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Elaphopsocoides, a new genus of Psocidae (Psocodea: Psocoptera) from Valle del Cauca, Colombia

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Abstract

Two new species of *Elaphopsocoides* n. gen. from Valle del Cauca, Colombia, are here described and illustrated. The new genus is related to *Elaphopsocus* Roesler, but differs from it mostly in the hypandrial projections and in phallosome structure. The female subgenital plate has a distinct, median, posterior projection. The types are deposited in the Entomology Museum, Universidad del Valle (MUSENUV), Santiago de Cali, Colombia.

Key words: Amphigerontiinae, taxonomy, neotropics

Introduction

Based on two male specimens from Santa Catarina, Nova Teutonia, Brazil, Roesler (1940) erected the genus *Elaphopsocus* (Psocidae: Amphigerontiinae), the only genus in the family having a crossvein joining the areola postica with M in the forewing (Smithers 1990). Besides this distinguishing character, *Elaphopsocus* has simple terminalia, with hypandrium bearing no processes, apophyses or tubercular ornamentation (Smithers, 1972). Specimens of two species, representing an undescribed genus related to *Elaphopsocus*, were recently found in Valle del Cauca, western Colombia. The purpose of this work is to describe and illustrate the two species and to define the new genus.

Material and methods

Two males and one female were available for study. They were dissected in 70% ethanol, and the head, genitalia, and right wings and legs were mounted on slides in Canada balsam. Measurements (in μm) 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 X6.

Abbreviations for parts measured are as follows: FW, HW: lengths of right fore- and hind- wings, respectively; F, T, t1 and t2: lengths of femur, tibia and tarsomeres 1 and 2 of right hind leg respectively; ctt1: number of ctenidiobothria on t1; Mx4: length of fourth segment of right maxillary palpus; f1...fn: lengths of flagellomeres 1...n of right antenna; IO: minimum distance between compound eyes; D and d: antero-posterior diameter and transverse diameter, respectively, of right compound eye, all in dorsal view of head, PO: d/D; v1, v2 and v3: ventral, dorsal and external valves respectively. The types are deposited in the Entomological Museum of the Universidad del Valle, Santiago de Cali, Colombia (MUSENUV).

Results

Elaphopsocoides n. gen.

Diagnosis. Belonging in subfamily Amphigerontiinae *sensu* Lienhard & Smithers (2002) and Yoshizawa *et al.* (2011). Differing from *Elaphopsocus* mainly in having the hypandrium with distal processes and the side struts of the phallosome independent. Female subgenital plate broad, with a wide posterior projection, with posterior border obtusely concave. Gonapophyses: v1 wide based, slender, elongate, distally acuminate, v2 broad, with slender distal process, v3 oval, with a row of setae on posterior border, with a row of setae on posterior border, with posterior lobe.

Type species. *Elaphopsocoides colombiensis* n. sp.

Etymology. The generic name refers to the similarity of this genus with *Elaphopsocus* Roesler.

Elaphopsocoides colombiensis n. sp.

(Figs 1–13)

Diagnosis. As in generic diagnosis plus the following: hypandrium symmetrical, with median process stout, obtusely concave distally, with sides finely serrate; three projections on each side, the inner one long, curved, slender, acuminate, and the outer ones short and pointed.

Male. Color (in 70% ethanol). Head ground color creamy. Compound eyes black, ocelli hyaline, with ochre centripetal crescents. Median vertex area dark brown. Frontal, fronto–genal, and fronto–clypeal sulci dark brown, with two black bars extending from the epicranial sulcus to postclypeus. Gena with dark brown spots. Antennae brown, with dark brown spots. Maxillary palpomeres distally brown. Coxae, trochanters and femora brown, tibiae and tarsi white. Forewings with light brown spots over most cells except m_1 and m_2 , which are mostly hyaline. Cells r_1 and r_3 with a distal hyaline area and a small distal hyaline area also in cell r_5 . Pterostigma brown, with hyaline areas. Hindwings with cell cup light brown and a dark brown basal spot. Veins brown in hindwing and forewing. Abdomen uniformly light brown; terminalia darker, sclerotized. Hypandrium gradually more sclerotized distally.

Morphology. Vertex weakly concave (Fig. 1). Compound eyes not reaching the level of the vertex. Hypandrium wide (Fig. 2), rounded anteriorly. Phallosome elongate, broadly H-shaped (Fig. 6); phallobase with a pair of wide based, spine-like projections directed inward. External parameres stout, each with a mesal protuberance on inner border, and a wide, almost rectangular, preapical extension on outer border, bearing a row of spines along border, each paramere distally dilated, pointed outwards, bearing a field of short spines. Arms of aedeagus long, slender, bow-shaped, distally with a field of short spines. Paraprocts longer than wide, setae as illustrated, sensory fields with 28–30 trichobothria in basal rosettes; outer half membranous. Distal ends of paraprocts bearing a slender thorn. Epiproct semi-circular, with field of setae on distal third (Fig. 7).

Measurements. FW: 3525, HW: 2550, F: 625, T: 1475, t1: 525, t2: 150, ctt1: 18, Mx4: 160, f1: 520, f2: 370, f3: 260, IO: 520, D: 180, d: 280, IO/d: 1.86, PO: 1.56.

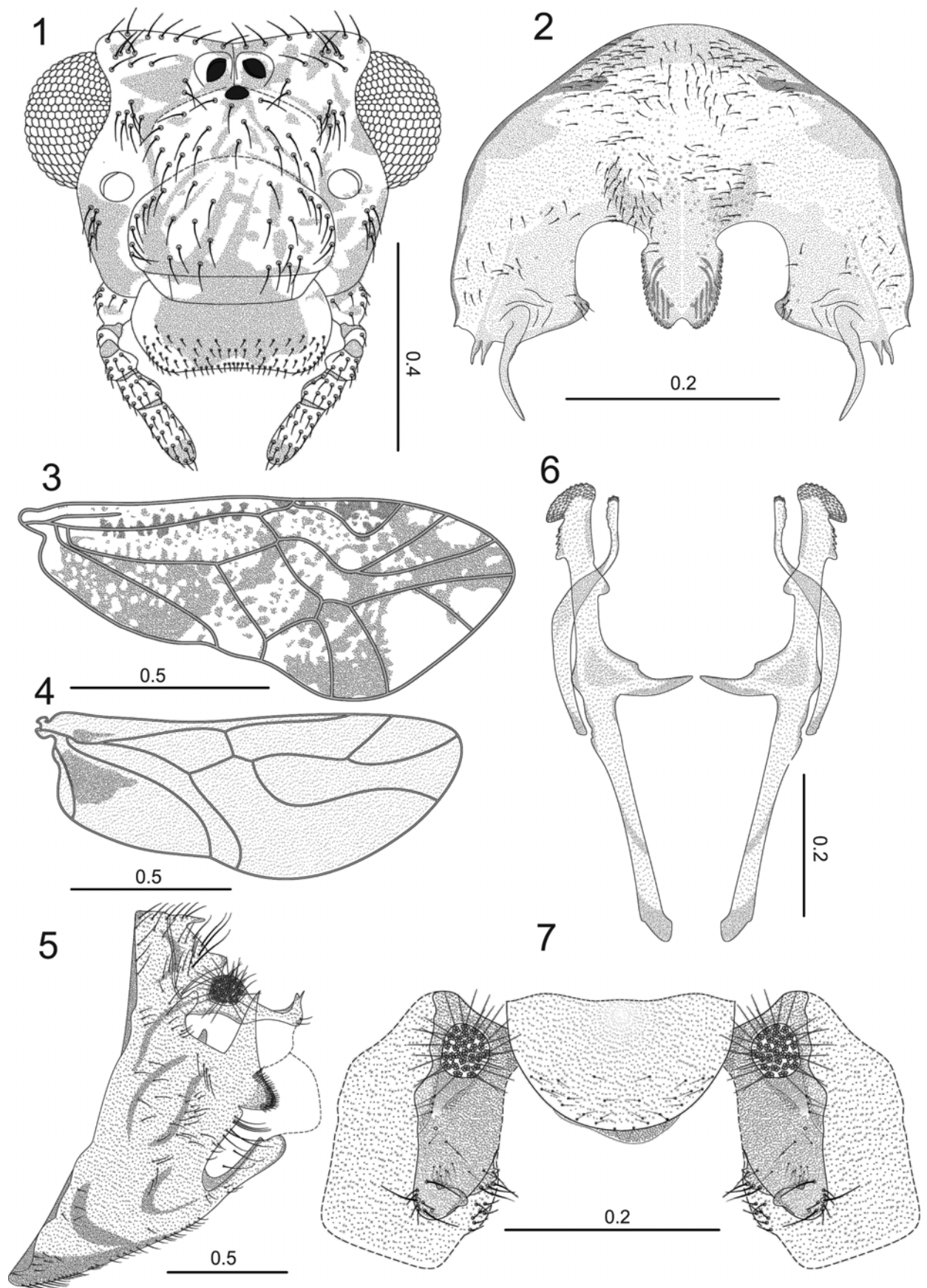
Female. Color (in 70% ethanol). Same as the male, exhibiting two shades of brown on the subgenital plate. Ninth sternum creamy. Valves brown to dark brown.

Morphology. Subgenital plate simple, slightly sclerotized and ending distally in a short, posteriorly concave process. Ninth sternum (Fig. 13), spermapore circular, surrounded by a pigmented rim. v1 long, slender, distinctly wider proximally, distally acuminate; v2 quadrangular at base and ending in an acute projection, v3 rounded, with a dense row of long setae on posterior border. Paraprocts subtriangular (Fig. 9), with setae on apex and lateral margins; sensory fields with 20–22 trichobothria, issuing from basal rosettes. Epiproct oval, broad at base, longer than wide, with setae as illustrated (Fig. 9).

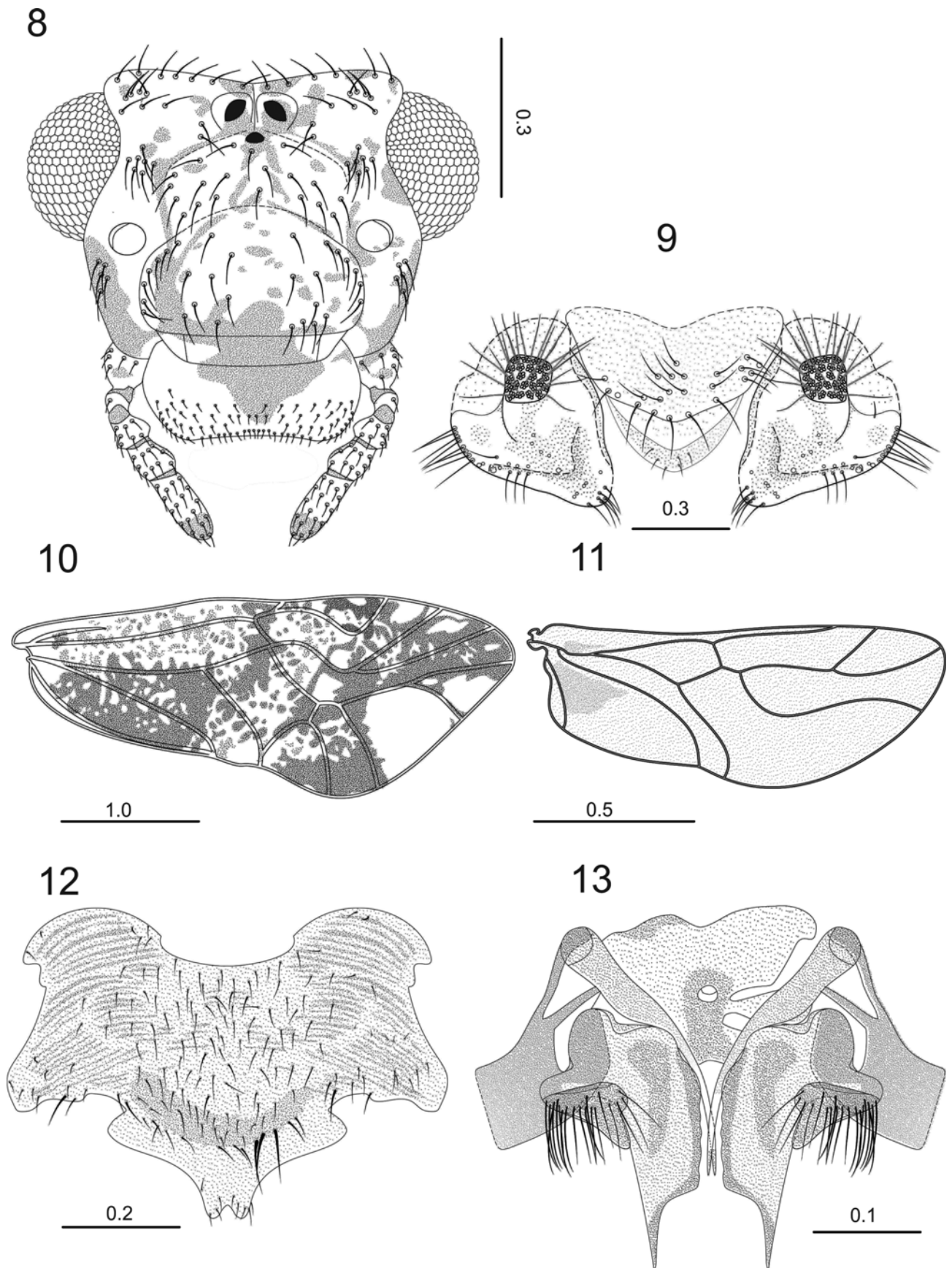
Measurements. FW: 3625, HW: 2650, F: 625, T: 1450, t1: 500, t2: 125, ctt1: 18, Mx4: 170, f1: 470, f2: 310, f3: 270, f4: 220, IO: 560, D: 200, d: 280, IO/d: 2.0, PO: 1.4.

Specimens studied. Holotype male. **COLOMBIA.** Valle del Cauca, Santiago de Cali, San Antonio, Finca San Francisco (3°29'30.7"N; 76°37'09.0"W); 1875 m. 29.IV. 2012. MUSENUV slide code 25781. R. González & N. Carrejo. Paratype female, same data as the holotype, beating tree branches. R. González. MUSENUV slide code 25781.

Etymology. The specific name refers to Colombia, from where this genus and species are so far endemic.



FIGURES 1–7. *Elaphopsocoides colombiensis* n. sp. Male. 1. Front view of head. 2. Hypandrium. 3. Forewing. 4. Hindwing. 5. Lateral view of terminalia. 6. Phallosome. 7. Paraprocts and epiproct. Scales in mm.



FIGURES 8–13. *Elaphopsocoides colombiensis* n. sp. Female. 8. Front view of head. 9. Paraprocts and epiproct. 10. Forewing. 11. Hindwing 12. Subgenital plate. 13. Gonapophyses and ninth sternum. Scales in mm.

Elaphopsocoides lahonduraensis n. sp.

(Figs 14–21)

Diagnosis. Differing from *E. colombiensis* in having the median process of the hypandrium wider, coarsely serrate on the sides, and with postero–lateral corners projected, pointed; in having two long projections on each side, both acuminate, the outer one much stouter, and in having the phallosome broadly V-shaped.

Male. Color (in 70% ethanol). General pattern as in Figure 14. Head ground color pale yellow and white; frons yellow, with a pair of parallel brown bars on each side. Compound eyes greenish, with irregular black areas; ocelli hyaline, with ochre centripetal crescents; genae black with white stripe next to antennal fossae, these with brown rim; postclypeus light brown with pattern of creamy and dark brown bands. Antennal scape and pedicel pale brown, with brown spots. Thorax dark brown, with a longitudinal pale stripe on each pleuron. In mesothorax, episternum dark brown; epimeron light brown, tergal lobes white, with dark brown spots, anterior lobe dark brown. In metathorax, tergal lobes white, with pattern of dark brown spots, episternum dark brown, epimeron white. Legs brown; external surface of coxae with white line; two distal pale brown transverse bands on femur; tibia and tarsi white. Forewing (Fig. 17). Cells m_1 and m_2 mostly hyaline. Cells r_1 , r_3 and r_5 with a small hyaline area. Vein A_1 and distal part of all other veins pale yellow; crossvein $CuA1-M$ yellow. Mid region of $R1$ and $r1$ reddish brown, extending to median zone of pterostigmal area, with small brown spots. Hindwings mostly hyaline, with one big distinct basal spot cell pcu light brown. Veins brown. Abdomen yellowish dorsally, lateral and ventral surfaces with yellow spots on brown background. Terminalia dark brown, heavily sclerotized.

Morphology. Head vertex slightly concave (Fig. 15). Hypandrium symmetrical (Fig. 16), with two acuminate projections on each postero–lateral corner, the outer one stouter; a mid, setose, stout posterior process, with sides coarsely serrate. Anterior hypandrium projections slender; posterior projections thick. Setae scattered in central zone of the hypandrium. Forewing venation (Fig. 17). Paraprocts elongate, outer border with a pigmented band and a distal spine-like projection; setae as illustrated, sensory fields with 36 trichobotria in basal rosettes. Epiproct almost trapeziform, slightly rounded posteriorly and concave near clunium; setae as illustrated (Fig. 21). Phallosome (Fig. 20) elongate, V-shaped, each side strut distally with an inwardly directed, wide based, pointed process. External parameres distally dilated, pointing outwards, bearing a field of short spines. Aedeagus long, slender, slightly curved proximally, each arm terminating in a field of short spines.

Measurements. FW: 4225, HW: 2650, F: 675, T: 1500, t_1 : 425, t_2 : 150, ctt_1 : 18, Mx_4 : 130, f_1 : 500, f_2 : 380, IO: 570, D: 170, d : 253, IO/ d : 1.97, PO: 1.71.

Specimen studied. Holotype male. COLOMBIA. Valle del Cauca. El Dovio, La Hondura (04°32'32.8"N; 76°17'11.6"W; 1452 m.), 1.III.2014, beating branches of *Citrus* sp. R. González. MUSENUV slide code 25783.

Etymology. The specific name refers to the locality of La Hondura, El Dovio, Valle del Cauca, where this species was found.

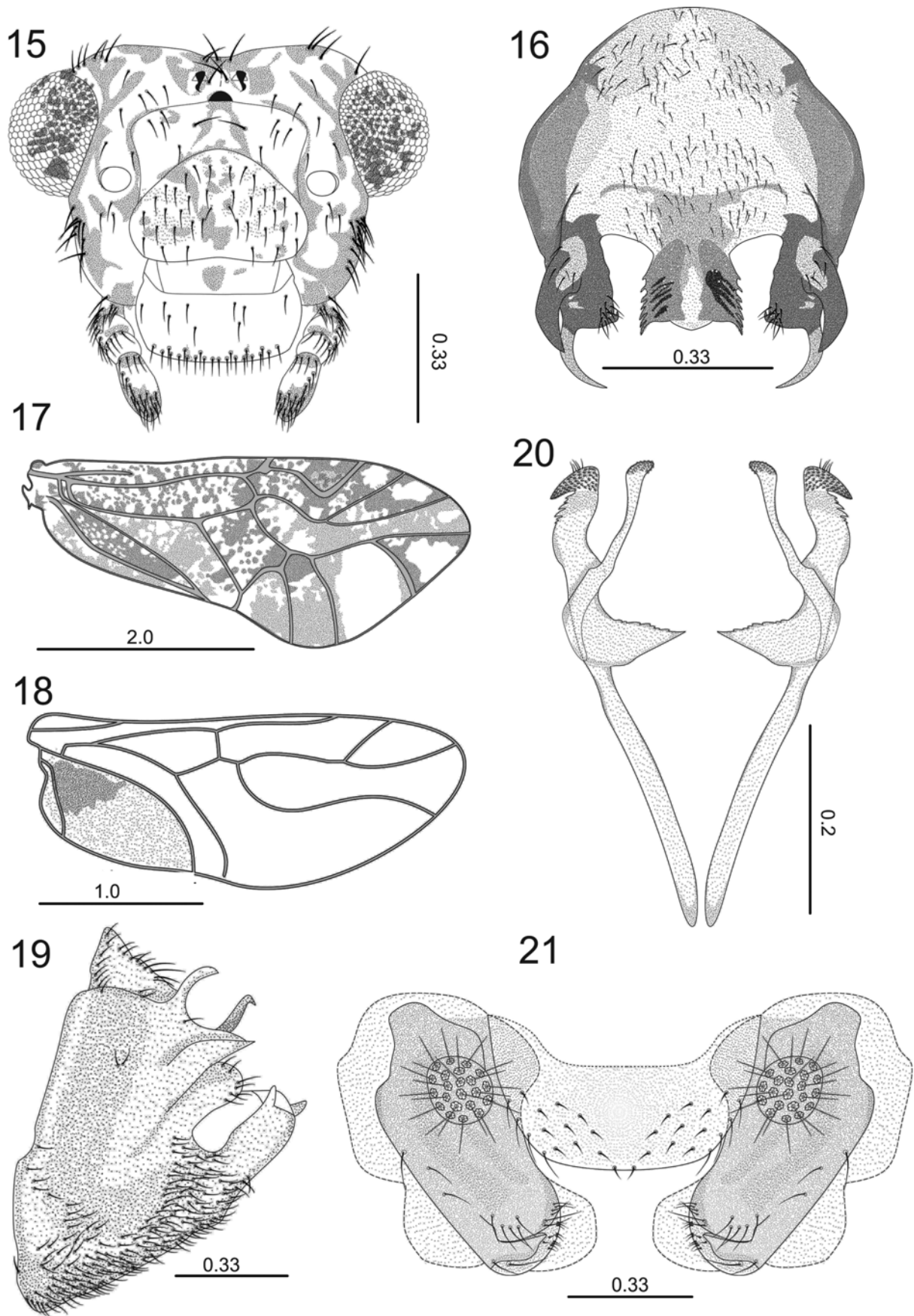
Discussion

The two species described here, although having spotted forewings, a crossvein between the areola postica and M, and a similar pterostigma to *Elaphopsocus* Roesler, cannot be assigned to that genus. The new genus differs from *Elaphopsocus* in the following autapomorphic characters: well developed and distinct posterior processes of the hypandrium; side struts of the phallosome proximally independent; as well as by the structure of the external parameres and arms of the aedeagus with fields of spines distally. The female of *Elaphopsocus* is unknown, but we anticipate similarities with the female of *Elaphopsocoides*. The synapomorphic characters for *Elaphopsocoides-Elaphopsocus* group are mainly the crossvein joining the areola postica with M in the forewing and also the unique wing pattern coloration among Psocidae. Four species of *Elaphopsocus* from Colombia (Cauca and Valle del Cauca), Brazil (states of Amazonas and Bahia), remain undescribed and will be dealt with in a separate work.

Elaphopsocoides is assigned to the subfamily Amphigerontiinae by having a broadly sclerotized eight sternum and a posteriorly open phallosome (Yoshizawa 2010; Yoshizawa *et al.* 2011). Although phylogenetic relationships have not yet been evaluated, the similarity in morphological character states found for the *Elaphopsocoides* species and the known species of *Elaphopsocus*, suggest that these genera are sister groups. The previous phylogenetic hypothesis proposed by Yoshizawa & Johnson (2008) does not constitute a statement on the position of *Elaphopsocoides* among the other genera in the subfamily, so a more extensive and detailed morphological and molecular analysis is required to resolve the phylogenetic position of this new genus.



FIGURE 14. *Elaphopsocoides lahonduraensis* n. sp. Male. Lateral view. Scale in mm.



FIGURES 15–21. *Elaphopsocoides lahonduraensis* n. sp. Male. 15. Front view of head. 16. Hypandrium. 17. Forewing. 18. Hindwing. 19. Lateral view of terminalia. 20. Phallosome. 21. Paraprocts and epiproct. Scales in mm.

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