recorded from Israel but there are records from the Mediterranean, namely, Tunisia, Italy, Yugoslavia, Bulgaria and Cyprus (Roháček, 1982b). *L. fontinalis* lives mainly in forests and seems to prefer higher altitudes in southern areas; its larvae are predominantly phytosaprophagous.

MATERIAL EXAMINED: Mt. Hermon (2000 m), 21.VI.83, I. Nussbaum (1♀), Mt. Hermon (1600 m), 20.V.86, A. Freidberg (2♀♀), Banyas, 20.IV.74, 24.IV.82, 19.V.83, 10.VI.83, 26.IV.84, A. Freidberg, F. Kaplan, I. Nussbaum, I. Yarom, (2♂♂, 5♀♀), Tel Dan, 7.VIII.74, F. Kaplan, (1♂), HaGosherim, 28.II.77, A. Freidberg (1♂), Hatzbani, 24.IV.82, 26.IV.84, I. Yarom, F. Kaplan (6♂♂, 1♀), Golan, Quneitra, 3.IV.71, J. Kugler (1♀), N. Bezet, 31.V.83, I. Nussbaum (1♂), Monfort, 10.III.81, A. Freidberg (1♀).

Leptocera (Leptocera) nigra Olivier, 1813

syn. *Limosina curvinervis* Stenhammar, 1854

Limosina roralis Rondani, 1880

This is one of the commonest species of Sphaeroceridae in the warmer areas of the Palaearctic Region but it is also widespread in Africa. There are numerous records from the Mediterranean subregion, including those from Israel (L. Galilee, Deganya), Palestine (Judean Hills — Wadi Kabala) and Jordania (see Roháček, 1982b). *L. nigra* occurs mainly in wet grassy habitats, in marshy areas and along rivers, pools and lakes, also in wet forests. Larvae develop in soil or mud.

MATERIAL EXAMINED: 85♂♂, 106♀♀ found from January to December at the following sites: Mt. Hermon (1600-2000 m), Majdel Chams, Golan Heights: Nafech, Quabiye, Ein Semsem, Qeshet, Nov, Banyas, Dan, Tel Dan, Tanur, Shelomi, Upper N. Keziv, Monfort, N. Amud, Kefar Shammay, Mahanayim, Park Hayarden, Bteicha, Kare Deshe, Ginnosar, Massada, Susita, Ramot Junc., N. Kanaf, Bet She'an Valley, En Malqoah, Mechola, W. Faria, Hadera, N. Poleg, Ga'ash, Kefar Shemaryahu, Herzliyya, Baptist's Village, Eyal, Nir Eliyyahu, Qalqilya, Horeshim, Tel Afeq, Tel Aviv, Abu

Kabir, Bet Oved, Jericho, En Tureiba, Kalia, Hulda, Latrun, Ashdod, Bet Guvrin, Sederot, Devira, En Gedi, Zomet Zohar, Yeroham, En Yorke'am, En Mor, Wadi Hatira, Zafit, Shivta, Egypt, Sinai: Ein, Qsaib, St. Katharina, W. Firan. Additional specimens in the collection of Tel Aviv University: Turkey, Abant, 31.VII.51 (1♂, 2♀♀).

Leptocera (Rachispoda) Lioy, 1864

This is one of the biggest groups of the Palaearctic Sphaeroceridae (cf. Papp, 1984). Formerly no species has been reported from Israel but now representatives of 12 species are recorded. Eight of them were identified with certainty, the other four will probably represent new species. Based on the hitherto known distribution, a further five species can be expected to occur in Israel (*L. (R.) gel* L. Papp, 1978: known from Tunisia and Afghanistan; *L. (R.) hostica* Villeneuve, 1917: recorded from South and Central Europe, Soviet Middle Asia, Turkey, Afghanistan and Mongolia; *L. (R.) limosina* (Fallén, 1820): a Holarctic species, known also from Tunisia; *L. (R.) subinceptipennis* (Brunetti, 1913): a widespread species in the Old World tropics and subtropics, known from the Pacific and found also in Egypt and in Greece (Papp, 1984)). Since a revision of the Palaearctic species of *Rachispoda* is in progress (by J. Roháček), a publication of the key to the Israeli species would be premature at present.

Leptocera (Rachispoda) acrosticalis (Becker, 1903)

It is widespread in the Afrotropical Region but its range extends to the Mediterranean (Egypt) and it has also been reported from Afghanistan (Papp, 1978). It seems abundant in Israel.

MATERIAL EXAMINED: Qala'at Nemrod, 8.VI.75, A. Freidberg (1♂, 1♀), Majdel Chams, 14.X.82, A. Zadka (1♀), Hatzbani, 28.V.80, A. Freidberg (1♀), N. Bezet, 23.X.86, I. Yarom (2♀♀), Golan Heights: Ein Semsem, 30.V.81, A. Freidberg (2♀♀), Nov, 13.V.81, A. Freidberg (1♂), Sifsufa, 30.IX.82, F. Kaplan (1♀), Nahal Kanaf, 5.I.83, I. Nussbaum (1♂), Herzliyya, 8.VI.81, 20.IV.82, 16.XII.81, A. Freidberg (3♂♂, 7♀♀), Tel Aviv, 12.V.71, 11.17.XII.77, J. Kugler, A. Freidberg (2♂♂, 1♀), Tel Aviv Swamp, 9.IV.81, A. Freidberg (2♂♂), Abu Kabir, 28.IV.81, A. Freidberg (1♀), Jerusalem, 20.IV.59, I. Weichselfish (1♀), Jericho, 8.III.76, 29.IV.71, A. Freidberg, J. Kugler (1♂, 1♀), Latrun, 3.X.74, A. Freidberg (3♀♀), Lifta, 6.VII., 3.VIII.83, I. Nussbaum (3♀♀), En Gedi, 18.X.72, M. Kaplan (1♂), En Mor, 16.I.75, 31.III.81, F. Kaplan, A. Freidberg (2♀♀), Avdat, 19.IV.75, A. Freidberg (7♂♂, 2♀♀), Nahal Zenifim, 3.V.86, F. Kaplan (2♂♂), En Zenifim, 3.V.86, A. Freidberg (2♂♂, 2♀♀), Egypt, Sinai: Quseima, 24.V.81, A. Freidberg (1♂, 3♀♀), Wadi Watir, 6.III.73, D. Furth (1♂), Wadi Firan, 9.IV.73, A. Freidberg (1♀).

Leptocera (Rachispoda) breviceps (Stenhammar, 1854)

Formerly known from Europe only (Papp, 1984). New to Israel and Asia, the

nearest records are from Hungary. The specimens were identified by a comparison of their genitalia with those of the European specimens.

MATERIAL EXAMINED: Herzliyya, 28.VIII.77, 24.V.80, F. Kaplan (3♂♂).

Leptocera (Rachispoda) fuscipennis (Haliday, 1833)

It is one of the most widespread sphaerocerids; it has been recorded from the Holarctic, Oriental, Afrotropical Regions and from New Zealand; known also from Egypt. The larvae develop in saline mud (seashores and salty continental areas).

MATERIAL EXAMINED: Mt. Meron, 30.IV.81, F. Kaplan (1♀), Akko, 10.XI.76, A. Freidberg (1♂), Ma'agan Mikhael, N. Tananim Spill, 20.IV.86, A. Freidberg (3♂♂, 3♀♀), Nizzanim, 26.VIII.83, I. Nussbaum (1♀), Shefeh Zohar, 25.II.79, M. Kaplan (1♂), En Mor, 16.I.75, 19.V.75, F. Kaplan, A. Freidberg (1♂, 1♀), Hazeva, 25.III.81, A. Freidberg (1♀), Egypt, Sinai: Ofira sewage, 22.III.81, A. Freidberg (2♂♂, 3♀♀), Ras Mamlach, 11-5.IV.80, B.R. Pitkin (2♂♂, BMNH).

Leptocera (Rachispoda) kabuli L. Papp, 1978

This species was described from Afghanistan but since then it has been reported from Tunisia. New to Israel.

MATERIAL EXAMINED: Akko, 29.III.75, A. Freidberg (2♀♀), Park Hayarden, 30.IX.82, F. Kaplan (1♀), Ma'agan Mikhael, N. Tananim Spill, 20.IV.86, A. Freidberg (1♂), Nizzanim, 26.VIII.83, I. Nussbaum (1♂, 1♀), Ze'elim, 24.III.75, M. Kaplan (1♀), Yeruham, 22.IV.81, T. Furman (1♂), En Mor, 16.I.75, F. Kaplan (1♀).

Leptocera (Rachispoda) lutosoidea (Duda, 1938)

This species is common in all parts of Europe (except for subarctic areas) and it has been reported also from Tunisia and Afghanistan. It is new to Israel, and seems rather common there. The larvae develop in mud.

MATERIAL EXAMINED: Mt. Hermon (2000 m), 20.V.86, A. Freidberg (1♂), Mt. Hermon (1400 m), 21.V.71, J. Kugler (1♀), Neve Ativ 3.VI.73, D. Furth (2♂♂), Golan Heights: Nafech, 10.XII.73, A. Freidberg (1♀), Ein Semsem, 30.V.81, F. Kaplan (1♀), Nov, 29.XII.83, I. Nussbaum (1♂); Tel Dan, 18.VI.71, J. Kugler (1♀), Gonen, 15.III.75, F. Kaplan (1♂), Hula, 28.II.77, F. Kaplan (2♀♀), Mahanayim, 5.V.75, A. Freidberg (1♂, 3♀♀), Bteicha, 16.XI.82, A. Freidberg (1♀), Akko, 29.III.75, A. Freidberg (1♂), Ramot Junction, 16.XI.82, F. Kaplan (1♂), Hadera, 24.V.80, A. Freidberg (1♂), Hadera, 24.V.80, A. Freidberg (1♂), W. Faria, Ein Shibli, 31.V.81, A. Freidberg (1♂).

Leptocera (Rachispoda) modesta (Duda, 1924)

This species is known from Central and Southern Europe, Soviet Middle Asia,

Afghanistan, Tunisia and the Canary Islands (Papp, 1984). New to Israel.

MATERIAL EXAMINED: Bet Shean Valley, Ein Malkoah, 22.X.81, A. Freidberg (5♂♂, 1♀), Hadera, 24.V.80, F. Kaplan (1♂), Tel Aviv, 23.VI.77, F. Kaplan (1♀), Zafirim, 18.XI.83, I. Nussbaum (1♂).

Leptocera (Rachispoda) octisetosa (Becker, 1903)

This is a little known species reported from Egypt and the Azores only (Papp, 1984). New to Israel.

MATERIAL EXAMINED: Ziqim, 29.II.84, A. Freidberg (1♀), Ma'agan Mikhael, N. Tananim Spill, 20.IV.86, A. Freidberg (1♀).

Leptocera (Rachispoda) varicornis (Strobl, 1900)

Formerly known from the Palaearctic and Afrotropical Regions and Macaronesia (including Tunisia, Egypt and Afghanistan, see Papp, 1984). New to Israel. The larvae develop in warm mud.

MATERIAL EXAMINED: Mt. Hermon (2000 m), 24.VII.85, A. Freidberg (1♀), Mt. Hermon (1400 m), 21.VI.71, J. Kugler (4♂♂, 9♀♀), Neve Ativ, 3.VI.73, D. Furth (1♀), Bteicha, 16.X.82, A. Freidberg, I. Yarom (3♂♂, 2♀♀), Kare Deshe, 14.IV.65, J. Kugler (1♀), Hadera, 24.V.80, A. Freidberg (1♀), Jericho, 8.III.76, A. Freidberg (1♀), Kefar Jeruham, 22.VII.62, J. Kugler (2♂♂, 2♀♀); Egypt, Sinai: Nueiba 6.IX.74, M. Kaplan (1♀), Ras Mamlach 11-15.IV.80, B.R. Pitkin (3♂♂, 4♀♀), BMNH, 1 Km S. Taba, 10.IV., B.R. Pitkin (1♀), BMNH.

Leptocera (Rachispoda) sp.n.? (nr. acrosticalis)

MATERIAL EXAMINED: Avdat, 19.IV.75, A. Freidberg (1♂).

Leptocera (Rachispoda) sp. nr. anceps (A)

MATERIAL EXAMINED: Majdel Chams, 14.X.82, A. Zadka (1♀), Akko, 27.XI.71, J. Kugler (1♀), Nahr Rubin, 7.III.51, O. Theodor (1♂, 1♀).

Leptocera (Rachispoda) sp.n. nr. anceps (B)

MATERIAL EXAMINED: Kefar Rupin, 10.X.78, A. Freidberg (1♀).

Leptocera (Rachispoda) sp. nr. breviceps

MATERIAL EXAMINED: Akko, 29.III.75, A. Freidberg (1♂), Bitan Aharon, 15.II.75, M. Kaplan (1♂), Herzliyya, 10.III.75, A. Freidberg (1♂, 2♀♀).

Trachyopella Duda, 1918

Roháček and Marshall (1985) revised the Holarctic species of this genus and recorded 11 species from the West Palaearctic and Yemen. Only one species was found in Israel (see below) but about six further species probably occur there. These are as follows: *T. leucoptera* (Haliday, 1836), an almost cosmopolitan species (nearest record from Afghanistan); *T. pannosa* Roháček and Marshall, 1985 (described from Yemen); *T. melania* (Haliday, 1836), a Palaearctic species (southernmost record from Spain); *T. lineafrons* (Spuler, 1925), a Holarctic species (nearest records from Crete and Afghanistan); *T. atomus* (Rondani, 1880), an almost cosmopolitan species (nearest record from Afghanistan) and *T. straminea* Roháček and Marshall, 1985, a Holarctic species but possibly introduced from the Nearctic into Europe (nearest record from Crete). A detailed key to Holarctic *Trachyopella* species is published by Roháček and Marshall (1985).

Trachyopella coprina (Duda, 1918)

syn. *Trachyopella melania* auctorum, nec Haliday, 1836

This thermophilous species is distributed in South and Central Europe and has recently been found in the USA (apparently introduced) by Roháček and Marshall (1985). It is new to Israel, with the nearest record from Crete (Duda, 1918). *T. coprina* develops in dung and manure but its adults were also found on decaying vegetation.

MATERIAL EXAMINED: Herzliya, 7.I.82, Malaise trap, A. Freidberg (1♂).

Thoracochaeta Duda, 1918

The Palaearctic species of this genus badly need revision. Only one species was found in the material examined from Israel but no less than five may occur there. *T. fittkaui* (Remmert, 1955) was described from Egypt, *T. tunisica* L. Papp, 1978 was described from Tunisia, *T. zostere* (Haliday, 1833) is a Holarctic species, known also from South Europe (cf. Papp, 1984). There are specimens, from Greece, of another species in the collection of the Hungarian Natural History Museum, which may either be conspecific with one of the Nearctic species (revised by Marshall, 1982) or represent a new species, which may also occur in Israel.

Thoracochaeta brachystoma (Stenhammar, 1854)

Reported from Europe, Egypt, the Canary Islands and the Nearctic Region (also Africa, New Zealand, South America, Hawaii etc.) but some of the published data need revision. It is abundant on the sea-shores but there are also inland populations. New to Israel.

MATERIAL EXAMINED: Herzliya Beach, 15.V.82, A. Freidberg (1♂, 1♀).

Halidayina Duda, 1918

The genus includes three species (Marshall, 1982), but only one occurs in the Palaearctic Region. Although hitherto unrecorded, *H. spinipennis* (Haliday, 1936) is certainly to be expected in Israel because this common Holarctic species has a strong tendency to synanthropy and it has already been recorded from Bulgaria, Yugoslavia (Roháček, 1983) and Afghanistan (Papp, 1978).

Telomerina Roháček, 1983

Marshall and Roháček (1984) revised the Holarctic species of this genus; only five of them occur in the West Palaearctic (see also Roháček, 1983). One species was found in Israel. Keys to *Telomerina* species were published in the above mentioned works.

Telomerina flavipes (Meigen, 1830)

The species is now cosmopolitan due to its synanthropy. It is new to Israel but there have been records from Roumania, Bulgaria, Tunisia and Afghanistan. *T. flavipes* is necrophagous -- coprophagous and often forms synanthropic populations, which develop in various refuse within human settlements (Roháček, 1983).

MATERIAL EXAMINED: Nir Eliyyahu, 19.II.75, F. Kaplan (1♀), Nahal Oren, 22.II.81, A. Freidberg (1♀), Ma'agan Mikhael, 10.III.81, A. Valdenberg (2♂♂, 2♀♀), Herzliyya, 4,18.I.82, Malaise trap, A. Freidberg (2♂♂), Tel Aviv, 15.XII.77, "ex: dead sheep, 8.I.78", A. Freidberg (1♀).

Opalimosina Roháček, 1983

Only seven species of this genus are known from the whole Palaearctic, all occurring in Europe. They were revised and keyed by Roháček (1983). No species of *Opalimosina* is known from Israel but the cosmopolitan and synanthropic *O. mirabilis* (Collin, 1902) is certain to be found there (nearest records are from Bulgaria and Greece). Two further species, *O. liliputana* (Rondani, 1880) (nearest records from Bulgaria) and *O. denticulata* (Duda, 1924) (besides Central Europe, known also from Spain) might also occur in Israel, particularly in mountains.

Philocoprella Richards, 1929

This is a small genus with five known species. All live in droppings of hoofed animals in pastures. At least one species, *Ph. italica* (Deeming, 1964) is expected to occur in Israel (nearest records are from Italy and Afghanistan). The species are usually poorly represented in collections, as a consequence of the habits of the imago, which seldom fly, their wings helping them spring short distances only; the specimens may be collected on droppings using special aspirators.

Elachisoma Rondani, 1880

These species are minute flies (0.6 to 1.0 mm), which develop in dung, manure heaps and decaying vegetable matter. Hitherto no species has been found in Israel but four species might be expected to occur there: *E. pilosum* (Duda, 1924) known from Europe, Afghanistan and from the Oriental Region (probably introduced there); *E. kerteszi* (Duda, 1924) known from Hungary, Spain and Bulgaria; *E. aterrimum* (Haliday, 1833) widespread, the nearest records being from Egypt and Afghanistan; *E. bajzae* L. Papp, 1983, described from Hungary, Slovakia and Kreta. Papp (1983) gave a key for the Old World species.

Coproica Rondani, 1861

The genus includes the commonest dung-inhabiting species of the family Sphaeroceridae. Ten species are known from the Palaearctic Region (Papp, 1984) six species were identified among the material examined from Israel but eight species are included in the key below, since *C. acutangula* (Zetterstedt, 1847) (known also from the Mediterranean) and *C. pusio* (Zetterstedt, 1847) (the nearest records from Bulgaria and Afghanistan) might also be expected to occur in Israel.

1. Second costal section longer than third section 2
- Second costal section shorter than or at most as long as third section 5
2. Vein R_{4+5} upcurving in its distal part. 3 katepisternal bristles. Wings dark brownish. Thorax more or less reddish, particularly on sides
- *ferruginata* (Stenhammar, 1854)
- Vein R_{4+5} straight in its distal part. 2 katepisternal bristles. Wings lighter (sometimes with some infuscation). Thorax mostly black but never reddish . . . 3
3. Distal (unpigmented) part of vein M_{1+2} almost reaching wing margin. Katepisternal bristles widely separated and long; posterior katepisternal longer than fore basitarsus, anterior katepisternal longer than $\frac{2}{3}$ length of the posterior one. Wings milky or infuscated. Male fore basitarsus without ventroapical process. *vagans* (Haliday, 1833)
- Distal (unpigmented) part of vein M_{1+2} short, ends far from wing margin. Katepisternal bristles weaker; posterior katepisternal distinctly shorter than fore basitarsus, anterior katepisternal shorter than $\frac{2}{3}$ length of posterior one. Wings almost clear, at most with some light brownish or greyish hue. Male fore basitarsus with digitiform ventroapical process 4
4. Wings normal in both sexes, both distal angles of discal cell right-angled; wings clear or with light greyish yellow *digitata* (Duda, 1918)
- Male M_{1+2} recurving, hind crossvein most oblique, wing margin below tip with a row of long incurving bristles. Female discal cell with upper corner wider than right angle, lower corner smaller than right angle. Wings usually with some brownish hue. Female genae and fore coxae black
- [*acutangula* (Zetterstedt, 1847)]

5. Midtibia with a posterodorsal bristle in its proximal fourth and at its middle. Eyes small, consequently genae widening posteriorly. Veins R_{2+3} and R_{4+5} usually distinctly upcurving. *hirtula* (Rondani, 1880)
- Midtibia without a posterodorsal bristle in its proximal fourth (possibly no posterodorsal at middle). Eyes normal. Veins R_{2+3} and R_{4+5} completely straight 6
6. Male genitalia large, globular, female cerci with short straight bristles only. Wings distinctly grey. Mid basitarsus without bristles basally, with a pair of short bristles sub-basally, 1 longer bristle at middle and another bristle more distally *lugubris* (Haliday, 1836)
- Male genitalia smaller, female cerci with long, wavy bent hairs. Wings light. Mid basitarsus with 1 or 2 bristles basally. 7
7. Mid basitarsus with a pair of rather strong bristles basally and with another pair of shorter bristles at about middle. Male perianthium small and less setulose. Female tergites with long marginal bristles at posterolateral corners *hirticula* Collin, 1956
- Mid basitarsus without long ventral bristles, anteroventrally with 3, posteroventrally with 2 bristles. Male perianthium bigger and densely setulose. Female tergites with shorter and much thinner marginal bristles at posterolateral corners [*pusio* (Zetterstedt, 1837)]

Coproica digitata (Duda, 1918)

A thermophilous species, which develops in droppings. It is known from Central and Southern Europe, Tunisia, Egypt and Afghanistan (Papp, 1984). New to Israel.

MATERIAL EXAMINED: Mt. Meron, 30.IX.76, A. Freidberg (2♂♂, 1♀), Park Hayarden, 17.VI.82, A. Freidberg (1♂), Jiftlik, 11.IV.81, A. Freidberg (6♂♂, 2♀♀).

Coproica ferruginata (Stenhammar, 1854)

This species is cosmopolitan owing to human activity. It develops in very large numbers in dung heaps and in drier litter or corrals, in stables etc. Formerly it was not reported from Israel but it must be common there.

MATERIAL EXAMINED: En Harod, 9.III.65 (1♂), Tel Aviv, Botanical Garden, Caesarea, 2.12.III.82, on *Arum dioscoridis* or *Eminium spiculatum* (7♂♂, 3♀♀), Jiftlik, 11.IV.81, A. Freidberg (2♂♂), Tel Aviv, 28.III.78, 11.XII.77, A. Freidberg (2♂♂, 2♀♀), Migdal Zedek, 24.IX.81, F. Kaplan (1♂), Giv'at Brenner, 20.XI.40 (1♂, 1♀).

Coproica hirticula Collin, 1956

It has been recorded from Europe and Australia (introduced). New to Israel. In Central Europe it is a characteristic species on dung heaps but it occurs also in stables, in corrals and less frequently on droppings.

MATERIAL EXAMINED: Avdat, 31.III.81, F. Kaplan (1♀).

Coproica hirtula (Rondani, 1880)

It is a synanthropic species associated with animal husbandry; as a consequence it has become a cosmopolitan species. It prefers dark, shady places (stables etc.).

MATERIAL EXAMINED: Akko, 10.XI.76, A. Freidberg (1♀), Ma'agan Mikhael, 10.III.81, A. Valdenberg (1♂, 1♀), Caesarea, 12,13.III.82, on *Arum dioscoridis* or, *Eminium spiculatum* (4♂♂, 3♀♀), Herzliyya Beach, on *Polygonum* sp., 18.X.86, A. Freidberg (1♂), Tel Aviv, 16.IV.78, A. Freidberg (1♂, 2♀♀), Petah Tiqwa, 18.X.82, I. Nussbaum (1♀), Migdal Zedek, 4.IX.77, A. Freidberg (1♀), Rehovoth, 11,17,25.IX.31, J. Aharoni (1♂, 2♀♀), Hulda, 4.II.76, A. Freidberg (1♂), Hazor, 13.IX.77, A. Freidberg (1♂), Eilat, 3.V.86, F. Kaplan (1♂), Egypt: Sinai, Nabek, 13.III.82, A. Freidberg (1♂).

Coproica lugubris (Haliday, 1836)

A widespread Palaearctic species, also known from Tunisia and Afghanistan. New to Israel. It develops in droppings of large hoofed animals.

MATERIAL EXAMINED: Binyamina, 26.I.76, A. Freidberg (1♀), Hadera, 24.V.80, A. Freidberg (1♂), Jiftlik, 11.IV.81, A. Freidberg (1♂, 2♀♀), Hazor, 13.IX.77, A. Freidberg (1♂).

Coproica vagans (Haliday, 1833)

A synanthropic species associated with animal husbandry, it has become cosmopolitan. Together with *C. ferruginata* it develops en masse in dun heaps, in stables, in corrals etc. New to Israel.

MATERIAL EXAMINED: Tiv'on, 7.III.81, A. Freidberg (1♂), Ma'agan Mikhael, 29.X.80, 10.III.81, 11.84, A. Valdenberg (3♂♂, 14♀♀), Caesarea, 4,8,12.III.82, on *Arum dioscoridis* (2♂♂, 7♀♀), Migdal Zedek, 24.IX.81, F. Kaplan (1♀), Mishor Rotem, 3.III.65, M. Weichselfish (2♀♀), Egypt: Sinai, 1 Km S. Taba, 10.IV.80, B.R. Pitkin (3♂♂, 4♀♀; BMNH).

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