

A REVIEW OF THE AFROTROPICAL SPECIES  
OF *LEPTOCERA* OLIVIER (DIPTERA: SPHAEROCERIDAE)

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The Afrotropical species of the genus *Leptocera* OLIVIER, 1813 are reviewed and illustrated. Two new species: *Leptocera austroafricana* sp. n. (Malawi, Rwanda, R.S.A.) and *L. inconspicua* sp. n. (Kenya, R.S.A.) are described, *L. kovacsi* DUDA, 1925 and *L. elgonensis* RICHARDS, 1938 are re-described. *Limosina (Paracollinella) chambii* VANSCHUYTBROECK, 1950 is synonymised with *Leptocera nigra* OLIVIER, 1813 and “*Limosa*” (*Paracollinella*) *decisetosa* VANSCHUYTBROECK, 1952 is synonymised with *Leptocera marginata* (ADAMS, 1905). *Paracollinella basilewskyi* VANSCHUYTBROECK, 1962 is transferred from *Leptocera* to the genus *Rachispoda* LIOY, 1864 as *Rachispoda basilewskyi* (VANSCHUYTBROECK, 1962). The characteristics of the species groups are discussed.

Key words: Sphaeroceridae, Limosininae, *Leptocera*, new species, taxonomy, Afrotropics

## INTRODUCTION

The genus *Leptocera* OLIVIER, 1813 includes a number of limosinine sphaerocerids with stout body and clear wings. *Leptocera* belongs to a group of genera with distinct ventral preapical seta on the mid tibia (in both sexes) and strong ventral seta on the mid basitarsus. The scutellum *Leptocera* usually bears 4 marginal (submarginal) pairs of setae (a few species have additional setae). In contrast to the closely related *Rachispoda*, *Leptocera* species have the foremost pair of dorso-centrals directed posteriorly and the facial carina never protrudes between the antennae (ROHÁČEK 1982, 1991).

In the male genitalia epandrium is not fused below anal opening and the modified cerci (cercal processes) are separate from the epandrium. The male cercus, the hypandrium, the two parts of surstylus and the postgonite show important differentiating characters. In the female postabdomen the shape and chaetotaxy of the tergite 7, sternite 7 and sternite 8, as well as tergite 10, cerci (usually fused with tergite 10) and spermathecae may be diagnostic.

*Leptocera* is a moderately diverse genus in the Afrotropical region with fourteen species reported so far (DUDA 1925, RICHARDS 1938, VANSCHUYTBROECK 1950, 1951, 1959, 1962, BUCK & MARSHALL 2009; see also HACKMAN 1965 and ROHÁČEK *et al.* 2001, MARSHALL *et al.* 2011). Two synonymies have been proposed previously (RICHARDS 1980, ROHÁČEK in ROHÁČEK *et al.* 2001) and two new synonyms are proposed here. Records of *L. fontinalis* from the Afrotropical

region are almost certainly erroneous (see also BUCK & MARSHALL 2009). One species (*L. basilewskyi* (VANSCHUYTBROECK, 1962)) is transferred to *Rachispoda* LIOY, 1864. Two new species are newly described here and the occurrence of ten other species of *Leptocera* is confirmed for the Afrotropical region (including at least two introduced ones).

Although I found only two new species in the course of this study more new species will likely be discovered in the future.

## MATERIALS AND METHODS

This paper is based on studies of double-mounted (mostly minuten pinned) specimens of *Leptocera*, which are housed in the: Department of Entomology, National Museum Bloemfontein, R.S.A. (BMSA); Department of Environmental Biology, University of Guelph, Canada (DEBU); Diptera Collection of the Department of Zoology, Hungarian Natural History Museum, Budapest (HNHM); Institut Royal des Sciences Naturelles, Brussels (IRSN); Entomologie, Muséum National d'Histoire Naturelle, Paris, France (MNHN); Muséum Royal d'Afrique Central, Tervuren, Belgium (MRAC); Museo Zoologico "La Specola", Firenze, Italy (MZUF); Department of Natural Sciences, KwaZulu-Natal Museum, Pietermaritzburg, R.S.A. (NMSA); Snow Entomological Museum, University of Kansas, Lawrence, Kansas, USA (SEMC); Instituut voor taxonomische Zoölogie, Amsterdam, The Netherlands (ZMAN).

Abdomina of several specimens (at least one) of each species were removed and treated with hot sodium-hydroxide and lactic acid, washed, etc. as standard procedure; dissected abdomina with genitalia are kept in plastic microvials with glycerol.

In the material examined below, label data are quoted literally; hand-written label data are given in quotation marks, whereas my annotations of label data are in square brackets.

### *Leptocera* OLIVIER, 1813

Type species: *Leptocera nigra* OLIVIER, 1813 (monotypy).

ROHÁČEK (1982) and BUCK and MARSHALL (2009) described the morphology and diagnostic features in great detail, and there is not much to add here. Below I summarise the characteristics of the male and female terminalia only.

Male abdominal tergites (incl. the 5th one) with long caudal marginal setae. Male sternite 5 various, with or without with a pair of posterior lobes but usually with a medio-caudal less sclerotised and melanised part, which bears dense fine short microtrichia and usually also some setae. Synsternite with basic structure characteristic in the subfamily Limosininae, but their sternite 8 is fused to epandrium. The epandrium is not fused below the anal opening and the modified cerci are separate from it. The shape of their cercus is often species-specific.

Hypandrium broadly and strongly fused to epandrium, strongly sclerotised, its apodeme rod-like or dorso-ventrally flattened, posteriorly with forked processes that connects with the postgonites (Figs 20, 64, etc.). Two pairs of surstyli connected by membranes only: anterior part of surstylus usually with a larger anterior part terminating in a ventrally directed process and a less projecting posterior part; posterior part of surstylus with a strong bristle apically. The postgonites are broadly fused to each other at the base, forming one piece (cf. BUCK & MARSHALL 2009) often characteristic (length, shape, etc.). Phallus in two parts: basiphallus well sclerotised without epiphallus, distiphallus short (always shorter than phallapodeme), mainly membranous with dense fine microtrichia, mostly with a dorsal sagittal sclerotised sclerite, in several species also with a shorter ventral sclerite, which may be fused firmly with the dorsal one. Phallapodeme strong. Ejaculatory apodeme present but small, variably sclerotised.

Female with seven normal preabdominal segments, although length of the 7th is variable. Tergite 8 consists of 2 lateral sclerites, which have a pair of medially directed narrow ventral processes and bear long setae, mostly on caudal margin. Sternite 8 usually species-specific; intersegmental membrane before sternite 8 sometimes with an additional translucent sclerite (e.g. Fig. 16). Tergite 10 (= tergite 9 or epiproct of authors) usually flat, with or without setae. Sternite 10 (sternite 9, hypoproct) well formed and enlarged in some species, with short setulae, but sometimes reduced to a caudal rim, with short, often very thick (peg-like) setae. Cerci sometimes short, usually fused to tergite 10 to form a single sclerite (a condition that likely evolved more than once in the genus). Spermathecae 1+2, globular to pear-shaped, or cylindrical, with usually numerous (rarely few) more or less acute projections (spicules), especially on their base. The length of sclerotised ducts (incl. individual ducts of paired spermathecae) is also characteristic.

## AFROTROPICAL SPECIES

### *Leptocera atra* (VANSCHUYTBROECK, 1951)

*Paracollinella atra* VANSCHUYTBROECK, 1951: 7. Type locality: Zaire, Élisabethville (= Lubumbashi). The holotype male is deposited in the Collection of the IRSN.

*Leptocera (Leptocera) nigricorpus* RICHARDS, 1980: 619 [unnecessary new name for *Paracollinella atra* VANSCHUYTBROECK, 1951, in *Leptocera* a secondary junior homonym of *Limosina atra* ADAMS, 1903, now *Rachispoda atra* (ADAMS, 1903)].

For detailed synonymy see ROHÁČEK *et al.* 2001: 151.

Material studied: 2 female paratypes (one of them without head, HNHM): Congo belge, Eala-XI-1936, J. Ghesquière – P. Vanschuytbroeck det. 1951, *Paracollinella atra* Vansch. – [red] Paratype – cf. Bull. Inst. Sc. Nat. Belg. T. XXVII, n° 41, 1951, p. 7.

An easily identifiable species, which appears to be rare and restricted to the Congo Basin.

Hitherto only known from the type locality (Zaire).

### ***Leptocera austroafricana* sp. n.**

(Figs 1–12)

Holotype male (NMSA): MALAWI, Zomba Plateau, 13–14. xii. 1980, 1500 m, Londt & Stuckenberg. 1535Ad. Montane forest.

Paratypes: 1 male, 1 female (NMSA), 1 male (HNHM, abdomen and genitalia prepared and preserved in a plastic microvial with glycerol): same as for holotype; 1 female (NMSA): ibid., Mtchisi forest reserve, 1334Ac, 1500 m, 3–4. xii. Montane forest & woodland. SOUTH AFRICA: 1 male 1 female (NMSA): S AFRICA: E Cape #7, 5 km W of Rhodes, 30° 49' S: 27° 55' E, 1800 m. Date: 5. 11. 1992. Natal Museum Expedition, grassland & ravine. RWANDA: 5 males 1 female (HNHM, 2 males with gen. prep.): Rwanda, Volcanoes Nat. Park – 1988. V. 7., leg. Vojnits. Paratypes from Rwanda are slightly damaged: thoracic setae, and parts of legs missing, etc.

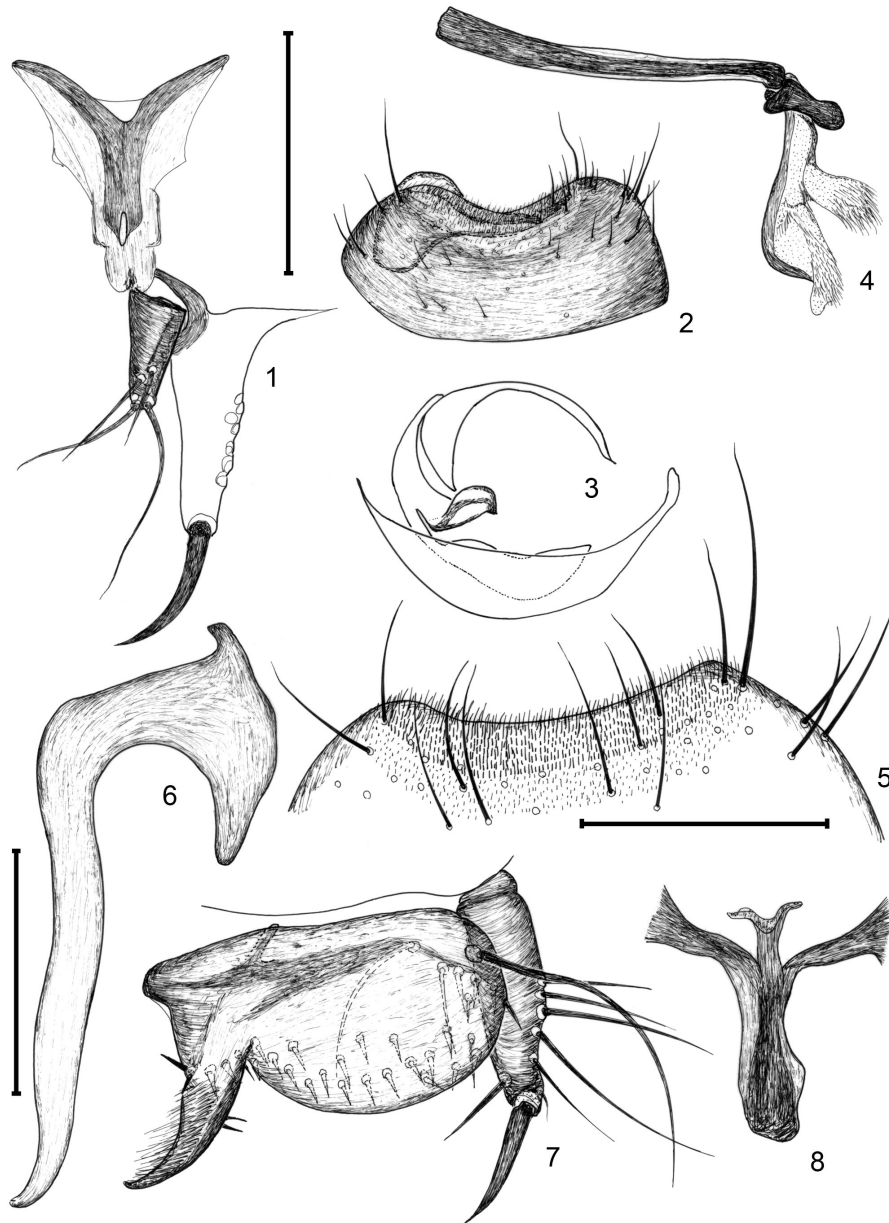
Measurements in mm: body length 2.45 (holotype), 1.87–2.55 (paratypes), wing length 2.23 (holotype), 2.03–2.30 (paratypes), wing width 1.01 (holotype), 0.85–1.04 (paratypes).

Body including facial plate and frons dark brown with grey microtomentum.

Anterior fronto-orbital pair only 3/5 of the length of the posterior pair. Gena below eye 0.12 mm, longest axis of eye 0.37 mm. 3 interfrontal pairs plus 1 minute thin interfrontal seta anteriorly. Genal seta well above peristomal setae but only 0.14 mm long. Arista cilia 0.025 mm, similarly to the apical cilia on first flagellomere.

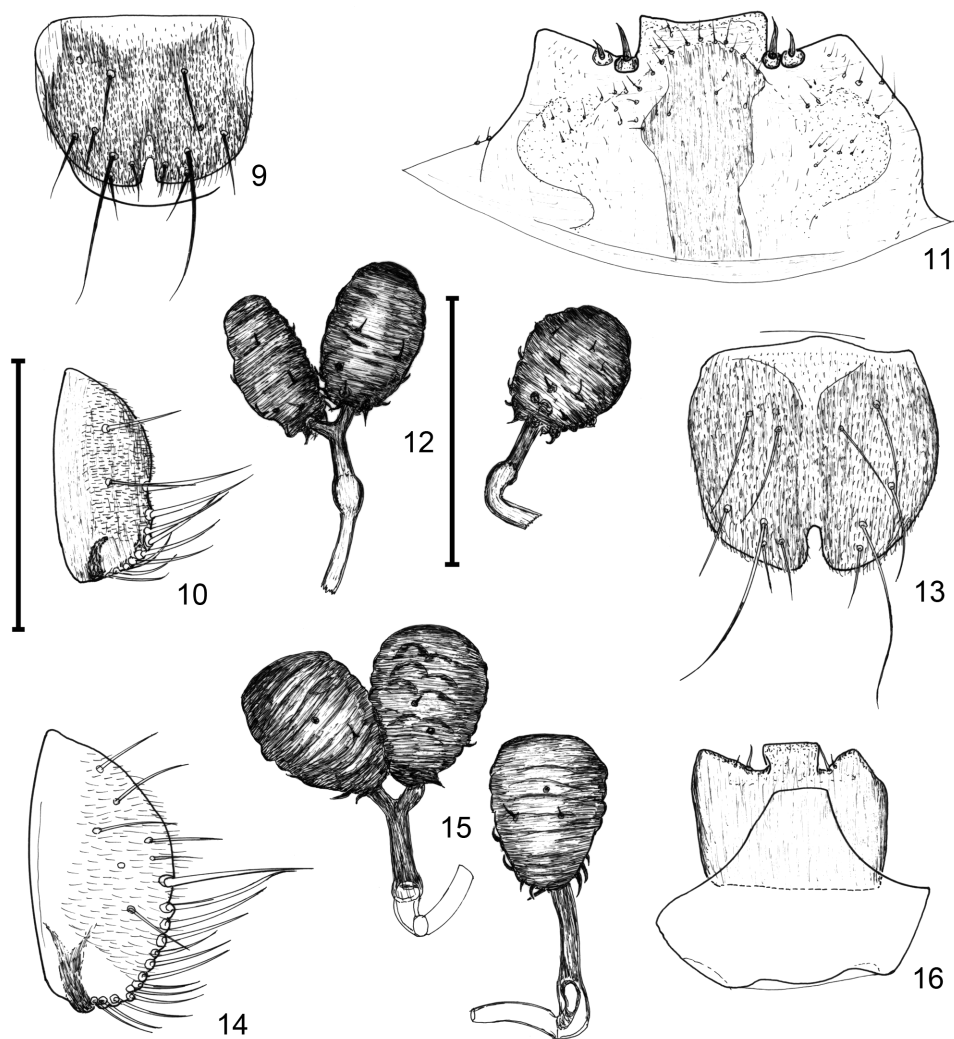
1+3 dorsocentral pairs, anterior dorsocentral pair well anterior to suture. 5 acrostichal macrochaetae: first pair about as long as presutural *dc*, 2nd pair slightly longer than presutural dorsocentral pair; 2 pairs plus a right-side one, some short acrostichals between them. Second scutellar pair as long as apical pair, 3rd pair half as long. Wing light brownish grey, veins light brown (ochre), venation as in the related species. Legs dark brown, only mid and hind tarsi ochre. Mid tibia with antero-dorsals at 5/53, 10/53, 17/53, 34/53 (0.22 mm long), a dorsal seta at 32/53 and a 0.25 mm long dorsal seta at 36/53; postero-dorsals at 10/53, 18/53, a perpendicular posterior seta at 36/53. Posterior apical setae on mid tibia both long: posterodorsal 0.10 mm and posteroventral 0.13 mm. Mid basitarsal seta 0.225 mm long.

One long latero-caudal pair of setae each on tergite 3 to tergite 5. Male sternite 5 (Figs 2–3, 5) large, medio-caudal desclerotised area wide and shallow, with dense microtrichia. Synsternite (Fig. 3) comparatively small, sternite 6 medium-long, sternite 7 and 8 rather small. Epandrium with long setae, particularly so ventrally. Cercus (Fig. 1) long though small with 3–4 apical setae. Hypandrium (Fig. 8) with robust asymmetrical apodeme, which is much shorter than phallapodeme, medial part with the usual caudal process. Subepandrial sclerite (Fig. 1) small, 0.08 mm broad but only 0.09 mm high. Anterior part of surstylus (Fig. 7) with moderately long, tapered anteroventral process and broad rounded ventral lobe; the latter with numerous short setae on medial surface. Posterior part of



**Figs 1–8.** *Leptocera austroafricana* sp. n., male postabdomen. 1 = subepandrial sclerite, cercus and contours of posterior part of surstylus, caudal view, 2 = sternite 5 and sternite 6, 3 = contours of sternite 5 and synsternite 6–8, caudal view, 4 = phallus and phallapodeme, left lateral view, 5 = caudal part of sternite 5, ventral view, 6 = postgonite, left lateral view, 7 = anterior and posterior part of surstylus, lateral view, 8 = hypandrium, ventral view. Scale bars: 0.4 mm for Figs 2–3 (upper bar), 0.2 mm for Figs 4–5, 8, 0.1 mm for Figs 1, 6–7

surstylus (Figs 1, 7) with apical bristle only half as long as body of the surstylus. Postgonite (Fig. 6) with extremely long but not broad basal part, which has a posteroventral process. Apical part of postgonite slender with curved apex. Phallus 0.15 mm long with a strong melanised dorsal rib (Fig. 4). Phallapodeme (Fig. 4) much longer than hypandrial apodeme.



**Figs 9–16.** *Leptocera* spp., female postabdomen and spermathecae. 9–12. *L. austroafricana* sp. n.: 9 = tergite 10 fused with cerci, dorsal view, 10 = tergite 8, lateral view, 11 = sternite 8, ventral view, 12 = spermathecae. 13–16. *L. elgonensis* RICHARDS: 13 = tergite 10 fused with cerci, dorsal view, 14 = tergite 8, lateral view, 15 = spermathecae, 16 = sternite 7 and sternite 8, ventral view. Scale bars: 0.2 mm for Figs 9–10, 13–14, 16, 0.1 mm for Figs 11–12, 15

Female tergite 8 (Fig. 10) with rather few setae on dorsal half, ventral half with medium-long setae only. Sternite 8 (Fig. 11) with a broad but short posteromedial lamella and with 2 pairs of short caudal setulae. Tergite 10 completely fused with cerci (Fig. 9), with a pair of medium-long seta on tergal part and with a longer pair of setae on cercal part. Spermathecae (Fig. 12) very characteristic with very long sclerotised ducts; shape oval, unpaired spermatheca sub-globular, all the three spermathecae with thin apically curved spicules on most of their surface.

Etymology. The specific epithet (“south African”) of the new species refers to its occurrence in the southern half of Africa.

*Leptocera caenosa* (RONDANI, 1880)

*Limosina caenosa* RONDANI, 1880: 36.

For detailed synonymy see ROHÁČEK *et al.* 2001: 151–152.

Type locality: Italy (“in montuosis Italiae centralis”).

The lectotype male (MZUF) was designated by ROHÁČEK (1982: 33). In the same paper (ROHÁČEK 1982) he described it excellently (p. 33–40) and depicted the male and female genitalia (figs 58–68, 74).

Material studied (HNHM): c. 60 specimens from Hungary, Germany, Switzerland, Finland, Mongolia and Jordania.

Widespread in the Palaearctic region (MARSHALL *et al.* 2011): Andorra, Austria, Portugal: Azores, Belgium, Bulgaria, Spain: Canary Is, Czech Republic, Denmark, Finland, France, Germany, Great Britain, Greece, Hungary, Iceland, Ireland, Italy (incl. Sardinia), Latvia, ?Madeira (Portugal), Malta, Netherlands, Norway, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Yugoslavia, Russia (NET, CET, ES, WS, FE), Georgia, Afghanistan, Uzbekistan, Mongolia, North Korea, Japan, Israel. It has been regarded as a cosmopolitan species through human activity; it has also been found in the Australasian/Oceanian (Australia, Hawaii, New Zealand), the Nearctic and the Neotropical regions and in the South Atlantic (Gough I.) and subantarctic regions (South Shetlands).

It has been reported also from South Africa. I studied a male (BMSA: R.S.A.: Eastern Cape, Hogsback Redwood trail, 32° 30.337' S, 26° 56.135'E, 8–10. iv. 2010, 1169 m, Kirk-Spriggs & V. R. Smart – Indigenous (mixed) Afromontane forest, Malaise trap), which would not completely fit to ROHÁČEK's figures (figs 60–68). It has the medio-caudal desclerotised area of sternite 5 much broader, basal part of postgonite definitely longer, “notch” of the postgonite deep. This is why first I hesitate to name it as *L. caenosa*; I was adviced to accept it as *L. caenosa*, since this species highly variable also as for genital characters.

*Leptocera elgonensis* RICHARDS, 1938  
(Figs 13–23)

*Leptocera (Leptocera) elgonensis* RICHARDS, 1938: 382.

The holotype female (Kenya, Suam Fishing Hut, E. side Mount Elgon, 2,700–2,800 m., March) is deposited in the collection of the MNHN (not seen). Two female paratypes with similar data are in the collection of the Natural History Museum, London (PTKIN 1989: 16: Duam Fishing Hut, etc.). The “allotype ♂” is from “Elgon Saw mill, E. side Mount Elgon, camp II, 2470 m, Dec.” (MNHN). One of the other paratypes is from Marakwet, Campi Cherangani (MNHN). I did not manage to examine the types in the course of this study.

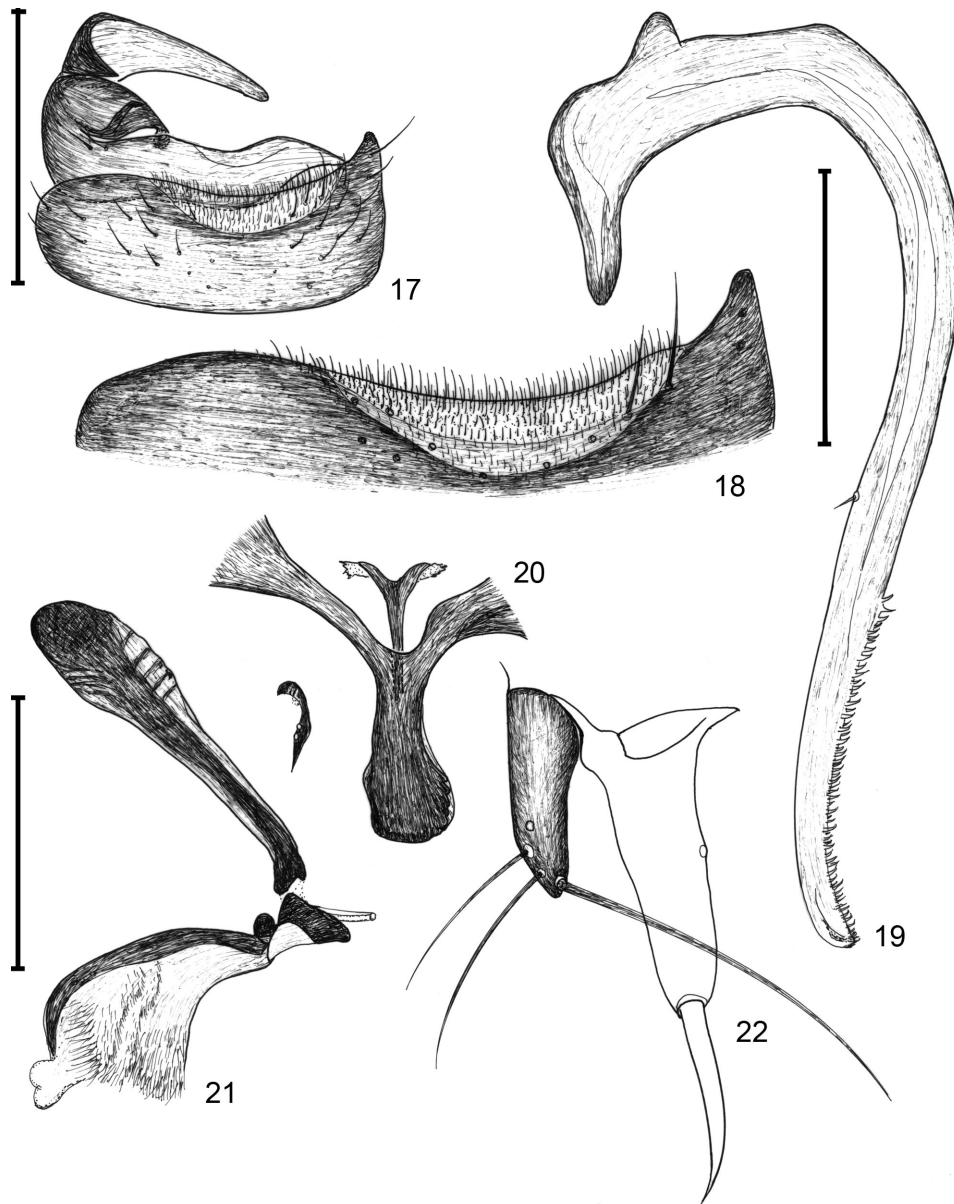
Material studied: 3 males 2 females (NMSA, 1 male with genitalia dissected, HNHN): KENYA: Narok #80, Ridge of Mau Escarpment, 00° 22' N: 34° 53'E, 1620 m. Date: 24. xi. 1992, A Whittington & J Londt. Indig. Bamboo forest; 1 male: KENYA: Kiambu #82, 50 km NNW of Nairobi, 00° 57' S: 36° 40'E, 2260 m. Date: 28. xi. 1992, J Londt & A Whittington. Gatamuyu Forest (indig.).

Redescription – Male body length usually c. 2.6–2.7 mm (smallest one from Kiambu only 2.03 mm), wing length 2.3–2.4 mm, wing width c. 1.0 mm; females larger, 2.7–2.8 mm, wing length c. 2.6–2.7 mm, width 1.14–1.18 mm.

Body dark brown, finely grey microtomentose, including facial plate and frons. Cephalic chaetotaxy as in *L. kovacsi*. Anterior fronto-orbital seta c. 5/7 length of the posterior one. Gena below eye 0.105 mm broad, longest axis of eye 0.39 mm. Genal seta 0.15 mm long. Arista cilia as long as longest cilia on first flagellomere, i.e. 0.025 mm. 1+3 pair of dorsocentral setae. 5 acrostichal macrochaetae, the 5th one may be found on the left side (contrarily to *L. kovacsi*). Anterior acrostichal pair shorter than presutural dorsocentral pair, 2nd acrostichal pair about as long as presutural dorsocentrals. Apical scutellar seta as long as 2nd pair (0.60 mm up to 0.77 mm), 3rd pair half as long. Anterior katapisternal 0.26 mm, posterior one 0.47 mm. Mid basitarsus with a 0.17 mm long ventral seta. Mid tibia with antero-dorsal setae at 7/62 (short), 13/62, 21/62 (very long), 37/62 (short), 43/62 (very long); dorsal setae at 41/62, 46/62 (0.34 mm), postero-dorsals at 13/62 and 23/62; a nearly perpendicular posterior seta at 42/62. Posterodorsal apical setae on mid tibia 0.06 mm, posteroventral 0.13 mm long.

Male abdominal sternite 5 (Figs 17–18) broad, almost without long setae, posteromedial membranous and desclerotized part not large, setulae there thin. Synsternite (Fig. 17) larger than in *L. austroafricana*, with extremely large sternite 6 and small, short sternite 7 and 8. Epandrium with a large ventro-caudal seta but otherwise with medium-long setae only. Arms of hypandrium slightly asymmetrical (Fig. 20), rather short, apodeme strongly asymmetrical, with caudally directed Y-shaped process to join to postgonites. Subepandrial sclerite slightly larger than in its congeners, as broad as high (0.10 mm). Cercus (Fig. 22) digitiform with 1 very long apical and several shorter setae. Anterior part of surstylus (Fig. 23) peculiar with long but low basal part, anterior process very large sickle-shaped with fine hairs anteriorly. Posterior part of surstylus (Figs 22–23), obliquely medially directed with long lateral setae, apical bristle comparatively short. Phallapodeme rather short (0.29 mm), phallus comparatively long, 0.25 mm with sclerotised and melanised dorsal sagittal rib. Basal part of postgonite strongly curved (Fig. 19) with large ventrally projecting caudal process, which turns to be perpendicular to body axis. Apical half of postgonite long, slender and sinuate with minute teeth on anterior edge. Due to their length the postgonites are freely visible in three out of four examined specimens without any preparation.





**Figs 17–22.** *Leptocera elgonensis* RICHARDS, male postabdomen. 17 = sternite 5 and synsternite, ventral view, 18 = caudal part of sternite 5, ventral view, 19 = postgonite, right lateral view, 20 = hypandrium, ventral view, 21 = phallus, phallapodeme and ejaculatory apodeme, left lateral view, 22 = cercus and contours of posterior part of surstylus, caudal view. Scale bars: 0.4 mm for Fig. 17, 0.2 mm for Figs 18, 20–21, 0.1 mm for Figs 19, 22

Female terminalia. Tergite 8 (Fig. 14) large (long) with some setae on dorsal part but with at least 12 setae densely placed marginally on ventral part. Sternite 8 (Fig. 16) with preceding sclerotized but pale membrane. Tergite 10 (Fig. 13) completely fused to cerci, tergal part with 2 pairs of setae, cercal part with a pair of long as well as some short setae. Spermathecae (Fig. 15) ovoid, with ducts that are slightly longer than in *L. austroafricana*. Spermathecae with mostly apically curved spicules except in apical third.

Remark. RICHARDS's (1938) description is very superficial. However, his fig. 5 on spermathecae (tip of one of the paired spermathecae lost), and even fig. 3 on tergite 8 (much more ventral view than true lateral) are similar to my figures.

Distribution. Known from type locality and two other nearby localities in Kenya.

#### *Leptocera erratica* BUCK in BUCK & MARSHALL, 2009

*Leptocera erratica* BUCK in BUCK & MARSHALL, 2009: 32.

The holotype and five paratypes are from Australia, other paratypes are from California, Argentina and South Africa.

Material examined: Paratype male (DEBU, abdomen and genitalia prepared and preserved in a plastic microvial with glycerol): AUSTRALIA, S.E.Q., Mt. Glorious, 27.iv–26.x.1989, Malaise trap, A. Hiller – *Leptocera erratica* sp. n. Det. M. Buck 1999, debu 00020552 – [yellow] PARATYPE. 1 male, (NMSA, abdomen and genitalia prepared and preserved in a plastic microvial with glycerol): "Pretoria 5. 10. 05 II" [the last 2 letters are not legible]. 1 male (BMSA): Malaise traps, Acacia savanna –RSA: Free State, Brandfort, Florisbad Res. Stat., 28° 46.039' S, 26° 04.234'E, 25.–29. x. 2010, A. H. Kirk-Spriggs, BMSA(D) 29579. These three males are with the genitalia exactly the same as given on Buck's figures 55–58. I cannot see silvery reflexion on their mesonotum.

Tentatively identified females (which cannot be separated from *L. caenosa* with certainty, see BUCK & MARSHALL, 2009): 1 female (NMSA, abdomen and genitalia prepared and preserved in a plastic microvial with glycerol): SOUTH AFR.: Cape Prov., Boesmansriviermond 3326AD, 27–31. xii. 1985, J. Londt. Hillabore caravan park; 1 female (NMSA): "Sterkfontein Cave, Transvaal, 18. 6. 49."; 1 female (HNHM): SOUTH AFRICA, Western Cape, Robertson [Municipality], 15 km W, 33.50S–19.45E, primaeval forest, 1978. 5. 12., leg. Endrödy-Younga S.

#### *Leptocera erratica* BUCK in BUCK & MARSHALL, 2009

South African form  
(Figs 71–74, 76–83)

I found some specimens from South Africa, which are not completely fit to the type and original figures. Although the differences are not definitive, I felt useful to describe this form with rather numerous figures for later studies.

Material examined: 1 male (NMSA, abdomen and genitalia prepared and preserved in a plastic microvial with glycerol): "Pretoria 5. 10. 05 II" [the last 2 letters are not legible]. 1 female (NMSA, abdomen and genitalia prepared and preserved in a plastic microvial with glycerol): SOUTH AFR.: Cape Prov., Boesmansviermond 3326AD, 27–31. xii. 1985, J. Londt. Hillabore caravan park; 1 female (NMSA): "Sterkfontein Cave, Transvaal, 18. 6. 49."; 1 female (HNHM): SOUTH AFRICA, Western Cape, Robertson [Municipality], 15 km W, 33.50S–19.45E, primeval forest, 1978. 5. 12., leg. Endrődy-Younga S.

Measurements in mm: body length 2.56 (male), 2.25–2.64 (females), wing length 2.45 (male), 2.12–2.53 (females), wing width 0.96 (male), 0.97–1.07 (females).

Body dark brown, mesonotum and scutellum with silvery tomentum (particularly when viewed from behind).

Frons dark grey reddish, facial plate yellowish grey. Cephalic setae strong, inner occipitals with convergent tips. Two subequal pairs of fronto-orbitals, plus at least three reclinate shorter setae on orbital plate between upper orbital and vertical bristles. Three pairs of long and thick interfrontals plus one small anterior *ifr*. Width of gena below eye 0.155 mm, longest axis of eye 0.34 mm. Genal seta strong (0.20 mm long) situated just above peristomals. A complete row of fine pre-ocular setae (fine whitish setulae up to 0.05 mm) on cheek. Apical row of setae on pedicel well developed. Arista cilia 0.04 mm long, cilia on apex of first flagellomere only 0.025 mm. Palpus inflated, 4 to 4.5 times as long as wide.

Anterior dorsocentral pair (of two) well behind suture, preceded by three enlarged setae of moderate to small size. Acrostichal rows without enlarged setae. Third pair of scutellar bristles less than half as long as pair, more than half as long as second pair. Anterior katapisternal seta only 0.20 mm, posterior pair 0.44 mm long. Wing (Fig. 76) greyish, veins ochre, costa thick (0.045 mm at the level of r-m), longest costal seta 0.225 mm. Legs robust, greyish yellow, with the typical chaetotaxy, i.e. with a long ventral seta on mid basitarsus (0.17 mm). Mid tibia with antero-dorsal setae at 10/55, 18/55, 35/55, 39/55 (very long and thick), a smaller dorsal seta at 37/55, posterodorsals at 11/55, (short), 22/55, 42/55 (long and thick), one shorter thick posterior seta at 39/55. The two posterior apical setae on mid tibia small and weak, posterodorsal one 0.05 mm, posteroventral one 0.055 mm.

Male abdomen. One pair each of long setae latero-caudally on sternite 5, tergite 4 and tergite 5; the latter 0.41 mm long. Sternite 5 with very small medio-caudal desclerotised area (Fig. 77): its width only 1/6 of sternal width; i.e. much smaller than in *L. caenosa*, cf. ROHÁČEK (1983: fig. 64). Scales at posterior margin slender, c. 0.03 mm long (Fig. 77, outset). Sternite 6 long (anterior-posteriorly), largely perpendicular to body axis (Fig. 78), sternite 7 small, sternite 8 long but narrow (only half abdominal width). Epandrium with ventral setae less numerous than in *L. caenosa*. Cercus closely joined to posterior part of surstylus, small and weakly sclerotised, longitudinal to the body axis, with numerous medium-sized setae. Subepandrial sclerite (Fig. 79) subquadrate, extremely broad (0.16 mm) compared to width of epandrium (0.31 mm). Anterior part of surstylus (Figs 80–81) with long (deep) and broad anterior part that is finely pointed on anterior surface. Caudal part of anterior part of surstylus small and low with one very long curved seta (Figs 80–81). Posterior part of surstylus broad, subtriangular, and slightly pointing inward (Figs 79, 82), apical seta 0.035 mm, i.e. slightly more than 1/3 of surstylar length. Hypandrial arms longer than apodeme, which extends farther anteriorly than the apex of the phallapodeme. Basiphallus very small, only 0.025 mm long and 0.055 mm deep. Distiphallus with rather strong dorsal rib, curved downward apically; sclerotized part 0.175 mm long, membranous part distinctly shorter. No sclerotised ventral rib. Postgonite (Figs 81, 83) 0.16 mm long, basal part broadened but only slightly curved with a definite notch lacking a ventral process; apical 3/5 slender, apex slightly curved anteriorly, more or less rounded.

Female terminalia. Tergite 7 somewhat shining medially. Tergite 8 (Fig. 73) comparatively long with strong medially directed ventral process; several shorter setae laterally and an extremely thick seta on medial caudal edge, plus several thinner and short setae ventrally to that seta. Sternite 8 (Figs 73–74) divided into the two usual portions: basal part broad, distal part with wide medial lobe and extremely long lateral lobes (Fig. 74). Tergite 10 (Fig. 72) completely fused with cerci and emarginate apically; each cercus with three setae. Spermathecae (Fig. 71) pear-shaped, ducts shorter than spermathecae; spicules curved apically, rather strong but restricted to the basal part of spermathecae.

### *Leptocera erythrocer* (BECKER, 1920)

*Limosina erythrocer* BECKER, 1920: 183.

For detailed synonymy see ROHÁČEK *et al.* 2001: 153, BUCK & MARSHALL, 2009: 34, MARSHALL *et al.* 2011: 246.

This widespread New World species was recorded by BUCK and MARSHALL (2009) also from Burkina Faso. Although this only Afrotropical record is considered due to a recent introduction, the species is included in the key to Afrotropical *Leptocera* species.

### ***Leptocera inconspicua* sp. n.** (Figs 24–33)

Holotype male (NMSA): KENYA: W Kakamega, #73, Kakamega Forest Reserve, 00°22'N, 34° 53'E, 1620 m, 24. xi. 1992, A Whittington & J Londt. Indigenous forest paths.

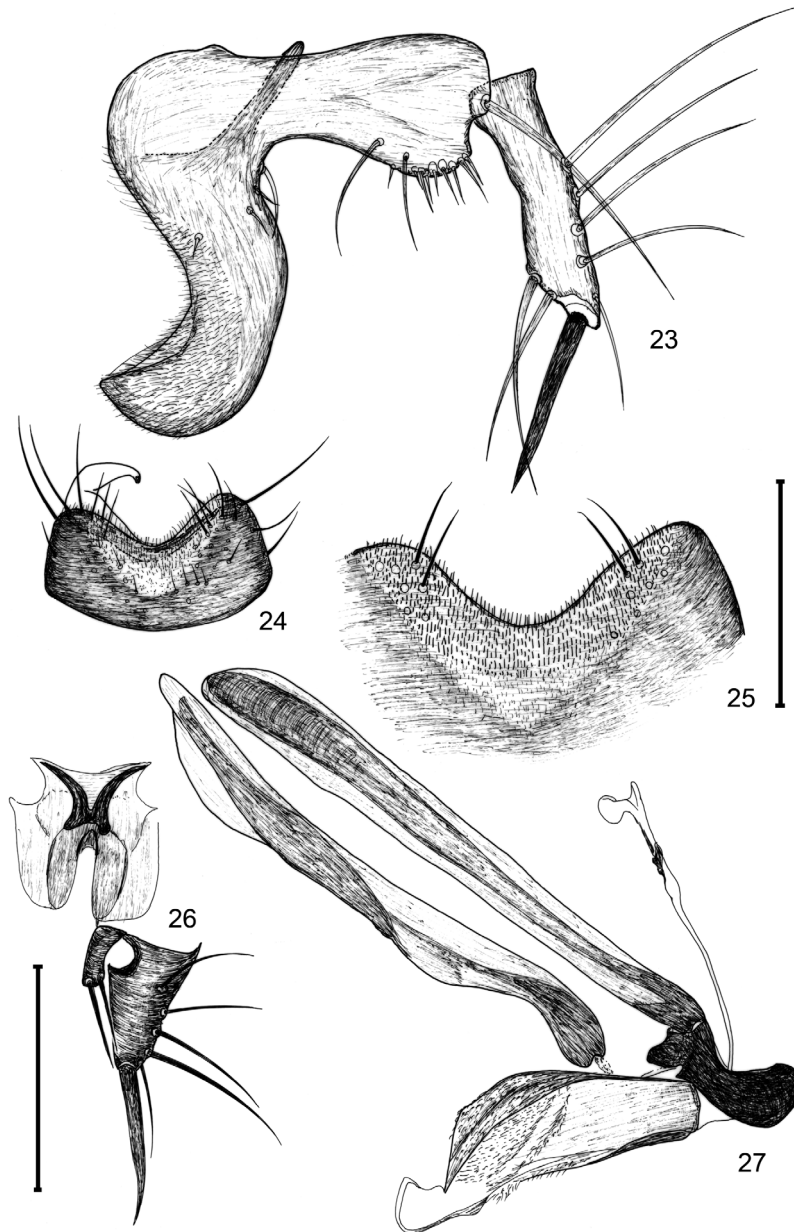
Paratypes: 1 male, 2 females (NMSA), 1 male (HNHM, abdomen and genitalia prepared and preserved in a plastic microvial with glycerol): same data as holotype.

Measurements in mm: body length 2.13 (holotype), 2.06–2.23 (paratypes), wing length 2.10 (holotype), 1.85–2.16 (paratypes), wing width 0.89 (holotype), 0.78–0.91 (paratypes).

Body brown, with weak grey microtomentum, legs (incl. fore coxa) yellow or ochre. Anterior half of frons and facial plate yellow, anterior part of gena yellowish grey.

Three pairs of interfrontal setae, anterior pair as long as antenna (much longer than in *L. nigra*). That anterior ifr seldom preceded by a minute ifr. Arista reddish. Arista cilia long (0.04 mm), about as long as longest cilia on first flagellomere. Genal seta relatively short, only third as long as vibrissa (in *L. nigra* half as long). Anterior fronto-orbital only half as long as posterior one.

Acrostichal macrochaetae short, at most 2 times as long as acrostichal microchaetae. Acrostichal macrochaetal rows with 1–2 short setae between them. 1+3 dorsocentral pairs as in other species, anterior pair well anterior to suture, first postsutural pair maybe weak. Anterior katepisternal seta only 0.075–0.08 mm long. Wing greyish, veins pale yellowish. Costal index 0.75 mm/0.51 mm, i.e. 1.47. Discal cell appendiculate posteriorly, with appendage rather faint and very short. Distance between r-m and dm-cu 0.29 mm, dm-cu crossvein 0.125 mm long. Mid tibia with 2 pairs of antero- and postero-dorsal setae at 1/5–11/50, 3/10–18/50, antero-dorsal at 16/25, a dorsal at 41/50; distal postero-dorsal (actually posterior) at 33/50, perpendicular to tibia and 0.10 mm long. Other (shorter)



**Figs 23–27.** *Leptocera* spp., male postabdomen: 23 = *L. elgonensis* (RICHARDS), anterior and posterior parts of surstylus, lateral view. 24–27. *L. inconspicua* sp. n., paratype male: 24 = sternite 5 and contours of ventral part of synsternite, ventral view, 25 = caudal part of sternite 5, ventral view, 26 = subepandrial sclerite, cercus and posterior part of surstylus, caudal view, 27 = phallus, phallopodeme, ejaculatory apodeme and medial part of hypandrium, left lateral view. Scale bars: 0.4 mm for Fig. 24 and 0.2 mm for Fig. 25, respectively, 0.1 mm for Figs 23, 26–27

antero-dorsals at 1/10, 18/25, 23/25. Posterior subapicals: a more dorsal of 0.09 mm and a more ventral of 0.15 mm. Mid tibia apically with 2 setae: a very long and thick more ventral one and a distinct (at least half as long) more dorsal one. Mid basitarsal seta thick and 0.18 mm long (holotype). Mid trochanter with 0.24 mm long seta. Anterior setal row on mid femur along its apical 1/3 strong.

Male abdominal tergites 4 and 5 each with extremely long latero-caudal pair of setae (much longer, c. 1.5 times as long as tergite). Male sternite 5 (Figs 24–25) large, without a pair of caudal lobes. Medio-caudal part desclerotised and microtrichose, laterally with long setae. Sternite 6 (Fig. 24) medially rather long, perpendicular to abdominal axis (and broadly joined to sternite 5). Hypandrial arms curved, apodeme strong and as long as phallapodeme (Fig. 27). Subepandrial sclerite (Fig. 26) small, not higher than 0.05 mm. Cercus stub-like with 2 long setae (Fig. 26). Anterior part of surstylus (Fig. 28) with anterior part long and broad, directed ventrally, posterior part developed as a broad (but not very prominent) rounded lobe. Posterior part of surstylus (Figs 26, 28) short with numerous long setae and with very long apical bristle (slightly longer than surstylus itself). Phallapodeme (Fig. 27) thin 0.27–0.31 mm long and almost straight. Distiphallus short, 0.12 mm only, without peculiarities. Postgonite (Fig. 29) very long (0.24 mm), basal part broad and curved, distal portion very long, almost straight, apex finely spiculate (Fig. 29). Ejaculatory apodememe (Fig. 27) discernible but less strongly sclerotised than in its congeners.

Female terminalia. Tergite 8 short (Fig. 31) with thick setae on caudal margin. Sternite 8 (Fig. 32) with very wide posteromedial and small latero-caudal lobes; there are 2 pairs of setulae between them: a short one and a minute one; a broad medial part of sternite 8 darker than rest of sclerite. Tergite 10 completely fused to cerci; only 1 pair of dorsal setae long, other setae short and thin. Spermathecae (Fig. 30) elliptic with short sclerotised ducts, spicules on surface restricted mostly to basal third.

**Etymology.** Named ‘inconspicua’ (= not readily visible, not prominent) because of its plain, non-descript external appearance (unlike the genitalia, which are characteristic).

### *Leptocera kovacsi* Duda, 1925 (Figs 34–44, 75)

*Leptocera (Paracollinella) Kovácsi* DUDA, 1925: 56.

For detailed synonymy see ROHÁČEK *et al.* 2001: 155.

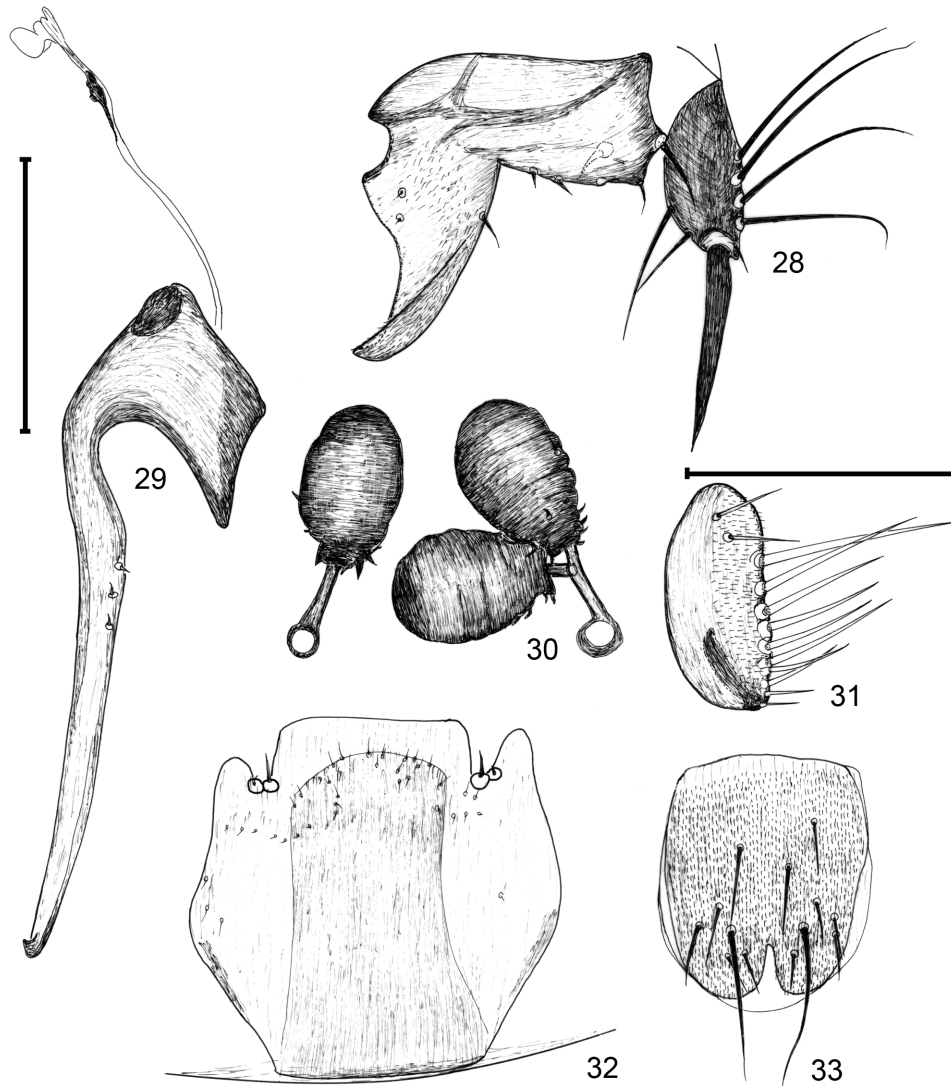
**Lectotype** (HNHM, designated here): 1) Abyssinia, Kovács [Ödön] – 2) Tshertsher, 1911. X. – 3) “*Paracollinella Kovacsi* n. sp. ♂” – DET. DR. O. DUDA – 4) [red] TYPUS.

**Paralectotypes** (HNHM): 5 males 11 females: same data; plus 1 male and 1 female which were sent to the MRAC as exchange material in the ‘70ies. 1 male [genital parts visible without any preparation] 1 female [with gen. prep.]: 1) Abyssinia, Kovács – 2) Dire-Daua, “1919. 11. 19.” – 3) “*P. Kovacsi* ♂” – DET. DR. O. DUDA. 1 male 1 female: 1) Abyssinia, Kovács – 2) Marako, 1912. III. – 3) “*P. Kovacsi* ♂” – DET. DR. O. DUDA.

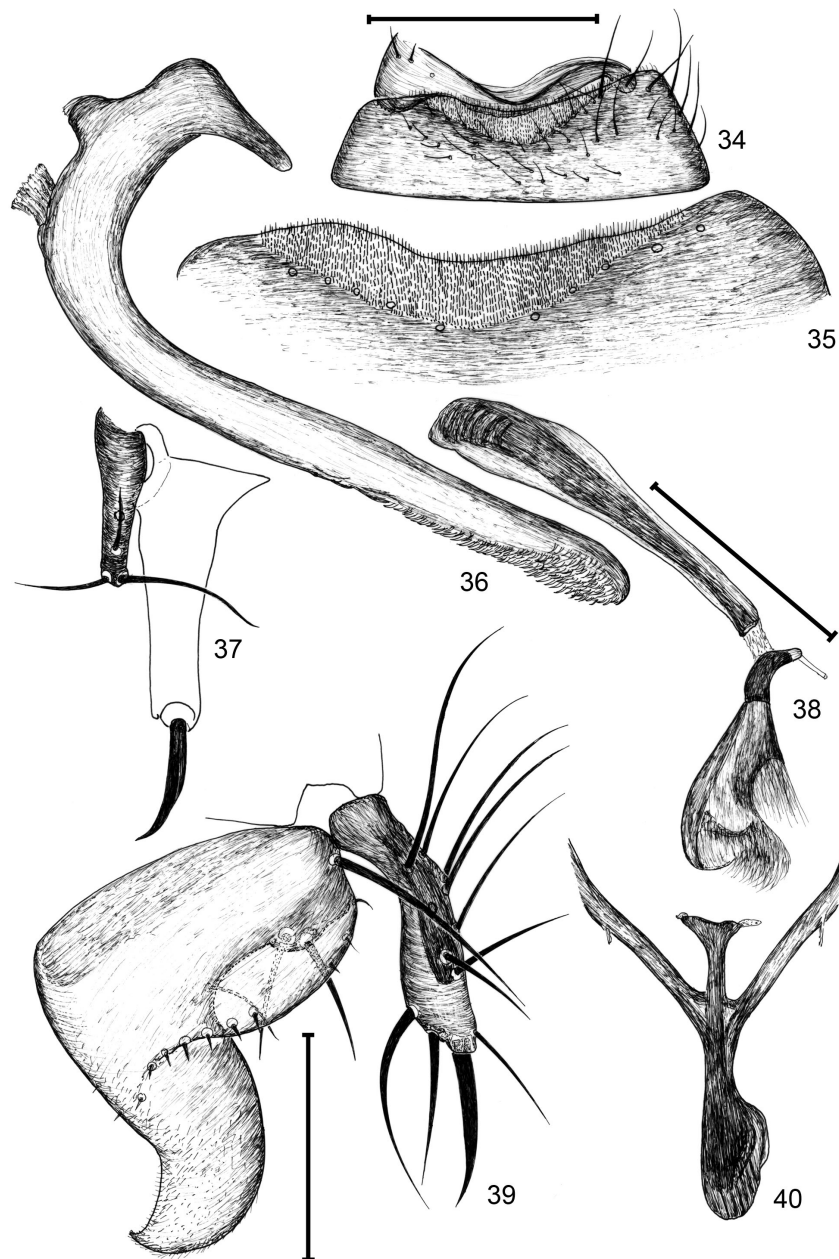
**Other material:** Ethiopia, leg. [András] Demeter, 1980 (all HNHM): 1 male: Addis Ababa, Akaki river, No. 93, 29. IX.; 1 male 2 females: Menagesha forest, Mt. Wuchacha, 3. 12.; 4 males 1 female: Mt. Wuchacha, 3. 12.; 1 female: Ambo, No. 513., 23. XI.; 1 female: Mt. Menagesha, 26. 10.

**Redescription** – **Lectotype male.** Body length 2.53 mm, wing length 2.29 mm, wing width c. 1.00 mm (not precisely measurable). Left fore tarsi lost, wings stuck to the abdomen, most of the scutellar setae broken off.

Body dark brown, grey microtomentose, mid and hind tarsi ochre. Gena below eye 0.105 mm, longest axis of eye 0.425 mm. Genal seta emerges dorsally to the level of peristomals, 0.14 mm long. Arista cilia 0.025 mm. Mesonotum somewhat more shiny than in *L. elgonensis*. 1+3 dorsocentral pairs, anterior dorsocentral pair well anterior to suture. Five enlarged acrostichal bristles (the three on

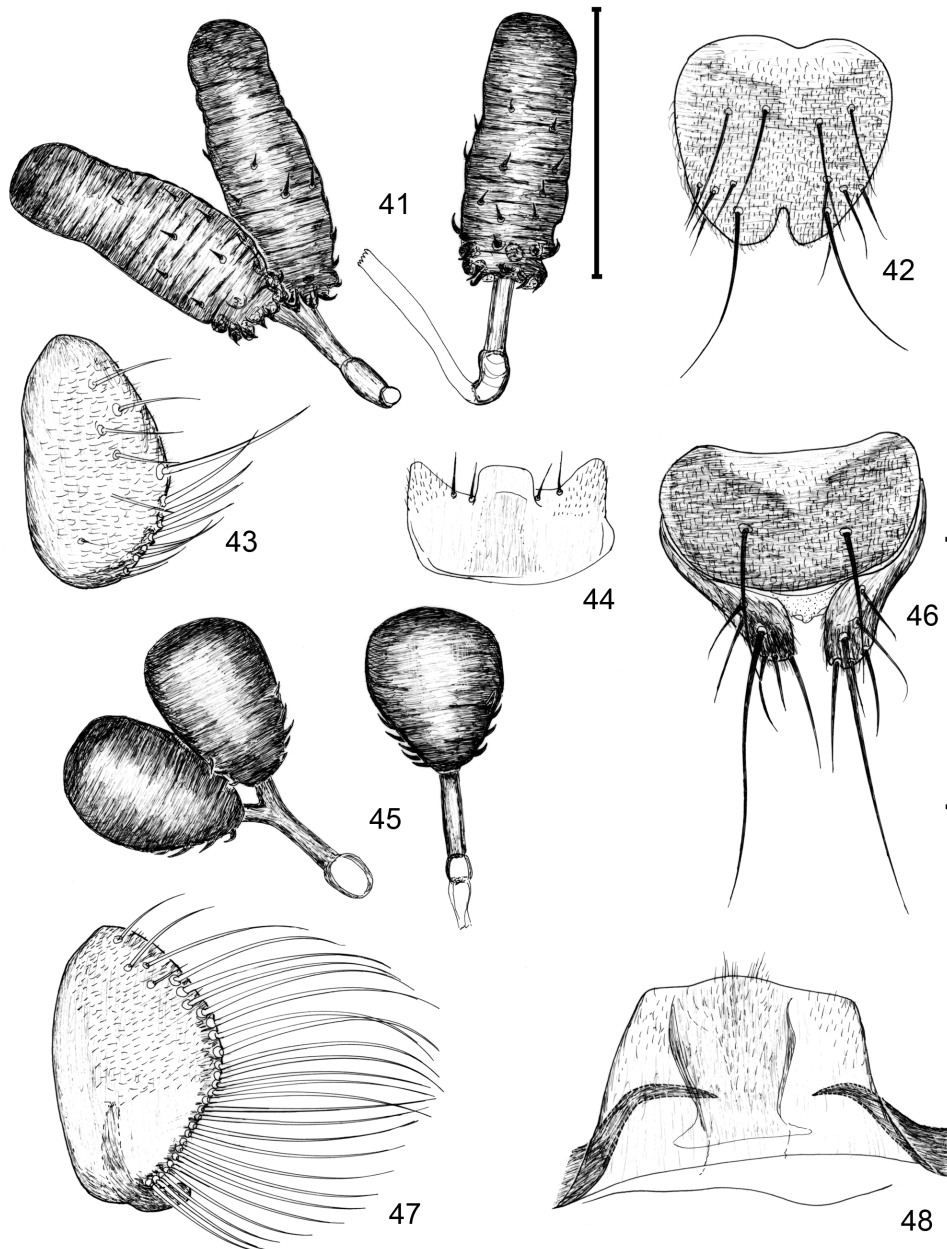


**Figs 28–33.** *Leptocera inconspicua* sp. n., male and female genitalia: 28 = anterior and posterior part of surstylus, lateral view, 29 = postgonite, left lateral view, 30 = spermathecae, 31 = female tergite 8, lateral view, 32 = sternite 8, ventral view, 33 = tergite 10 fused with cerci, dorsal view. Scale bars: 0.2 mm for Fig. 31, 0.1 mm for Figs 28–30, 32–33

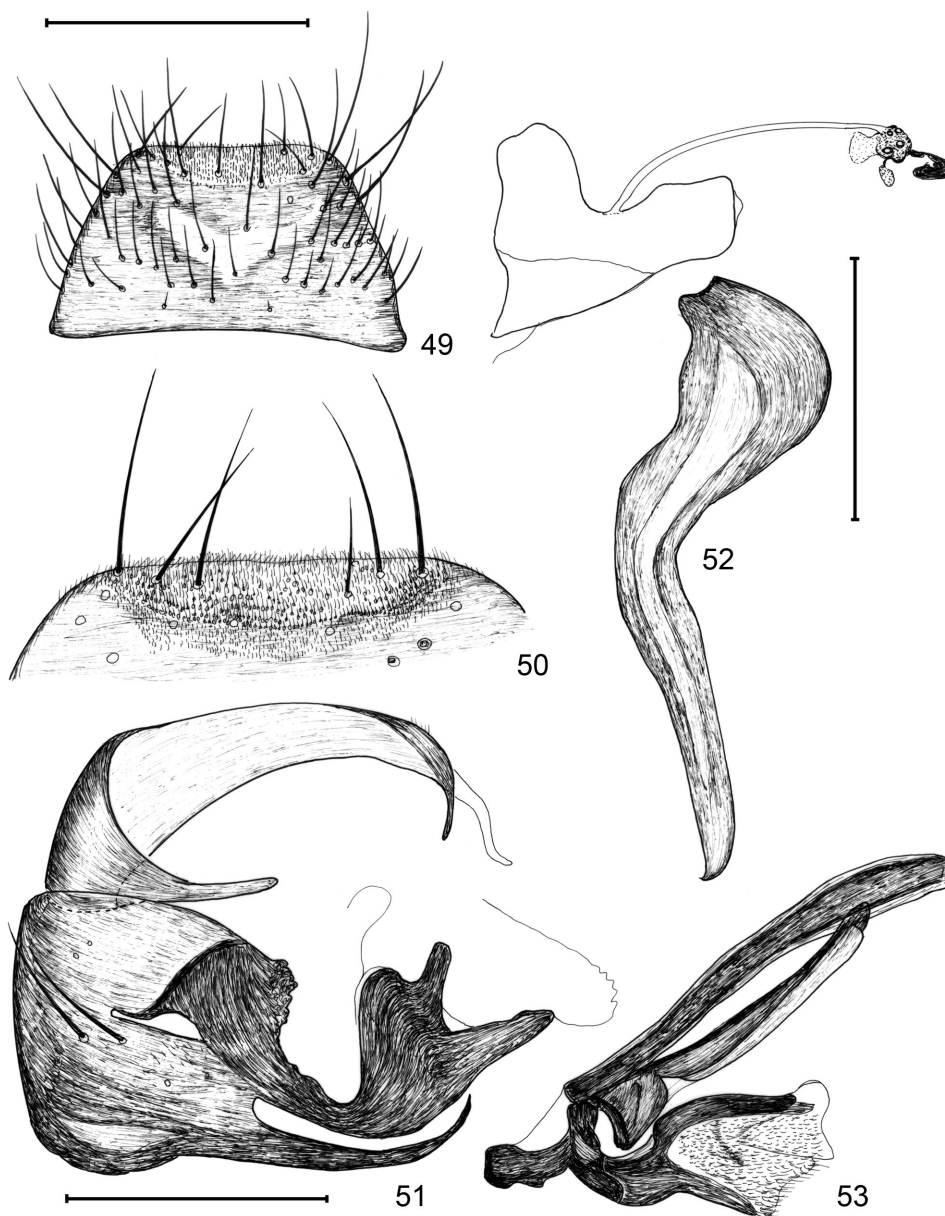


**Figs 34–40.** *Leptocera kovacsi* DUDA, male postabdomen: 34 = sternite 5 and ventral part of synsternite, ventral view, 35 = caudal part of sternite 5, ventral view, 36 = postgonite, left lateral view, 37 = cercus and contours of posterior part of surstylus, caudal view, 38 = phallus and phallapodeme, left lateral view, 39 = anterior and posterior parts of surstylus, lateral view, 40 = hypandrium, ventral view.  
 Scale bars: 0.4 mm for Fig. 34, 0.2 mm for Figs 35, 38, 40, 0.1 mm for Figs 36–37, 39





**Figs 41–48.** *Leptocera* spp., female postabdomen and spermathecae: 41–44. *L. kovacsi* DUDA: 41 = spermathecae, 42 = tergite 10 fused with cerci, dorsal view, 43 = tergite 8, lateral view, 44 = sternite 8, ventral view. 45–48. *L. marginata* (ADAMS): 45 = spermathecae (single one slightly flattened), 46 = tergite 10 and cerci, dorsal view, 47 = tergite 8, lateral view, 48 = sternite 8, ventral view. Scale bars: 0.2 mm for Figs 42–44, 46–48, 0.1 mm for Figs 41, 45



**Figs 49–53.** *Leptocera marginata* (ADAMS, 1905), male postabdomen: 49 = sternite 5, ventral view, 50 = caudal part of sternite 5, ventral view, 51 = synsternite, subventral (slightly caudal) view, 52 = postgonite, left lateral view, 53 = phallus, phallapodeme and medial part of hypandrium, right lateral view. Scale bars: 0.4 mm for Fig. 49, 0.2 mm for Figs 50–51, 53, 0.1 mm for Fig. 52

right side broken off on lectotype). First acrostichal pair about as long as presutural dorsocentral pair, 2nd acrostichal pair definitely longer than presutural dorsocentrals. Anterior katepisternal seta thin, half as long as posterior one (the latter 0.48 mm). Wing (Fig. 75) light greyish, veins ochre, costa not unusually thickened. Mid tibia with antero-dorsals at 5/52, 10/52, 15/52 (very long), 35/52 (very long), dorsal setae at 32/52, 38/52 (very long); postero-dorsals at 10/52, 20/52 (very long), a posterior seta at 35/52. Posterior apical setae on mid tibia strongly unequal: posterodorsal one 0.05 mm, posteroventral one 0.135 mm

Male and female postabdomen and genitalia (based on preparations on paralectotypes). Male sternite 5 (Figs 34–35) wide but relatively short, with medium-sized bristles, posteromedial desclerotized area wide and shallow. Sternite 6 (Fig. 34) relatively long and wide (almost reaching right margin of sternite 5), mostly perpendicular to body axis. Epandrium with numerous setae, especially ventrally. Hypandrium (Fig. 40) with long and rather slender lateral arms, broad asymmetrical apodeme, and long posteromedial process. Cercus (Fig. 37) cylindrical with two pairs of laterally directed longer and some shorter setae. Anterior part of surstylus (Fig. 39) peculiar, robust with broad curved anterior part and a broad (but not very prominent) posterior part, the latter with a long caudal seta and a few other setae. Posterior part of surstylus (Figs 37, 39) long, ventrally directed apical bristle much shorter than surstylus, with two thick subapical setae and several long caudal setae on its mid section. Basiphallus comparatively small (Fig. 38), distiphallus with two tufts of hairs (subapically and ventrally). Phallapodeme (Fig. 38) distinctly longer than hypandrial apodeme. Basal part of postgonite (Fig. 36) strongly curved with less robust basal projection; apical 2/3 of postgonite almost straight, rather thick with numerous minute teeth in several rows subapically and on anterior edge of apical 1/3; apex rounded.

Female terminalia. Tergite 8 (Fig. 43) with short discal hairs and several marginal setae along ventral half. Sternite 8 (Fig. 44) small and rather short, with a narrow rounded medial and relatively large lateral lobes. There are two pairs of longer thin setae on sternite 8 caudally. Tergite 10 completely fused to cerci (Fig. 42), with two pairs of moderately long setae on tergal part, one pair of long setae plus several shorter setae on cercal part. Spermathecae (Fig. 41) very distinct: cylindrical (sub-cylindrical) and very elongate, with numerous apically curved spicules on basal 2/3. Sclerotised ducts of spermathecae short.

A lectotype was designated to rule out confusion with closely related species.

Distribution – Ethiopia, Zaire (ROHÁČEK *et al.* 2001). The records from Zaire (origination from VANSCHUYTBROECK 1959) appears questionable to me.

*Leptocera marginata* (ADAMS, 1905)  
(Figs 45–56)

*Limosina marginata* ADAMS, 1905: 200. Type locality: Zimbabwe, Salisbury. Lectotype male, designated by RICHARDS, 1973: 304 (SEMC).

*Limosina* [as “*Limosa*”] (*Paracollinella*) *decisetosa* VANSCHUYTBROECK, 1950: 11. New synonymy. Type locality: Zaire, Île de Mateba (holotype male in the ISNB). For detailed synonymy see ROHÁČEK *et al.* 2001: 155.

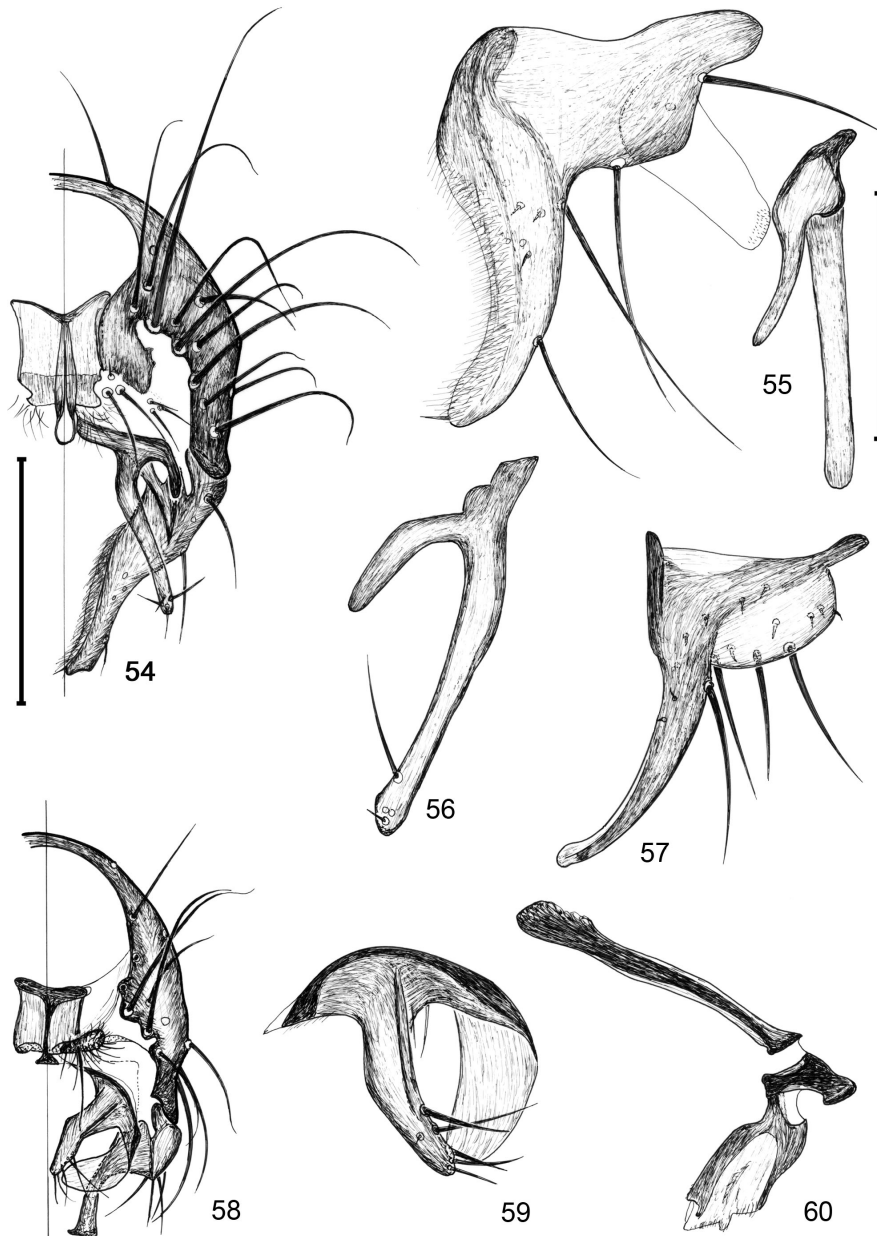
Material studied: 2 female paratypes of *L. decisetosa* (HNHM): 1) ♀ – 2) Mateba (île), 3-ii-1949, P. Vanschuytbroeck. P. Vanschuytbroeck det. 1950: “*Paracollinella decisetosa* Vanschuytbr.” – [red] Para-type – cf. Bull. Inst. Sc. Nat. Belg. T. XXVI, n° 25, 1950, p. 11–12. Other specimens, HNHM: R.S.A., leg. L. Papp & M. Földvári 2007: 5 males 1 female: farmlands nr Happy Lands, Jan 11, S33° 28' 38.1'' E25° 35' 49.7'', 51 m, No. 15; 1 male 1 female: Sandvlakte Farm nr Paterson, cattle pasture, Jan 12, S33° 26' 14.2'' E25° 56' 54.8'', 300 m, No. 18; 1 male: KwaZulu Natal, S Drakensberg, Garden Castle, along Mlambonja River, Jan 22, GPS21, S29° 44' 59.4'' E29° 12' 42.1'', 1811 m, No. 33; 2 males 2 females: KwaZulu Natal, N Drakensberg, along eNdumeni River, on sedge and on mud, Jan 31, 2007, No. 45, leg. L. Papp. Tanzania: 1 male 1 female: Morogoro region, Mikumi National Park, Mikumi Tented Camp – Netting over excrement of elephant, Feb 1, 1987, leg. S. Mahunka – T. Pócs – A. Zicsi, No.8.; 8 males 3 females: Meru, 1979. II.-III., leg. Eöry – Sipos. Ethiopia: 1 female: Ambo, 23. 11. 1980., leg. Demeter. Other specimens, NMSA: 4 males 6 females: South Africa, Barberton, 16. 5. [19]13., H.K. Munro; 7 males 1 female: Heidelberg, 20. I. 21., H.K. Munro; 3 males, 3 females: SOUTH AFRICA: Natal, Rietspruit farm, 13km NE Pietermaritzburg, 29° 32' 27'' S 30° 29' 04'' E, 13. iii. 1990, Wetland & Dam, A. Whittington. 1 male 1 female: S AFRICA: KZ-Natal #21, Itala Game Reserve, 27° 31' S: 31° 15' E, 800m. Date: 27–29. iii. 1996. Coll: D.A. Barraclough, Woodland/Thomveld. 1 male: SOUTH AFRICA: Natal #93, Merrivale, at light, 29° 31' S: 30° 15' E, 1000m, Tehwalabenyoni farm. Date: 2. ii. 1994. Coll: B. R. Stuckenberg.

Redescription of this species is given by RICHARDS (1973), so only postabdominal structures of both sexes are described here.

Male postabdomen and genitalia. Sternite 5 (Figs 49–50) large (long) with numerous long setae. Posteromedial desclerotized part of sternite 5 rather broad, microtrichia apparently born on small tubercles. Synsternite (Fig. 51) very characteristic: right half of sternite 6 greatly narrowed, sternite 7 extended towards the right side as a curved, heavily sclerotised dark sclerite. Medial and right portions of sternites 6 and 7 forming a distinct pocket. Sternite 8 part also larger than usual; male terminalia therefore larger than usual. Epandrium (Fig. 54) with a large transparent and less sclerotised posteroventral part bearing shorter setae, epandrium otherwise with numerous long setae. Hypandrium with apodeme shorter than phallapodeme (Fig. 53). Subepandrial sclerite slightly higher than broad, with a more sclerotised narrow median part. Cercus desclerotised, with hairs but no bristles (Fig. 54). Anterior part of surstylus (Figs 54–55) with large, ventrally directed anterior part and a relatively small posterior part, which bears a thin transparent lamella medially. Posterior part of surstylus deeply bifid (Figs 54–56): the longer, ventral part with very short apical and a long subapical seta, the shorter dorsal part bare. Basiphallus (Figs 52–53) extended caudally. Distiphallus (Fig. 53) with both dorsomedial and ventromedial rib, which are united basally into a strong wide sclerite. Distiphallus microtrichose between the sclerotised ribs. Postgonite (Fig. 52) robust, without basal caudal projection; basal part broader and rounded caudally. Apical part rather stout with a minute anteriorly curved apex. Ejaculatory apodeme (Fig. 52) distinct but irregular in form.

Female postabdomen and genitalia. Tergite 8 (Fig. 47) rather large with numerous thick setae along entire caudal margin (easily seen in undissected specimens). Sternite 8 (Fig. 48) not divided into posterior lobes, sparsely microtrichose, medial part slightly darker. Tergite 10 (Fig. 46) *not* fused to cerci, with a pair of long setae. Cerci (Fig. 46) short with a pair of very long setae (easily seen under lower magnification). Spermathecae (Fig. 45) ovoid with somewhat narrowed base; apically curved spicules present on basal 2/5. Sclerotised part of duct about as long as spermathecae.

Distribution – Rwanda and Zaire (occurrence data for *L. decisetosa*, see ROHÁČEK *et al.* 2001, PAPP 2008 and MARSHALL *et al.* 2011); Ethiopia, South Af-



**Figs 54–60.** *Leptocera* spp., male postabdomen. 54–56. *L. marginata* (ADAMS, 1905): 54 = right half of epandrium and genitalia, caudal view, 55 = anterior and posterior part of surstylus, lateral view, 56 = posterior part of surstylus, posterior view. 57–60. *L. melanaspis* (BEZZI): 57 = anterior part of surstylus, lateral view, 58 = right half of epandrium and genitalia, caudal view, 59 = posterior part of surstylus, posteroventral view, 60 = phallus and phallapodeme, left lateral view. Scale bars: 0.2 mm for Fig. 54, 58, 60, 0.1 mm for Figs 55–57, 59

rica, Botswana, Zimbabwe; Australia (NSW, QLD). Newly recorded from Tanzania. Locality data from outside the Afrotropical region require confirmation.

*Leptocera melanaspis* (BEZZI, 1908)  
(Figs 57–70)

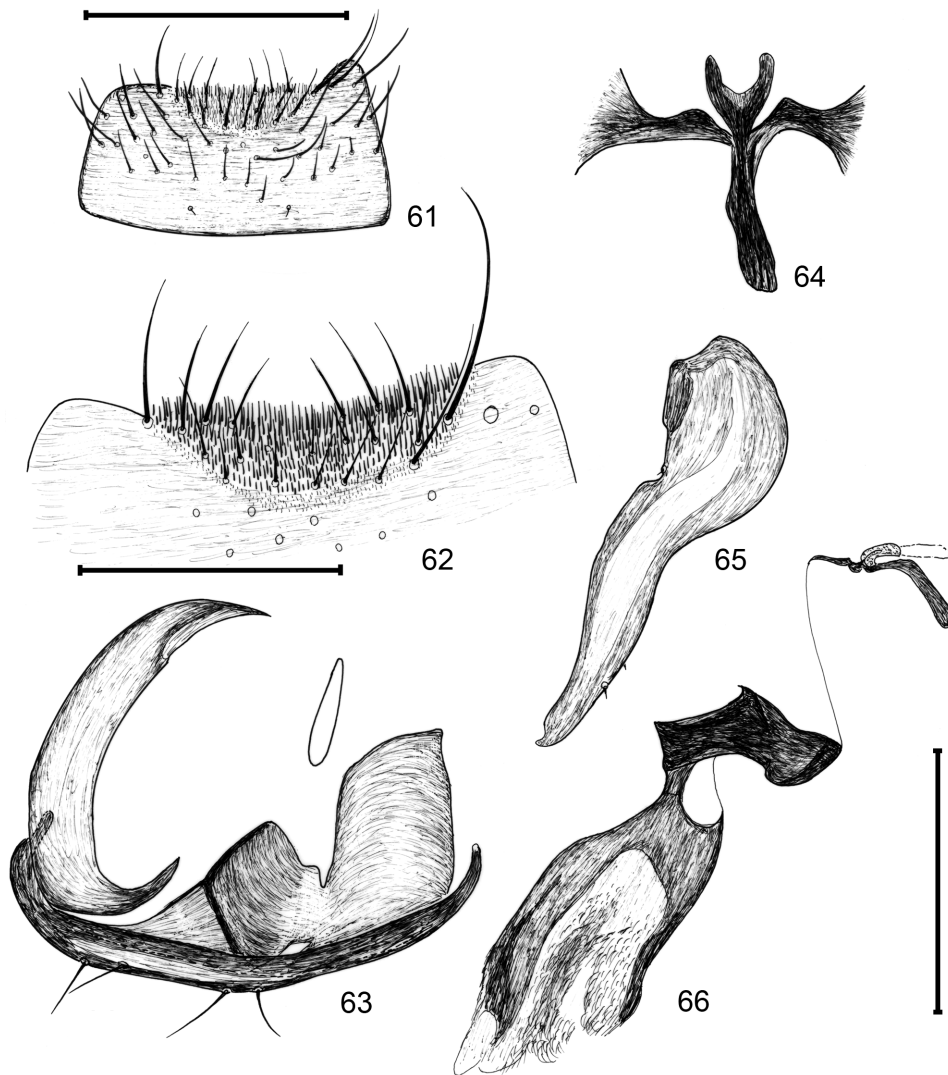
*Limosina melanaspis* BEZZI, 1908: 384. Type locality: Zaire, Kinshasa. Holotype male in the collection of the ISNB.

For detailed synonymy see ROHÁČEK *et al.* 2001: 155.

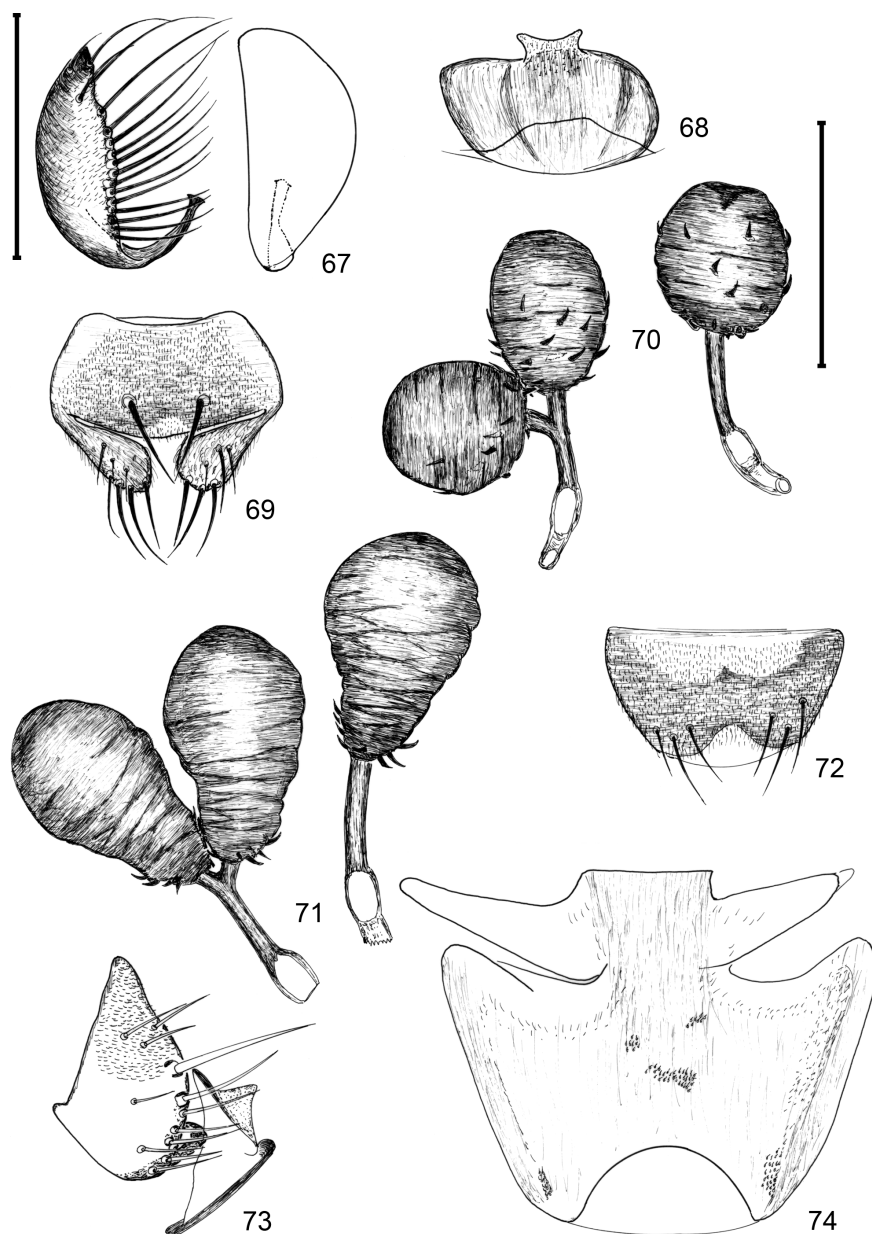
Material studied (HNHM): Ethiopia: 1 male (gen. prep.): Abyssinia, Kovács – Marako, 1912. III. – “*Paracollinella melanaspis* Bezzi ♂” DET. DR. O. DUDA. Ethiopia, leg. [András] Demeter, 1980: 4 males 5 females (also No. 55 on 1 f): Addis Ababa, Akaki River, 29. IX.; 2 females: *ibid.*, 6/13. X.; 2 males 1 female: *ibid.*, 6. X.; 2 males 1 female: *ibid.*, Ambo, No. 513, 23. XI.; 1 male: Mt. Menagesha, 26. X. Congo: 1 female: Brazzaville, Congo River, 21–31. XII. 1963., leg. Endrődy-Y., Balogh, Zicsi. Uganda: 1 male, Uganda, Katona [= K. Kittenberger], Mujenje, 1913. VIII., “*Paracollinella melanaspis* Bezzi ♀” det. DR. O. DUDA [misidentified as female]. Tanzania: 1 female: Africa or., Katona905 [=K. Kittenberger], Mto ya Kifaru, “*Paracollinella melanaspis* Bezzi ♀” DET. DR. O. DUDA; 3 males 2 females: Morogoro region, Mikumi National Park, Mikumi Tented Camp – Netting over excrement of elephant, Feb 1, 1987, leg. S. Mahunka – T. Pócs – A. Zicsi, No.8. Republic of South Africa: 1 female (gen. prep.): Natal, New Hannover, 1913. VIII., “*Paracollinella melanaspis* Bezzi ♀” DET. DR. O. DUDA; 1 male 1 female: R.S.A., KwaZulu Natal, N Drakensberg, along eNdumeni River, on sedge and on mud, Jan 31, 2007, No. 45, leg. L. Papp.

Male postabdomen and genitalia. Sternite 5 (Figs 61–62) rather long with medium-sized discal and long marginal setae. Posteromedial desclerotized area not very wide but fairly long, with relatively long microtrichia and several longer setae (Fig. 62). Synsternite (Fig. 63) with sternite 6 and 7 extended far towards the right side, with large sclerotised portion on the right side; sternite 8 shifted to left side. Epandrium (Fig. 58) with large transparent posteroventral (ventro-caudal) part devoid of setae, with fine hairs only. Epandrium otherwise with numerous long setae. Hypandrium strong, its apodeme shorter than phallapodeme (Fig. 64), posteromedial processes to postgonites also strong. Subepandrial sclerite (Fig. 58) comparatively small, only slightly higher than broad with narrow, more sclerotised median part. Cercus weakly sclerotised, transverse and haired, with one pair of stronger setae (Fig. 58). Anterior part of surstylus (Figs 57–58) short, with long, slender and bare ventrally directed anterior part (slightly broadened at apex) and relatively small posterior part, which bears some short setae medially. One longer seta basally an anterior part and 3 long setae on posterior part. Posterior part of surstylus peculiar (Figs 58–59): the medial part shorter than anterior projection of anterior part of surstylus with some apical and subapical lateral setae, the lateral part of posterior part of surstylus lamelliform, broadly rounded and medially curved without any setae. Basiphallus (Figs 60, 66) extended caudally. Distiphallus (Figs 60, 66) with a larger dorsal and a shorter ventral medial rib, which are united caudally into a narrow sclerite (wide in *L. marginata*), which is joined rather narrowly to the basiphallus. Distiphallus microtrichos between the sclerotised ribs. Postgonite (Fig. 65) relatively short but thick, without basal caudal projection; basal part broader and rounded caudally; apical part rather thick with a definite anteriorly curved apex. Ejaculatory apodeme (Fig. 66) discernible but without a characteristic shape.

Female postabdomen and genitalia. Tergite 8 (Fig. 67) relatively large. Medially directed ventral processes long, the whole caudal margin with long setae. Sternite 8 (Fig. 68) relatively small with medial process only, lacking lateral lobes. Tergite 10 (Fig. 69) fused to cerci only at extreme sides, with a pair of stout medium-sized setae. Cercus not small compared to other species, with 3 apical setae. Spermathecae (Fig. 70) spherical with short sclerotised ducts; apically curved spicules evenly distributed over surface (except apical part), not numerous.



**Figs 61–66.** *Leptocera melanaspis* (BEZZI, 1908), male postabdomen: 61 = sternite 5, ventral view, 62 = caudal part of sternite 5, ventral view, 63 = synsternite, posteroventral view, 64 = hypandrium, ventral view, 65 = postgonite, left lateral view, 66 = phallus and ejaculatory apodeme, left lateral view. Scale bars: 0.4 mm for Fig. 61, 0.2 mm for Figs 62–64, 0.1 mm for Figs 65–66



**Figs 67–74.** *Leptocera* spp., female postabdomen and spermathecae. 67–70. *L. melanaspis* (BEZZI, 1908): 67 = tergite 8, exact lateral view (left), and viewed perpendicular to surface (to show maximum dimensions), 68 = sternite 8, ventral view, 69 = tergite 10 and cerci, dorsal view, 70 = spermathecae. 71–74. *L. erratica*: 71 = spermathecae, 72 = tergite 10 fused with cerci, dorsal view, 73 = tergite 8 and sternite 8, lateral view, 74 = sternite 8, ventral view. Scale bars: 0.2 mm for Figs 67–69, 72–73, 0.1 mm for Figs 70–71, 74



Distribution – Ethiopia, Kenya, South Africa, Tanzania (new), Uganda, Zaire.

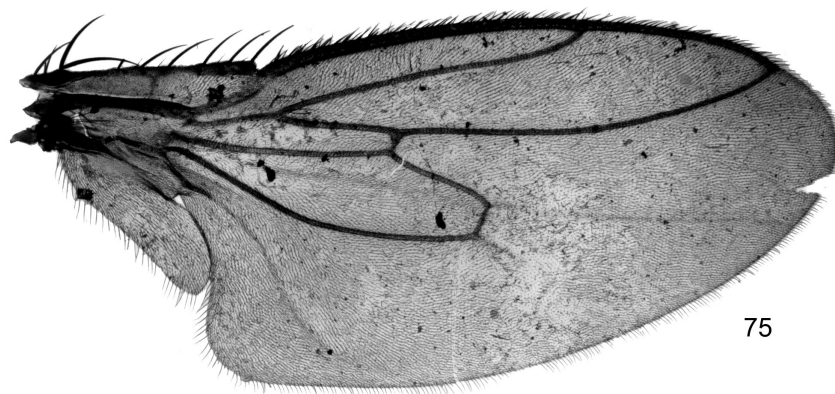
Remark. RICHARDS (1938) described “*Leptocera* (s. str.) *melanaspis* (Bezzi) var. *velutina*, n. var.” but he synonymised it with *L. melanaspis* in 1980 (RICHARDS 1980: 619).

*Leptocera nigra* OLIVIER, 1813

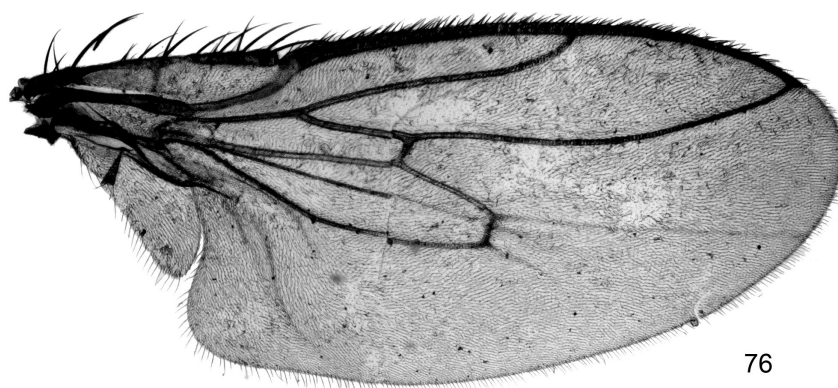
*Leptocera nigra* OLIVIER, 1813: 489.

For detailed synonymy see ROHÁČEK *et al.* 2001: 156.

The HNHM has 47 specimens from the Congo, Ethiopia and R.S.A, identified by Dr J. ROHÁČEK (c. 3000 identified specimens from other regions). Additional specimens: Ethiopia: 1 male: Akaki river, Addis Ababa, No. 115., 6. X. 1980., leg. Demeter. Rwanda: 1 male: Kagera Nat. Park, 1988. V. 1., leg. Vojnits.

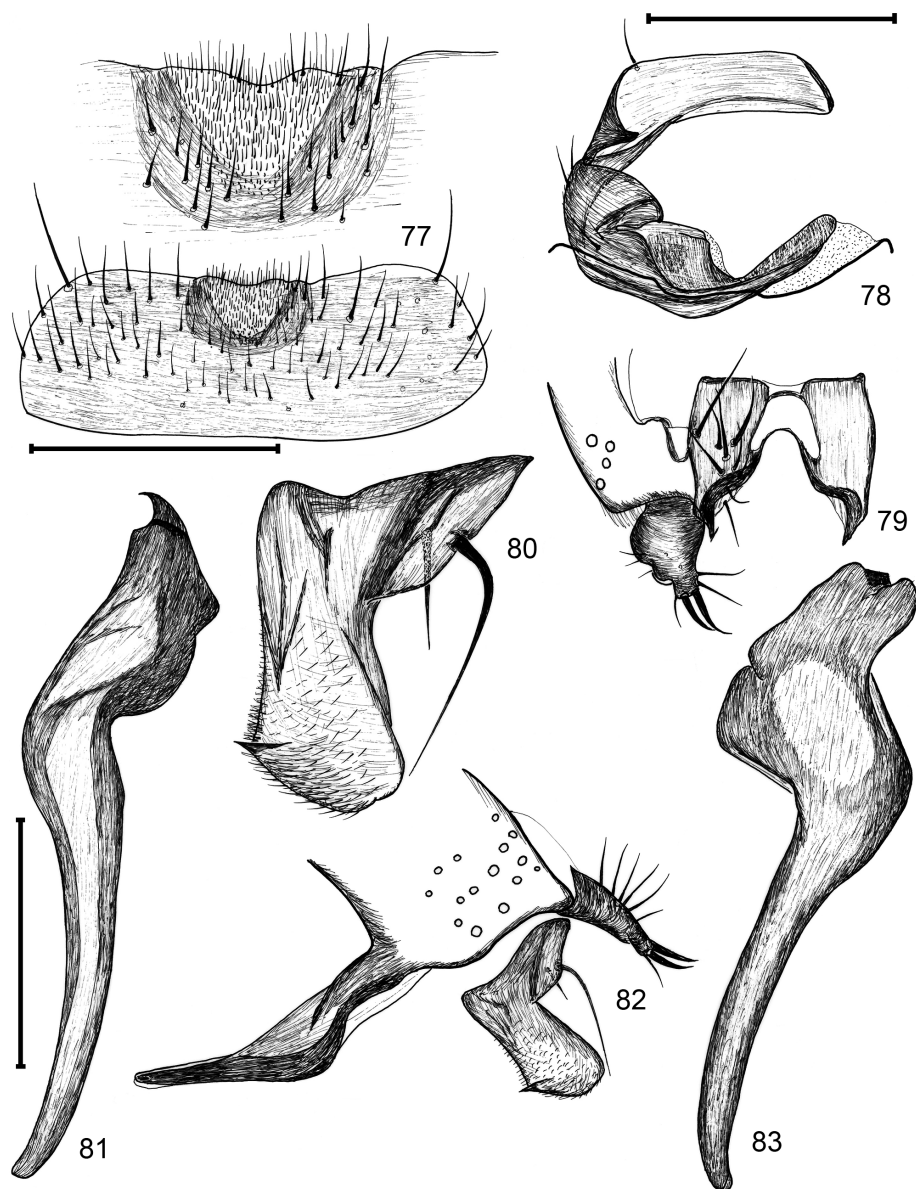


75



76

**Figs 75–76.** *Leptocera* spp., wings. 75 = *L. kovacsi* DUDA, paralectotype male. 76 = *L. erratica*, South African form, female



**Figs 77–83.** *Leptocera erratica*, South African form, male postabdomen: 77 = sternite 5 and postero-medial part in higher magnification, ventral view, 78 = synsternite, ventral view, 79 = subepandrial sclerite and left ventral part of epandrial complex with posterior part of surstylus, caudal view, 80 = anterior part of surstylus, lateral view, 81 = postgonite, lateral view, 82 = ventral part of epandrium with hypandrium, anterior and posterior parts of surstyli, lateral view, 83 = left postgonite, in broadest (oblique lateral) view. Scale bars: 0.4 mm for Fig. 78, 0.2 mm for Figs 77, 79, 82, 0.1 mm for Figs 80–81, 83

There are c. 370 specimens of *L. nigra/salatigae* in 50 vials of alcohol at the HNHM from the Congo (Brazzaville) and Ghana; most of which have not been dissected and remain unidentified (see also under *L. salatigae*). ROHÁČEK's (1982, 1983) figures on the male and female genitalia provide a sound basis to identify these species. I was unable to find non-genitalic characters that would separate *L. nigra* from *L. salatigae*.

Distribution. Widely distributed in the Palaearctic and Afrotropical regions (in details see ROHÁČEK *et al.*, 2001 and MARSHALL *et al.*, 2011).

*Limosina (Paracollinella) chambii* VANSCHUYTBROECK, 1950: 24,  
**syn. n.**

Material studied: Holotype male (MRAC): 1 ♂; 2) [reddish] HOLOTYPUS; 3) Musée du Congo, Parc Albert: "Chumbi XI" – 1933, Dr De Wulf; 4) [reverse, reddish] TYPE; 5) R. DET 5663; 6) P. Vanschuytbroeck det., 1950 "Paracollinella ♂ chambii nsp."; 7) "Leptocera (s.str.) chambii (Vansch.) J. ROHÁČEK det. 1982"; 8) [code label of MRAC] RMCA ENT 000016278. In a rather poor state of preservation: head removed and glued to polyporus block in front of minuten pin, frontal setae rubbed off, upper half of right wing lost, remainder stuck to left wing; fore tarsi (except right basitarsus) and hind legs missing; mesonotal and scutellar setae rubbed off except 2 right basal scutellar setae. Abdomen and genitalia in a small microvial [J. ROHÁČEK] pinned below label 1).

Paratypes (MRAC): 14 male and 14 female paratypes (MRAC, all in a very good state of preservation, supplemented now with "♂" / "♀" signs): 1 male 2 females: same labels; 1 female: *ibid.*, without "plaine de lave"; 1 male 1 female: *ibid.*, Kivu, Katana, "Kibati X–1933"; 6 males 6 females (plus 1 male paratype in the HNHM, through an exchange in the 1970ies): *ibid.*, Chumbi XI–1933; 1 male 2 females: *ibid.*, Kibati, – 1933 (200 m. dessus gîte); 1 female: *ibid.*, P.N.A. –1933, cratère Mugunga; 1 male: *ibid.*, N. Kivu: Kibati, XI–XII–1963; 1 male: *ibid.*, Rutshuru, I–1934; 2 males 1 female: *ibid.*, Envir. Mission Rugari (Lulenga), –1933. 1 female (not conspecific with holotype): PARATYPUS – Musée du Congo, N. Kivu: X–1933, Kibati (plaine de lave) Dr De Wulf – R. DET. 5663 – "Chaetopodella ? denigrata (Duda) ♂ det. L. Papp 2011"; head lost, in a very poor state of preservation: left wing with part of thorax and left mid and hind legs all lost.

*L. chambii* was treated as a separate (valid) species formerly, see ROHÁČEK *et al* (2001). Its synonymy with *L. nigra* is proposed here.

*Leptocera salatigae* (DE MEIJERE, 1914)

*Limosina salatigae* DE MEIJERE, 1914: 269. Lectotype male (designated by ROHÁČEK, 1983: 138, ZMAN): Indonesia, Java, Salatiga.

*Leptocera (Leptocera) salatigae*. – ROHÁČEK 1983: 138–143 (redescription, phylogenetic notes and illustrations).

*Leptocera (Paracollinella) parafulva* DUDA, 1925: 54. Lectotype female (ZMHB, designated by HAYASHI 1995: 556, synonymy): Taiwan, Taihoku.

*Limosina (Paracollinella) saegeri* VANSCHUYTBROECK, 1959: 74. Holotype male: Zaire, Parc National de la Garamba (MRAC). – ROHÁČEK in ROHÁČEK *et al.* 2001: 23; synonymy proposed. For detailed synonymy see ROHÁČEK *et al.* 2001: 157.

Material studied (HNHM): 20 specimens from Ghana and Uganda, identified by Dr J. ROHÁČEK. Additional specimens: Tanzania: 1 male: Muyuni, Morogoro reg., 1–18. II. 1987., leg. Mahunka, Zicsi. Yemen: 2 males 1 female: Wadi Zabid, fényre [on light], 1970. X./XI./VII., Szalay-Marzsó A.[Aladár].

A species which was frequently misidentified (see the synonymy list above), until ROHÁČEK (1983) revised it through studies on types (see his figures 1 to 13).

Distribution (after ROHÁČEK *et al.* 2001) – Afrotropical: Burkina Faso, Cap Verde Is, Ghana, Guinea, Kenya, Madagascar, Malawi, Mozambique, Nigeria, Seychelles, Sierra Leone, South Africa, Tanzania (new), Uganda, Yemen (new), Zaire; Australasian/Oceanian region: American Samoa, Australia (NSW, QLD), Bonin I. (Japan), New Caledonia, Papua New Guinea, Samoa i Sisifo, Tonga; Oriental region: India (Kashmir), Indonesia (Java, Flores, Krakatau), Nepal, Pakistan, Philippines, Srí Lanka, Taiwan, Thailand, Vietnam; Palaeartic: Japan.

*Leptocera fontinalis* (FALLÉN, 1826) – ROHÁČEK (1982) redescribed this species correctly with excellent figures. I have not seen any material from the Afrotropical region and I am uncertain which species was depicted by RICHARDS (1938: figs 2, 4). The postabdomen and spermathecae are clearly different from *L. fontinalis* (cf. ROHÁČEK 1982: figs 44, 42). Apparently, all records from the Afrotropical region are based on misidentifications. ROHÁČEK *et al.* (2001) also considered all Afrotropical records doubtful.

*Rachispoda basilewskyi* (VANSCHUYTBROECK, 1962), **comb. n.**

*Paracollinella basilewskyi* VANSCHUYTBROECK, 1962: 473.

*Leptocera basilewskyi*: ROHÁČEK *et al.* 2001: 151.

Material studied: Holotype male (MRAC, double mounted on a long polyporus blicklet): 1) [yellowish] HOLOTYPUS ♂; 2) Coll. Mus. Congo, Tanganyika Terr.: Longido, Masai Distr., 1500 m. 17/20-IV-1957. 3) Mission Zoolog. I.R.S.A.C. en Afrique orientale (P. Basilewsky et N. Leleup); 4 [reddish] TYPE; 5) P. Vanschuytbroeck det., 195 “Paracollinella ♂ basilewskyi nsp.” [pencil hand-writing of P. V.]; 6) “Rachispoda basilewskyi (Vanschuytbroeck, 1962) holotype L. Papp 2011”; 7) [reverse code label of MRAC] RMCA ENT 000016277. Some of its setae displaced or broken off, wings stuck together.

Paratype male (MRAC, abdomen and genitalia removed and kept in a plastic microvial with glycerol): 1) PARATYPUS ♂; 2)–3): same as on HT; 4) “Paracollinella Basilewskyi n. sp. det. P. Vanschuytbroeck [sic!] [handwriting with fine pen, P. V.]; 5) “Rachispoda basilewskyi (Vanschuytbroeck, 1962) L. Papp 2011”. It is without head but otherwise well-preserved.

This species is obviously a member of the *R. fuscipennis* group of *Rachispoda*. Foremost pair of dorsocentrals medially curved, scutellum with 8 larger and several short (mainly lateral marginal) setae. Facial plate bulging, bulbous prominent between antennae. Three strong pairs of interfrontal setae plus some short ones. I was able to detect 3 acrostichal macrochaetae. Discal cell with distinct posteroapical corner, paratype with minute vein stub there. Mid tibia with long ventral posteroapical bristle (similar to that of the *Leptocera nigra* species group). Ventral preapical seta of mid tibia much longer and thicker than ventral metatarsal seta. Hind tibia anterodorsally and posterodorsally with numerous long setae.

A study of the male genitalia of the paratype confirmed that this species belongs to the *Rachispoda fuscipennis* species group.

Known only from the type locality (Tanzania).

## DISCUSSION

For the time being the Afrotropical fauna does not seem rich as for the genus *Leptocera*. I think the following groups can be considered:

- *L. caenosa* group with *L. caenosa*, *L. erratica*, *L. erythrocerca*;
- *L. marginata* – *L. melanaspis* group;
- *L. nigra* group with *L. nigra* and *L. salatigae*;
- *L. kovacsi* group with *L. austroafricana*, *L. elgonensis*, *L. inconspicua*, *L. kovacsi*;
- Not grouped species: *L. atra*.

The *L. caenosa* group was excellently characterised by BUCK and MARSHALL (2009), so I do not need to give it here.

*L. marginata* – *L. melanaspis* group: Though they do not key together, since *L. marginata* has extra scutellar setae, they are obviously closely related. They shared characteristics are: Robust flies. Mesonotum with enlarged medial acrostichal setae and short setae (even 2 rows) between them. Radial vein  $R_{4+5}$  strongly up-curved. Setae on legs long and thick. Mid tibia with a pair of short posteroventral and posterodorsal (sub) apical setae, or, postvertical seta very thick and distinctly longer but less so than in *L. nigra*. Anterior katepisternal seta also very strong, at least half as long, or subequal to posterior katepisternal. Males with thinly sclerotised but not melanised parts of the epandrium ventrally, male cercus small and weakly sclerotised. Female tergite 8 with very long dense caudal marginal setae, cerci not fused with epiproct (or only most basally). Spermathecae spherical (globular) with comparatively long spiculiform processes.

The characteristic features of the *L. nigra* group were correctly summarised by ROHÁČEK (1983) as follow:

No enlarged medial acrostichal setae, radial vein  $R_{4+5}$  very strongly up-curved, an extremely enlarged postero-apical seta on mid tibia, male sternite 5 with a pair of distinct posterior lobes, cercus intricate in form but rather weakly sclerotised, its posterior part without a strong spine, postgonite rather straight and not angularly bent basally but proximal part with a laterally extended lobe, female tergite 10 fused with cerci, female sternite 8 shortened, transverse and weakly sclerotised, spermathecae elongate, ducts thin and long, bifurcate part of the duct of the paired spermathecae comparatively long and thin. I do not dare saying anything about the origin of the group, since *L. nigra* does not occur in the Oriental region and *L. salaticgae* maybe introduced in the Afrotropical region.

*L. kovacsi* group: it seems a group of Afrotropical species, indeed. We may expect even more species than those four ones, which have been known. Their characteristic features are: Enlarged medial acrostichal setae with short setae between them. (In *L. inconspicua* there are hardly longer than adjacent ones but I put it in this group since some genital characters fit to those of the group.) Anterior katepisternal short, at most half as long as posterior setae, or even shorter. Radial vein  $R_{4+5}$  less strongly curved up. Posteroventral or both posteroventral and postero-dorsal subapical setae on mid tibia enlarged. Male sternite 5 postero-medially with wide less sclerotised area covered by fine microtrichia, posterior section of surstylus short and deep, with a long and thick ventral thorn and with long setae, postgonite long thin, basal part perpendicularly curved. Female epiproct and cerci fused completely, spermathecae with spiculiform processes longer and denser on basal part.

#### KEY FOR TO THE AFROTROPICAL SPECIES OF *LEPTOCERA*

- 1 More than 4 pairs of scutellar setae, plus several short submarginal setae on margin of scutellum. Male and female genitalia as on in Figs 49–56 and Figs, 45–48. Rwanda, Zaire, Ethiopia (new), Tanzania (new), RSA.  
*L. marginata* (ADAMS, 1905)
- Four pairs of scutellar setae. 2
- 2 Mid tibia with very long apical posteroventral bristle, at least half times as long as basitarsus. No enlarged acrostichal setae medially (and gena below eye definitely broader than first flagellomere). Base of postgonite not extended caudally (ROHÁČEK 1982: fig. 7, ROHÁČEK 1983: figs 7, 16). Sibling species of the *L. nigra* species group. 3

- Mid tibia with short or medium-sized apical posteroventral bristle, at most 2/5 times as long as basitarsus. Some medial acrostichal setae more or less enlarged. In case of bias gena below eye definitely broader than first flagellomere. Male sternite 5 without posterior lobes. 4
- 3 Anterior part of surstylus large (lengthened anteriorly, ROHÁČEK 1983: fig. 6), apical half of postgonite thicker, dorsal sclerite of distiphallus somewhat shorter than membranous ventral part (ROHÁČEK 1983: fig. 7); female sternite 8 with a pair of small caudal lobes, spermathecae without small warts proximally (ROHÁČEK 1983: figs 12–13). Widespread.  
*L. salatigae* (DE MEIJERE, 1914)
- Anterior part of surstylus composed of two setose lobes only (not extended anteriorly, ROHÁČEK 1982: fig. 6), apical half of postgonite slender, dorsal sclerite of distiphallus longer than membranous ventral part (ROHÁČEK 1982: fig. 7), female sternite 8 with a small medio-caudal lobe only, spermathecae with small warts proximally (ROHÁČEK 1982: figs 12–13). Widespread.  
*L. nigra* OLIVIER, 1813
- 4 Scutellum and mesonotum black centrally. Thoracic macrochaetae emerge from round silvery spots. Enlarged acrostichal macrochaetae present without smaller bristles between them. Only known from Zaire.  
*L. atra* (VANSCHUYTBROECK, 1951)
- Scutellum and thorax otherwise coloured. Short setae present between acrostichal macrochaetae. 5
- 5 Scutellum with silvery spots. Male genitalia (Figs 57–66) with some ventral parts of epandrium not melanised. Female cerci only basally fused to tergite 10. Widespread.  
*L. melanaspis* (BEZZI, 1908)
- Scutellum and mesonotum dark brown, more or less grey microtomentose, without silvery spots. Male genitalia different. Female cerci more or less completely fused to tergite 10. 6
- 6 Gena below eye definitely broader than first flagellomere. Some additional orbital setulae present between upper fronto-orbital and vertical setae. Arista with long cilia. Both anterior and posterior apical setae on mid tibia minute. Female tergite 7 at least as long medially as the length of tergite 10 + cerci (*L. caenosa* group). 7

- Gena below eye narrower than first flagellomere. No additional orbital setulae between upper fronto-orbital and vertical setae. Arista with shorter cilia. Female tergite 7 shorter medially than the length of tergite 10 + cerci. 9
- 7 Caudal margin of male sternite 5 medially with long and stout scales (fig. 65 of BUCK & MARSHALL 2009). Palpus slender. Burkina Faso, introduced. *L. erythrocer*a (BECKER, 1920)
- Caudal margin of male sternite 5 medially with slender acute scales. Palpus more or less inflated. 8
- 8 Acrostichal macrochaetae well enlarged, much longer than acrostichal microchaetae. Desclerotised caudal medial area of male sternite 5 wide (ROHÁČEK 1982: fig. 64, BUCK & MARSHALL 2009: fig. 49). Posterior part of surstylus more slender, medially curved; anterior part of surstylus with anterior process distinctly pointed (ROHÁČEK 1982: fig. 62, BUCK & MARSHALL 2009: fig. 50). South Africa. *L. caenosa* (RONDANI, 1880)
- Acrostichal macrochaetae only slightly enlarged, at most only slightly longer than acrostichal microchaetae. Desclerotised caudal medial area of male sternite 5 much smaller subtriangular. Posterior part of surstylus more stout not medially curved; anterior process of anterior part of surstylus with a minute point only (Fig. 80). South Africa. *L. erratica* (BUCK, 2009)
- 9 Acrostichal macrochaetae less enlarged, the pair on/just behind suture only 2 times as long as acrostichal microchaetae. Posterior part of surstylus small, its apical seta longer (Fig. 28). Base of postgonite extended caudally, consequently postgonite very broad at base (Fig. 29). Kenya, South Africa.  
**L. inconspicua** sp. n.
- Acrostichal macrochaetae more enlarged, the pair on/just behind suture at least 4 times as long as acrostichal microchaetae. Posterior part of surstylus larger, its apical seta shorter than posterior part itself (e.g. Figs 23, 39). Postgonite not broad at base (e.g. Figs 19, 36). 10
- 10 Mid tibia with two sub-equal posteroapical setae. Postgonite with smooth anterior surface. Male genitalia (Figs 1–8): anterior surface of postgonite smooth. Malawi, Rwanda, South Africa. **L. austroafricana** sp. n.
- Mid tibia with apical posterodorsal seta much shorter than posteroventral (at most half as long). Apical part of postgonite with finely serrate anterior surface (Figs 19, 36). 11



- 11 Anterior process of anterior part of surstylus shorter, not sickle-shaped (Fig. 39). Male genitalia (Figs 34–40): cercus (Fig. 37) cylindrical with two pairs of laterally directed longer and some shorter setae, anterior part of surstylus (Fig. 39) robust with broad curved anterior part, basal part of postgonite (Fig. 36) with less robust basal projection. Spermathecae (Fig. 41) long cylindrical. Ethiopia, ?Zaire. *L. kovacsi* DUDA, 1925
- Anterior process of anterior part of surstylus longer and more sickle-shaped (Fig. 23). Male genitalia (Figs 17–23): cercus (Fig. 22) digitiform with 1 very long apical and several shorter setae, anterior part of surstylus (Fig. 23) with long but low basal part, basal part of postgonite (Fig. 19) with large ventrally projecting caudal process,. Spermathecae spherical (Fig. 15). Kenya. *L. elgonensis* RICHARDS, 1938

\*

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## REFERENCES

- ADAMS, C. F. (1905) Diptera Africana, I. *The Kansas University Science Bulletin* **3**(6): 149–208.
- BEZZI, M. (1908) Diagnoses d'espèces nouvelles de Diptères d'Afrique. *Annales de la Société Entomologique de Belgique* **52**(12): 374–388.
- BUCK, M. & MARSHALL, S. A. (2009) Revision of New World Leptocera Olivier (Diptera, Sphaeroceridae). *Zootaxa* **2039**: 1–139.
- DUDA, O. (1925) Die aussereuropäischen Arten der Gattung Leptocera Olivier – Limosina Macquart (Dipteren) mit Berücksichtigung der europäischen Arten. *Archiv für Naturgeschichte* **90A** (1924): 5–215.
- HACKMAN, W. (1965) Diptera (Brachycera): Sphaeroceridae (Borboridae). *South African Animal Life, Lund* **11**: 485–503.
- HAYASHI, T. (1995) Identity of *Paracollinella parafulva* Duda (Diptera, Sphaeroceridae) from Taiwan. *Japanese Journal of Entomology* **63**(3): 556.
- MARSHALL, S. A., ROHÁČEK, J., DONG, H. & BUCK, M. (2011) The state of Sphaeroceridae (Diptera: Acalyptratae): a world catalog update covering the years 2000–2010, with new generic synonymy, new combinations, and new distributions. *Musei Nationalis Pragae* **51**(1): 217–298.
- MEIJERE, J. C. H. DE (1914) Studien über südostasiatische Dipteren. IX. *Tijdschrift voor Entomologie* **57**: 137–275.
- OLIVIER, G. A. (1813) Première mémoire sur quelques Insectes qui attaquent les céréales. *Mémoires de la Société d'Agriculture du Département de Seine-et-Oise* **16**: 477–495.

- PAPP, L. (2008) Will the elephant dung flies go extinct after the elephants disappear? *Folia entomologica hungarica* **69**: 221–228.
- PITKIN, B. R. (1989) A review of the Sphaeroceridae (Diptera) described by O. W. Richards. *Occasional Papers on Systematic Entomology, London* **6**: 1–44.
- RICHARDS, O. W. (1938) Diptera Sphaeroceridae (Borboridae, Cypselidae). Mission scientifique de l'Omo. *Mémoires du Muséum National d'Histoire Naturelle, Paris (n.s.)* **4**(40): 381–405.
- RICHARDS, O. W. (1973) The Sphaeroceridae (= Borboridae or Cypselidae; Diptera Cyclorhapha) of the Australian Region. *Australian Journal of Zoology, supplementary series* **22**: 297–401.
- RICHARDS, O. W. (1980) 57. Family Sphaeroceridae. Pp. 614–626. In: CROSSKEY, R. W. (ed.): *Catalogue of the Diptera of the Afrotropical Region*. British Museum (Natural History), London, 1437 pp.
- ROHÁČEK, J. (1982) Revision of the subgenus Leptocera (s.str.) of Europe (Diptera, Sphaeroceridae). *Entomologische Abhandlungen, Staatliches Museum für Tierkunde in Dresden* **46**(1): 1–44.
- ROHÁČEK, J. (1983) Oriental species of the Leptocera (Leptocera) nigra-group (Diptera, Sphaeroceridae). *Acta Entomologica Bohemoslovaca* **80**: 37–148.
- ROHÁČEK, J. (1991) A monograph of Leptocera (Rachispoda Lioy) of the west Palaearctic area (Diptera, Sphaeroceridae). *Časopis Slezského zemského Muzea, Opava (A)* **40**: 97–288.
- ROHÁČEK, J., MARSHALL, S. A., NORRBOM, A. L., BUCK, M., QUIROS, D. I. & SMITH, I. (2001) *World Catalog of Sphaeroceridae (Diptera)*. Slezské zemské museum, Opava, 414 pp.
- RONDANI, C. (1880) Species italicae ordinis dipterorum (Muscaria Rndn.) collectae et observatae. Stirps XXV. Copromyzinae Zett. *Bullettino della Società Entomologica Italiana* **12**: 3–45.
- VANSCHUYTBROECK, P. (1950) Diptères Sphaeroceridae du Musée du Congo belge. *Annales du Musée du Congo Belge, Tervuren Série in 8<sup>o</sup> (Sciences Zoologiques)* **5**: 5–46.
- VANSCHUYTBROECK, P. (1951) Contribution à l'étude des Sphaeroceridae africains (Diptera Acalypterae) (3<sup>me</sup> note). *Bulletin Institut royal des Sciences naturelles de Belgique, Bruxelles* **27**(41): 1–20.
- VANSCHUYTBROECK, P. (1959) Sphaerocerinae, Limosinae, Ceropterinae (Diptera, Ephydroidea). *Parc National de la Garamba, Mission H. de Saeger (1949–52), Bruxelles* **17**(2): 15–85.
- VANSCHUYTBROECK, P. (1962) Mission zoologique de l'I.R.S.A.C. en Afrique orientale (P. Basilewsky et N. Leleup, 1957). LXXII. Diptera: Sphaeroceridae. *Annales du Musée Royal de l'Afrique Centrale, Tervuren, Série in 8<sup>o</sup> (Sciences Zoologiques)* **107**: 469–477.

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