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The genus *Elaphopsocus* Roesler (Psocodea: 'Psocoptera': Psocidae) with six new species from Brazil and Colombia

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Abstract

Six new species of *Elaphopsocus* Roesler from Brazil and Colombia are described and illustrated. Revised generic diagnoses are provided for *Elaphopsocoides* and *Elaphopsocus*; based on the structure of the male hypandrium and phallosome three species groups are recognized in *Elaphopsocus*.

Key words: *Elaphopsocus*, *Elaphopsocoides*, Colombia, Brazil, Neotropics

Introduction

The family Psocidae includes over 900 described species in 80 genera. It is the largest and most diverse family within the Psocodean suborder Psocomorpha (Yoshizawa & Johnson 2008). About 100 species belonging to the family have been described in Colombia and Brazil, 22 and 88 species respectively, rather small numbers in relation to the total number of species described in the family (García Aldrete & Mockford 2009; Lienhard & Smithers 2002; Román-P. *et al.* 2014). Thus, the lack of knowledge is evident in the alpha taxonomy of Psocidae in the Neotropics, where a high diversity of 'Psocoptera' has been documented recently (González-Obando *et al.* 2011; García Aldrete *et al.* 2012; Casasola-González *et al.* 2013; Román-P. *et al.* 2014; Saenz-Manchola *et al.* 2014; Calderón-Martínez *et al.* 2014; García Aldrete *et al.* 2014; García Aldrete & Silva Neto 2014). This contrasts with the diversity of psocids recorded in other latitudes (*e. g.* El-Hawagry *et al.* 2013; Liu *et al.* 2014).

More than 70 years have passed since the description by Roesler (1940) of the single species assigned to *Elaphopsocus*, and this was based on two males from Brazil. Here we provide information on females for the first time, re-diagnose the genus and distinguish it from *Elaphopsocoides* Román-P., García Aldrete & González, and present a scheme of classification based on the male hypandrium and phallosome.

Material and methods

We studied thirteen specimens of six species of *Elaphopsocus*; ten of them were dissected in 75% ethanol. The head, terminalia, and right wings and legs were mounted on slides in Canada balsam. Measurements (in microns) were taken using an ocular micrometer mounted on a Nikon Eclipse microscope. Color was recorded by placing whole specimens, before dissection, under a microscope illuminated with cold white light at 40X. The illustrations were made from photographs taken with a Canon T3i and Helicon Focus program and processed in a vector graphics editor CorelDraw X7.

Abbreviations for lengths of parts measured are as follows: FW: right forewing; HW: right hindwing; F: Femur of right hind leg; Mx4: fourth segment of right maxillary palpus; f1...fn: flagellomeres 1...n of right antenna; IO: minimum distance between compound eyes in dorsal view of head; D and d: antero-posterior diameter and

transverse diameter, respectively, of right compound eye; PO: d/D. The types are deposited in the Entomological Museum of the Universidad del Valle, Santiago de Cali, Colombia (MUSENUV), Coleção de Invertebrados, INPA, Manaus, Amazonas, Brazil and in the Laboratório de Sistemática de Insetos, Departamento de Ciências Biológicas, Universidade Estadual de Feira de Santana, Bahia, Brazil, as indicated in each description.

***Elaphopsocoides* Román-P., García Aldrete & González**

Elaphopsocoides Román-P., García Aldrete & González, 2014: 94. Type species: *E. colombiensis* Román-P., García Aldrete & González.

This genus of two species was assigned to the subfamily Amphigerontiinae *sensu* Lienhard & Smithers (2002) and Yoshizawa *et al.* (2011). It differs from *Elaphopsocus* as follows: forewing pattern with cells m1 and m2 mostly hyaline (except for details in forewing pattern of *Elaphopsocus glaphyrostigma* Roesler; compare Figs 3 and 17, in Román-P. *et al.*, 2014, with Fig. 50 in this paper). Hypandrium with a large posterior process in the middle, and postero-lateral corners with 2–3 posterior projections. Phallosome with side struts clearly independent, with large, distally pointed projections, mesally on inner side; external parameres slender, distally rugose, not forming an arch; aedeagal arms stout, distally dilated, rugose. Subgenital plate and gonapophyses essentially as in *Elaphopsocus*, but with v3 bearing a posterior process.

Comment. This genus is the sister genus to *Elaphopsocus*. The above diagnosis is presented to discriminate the two genera unequivocally.

***Elaphopsocus* Roesler**

Elaphopsocus Roesler, 1940: 239. Type species: *Elaphopsocus glaphyrostigma* Roesler, by monotypy. The etymology of the genus name (Elaphos means deer, in Greek) refers to the external parameres being antler-like.

Roesler diagnosed the genus in four lines, utilizing male forewing, hypandrium and phallosome characters. The information provided by the species described below allows the following expanded generic diagnosis: forewings with a distinct, variable pigmented pattern (Figs 3, 9, 13, 16, 22, 28, 34, 38, 47, 50, 52, 53, 54); pterostigma much wider posteriorly, with posterior angle decidedly extended towards Rs. Areola postica with sides slightly convex, with a short crossvein between its apex and M. Hypandrium broad, with posterior border either straight, with postero-lateral corners rounded, not projected posteriorly, or with posterior border straight, convex or concave, with postero-lateral corners projected into a short or long extension. Phallosome with side struts anteriorly fused or independent. Aedeagus forming an arch or with aedeagal arms separate. External parameres simple, or complex, branched antler like, as in the type species. Male paraprocts with a distinct mesal or posterior prong. Female subgenital plate broad, with a median process, straight posteriorly. Gonapophyses: v1 long, slender, distally acuminate, v2 broad, with an acuminate distal process, v3 broad, bearing setae posteriorly, lacking posterior lobe.

Key to the species of *Elaphopsocus* [males]

1. Hypandrium simple, without posterior projections. 2
- Hypandrium bearing a long posterior projection on each side (Figs 48, 49). *E. roesleri* n. sp.
2. Posterior angle of pterostigmal apex not rounded, "v" shaped (Fig. 52). 3
- Posterior angle of pterostigmal apex rounded (Fig. 53). 5
3. Aedeagal arch straight posteriorly (Fig. 36). Epiproct with a field of papillae posteriorly. Clunium with a field of papillae over the area of the epiproct (Fig. 33). *E. bahianus* n. sp.
- Aedeagal arms not forming an arch. Clunium and epiproct not papillose. 4
4. Aedeagal arms bent in the middle at an angle of 90°; phallobase more than half the length of the phallosome (Fig. 30) *E. rayoi* n. sp.
- Aedeagal arms bent distally at an angle of about 50°; phallobase less than half the length of the phallosome (Fig. 18) *E. gorrones* n. sp.
5. Phallosome with aedeagal arms deeply cleft. External parameres sigmoid (Fig. 41). *E. amazonicus* n. sp.

- Phallosome with external parameres slender or dilated distally 6
- 6. Phallosome with external parameres antler-like (Fig. 51) *E. glaphyrostigma* Roesler
- Phallosome with external parameres dilated posteriorly, bearing on inner side a hook like projection (Fig. 5) *E. nasa* n. sp.

Species groups of *Elaphopsocus*

The following species groups are proposed for these seven species based on the structure of the male hypandrium and phallosome:

Group I. Hypandrium posteriorly straight, postero-lateral corners not projected posteriorly. Phallosome fused anteriorly, aedeagal arch complete, or with arms separate; external parameres slender or robust. Species included: *E. glaphyrostigma* Roesler, *E. bahianus* n. sp. (Brazil).

Group II. Hypandrium posteriorly straight or slightly concave; postero-lateral corners projected posteriorly as short or mid length extensions. Phallosome fused anteriorly, or with proximal ends of side struts slightly separated. Aedeagal arms long, slender, not forming an arch. Species included: *E. nasa* n. sp., *E. gorrones* n. sp., *E. rayoi* n. sp., and *E. amazonicus* n. sp. (Brazil and Colombia).

Group III. Hypandrium posteriorly convex, with postero-lateral corners projected posteriorly to form long, slender, acuminate extensions. Phallosome with side struts separate proximally, aedeagal arms stout, of mid length. Species included: *E. roesleri* n. sp. (Colombia).

***Elaphopsocus nasa* n. sp.**

(Figs 1–13, 53)

Diagnosis. Hypandrium posteriorly concave in the middle, with slender projections limiting the concavity (Fig. 6). Phallosome fused anteriorly, side struts slender, aedeagal arms stout, curved, acuminate; external parameres dilated posteriorly, each bearing a stout, hook-like projection distally, directed outwards (Fig. 5). Subgenital plate with distal process stout, posteriorly straight, mesally with a pointed apophysis on each side (Fig. 12). Ninth sternum obtusely concave anteriorly (Fig. 11).

Male. Color (in 80% ethanol). Body light brown. Compound eyes black, ocelli hyaline, with ochre centripetal crescents. Dark brown banding pattern next compound eyes. Frontal, fronto-genal, and fronto-clypeal sulci dark brown, postclypeus with brown bands as illustrated (Fig. 1). Genae creamy. Antennae pale brown, scape unpigmented. Maxillary palpomeres dark brown. Coxae, trochanter, femora and tarsi brown, tibiae white. Forewing pattern (Fig. 3), with dark brown spots basally, to the discal cell, and light brown spots over a hyaline background distally. Pterostigma with small brown spots. Veins brown (Fig. 3). Hindwing (Fig. 4), almost hyaline, with cell CuP light brown. Abdomen uniformly light brown; hypandrium more strongly pigmented distally.

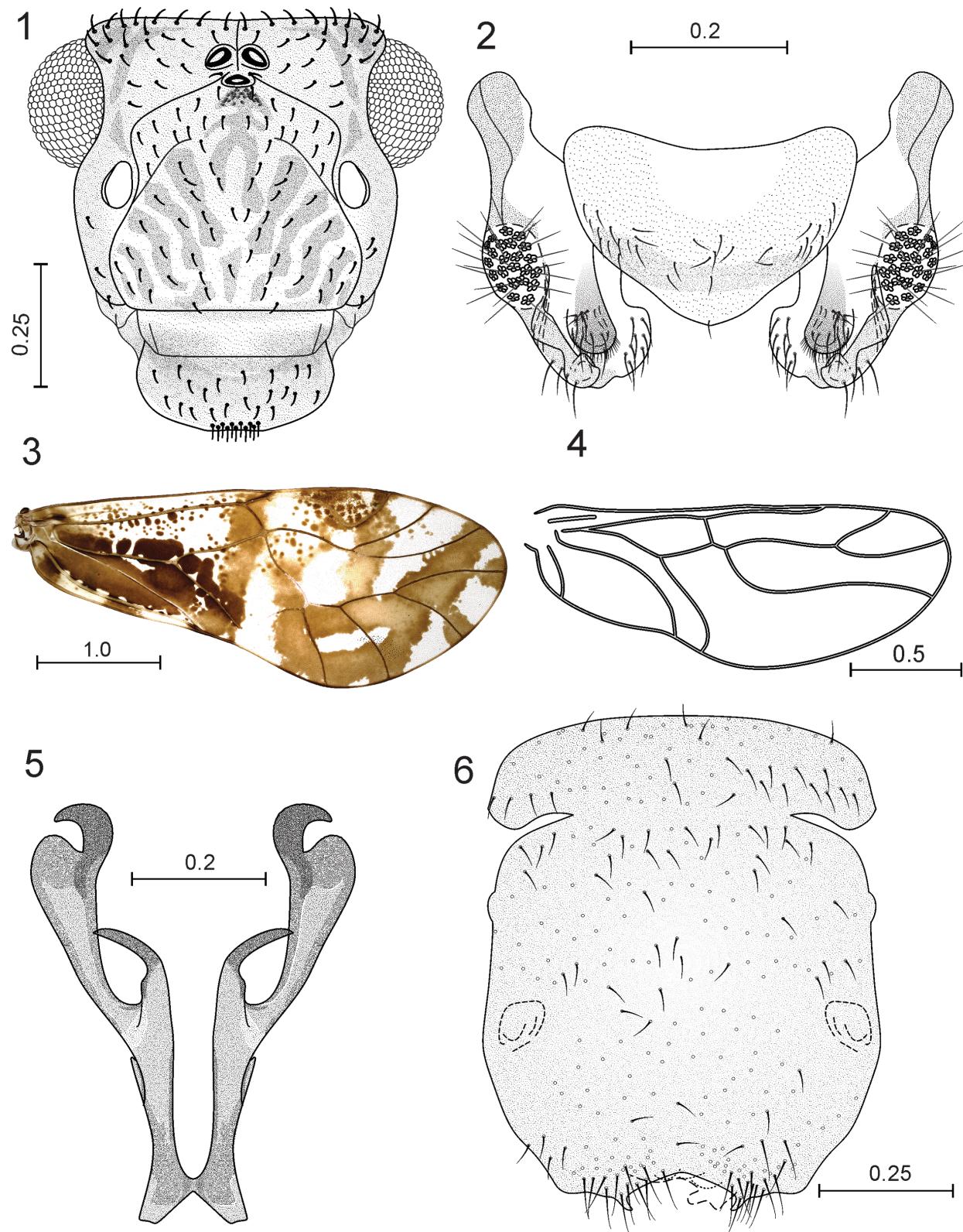
Morphology. As in diagnosis, plus the following: vertex slightly concave, with compound eyes not reaching the level of vertex (Fig. 1). Pterostigma rounded distally, slightly extended posteriorly towards Rs-M (Fig. 3). Cell m wide, almost rectangular, crossvein between areola postica and M very short. Hypandrium broad, almost quadrangular, phallosome elongate, slightly fused anteriorly (Fig. 5). Paraprocts elongate, marginally sclerotized, with an elongate anterior “handle”, and a posterior stout prong (Fig. 2). Sensory fields with 32–34 trichobothria in penta-lobed basal rosettes. Epiproct broadly semicircular, slightly convex anteriorly, marginally sclerotized, with setal field on distal third (Fig. 2).

Measurements (in microns). FW: 4275, HW: 3550, IO: 540, D: 170, d: 250, IO/d: 2.16, Mx4: 200, f1: 670, f2: 480, f3: 400, PO: 1.47.

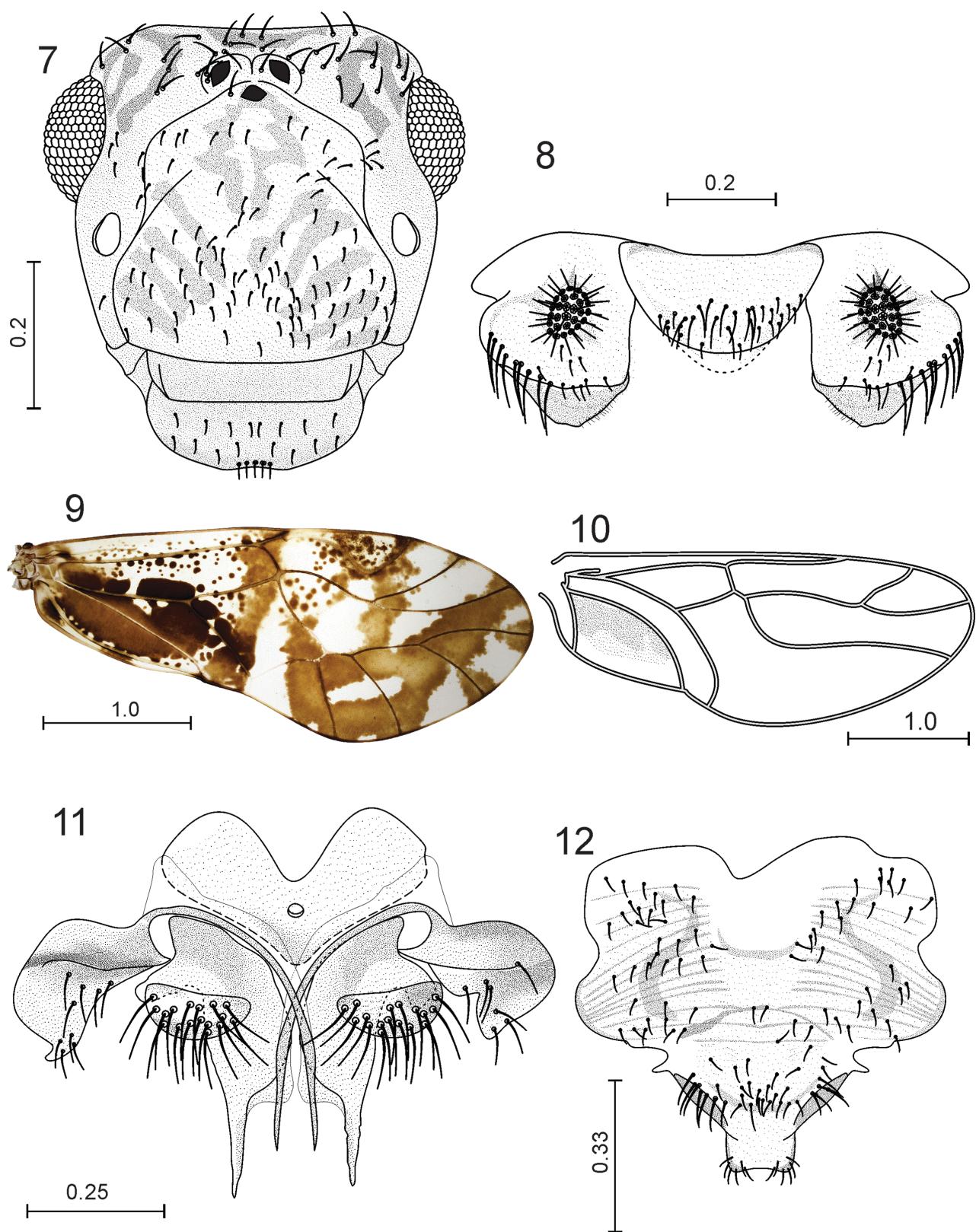
Female. Color (in 80% ethanol). Essentially as in the male, but slightly less pigmented (Fig. 13). Genitalia darker than rest of abdomen, sclerotized. Gonapophyses: v1 uniformly sclerotized; v2 and v3 darker posteriorly. Subgenital plate uniformly dark brown with transverse brown spots.

Morphology. As in diagnosis, plus the following: vertex straight (Fig. 7). Pterostigma, cell m, and crossvein CuA1-M as in the male (Fig. 9). Subgenital plate heavily sclerotized, symmetrical, pigmented area anteriorly concave; setae as illustrated (Fig. 12). Gonapophyses: v1 long, slender, distally acute and basally wide; v2 well developed, quadrangular at base and ending in a distal acuminate projection; v3 small, rounded and bearing a field

of setae posteriorly. Ninth sternum symmetrical, spermapore circular and surrounded by a pigmented rim (Fig. 11). Paraprocts simple, faintly sclerotized, quadrangular, with rounded borders, a row of marginal setae on outer margin; sensory fields with 26–28 trichobothria in penta-lobed basal rosettes (Fig. 8). Epiproct distally rounded and basally truncate, with a field of about 28 strong setae on distal half.



FIGURES 1–6. *Elaphopsocus nasa* n. sp. Male. 1. Front view of head. 2. Paraprocts and epiproct. 3. Forewing. 4. Hindwing. 5. Phallosome. 6. Hypandrium. Scales in mm.



FIGURES 7–12. *Elaphopsocus nasa* n. sp. Female. 7. Front view of head. 8. Paraprocts and epiproct. 9. Forewing. 10. Hindwing. 11. Gonapophyses and ninth sternum. 12. Subgenital plate. Scales in mm.

13



FIGURE 13. *Elaphopsocus nasa* n. sp. Female. Scale in mm.

Measurements (in microns). FW: 4625, HW: 3350, IO: 530, D: 160, d: 230, IO/d: 2.30, Mx4: 210, f1: 510, f2: 350, f3: 250, PO: 1.43.

Specimens studied. Holotype male. **COLOMBIA.** Cauca, Puracé ($2^{\circ} 22' N$; $76^{\circ} 23' W$); 1875 m. 13.v.2012. MUSENUV slide code 26127. J. Mendivil. Paratype female, same data as the holotype. J. Mendivil. MUSENUV slide code 26128. Three females from the same locality, not dissected, in 75% ethanol.

Etymology. This species is dedicated to the Nasa tribe, that inhabits the type locality.

Elaphopsocus gorrones n. sp.

(Figs 14–25, 52)

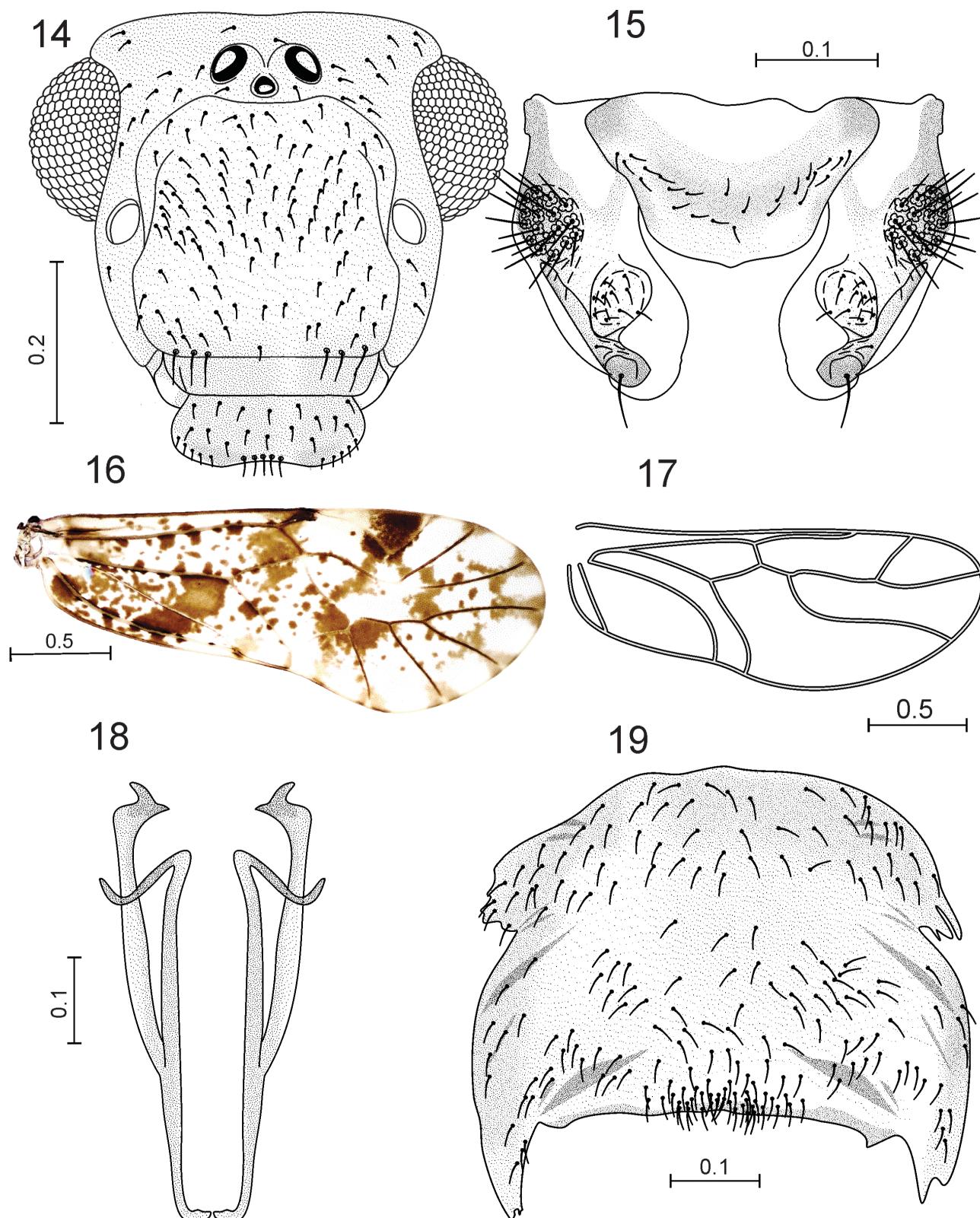
Diagnosis. Forewing pattern (Figs 16, 22). Hypandrium broad, with postero-lateral corners projected posteriorly (Fig. 19). Phallosome with side struts almost fused anteriorly, each arm slender, elongate, external parameres ending in two pointed projections, one small, directed inwards, the other one larger, directed posteriorly; aedeagal arms slender, distally bent outwards, pointed (Fig. 18). Female subgenital plate with median process wide based, narrowing distally to straight posterior border (Fig. 25); ninth sternum almost rectangular (Fig. 24).

Male. Color (in 75% ethanol). Body reddish brown. Compound eyes black, ocelli hyaline, with ochre centripetal crescents. Fronto-clypeal sulcus white. Genae with brown spots. Antennae brown. Maxillary palpomeres brown. Coxae, trochanters, femora, tibiae and tarsi light brown. Forewing pattern as illustrated (Fig. 16), with small spots over most cells. Veins R₂₊₃, R₄₊₅, M₁, M₂ and M₃ with distal area brown. Pterostigma with a brown spot covering most of the surface. Hindwings hyaline (Fig. 17). Veins light brown. Abdomen uniformly light brown. Genitalia more pigmented than rest of abdomen, sclerotized. Phallosome distally more pigmented; hypandrium with brown spots on surface, irregularly distributed (Fig. 19).

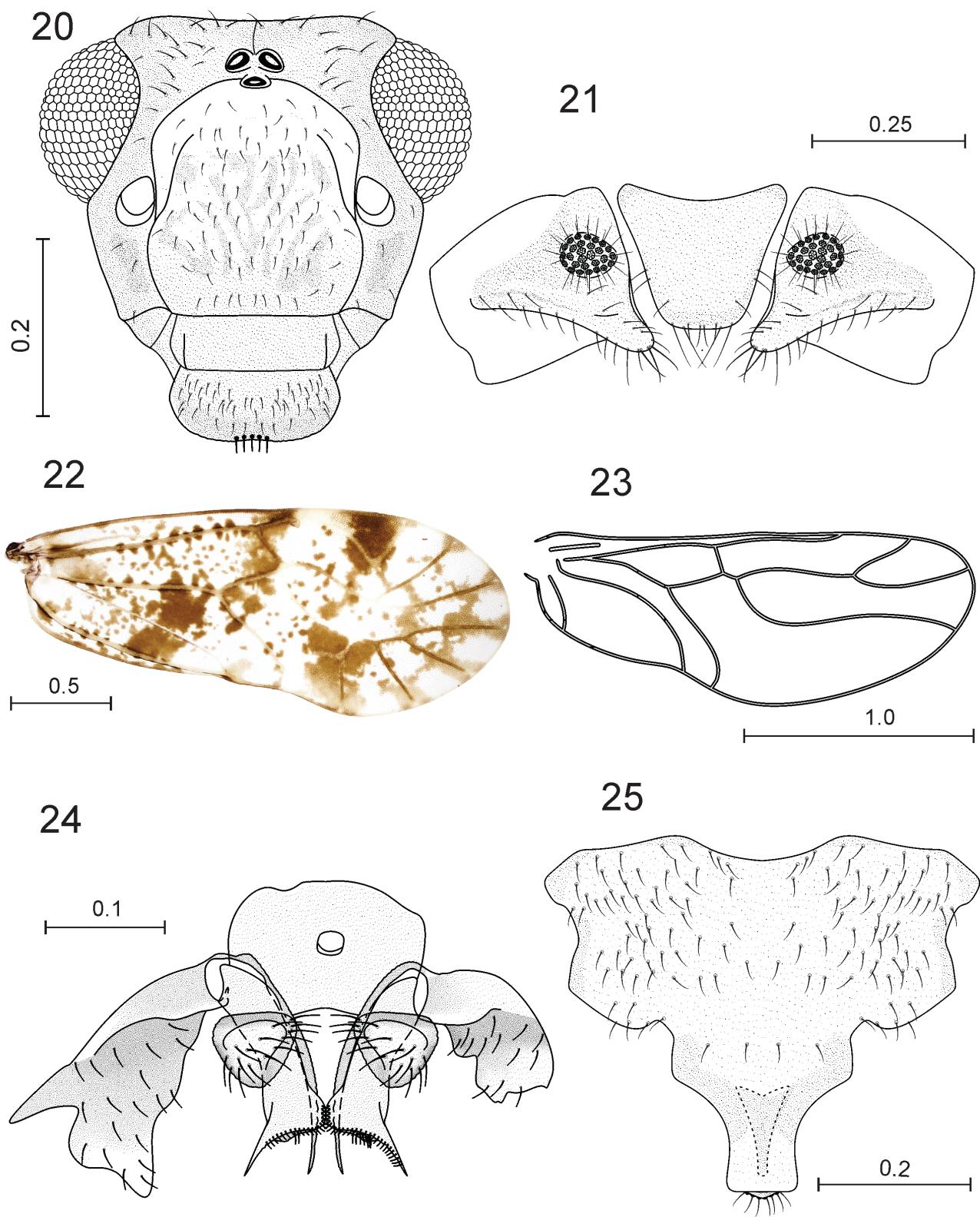
Morphology. As in diagnosis, plus the following: vertex straight. Compound eyes below level of vertex (Fig. 14). Pterostigma rounded and posteriorly projected towards Rs (Fig. 16). Posterior border of hypandrium straight, with a dense field of setae in the middle (Fig. 19). Phallosome (Fig. 18). Paraprocts weakly sclerotized, with prongs stout, bearing a distal, posteriorly directed macroseta; sensory fields with 28–29 trichobothria in basal rosettes. Epiproct distally rounded and basally concave, mostly membranous, with a field of setae mesally (Fig. 15).

Measurements (in microns). FW: 2600, HW: 2075, F: 525, IO: 360, D: 130, d: 180, IO/d: 2, Mx4: 140, f1: 340, f2: 240, f3: 210, PO: 1.38.

Female. Color (in 80% ethanol). Essentially as in the male but with darker coloration. Forewing with large brown spots, hindwing hyaline (Fig. 22). Subgenital plate more pigmented on the sides.



FIGURES 14–19. *Elaphopsocus gorrones* n. sp. Male. 14. Front view of head. 14. Paraprocts and epiproct. 16. Forewing. 17. Hindwing. 18. Phallosome. 19. Hypandrium. Scales in mm.



FIGURES 20–25. *Elaphopsocus gorrones* n. sp. Female. 20. Front view of head. 21. Paraprocts and epiproct. 22. Forewing. 23. Hindwing. 24. Gonapophyses and ninth sternum. 25. Subgenital plate. Scales in mm.

Morphology. As in diagnosis, plus the following: pterostigma as in the male (Fig. 22). Subgenital plate wide basally, setose as illustrated (Fig. 25). Ninth sternum almost quadrate, with spermapore large, surrounded by a pigmented rim. Gonapophyses: v1 long, slender; v2 quadrangular at the basal portion and bearing a distal spine-like projection; v3 oval, bearing few setae posteriorly (Fig. 24). Paraprocts broad, setose; sensory fields with 27–29

trichobothria in basal rosettes (Fig. 21). Epiproct trapeziform, membranous, bearing a row of heavy setae posteriorly and lateral thin setae.

Measurements (in microns). FW: 2475, HW: 1900, F: 550, IO: 440, D: 110, d: 220, IO/d: 2.0, PO: 2.0, Mx4: 120, f1: 330, f2: 220, f3: 200.

Specimens studied. Holotype male. **COLOMBIA.** Valle del Cauca, Roldanillo, ca. Paramillo-Bélgica, ($4^{\circ} 26' 32.5''$ N: $76^{\circ} 12' 34.9''$ W), 1930 m, 10.iii.2013. MUSENUV slide code 26129, beating branches, O. Saenz. Paratypes: 1 female. COLOMBIA, Valle del Cauca, Dagua, Km 25 ($3^{\circ} 33' 13.2''$ N: $76^{\circ} 36' 34.7''$ W), 1666 m, 24.iv.2011. MUSENUV slide code 26130. R. González & N. Carrejo. 1 female. COLOMBIA, Valle del Cauca, Santiago de Cali, Quebrada Honda ($3^{\circ} 26' 04.9''$ N: $76^{\circ} 38' 3.7''$ W), 1818 m, 23.i.2013. MUSENUV slide code 26131. N. Calderon & R. Gonzalez. 1 male, COLOMBIA, Santiago de Cali, La Buitrera ($3^{\circ} 22' 20.5''$ N: $76^{\circ} 34' 11.3''$ W); 1153 m. 18.iii. 2012. MUSENUV slide code 26132. R. González.

Etymology. This species is dedicated to the Gorrones tribe, that inhabit the type locality of the species, Roldanillo.

Elaphopsocus rayoi n. sp.

(Figs 26–31)

Diagnosis. Hypandrium broad, posteriorly straight, with postero-lateral corners slightly projected posteriorly (Fig. 31). Phallosome with side struts slender, almost fused anteriorly; aedeagal arms mesally bent outwards at right angles, then directed posteriorly, distally acuminate (Fig. 30).

Male. Color (in 80% ethanol). Body dark brown. Compound eyes black, ocelli hyaline, with ochre centripetal crescents. Fronto-clypeal sulcus light brown. Genae dark brown. Antennae pale brown. Coxae, trochanters, femora, tibiae and tarsi light brown. Forewing pattern (Fig. 28); pterostigma distally with a large brown spot. Light brown spots throughout the membrane. Hindwing mostly hyaline (Fig. 29) with a small light brown spot in cell CuP. Veins brown. Abdomen uniformly light brown. Genitalia more pigmented than rest of the abdomen. Phallosome distally more pigmented. Hypandrium with irregular transverse spots (Fig. 31).

Morphology. As in diagnosis, plus the following: vertex straight (Fig. 26). Compound eyes not reaching the level of the vertex. Pterostigma acute posteriorly (Fig. 28). Hypandrium broad, setose, with a dense field of setae in the middle, next to posterior border (Fig. 31). Phallosome slender, elongate, external parameres distally blunt (Fig. 30). Paraprocts weakly sclerotized, with prongs strongly sclerotized, pointed; sensory fields with 28–30 trichobothria in basal rosettes. Epiproct distally rounded and basally concave, mostly membranous, setae as illustrated (Fig. 27).

Measurements (in microns). FW: 3475, HW: 2625, IO: 450, D: 280, d: 310, IO/d: 1.45, PO: 1.11, Mx4: 80, f1: 550, f2: 350.

Specimen studied. Holotype male. **COLOMBIA.** Valle del Cauca, Roldanillo, ca. Bélgica, ($4^{\circ} 26' 46.6''$ N: $76^{\circ} 12' 33.6''$ W), 1894 m, 9.iii.2013. MUSENUV slide code 26133, light trap, R. González, J. Mendivil, N. Calderón & O. Saenz.

Etymology. This species honors the plastic artist Omar Rayo, from Roldanillo, Valle del Cauca, where the species was found. He founded the Art Museum that bears his name “Museo Rayo”, in Roldanillo.

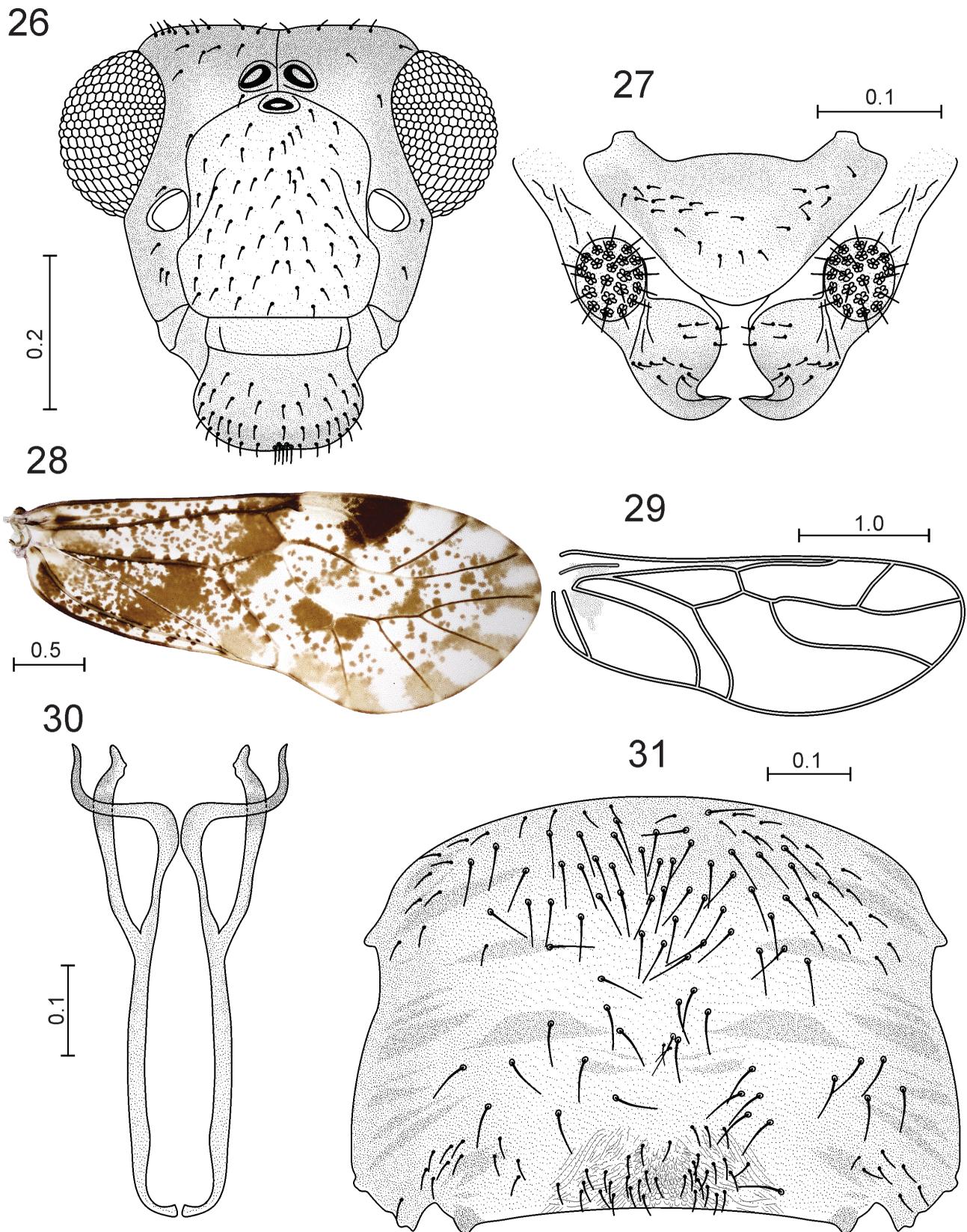
Elaphopsocus bahianus n. sp.

(Figs 32–37)

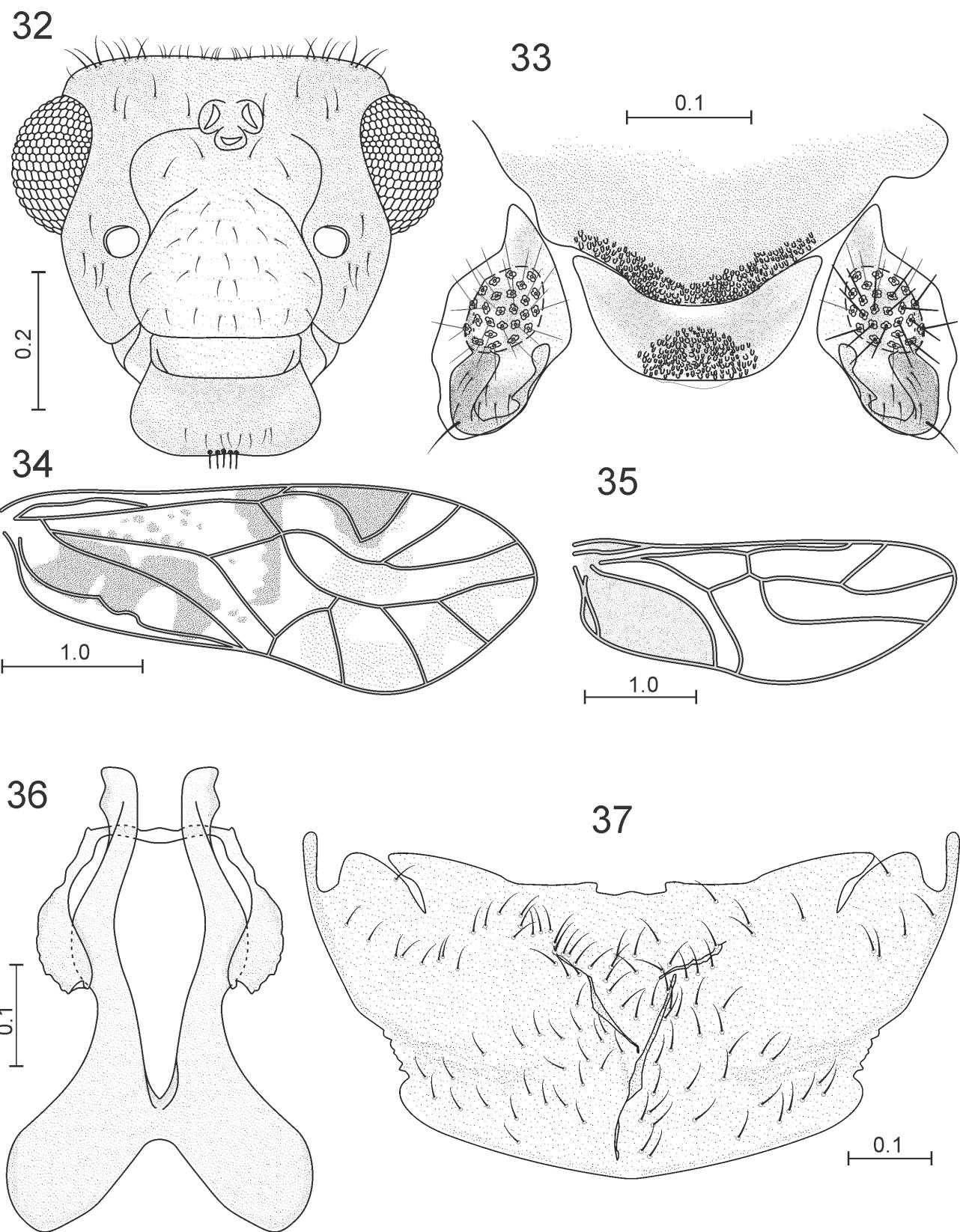
Diagnosis. Hypandrium broad, with posterior border straight (Fig. 37). Pallosome robust, with side struts fused anteriorly; aedeagal arch straight posteriorly, with arms anteriorly broad, distally slender; external parameres stout, distally blunt, slightly curved outward (Fig. 36). Clunium with a field of papillae over the area of the epiproct, this trapeziform, with a field of papillae posteriorly in the middle (Fig. 37). Paraprocts with a mesal, strongly sclerotized, distally blunt prong (Fig. 33).

Color (in 80% ethanol). Body reddish brown. Compound eyes black, ocelli hyaline, with thick, ochre centripetal crescents (Fig. 32). Antennae brown, Mx4 reddish brown throughout, Mx1-3 pale brown. Legs brown,

apices of femora and t2 reddish brown. Forewing and hindwing patterns (Figs 34, 35), veins brown. Forewing with dark spots over most of the surface and light brown spots on cells m1, m2, m3 and areola postica. Hindwing with light brown cell CuP.



FIGURES 26–31. *Elaphopsocus rayoi* n. sp. Male. 26. Front view of head. 27. Paraprocts and epiproct. 28. Forewing. 29. Hindwing. 30. Phallosome. 31. Hypandrium. Scales in mm.



FIGURES 32–37. *Elaphopsocus bahianus* n. sp. Male. 32. Front view of head. 33. Paraprocts, epiproct and hind margin of clunium. 34. Forewing. 35. Hindwing. 36. Phallosome. 37. Hypandrium. Scales in mm.

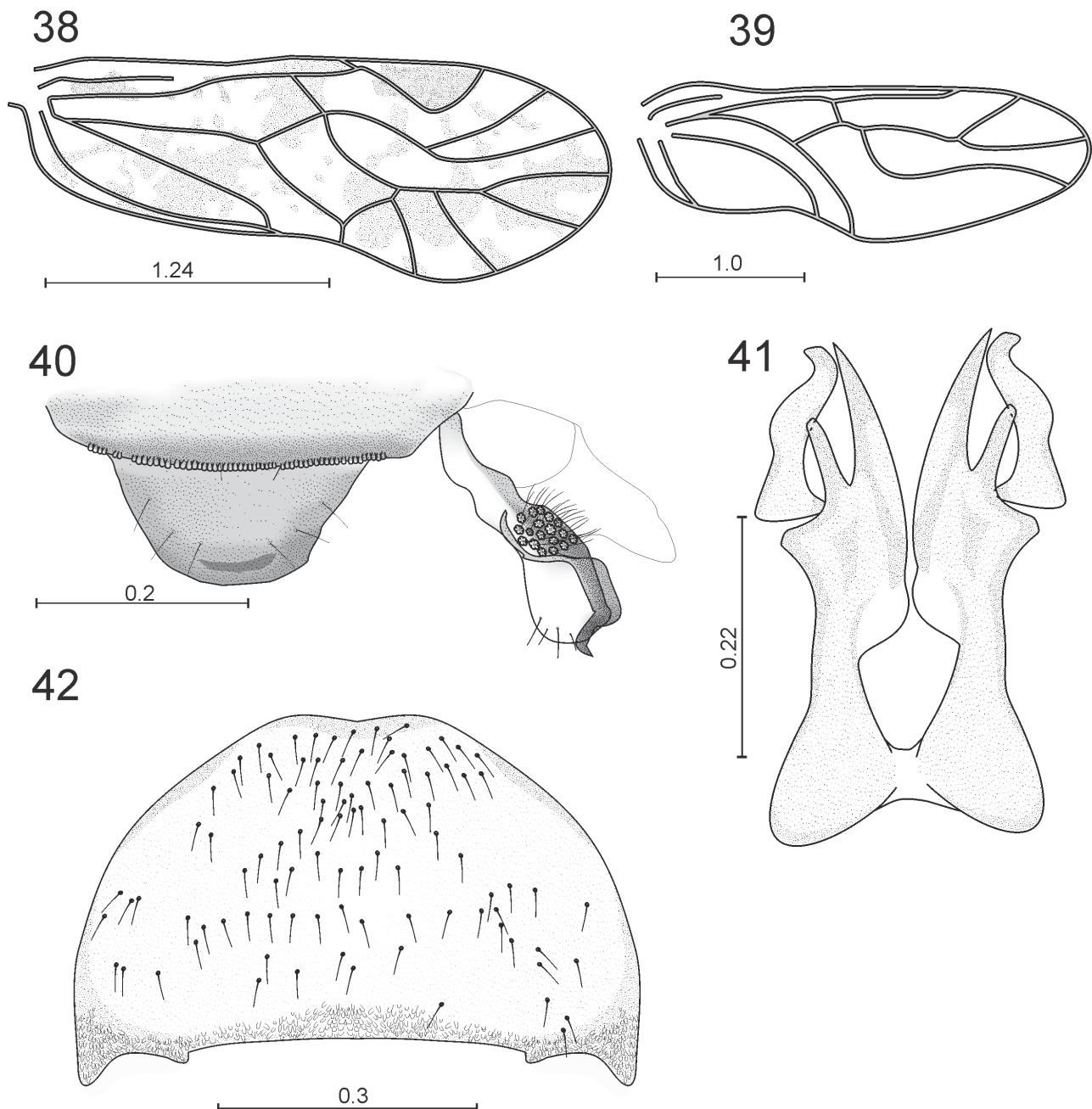
Morphology. As in diagnosis, plus the following: compound eyes slightly below the level of the vertex. Forewing pterostigma anteriorly narrow, posteriorly wide, projected towards Rs. Veins Rs-M diverging from a

point; areola postica with sides slightly convex, crossvein between areola postica and M, short. Hypandrium with postero-lateral corners rounded, not projected posteriorly (Fig. 37). Phallosome with side struts basally rounded, narrowing distally, apically blunt; aedagus arch wide anteriorly, with margins irregular, distally slender (Fig. 36). Paraprocts elongate, bearing a mesal, curved, strongly sclerotized prong, distally blunt. Sensory fields with 33–34 trichobothria in basal rosettes. Epiproct with a slender, sclerotized band along posterior border (Fig. 33).

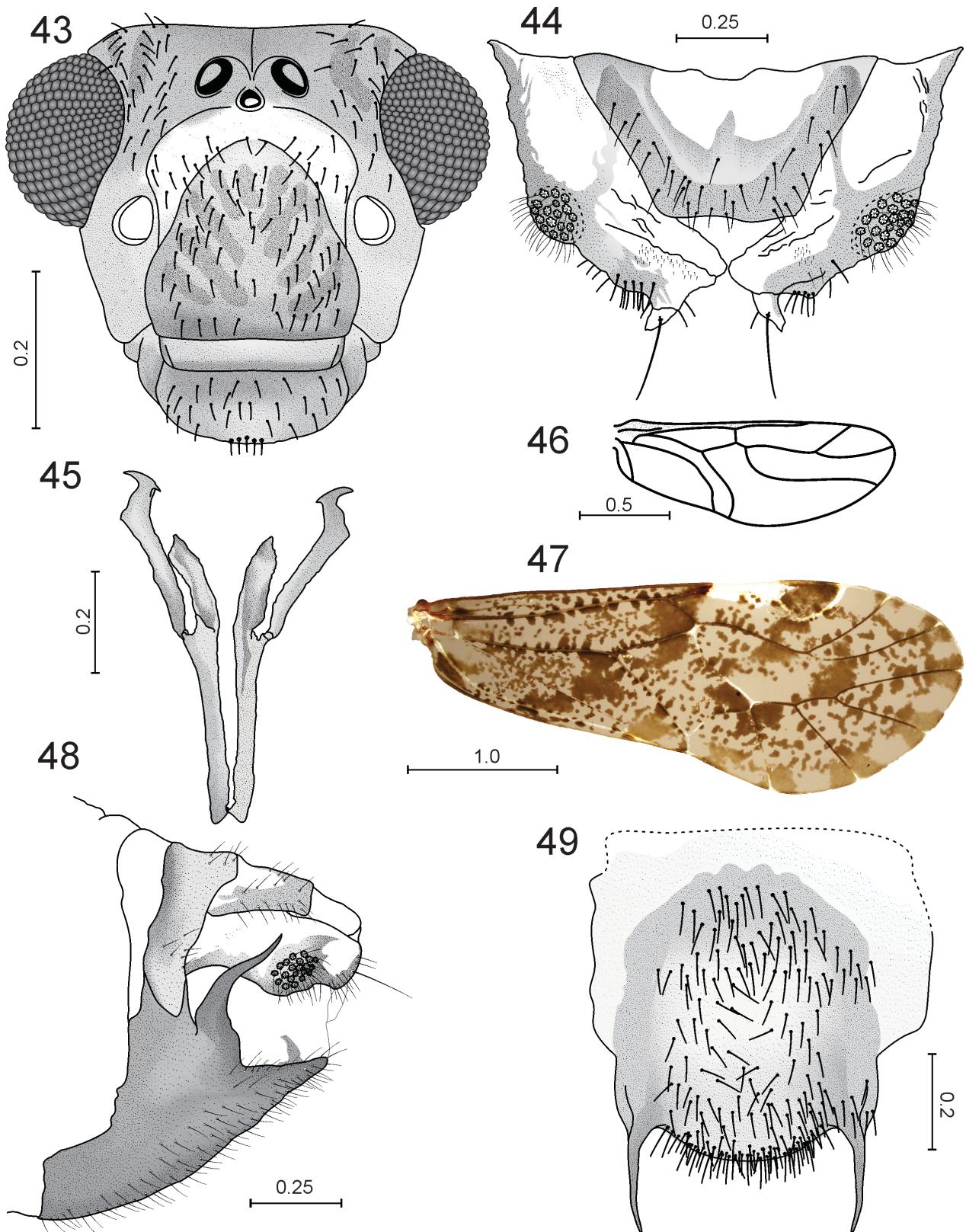
Measurements (in microns). FW: 3637, HW: 2697, IO: 477, D: 306, d: 185, IO/d: 2.5, Mx4: 137, f1: 750, f2: 362, PO: 0.60.

Specimen studied. Holotype male. **BRAZIL.** Bahia. Santa Terezinha, Serra da Jibóia. 24. v.2000. F. Bravo. Laboratório de Sistemática de Insetos, Departamento de Ciências Biológicas, Universidade Estadual de Feira de Santana, Bahia, Brazil.

Etymology. The specific name refers to the Brazilian state of Bahia, where the holotype was found.

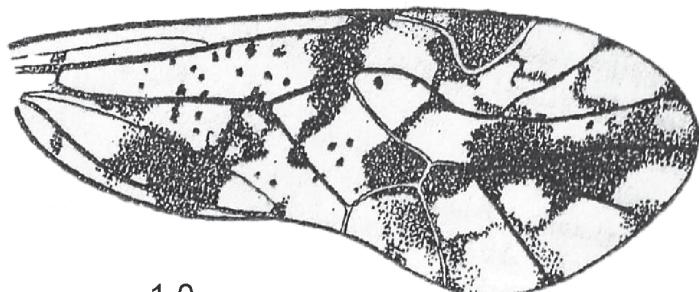


FIGURES 38–42. *Elaphopsocus amazonicus* n. sp. Male. 38. Forewing. 39. Hindwing. 40. Right paraproct, epiproct and posterior border of clunium. 41. Phallosome. 42. Hypandrium. Scales in mm.



FIGURES 43–49. *Elaphopsocus roesleri* n. sp. Male. 43. Front view of head. 44. Paraprocts and epiproct. 45. Phallosome. 46. Hindwing. 47. Forewing. 48. Lateral view of abdomen terminalia. 49. Hypandrium. Scales in mm.

50



51



FIGURES 50–51. *Elaphopsocus glaphyrostigma* Roesler. 50. Forewing. 51. Phallosome. From Roesler (1940). Scales in mm.

***Elaphopsocus amazonicus* n. sp.**

(Figs 38–42)

Diagnosis. Clunium with a row of denticles over the area of the epiproct (Fig. 40). Hypandrium broad; postero-lateral corners projected posteriorly into short, stout, blunt ended, papillose protuberances, the posterior border between them straight, bearing a field of papillae (Fig. 42). Phallosome fused anteriorly, aedeagal arms ending in two projections, the inner one large and acuminate, the outer one short and blunt ended (Fig. 41); external parameres sigmoid and articulated next the outer projection of the aedeagal arms.

Color (in 80% ethanol). Body reddish brown. Forewing pattern (Fig. 38), with pterostigma darker and spots over most cells. Hindwing hyaline (Fig. 39). Veins brown. Hypandrium with pigmented band along anterior border (Fig. 42).

Morphology. As in diagnosis plus the following: pterostigma anteriorly narrow, posteriorly wide, slightly projected towards Rs; veins Rs and M diverging from a point, sides of areola postica slightly convex, crossvein from apex of areola postica to M, short (Fig. 38). Paraprocts slender, with a pigmented anterior “handle” articulated to clunium, and a posterior slender prong; sensory fields with 18–19 trichobothria on basal rosettes (Fig. 40). Epiproct trapeziform, bearing, next to posterior border, a slender, transverse, sclerotized band (Fig. 42).

Measurements (in microns). FW: 2380, HW: 1826 (Head and hind legs missing)

Specimen studied. Holotype male. **BRAZIL.** Amazonas. AM 010, Km 26, Reserva Florestal Adolpho Ducke. 27.ix.1978. Malaise trap. J. Arias. Coleção de Invertebrados, INPA, Manaus, Amazonas, Brazil.

Etymology. The specific name refers to the nature of the area where the holotype was collected; the Reserva Florestal Adolpho Ducke is a protected area of Amazonian forest, close to Manaus.

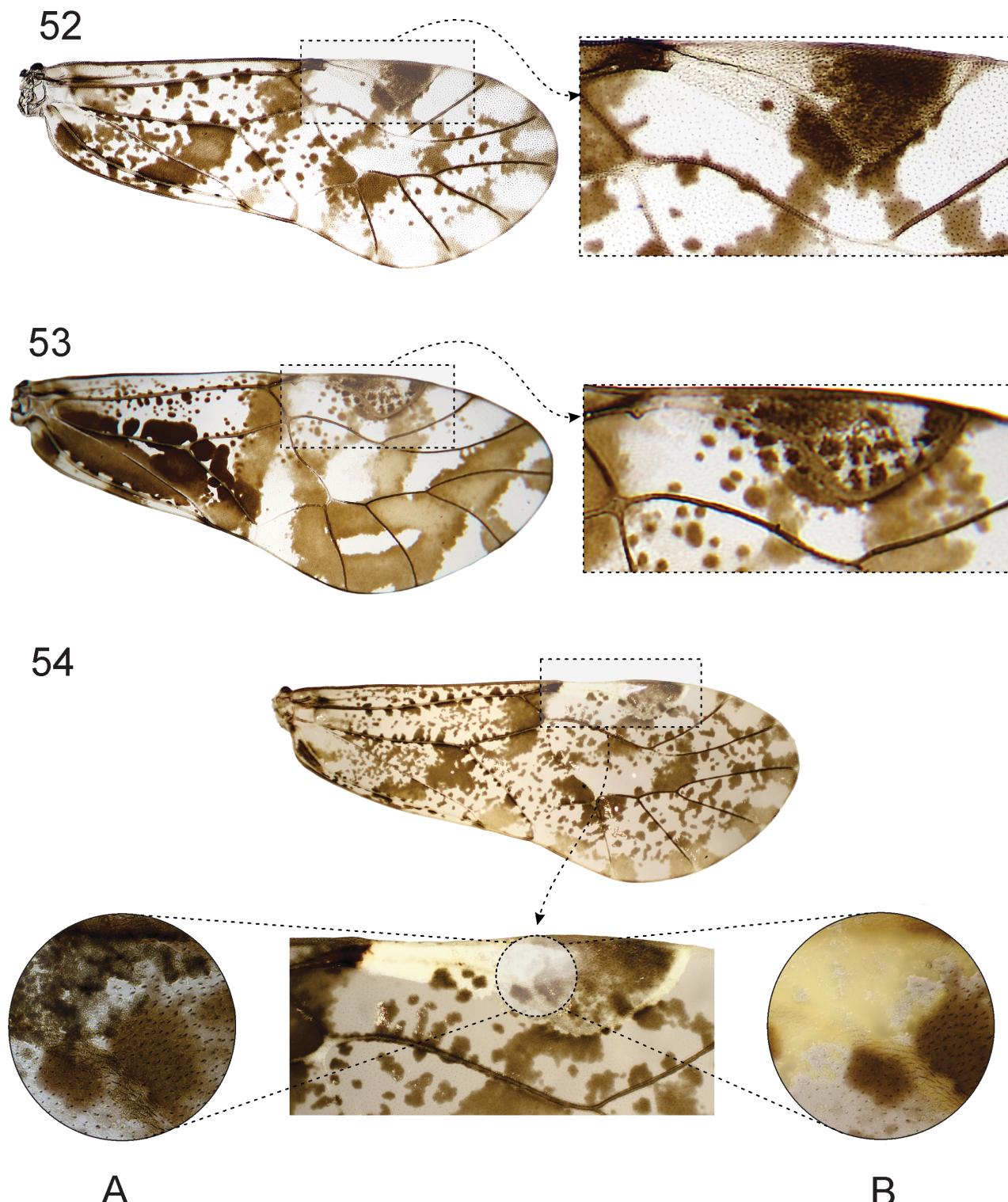
***Elaphopsocus roesleri* n. sp.**

(Figs. 43–49, 54)

Diagnosis. Hypandrium with postero-lateral corners extended posteriorly to form long, slender, acuminate projections; posterior border convex, bearing a dense field of setae (Fig. 49). Phallosome with side struts stout, independent, aedagal arms stout, distally pointed; external parameres long, stout, distally with a pointed projection directed outwards; (Fig. 45).

Color (in 80% ethanol). Body brown. A creamy area between third ocellus and epistomal sulcus, postclypeus with dark brown bands converging medially. Epiproct centrally membranous (Fig. 44), paraprocts dark brown.

Foreswing pattern (Fig. 47). If the forewing is illuminated from below, the pterostigma shows little black spots (Fig. 54A); if the forewing is illuminated from above, the pterostigma appears white (Fig. 54B). Hindwings hyaline (Fig. 46). Veins brown.



FIGURES 52–54. Morphological variation of the forewing in *Elaphopsocus*. 52. Angulate pterostigma in *E. gorrones* n. sp. 53. Rounded pterostigma in *E. nasa* n. sp. 54. Pterostigma in *E. roesleri* n. sp. illuminated from below (A) and above (B).

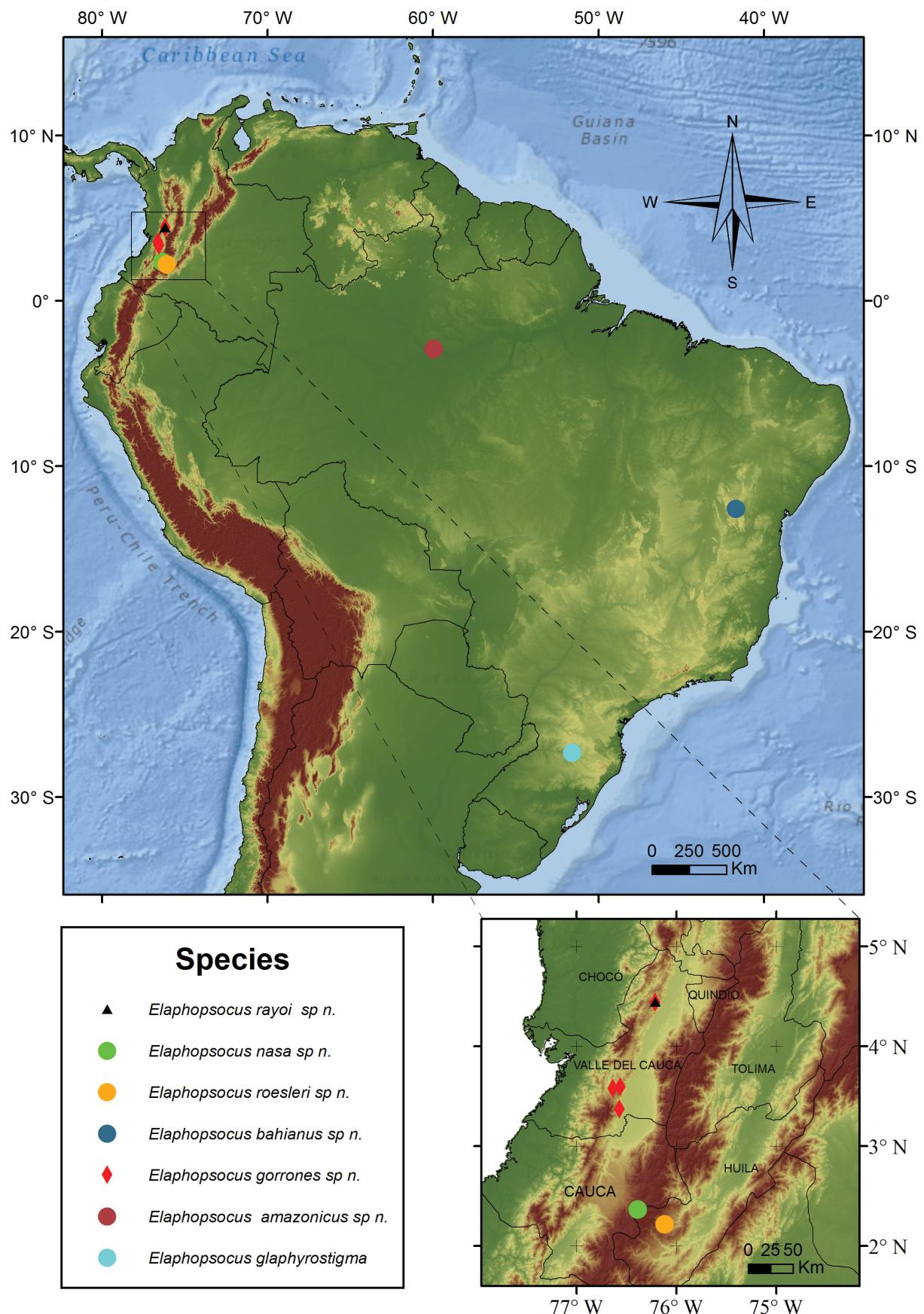


FIGURE 55. Geographic distribution of *Elaphopsocus* spp.

Morphology. As in diagnosis, plus the following: Compound eyes not reaching the level of the vertex (Fig. 43). Pterostigma much wider posteriorly (Fig. 47). Paraprocts weakly sclerotized, bearing posteriorly a pointed prong; sensory fields with 25–26 trichobothria in basal rosettes. Epiproct trapeziform, with setae on sides and posterior border (Fig. 44).

Measurements (in microns). FW: 3725, HW: 2875, IO: 1.07, D: 260, d: 280, IO/d: 1.64, Mx4: 70, f1: 660, f2: 440, f3: 360, f4: 290, PO: 1.07.

Specimen studied. Holotype male. **COLOMBIA.** Huila. Merenberg Nature Reserve ($02^{\circ} 13' 06.6''$ N: $76^{\circ} 07' 01.1''$ W), 2352 m, 21.i.2015. MUSENUV slide code 26134, beating branches, R. González.

Etymology. This species is dedicated to the late German entomologist Rudolf Roesler, who, in 1940, described the genus *Elaphopsocus*, on the basis of two male specimens, from Nova Teutonia, Santa Catarina, Brazil.

Discussion

The seven known species of *Elaphopsocus* show a considerable range of morphological variation, particularly in the male hypandrium and phallosome; the former may present the posterior border either straight, without a distinct setal field (*E. bahianus* and *E. glaphyrostigma*), with short lateral projections and setal fields present or absent (*E. nasa*, *E. rayoi*, *E. amazonicus*), or with medium length or elongate lateral projections, with a distinct, median setal field (*E. gorrones*, *E. roesleri*).

The side struts of the phallosome are fused anteriorly (*E. nasa*, *E. bahianus*, *E. amazonicus*, *E. glaphyrostigma*), or they are independent (*E. gorrones*, *E. rayoi*, *E. roesleri*). Also, the posterior border of the clunium, over the area of the epiproct, may be simple (*E. nasa*, *E. gorrones*, *E. rayoi*, *E. roesleri*), or it may present a field of papillae (*E. bahianus*), or a row of denticles (*E. amazonicus*); in only one species (*E. bahianus*), the male epiproct presents a field of papillae posteriorly.

The variation outlined above, points to the possibility of *Elaphopsocus* being paraphyletic, but presently, the genus is clearly separable from *Elaphopsocoides*, as shown by the generic diagnoses presented above. The two genera probably constitute a clade, having the crossvein between the areola postica and M as a synapomorphy; the assignment of specimens to each genus should be based on genital morphology.

The distribution of the species of *Elaphopsocus* (Fig. 55), shows enormous distances between the localities for *E. glaphyrostigma*, *E. bahianus*, *E. amazonicus*, and the four Colombian species, which points to the possibility of finding additional species in the areas in between. The Colombian species, found in a relatively small area, are a result of recent intensive collecting in that country, by the Group of Entomological Investigations, of the Universidad del Valle (Santiago de Cali, Colombia).

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