

## Two new species of *Lachesilla* of *Pedicularia* group (Psocodea: ‘Psocoptera’), from Valle del Cauca, Colombia

Dos especies nuevas de *Lachesilla* del grupo *Pedicularia* (Psocodea: ‘Psocoptera’), del Valle del Cauca, Colombia

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**Abstract:** Two new species of *Lachesilla*, in species group *Pedicularia*, from Valle del Cauca, Colombia, are here described and illustrated. The males of these species present one mid clunial apophysis directed posteriorly. Species in group *Pedicularia*, in which the males have one mid clunial apophysis were previously known from the Departments of Cuzco and Madre de Dios, Peru. Males of *Lachesilla* with one mid clunial apophysis are known only in the Chinese *Ceratolachesillus quinquecornus* Li, and in the Mexican *L. cerorma* García Aldrete, in the latter, the clunial apophysis bears abundant setae, quite distinct from the glabrous, sclerotized apophyses of the other species.

**Key words:** *Lachesillinae*. Neotropics. Taxonomy. Clunial apophyses.

**Resumen:** Dos nuevas especies de *Lachesilla*, incluidas en el grupo *Pedicularia*, del Valle del Cauca, Colombia, son descritas e ilustradas. Los machos de estas especies presentan una apófisis clunial media dirigida posteriormente. Especies del grupo *Pedicularia*, en las cuales los machos poseen este tipo de apófisis han sido previamente conocidas del Departamento de Cuzco y Madre de Dios, Perú. Machos de *Lachesilla* con apófisis clunial media son conocidas solo en China, en *Ceratolachesillus quinquecornus* Li, y en México, en *L. cerorma* García Aldrete, en esta última, la apófisis clunial posee abundantes setas, muy diferente de las otras especies, en la cuales la apófisis es esclerosada y glabra.

**Palabras clave:** *Lachesillinae*. Neotrópico. Taxonomía. Apófisis clunial.

### Introduction

In the *Lachesillinae* (Psocodea: ‘Psocoptera’: *Lachesillidae*), males with one mid clunial apophysis are known in the Chinese monotypic genus *Ceratolachesillus* Li (2002) (Fig. 5A), and in the cosmopolitan genus *Lachesilla* Westwood; and in the latter, only in species groups *Cerorma* (García Aldrete 2010) (Fig. 5B) and *Pedicularia* (García Aldrete 1974; Mockford 1993). In these two species groups, the clunial apophyses are of different nature: glabrous and sclerotized in the latter, and setose and not sclerotized in the former. The known species in the *Pedicularia* species group, in which the males have one mid clunial apophysis are Peruvian: *L. carpinteroi* García Aldrete, 2010 (Fig. 5C), and *L. williamsi* García Aldrete, 2010 (Fig. 5G), from Cuzco (García Aldrete 2010), and *L. asymmetriproctus* García Aldrete, 2008 (Fig. 4F), *L. convexicornis* García Aldrete (Fig. 5D), and *L. macro-pudenda* García Aldrete, 2008 (Fig. 5E), from the Tambopata Reserved Zone, in Madre de Dios (García Aldrete 2008).

We recently collected, in Valle del Cauca, Colombia, six males and one female of *Lachesilla* in species group *Pedicularia*, that represent two species; the males have one mid clunial apophysis over the area of the epiproct, and these species are different from the Peruvian ones indicated above. The purpose of this paper is to describe and illustrate the two new Colombian species.

### Material and methods

Seven specimens, six males and one female, collected in the period 2009 - 2013, in three localities of the municipality of

Santiago de Cali, Valle del Cauca, Colombia, were available for study. Four males and one female were dissected in 80% ethanol, and their parts (head, right wings and legs, and genitalia), were mounted on slides in Canada Balsam. Color was recorded by placing whole specimens, before dissection, under a microscope illuminated with cold white light, at 50X. Parts on the slides were measured, following standard procedures, and the illustrations were made from digital photographs, taken with a Canon T3i camera and Helicon Focus program, processed in a vector graphics editor CorelDraw.

Abbreviations of parts measured are as follows: FW and HW: lengths of right fore –and hind– wings, F, T,  $t_1$  and  $t_2$ : lengths of femur, tibia and tarsomeres 1 and 2 of right hind leg, respectively, ctt<sub>1</sub>: number of ctenidobothria on  $t_1$ , Mx4: length of fourth palpomere of right maxillary palpus, f<sub>1</sub>...f<sub>n</sub>: lengths of flagellomeres 1...n of right antenna, IO, D and d: minimum distance between compound eyes, antero-posterior diameter and transverse diameter of right compound eye, respectively, on dorsal view of head, PO: d/D.

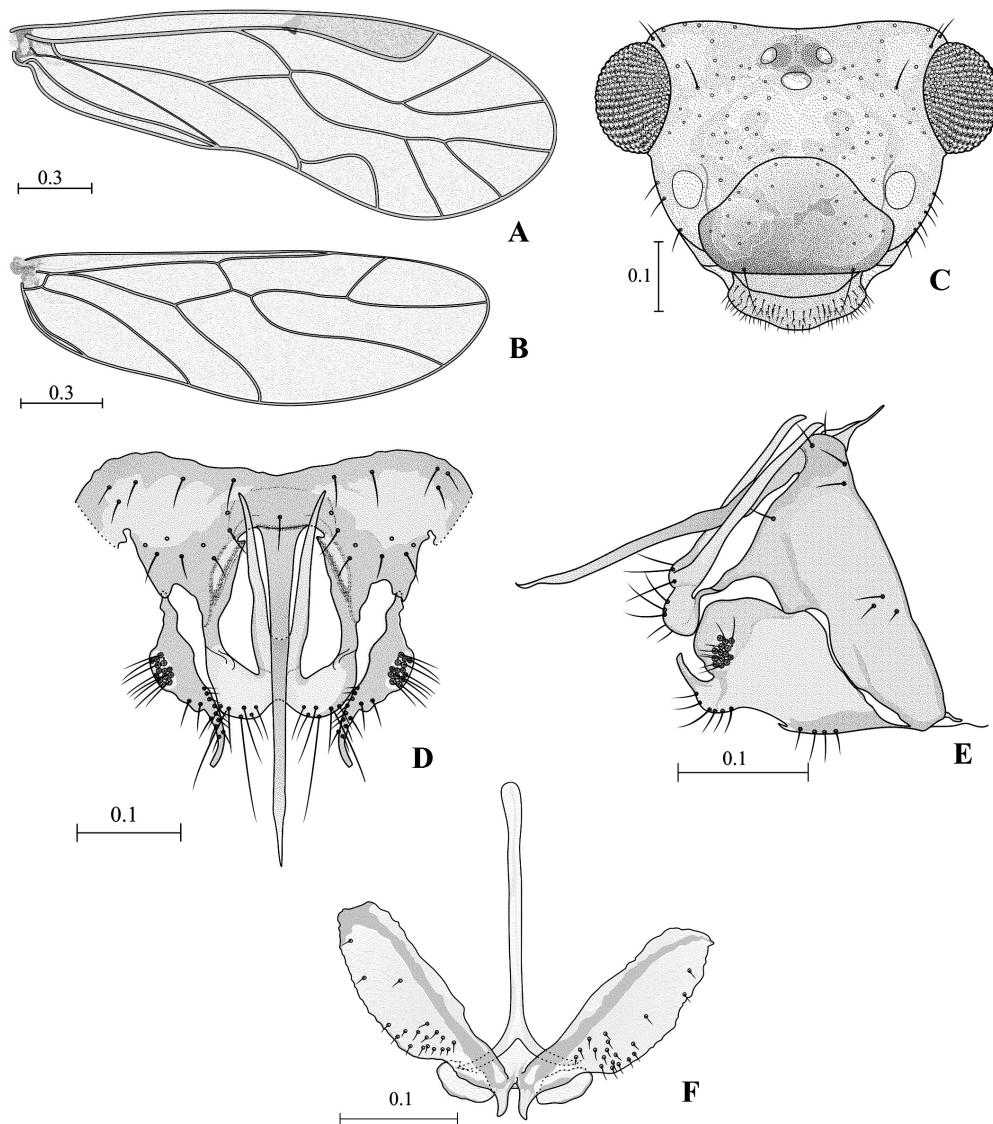
The specimens studied are deposited in the Entomological Museum, Universidad del Valle (MUSENUV), Santiago de Cali, Colombia.

### Results

#### *Lachesilla cesarcardonai* sp. n. (Figs. 1, 2 and 4B)

**Diagnosis:** Belonging in species group *Pedicularia* (García Aldrete 1974; Mockford 1993). Differing from all the other species in species group *Pedicularia*, in which the males have

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**Figure 1.** *Lachesilla cesarcardonai* sp. n. Male. A. Forewing. B. Hindwing. C. Front view of head. D. Epiproct, paraprocts and clunium. E. Side view of epiproct, paraprocts and clunium. F. Phallosome, hypandrium and claspers. Scales in mm.

one mid clunial apophysis (see above), in that the apophysis is very long, slender and acuminate, the posterior border of the clunium is concave, the sides forming slender extensions that join the antero-lateral corners of the epiproct.

**Description. Male.** **Color** (in 80% ethanol). Body reddish brown (Fig. 4B). Compound eyes black, ocelli hyaline, with ochre centripetal crescents. Wings almost hyaline, veins brown. Abdomen yellowish, with reddish brown subcuticular rings, less pigmented ventrally.

**Morphology.** Forewings 2.9 times as long as wide; pterostigma wider posteriorly, 3.3 times as long as wide. Veins  $R_s$  and  $M$  joined by a short crossvein (Fig. 1A). Areola postica broadly triangular, wide based, apically rounded. Hindwings 3.1 times as long as wide (Fig. 1B). Clunium with a long, slender apophysis in the middle, about eight times as long as its basal width, directed caudally, between the long epiproctal processes, directed backwards (Figs. 1D-1E).

Claspers long, subelliptic, with inner border strongly sclerotized, with setae as illustrated (Fig. 1F); distal ends short, stout. Hypandrium small, membranous, joined laterally to each clasper; phallosome apodeme long, slender, distally divided in two arms, each ending in an elliptic membranous area (Fig. 1F). Paraprocts of two pieces, the proximal one joining the clunium, sensory fields with 14 trichobothria on basal rosettes, and one marginal trichobothrium without basal rosette; distal piece with a small sclerotized prong, distally truncate (Figs. 1D-1E).

**Measurements** (in  $\mu\text{m}$ ) FW: 2250, HW: 1725, F: 410, T: 730,  $t_1$ : 210,  $t_2$ : 102,  $ctt_1$ : 16,  $Mx4$ : 105,  $f_1$ : 210,  $f_2$ : 210,  $f_3$ : 170,  $f_4$ : 90,  $f_5$ : 80,  $f_6$ : 80,  $f_7$ : 80,  $f_8$ : 80,  $f_9$ : 80,  $f_{10}$ : 80,  $f_{11}$ : 100, IO: 370, D: 110, d: 160, IO/d: 2.3, PO: 1.4.

**Female. Color.** As in the male. Subgenital plate, ninth sternum and valves dark brown.

**Morphology.** Forewings 3.3 times as long as wide; pterostigma as in the male, 3.5 times as long as wide; veins Rs and M joined by a short crossvein (Fig. 2A). Hindwing as in the male, 3.2 times as long as wide (Fig. 2B). Subgenital plate long, broad, setose as illustrated (Fig. 2D), with posterior border straight and pigmented area slightly cleft anteriorly. Ninth sternum pigmented, rounded anteriorly, spermapore towards anterior border, with a pigmented rim, close to two pigmented areas near the border (Fig. 2E). Gonapophyses elongate, slightly curved, directed posteriorly, with apex blunt, and 3 - 6 setae in a longitudinal row. Paraprocts broad, subelliptic, with setae as illustrated, sensory fields with seven trichobothria on basal rosettes, and one marginal trichobothrium without basal rosette (Fig. 2F). Epiproct trapeziform, with setae as illustrated (Fig. 2F).

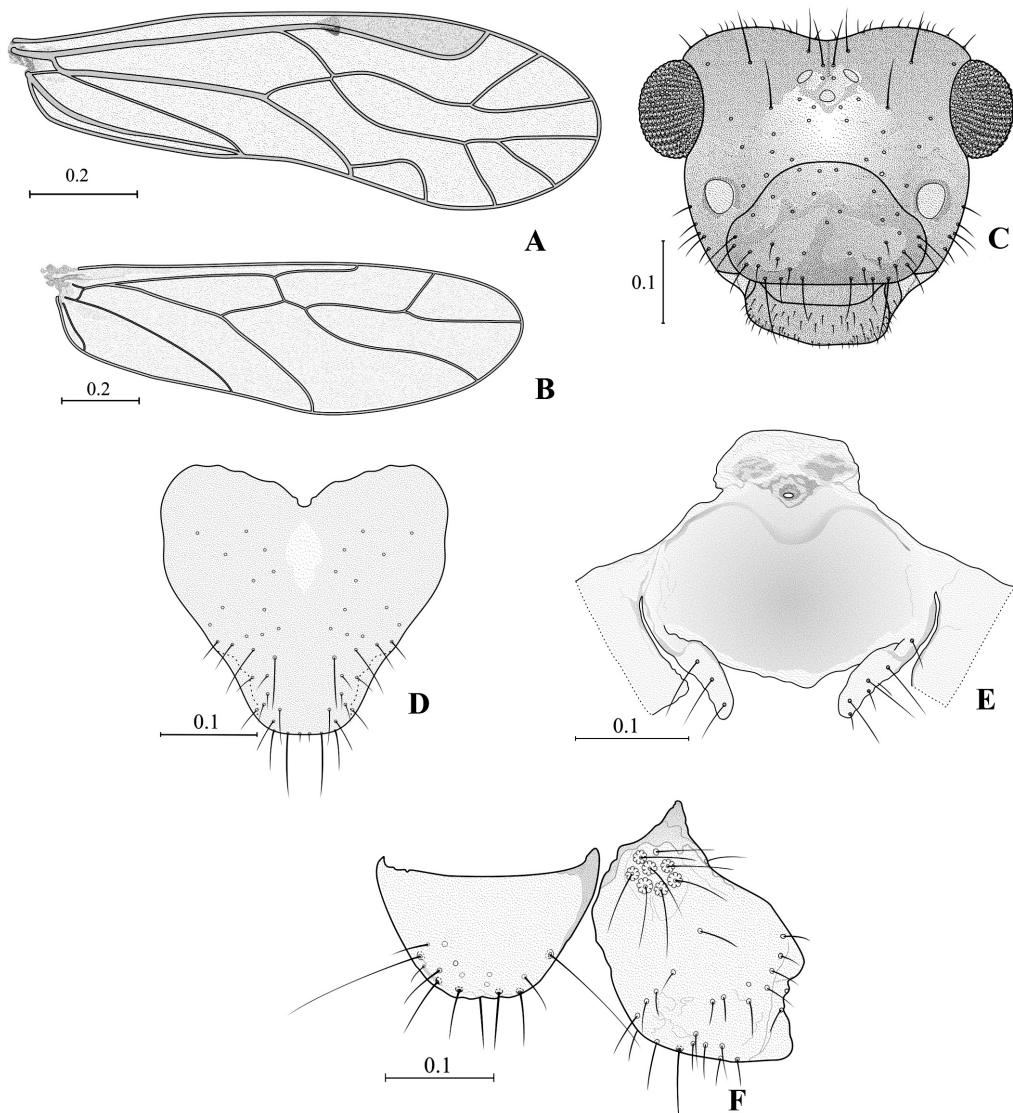
**Measurements** (in  $\mu\text{m}$ ). FW: 1650, HW: 1300, F: 340, T: 600,  $t_1$ : 167,  $t_2$ : 80,  $ctt_1$ : 12, Mx4: 97,  $f_1$ : 140,  $f_2$ : 135,  $f_3$ : 110,  $f_4$ : 92,  $f_5$ : 65,  $f_6$ : 65,  $f_7$ : 55,  $f_8$ : 60,  $f_9$ : 57,  $f_{10}$ : 65,  $f_{11}$ : 80, IO: 310, D: 70, d: 120, IO/d: 2.5, PO: 1.7.

**Specimens studied:** Holotype ♂, COLOMBIA. Valle del Cauca, Santiago de Cali, San Antonio, Finca San Francisco, 22.ix.2012, R. González (MUSENUV). Paratypes: 1♂, same data as the holotype (MUSENUV). 1♀, same locality and collector as the holotype 29.ix.2012. (MUSENUV).

**Etymology.** This species is dedicated, as a small post-obitum homage, to the Colombian entomologist César Cardona, who devoted his life to the study and understanding of insect pests in commercial agroecosystems.

***Lachesilla ilama* sp. n. (Figs. 3 and 4A)**

**Diagnosis.** Belonging in species group *Pedicularia* (García Aldrete 1974; Mockford 1993). Differing from the Peruvian species having male mid clunial apophyses as follows: from *L. assymetrioproctus* in having the epiproctal processes symmetric, and in having the clunial process much broader; differing from *L. carpinteroi* in having the distal ends of the claspers fused and pointed, and in having the clunial process



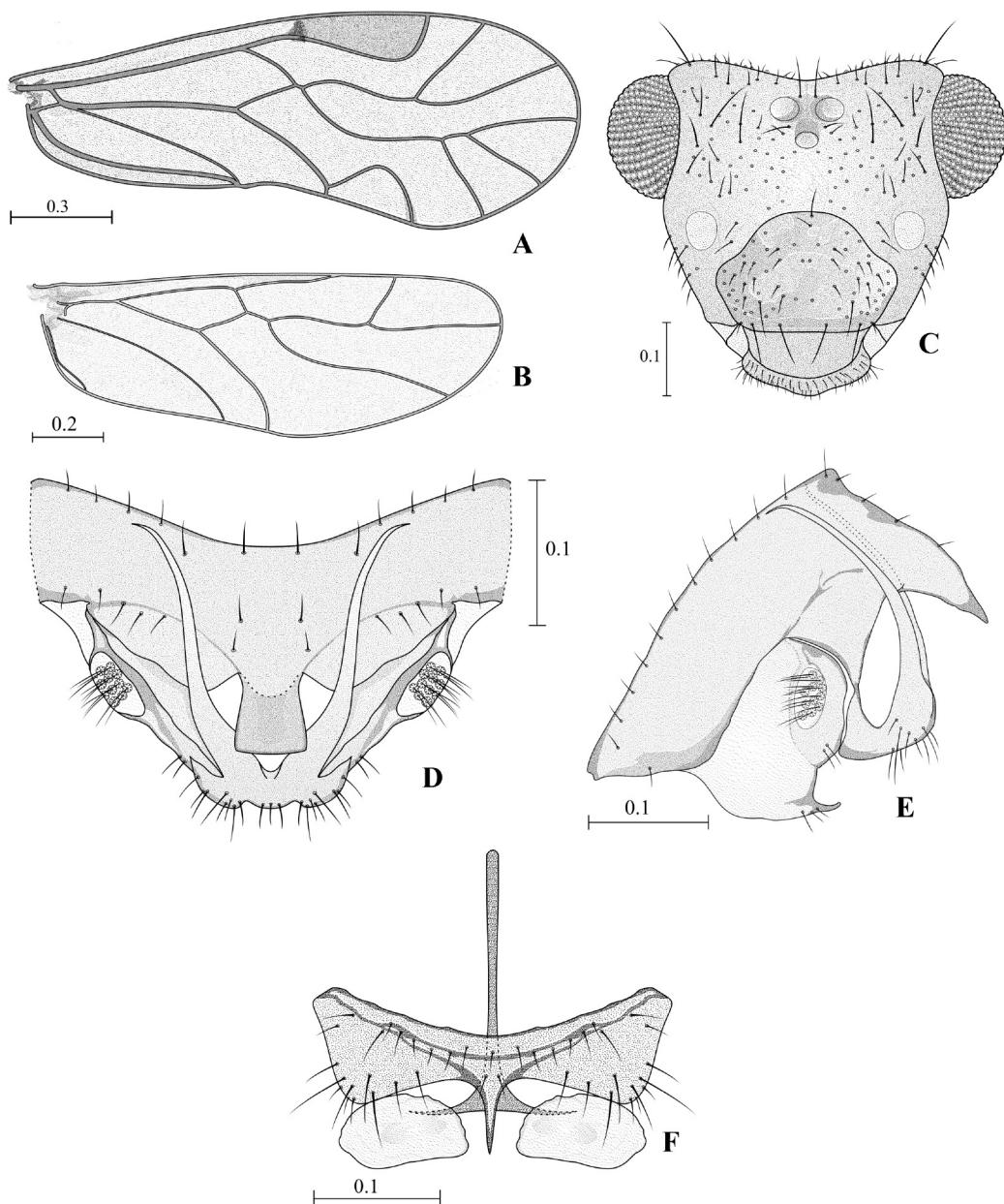
**Figure 2.** *Lachesilla cesarcardonai* sp. n. Female. **A.** Forewing. **B.** Hindwing. **C.** Front view of head. **D.** Subgenital plate. **E.** Gonapophyses and ninth sternum. **F.** Epiproct and right paraproct. Scales in mm.

much broader; differing from *L. convexicornis* in having the epiproctal processes much longer and slender, in having the distal ends of the claspers pointed, and in having the clunial process much longer, extending beyond the posterior border of the clunium; differing from *L. macropudenda* in having the distal ends of the claspers fused and pointed, and in having the clunial process broader and longer, in addition, *L. macropudenda* lacks epiproctal processes; differing from *L. williamsi* in having the epiproctal processes much longer and slender, in having the distal processes of the claspers fused, and in having the clunial process much longer and broader.

**Description. Male.** *Color* (in 80% ethanol). Body reddish brown (Fig. 4A). Compound eyes black, ocelli hyaline, without pigmented centripetal crescents. Wings hyaline, veins

brown. Abdomen pale brown, with dark brown subcuticular rings, less pigmented ventrally.

**Morphology.** Forewings 2.6 times as long as wide; pterostigma wider posteriorly, 2.6 times as long as wide; veins *Rs* and *M* fused for a short length. Areola postica broadly triangular, wide, apically rounded (Fig. 3A). Hindwings 3.1 times as long as wide (Fig. 3B). Clunium with a median, stout, broad process, with posterior border straight (Figs. 3D-3E). Distal ends of the claspers fused to form a pointed process (Fig. 3F). Phallosome apodeme long, slender, distally dilated and divided in two arms apically pointed, each directed laterally and ending in a round membranous area (Fig. 3F). Paraprocts of two pieces, a proximal one elliptic and joined to clunium; distal piece with a sclerotized, curved mesal prong; sensory fields with 11 trichobothria issuing from basal rosettes, and



**Figure 3.** *Lachesilla ilama* sp. n. Male. **A.** Forewing. **B.** Hindwing. **C.** Front view of head. **D.** Epiproct, paraprocts and clunium. **E.** Side view of genitalia. **F.** Phallosome, hypandrium and claspers. Scales in mm.

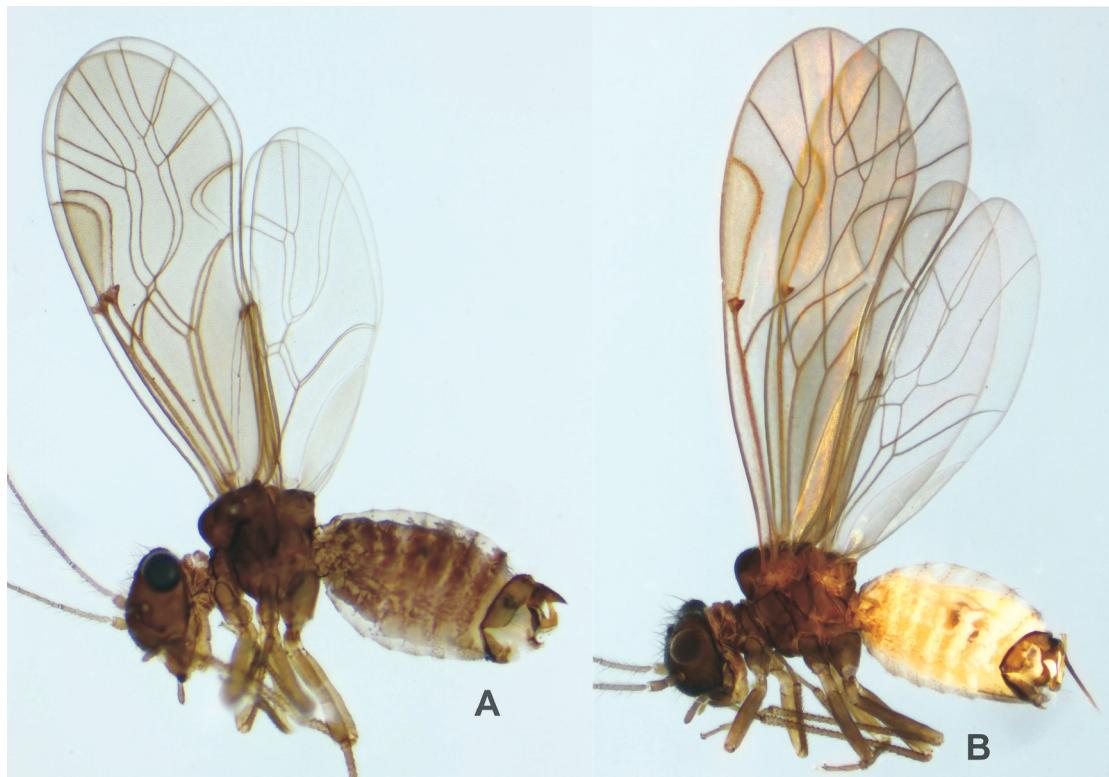


Figure 4. Lateral view of male *Lachesilla*. A. *L. ilama* n. sp. B. *L. cesarcardonai* n. sp.

one marginal trichobothrium without basal rosette (Figs. 4D-4E). Epiproct with two well defined halves, each with a long, curved, distally acuminate process (Fig. 3D).

**Measurements** (in  $\mu\text{m}$ ). FW: 1700, HW: 1325, F: 340, T: 630,  $t_1$ : 217,  $t_2$ : 90, ctt<sub>1</sub>: 19, Mx4: 75,  $f_1$ : 190,  $f_2$ : 160,  $f_3$ : 150,  $f_4$ : 120,  $f_5$ : 80,  $f_6$ : 70,  $f_7$ : 70,  $f_8$ : 70,  $f_9$ : 70,  $f_{10}$ : 80,  $f_{11}$ : 90, IO: 290, D: 100, d: 160, IO/d: 1.8, PO: 1.6.

**Specimens studied.** Holotype ♂. COLOMBIA. Valle del Cauca, Santiago de Cali, La Buitrera, 26.xii.2010, R. González. (MUSENUV). Paratypes: 1♂, same locality and collector as the holotype, 23.i.2011. (MUSENUV). 1♂, same locality and collector, 1.v.2013 (MUSENUV). 1♂, Santiago de Cali, Parque Las Garzas, 21.i.2009 (MUSENUV).

**Etymology.** The specific name is a tribute to the llamas, an ethnic group that inhabited, from 1500-0 B. C., in what is now Valle del Cauca.

### Discussion

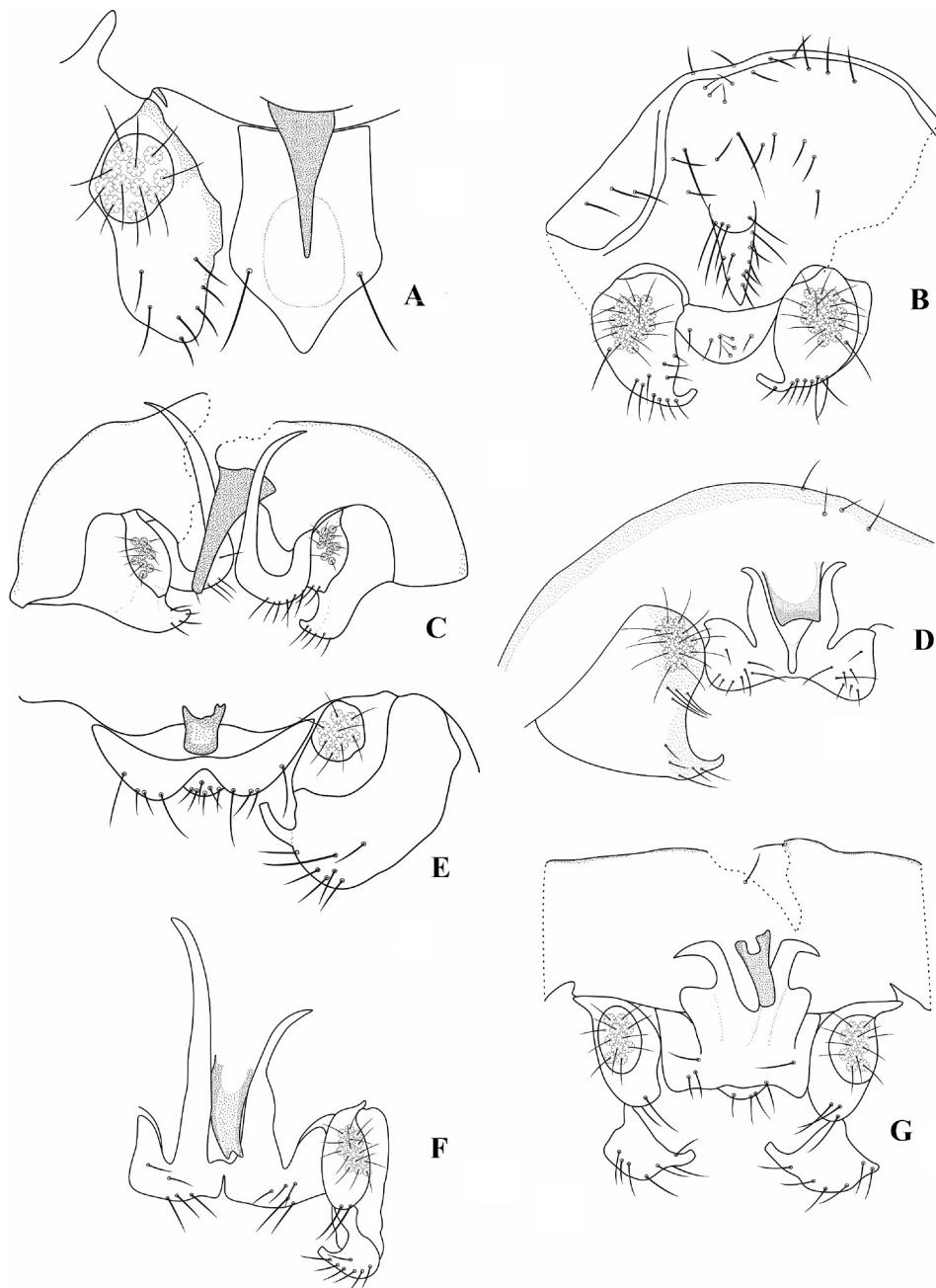
Species of *Lachesilla* in the *Pedicularia* group, in which the males have one mid clunial apophysis, were known only from the Departments of Cuzco and Madre de Dios, Peru. They are here now recorded in Colombia. Several Afro-Eurasian species of *Lachesilla* in the *Pedicularia* group have males with two clunial apophyses (see García Aldrete 2010). The function of these apophyses is unknown.

The assemblage of species in the *Pedicularia* group, with males having one mid clunial apophysis is strictly South American; the species in it have the phallosome, hypandrium and claspers built on the same plan, and, except for *L. macropudenda*, all have the male epiproct with two curved processes directed backwards, flanking the clunial apophysis. These species can be separated on basis of the shape of the clunial apophysis, the shape of the epiproct, the posterior border of the clunium, and the distal ends of the claspers, either fused or independent.

These seven species are quite distinct from *Ceratolachesillus quinquecornus* Li, and from *L. cerorma* García Aldrete, that belongs in a different species group. In the species assemblage referred above, *L. caesarcardonai* and *L. macropudenda* stand apart from all the others: the former, on account of the very long and slender acuminate apophysis, and by having the clunium extended posteriorly, next to each paraproct, to join each antero-lateral corner of the epiproct, and the latter, on account of lacking epiproctal processes. *L. ilama* is closer to *L. convexcornis* than to the other species in the assemblage, on basis of the broad clunial apophyses, and by having the distal ends of the claspers fused.

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**Figure 5.** Male clunial apophyses, epiproct and paraprocts in *Lachesillinae*. **A.** *Ceratolachesillus quinquecornus* Li. **B.** *L. cerorma* García Aldrete. **C.** *L. carpinteroi* García Aldrete. **D.** *L. convexicornis* García Aldrete. **E.** *L. macropudenda* García Aldrete. **F.** *L. asymmetriproctus* García Aldrete. **G.** *L. williamsi* García Aldrete.

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