



Article

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Four new species of *Hemicaecilius* Enderlein (Lachesillidae: Psocoptera) from Valle del Cauca, Colombia

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Abstract

Four related species of *Hemicaecilius*, from Valle del Cauca, Colombia, are here described and illustrated. They constitute a species assemblage distinct from two of the known species of the genus, *H. venezolanus* and *H. cuzcoensis*, found to the north and south, respectively from Valle del Cauca, along the Andes. The types are deposited in the Entomological Museum, Universidad del Valle, Santiago de Cali, Colombia (MUSENUV).

Keywords: Andes, taxonomy, neotropics

Introduction

The lachesillid genus *Hemicaecilius* Enderlein, presently includes three species: *H. bogotanus* Enderlein, of which only one forewing and one hindwing remain, *H. venezolanus* García Aldrete & Mockford, known from one female, and *H. cuzcoensis* García Aldrete & Mockford, known from one male (García Aldrete & Mockford, 1997, 2011). Recently, two of us (RGO and NSC), collected a sizable number of specimens of this genus in Valle del Cauca, Colombia, that represent four undescribed species; the finding of these specimens is significant, as the females agree in general with the female body plan of *H. venezolanus*, and the males agree in general with the male body plan of *H. cuzcoensis*; although these Colombian species constitute an assemblage distinct from the species mentioned above, their finding provides a sound ground to establish a diagnosis of the genus. The purpose of this paper is to describe and illustrate the new species, to characterize them as distinct from *H. cuzcoensis* and *H. venezolanus*, and to present a diagnosis of *Hemicaecilius*.

Material and Methods

77 specimens were available for study, of these, 16 were dissected in 80% ethyl alcohol, and their parts were then mounted on slides in Canada Balsam, following standard procedures (see González Obando *et al.*, 2011). Color was recorded from whole specimens in 80% ethyl alcohol, under a dissecting microscope at 80X, with cold white light illumination. Standard measurements of slide mounted parts were taken using an ocular micrometer mounted in a Nikon Eclipse 200 microscope; in the descriptions below, they are given in μm . Illustrations are from digital photographs taken with a Canon T3i camera and Helicon Focus program, some were processed in a vector graphics editor CorelDraw (González Obando *et al.*, 2011). Abbreviations, for parts measured are: FW: right fore wing; HW: right hindwing; F, T, t1, t2: femur, tibia and tarsomeres of right hind leg; ctt1: number of ctenidobothria on t1; Mx4: fourth segment of right maxillary palpus; f1...fn: flagellomeres 1...n; IO: minimum distance between compound eyes; D and d: antero-posterior diameter and transverse diameter, respectively, of right compound eye. The types and other specimens studied, are deposited in the Entomological Museum of the Universidad del Valle, Santiago de Cali, Colombia (MUSENUV).

A diagnosis of *Hemicaecilius*

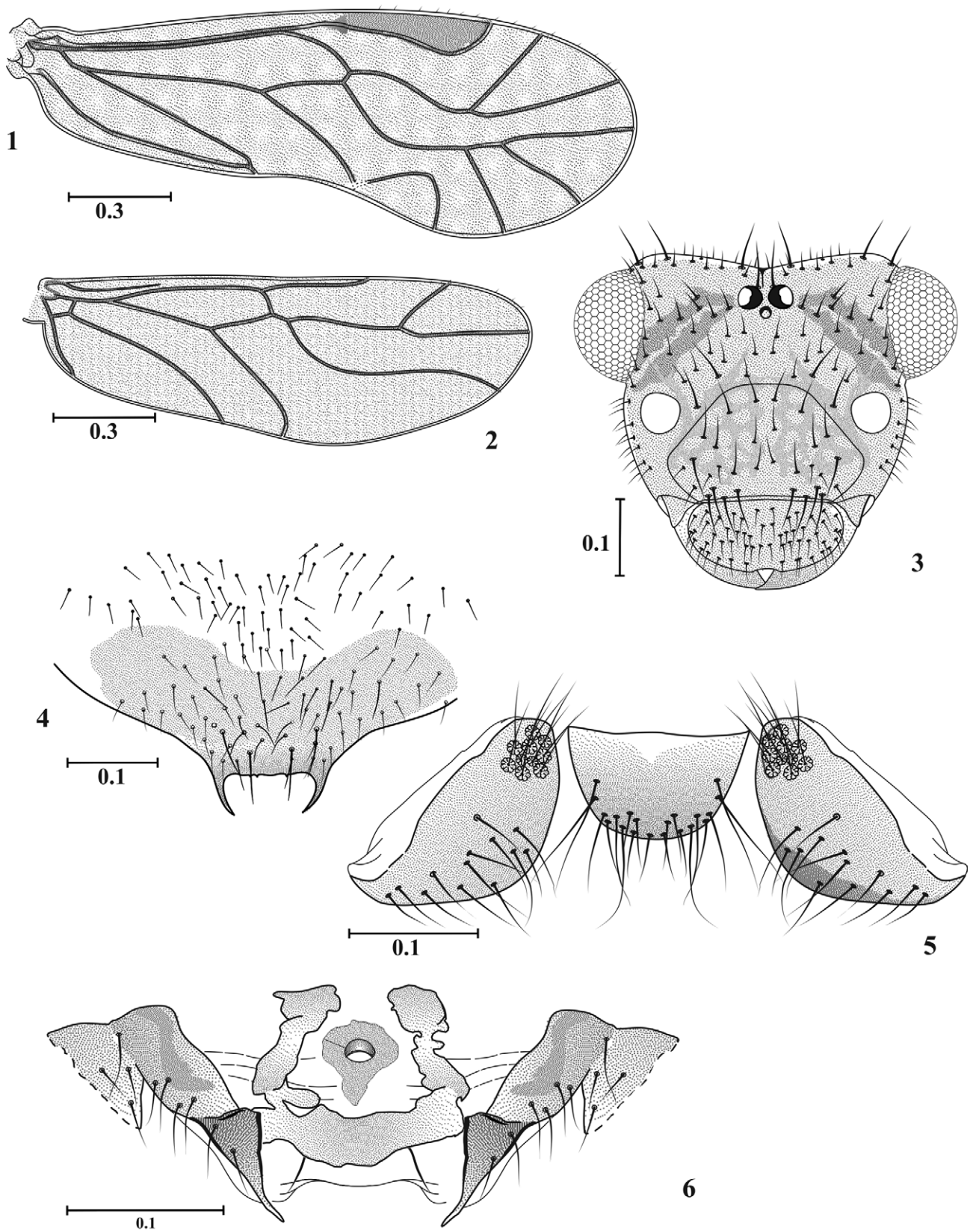
The information provided by the seven known species of *Hemicaecilius*, allow us to present a diagnosis of the genus as follows:

Belonging in the Lachesillinae. Head vertex slightly obtusely concave, compound eyes below the level of the vertex, third ocellus smaller than the two anterior ones; lacinial tip bicuspid, with outer cusp much larger than the inner one. Forewing Rs-M joined by a crossvein; hindwing Rs-M fused. Female subgenital plate with four distinct mesal macrosetae on distal third, and two posterior lateral projections; gonapophyses joined to sides of the ninth sternum. Hypandrium fused to distal halves of claspers, with or without a median posterior projection; distal halves of claspers long, distally acuminate; phallosome apodemes small, Y shaped. Paraprocts with mesal prongs. Epiproct with or without a median posterior projection.

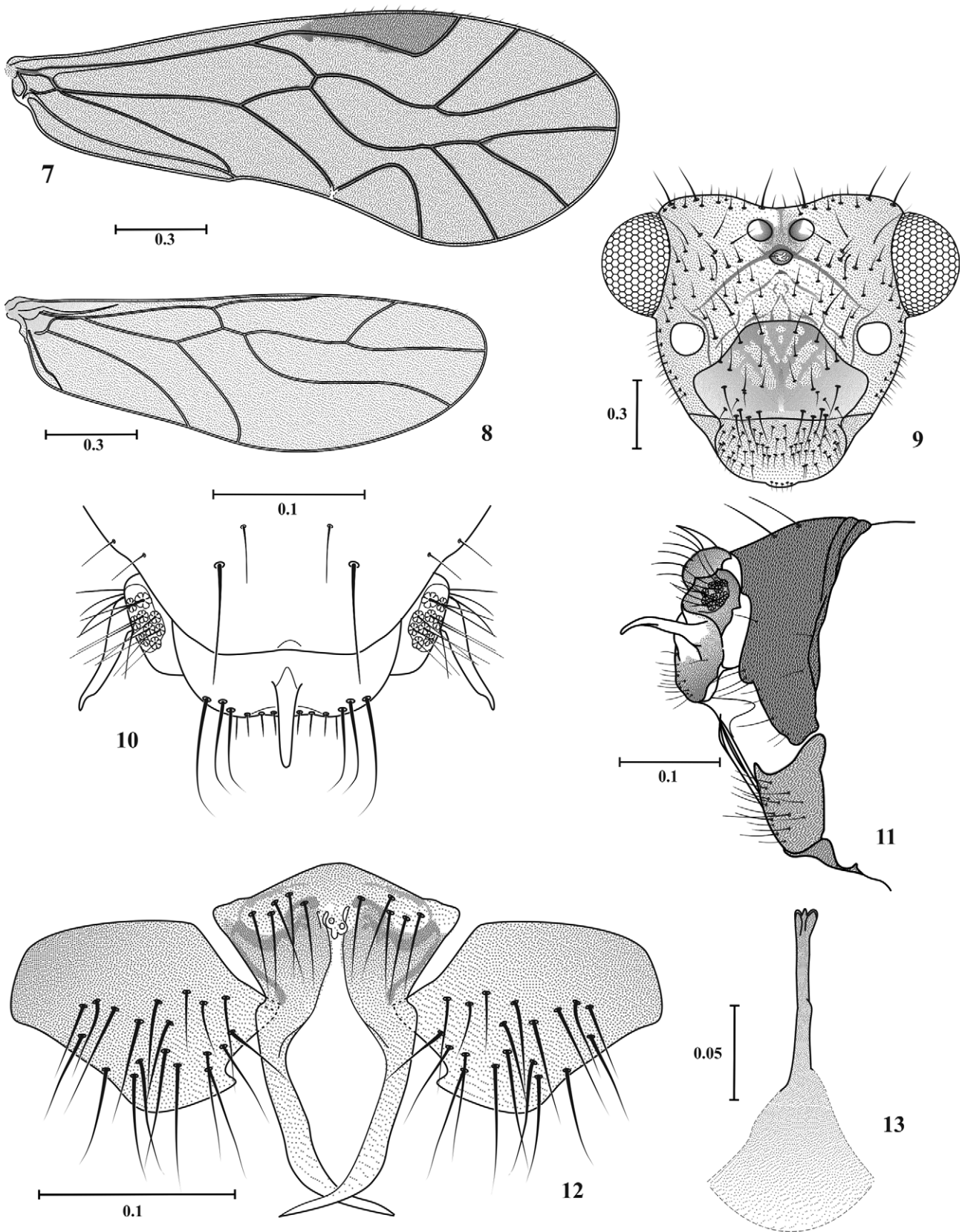
A key to the species of *Hemicaecilius*

(*H. bogotanus* Enderlein not included)

1. Females 2
- Males 6
2. Lateral posterior projections of subgenital plate slender, acuminate; posterior border of subgenital plate straight or slightly concave (Figs. 4, 22, 29, 36); gonapophyses with proximal and distal halves well defined (Figs. 6, 24, 31, 38) 3
- Lateral posterior projections of subgenital plate stout, blunt ended; posterior border of subgenital plate convex; gonapophyses of one piece, with proximal and distal halves undefined. Distribution: Trujillo, Venezuela
..... *H. venezolanus* García Aldrete & Mockford
3. Lateral posterior projections of subgenital plate elongate (Figs. 4, 22, 29); posterior border of subgenital plate straight; ninth sternum with large, pigmented areas (Figs. 6, 24, 31) 4
- Lateral posterior projections of subgenital plate very short (Fig. 36); posterior border concave; ninth sternum unpigmented, other than the ring surrounding the spermapore (Fig. 38). Distribution: Valle del Cauca, Colombia *H. rauli* n. sp.
4. Spermapore inscribed in a broad pigmented area (Figs. 24, 31); subgenital plate deeply pigmented posteriorly (Figs. 22, 29) 5
- Spermapore surrounded by a pigmented rim, extended posteriorly in the middle (Fig. 6); subgenital plate not posteriorly pigmented as above (Fig. 4). Distribution: Valle del Cauca, Colombia *H. mockfordi* n. sp.
5. Lateral posterior projections of subgenital plate curved inwards (Fig. 22); spermapore inscribed in a broad, longitudinal, irregularly rectangular pigmented area, flanked by longitudinal, irregular pigmented bands (Fig. 24). Distribution: Valle del Cauca, Colombia *H. smithersi* n. sp.
- Lateral posterior projections of subgenital plate straight (Fig. 29); spermapore inscribed in a central, rounded pigmented area, with a broad, elongate, irregular pigmented arm on each side (Fig. 31). Distribution: Valle del Cauca, Colombia
..... *H. nicolasi* n. sp.
6. Hypandrium without an elongate mid posterior projection, fused to distal halves of claspers (Fig. 12); epiproct with a mid posterior projection (Fig. 10) 7
- Hypandrium with an elongate mid posterior projection, fused to distal halves of claspers to form a trident structure (Figs. 27, 34, 41); epiproct without a mid posterior projection (Figs. 25, 32, 39) 8
7. Proximal halves of claspers elongate, elliptic; distal halves of claspers long, slender, antepically dilated; paraproct with a sickle shaped prong, bearing a basal "handle"; epiproct with a short, slender, mid posterior projection. Distribution: Cuzco, Peru *H. cuzcoensis* García Aldrete & Mockford
- Proximal halves of claspers broad, approximately rounded (Fig. 12); distal halves of claspers stout, curved, distally acuminate, not antepically dilated; paraprocts with straight mesal prong (Fig. 10); epiproct with stout, elongate mid posterior projection (Figs. 10, 11). Distribution: Valle del Cauca, Colombia *H. mockfordi* n. sp.
8. Mid posterior projection of hypandrium narrow based, straight, long, slender (Figs. 27, 41); proximal halves of claspers broadly triangular or elliptic; prongs of paraprocts smooth (Figs. 25, 39) 9
- Mid posterior projection of hypandrium wide based, shorter than above, stout, distally curved (Fig. 34); proximal halves of claspers irregularly triangular, angulate; prongs of paraprocts with a mesal denticle on inner edge (Figs. 32, 33). Distribution: Valle del Cauca, Colombia *H. nicolasi* n. sp.
9. Proximal halves of claspers broadly triangular (Fig. 41); phallosome apodemes slender, with long stem (Fig. 42). Distribution: Valle del Cauca, Colombia *H. rauli* n. sp.
- Proximal halves of claspers broadly elliptic (Fig. 27); phallosome apodemes stout, with short stem (Fig. 28). Distribution: Valle del Cauca, Colombia *H. smithersi* n. sp.



FIGURES 1–6. *Hemicaecilius mockfordi* n. sp. female. 1. Forewing. 2. Hindwing. 3. Front view of head. 4. Subgenital plate. 5. Epiproct and paraprocts. 6. Gonapophyses and ninth sternum. Scales in mm.



FIGURES 7–13. *Hemicaecilius mockfordi* n. sp. Male. 7. Forewing. 8. Hindwing. 9. Front view of head. 10. Epiproct, paraprocts and clunium. 11. Side view of genitalia. 12. Hypandrium and claspers. 13. Phallosome apodemes. Scales in mm.

***Hemicaecilius mockfordi* n. sp.**

(Figs. 1–15)

Female. Color. Body dark brown. Compound eyes black, ocelli hyaline, with ochre centripetal crescents (Fig. 3). Distal segment of maxillary palps more pigmented than the others. Antennae and legs brown. Wings brown, opaque, R1 dark brown, much more pigmented than the other veins (Figs 1, 2 and 15).

Morphology. Forewing L/W: 2.8; pterostigma long, wider posteriorly, lp/wp: 3.52. Areola postica triangular, slanted posteriorly (Figs. 1 and 15). Hindwing L/W: 2.9 (Fig. 2). Subgenital plate broad, setose; pigmented area concave anteriorly in the middle; posteriorly with two slender, slightly curved inward, acuminate projections of medium length (Fig. 4); posterior border, between projections, straight, with small, pointed projections (Fig. 4). Gonapophyses with proximal half broad, almost rectangular, bearing four setae; distal half triangular, wide based, distally acuminate, with two setae (Fig. 6). Ninth sternum with two oblique, pigmented lines posterior to spermapore; this large, with a broad pigmented ring extended posteriorly in the middle; a large, irregular pigmented arch enclosing the spermapore (Fig. 6). Paraprocts semicircular, setose, with sensory fields bearing ten trichobothria in basal rosettes (Fig. 5). Epiproct trapeziform, with a field of setae on sides and along posterior border, as illustrated (Fig. 5).

Measurements. FW: 1850, HW: 1437, F: 310, T: 585, t1: 202, t2: 92, ctt1: 16, Mx4 :100, f1: 175, f2: 146, f3: 113, f4: 100, f5: 60, f6: 62, f7: 50, f8: 60, f9: 50, f10: 50, f11: 70, IO: 315, D: 95, d: 150, IO/d: 2.1.

Male. Color. Same as the female.

Morphology. Forewing L/W: 2.64. Pterostigma as in the female, lp/wp: 3.31. Areola postica triangular, not slanted posteriorly (Figs. 7 and 14). Hindwing L/W: 2.96 (Fig. 8). Hypandrium fused to the distal halves of the claspers, forming a long structure of two arms; each arm stout, wide based, long, distally acuminate, bent inwards (Fig. 12); proximal half of each clasper large, irregularly rounded, with long setae over the surface, separated from the distal half by membranes (Fig. 12). Phallosome (Fig. 13). Paraprocts broad, sclerotized, setose as illustrated (Figs. 10 and 11), with a long, slender, slightly curved mesal prong; sensory fields elliptic, with 9–10 trichobothria in basal rosettes. Epiproct trapeziform, posteriorly with a stout, sclerotized projection in the middle, distally truncate; a setal field on each postero-lateral corner, with long setae (Figs. 10 and 11).

Measurements. FW: 2012, HW: 1575, F: 355, T: 650, t1: 210, t2: 95, ctt1: 18, Mx 4: 95, f1: 200, f2: 190, f3: 156, f4: 120, f5: 70, f6: 75, f7: 60, f8: 70, f9: 55, f10: 62, f11: 80, IO: 350, D: 100, d: 160, IO/d: 2.18.

Specimens studied. Holotype male. **COLOMBIA**, Valle del Cauca, El Porvenir, Los Yarumos Natural Reserve (03°27'02.2"N: 76°39'32.1"W, 1994 m), 27.iv.2012, MUSENUV slide cod. 23669. O. Saens and N. Calderón. Paratypes: 2 females, same locality as the holotype, 28.iv.2012, MUSENUV slide cod. 23670–23671, R. González and N. Carrejo. 2 males and 5 females, Valle del Cauca, Santiago de Cali, Km. 18, ca. Zingara (03°30'38.3"N: 76°37'13.8"W, 1990 m), 9.vi.2012, MUSENUV slides cod. 24021–24022. R. González. 2 males, 18 females, Valle del Cauca, El Cerrito, Cerrito Adentro (3°38'53.3"N: 76°9'19.6"W, 1990 m), 8.vii.2012, N. Carrejo & R. González. All specimens taken beating shrubs and ferns with dead, hanging leaves.

Etymology. This species is dedicated, with great pleasure, to Dr. Edward L. Mockford, Distinguished Professor at Illinois State University, Normal, Illinois, in recognition to his leadership and seminal contributions in the study of Psocoptera worldwide.

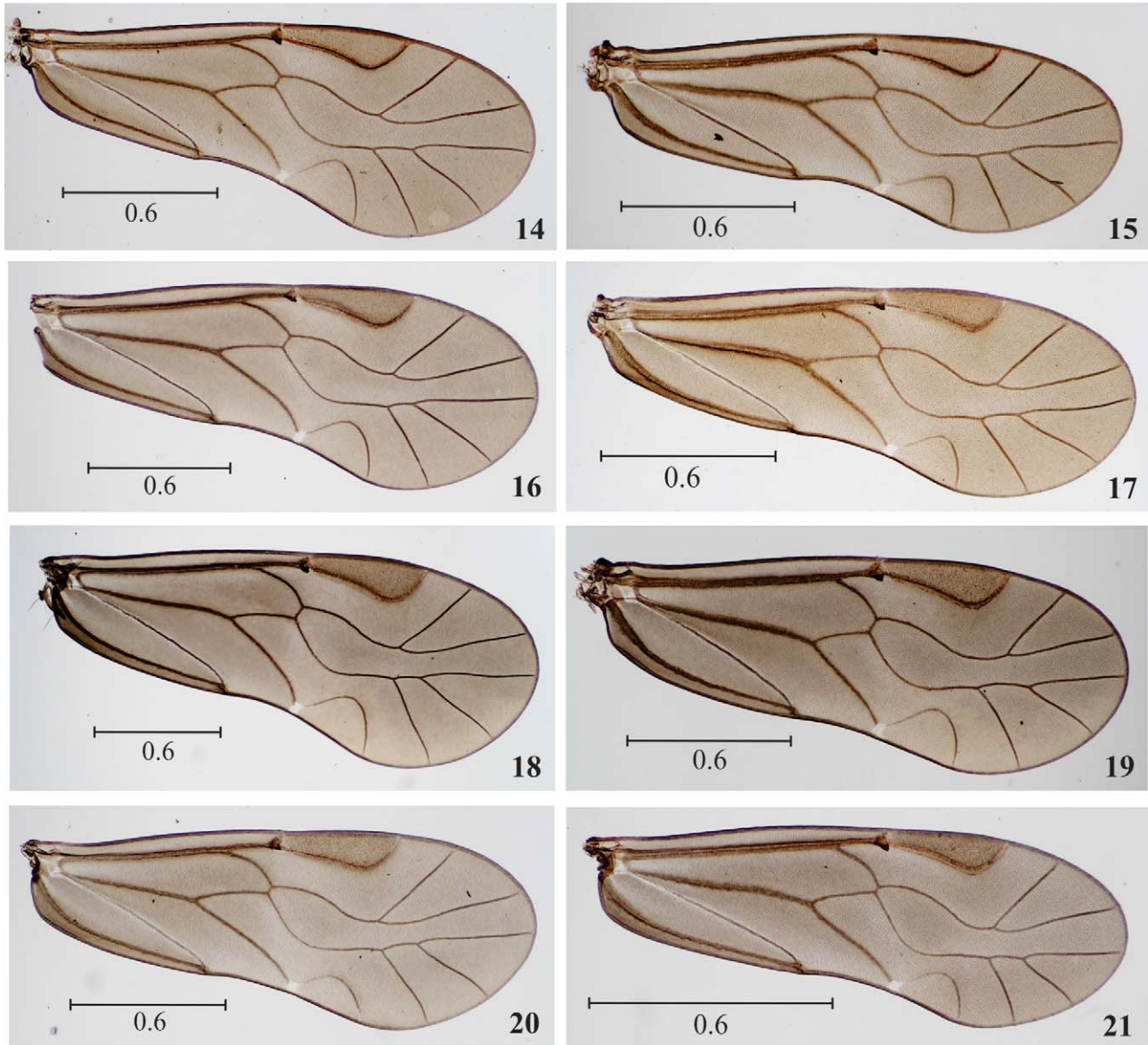
***Hemicaecilius smithersi* n. sp.**

(Figs. 16–17, 22–28)

Female. Color. Body dark brown. Compound eyes black, ocelli hyaline, with ochre centripetal crescents. Wings reddish brown, opaque, R1 dark brown (Fig. 17), distinctly more pigmented than the other veins. Abdomen pale brown, with brown, transverse subcuticular rings.

Morphology. Forewing L/W: 2.67; pterostigma long, wider posteriorly, lp/wp: 1.75. Areola postica broadly triangular (Fig. 17). Hindwing L/W: 2.86. Subgenital plate (Fig. 22), broad, setose; pigmented area widely concave anteriorly; distal third strongly pigmented; lateral posterior projections slender, curved, acuminate, posterior border, between projections, with small pointed projections in the middle. Gonapophyses proximally broad, almost

rectangular, bearing three setae; distal halves wide based, narrowing distally, acuminate (Fig. 24). Ninth sternum (Fig. 24): spermapore central, large, circular, inscribed in a broad, pigmented area as illustrated, flanked by one slender, longitudinal pigmented band. Paraprocts (Fig. 23), almost semicircular, with a large mesal seta and a field of setae on outer margin; sensory fields with 9–10 trichobothria on basal rosettes. Epiproct (Fig. 23) trapeziform, with field of setae on sides and posterior third, as illustrated.



FIGURES 14–21. Forewings of *Hemicaecilius* spp. 14, 16, 18 and 20, males. 15, 17, 19 and 21, females. 14–15. *H. mockfordi* n. sp. 16–17. *H. smithersi* n. sp. 18–19. *H. nicolasi* n. sp. 20–21. *H. rauli* n. sp. Scales in mm.

Measurements. FW: 1900, HW: 1500, F: 317, T: 430, t1: 140, t2: 102, ctt1: 16, Mx 4: 103, f1: 194, f2: 180, f3: 148, f4: 106, f5: 60, f6: 73, f7: 58, f8: 62, f9: 55, f10: 58, f11: 65, IO: 320, D: 91, d: 160, IO/d: 2.0

Male. Color. Same as the female.

Morphology. Forewing L/W: 2.60: pterostigma long, wider posteriorly, lp/wp: 1.80 (Fig. 16). Hindwing L/W: 2.78. Hypandrium (Fig. 27) wide, narrow, with a stout, elongate, acuminate posterior projection in the middle. Proximal halves of claspers (Fig. 27) large, broad, setose, almost elliptic; distal halves of claspers elongate, slender, curved, distally acuminate (Fig. 27). Phallosome apodemes (Fig. 28). Paraprocts (Figs. 25 and 26) broad, setose as illustrated, bearing a mesal, long, stout, acuminate prong; sensory fields with 10–11 trichobothria on basal rosettes.

Epiproct (Fig. 25), straight anteriorly, pigmented area concave posteriorly, to form two side lobes, with an unpigmented area between them, bearing a row of setae posteriorly; each lobe with a setal field as illustrated.

Measurements. FW: 2100, HW: 1632, F: 390, T: 690, t1: 235, t2: 104, ctt1: 17, Mx 4: 100, f1: 203, f2: 190, f3: 152, f4: 130, f5: 81, f6: 80, f7: 60, f8: 80, f9: 60, f10: 70, f11: 72, IO: 350, D: 100, d: 170, IO/d: 2.06.

Specimens studied. Holotype male. **COLOMBIA**, Valle del Cauca, Santiago de Cali, San Antonio Forest (03°29'27.7"N: 76°37'40.9"W, 2130 m), 25.v.2012, MUSENUV slide cod. 24023, R. González and N. Carrejo. Paratypes: 1 female, same locality as the holotype, 27.i.2012, MUSENUV slide cod. 24024, R. González, 3 females, same locality as the holotype (03°29'23.5"N: 76°37'39.4"W, 2142 m), 23.v.2012, MUSENUV slide cod. 24025, R. González and N. Calderón, 1 male, 3 females, same locality as the holotype, 25.v.2012, R. González & N. Carrejo. 4 males, 13 females, same locality as the holotype, 2.VI.2012, MUSENUV slide cod.24026, R. González and N. Carrejo. 1 male, 9 females, same locality as the holotype, 9.vi.2012, R. González. All the specimens taken beating tree branches and shrubs with dead leaves.

Etymology. This species is dedicated to the late Dr. Courtenay N. Smithers, in recognition of his many and important contributions to the study of Australian, New Guinean and Melanesian Psocoptera. He will always be remembered with love and gratitude by all of us who were fortunate to know him.

Hemicaecilius nicolasi n. sp.

(Figs. 18–19, 29–35)

Female. Color. Same as the two preceding species.

Morphology. Forewing L/W: 2.61; pterostigma long, wider posteriorly, lp/wp: 1.77 (Fig. 28). Areola postica broad, apically rounded (Fig. 19). Hindwing L/W: 2.78. Subgenital plate broad, setose, pigmented area broadly concave anteriorly; posterior fourth deeply pigmented, posterior projections slender, straight, acuminate, slightly directed inward; posterior border, between projections, with small, pointed extensions (Fig. 29). Gonapophyses (Fig. 31): proximal halves broad, almost rectangular, bearing two setae; distal halves wide based, narrowing distally, acuminate. Ninth sternum (Fig. 31): spermapore central, surrounded by a strongly pigmented rim, inscribed in a broad, irregular pigmented area as illustrated. Paraprocts (Fig. 30), almost elliptic, setose, sensory fields with 10–11 trichobothria in basal rosettes. Epiproct (Fig. 30) semicircular, with field of setae on sides and along posterior border, as illustrated.

Measurements. FW: 2000, HW: 1600, F: 390, T: 710, t1: 240, t2: 100, ctt1: 16, Mx 4: 114, f1: 200, f2: 180, f3: 150, f4: 112, f5: 70, f6: 72, f7: 61, f8: 65, f9: 60, f10: 60, f11: 78, IO: 350, D: 100, d: 160, IO/d: 2.19.

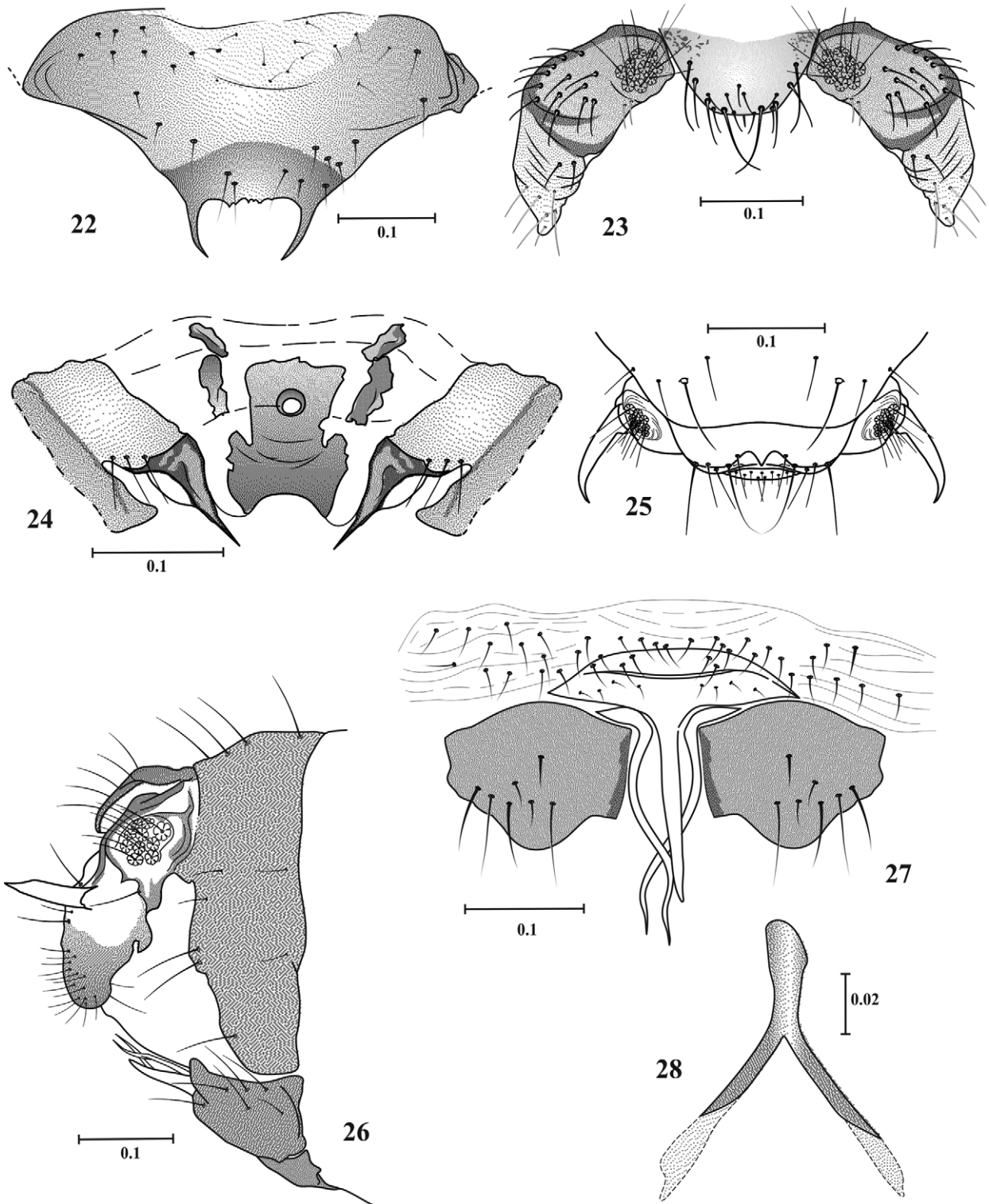
Male. Color. Same as the two preceding species.

Morphology. Forewing L/W: 2.47; pterostigma long, wider posteriorly, lp/wp: 2.81 (Fig. 18). Hindwing L/W: 2.78. Hypandrium long, narrow, with a wide based, elongate, stout, curved acuminate posterior projection in the middle (Fig. 34). Claspers (Fig. 34): proximal halves broad, setose, approximately triangular; distal halves slender, elongate, slightly curved, distally acuminate (Fig. 34). Phallosome apodemes (Fig. 35). Paraprocts broad, setose, with a long, stout, acuminate mesal prong, bearing a small denticle in the middle of the inner edge. Sensory fields with 18–20 trichobothria in basal rosettes (Fig. 32 and 33). Epiproct (Fig. 32) trapeziform, with an unpigmented area along posterior border, setal fields on each postero-lateral corner and along posterior margin, as illustrated.

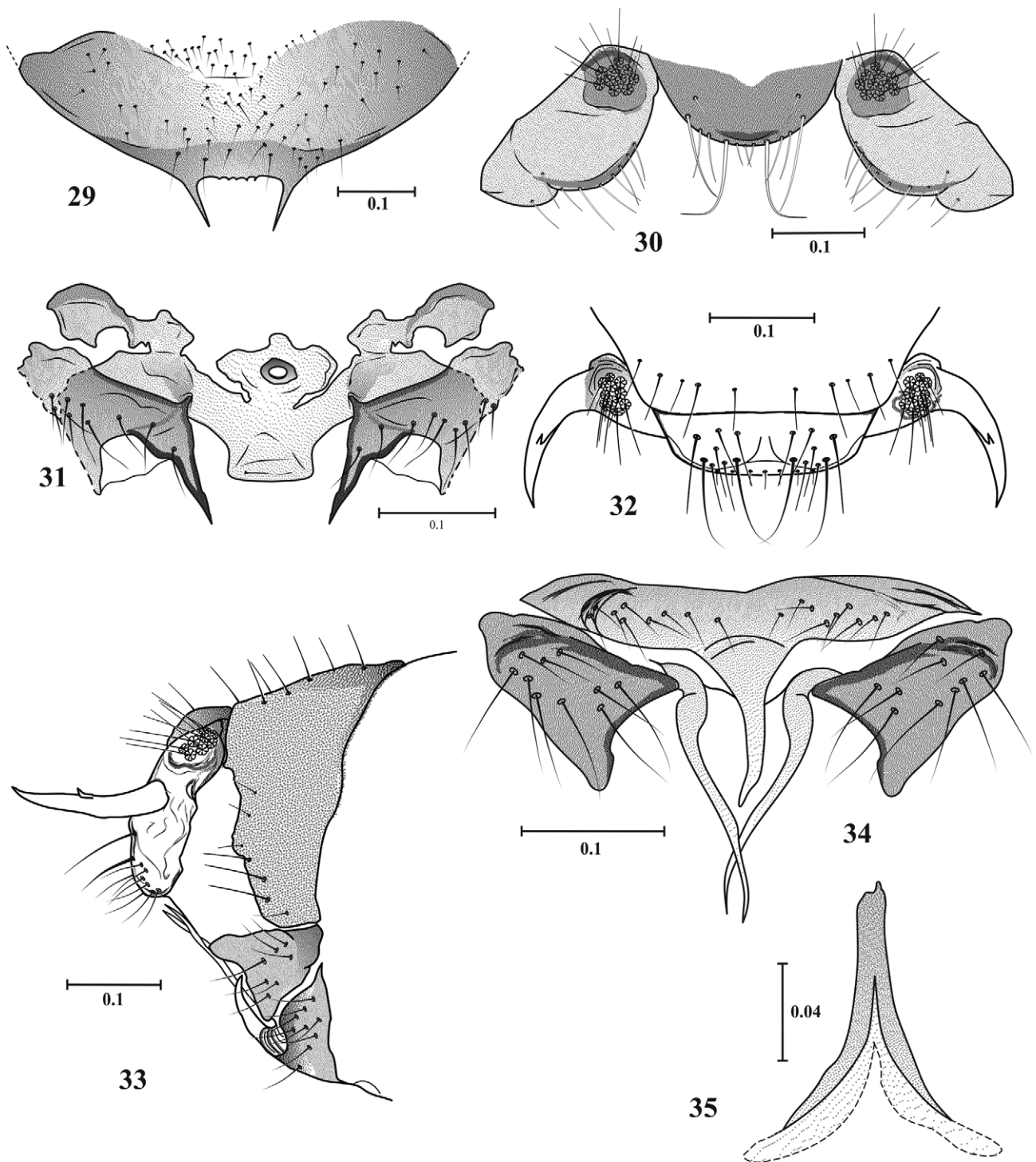
Measurements. FW: 2375, HW: 1875, F: 430, T: 800, t1: 270, t2: 116, ctt1: 20, Mx 4: 113, f1: 240, f2: 222, f3: 180, f4: 140, f5: 90, f6: 88, f7: 72, f8: 81, f9: 79, f10: 71, f11: 90, IO: 365, D: 102, d: 201, IO/d: 1.82.

Specimens studied. Holotype male. **COLOMBIA**, Valle del Cauca, Santiago de Cali, San Antonio Forest (03°29'27.7"N: 76°37'40.9"W, 2130 m), 2.vi.2012, MUSENUV slide cod. 24027, R. González and N. Carrejo. Paratypes: 2 females, 1 male, same locality as the holotype, 2.vi.2012, MUSENUV slide cod. 24028–24029, R. González and N. Carrejo. 1 female, same locality as the holotype, 23.v.2012, MUSENUV slide cod. 24030, R. González and N. Calderón. 1 female, same locality as the holotype, 25.v.2012, R. González & N. Carrejo. All specimens taken beating tree branches and shrubs with dead leaves.

Etymology. This species is dedicated to Nicolás David González Carrejo, the younger son of Ranulfo and Nancy, co-authors of this paper.



FIGURES 22–28. *Hemicaecilius smithersi* n. sp. 22–24. Female. 25–28. Male. 22. Subgenital plate. 23. Epiproct and paraprocts. 24. Gonapophyses and ninth sternum. 25. Clunium, epiproct and paraproct. 26. Side view of genitals. 27. Hypandrium and claspers. 28. Phallosome apodemes. Scales in mm.



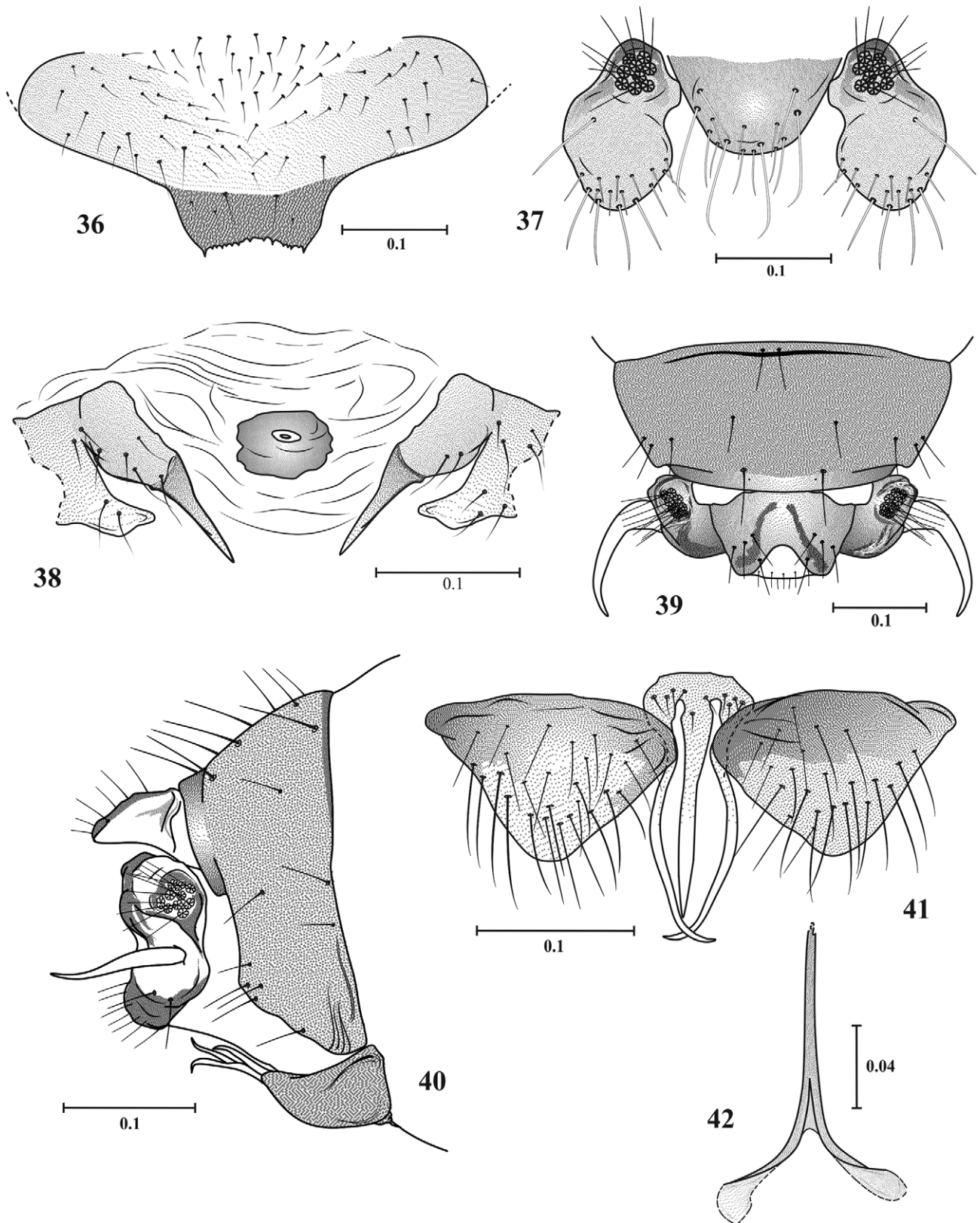
FIGURES 29–35. *Hemicaecilius nicolasi* n. sp. 29–31. Female. 32–35. Male. 29. Subgenital plate. 30. Epiproct and paraprocts. 31. Gonapophyses and ninth sternum. 32. Clunium, epiproct and paraproct. 33. Side view of genitals. 34. Hypandrium and claspers. 35. Phallosome apodemes. Scales in mm.

***Hemicaecilius rauli* n. sp.**

(Figs. 20–21, 36–42)

Female. Color (in 80% alcohol). Same as the three preceding species.

Morphology. Forewing L/W: 2.80. Pterostigma long, wider posteriorly, lp/wp: 1.52; areola postica wide, apically rounded (Fig. 21). Hindwing L/W: 2.90. Subgenital plate (Fig. 36), broad, setose, pigmented area widely



FIGURES 36–42. *Hemicaecilius rauli* n. sp. 36–38. Female. 39–42. Male. 36. Subgenital plate. 37. Epiproct and paraprocts. 38. Gonapophyses and ninth sternum. 39. Epiproct, paraprocts and clunium. 40. Side view of genitals. 41. Hypandrium and claspers. 42. Phallosome apodemes. Scales in mm.

concave; with broad trapeziform posterior projection, this with two short, acuminate side posterior projections; posterior border, between side projections, with small, pointed extensions. Gonapophyses (Fig. 38): proximal halves broad, almost rectangular, distal halves wide based, narrowing distally, acuminate. Ninth sternum (Fig. 38)

almost unpigmented, spermapore central, round, surrounded by a broad pigmented rim. Paraprocts (Fig. 37), broad, almost elliptic, with setal field distally, as illustrated, sensory fields with 8–9 trichobothria in basal rosettes. Epiproct (Fig. 37) trapeziform, with field of setae on sides and along posterior margin.

Measurements. FW: 1762, HW: 1412, F: 335, T: 574, t1: 182, t2: 100, ctt1: 12, Mx 4: 92, f1: 160, f2: 131, f3: 110, f4: 90, f5: 55, f6: 60, f7: 47, f8: 55, f9: 40, f10: 47, f11: 63, IO: 300, D: 80, d: 150, IO/d: 2.0.

Male. Color. Same as the three preceding species.

Morphology. Forewing L/W: 2.62. Pterostigma long, wider posteriorly, lp/wp: 3.39 (Fig. 20). Hindwing L/W: 2.82. Hypandrium (Fig. 41), fused to distal halves of the claspers, with a median, long, slender, distally acuminate projection, to form a trident structure, associated with membranes to proximal halves of the claspers, these large, broad, setose, almost triangular. Phallosome apodemes (Fig. 42). Paraprocts (Figs. 39 and 40), broad, setose, with a mesal, stout, acuminate long prong, slightly bent distally; sensory fields bearing 10–11 trichobothria in basal rosettes. Epiproct (Fig. 39) trapeziform, pigmented area posteriorly concave, forming two lobes, with an unpigmented area between the lobes, with a row of setae along posterior border.

Measurements. FW: 2000, HW: 1550, F: 350, T: 600, t1: 204, t2: 101, ctt1: 15, Mx 4: 90, f1: 190, f2: 170, f3: 145, f4: 120, f5: 70, f6: 75, f7: 60, f8: 65, f9: 50, f10: 62, f11: 80, IO: 330, D: 95, d: 155, IO/d: 2.13.

Specimens studied. Holotype male. **COLOMBIA**, Valle del Cauca, Santiago de Cali, San Antonio Forest (03°29'27.7"N: 76°37'40.9"W, 2130 m), 23.v.2012, MUSENUV slide cod. 24031, R. González. Paratypes: 1 female, 1 male, same locality as the holotype, 2.vi.2012, MUSENUV slide cod. 24032–24033, R. González and N. Carrejo. 2 females, same locality as the holotype, 4.vi.2012, R. González & N. Carrejo.

Etymology. This species is dedicated to Raúl Ernesto González Carrejo, elder son of Ranulfo and Nancy, co-authors of this paper.

TABLE 1. Character states of eight characters in six species of *Hemicaecilius*.

Character	<i>H. venezolanus</i>	<i>H. cuzcoensis</i>	<i>H. mockfordi</i>	<i>H. smithersi</i>	<i>H. nicolasi</i>	<i>H. rauli</i>
1. Posterior projections of subgenital plate blunt ended (0), or acuminate (1)	0	-	1	1	1	1
2. Posterior border of subgenital plate convex, abundantly denticulate (0), or straight, sparsely denticulate (1)	0	-	1	1	1	1
3. Gonapophyses with indistinct (0), or distinct (1) proximal and distal halves	0	-	1	1	1	1
4. Area surrounding spermapore unpigmented (0), or distinctly pigmented (1)	0	-	1	1	1	1
5. Proximal halves of claspers elongate, elliptic (0), or broad, almost round (1)	-	0	1	1	1	1
6. Distal halves of claspers slender, straight, dilated anteapically (0), or curved, acuminate, not dilated anteapically	-	0	1	1	1	1
7. Hypandrium without (0), or with (1) a mid posterior projection	-	0	0	1	1	1
8. Male epiproct with (0) or without (1) a mid posterior projection	-	0	0	1	1	1

Discussion

As shown in Table 1, the four species described in this work, constitute an assemblage of related species, that differ from *H. venezolanus* García Aldrete & Mockford, in characters 1, 2, 3 and 4. They also differ from *H. cuzcoensis*

in characters 5 and 6; *H. mockfordi* shares with *H. cuzcoensis* characters 7 and 8. The four species here described, differ among themselves in the pattern of pigmentation of the ninth sternum, *H. mockfordi* lacks a mid posterior projection of the hypandrium, and the male epiproct has a mid posterior projection; *H. smithersi*, *H. nicolasi* and *H. rauli* (that are found in the same locality, separate in distribution from *H. mockfordi*), lack a mid posterior projection in the male epiproct, and all have an elongate mid hypandrial projection; *H. nicolasi* is the only one having a median tooth on the inner edge of the paraproctal prong, and a wide based, curved hypandrial projection. In all cases, the phallosome apodemes are similar, and unfortunately this structure is not available for comparison in *H. cuzcoensis*. *H. mockfordi* presents a wider range of distribution than the other three, occurring in the west and central cordilleras, and, although the species of this genus are restricted to the Andes, in what Morrone (2004) calls the South American transition zone, they show significant differences in the north (*H. venezolanus*), in the center-north (the species here described), and in the center-south (*H. cuzcoensis*). *H. bogotanus* continues to be an enigma, and it would be worth the effort to explore more the eastern mountains of Bogotá, to attempt to find it, and to do more collecting in the South American transition zone, north and south of Cuzco, for the possibility of additional species.

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References

- García Aldrete, A.N. & Mockford, E.L. (1997) The position of *Hemicaecilius* (Psocoptera: Lachesillidae) and description of a new species from Venezuela. *Entomological News*, 108 (2), 102–106.
- García Aldrete, A.N. & Mockford, E.L. (2011) A new species of *Hemicaecilius* Enderlein based on a male from Cuzco, Peru (Psocodea: Psocoptera: Lachesillidae). *Acta Zoológica Mexicana* (n. s.), 27 (2), 419–423.
- González Obando, R., García Aldrete, A.N. & Carrejo, N.S. (2011) New species of *Steleops* (Psocodea: Psocoptera: Psocidae) from Brazil, Colombia, Mexico and Peru. *Zootaxa*, 3139, 28–54.
- Morrone, J.J. (2004) Panbiogeografía, componentes bióticos y zonas de transición. *Revista Brasileira de Entomología*, 48 (2), 149–162.