

# New species of *Loneura* Navás, 1927 (Insecta: Psocodea: 'Psocoptera': Ptiloneuridae) from Peru

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**Abstract.** Two species of Peruvian *Loneura* Navás, *L. amakii* sp. nov., and *L. kosnipatensis* sp. nov., are here described and illustrated; they belong in infrageneric group II of González Obando *et al.* (2020). The number of species of Peruvian *Loneura* is raised to four. The number of species of *Loneura* is raised to 38.

**Keywords.** Taxonomy; Epipsocetidae; South America.

## INTRODUCTION

*Loneura* Navás, 1927, is one of eleven genera in the family Ptiloneuridae (Psocodea: Epipsocetidae). The genus was re-defined, and some of the species included in it were transferred to *Ptiloneura* Enderlein (García Aldrete *et al.*, 2020). *Loneura* presently includes 36 described species (García Aldrete *et al.*, 2011a, 2011b; Mendivil Nieto *et al.*, 2017; Moura Lima *et al.*, 2019; González Obando *et al.*, 2020; González Obando & Carrejo-Gironza, 2020). The species described to date have been found in Belice, Bolivia, Brazil, Colombia, Costa Rica, Ecuador, Guatemala, Mexico, Nicaragua, Panama and Peru. From samplings with led light traps and direct search in natural areas of Cuzco, Peru, two other species of *Loneura* were found, to reach four species recorded for this country. These two species are described and illustrated below.

## MATERIAL AND METHODS

The specimens were collected with a LED light trap and direct search on tree bark, using canvas beating sheets and oral aspirators. Three specimens were available for study, they were dissected in 80% ethanol, and their parts were mounted on glass slides in Canada balsam following standard procedures. For the preparation of the plates, the protocol regularly used in other studies of psocids was followed (see González Obando *et al.*, 2011).

Color was recorded from whole specimens, observed under a dissecting microscope illuminated with cold white light at 50X. Measurements (given in  $\mu\text{m}$ ) of parts on the glass slides (head, right wings and legs and genitalia), were taken with a micrometer, mounted on a Nikon Eclipse Ci microscope.

**Abbreviations of parts measured are as follows:** H: head median length (in dorsal view); MxW: maximum width of head capsule; Mx2, Mx4: lengths of second and fourth segment of right maxillary palpus, f1...fn: lengths of flagellomeres 1...n of right antenna, IO, D and d, respectively: minimum distance between compound eyes, antero-posterior diameter and transverse diameter of right compound eye, all in dorsal view of head; FW and HW: lengths of right fore- and hind- wings; W and w: width of fore- hind- wings; lp: pterostigma length; wp: pterostigma width; al: areola postica length; ah: areola postica height; F, T, t1-t3: lengths of femur, tibia and tarsomeres 1-3 of right hind leg, ctt1: number of ctenidiobothria on t1 of right hind leg. Ratios of head and wings were taken: H/MxW; H/D; PO: d/D; IO/d; FW/W; HW/w; lp/wp; al/ah (see González Obando *et al.*, 2011). The illustrations were made from digital photographs, taken with a Canon T5i camera and Helicon Focus program, processed in a Clip Studio Paint vector graphics editor program. The scales are given in mm. The specimens are deposited in the Entomological Museum, Universidad del Valle, Santiago de Cali, Colombia (MUSENUV).

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## RESULTS

### Description of new species

The species described below belong in group II (see González Obando *et al.*, 2020), by having the hypandrium of a single sclerite resulting from the fusion of the proximal ends of the side sclerites to the central sclerite, this extended mesally on each side, and with two posterior projections in the middle, variously shaped (García Aldrete *et al.*, 2011a, 2012).

#### *Loneura amankii* sp. nov. Male (Figs. 1-6)

**Diagnosis:** Hypandrium with a posterior, broad median concavity, posterior processes short, distally acuminate, curved inward (Fig. 5); lateral endophallic sclerites overlapping with the anterior sclerite, widened and mesally overlapping slightly between them; mesal sclerites fused, laminate and laterally widened (Fig. 6). Forewings with submarginal brown band.

**Color:** Body brown. Head pattern (Fig. 3), with an ochre-dark brown transverse band from the inner border of each compound eye to the ocellar triangle; another band from the inner border of each compound eye to the epistomal sulcus, connecting with the ocellar triangle. Vertex, occiput and post-occiput light brown. Compound eyes black, ocelli hyaline, with ochre centripetal crescents. Labrum, anteclypeus and postclypeus brown. Genae brown, with ochre spots; postgenae light brown. Antennae light brown; flagellomeres cream apically. Maxillary palps light brown to cream, Mx4 dark brown distally. Prothorax light brown. Tergal lobes of meso- and metathorax brown, with small light brown spots. Pleura brown to ochre, with cream areas. Legs light brown, tibiae and tarsi dark brown, coxae cream, with basal and apical brown spots; hind femora light brown, with dark brown spots. Wings almost hyaline, with small brown and greyish spots, veins dark brown. Forewings with a submarginal greyish band from  $R_{4+5}$  to  $M_5$ ; pterostigma hyaline, with small proximal and distal brown bands (Fig. 1), with brown spots in base of wing, apical part of A1, veins  $R_s$  (basally) and transverse  $rs-m$ ; veins with dark brown spots distally, at wing margin. Hindwings with brown spots distally on veins M at wing margin. Abdomen light brown, with ochre subcuticular spots. Clunium, epiproct and paraprocts light brown. Hypandrium brown to light brown; phallosome brown, endophallic sclerites dark brown.

**Morphology:** Head (Fig. 3): H/MxW: 1.63; H/d: 2.37; IO/MxW: 0.63. Vertex at the same level of the upper border of the compound eyes. Outer cusp of lacinial tips broad, with six denticles.  $Mx_4/Mx_2$ : 1.14. Forewings (Fig. 1): FW/W: 2.58. Pterostigma long: lp/wp: 5.08, areola postica rounded apically, almost twice as long as wide: al/ah: 1.87,  $R_{4+5}$  sinuous, M four to five-branched,

$M_4$  or  $M_5$  forked. Hindwings (Fig. 2): HW/w: 2.80; M three-branched,  $M_2$  forked. Hypandrium (Fig. 5) of a single sclerite, resulting from the fusion of the proximal ends of the side sclerites to the central sclerite, with great median concavity distally, outer margins strongly convex, posterior lobes with short processes tapered apically, curved inward (Fig. 5). Phallosome Y-shaped anteriorly, side struts slender, basally separated and articulated by a thin membrane; external parameres wide, with pores, no teeth on outer margin (Fig. 6). Three pairs of endophallic sclerites, anterior pair overlapping with lateral endophallic sclerites forming wide sclerites, each with elongated lateral lobes, anterior margins with fine and short teeth, and with an elongated process curved outward, mesal sclerite laminar, anterior margin with wide concavity (Fig. 6). Paraprocts (Fig. 4) robust, oval, with setal fields and macrosetae as illustrated; sensory fields with 23-28 trichobothria on basal rosettes. Epiproct (Fig. 4) semioval, with short setae and a field of microspicules and microsetae anteriorly.

**Measurements (in microns):** FW: 4950, HW: 3357, F: 1300, T: 2150, t1: 1010, t2: 82, t3: 170, ctt1: 30, f1: 930, f2: 920, f3: 740, f4: 605, f5: 400, Mx4: 312, IO: 420, D: 463, d: 320, IO/d: 1.31, PO: 0.69.

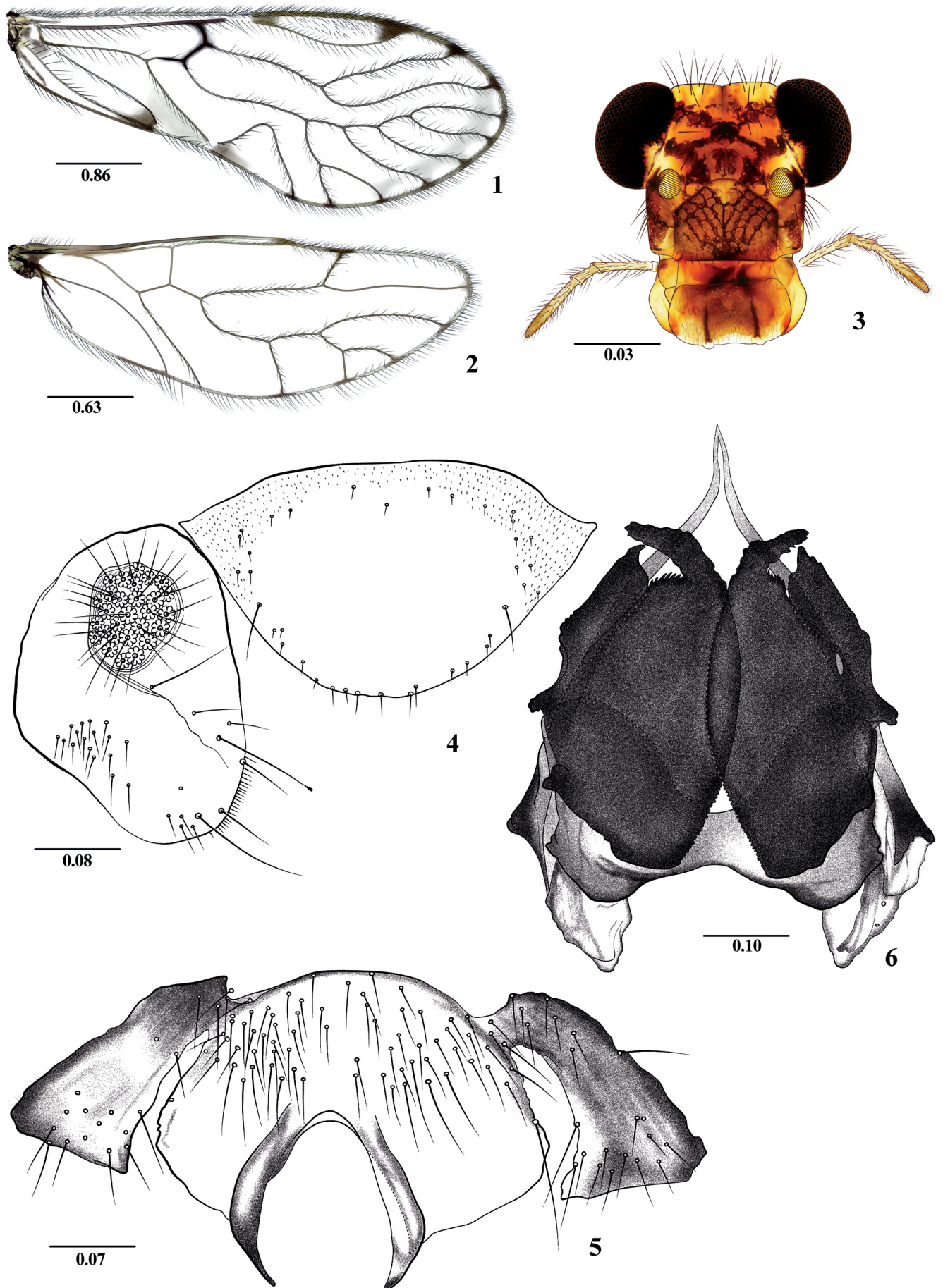
**Material studied:** Holotype male. Peru. Cuzco. Kosñipata, Pillcopata, Sapam Sachayoc-Tunky Wasi, 13°02'20.0"S: 71°30'22.2"W, 1,150 m, 25-26.IX.2019. N. Carrejo and R. González. LED light trap in forest canopy.

**Etymology:** This species is dedicated to Florencio Amanki, inhabitant and protector of a "paradise" in the Peruvian jungle (Sapam Sachayoc-Tunky Wasi).

#### *Loneura kosnipatensis* sp. nov. (Figs. 7-17)

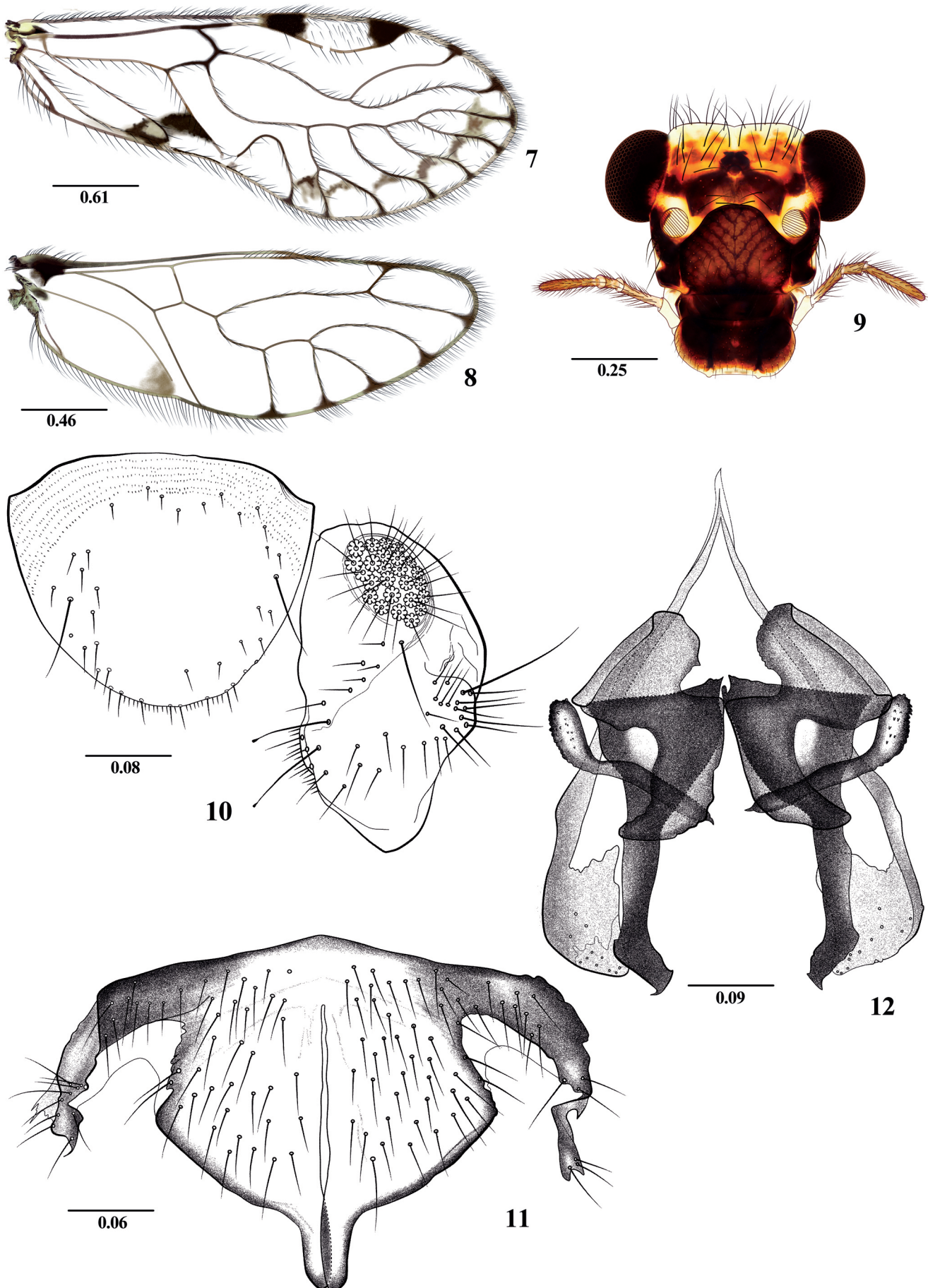
**Diagnosis:** Hypandrium deeply cleft posteriorly in the middle; each posterior lobe anteriorly broad, projected on the sides, with a narrow, slender, mid sized posterior process of triangular apex, (Fig. 11). Mesal pair of endophallic sclerites stout, L-shaped, distally curved outwards. Lateral endophallic sclerites narrow, almost transverse (Fig. 12). IX sternum of three distinct areas; basal with concentric lines on each postero-lateral corner; middle area with sides converging posteriorly to truncate apex; anterior area with anterior border straight, and posterior border with two broad lobes (Fig. 17).

**Male: Color:** Body brown. Head pattern (Fig. 9), a dark brown transverse band from the inner border of each compound eye to the ocellar triangle and to the epistomal sulcus. Vertex, occiput and postocciput light brown. Compound eyes black, ocelli hyaline, with dark ochre centripetal crescents. Labrum, anteclypeus and postclypeus dark brown. Genae dark brown, postgenae light brown. Antennae: scape dark brown, pedicel and flagellomeres pale brown, cream apically. Maxillary



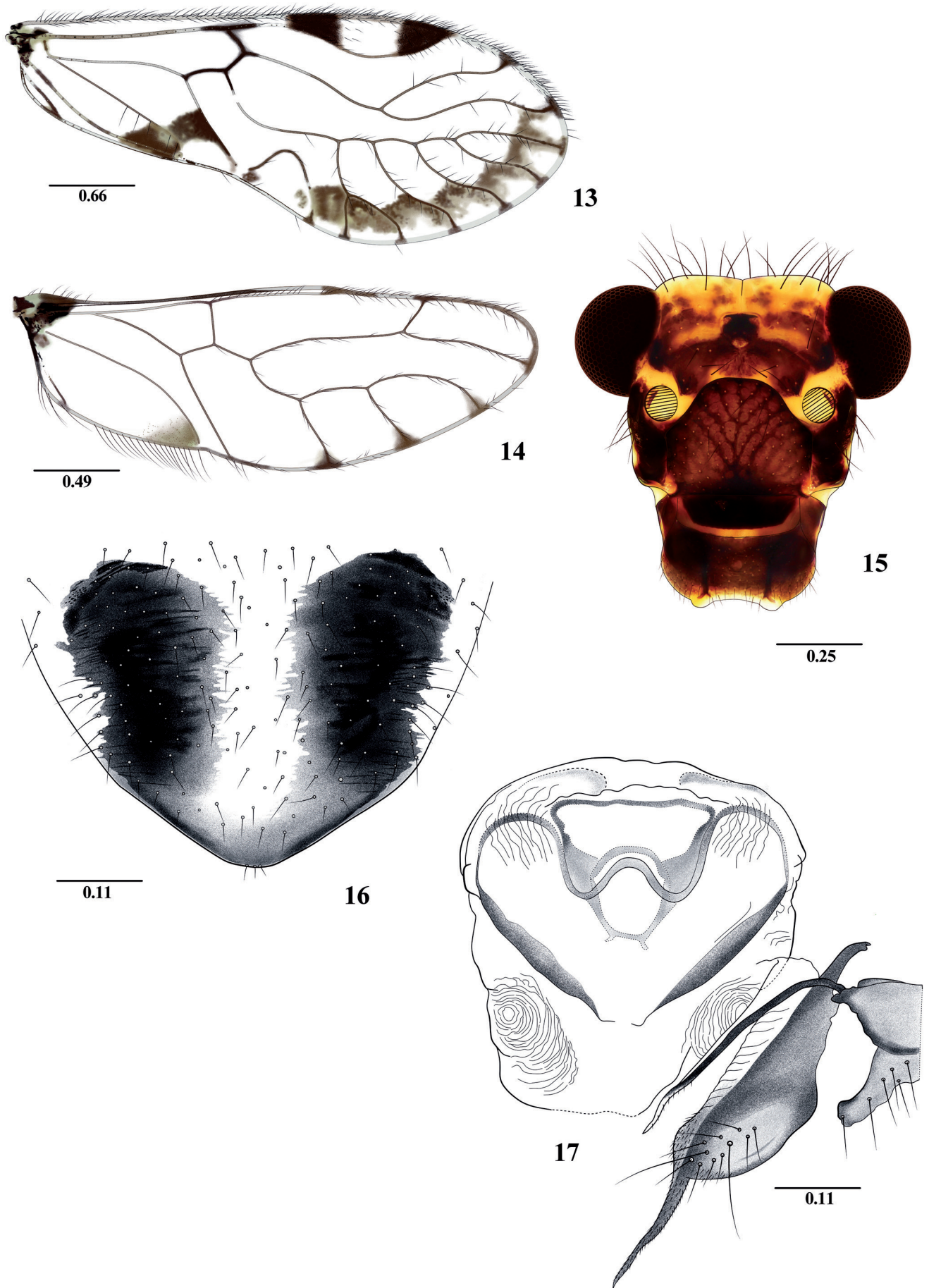
**Figures 1-6.** *Loneura amankii* sp. nov. Male. (1) Forewing. (2) Hindwing. (3) Front view of head. (4) Left paraproct and epiproct. (5) Hypandrium. (6) Phallosome. Scales in mm.





**Figures 7-12.** *Loneura konispatensis* sp. nov. Male. (7) Forewing. (8) Hindwing. (9) Front view of head. (10) Right paraproct and epiproct. (11) Hypandrium. (12) Phallosome. Scales in mm.





**Figures 13-18.** *Loneura konispatensis* sp. nov. Female. (13) Forewing. (14) Hindwing. (15) Front view of head. (16) Subgenital plate. (17) Ninth sternum and left gonapophyses. Scales in mm.

palps:  $Mx_1$  creamy;  $Mx_{2-4}$  brown. Prothorax cream, with small light brown pronotal stripe. Tergal lobes of meso- and metathorax creamy, with small light brown spots. Mesothoracic pleura dark brown, with cream small areas; metathoracic pleura cream, with small brown areas. Legs pale brown, fore-coxae brown, mid-coxae cream, with small brown spot, hind-coxae cream; trochanters and femora cream, femora with two small brown rings; tibiae and tarsi pale brown. Wings almost hyaline, with small brown spots, veins dark brown. Forewings mostly hyaline, pterostigma with large proximal and distal dark brown bands, veins with dark brown spots distally, at wing margin; a brown submarginal band from  $R_{4+5}$  to areola postica; a dark brown spot in distal part of  $Cu_1$  and end of cell  $cu_2$  (Fig. 7). Hindwings with brown spots on vein ends,  $R_{4+5}$  and M, at wing margin. Abdomen cream, with small ochre subcuticular spots; clunium and phallosome brown. Hypandrium brown to cream. Epiproct and paraprocts light brown.

**Morphology:** Head (Fig. 9): H/MxW: 1.44; H/D: 2.61; IO/MxW: 0.75. Vertex almost at the same level of the upper border of the compound eyes. Outer cusp of lacinial tips broad, with seven denticles.  $Mx_4/Mx_2$ : 1.32. Forewings (Fig. 7): FW/W: 2.50. Pterostigma: lp/wp: 4.07, areola postica tall, almost as tall as wide, rounded apically: al/ah: 1.50,  $R_{2+3}$  and  $R_{4+5}$  sinuous, M five-branched,  $M_5$  forked. Hindwings (Fig. 8): HW/w: 2.79; M three-four-branched, if M is three-branched, then  $M_2$  is forked. Hypandrium (Fig. 11), of a single sclerite, resulting from the fusion of the proximal ends of the side sclerites to the central sclerite, with abundant setae. Phallosome Y-shaped anteriorly, side struts slender; external parameres wide, bearing pores, without teeth on outer margin (Fig. 12); three pairs of endophallic sclerites, anterior pair laminar, like wide lobes, S-shaped; mesal pair elongate, converging basally and wide, apically diverging and curved inward (Fig. 12). Paraprocts (Fig. 10) elliptical, with distal setal field and macrosetae, two of them spatulate apically, as illustrated; sensory fields with 25-28 trichobothria on basal rosettes. Epiproct (Fig. 10) semioval, with short setae and two lateral macrosetae distally, with a field of microspicules and short setae anteriorly.

**Measurements (in microns):** FW: 3875, HW: 2750, F: 960, T: 1680, t1: 740, t2: 76, t3: 131, ctt1: 25, f1: 550,

f2: 440, f3: 380, f4: 350,  $Mx_4$ : 250, IO: 480, D: 352, d: 248, IO/d: 1.94, PO: 0.71.

**Female: Color:** Body, head, legs, epiproct, paraprocts and wings as in the males. Subgenital plate hyaline, with pigmented areas dark brown at sides, apically light brown to hyaline (Fig. 16). Gonapophyses dark brown, with light brown to hyaline areas, ninth sternum pale brown, with pigmented areas as illustrated (Fig. 17).

**Morphology:** Head (Fig. 15) H/MxW: 1.40; compound eyes large, H/D: 2.65; IO/MxW: 0.72. Vertex slightly above the level of the upper border of the compound eyes; outer cusp of lacinial tips broad, with 6-7 short denticles.  $Mx_4/Mx_2$ : 1.35. Forewings (Fig. 13) FW/W: 2.46; pterostigma: lp/wp: 4.04, elongate, wider in the middle; M five branched,  $M_5$  forked distally; areola postica: la/ha: 1.63, tall, broadly triangular, apically rounded. Hindwings (Fig. 14) HW/w: 2.85; M three-branched. Subgenital plate (Fig. 16) wide, setose, with apical border rounded. Gonapophyses (Fig. 17):  $v_1$  elongate, slender and acuminate, with microspicules distally;  $v_{2+3}$  with a proximal slender heel,  $v_2$  with field of 11-12 macrosetae; distal process long, sinuous and acuminate, bearing microspicules on surface. Ninth sternum (Fig. 17) of three distinct areas; basal one unpigmented, with an area of concentric lines on each postero-lateral corner; middle area large, with sides converging posteriorly to truncate apex, anteriorly deeply concave; anterior area small, with anterior border straight, and posterior border concave in the middle, forming two broad lobes. Paraprocts and epiproct missing.

**Measurements (in microns):** FW: 4212, HW: 2962.5, F: 890, T: 1060, t1: 540, t2: 85, t3: 105, ctt1: 19, f1: 550, f2: 450,  $Mx_4$ : 230, IO: 470, D: 343, d: 250, IO/d: 1.88, PO: 0.73.

**Material studied:** Holotype male. Peru. Cuzco. Kosñipata, Pillcopata, Sapam Sachayoc-Tunky Wasi, 13°02'20.0"S: 71°30'22.2"W, 1,150 m, 27-28.IX.2019. N. Carrejo and R. González. LED light trap in forest canopy. Paratypes: 1 female, same data as the holotype. R. González & N. Carrejo. LED light trap in forest canopy.

**Etymology:** The specific epithet refers to the Peruvian district of Kosñipata, province of Paucartambo, Department of Cuzco, where the types were found.

### Identification key to the species of *Loneura* Navás, 1927 (Modified from González Obando et al., 2020 and González Obando & Carrejo-Gironza, 2020)

1. Hypandrium of one sclerite, resulting from the fusion of the proximal ends of the side sclerites to the central sclerite, this extended mesally on each side, with two posterior processes in the middle, variously shaped (Figs. 5, 11) ..... Group II . . . 2
- Hypandrium of three sclerites, two small, elongate side sclerites flanking a large, central sclerite ..... Group I . . . (see key in González Obando et al., 2020)
2. Forewings with a submarginal brown band, with segments arc-shaped, or with long spots only at the end of cell m (Figs. 7, 13) ..... 3
- Forewings without submarginal brown band as above, or without long spots at the end of cell m, hyaline or with few spots .....  
... (*L. altaquerensis*, *L. farallonensis*, *L. gorgonaensis*, *L. insularis*, *L. monticola*, *L. nonuya*, *L. occidentalis* and *L. tatama*) (see key in González Obando et al., 2020)
3. Hypandrium without deep median incision reaching near the base, with concavity distally and posterior processes projected from the margin of the concavity (Fig. 5) ..... 4
- Hypandrium with deep median incision reaching near the base, with posterior processes not as above (Fig. 11), postero-lateral process present or absent... 5



- 4 Lateral margins of hypandrium convex, without pronounced overhang; phallosome with mesal sclerites fused, laminate and laterally widened; a large concavity in the anterior margin (Fig. 6)..... *L. amankii* **sp. nov.**
- Lateral margins of hypandrium with angled pronounced overhang. Phallosome with mesal sclerites not as above ..... *L. amazonica* (New)
- 5. Posterior lobes of the hypandrium distally widened, with parallel margins, each with short latero-posterior processes, projected from postero-lateral corners (Fig. 5). Phallosome with lateral endophallic sclerites apparently fused with the anterior sclerite, C-shaped ..... *L. garcialdretei* González Obando & Carrejo
- Posterior lobes of hypandrium not widened distally as above or without latero-posterior processes (Fig. 11). Phallosome with lateral endophallic sclerites variable ..... 6
- 6 Hypandrium with each posterior lobe angled in outer margin and with narrow posterior process of rounded apex, extended as a continuation of the internal margin (Fig. 11). Mesal endophallic sclerites not fused, elongate. Lateral endophallic sclerites lobular, narrow, almost transverse (Fig. 12)..... *L. konispatensis* **sp. nov.**
- Hypandrium and endophallic sclerites variable, lateral endophallic sclerites not as above .....  
 ..... (*L. carijona*, *L. erwini*, *L. javierensis*, *L. koreguaje*, *L. misak*, *L. orucapu*, *L. zuluagai*) (see key in González Obando et al., 2020).

### DISCUSSION

The species of *Loneura* known in Peru is raised to four. Until 2019 the only known *Loneura* species in Peru was *L. erwini* (New & Thornton, 1988), originally described as *Ptiloneura* (*Loneura*); now *L. garcialdretei* González Obando & Carrejo-Gironza, 2020, and the two species described above, belong to the same species group (Group II: Hypandrium of a single sclerite resulting from the fusion of the proximal ends of the side sclerites to the central sclerite, this extended mesally on each side, and with two posterior projections in the middle, variously shaped). The species in this group are somewhat similar to those with forewings with a submarginal brown band, with segments arc-shaped, or with long spots only at the end of each cell m (Figs. 7, 13) but differ considerably in head pattern, and details of the hypandrium and phallosome. By the shape of the hypandrium *L. amankii* **sp. nov.** is somewhat similar to *L. amazonica* (New), but differing from it by the shape of the endophallic sclerites and by details of the hypandrium. By the coloration pattern of the head and wings. *Loneura konispatensis* **sp. nov.** is similar to several species of group II; by the shape of the

hypandrium it is similar to *L. amazonica* (New). By the shape of the endophallic sclerites it is similar to *L. zuluagai* González Obando, Carrejo-Gironza, Panche & Garcia-Aldrete. Differs from them and from similar species in group II by the shape of the hypandrium and endophallic sclerites (Figs. 11, 12).

The number of species in *Loneura* is raised to 38. The number of species assigned in Group II, characterized by having the hypandrium of a single sclerite, is raised to 19 (Table 1) which constitutes 50% of the species described in the genus.

It is pertinent to remember that the character “hypandrium of a single sclerite” is shared with five species of *Euplocania* in species group *Bonaverensis* (González Obando et al., 2018), which points to the need to clarify the relationships among the genera of Ptiloneuridae. Also, it would be advisable to consider the species known only from females (*L. brasiliensis* Roesler, *L. erwini* New & Thornton, *L. lienhardi* García-Aldrete, *L. maesi* García Aldrete, *L. murui* González Obando, Carrejo-Gironza, Panche & Garcia-Aldrete, and *L. quinaria* Navás), as well as the females with uncertain assignment to species group.

**Table 1.** Species of *Loneura* in Group II, sexes known, altitudinal and geographic distribution of each species.

Species	Sexes known	Elevation (masl)	Distribution known (Country)
<i>L. altaquerensis</i> González-Obando, Carrejo-Gironza, Panche & García-Aldrete	Male	1386	Colombia
<i>L. amazonica</i> (New)	Both	70?	Brazil
<i>L. amankii</i> <b>sp. nov.</b>	Male	1150	Peru
<i>L. carijona</i> González-Obando, Carrejo-Gironza, Panche & García-Aldrete	Male	917	Colombia
<i>L. erwini</i> (New & Thornton)	Male	220-290	Peru, Ecuador
<i>L. farallonensis</i> Mendivil-Nieto, García-Aldrete & González-Obando	Both	1682-1820	Colombia
<i>L. garcialdretei</i> González-Obando & Carrejo-Gironza	Male	1150	Peru
<i>L. gorgonaensis</i> García-Aldrete, González-Obando & Sarria-Sarria	Both	28-940	Colombia
<i>L. insularis</i> García Aldrete, González-Obando & Sarria-Sarria	Male	28-247	Colombia
<i>L. javierensis</i> González-Obando, Carrejo-Gironza, Panche & García-Aldrete	Both	700-1621	Colombia
<i>L. konispatensis</i> <b>sp. nov.</b>	Both	1150	Peru
<i>L. koreguaje</i> González-Obando, Carrejo-Gironza, Panche & García-Aldrete	Male	844	Colombia
<i>L. misak</i> González-Obando, Carrejo-Gironza, Panche & García-Aldrete	Male	844	Colombia
<i>L. monticola</i> García Aldrete, González-Obando & Sarria-Sarria	Male	90-241	Colombia
<i>L. nonuya</i> González-Obando, Carrejo-Gironza, Panche & García-Aldrete	Both	917	Colombia
<i>L. occidentalis</i> González-Obando, Carrejo-Gironza, Panche & García-Aldrete	Both	1383-1617	Colombia
<i>L. orucapu</i> González-Obando, Carrejo-Gironza, Panche & García-Aldrete	Both	844	Colombia
<i>L. tatama</i> González-Obando, Carrejo-Gironza, Panche & García-Aldrete	Both	1617	Colombia
<i>L. zuluagai</i> González-Obando, Carrejo-Gironza, Panche & García-Aldrete	Both	917	Colombia

Considering the altitudinal distribution range of the known species of *Loneura*, the challenge is to carry out more explorations, in more areas, especially in the Amazonian foothills of Bolivia, Ecuador, Peru and Venezuela, as well as in mountainous areas of Brazil and other neotropical countries. Based on the exploratory work carried out in Colombia, the country most species rich for *Loneura* (Table 1) (García Aldrete *et al.*, 2011b, 2012; Mendivil Nieto *et al.*, 2017; González Obando *et al.*, 2020; González Obando & Carrejo-Gironza, 2020), transferring the results of this effort to natural areas of other countries in the Amazon Basin, the number of species could probably be dramatically increased, in accordance with the megadiverse nature of these countries.

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### AUTHORS' CONTRIBUTIONS

R.G.O., N.S.C.G. and A.N.G.A. conceived the study. R.G.O. and N.S.C.G. collected the samples. R.G.O. made the preparation of the plates and photographs. R.G.O., N.S.C.G. and A.N.G.A. wrote the manuscript, all participated actively in the descriptions and the discussion. A.N.G.A. reviewed writing English. N.S.C.G. prepared the illustrations. All authors read and approved the final manuscript.

### REFERENCES

- García Aldrete, A.N.; González Obando, R. & Carrejo, N.S. 2011a. A new *Loneura* from Colombia, and Colombian records of *L. mirandaensis* García Aldrete, and *Loneuroides venezolanus* García Aldrete (Psocodea: 'Psocoptera': Ptiloneuridae). *Dugesiana*, 18(1): 35-37.
- García Aldrete, A.N.; González Obando, R. & Sarria Sarria, F.A. 2011b. Three new species of *Loneura* (Psocodea: 'Psocoptera': Ptiloneuridae) from Gorgona Island, Cauca, Colombia, with a new infrageneric classification. *Zootaxa*, 3050: 55-62.
- García Aldrete, A.N.; González Obando, R. & Carrejo, N.S. 2020. On the genera *Ptiloneura* Enderlein, *Loneura* Navás, and *Loneuroides* García Aldrete (Psocodea: 'Psocoptera': Ptiloneuridae). *Zootaxa*, 4751(2): 291-309.
- García Aldrete, A.N.; Mendivil Nieto, J.A. & González Obando, R. 2012. A pair of new sister species of *Loneura* (Psocodea, 'Psocoptera', Ptiloneuridae) from Valle del Cauca, Colombia, representing a new infrageneric group. *ZooKeys*, 168: 65-76. [DOI](#)
- González Obando, R. & Carrejo-Gironza, N.S. 2020. New species of *Loneura* Navás, 1927 (Insecta: Psocodea: 'Psocoptera': Ptiloneuridae) from Peru. *Dugesiana*, 27(2): 137-140.
- González Obando, R.; Carrejo, N.S.; Panche, J.D. & García Aldrete, A.N. 2020. The genus *Loneura* Navás (Insecta: Psocodea: 'Psocoptera': Ptiloneuridae) in Colombia, description of new species and key for identification. *Zootaxa*, 4802(2): 201-249.
- González Obando, R.; García Aldrete, A.N. & Carrejo, N.S. 2011. A new species of *Steleops* Enderlein, and a Colombian record of *S. pulcher* New (Psocodea: 'Psocoptera': Psocidae). *Zootaxa*, 2735, 23-27.
- González Obando, R.; García Aldrete, A.N.; Carrejo, N. & Panche, J. 2018. New species of *Euplocania* Enderlein (Psocodea: 'Psocoptera': Psocomorpha), in three species groups, from Colombia and Ecuador. *Zootaxa*, 4483(3): 497-522.
- Mendivil Nieto, J.A.; García Aldrete, A.N. & González Obando, R. 2017. Seven new species of *Loneura* Navás (Insecta: Psocodea: 'Psocoptera': Ptiloneuridae) from Valle del Cauca, Colombia. *Zootaxa*, 4227(4): 495-523.
- Moura Lima, D.M.; Silva-Neto, A.M.; García Aldrete, A.N. & Bravo, F. 2019. *Loneura* Navás (Psocodea: Psocomorpha: Ptiloneuridae): new species from Brazil, and description of the female of *Loneura maracaensis* García Aldrete, with a checklist of all known species of the genus. *Zootaxa*, 4576(1): 179-186.
- New, T.R. & Thornton, I.W.B. 1988. Epipsocetæ (Psocoptera) from Peru. *Studies on Neotropical Fauna and Environment*, 23(4): 225-250.