

## Nine new species of Afrotropical *Leucophenga* (Diptera: Drosophilidae)

GERHARD BÄCHLI<sup>1</sup>, CARLOS R. VILELA<sup>2</sup> & SHANE F. McEVEY<sup>3</sup>

<sup>1</sup> Zoologisches Museum, Universität Zürich, Winterthurerstrasse 190, CH-8057, Zürich, Switzerland. — baechli@zoolmus.unizh.ch

<sup>2</sup> Departamento de Biologia, Instituto de Biociências, Universidade de São Paulo, Caixa Postal 11461, São Paulo—SP, 05422–970, Brazil. — rvilela@ib.usp.br

<sup>3</sup> Australian Museum, 6 College Street, Sydney NSW 2010, Australia. — shanem@austmus.gov.au

Four new species of *Leucophenga* (Drosophilidae) from South Africa: *L. ferrari* n. sp., *L. londti* n. sp., *L. muden* n. sp., and *L. stuckenbergi* n. sp., and five from Madagascar: *L. isaka* n. sp., *L. ivontaka* n. sp., *L. malgachensis* n. sp., *L. mananara* n. sp., and *L. ranohira* n. sp. are described and their male terminalia illustrated. All named *Leucophenga* species occurring in the southern Afrotropical Biogeographic Region are listed.

Keywords. New species, male terminalia, illustrations, new records, Madagascar, South Africa, southern Africa.

### INTRODUCTION

Knowledge of the drosophilid fauna of southern Africa and Madagascar stems largely from material in the Natal Museum. The careful curation of the drosophilid specimens — many of them more than 40 years old — has greatly facilitated taxonomic research. Flies sorted to the genus *Leucophenga* in that collection form the material basis of the taxonomic work reported in the present paper.

The genus *Leucophenga* is one of the largest in the family Drosophilidae. Flies in this genus are relatively large and usually encountered only in low frequency; they will come to baits in small numbers but the majority are collected serendipitously by sweeping or in malaise traps. Rarely they gather in very dense aggregations, a phenomenon that occurs in confined, dark spaces. Hundreds of individuals have, for example, been found «resting» in the footwell of a vehicle parked overnight in a desert, inside a discarded metal stove in tropical rainforest, and at the small entrance to a cave inhabited by bats (pers. obs. SFMcE).

Sexual dimorphism is strong in most species of *Leucophenga* and as a consequence males and their conspecific females are usually associated using indirect evidence. Alternatively, only males are described and females, because of their uncertain affiliation, are usually excluded from type series. This problem is exacerbated by the fact that the extent of pigmentation in abdominal patterning of females can be variable within a species (Bächli 1971; Bock 1979).

The current classification of the Afrotropical *Leucophenga* fauna builds on several taxonomic works. Most significant among them is Bächli's (1971) major study of the *Leucophenga* and *Paraleucophenga* of the Afrotropical Region («aethiopische Region») which listed 58 Afrotropical species, 34 newly described and 9 noted as new but left undescribed. Bächli (1971) reported 18 *Leucophenga*

species from southern Africa, two from the Seychelles and none from Madagascar. The former total included seven from Zimbabwe that were originally described in the genus *Drosophila* by Adams (1905) and later transferred to *Leucophenga* by Sturtevant (1921). These numbers were slightly increased following an initial examination of 182 of the Natal Museum's *Leucophenga* specimens by Tsacas (1990) who recognized the richness of the collection but restricted his investigation to just four species — those with patterned wings; he reported the range-extension of *L. kilembensis* Bächli, 1971 and *L. paracuthbertsoni* Bächli, 1971 further southwards into South Africa.

A large collection of Drosophilidae made by a 1987 French CNRS expedition (led by Jean David, with Sylvie Aulard and SFMcE) to Madagascar yielded more than 100 species in a wide range of genera. That collection included at least 18 species of *Leucophenga* and one of *Paraleucophenga*, species that will be dealt with separately — some of the other genera and species have already been reported by McEvey *et al.* (1989: *Drosophila flavohirta*), McEvey (1990: the *Scaptomyza* species), Chassagnard & McEvey (1992: the *Zaprionus* species; 1997: the *Phorticella* species), and Lachaise *et al.* (1996: drosophilid biogeography in Madagascar and the Mascarene Islands). Tsacas, in several other publications, has also drawn material from the 1987 CNRS expedition (Mission Madagascar) and from earlier collecting trips (e.g., those of D. Lachaise in 1980 and L.A. Nilsson in 1986) to augment his taxonomic work on the Afrotropical fauna. Another very important collection of Drosophilidae was made along an altitudinal transect at Parc National de Marojejy in Madagascar in 1996 (Grimaldi *et al.* 2000). Of the 58 different drosophilid species sorted to genera, only one unnamed female *Leucophenga* was recovered (at 450 m in a malaise trap); an unexpected result treated as being a possible artefact of collecting technique but adding weight to the argument that large numbers of species await discovery when alternate sampling methods exploit varied ecological preference (Grimaldi *et al.* 2000). It was the 1957–1958 collecting expedition to Madagascar by Brian R. Stuckenberg, however, that first indicated the remarkable richness of the drosophilid (and other dipterous families) fauna and the high degree of endemism. That field trip together with numerous others in South Africa and Zimbabwe over the subsequent decades produced the bulk of the Natal Museum *Leucophenga* collection. Other entomologists — J.G.H. Londt, Ray M. Miller and D. Barraclough in the 1970s and 1980s and H.K. Munro 60 years earlier — sampled extensively in South Africa, their contribution is also significant. Adams (1905) worked with Kansas University specimens collected by Frank L. Snow near Salisbury (= Harare, Zimbabwe).

Madagascar and the high rainfall areas of eastern Zimbabwe, Mozambique, and KwaZulu-Natal (South Africa) abound with undescribed species in the family Drosophilidae and provide ample scope for further fieldwork and taxonomic investigation.

#### MATERIAL AND METHODS

A total of 190 specimens were analyzed; all are deposited in the Natal Museum, Pietermaritzburg, South Africa.

Label data attached to each type specimen are cited in full with a slash indicating the start of a separate label. When a detail is vague or imprecise our inter-

pretation is inserted within square brackets. Specimens examined by SFMcE (in Paris) have been numbered and a label: «Registered specimen S F McEvey» attached, this information is abbreviated «Reg.» and the number — when given in the text below — is prefixed «M». Similarly, and independently, numbers have been attached to specimens examined by GB (in Zürich) and are prefixed «B» in the following text. The two numerical sequences overlap so application of the correct prefix is important.

Morphological terminology together with the methods used to prepare terminalia for microscopic examination, to illustrate and measure morphology, and to calculate indices, are given in Vilela & Bächli (2000) and Bächli *et al.* (2004). The prscut index is the ratio of the length of the prescutellar setae divided by the length of the anterior dorsocentral setae (see Bächli 1971, Tab. 3). All line drawings and all photomicrographs (Agfa Pan, 25 ASA) within a plate are to the same magnification.

## DESCRIPTIONS

### *Leucophenga ferrari* n. sp.

(Figs 1A, B, 2A, B)

*Material examined.* Male holotype, labelled: «6583 / Reg. / SOUTH AFRICA, Nylsvley Reserve, Naboomspruit, Tvl. [Transvaal], 5 Oct 1977, P. Ferrar / ♂ / *Leucophenga ferrari* Bächli *et al.*, 2004 / HOLOTYPE» [M6583].

*Type locality.* Nylsvley Reserve, Naboomspruit, Province of Northern Transvaal, South Africa.

*Diagnosis.* A species with dark abdomen and without a distinctive abdominal pattern; middle layer of dorsal arch very wide, parallel to gonopod; gonopod bearing 4 long setae four times longer than setulae on outer paraphysis); aedeagus tube-shaped, distally microtrichose; outer paraphysis distinctly square-shaped.

*Description.* ♂. Head yellow. Frons golden yellow, frontal length = 0.45 mm, frontal index = 1.29, top to bottom width ratio = 1.07; ocellar triangle about 28 % frontal length. Orbital plates about 2/3 frontal length. Orbital setae in line, distance of or2 to or3 twice that of or2 to or1, distance of or3 to or1 = 300 % of or3 to vtm, or1/or3 = 0.65, or2/or1 = 0.91; postocellar setae = 28 %, ocellar setae = 67 % of frontal length; vibrissal index = 0.20. Cheek index about 15. Eye index = 1.26. Flagellomere 1 with short setulae, length to width ratio = 1.40. Arista with 5 dorsal, 2 relatively short ventral and about 8 very short inner branches, plus small terminal fork. Proboscis and palpus yellow.

Thorax generally yellow; length = 1.50 mm. Scutum brownish, slightly shiny; 8 rows of acrostichal setae. h index = 1.83. Transverse distance of dorsocentral setae about 250 % of longitudinal distance; dc index = 0.43; prscut index = 1.20. Scutellum brown, apical fifth sharply defined white; scutellar setae nearly equidistant; scut index = 1.65; sterno index = 0.88; mid katepisternal seta about 27 % of anterior one. Halter whitish. Legs yellow.

Wing slightly brownish along R<sub>1</sub>; length = 2.75 mm; length to width ratio = 2.20. Indices: C = 2.44, ac = 2.45, hb = 0.85, 4C = 1.08, 4v = 1.92, 5x = 1.09, M = 0.48, prox. x = 0.80.

Abdomen mainly shiny brown; T2 with basal dark corners, T3 and T4 with

narrow darker marginal bands, T3 with an additional dark median triangle which is faintly continued as longitudinal band till tip of T5.

♂ Terminalia (Figs 1A, B, 2A, B). Epandrium posteroventrally microtrichose, with ca. 3 lower setae, and 4–5 upper setae near posterior margin; ventral lobe not distinguishable. Cercus as wide as epandrium, slightly attached to epandrium by membranous tissue, posteriorly microtrichose. Surstylus double-walled, microtrichose, slightly attached to epandrium by membranous tissue, with no prensisetae; ca. 11 outer setae and ca. 7–8 inner setae. Decasternum anteriorly well developed, sinuate, folded three times over itself forming a dorsal arch (Fig. 2A), laterally attached to arms of hypandrium by membranous tissue, posteriorly reduced and attached to surstyli by membranous tissue. Hypandrium as long as epandrium, reduced to a narrow V-shaped strip, arms anteriorly fused to ventral rod of aedeagal apodeme; dorsal arch (originating from decasternum) roughly sinuate in lateral view, three-layered (upper layer omitted from Fig. 2A), middle layer very wide, parallel to gonopods, and medially papillate, ventralmost layer protrusive, hook-shaped and directed upwards at tip in lateral view, perpendicular to aedeagus (when not extruded), and attached both ventrolaterally to apical region of inner paraphyses and laterally to hypandrial arms by membranous tissue; gonopod fused to distal region of hypandrial arm, medially slightly attached to outer paraphysis by membranous tissue, and bearing 4 setae (missing in illustration of left gonopod; only their sockets are represented) four times longer than setulae of outer paraphysis. Aedeagus tube-shaped, anteriorly folded over itself, anterior region canaliculate dorsally entirely membranous, anteriorly fused to inner paraphysis, distally microtrichose. Aedeagal apodeme anteriorly short, posteriorly bifid, with two long, apically slightly expanded arms, ventrally fused to hypandrial arms, embracing anterior region of aedeagus. Ventral rod indistinguishable, fused to anterior hypandrial arms. Outer paraphyses somewhat square-shaped in lateral view, embracing aedeagus distally, dorsomedially bearing ca. 3 setulae; attached both anteriorly to aedeagal apodeme arm and ventromedially to gonopod by membranous tissue. Inner paraphyses flat, bare, bent, proximally widely spaced but distally attached to each other by membranous tissue, basally fused (dotted line in Fig. 2A identifies a sharply pointed structure) to dorsodistal margin of anterior region of aedeagus; attached by membranous tissue both anterolaterally to apical region of aedeagal apodeme arm and apically to ventralmost layer of dorsal arch.

*Etymology.* Named after P. Ferrar, collector of the holotype.

*Distribution.* Known only from the Northern Transvaal, South Africa (type locality).

*Comments.* Despite some similarities in external morphology with members of the *flavopuncta* group, the differences in male terminalia of this species suggest that it is distantly related and it is excluded from this group.

### ***Leucophenga isaka* n. sp.**

(Figs 1C, 3 A, B)

Material examined. Male holotype, labelled «6237 / Reg. / Madagascar Est, Forêt d'Isaka 225m, dct Fort-Dauphin, 24–26.II.[19]58 B.Stuckenberg / ♂ / *Leucophenga isaka* Bächli et al., 2004 / HOLOTYPE» [M6237].

Type locality. Forêt d'Isaka, District of Fort-Dauphin, Province of Toliara, Madagascar.

*Diagnosis.* A species of the flavopuncta group close to *L. pleurovirgata* Bächli, 1971 but frons, wing venation and abdominal pattern differ; postocellar, ocellar and vibrissal setae relatively long, anterior dorsocentral seta relatively short; aedeagus strongly sinuate but relatively longer and narrower than that of *L. mananara* n. sp. and bearing a narrow ventral carina subapically in lateral view.

*Description.* ♂. Head mainly yellow. Frons relatively narrow, posteriorly divergent, dark golden yellow, frontal length = 0.45 mm; frontal index = 1.29, top to bottom width ratio = 1.14; ocellar triangle black, about 37 % of frontal length. Orbital plates shiny brownish, about 63 % of frontal length. Orbital setae black, almost in line, distance of or3 to or1 = 200 % of or3 to vtm, distance of or2 to or3 = 500 % of or2 to or1, or1/or3 = 0.63, or2/or1 = 1.00; postocellar setae = 44 %, ocellar setae = 83 % of frontal length; vibrissal index = 0.44. Cheek index about 16–17. Eye index = 1.32. Face whitish. Flagellomere 1 with short setulae, slightly brownish along margin, length to width ratio = 1.80. Arista with 6 dorsal, 3 ventral and about 6 inner branches, plus terminal fork. Proboscis and palpus yellow.

Thorax mainly yellow, length = 1.62 mm. Scutum shiny yellowish; 10 rows of acrostichal setulae. h index = 3.25. Transverse distance of dorsocentral setae = 412 % of longitudinal distance; scutellum brown, apically diffusely whitish, scutellar setae almost equidistant; basal ones divergent; scut index 1.22. Pleura yellow, with a brownish stripe, whitish above, sterno index = 0.74, mid katepisternal seta about 29 % of anterior one. Legs and halter yellow.

Wing hyaline,  $R_{4+5}$  and M slightly divergent, length = 2.57 mm, length to width ratio = 2.15. Indices: C = 2.15, ac = 1.93, hb = 0.85, 4C = 1.08, 4v = 1.56, 5x = 1.33, M = 0.52, prox. x = 0.76.

Abdomen somewhat silvery in the yellow parts, with shiny black pattern: T2 with large basal corners, T3 with a medially broadened marginal band, T4 and T5 with a median stripe and laterally broadened marginal bands, T6 black, T3 to T6 ventrally black.

♂ Terminalia (Figs 1C, 3A, B). Epandrium microtrichose, with ca. 2 lower setae, and 11 upper setae; ventral lobe not distinguishable. Cercus narrower than epandrium, microtrichose except for distal  $\frac{1}{4}$ , attached to epandrium by membranous tissue. Surstylus double-walled, microtrichose except anteroventrally, slightly attached to epandrium by membranous tissue, with no prensisetae, ca. 9 outer setae and ca. 22 inner setae. Decasternum anteriorly well developed, sinuate, folded three times over itself forming a dorsal arch (Figs 1C, 3A), laterally attached to arms of hypandrium by membranous tissue, posteriorly reduced and attached to surstyli by membranous tissue. Hypandrium as long as epandrium, somewhat square-shaped in posterior view, arms anteriorly fused to ventral rod of aedeagal apodeme; dorsal arch (originating from decasternum) roughly sinuate in lateral view, three-layered, middle layer saddle-shaped and sharply pointed in lateral view, mostly embracing ventralmost layer, which is medially bent, protruded, as long as inner paraphysis, perpendicular to aedeagus, and attached both ventrally to apical region of inner paraphyses and laterally to hypandrial arms by membranous tissue; gonopod bare, ventromedially membranous, partially fused to distal region of hypandrial arm, dorso-medially slightly attached to outer paraphysis by membranous tissue. Aedeagus long, sinuate in lateral view, anteriorly folded over itself, anterior region canaliculate and dorsally entirely membranous, anteriorly fused to inner paraphysis, late-

rally flattened distally and dorsoventrally flattened medially with lateral margins undulate and turned dorsad, subapically bearing a narrow ventral carina, distally covered with tiny scales, apically weakly sclerotized. Aedeagal apodeme anteriorly rather wide in lateral view, and anteriorly and posteriorly bifid, with two long distal arms gradually narrowing towards tip, ventrally fused to hypandrial arms, embracing anterior region of aedeagus. Ventral rod indistinguishable, fused to anterior hypandrial arms. Outer paraphyses anteriorly narrow, apically serrate, embracing aedeagus distally, dorsomedially bearing ca. 3 setulae; attached both anteriorly to aedeagal apodeme arm and ventromedially to gonopod by membranous tissue. Inner paraphyses strongly sclerotized, fused at distal 1/3, medially attached to each other by membranous tissue, flat, bare, posteriorly bent, basally fused to dorsodistal margin of anterior region of aedeagus; attached by membranous tissue both laterally to apical region of aedeagal apodeme arm and apically to ventralmost layer of dorsal arch.

*Etymology.* The epithet *isaka* is a noun in apposition, referring to the type locality.

*Distribution.* Known only from Madagascar (type locality).

*Comments.* *L. isaka* n. sp. is most closely related to *L. mananara* n. sp. but also to *L. ivontaka* n. sp. and to *L. ranohira* n. sp. from which it differs chiefly in the form of the aedeagus.

### ***Leucophenga ivontaka* n. sp.**

(Figs 1D, 4 A, B)

*Material examined.* Male holotype, labelled «6235 / Reg. / Madagascar Est, Ivontaka 15m, dct Mananara, 10–14.III.[19]58 B.Stuckenberg / ♂ / *Leucophenga ivontaka* Bächli et al., 2004 / HOLOTYPE» [M6235].

*Type locality.* Ivontaka, District of Mananara, Province of Toamasina, Madagascar.

*Diagnosis.* A species of the *flavopuncta* group close to *L. pleurovirgata* Bächli, 1971 but frons, wing venation and abdominal pattern differ; postocellar, ocellar and vibrissal setae relatively long, anterior dc relatively short; aedeagus blunt at tip, narrow anteriorly, wide distally, dorsally straight in lateral view; ventral margin of distal arm of aedeagal apodeme medially serrate in lateral view.

*Description.* ♂. Head mainly yellow. Frons relatively narrow, posteriorly divergent, dark golden yellow, frontal length = 0.40 mm; frontal index = 1.23, top to bottom width ratio = 1.15; ocellar triangle black, about 30 % of frontal length. Orbital plates shiny brownish, about 70 % of frontal length. Orbital setae black, almost in line, distance of or3 to or1 = 175 % of or3 to vtm, distance of or2 to or3 = 250 % of or2 to or1, or1/or3 ratio = 0.64, or2/or1 ratio = 1.09, postocellar setae = 50 %, ocellar setae = 81 % of frontal length; vibrissal index = 0.38. Cheek index about 14–15. Eye index = 1.26. Flagellomere 1 shortly setulose, slightly brownish along margin, length to width ratio = 1.80. Arista with 6–9 dorsal, 3 ventral and 7 inner branches, plus terminal fork. Proboscis and palpus yellow.

Thorax mainly yellow, length = 1.50 mm. Scutum shiny brownish, anteriorly yellow; 8–10 rows of acrostichal setulae. h index = 2.00. Transverse distance of dorsocentral setae = 350 % of longitudinal distance; dc index = 0.38, prscut index = 1.44. Scutellum brown, apically diffusely yellow, scutellar setae almost equidistant; basal ones divergent; scut index 1.29. Pleura yellow, with a black longitudinal band,



whitish above, sterno index = 0.78, mid katepisternal seta about 36 % of anterior one. Legs and halter yellow.

Wing hyaline,  $R_{4+5}$  and M slightly divergent, length = 2.37 mm, length to width ratio = 2.16. Indices: C = 1.89, ac = 1.93, hb = 0.78, 4C = 1.29, 4v = 1.71, 5x = 1.22, M = 0.52, prox. x = 0.86.

Abdomen slightly silvery in the yellow parts, with shiny black pattern: T2 with large basal corners, T3 with a medially broadened marginal band, T4 and T5 with a median stripe and laterally broadened marginal bands (almost covering the whole T5), T6 black, T3 to T6 ventrally black.

♂ Terminalia (Figs 1D, 4A, B). Epandrium microtrichose, with ca. 1 lower seta, and 7 upper setae; ventral lobe not distinguishable. Cercus narrow than epandrium, microtrichose except for 1/4 distal, attached to epandrium by membranous tissue. Surstylus double-walled, microtrichose except anteroventrally, slightly attached to epandrium by membranous tissue, with no prensiseta, ca. 8 outer setae and ca. 20 inner setae. Decasternum anteriorly well developed, sinuate, folded three times over itself forming a dorsal arch (Figs 1D, 4A), laterally attached to arms of hypandrium by membranous tissue, posteriorly reduced and attached to surstyli by membranous tissue. Hypandrium as long as epandrium, somewhat square-shaped in posterior view, arms anteriorly fused to ventral rod of aedeagal apodeme; dorsal arch (originating from decasternum) roughly sinuate in lateral view, three-layered, middle layer saddle-shaped and sharply pointed in lateral view, mostly embracing ventralmost layer, which is medially bent, protruded, as long as inner paraphysis, perpendicular to aedeagus, and attached both ventrally to apical region of inner paraphyses and laterally to hypandrial arms by membranous tissue; gonopod bare, fused to distal region of hypandrial arm, medially slightly attached to outer paraphysis by membranous tissue. Aedeagus distally blunt, dorsally straight in lateral view, anteriorly folded over itself, anterior region short, canaliculate and dorsally entirely membranous, anteriorly fused to inner paraphysis, laterally flattened distally and dorsoventrally flattened medially with lateral margins undulate and turned dorsad, ventrodistally covered with tiny trichoid-like scales, apically weakly sclerotized. Aedeagal apodeme anteriorly rather wide and roughly square-shaped in lateral view, anteriorly and posteriorly bifid, with two long arms gradually narrowing towards tip, ventrally fused to hypandrial arms, embracing anterior region of aedeagus; ventral margin of distal arm medially serrate in lateral view. Ventral rod indistinguishable, fused to anterior hypandrial arms. Outer paraphyses anteriorly narrow, apically serrate, embracing aedeagus distally, dorsomedially bearing ca. 3 setulae; attached both anteriorly to aedeagal apodeme arm and ventromedially to gonopod by membranous tissue. Inner paraphyses strongly sclerotized, fused at distal  $\frac{1}{3}$ , medially attached to each other by membranous tissue, flat, apically bent, basally fused to dorsodistal margin of anterior region of aedeagus; attached by membranous tissue both laterally to apical region of aedeagal apodeme arm and apically to ventralmost layer of dorsal arch.

*Etymology.* The epithet *ivontaka* is a noun in apposition, referring to the type locality.

*Distribution.* Known only from Madagascar (type locality).

*Comments.* *L. ivontaka* n. sp. is most closely related to *L. isaka* n. sp., but has a quite distinct shape of the aedeagus.

*Leucophenga londti* n. sp.

(Figs 1E, 5A, B)

*Material examined.* Male holotype, labelled «6671 / Reg. / SOUTH AFRICA Natal, Giant's Castle Game, Res.- Injamuti area, SE2929AB JGH Londt, 5–11.xii.1983 / ♂ / *Leucophenga londti* Bächli et al., 2004 / HOLOTYPE» [M6671].

*Type locality.* Giant's Castle Game Reserve, Injamuti area, Province of KwaZulu-Natal, South Africa.

*Diagnosis.* A species of the *mutabilis* group, externally similar to *L. curvipila* Duda, 1939 but mid orbital seta distant from anterior one, abdominal pattern somewhat different; postocellar setae short; aedeagus distally straight and distinctly paint-brush-shaped.

*Description.* ♂. Head yellow. Frons relatively narrow, golden yellow, anteriorly paler, frontal length = 0.40 mm; frontal index = 1.45, top to bottom width ratio = 1.09, ocellar triangle brownish, about 30 % of frontal length. Orbital plates narrow, about 60 % of frontal length. Orbital setae blackish, almost in line, or2 close to or1, distance of or3 to or1 = 200 % of or3 to vtm, or1/or3 ratio = 1.00, or2/or1 ratio = 0.64, postocellar setae = 19 %, ocellar setae = 56 % of frontal length; vibrissal index = 0.40. Cheek index about 14. Eye index = 1.35. Flagellomere 1 shortly setulose, length to width ratio = 1.75. Arista with 5 dorsal, 2 ventral and about 8 inner branches, plus terminal fork. Proboscis and palpus yellow.

Thorax yellow, length = 1.28 mm. Scutum shiny, 8 rows of acrostichal setulae. h index = 2.20. Transverse distance of dorsocentral setae = 400 % of longitudinal distance; dc index = 0.43. prscut index 1.11. Scutellum paler at tip, scutellar setae almost equidistant; basal ones divergent; scut index = 1.17. Pleura yellow, sterno index = 0.69, mid katapisternal seta about 36 % of anterior one. Halter slightly brownish. Legs pale yellow.

Wing narrow and apically slightly pointed,  $R_1$  brown, length = 2.18 mm, length to width ratio = 2.49. Indices:  $C = 2.55$ ,  $ac = 2.00$ ,  $hb = 0.60$ ,  $4C = 1.18$ ,  $4v = 2.12$ ,  $5x = 1.13$ ,  $M = 0.53$ , prox.  $x = 1.00$ .

Abdomen shiny yellow, with small median spots on T3 to T5 and large lateral spots on T4.

♂ Terminalia (Figs 1E, 5A, B). Epandrium microtrichose except for most anterior area, with ca. 6 lower seta on anteroventral corner plus 1 on middle area, and 7 upper setae; ventral lobe not distinguishable. Cercus much narrower than epandrium, medially bearing a row of ca. 7 long (but ca. half length of those in *L. malgachensis* n. sp.) and sinuate setae, microtrichose except for  $\frac{1}{4}$  distal, attached to epandrium by membranous tissue. Surstylus double-walled, microtrichose except anteroventrally, slightly attached to epandrium by membranous tissue, with no preniseta, ca. 9 outer setae (as long as epandrial setae) and ca. 20 inner setae (dorsal ones distinctly peg-like,  $\frac{1}{7}$  length of outer setae and roundish at tip, lower ones thin and short). Decasternum anteriorly well developed, sinuate, folded three times over itself forming a dorsal arch (Fig. 5A), laterally attached to arms of hypandrium by membranous tissue, posteriorly reduced and attached to surstyli by membranous tissue. Hypandrium longer than epandrium, Y-shaped in posterior view, arms anteriorly fused to ventral rod of aedeagal apodeme; dorsal arch (originating from decasternum) roughly sinuate in lateral view, three-layered, middle layer saddle-shaped in lateral view, mostly embracing ventralmost layer, which is hook-shaped, sub-



medially bent, protruded, shorter than inner paraphysis, perpendicular to aedeagus (when not extruded), and attached both ventrally to apical region of inner paraphyses and laterally to hypandrial arms by membranous tissue; gonopod bare, fused to distal region of hypandrial arm, medially slightly attached to outer paraphysis by membranous tissue. Aedeagus distally straight, distinctly paintbrush-shaped, anteriorly folded over itself, anterior region short, canaliculate and dorsally entirely membranous, anteriorly fused to inner paraphysis, ventrally more sclerotized than dorsally, distally membranous and covered with long, curved, compact, trichoid-like scales. Aedeagal apodeme anteriorly short, posteriorly bifid, with two long arms gradually narrowing towards tip, ventrally fused to hypandrial arms, embracing anterior region of aedeagus. Ventral rod indistinguishable, fused to anterior hypandrial arms. Outer paraphyses roughly elliptical, anteroventrally notched, and strongly sclerotized, embracing aedeagus distally, dorsodistally bearing ca. 7 setulae; attached both anteriorly to aedeagal apodeme arm and ventromedially to gonopod by membranous tissue. Inner paraphyses strongly sclerotized, fused at distal  $\frac{3}{4}$ , medially attached to each other by membranous tissue, flat, apically bent, basally fused to dorsodistal margin of anterior region of aedeagus; attached by membranous tissue both laterally to apical region of aedeagal apodeme arm and apically to ventralmost layer of dorsal arch.

*Etymology.* Named after J.G.H. Londt, collector of the holotype.

*Distribution.* Known only from Natal, South Africa (type locality).

*Comments.* The male terminalia show similarities with those of *Leucophenga melanogaster* Tsacas and Chassagnard, 1991, particularly regarding the paintbrush-shaped aedeagus, but the abdomen of the latter is fully black, without spots.

### *Leucophenga malgachensis* n. sp.

(Figs 6A–C, 7A, B)

*Material examined.* Male holotype, labelled «6218 / Reg. / Madagascar Centre, Vakoana 1520m, Andringitra Ambalavao, 21–24.I.[19]58 B.Stuckenberg / ♂ / *Leucophenga malgachensis* Bächli et al., 2004 / HOLOTYPE» [M6218]. — 8 paratypes (7 ♂♂, 1 ♀), 7 ♂♂, same labels as holotype, but with different register numbers, plus «PARATYPE» label. [M6219, M6220, M6221, M6222, M6223, M6224, M6225]; 1 ♀, same labels as holotype, but numbered 6226, plus «PARATYPE» label. [M6226]

*Type locality.* Andringitra Ambalavao Vakoana, Province of Fianarantsoa, Madagascar.

*Diagnosis.* A species of the *mutabilis* group close to *L. dilatata* Bächli, 1971 but the male scutellum is completely dark basally and the spots of tergite 4 confluent; aedeagus very long, entirely membranous distally and covered with long, straight, and scattered trichoid-like scales.

*Description.* ♂. Head mainly yellow. Frons whitish, almost parallel-sided, frontal length = 0.43 (0.42–0.45) mm; frontal index = 1.24 (1.21–1.29), top to bottom width ratio = 0.98 (0.93–1.00), ocellar triangle blackish, about 35 % of frontal length. Orbital plates about 70 % of frontal length. Orbital setae blackish, or2 close to and slightly outside of or2, distance of or3 to or1 = 100 % of or3 to vtm, or1/or3 ratio = 0.92, or2/or1 ratio = 0.67, postocellar setae = 22–29 %, ocellar setae = 56–59 % of frontal length; vibrissal index = 0.39 (0.29–0.50). Cheek index about 13–15. Eye index = 1.30 (1.23–1.36). Flagellomere 1 shortly setulose, length to width ratio

= 1.60–1.80. Arista with 5–6 dorsal, 2–3 ventral and 7–10 inner branches, plus small terminal fork. Proboscis yellow. Palpus brown, narrow, with 4 ventral setae.

Thorax mainly yellow, length = 1.53 (1.47–1.58) mm. Scutum brownish yellow, with two diffuse short stripes in anterior dc lines, silvery, particularly in posterior half; 6 (8) rows of acrostichal setulae. h index = 4.56 (4.33–4.67); Transverse distance of dorsocentral setae about 300% of longitudinal distance; dc index = 0.53 (0.50–0.56), prscut index 1.08 (1.00–1.17). Scutellum with yellow-white apical third, basally contrasting brownish-black, scutellar setae nearly equidistant; scut index = 1.24 (1.22–1.27). Pleura whitish yellow, diffusely brownish around halter; sterno index = 0.86 (0.82–0.89), mid katepisternal seta about 20–29 % of anterior one. Halter white. Legs yellow.

Wing hyaline,  $R_1$  blackish, length = 2.69 (2.62–2.75) mm, length to width ratio = 2.20 (2.16–2.24). Indices: C = 2.23 (2.11–2.33), ac = 1.91 (1.81–2.00), hb = 0.68 (0.64–0.70), 4C = 1.24 (1.22–1.26), 4v = 1.91 (1.83–2.00), 5x = 1.46 (1.27–1.60), M = 0.66 (0.61–0.73), prox. x = 0.88 (0.83–0.91).

Abdomen yellow, shiny, silvery and spotted as in *L. dilatata* but with confluent spots on T4. T3 distinctly shorter than T4 and with few setae only.

♂ Terminalia (Figs 6A–C, 7A, B). Epandrium microtrichose except for very anterior area, with ca. 3 lower and 8 upper setae; ventral lobe not distinguishable. Cercus narrower than epandrium, medially bearing a prominent row of ca. 6 strong, very long and sinuate setae, gradually increasing in length from ventral to dorsal region, microtrichose except for distal  $\frac{1}{4}$ , attached to epandrium by membranous tissue. Surstylus double-walled, microtrichose except for ventral  $\frac{1}{4}$ , slightly attached to epandrium by membranous tissue, with no prensiseta, ca. 7–11 outer setae and ca. 18 inner setae. Decasternum anteriorly well developed, sinuate, folded three times over itself forming a dorsal arch (Fig. 7A), laterally attached to arms of hypandrium by membranous tissue, posteriorly reduced and attached to surstyli by membranous tissue. Hypandrium longer than epandrium, Y-shaped in posterior view, arms anteriorly fused to ventral rod of aedeagal apodeme; dorsal arch (originating from decasternum) roughly sinuate in lateral view, three-layered, middle layer saddle-shaped in lateral view, mostly embracing ventralmost layer, which is rod-shaped, submedially bent, protruded, shorter than inner paraphysis, perpendicular to aedeagus, and attached both ventrally to apical region of inner paraphyses and laterally to hypandrial arms by membranous tissue; gonopod bare, fused to distal region of hypandrial arm, medially slightly attached to outer paraphysis by membranous tissue. Aedeagus anteriorly folded over itself, anterior region short, canaliculate and dorsally entirely membranous, anteriorly fused to inner paraphysis, ventrally more sclerotized than dorsally, distally distinctly and entirely membranous and covered with long, straight, scattered, trichoid-like scales. Aedeagal apodeme anteriorly vestigial, posteriorly bifid, with two long and curved arms at tip, ventrally fused to hypandrial arms, embracing anterior region of aedeagus. Ventral rod indistinguishable, fused to anterior hypandrial arms. Outer paraphyses roughly elliptical, ventral margin submedially notched, and strongly sclerotized, embracing aedeagus distally, dorsodistally bearing ca. 5 tiny setulae (the long one in Fig. 7B is aberrant, they are all alike in right outer paraphysis); attached both anteriorly to aedeagal apodeme arm and ventromedially to gonopod by membranous tissue. Inner paraphyses strongly sclerotized, fused at distal  $\frac{3}{4}$ , flat, apically bent, basally fused

to dorsodistal margin of anterior region of aedeagus; attached by membranous tissue both laterally to apical region of aedeagal apodeme arm and apically to ventralmost layer of dorsal arch.

♀. Differs from male: palpus brown, flat, as broad as flagellomere 1 and shortly setulose; scutum and scutellum shiny, basal half of scutellum mostly brownish, tip white, abdomen yellow, shiny, with blackish, roundish spots: lateral on T2, median and ventral on T3, median, lateral and ventral on T4 and T5, in part confluent on T4, lateral on T6.

Measurements: frontal length = 0.45 mm, frontal index = 1.20, top to bottom width ratio = 1.07, ocellar triangle about 30 % of frontal length, orbital plates about 65 % of frontal length, distance of or3 to or1 = 80 % of or3 to vtm, or1/or3 ratio = 0.86, or2/or1 ratio = 0.83, postocellar setae = 28 %, ocellar setae = 67 % of frontal length, vibrissal index = 0.38, cheek index about 14–15, eye index = 1.38; thorax length = 1.61 mm. h index = 3.50, transverse distance of dorsocentral setae = 300 % of longitudinal distance, dc index = 0.52, scut index = 1.32, prscut index = 1.15, sterno index = 0.83, mid katepisternal seta about 33 % of anterior one; wing length = 2.95 mm, length to width ratio = 2.15. Indices: C = 2.27, ac = 2.14, hb = 0.70, 4C = 1.25, 4v = 2.13, 5x = 1.33, M = 0.67, prox. x = 0.88.

*Etymology.* Named in allusion to its presence in Madagascar (formerly Republique Malgache, in French).

*Distribution.* Known only from Madagascar (type locality).

*Comments.* A female is included in the type series because it was collected together with the type series. It possesses the broad, flat palpus typical of many species of the *mutabilis* group.

The following female specimens were not collected at the type locality, but may belong to this species because of their external morphology. They are excluded from the type series because of the difficulty associating males and females, and because some of them have been collected in South Africa, far from the type locality. They are labelled as follows:

- «6233 / Reg. / Madagascar Est, Ivontaka 15m, dct Mananara, 10–14.III.[19]58 B.Stuckenberg» [M6233]
- «6399 / Reg. / Barberton [South Africa], 3.5.13 [3 May 1913], H.K.Munro» [M6399]
- «6533 / Reg. / SWAZILAND 2531CC, 4km e. Havelock, Mokomaana River, XI 30,1976 R.Miller» [M6533]
- «near Lilani, Ahrens district, Natal, S. Africa, B. & P. Stuckenberg, April 1962 / *Leucophenga* [handwritten] / ♀ / 6325» [B6325]
- «Royal Natal National Park, Drakensberg Mts., B. & P. Stuckenberg / from montane forest, 11.IX.[19]63, 1530m / *Leucophenga* [handwritten] / ♀ / 6326» [B6326]

### *Leucophenga mananara* n. sp.

(Figs 1F, 8A, B)

*Material examined.* Male holotype, labelled «6236 / Reg. / Madagascar Est, Ivontaka 15m, dct Mananara, 10–14.III.[19]58 B.Stuckenberg / *Leucophenga mananara* Bächli et al., 2004 / HOLOTYPE» [M6236].

Type locality. Ivontaka, District of Mananara, Province of Toamasina, Madagascar.

*Diagnosis.* A species of the *flavopuncta* group close to *L. pleurovirgata* Bächli, 1971 but with different frons, wing venation and abdominal pattern; post-ocellar, ocellar and vibrissal setae relatively long, anterior dc relatively short; aede-

gus strongly sinuate, but relatively shorter and wider than that of *L. isaka* n. sp., and subapically bearing a ventral carina in lateral view.

*Description.* ♂. Head mainly yellow. Frons relatively narrow, posteriorly divergent, dark golden yellow, frontal length = 0.45 mm; frontal index = 1.38, top to bottom width ratio = 1.23; ocellar triangle black, about 30 % of frontal length. Orbital plates shiny brownish, about 65 % of frontal length. Orbital setae black, almost in line, distance of or3 to or1 = 240 % of or3 to vtm, distance of or2 to or3 = 399 % of or2 to or1, or1/or3 ratio = 0.63, or2/or1 ratio = 1.08, postocellar setae = 44 %, ocellar setae = 78 % of frontal length; vibrissal index = 0.33. Cheek index about 16. Eye index = 1.28. Flagellomere 1 shortly setulose, slightly brownish along margin, length to width ratio = 1.80. Arista with 9 dorsal, 3 ventral and about 7 inner branches, plus terminal fork. Proboscis and palpus yellow.

Thorax mainly yellow, length = 1.57 mm. Scutum shiny brownish, anteriorly yellow; 10 rows of acrostichal setulae. h index = 2.17. Transverse distance of dorsocentral setae = 450 % of longitudinal distance; dc index = 0.42, prscut index = 1.18. Scutellum brown, apically diffusely yellow, scutellar setae almost equidistant; basal ones divergent; scut index 1.21. Pleura yellow, with a brownish stripe, whitish above, sterno index = 0.83, mid katepisternal seta about 40 % of anterior one. Legs and halter yellow.

Wing hyaline,  $R_{4+5}$  and M slightly divergent, length = 2.50 mm, length to width ratio = 2.17. Indices: C = 1.96, ac = 2.00, hb = 0.86, 4C = 1.27, 4v = 1.77, 5x = 1.20, M = 0.55, prox. x = 0.95.

Abdomen somewhat silvery in the yellow parts, with shiny black pattern: T2 with large basal corners, T3 with a medially broadened marginal band, T4 and T5 with a median stripe and laterally broadened marginal bands, T6 black, T3 to T6 ventrally black.

♂ Terminalia (Figs 1F, 8A, B). Epandrium microtrichose, with no lower seta, and 10 upper setae; ventral lobe not distinguishable. Cercus as wide as epandrium, microtrichose except for distal  $\frac{1}{4}$ , attached to epandrium by membranous tissue. Surstylus double-walled, microtrichose except anteroventrally, slightly attached to epandrium by membranous tissue, with no prensiseta, ca. 11 outer setae and ca. 20 inner setae. Decasternum anteriorly well developed, sinuate, folded three times over itself forming a dorsal arch (Figs 1F, 8A), laterally attached to arms of hypandrium by membranous tissue, posteriorly reduced and attached to surstyli by membranous tissue. Hypandrium as long as epandrium, somewhat square-shaped in posterior view, arms anteriorly fused to ventral rod of aedeagal apodeme; dorsal arch (originating from decasternum) roughly sinuate in lateral view, three-layered, middle layer saddle-shaped and sharply pointed in lateral view, mostly embracing ventral-most layer, which is rod-shaped, medially bent, protruded, as long as inner paraphysis, perpendicular to aedeagus (when not extruded), and attached both ventrally to apical region of inner paraphyses and laterally to hypandrial arms by membranous tissue; gonopod bare, ventromedially membranous, partially fused to distal region of hypandrial arm, dorsomedially slightly attached to outer paraphysis by membranous tissue. Aedeagus long, sinuate in lateral view, anteriorly folded over itself, anterior region canaliculate and dorsally entirely membranous, anteriorly fused to inner paraphysis, laterally flattened distally and dorsoventrally flattened medially with lateral margins undulate and turned dorsad, subapically bearing a nar-

row ventral carina, distally covered with tiny scales, apically weakly sclerotized. Aedeagal apodeme anteriorly rather wide, anteriorly and posteriorly bifid, with two long distal arms gradually narrowing towards tip, ventrally fused to hypandrial arms, embracing anterior region of aedeagus. Ventral rod indistinguishable, fused to anterior hypandrial arms. Outer paraphyses anteriorly narrow, embracing aedeagus distally, dorsomedially bearing ca. 13 tiny setulae; attached both anteriorly to aedeagal apodeme arm and ventromedially to gonopod by membranous tissue. Inner paraphyses strongly sclerotized, fused at distal  $\frac{1}{3}$ , medially attached to each other by membranous tissue, flat, bare, posteriorly bent, basally fused to dorsodistal margin of anterior region of aedeagus; attached by membranous tissue both laterally to apical region of aedeagal apodeme arm and apically to ventralmost layer of dorsal arch.

*Etymology.* The epithet *mananara* is a noun in apposition, referring to the district which includes the type locality.

*Distribution.* Known only from Madagascar (type locality).

*Comments.* *L. mananara* n. sp. is closely related to *L. isaka* n. sp., from which it differs by having a relatively shorter and wider (in lateral view) aedeagus.

### ***Leucophenga muden* n. sp.**

(Figs 9A, 10A, B)

*Material examined.* Male holotype, labelled «Muden, Natal, South Africa, 24 Jul. 1954, B. Stuckenberg / ♂ / 6324 / *Leucophenga muden* Bächli et al., 2004 / HOLOTYPE» [B6324].

*Type locality.* Muden, Province of KwaZulu-Natal, South Africa.

*Diagnosis.* A species of the *subpollinosa* group close to *L. subpollinosa* (de Meijere, 1914), but differing in the following characters: scutum not striped, mesonotum completely silvery, pleural band less distinctive, knob of halter more-or-less black, abdomen silvery on tergites 2 and 3; aedeagus slightly sinuate, subapically widened, apically membranous and devoid of scales.

*Description.* ♂. Head mainly yellow. Frons yellow, medially diffusely brownish, laterally slightly silvery, frontal length = 0.33 mm, frontal index = 1.30, top to bottom width ratio = 1.10; ocellar triangle dark, about 30 % of frontal length. Orbital plates narrow, about 60 % of frontal length. Orbital setae black, or2 close to and slightly outside of or1, distance of or3 to or1 = 300 % of or3 to vtm, or1/or3 ratio = 0.67, or2/or1 ratio = 1.13, postocellar setae = 23 %, ocellar setae = 69 % of frontal length; vibrissal index = 0.33. Cheek index about 21. Eye index = 1.24. Flagellomere 1 with slightly prolonged marginal setulae, length to width ratio = 1.75. Arista with 5–7 dorsal, 2 ventral and about 6 very short inner branches, plus small terminal fork. Proboscis and palpus yellow.

Thorax mainly brownish yellow; length = 1.00 mm. Mesonotum silvery, particularly in posterior half, 4–6 rows of acrostichal setulae. h index = 4.50. Transverse distance of dorsocentral setae = 350 % of longitudinal distance; dc index = 0.37. prscut index = 1.14; Scutellar setae almost equidistant, basal ones divergent; scut index = 1.47. Pleura yellow, with a more-or-less diffuse brown stripe in upper half; sterno index = 0.85, mid katapisternal seta about 18 % of anterior one. Halter knob with black tip. Legs yellow.

Wing diffusely tinged along costal margin, brownish along  $R_1$ , M apically fading,  $R_{4+5}$  and M apically slightly divergent; length = 1.92 mm; length to width

ratio = 2.26. Indices: C = 2.00, ac = 1.91, hb = 0.90, 4C = 1.24, 4v = 2.00, 5x = 1.83, M = 0.65, prox. x = 0.76.

Abdomen blackish, strongly silvery on T2 and T3; T4–T6 shiny.

♂ Terminalia (Figs 9A, 10A, B). Epandrium microtrichose, with no lower and 4 upper setae; ventral lobe not distinguishable. Cercus narrower than epandrium, microtrichose, attached to epandrium by membranous tissue. Surstylus double-walled, anterodorsally microtrichose, slightly attached to epandrium by membranous tissue, with no prensiseta, ca. 10 outer setae and ca. 16 inner setae. Decasternum anteriorly well developed, sinuate, folded three times over itself forming a dorsal arch (Figs 9A, 10A), laterally attached to arms of hypandrium by membranous tissue, posteriorly reduced and attached to surstyli by membranous tissue. Hypandrium longer than epandrium, Y-shaped in posterior view, arms anteriorly fused to ventral rod of aedeagal apodeme; dorsal arch (originating from decasternum) roughly sinuate in lateral view, three-layered, middle layer saddle-shaped in lateral view, distally papillate, largely embracing ventralmost layer, which is hook-shaped, slightly protruded, half the length of inner paraphysis, perpendicular to aedeagus (when not extruded), and attached both ventrally to apical region of inner paraphyses and laterally to hypandrial arms by membranous tissue; gonopod bearing a seta medially, mostly fused to distal region of hypandrial arm, medially slightly attached to outer paraphysis by membranous tissue. Aedeagus anteriorly folded over itself, anterior region short, canaliculate and dorsodistally entirely membranous, anteriorly fused to inner paraphysis, distally narrow, slightly sinuate, ventrally more sclerotized than dorsally, subapically widened, apically membranous and devoid of scales. Aedeagal apodeme anteriorly vestigial, posteriorly bifid, with two long, enlarged and curved at tip of arms, ventrally fused to hypandrial arms, embracing anterior region of aedeagus. Ventral rod indistinguishable, fused to anterior hypandrial arms. Outer paraphyses long, embracing aedeagus distally, dorsodistally bearing ca. 7 tiny setulae; attached both anteriorly to aedeagal apodeme arm (but widely spaced from each other) and ventromedially to gonopod by membranous tissue. Inner paraphyses strongly sclerotized, fused at distal 3/4, flat, apically bent, basally fused to dorso-distal margin of anterior region of aedeagus; attached by membranous tissue both laterally to apical region of aedeagal apodeme arm and apically to ventralmost layer of dorsal arch.

*Etymology.* The epithet *muden* is a noun in apposition, referring to the type locality.

*Distribution.* Known only from Natal, South Africa (type locality).

*Comments.* The variability in external morphology — typical of many species in the *subpollinosa* group — prevents confident classification based on this feature alone. For this reason the following six specimens, despite the fact that they have similar external morphology, are excluded as paratypes because we have noticed subtle differences in the male terminalia in some of them (M6404, M6432). They are labelled as follows:

- 1 ♂: «6404 / Reg. / Barberton [South Africa], 18.5.13 [18 May 1913], H.K.Munro / ♂» [M6404].
- 1 ♂: «6432 / Reg. / SOUTH AFRICA, Natal, Zululand, Umfalozi Game Park, 2831Bd, 21-VII-1973, ME Irwin / ♂» [M6432].
- 1 ♂: «Orange F. State, Harrismith, South Africa, 1–20 Mar. 1927 / R.E.Turner, Brit. Mus., 1927–147 / [preparation of terminalia] / ♂ / 5192» [B5192]
- 1 ♂: «NATAL, Weenen, v. 1924, H.P. Thomasset / pres. by, Imp. Inst. ent., Brit. Mus., 1932–338 /



[preparation of terminalia] / ♂ / 5255» [B5255]

- 1 ♀: «Royal Natal National Park, Drakensberg Mts., B. & P. Stuckenberg / from montane forest, 11.IX.[19]63, 1530m / *Leucophenga* [handwritten] / ♀ / 6322» [B6322]  
 1 ♀: «Lions Bush, Nottingham, Natal, S. Afr., 9 Aug. 1954, B. Stuckenberg / in indigenous forest / ♀ / 6323» [B6323]

### *Leucophenga ranohira* n. sp.

(Figs 1G, 11A, B)

*Material examined.* Male holotype, labelled «6242 / Reg. / Madagascar-Ouest, Ranohira 860m, 26.I-4.II.58 [26 Jan.-4 Feb. 1958], B.Stuckenberg / ♂ / *Leucophenga ranohira* Bächli et al., 2004 / HOLOTYPE» [M6242].

*Type locality.* Ranohira, Province of Fianarantsoa, Madagascar.

*Diagnosis.* A species of the *flavopuncta* group closely related to *L. pleurovirgata* Bächli, 1971 but frons, wing venation and abdominal pattern differ; post-ocellar, ocellar and vibrissal setae relatively long, anterior dc relatively short; aedeagus dorsoventrally distinctly flattened, medially with lateral margins strongly serrate and turned dorsad.

*Description.* ♂. Head mainly yellow. Frons relatively narrow, posteriorly divergent, dark golden yellow, frontal length = 0.42 mm; frontal index = 1.13, top to bottom width ratio = 1.07; ocellar triangle black, about 30 % of frontal length. Orbital plates shiny brownish, about 65 % of frontal length. Orbital setae black, almost in line, distance of or3 to or1 = 220% of or3 to vtm, distance of or2 to or3 = 270% of or2 to or1, or1/or3 ratio = 0.67, or2/or1 ratio = 1.00, postocellar setae = 47 %, ocellar setae = 76 % of frontal length; vibrissal index = 0.44. Cheek index about 15–16. Eye index = 1.29. Flagellomere 1 shortly setulose, slightly brownish along margin, length to width ratio = 1.60. Arista with 7 dorsal, 3 ventral and about 9 inner branches, plus terminal fork. Proboscis and palpus yellow.

Thorax mainly yellow, length = 1.60 mm. Scutum shiny brownish; 10 rows of acrostichal setulae. h index = 2.60. Transverse distance of dorsocentral setae = 580 % of longitudinal distance; dc index = 0.37, prscut index = 1.40. Scutellum brown, apically diffusely yellow, scutellar setae almost equidistant; basal ones divergent; scut index 1.25. Pleura yellow, with a black longitudinal band, sterno index = 0.74, mid katapisternal seta about 36 % of anterior one. Legs and halter yellow.

Wing hyaline, length = 2.70 mm, length to width ratio = 2.16. Indices: C = 2.10, ac = 1.93, hb = 0.79, 4C = 1.16, 4v = 1.68, 5x = 1.17, M = 0.56, prox. x = 0.80.

Abdomen somewhat silvery in the yellow parts, with shiny black pattern: T2 with large basal corners, T3 with a medially broadened marginal band, T4 and T5 with a median stripe and laterally broadened marginal bands, T6 black, T3 to T6 ventrally black.

♂ Terminalia (Figs 1G, 11A, B). Epandrium microtrichose, with no lower seta, and 5 upper setae; ventral lobe not distinguishable. Cercus narrower than epandrium, microtrichose except for  $\frac{1}{4}$  distal, attached to epandrium by membranous tissue. Surstylus double-walled, microtrichose except anteroventrally, slightly attached to epandrium by membranous tissue, with no prensiseta, ca. 8 outer setae and ca. 22 inner setae. Decasternum anteriorly well developed, sinuate, folded three times over itself forming a dorsal arch (Fig. 11A), laterally attached to arms of

hypandrium by membranous tissue, posteriorly reduced and attached to surstyli by membranous tissue. Hypandrium as long as epandrium, somewhat square-shaped in posterior view, arms anteriorly fused to ventral rod of aedeagal apodeme; dorsal arch (originating from decasternum) roughly sinuate in lateral view, three-layered, middle layer saddle-shaped and sharply pointed in lateral view, mostly embracing ventralmost layer, which is rod-shaped, medially bent, protruded, as long as inner paraphysis, perpendicular to aedeagus (when not extruded), and attached both ventrally to apical region of inner paraphyses and laterally to hypandrial arms by membranous tissue; gonopod bare, ventromedially membranous, partially fused to distal region of hypandrial arm, dorsomedially slightly attached to outer paraphysis by membranous tissue. Aedeagus long, sinuate in lateral view, anteriorly folded over itself, anterior region canaliculate and dorsally entirely membranous, anteriorly fused to inner paraphysis, laterally flattened distally and dorsoventrally distinctly flattened medially with lateral margins strongly serrate and turned dorsad on anterior  $\frac{3}{4}$ , subapically covered with tiny scales ventrally, distally covered with tiny trichoid-like scales, ventroapically weakly sclerotized. Aedeagal apodeme anteriorly rather wide, anteriorly and posteriorly bifid, with two long distal arms gradually narrowing towards tip, ventrally fused to hypandrial arms, embracing anterior region of aedeagus. Ventral rod indistinguishable, fused to anterior hypandrial arms. Outer paraphyses anteriorly narrow, apically serrate, embracing aedeagus distally, dorsomedially bearing ca. 5 tiny setulae; attached both anteriorly to aedeagal apodeme arm and ventromedially to gonopod by membranous tissue. Inner paraphyses strongly sclerotized, attached to each other by membranous tissue, flat, bare, posteriorly bent, basally fused to dorsodistal margin of anterior region of aedeagus, papillate on distal half; attached by membranous tissue both laterally to apical region of aedeagal apodeme arm and apically to ventralmost layer of dorsal arch.

*Etymology.* The epithet *ranohira* is a noun in apposition, referring to the type locality.

*Distribution.* Known only from Madagascar (type locality).

*Comments.* *L. ranohira* n. sp. is related to *L. isaka* n. sp., *L. ivontaka* n. sp., and *L. mananara* n. sp., but has a quite different aedeagus.

### ***Leucophenga stuckenbergi* n. sp.**

(Figs 9B–G, 12A, B)

*Material examined.* Male holotype, labelled «Port St. Johns, South Africa, B. & P. Stuckenberg, 20–25 Nov. 1961 / Leucophenga [handwritten] / ♂ / 6315 / Leucophenga stuckenbergi Bächli et al., 2004 / HOLOTYPE» [B6315]. — 12 Paratypes (6 ♂♂, 6 ♀♀): 1 ♂, labelled «6589 / TRANSKEI [South Africa]: Zuka River, 10km E.Engcobo 3128CA, 26-X-1978 river bank, J. Londt & R. Miller / Reg. / ♂ / Leucophenga stuckenbergi Bächli et al., 2004 / PARATYPE» [M6589]. 2 ♂♂, labelled «6686 [6693] / SOUTH AFRICA: Natal, Pongolo Bush Nat. Res., 27°59'20"S 29°42'25"E, Montane Podocarpus, Forest margins 1580m, JGH Londt 20.iv.1988 / Reg. / ♂ / Leucophenga stuckenbergi Bächli et al., 2004 / PARATYPE» [M6686, M6693]. 1 ♂, labelled «River bank, 13.IX.[19]63, 1500 m / Royal Natal National Park, Drakensberg Mts., B. & P. Stuckenberg / Leucophenga [handwritten] / ♂ / 6317 / Leucophenga stuckenbergi Bächli et al., 2004 / PARATYPE» [B6317]. 2 ♂♂, labelled «Karkloof range [sic], nr. Mt. Alida, Natal, S. Africa, B. & P. Stuckenberg, 24.xii.1961 / Leucophenga [handwritten] / ♂ / 5062 [6318] / Leucophenga stuckenbergi Bächli et al., 2004 / PARATYPE» [B5062, B6318]. 4 ♀♀, labelled «6689 [6690, 6692, 6695] / SOUTH AFRICA: Natal, Pongolo Bush Nat. Res., 27°59'20"S 29°42'25"E, Montane Podocarpus, Forest margins 1580m, JGH Londt 20.iv.1988 / Reg. / ♀ / Leucophenga stuckenbergi Bächli et al., 2004 / PARATYPE». [M6689, M6690, M6692,

M6695] 1 ♀, labelled «6697 / SOUTH AFRICA: Natal, False Bay Park Res., ca 27°58'S 32°22'E, Sand Forest J. Londt, 23–24.iv.1988 40m, Mpophomeni Train area / Reg. / ♀ / *Leucophenga stuckenbergi* Bächli et al., 2004 / PARATYPE» [M6697]. 1 ♀, labelled «6587 / TRANSKEI [South Africa]: Zuka River, 10km E.Engcobo 3128CA, 26-X-1978 river bank, J. Londt & R. Miller / Reg. / ♀ / *Leucophenga stuckenbergi* Bächli et al., 2004 / PARATYPE» [M6587].

*Type locality.* Port St. Johns, Province of Eastern Cape, South Africa.

*Diagnosis.* A species of the *subpollinosa* group close to *L. dudai* Bächli, 1971 but having frons entirely whitish, ocellars minute, knob of halteres whitish, scutum not striped, wing veins  $R_{4+5}$  and M slightly convergent and male abdomen silvery in basal half only; aedeagus medially straight, distally entirely and distinctly membranous and devoid of scales.

*Description.* ♂. Head mainly yellow. Frons whitish, narrow, frontal length = 0.52 (0.50–0.55) mm, frontal index = 1.66 (1.54–1.75), top to bottom width ratio = 1.13 (1.08–1.17); ocellar triangle blackish, about 25 % of frontal length. Orbital plates narrow, about 55 % of frontal length. Orbital setae blackish, or2 close to and slightly outside of or1, distance of or3 to or1 = 250 % of or3 to vtm, or1/or3 ratio = 0.73 (0.69–0.75), or2/or1 ratio = 1.04 (0.91–1.22; postocellar setae = 10–14 %, ocellar setae = 14–15 % of frontal length; vibrissal index = 0.32 (0.29–0.33). Cheek index about 14–17. Eye index = 1.25 (1.21–1.33). Flagellomere 1 shortly setulose, length to width ratio = 1.50–1.80. Arista with 5–7 dorsal, 2 ventral and 5–7 short inner branches, plus small terminal fork. Proboscis and palpus yellow.

Thorax mainly yellow; length = 1.34 (1.25–1.50) mm. Scutum brownish yellow, strongly silvery; 4 rows of acrostichal setulae. h index = 4–7. Transverse distance of dorsocentral setae about 250 % of longitudinal distance; dc index = 0.54 (0.48–0.59); prscut index = 0.98 (0.92–1.08). Scutellum silvery, scutellar setae nearly equidistant; scut index = 1.35 (1.29–1.43). Pleura yellow with a distinct dark brown stripe; sterno index = 0.82 (0.75–0.88); mid katepisternal seta about 20–42 % of anterior one. Halter whitish-yellow. Legs yellow.

Wing infuscated along costal margin, brownish along  $R_1$ , M fading in distal half of apical section,  $R_{4+5}$  and M slightly convergent; length = 2.58 (2.40–2.80) mm; length to width ratio = 2.15 (2.13–2.20). Indices: C = 2.64 (2.61–2.67), ac = 1.97 (1.91–2.08), hb = 0.80 (0.78–0.81), 4C = 1.09 (1.00–1.21), 4v = 2.19 (2.00–2.47), 5x = 1.52 (1.36–1.75), M = 0.71 (0.64–0.79), prox. x = 0.88 (0.80–1.00).

Abdomen with dark brown ground colour, strongly silvery on T1–T3, also slightly laterobasally on T4 and T5.

♂ Terminalia (Figs 9B–G, 12A, B). Epandrium microtrichose, with no lower and 4–7 upper setae; ventral lobe not distinguishable. Cercus narrower than epandrium, microtrichose, attached to epandrium by membranous tissue. Surstylus double-walled, microtrichose except for ventral  $\frac{1}{4}$ , slightly attached to epandrium by membranous tissue, with no prensisetae, 8–10 outer setae and 13–21 inner setae. Decasternum anteriorly well developed, sinuate, folded three times over itself forming a dorsal arch (Figs 9B–G, 12A), laterally attached to arms of hypandrium by membranous tissue, posteriorly reduced and attached to surstyli by membranous tissue. Hypandrium as long as epandrium, Y-shaped in posterior view, arms anteriorly fused to ventral rod of aedeagal apodeme; dorsal arch (originating from decasternum) roughly sinuate in lateral view, three-layered, middle layer saddle-shaped in

lateral view, mostly embracing ventralmost layer, which is hook-shaped, protruded, as long as inner paraphysis, perpendicular to aedeagus (when not extruded), and attached both ventrally to apical region of inner paraphyses and laterally to hypandrial arms by membranous tissue; gonopod bare, fused to distal region of hypandrial arm, medially slightly attached to outer paraphysis by membranous tissue. Aedeagus anteriorly folded over itself, anterior region short, canaliculate and distally and dorsally entirely membranous, anteriorly fused to inner paraphysis, medially straight, distally entirely and distinctly membranous, devoid of scales. Aedeagal apodeme anteriorly vestigial, posteriorly bifid, narrow, with two long, curved arms, ventrally fused to hypandrial arms, embracing anterior region of aedeagus. Ventral rod indistinguishable, fused to anterior hypandrial arms. Outer paraphyses long, anteroventrally strongly sclerotized, embracing aedeagus distally, dorsomedially bearing ca. 7 tiny setulae; attached both anteriorly to aedeagal apodeme arm and ventromedially to gonopod by membranous tissue. Inner paraphyses strongly sclerotized, fused at distal  $\frac{2}{3}$ , flat, apically bent, basally fused to dorsodistal margin of anterior region of aedeagus; attached by membranous tissue both laterally to apical region of aedeagal apodeme arm and apically to ventralmost layer of dorsal arch.

♀. Differs from male: frons broader, golden yellow, slightly silvery along eye margin only; scutum yellowish, with a dark brown band in front of scutellum, laterally and posteriorly slightly silvery, scutellum yellowish, basally slightly silvery, darker brownish in apical half; abdomen blackish, hind margin of T2 and small laterobasal areas on T3 and T4 slightly silvery.

Measurements: frontal length = 0.37 (0.34–0.41) mm; frontal index = 1.07 (1.05–1.10), top to bottom width ratio = 1.06 (1.05–1.09), or1/or3 ratio = 0.76 (0.75–0.78), or2/or1 ratio = 1.00, postocellar setae = 21–32 %, ocellar setae = 50–71 % of frontal length; vibrissal index = 0.45 (0.40–0.50). Cheek index about 16–19. Eye index = 1.29 (1.26–1.31). Thorax length = 1.23 (1.13–1.34) mm. h index = 3.71 (3.00–4.50), dc index = 0.51 (0.42–0.70), prscut index = 1.11 (1.00–1.23), scut index = 1.30 (1.29–1.31), sterno index = 0.87 (0.82–0.90), mid katapisternal seta about 28–33 % of anterior one. Wing length = 2.38 (2.20–2.56) mm, length to width ratio = 2.10 (2.03–2.13). Indices: C = 2.49 (2.28–2.63), ac = 2.13 (2.00–2.25), hb = 0.80 (0.78–0.81), 4C = 1.12 (1.07–1.14), 4v = 2.21 (2.13–2.29), 5x = 1.56 (1.43–1.83), M = 0.71 (0.69–0.73), prox. x = 0.83 (0.79–0.93).

*Etymology.* Named after Brian Stuckenberg, collector of the holotype.

*Distribution.* South Africa.

*Comments.* The external morphology of the following four specimens suggest that they belong to this species, but they are excluded from the type series, because we have some doubts regarding their identity:

- 2 ♂♂: «Edendale, Natal, South Africa, 16.XII.1953, B. Stuckenberg / ♂ / 6316 [6320]» [B6316, B6320]
- 1 ♀: «Lions Bush, Nottingham, Natal S. Afr., 9 Aug. 1954, B. Stuckenberg / in indigenous forest / ♀» [B6319]
- 1 ♀: «Royal Natal National Park, Drakensberg Mts., B. & P. Stuckenberg / river bank, 11.IX.[19]63, 1500m / ♀ / 6321» [B6321]

## ZUSAMMENFASSUNG

Neun neue Arten von *Leucophenga* (Drosophilidae) werden beschrieben und ihre Terminalia abge-

bildet: Aus Südafrika *L. ferrari* n. sp., *L. londti* n. sp., *L. muden* n. sp. und *L. stuckenbergi* n. sp.; aus Madagascar *L. isaka* n. sp., *L. ivontaka* n. sp., *L. malgachensis* n. sp., *L. mananara* n. sp. und *L. ranohira* n. sp. Alle bekannten *Leucophenga*-Arten der südafrikanischen Biosphäre werden aufgelistet.

## REFERENCES

- Adams, C.F. 1905. Diptera Africana, I. — The Kansas University Science Bulletin 3: 149–208.
- Bächli, G. 1971. *Leucophenga* und *Paraleucophenga* (Diptera Brachycera), Fam. Drosophilidae. — Exploration du Parc National de l'Upemba. Mission G.F. de Witte, fasc. 71, 192 pp., 39 plates.
- Bächli, G. 1988. A catalogue of the types in the collections of Museo Civico di Storia Naturale di Milano. IX. Types of Diptera Drosophilidae. — Atti della Società italiana di Scienze naturali del Museo civico di Storia naturale in Milano 129: 116–120.
- Bächli, G., Vilela, C.R., Escher, S.A., & Saura, A. 2004. The Drosophilidae (Diptera) of Fennoscandia and Denmark. Fauna Entomologica Scandinavica, vol. 39. — Brill, Leiden.
- Chassagnard, M.-T. & McEvey, S.F. 1992. The *Zaprionus* of Madagascar, with descriptions of five new species (Drosophilidae: Diptera). — Annales de la Société entomologique de France (Nouv. série) 28(3): 317–335.
- Chassagnard, M.-T. & McEvey, S.F. 1997. Le genre *Phorticella* Duda de la région Afrotropicale et de Sumatra. Description de deux nouvelles espèces (Diptera: Drosophilidae). — Annales de la Société entomologique de France (Nouv. série) 33(1): 81–87.
- Chassagnard, M.-T., Tsacas, L., & Lachaise, D. 1997. Drosophilidae (Diptera) of Malawi. — Annals of the Natal Museum 38: 61–131.
- Collart, A. 1939. Revision des *Leucophenga* africains décrits par C. F. Adams (Diptera: Drosophilidae). — Bulletin du Musée royal d'Histoire naturelle de Belgique 15(21): 1–18.
- David, J. & Tsacas, L. 1975. Les Drosophilidae (Diptera) de l'Ile de La Réunion et de l'Ile Maurice. III. Biologie et origine des espèces. — Beiträge zur Entomologie 25: 245–254.
- Duda, O. 1939. Revision der afrikanischen Drosophiliden (Diptera). I. — Annales Historico-Naturales Musei Nationalis Hungarici 32: 1–57.
- Grimaldi, D.A., Quinter, E.L., & Nguyen, T. 2000. Fruit Flies as Ecological Indicators: Species Diversity and Abundance of Drosophilidae (Diptera) Along an Altitudinal Transect in the Parc National de Marojejy, Madagascar. — Fieldiana: Zoology 97(N.S.): 123–135.
- Hackman, W. 1960. Diptera (Brachycera): Camillidae, Curtonotidae and Drosophilidae. — In: Hansström, B., Brinck, P., & Rudebeck, G., (eds), South African Animal Life. Results of the Lund University Expedition in 1950–1951. Vol. 7, pp. 381–389. Almqvist & Wiksells.
- Lachaise, D. & Tsacas, L. 1983. Breeding-Sites in Tropical African Drosophilids. — In: Ashburner, M., Carson, H.L., & Thompson, J.N. (eds), The Genetics and Biology of *Drosophila*, vol. 3d, pp. 221–332. Academic Press.
- Lachaise, D., Harry, M., & Solignac, M. 1996. Affinités biogéographiques des Drosophilidae de Madagascar et des îles de l'Océan Indien. — In: Lourenço, W.R. (ed.), Biogéographie de Madagascar, pp. 467–478. Orstom, Paris.
- Malloch, J.R. 1925. Exotic Muscaridae (Diptera). - XVI. — Annals and Magazine of Natural History 16(Ser.9): 81–100.
- Malloch, J.R. 1929. Exotic Muscaridae (Diptera).- XXVII. — Annals and Magazine of Natural History 4(Ser.10): 249–257.
- McEvey, S.F., 1990. New species of *Scaptomyza* from Madagascar and Mauritius with a note on terminology (Diptera: Drosophilidae). — Annales de la Société entomologique de France (Nouv. série) 26(1): 51–64.
- McEvey, S.F., Aulard, S., & Ralisoa-Randrianasolo, O. 1989. An Australian drosophilid (Diptera) on *Eucalyptus* and *Eugenia* (Myrtaceae) flowers in Madagascar. — Journal of the Australian Entomological Society 28: 53–54.
- Paulian, R. 1950. Insectes utiles et nuisibles de la region de Tananarive. — 120 pp. Institut de Recherche scientifique.
- Séguy, E. 1932. Un drosophile commensal d'un cercopide de Madagascar. — Encyclopédie Entomologique 6 (Ser. B, Diptera): 93–94.
- Séguy, E. 1951. Dipteres mineurs de Madagascar. — Memoires de l'Institut scientifique de Madagascar 5 (Ser. A): 309–321.
- Sturtevant, A.H. 1921. The North American Species of *Drosophila*. — Carnegie Institute of Washington Publication 301: 1–150.
- Tsacas, L. 1972. Revision of the African Drosophilidae Described by Adams, Kahl and Curran. — University of Texas Publications 7213: 327–343.
- Tsacas, L. 1980. Family Drosophilidae. — In: Crosskey, R.W., (ed.), Catalogue of the Diptera of the

- Afrotropical Region. pp. 673-685, 1220. British Museum (Natural History).
- Tsacas, L. 1990. Drosophilidae de l'Afrique Australe (Diptera). — *Annals of the Natal Museum* 31: 103–161.
- Tsacas, L. & Chassagnard, M.-T. 1991. Diptera Drosophilidae de Nouvelle-Calédonie. 2. *Leucophenga*, *Mycodrosophila* et *Paramycodrosophila*, avec une note sur les genitalia de *Leucophenga*. — *Memoires du Muséum d'Histoire naturelle*, Paris 149a: 302–328.
- Vilela, C.R. & Bächli, G. 2000. Morphological and ecological notes on the two species of *Drosophila* belonging to the subgenus *Siphlodora* Patterson & Mainland, 1944 (Diptera, Drosophilidae). — *Mitteilungen der Schweizerischen Entomologischen Gesellschaft* 73: 23–47.

## APPENDIX

*Leucophenga* species so far recorded in the southern Afrotropical Region including the Malagasy area.

## La Réunion

*Leucophenga paracuthbertsoni* Bächli, 1971  
Lachaise *et al.* 1996

## Madagascar

*Leucophenga buxtoni* Duda, 1935

Lachaise *et al.* 1996

- 1 ♂: Madagascar Centre, Vakoana 1520m, Andringitra Ambalavao, 21–24.I.[19]58 B.Stuckenberg [Reg. M6215]  
1 ♀: Madagascar Est, Sainte-Luce 10m, dct Fort-Dauphin, 22–24.II.[19]58 B.Stuckenberg [Reg. M6239]

*Leucophenga cuthbertsoni* Malloch, 1929

Lachaise *et al.* 1996

- 2 ♂♂: Madagascar Centre, [Manjakatempo 1700m], dct Ambatolampy, 11–15.XII.[19]57 B.Stuckenberg [Reg. M6243, M6244]  
1 ♂: Madagascar Centre, Plateau Soaindrana 2060m, Andringitra-Ambalavao, 14–17.I.[19]58 B.Stuckenberg [Reg. M6245]  
1 ♀: Madagascar Centre, Anjavidilava 2020m, Andringitra Ambalavao, 17–21.I.[19]58 B.Stuckenberg [Reg. M6246]

*Leucophenga decaryi* (Séguy, 1932)

Séguy 1932; Paulian 1950; Lachaise & Tsacas 1983; Lachaise *et al.* 1996

*Leucophenga isaka* n. sp.

*Leucophenga ivontaka* n. sp.

*Leucophenga malgachensis* n. sp.

*Leucophenga mananara* n. sp.

*Leucophenga oedipus* Séguy, 1938

- 4 ♂♂, 1 ♀: Madagascar Sambirano, Lokobe Nossi-Bé 6m, 9–23.XI.[19]57 B. Stuckenberg [Reg. M6227, M6228, M6229, M6230, M6231]

*Leucophenga paracuthbertsoni* Bächli, 1971

Lachaise *et al.* 1996

- 1 ♂: Madagascar Centre, Anjavidilava 2020m, Andringitra Ambalavao, 17–21.I.[19]58 B.Stuckenberg



berg [Reg. M6240]

- 1 ♀ Madagascar Centre, Plateau Soaindrana 2060m, Andringitra-Ambalavao, 14–17.I.[19]58 B. Stuckenberg [Reg. M6241]

*Leucophenga perargentata* Bächli, 1971

- 1 ♂: Madagascar Est, Ambodivoangy 20m, dct Maroantsetra, 16–20.III.[19]58 B. Stuckenberg [Reg. M6232]

*Leucophenga pleurovirgata* Bächli, 1971

- 1 ♀: Madagascar Est, Ivontaka 15m, dct Mananara, 10–14.III.[19]58 B. Stuckenberg [Reg. M6234]

*Leucophenga ranohira* n. sp.

*Leucophenga scaevolaevora* (Séguy, 1951)

Séguy 1951; Lachaise *et al.* 1996

## Malawi

*Leucophenga disjuncta* Bächli, 1971

- 1 Ex.: MALAWI Ntchisi forest, reserve 1334Ac 1500m, Londt & Stuckenberg, 3–4.xii.1980 Montane, forest & woodland [Reg. M6645]

*Leucophenga mansura* (Adams, 1905)

Chassagnard *et al.* 1997

*Leucophenga palpalis* (Adams, 1905)

- 1 ♀: MALAWI Zomba 1535Ad, 24–27.xi.1980 1100m, Londt & Stuckenberg [Reg. M6637]

*Leucophenga paracapillata* Bächli, 1971

- 1 ♀: MALAWI Zomba 1535Ad, 24–27.xi.1980 1100m, Londt & Stuckenberg [Reg. M6636]

*Leucophenga paraflaviseta* Bächli, 1971

- 1 ♂: MALAWI Viphyta Mtns, Chikangawa 1133Dd, 5–8.xii.1980 1700m, Stuckenberg & Londt, forest edge & grassland [Reg. M6649]

*Leucophenga proxima* (Adams, 1905)

Chassagnard *et al.* 1997

- 1 ♂: MALAWI Kasungu Nat., Park Lifupa Camp, 1333Aa 9–10.xii.1980, 1000m Stuckenberg & Londt Brachystegia [Reg. M6652]

- 1 ♂: MALAWI Zomba 1535Ad, 24–27.xi.1980 1100m, Londt & Stuckenberg [Reg. M6635]

*Leucophenga subpollinosa* (de Meijere, 1914)

Chassagnard *et al.* 1997

## Mauritius

*Leucophenga paracuthbertsoni* Bächli, 1971

David & Tsacas 1975

## Mozambique

*Leucophenga cuneata* Bächli, 1971

Tsacas 1980

*Leucophenga curvipila* Duda, 1939

Bächli 1971

*Leucophenga dentata* Bächli, 1971

- 1 ♂: Tumbine Mountain, Milange Port East Africa, July 1957, B. & P. Stuckenberg [B6285]

*Leucophenga flavopuncta* Malloch, 1925

- 1 ♀: Gorongoza Mountain, Manica-Sofala Dist, Port. East Africa, 840 m, gallery forest, Sept. 1957, Stuckenberg [B5046]

*Leucophenga perargentata* Bächli, 1971

- 1 ♂: Luabo, Mozambique, Jan. 1956, P. Ushe. [B6279]

- 1 ♀: near Machipanda, Mozambique, 19 Jan. 1956, B.R.S. P.G. [B6282]

*Leucophenga proxima* (Adams, 1905)

- 2 ♂♂, 1 ♀: Luabo, Lower Zambesi River, Port East Africa, ix.1957, P.J. Usher [B5031, B5034, B5036]

- 1 ♂: Tumbine Mountain, Milange Port East Africa, July 1957, B. & P. Stuckenberg [B5035]

*Leucophenga sierraleonica* Bächli, 1971

Tsacas 1980

## Namibia

*Leucophenga mutabilis* (Adams, 1905)

- 2 ♂♂: SOUTH WEST AFRICA 2315Ca, Namib desert Park, Kuiseb, River at Gobabeb, 400m, 12.II.1974, M.E. & B.J. Irwin, riverine forest and sand [Reg. M6493, M6494]

## Seychelles

*Leucophenga grossipalpis* (Lamb, 1914)

Bächli 1971; Lachaise *et al.* 1996

*Leucophenga sericea* (Lamb, 1914)

Bächli 1971; Lachaise *et al.* 1996

## South Africa

*Leucophenga apicifera* (Adams, 1905)

- 1 ♂: Inchanga, Natal, South Africa, 7 July 1954, B. Stuckenberg [B6291]

- 1 ♀: St. Heller Est., near Hillcrest, Natal, South Africa, 20 Dec. 1954, B. Stuckenberg [B6292]

*Leucophenga atra* Bächli, 1971

- 1 ♀: Port St. Johns dist, coastal forest E. Cape Prov, 16–17 Oct. 1959, B. & P. Stuckenberg. [B5053]

- 1 ♀: Royal Natal National Park, Drakensberg Mts., B. & P. Stuckenberg, from montane forest, 11.IX.[19]63, 1530m [B5055]

- 1 ♀: Cathedral Peak, Natal area, South Africa, 1.i.1954, B. Stuckenberg; in indigenous forest [B5056]

- 1 ♀: near Lilani, Ahrens district, Natal, S. Africa, B. & P. Stuckenberg, April 1962 [B5057]

- 1 ♀: Port St. Johns dist, coastal forest E. Cape Prov, 20–25 Nov. 1961, B. & P. Stuckenberg [B5058]

- 1 ♀: Town Bush, Pietermaritzburg, South Africa, B. & P. Stuckenberg, 12 Dec. 1961 [date on label verso] [B5059]

*Leucophenga basilaris* (Adams, 1905)

- 2 ♂♂: Lions Bush, Nottingham, Natal, South Africa, 9 Aug. 1954, B. Stuckenberg [B5044, B5043]

- 3 ♂♂: Lions Bush, Nottingham, Natal, South Africa, 9 Aug. 1954, B. Stuckenberg; in indigenous forest [B5042, B5041, B5040]

- 1 ♂: S.AFRICA: E.Transvaal, 5km w. Sabie 2530BB, Lone Creek River, XII 5,1976. R. Miller [Reg. M6545]

- 1 ♂: S.AFRICA:E.Transvaal, 25km ne Ohrigstad, Echo Caves 2430DA, XII 6–7,1976. R. Miller, Sewage-seepage area [Reg. M6551]

- 1 ♂: SOUTH AFRICA: Natal, Pongolo Bush Nat. Res., 27°59'20"S 29°42'25"E, Montane Podocarpus, Forest margins 1580m, J.G.H. Londt 20.iv.1988 [Reg. M6691]

*Leucophenga buxtoni* Duda, 1935

- 1 ♂: Nhlavini River, Ixopo Dist, Natal S. Africa, 17 March 1957, B.R. Stuckenberg [B6286]

*Leucophenga caliginosa* Bächli, 1971

- 1 ♂, 1 ♀: Lions Bush, Nottingham, Natal, South Africa, 9 Aug. 1954, B. Stuckenberg; in indigenous

forest [B5088, B6260]

- 1 ♀: Oribi Gorge Reserve, Umzimkulwana Valley, Natal, South Africa, 21–28 Nov. 1960, B & P Stuckenberg [B5087]
- 1 ♀: Hogsback North of Alice, E Cape Province, South Africa, 2–3 November 1954, B & P Stuckenberg [B5086]
- 1 ♀: Kleinemonde, South Africa, 9.x.1953, B. Stuckenberg [B6261]
- 1 ♀: near Lilani, Ahrens district, Natal, S. Africa, B. & P. Stuckenberg, April 1962 [B6259]
- 1 ♀: Doornkloof Forest Reserve, Alexandria Dist, 11.12.67 2633CB, B & P Stuckenberg [B6257]
- 1 ♀: SO. AFRICA: CAPE PROV., 15km W. Alexandria, 3. XI. 1978 3326CA, J. Londt & R. Miller, hillside vegetation [Reg. M6597]

*Leucophenga cuneata* Bächli, 1971

Bächli 1971; Tsacas 1990

- 2 ♂♂: SOUTH AFRICA: Natal, Pongolo Bush Nat. Res., 27°59'20"S 29°42'25"E, Montane Podocarpus, Forest margins 1580m, J.G.H. Londt 20.iv.1988 [Reg. M6687, M6696]

*Leucophenga curvipila* Duda, 1939

Bächli 1971

- 1 ♂: Cape Province, Somerset East, 23–31.xii.1930, S. Africa, R.E. Turner, Brit. Mus., 1931–61 [B5200]
- 1 ♀: Natal, Weenen, iii–iv.1924, H.P. Thomasset [B5251]
- 2 ♂♂, 2 ♀♀: S. Africa, Durban Natal, vii.1948, J.C. Faure, ARI Pretoria [B5310, B5311, B5312, B5314]
- 1 ♂: seashore, Natal, S. Africa, B. & P. Stuckenberg, coastal bush, La Mercy, Umhloti, 24.7.1963 [B6269]

*Leucophenga cuthbertsoni* Malloch, 1929

Bächli 1971

*Leucophenga dudai* Bächli, 1971

Bächli 1988

- 1 ♂: South Africa, Natal Prov, Drakensberg Mts. (2929Ad), Giants Castle Reserve, Oct. 18, 1971 5800 ft. B.R. Stuckenberg & M.E. Irwin [B5063]
- 1 ♀: Royal Natal National Park, Drakensberg Mts., B. & P. Stuckenberg, from montane forest, 11.ix.[19]63, 1530m [B078]
- 1 ♂: South Africa, Natal, Pietermaritzburg, Oct. 12, 1971, M.E. Irwin (2930Cb) [B5064]
- 1 ♂: Oribi Gorge Reserve, Umzimkulwana Valley, Natal, South Africa, B. & P. Stuckenberg, 21–28 November 1960 [B5069]
- 1 ♀: Inchanga, Natal, South Africa, 7 July 1954, B. Stuckenberg [B5072]
- 1 ♂: Royal Natal National Park, Drakensberg Mts., B. & P. Stuckenberg, from montane forest, 16.ix.[19]63, 1500m [B5065]
- 1 ♂, 4 ♀♀: Royal Natal National Park, Drakensberg Mts., B. & P. Stuckenberg, from montane forest, 12.ix.[19]63, 1500m [B5068, B5073, B5075, B5076, B5077]
- 3 ♂♂, 2 ♀♀: Giants Castle Res., Natal Drakensberg, S. Africa 5800 ft., B. & P. Stuckenberg, 18–23 Sept. 1961 [B5066, B5067, B5071, B5074, B5079]

*Leucophenga ferrari* sp. nov.

*Leucophenga flaviseta* (Adams, 1905)

Bächli 1971

- 1 ♀: S. Africa, Durban Natal, vii.1948, J.C. Faure, ARI Pretoria [B5315]

*Leucophenga flavopuncta* Malloch, 1925

Malloch 1925; Bächli 1971

- 1 ♂: Royal Natal National Park, Drakensberg Mts., B. & P. Stuckenberg, from montane forest, 16.ix.[19]63, 1500m [B5045]
- 1 ♀: Hilton Road, Natal, South Africa, 21.x.1956, P. Graham [B5047]
- 1 ♀: Ingeli Forest, Kokstad Dist, Griqualand East, 17 Oct. 1959, B. & P. Stuckenberg [B5048]

*Leucophenga goodi* (Adams, 1905)

Hackman 1960 (as yaure Burla, 1951)

*Leucophenga kilembensis* Bächli, 1971

Tsacas 1990

- 1 ♂: Mont-aux-Sources, South Africa: Natal, Tugela Gorge, Date: 4 Jan. 1983, Coll: B.R. Stuckenberg [Reg. M6668]

*Leucophenga londti* n. sp.

*Leucophenga magnornata* Bächli, 1971

Bächli 1971; Tsacas 1990

*Leucophenga mansura* (Adams, 1905)

Bächli 1971

- 1 ♂: Town Bush, Pietermaritzburg, South Africa, B. & P. Stuckenberg, 27 Dec. 1961 [date on label verso] [B5039]  
 1 ♂: TRANSKEI: N The Haven, 24–25.VI.1979.3228Bb, R. Miller & P. Stabbins; indig. coastal bush [Reg. M6615]  
 1 ♀: SOUTH AFRICA: Natal, Pongolo Bush Nat. Res., 27°59'20"S 29°42'25"E, Montane Podocarpus, Forest margins 1580m, J.G.H. Londt 20.iv.1988. [Reg M6694]

*Leucophenga muden* n. sp.

*Leucophenga munroi* Duda, Duda, 1939

Tsacas 1980

*Leucophenga mutabilis* (Adams, 1905)

- 1 ♂: Dukuduku between St Lucia & Matubatuba, Zululand, S. Africa, B. & P. Stuckenberg, 7–8 April 1960 [B6268]  
 1 ♂: Gillitts, 21.xi.[19]63, Pinetown district, Natal, S. Africa, B. & P. Stuckenberg [B6267]

*Leucophenga neovittata* Bächli, 1971

- 1 ♂: Royal Natal National Park, Drakensberg Mts., B. & P. Stuckenberg, from montane forest, 13.ix.[19]63, 1500m [B6266]  
 1 ♂: Royal Natal National Park, Drakensberg Mts., B. & P. Stuckenberg, from montane forest, 16.ix.[19]63, 1500m [B6265]  
 1 ♂: Inchanga, Natal, South Africa, 7 July 1954, B. Stuckenberg [B6264]  
 1 ♂: near Lilani, Ahrens district, Natal, S. Africa, B. & P. Stuckenberg, April 1962 [B6263]  
 1 ♂: Gladdespruit River, nr Nelspruit Airfield, 2530DB Transvaal 2975 ft, 3 November 1970, Stuckenberg, streamside bush [B6262]

*Leucophenga nigrorbitata* Bächli, 1971

- 1 ♂: Karreedouw Mountains near Assegaaibos Humansdorp District, Cape Province, 28 October 1964, B. & P. Stuckenberg [B5060]

*Leucophenga palpalis* (Adams, 1905)

- 1 ♀: Gillitts, Pinetown district, Natal, S. Africa, B. & P. Stuckenberg, 1.x.1961 [B6271]  
 1 ♀: Gillitts, Pinetown district, Natal, S. Africa, B. & P. Stuckenberg, 20.xii.1961 [B6273]  
 1 ♀: Umhlanga Bush, near Durban, Natal, South Africa, Feb. 1967, B. & P. Stuckenberg [B6274]  
 1 ♀: S.AFRICA: E. Transvaal, Ofcolaco 2430AB, Selati River, XII 7–8, 1976. R. Miller [Reg. M6555]  
 1 ♂, 5 ♀: Dukuduku between St Lucia & Matubatuba, Zululand, S. Africa, B. & P. Stuckenberg, 7–8 April 1960 [B6270, B6275, B6276, B6277, B6278, B6272]

*Leucophenga paracuthbertsoni* Bächli, 1971

- 1 ♀: SO.AFRICA: Univ.Natal, Ukulinga Res.Frm, 10km, SE Pietermaritzburg, 26.3.1981 grassland, R.M. Miller [Reg. M6655]

*Leucophenga paraflaviseta* Bächli, 1971

- 1 ♂: Lions Bush, Nottingham, Natal, South Africa, 9 Aug. 1954, B. Stuckenberg; in indigenous forest [B5083, B5082, B5081]  
 1 ♂: STH AFRICA: Transvaal, Mariepskop area, Klaserie River lower, reaches 2430DB, 18. ix. 1986 J. Londt; riverine forest [Reg. M6683]

- 1 ♀: S.AFRICA: E. Transvaal, 9km n. Graskop, Lisbon Falls 2430DD, XII 6,1976. R. Miller [Reg. M6549]  
 1 ♂: SOUTH AFRICA: Natal, 20km w. Tugela Ferry, 26–27. II. 1977 2830CA, Raymond M. Miller, Malaise trap [Reg. M6567]  
 1 ♂: SOUTH AFRICA: Natal, Pietermaritzburg, Town Bush. April 1976, R. Miller. Malaise trap [Reg. M6513]

*Leucophenga perargentata* Bächli, 1971

- 1 ♀: Oribi Gorge Reserve, Umzimkulwana Valley, Natal, South Africa, B. & P. Stuckenberg, 21–28 November 1960 [B6284]  
 1 ♂: South Africa, Natal, Pietermaritzburg, 4.v.[19]72, M.E. Irwin (2930Cb) [B6281]  
 1 ♂: S. AFRICA: E. Transvaal, 9km n. Graskop, Lisbon Falls 2430DD, XII 6,1976. R. Miller [Reg. M6548]  
 1 ♀: S. AFRICA: E. Transvaal, 25km ne Ohrigstad, Echo Caves 2430DA, XII 6–7,1976. R. Miller; sewage-seepage area [Reg. M6552]  
 1 ♂: SO. AFRICA: CAPE PROV. 1km NW. Somerset East, 3225DA 28–29. X. 1978, J. Londt & R. Miller, Picnic area stream [Reg. M6596]  
 1 ♀: SOUTH AFRICA. Transvaal, Zoutspansberg Range 23°00S 30°, 14E Entabeni Forestry Station, Vera Kop Forest, c 1350m 15-I-1974 Stuckenberg [Reg. M6472]

*Leucophenga pleurovirgata* Bächli, 1971

- 1 ♂, 1 ♀: Dlinza Forest, Eshowe, Zululand, South Africa, B. & P. Stuckenberg, 5–6 April 1960 [B5051, B5052]  
 1 ♀: Port St. Johns dist, coastal forest E. Cape Prov, 20–25 Nov. 1961, B. & P. Stuckenberg [B5050]  
 1 ♀: South Africa, Natal, Eshowe Dlinza Forest, Reserve 450m 2831Cd, J.G.H. Londt 6.xii.1977 [Reg. M6585]  
 1 ♂: SOUTH AFRICA. Transvaal, Kruger Park 9-XII-1972, Sabie River 4km E Skukuza, Ficus gallery forest, B & P Stuckenberg 2431Dc [Reg. M6431]

*Leucophenga proxima* (Adams, 1905)

Duda 1939; Bächli 1971

- 1 ♂: Dukuduku between St Lucia & Matubatuba, Zululand, S. Africa, B. & P. Stuckenberg, 7–8 April 1960 [B5033]

*Leucophenga repletoides* Bächli, 1971

- 1 ♀: TRANSKEI: N The Haven, 24–25. VI. 1979. 3228Bb, R. Miller & P. Stabbins, indig. coastal bush [Reg. M6613]

*Leucophenga stuckenbergi* n. sp.

*Leucophenga subpollinosa* (de Meijere, 1914)

Duda 1939; Bächli 1971

*Leucophenga subvirgata* Bächli, 1971

- 1 ♀: Dlinza Forest, Eshowe, Zululand, South Africa, B. & P. Stuckenberg, 5–6 April 1960 [B5049]

*Leucophenga subvittata* Duda, 1939

Bächli 1971

## Swaziland

*Leucophenga basilaris* (Adams, 1905)

- 1 ♂: SWAZILAND 2531CC, 4km e. Havelock, Mokomaana River, XI 30,1976 R. Miller [Reg. M6534]

## Zambia

*Leucophenga perargentata* Bächli, 1971

- 1 ♀: Abercorn, N. Rhodesia, C. Smithers, 23.iv.1957 [B6283]

## Zimbabwe

*Leucophenga apicifera* (Adams, 1905)

Adams 1905; Collart 1939; Duda 1939; Bächli 1971

*Leucophenga atra* Bächli, 1971

1 ♀: N. Vumba, S. Rhodesia, 20 Jul. 1964, D. Cookson [B5054]

*Leucophenga basilaris* (Adams, 1905)

Adams 1905; Collart 1939; Bächli 1971; Tsacas 1972

*Leucophenga buxtoni* Duda, 1935

Tsacas 1980

*Leucophenga caliginosa* Bächli, 1971:

1 ♂: Vumba Mount., near Umtali, S. Rhodesia, 18 Jan. 1955, B.R.S. & P.G. [B5085]

1 ♀: Nyachowa Falls, near Umtali, S. Rhodesia, 16 Jan. 1955, B.R.S. P.G. [B6258]

*Leucophenga cuneata* Bächli, 1917

Tsacas 1990

*Leucophenga cuthbertsoni* Malloch, 1929

Malloch 1929; Collart 1939; Bächli 1971

*Leucophenga dudai* Bächli, 1971

1 ♂: Rhodes-Inyanga National Park, S. Rhodesia, 13 Jan. 1955, B.R.S. P.G. [B5070]

*Leucophenga flaviseta* (Adams, 1905)

Adams 1905; Collart 1939; Bächli 1971

*Leucophenga mansura* (Adams, 1905)

Adams 1905; Bächli 1971

1 ♂: Penhalonga near Umtali, S. Rhodesia, 17 Jan. 1955, B.R.S. P.G. [B5038]

*Leucophenga mutabilis* (Adams, 1905)

Adams 1905; Collart 1939; Duda 1939; Bächli 1971

*Leucophenga neovittata* Bächli, 1971:

2 ♂♂: Salisbury [Rhodesia], 10.6.[19]56, C.N.S.[mithers] [Reg. M6421, M6422]

*Leucophenga palpalis* (Adams, 1905)

Adams 1905; Collart 1939; Bächli 1971

*Leucophenga paracuthbertsoni* Bächli, 1971

Bächli 1971

1 ♀: N. Vumba, S. Rhodesia, 25.3.1965, D. Cookson [Reg. M6429]

*Leucophenga perargentata* Bächli, 1971

1 ♂: Rhodes-Inyanga National Park, S. Rhodesia, 13 Jan. 1955, B.R.S. P.G. [B6280]

*Leucophenga proxima* (Adams, 1905)

Adams 1905; Bächli 1971

1 ♂, 1 ♀: Vumba Mount., near Umtali, S. Rhodesia, 18 Jan. 1955, B.R.S. & P.G. [B5032, B5037]

*Leucophenga subpollinosa* (de Meijere, 1914)

Duda 1939

*Leucophenga subvittata* Duda, 1939

2 ♂♂, 1 ♀: N. Vumba, S. Rhodesia, 20. 5. 1964, D. Cookson [B6287, B6288, B6290]

1 ♂: N. Vumba, S. Rhodesia, 25. 5. 1964, D. Cookson [headless] [B6289]

*Leucophenga umbrosa* Bächli, 1971



1 ♀: N. Vumba, S. Rhodesia, 25. 5. 1964, D. Cookson [B5080]

## CAPTIONS

Fig. 1. Male terminalia, left lateral views. A, *Leucophenga ferrari* n. sp., holotype, external parts; B, *Leucophenga ferrari* n. sp., holotype, internal parts; C, *Leucophenga isaka* n. sp., holotype; D, *Leucophenga ivontaka* n. sp., holotype; E, *Leucophenga londti* n. sp., holotype; F, *Leucophenga mananara* n. sp., holotype; G, *Leucophenga ranohira* n. sp., holotype.

Fig. 2. Internal male terminalia of *Leucophenga ferrari* n. sp. A, aedeagus, inner paraphysis and dorsal arch (anterior region omitted); B, hypandrium, aedeagal apodeme, and outer paraphysis.

Fig. 3. Internal male terminalia of *Leucophenga isaka* n. sp. A, aedeagus, inner paraphysis and dorsal arch; B, hypandrium, aedeagal apodeme, and outer paraphysis.

Fig. 4. Internal male terminalia of *Leucophenga ivontaka* n. sp. A, aedeagus, inner paraphysis and dorsal arch; B, hypandrium, aedeagal apodeme, and outer paraphysis.

Fig. 5. Internal male terminalia of *Leucophenga londti* n. sp. A, aedeagus, inner paraphysis and dorsal arch; B, hypandrium, aedeagal apodeme, and outer paraphysis.

Fig. 6. Male terminalia of *Leucophenga malgachensis* n. sp., left lateral views, showing three subsequent steps, from A through C, of aedeagus extrusion. A, paratype Reg. M6220, aedeagus not extruded; B, paratype Reg. M6223, aedeagus semiextruded; C, holotype (ejaculatory apodeme included), aedeagus completely extruded.

Fig. 7. Internal male terminalia of *Leucophenga malgachensis* n. sp. A, aedeagus, inner paraphysis and dorsal arch; B, hypandrium, aedeagal apodeme, and outer paraphysis.

Fig. 8. Internal male terminalia of *Leucophenga mananara* n. sp. A, aedeagus, inner paraphysis and dorsal arch; B, hypandrium, aedeagal apodeme, and outer paraphysis.

Fig. 9. Male terminalia, left lateral views. A, *Leucophenga muden* n. sp., holotype. B–G, *Leucophenga stuckenbergi* n. sp., showing aedeagus extrusion in subsequent steps, from B through G. B, paratype B5062, Karkloof range, aedeagus non extruded; C, paratype M6589; D, paratype M6686, Pongolo Bush National Reserve; E, paratype M6693, Pongolo Bush National Reserve; F, paratype B6317, Royal Natal National Park; G, holotype, aedeagus completely extruded.

Fig. 10. Internal male terminalia of *Leucophenga muden* n. sp. A, aedeagus, inner paraphysis and dorsal arch; B, hypandrium, aedeagal apodeme, and outer paraphysis.

Fig. 11. Internal male terminalia of *Leucophenga ranohira* n. sp. A, aedeagus, inner paraphysis and dorsal arch; B, hypandrium, aedeagal apodeme, and outer paraphysis.

Fig. 12. Internal male terminalia of *Leucophenga stuckenbergi* n. sp. A, aedeagus, inner paraphysis and dorsal arch; B, hypandrium, aedeagal apodeme, and outer paraphysis.