



## A pair of new sister species of *Loneura* from Nicaragua and Venezuela (Psocoptera: Ptiloneuridae)

### Un par de especies hermanas nuevas del género *Loneura*, de Nicaragua y de Venezuela (Psocoptera: Ptiloneuridae)

Alfonso N. García-Aldrete

Departamento de Zoología, Instituto de Biología, Universidad Nacional Autónoma de México. Apartado postal 70-153, 04510 México, D. F.  
Correspondencia: [anga@ibiologia.unam.mx](mailto:anga@ibiologia.unam.mx)

**Abstract.** Two species of *Loneura*, one from Nicaragua and the other from Venezuela, are described and illustrated. They constitute a pair of sister species, based on characters of the compound eyes, forewing pterostigma and pattern of pigmentation, and structure of male phallosome and hypandrium. Also, they constitute a unique species group in *Loneura*.

Key words: Psocoptera, Ptiloneuridae, *Loneura*, sister species, Nicaragua, Venezuela.

**Resumen.** Se describen e ilustran sendas especies de *Loneura*, de Nicaragua y de Venezuela. Constituyen un par de especies hermanas, con base en caracteres de los ojos compuestos, pterostigma y patrón de pigmentación del ala anterior, y estructura del falosoma e hipandrio del macho. Asimismo, constituyen un grupo de especies único en el género.

Palabras clave: Psocoptera, Ptiloneuridae, *Loneura*, especies hermanas, Nicaragua, Venezuela.

#### Introduction

To the present, 4 species of *Loneura* Navás have been recorded in Nicaragua (*L. crenata* Navás, *L. maesi* García Aldrete, *L. mombachensis* García Aldrete, and *L. splendida* Mockford), and 1 species has been recorded in Venezuela (*L. lienhardi* García Aldrete) (García Aldrete 2003, 2004, and unpublished personal records). My purpose is to describe and illustrate 2 additional species in the genus, 1 from Nicaragua and another from Venezuela. They are closely related, constituting a pair of sister species, unique in that the compound eyes are large and extremely protuberant, the central element of the male hypandrium has a single posterior projection, bears 2 posterior tufts of long setae and has 2 long, acuminate sclerites associated with it posteriorly, in addition to the pair of lateral sclerites characteristic of most ptiloneurid genera (with the exception of *Ptiloneuropsis* Roesler, and *Willreevesia* García Aldrete -male unknown in *Loneuroides* García Aldrete-) (Casasola González 2006); in addition, the phallosomes of both species share a similar plan, differing

only in small details.

#### Material and methods

The specimens available for study (2 females and 2 males) were dissected in 80% alcohol, and their parts (head, right antenna, right wings, right legs, and genitalia), were mounted on slides in Canada Balsam. Color was recorded by observation of the whole specimen in 80% alcohol under the dissection microscope, illuminated with cold light at 60 X. Measurements, in  $\mu\text{m}$ , of parts mounted on slides, were taken with a filar micrometer, whose measuring unit is 136  $\mu\text{m}$  for wings, and 53  $\mu\text{m}$  for other parts. Abbreviations of parts measured (or counted) are as follows: FW: length of right forewing, HW: length of right hindwing, F: length of right hind femur, T: length of right hind tibia; t1, t2, t3: length of right hind tarsomeres, ctt1: number of ctenidobothria on t1, Mx4: length of fourth segment of right maxillary palpus, f1...fn: length of flagellomeres f1...fn of right antenna, IO: minimum distance between compound eyes, D: antero-posterior diameter of right compound eye, d: transverse diameter of right compound eye, PO: d/D. The location of the types is

indicated in each description.

## Descriptions

### *Loneura jinotegaensis* n. sp. (Figs. 1-9)

*Female. Color* (in 80% alcohol). Body creamy white, with ochre spots as indicated below. Compound eyes black, ocelli hyaline, with ochre centripetal crescents; with a dark brown band on each gena, from compound eye to each side of epistomal sulcus; postclypeus with oblique dark brown bands. Head pattern (Fig. 1). Scape and pedicel brown, flagellomeres light brown, with distal ends white. Mx4 pale brown, other palpomeres white. Thoracic pleura with irregular ochre spots. Legs pale brown, coxae with proximal and distal dark brown spots, trochanter with brown distal spot; femur with a distal brown spot. Abdomen with transverse, ochre subcuticular rings, less pigmented ventrally. Forewings hyaline, veins brown, pterostigma brown, with a large, central unpigmented area; a slender brown band along wing margin, from R4+5 to distal half of A1, with unpigmented fenestrae along wing margin (Fig. 2). Hind wings hyaline, veins brown, with brown maculae at the wing margin distally.

*Morphology*. Outer cusp of lacinial apex broad, with 7-8 denticles. Forewing pterostigma elongate, wider in the middle, slightly projected towards Rs; areola postica tall, apically rounded; Rs 2 branched, M 6 branched (Fig. 2). Hindwing M 4 branched (Fig. 2). Subgenital plate (Fig. 8), broad, setose, with pigmented area deeply concave; posterior border straight, with a row of 11 setae directed posteriorly. Gonapophyses (Fig. 4): v1 long, slender, joined to clunium and then bent posteriorly at a right angle; v2+3 with acuminate anterior heel, three setae on distal area of lobe, and distal projection stout, setose, narrowing distally. Ninth sternum broadly triangular, with side and apical folded areas and a distinct, anterior, transverse pigmented area (Fig. 4). Epiproct broadly triangular, setae apically rounded (Fig. 7). Paraprocts also broadly triangular, setae as illustrated, sensory fields circular, with 28-30 trichobothria issuing from basal rosettes (Fig. 6).

*Measurements*. FW: 5838, HW: 3945, F: 1188, T: 1432, t1: 687, t2: 129, t3: 173, ctt1: 21, Mx4: 330, f1: 1002, f2: 1057, f3: 877, IO: 562, D: 465, d: 399, IO/D: 1.2, PO: 0.85.

*Male. Color* (in 80% alcohol). Same as the female.

*Morphology*. Outer cusp of lacinial apex as described for the female. Forewing Rs 2 branched, M in right forewing 6 branched, in left forewing eight branched. M in right hindwing 4 branched, in left hindwing 3 branched. Hypandrium (Fig. 9) central sclerite broad, projected

posteriorly to form a sclerotized prong, with dense field of long setae on each side adjacent to the posterior margin; other setae as illustrated; side sclerites long, narrow anteriorly, wide and straight posteriorly; a wide based, distally acuminate sclerite, slightly curved outward, on each side of mid prong of central sclerite, posteriorly. Phallosome (Fig. 3) with side struts broad, V-shaped; external parameres long, slender, curved, rounded posteriorly; with 2 pairs of symmetric endophallic sclerites, outer pair long, slender, curved, distally parallel to external parameres, each arm with a subapical denticle on inner edge; arising basally from each side of a transverse, smooth, broad pigmented area; inner sclerites with basal thirds slender, curved, strongly sclerotized; distal third dilated, robust, bearing a row of short, blunt protuberances along inner edge. Epiproct (Fig. 5) trapeziform, peripherally with a field of microsetae, wider anteriorly, posterior border with row of 3 short setae, flanked by 2 larger ones; adjacent to anterior margin, medially, a group of 3 setae arranged in a triangle; other setae as illustrated. Paraprocts (Fig. 5), broad, setose, with a field of microspines mesally on outer edge; sensory fields circular, with 29-30 trichobothria issuing from basal rosettes.

*Measurements*. FW: 5317, HW: 3580, F: 1196, T: 1425, t1: 631, t2: 111, t3: 171, ctt1: 19, f1: 1098, f2: 718, IO: 506, D: 543, d: 417, IO/D: 0.93, PO: 0.76.

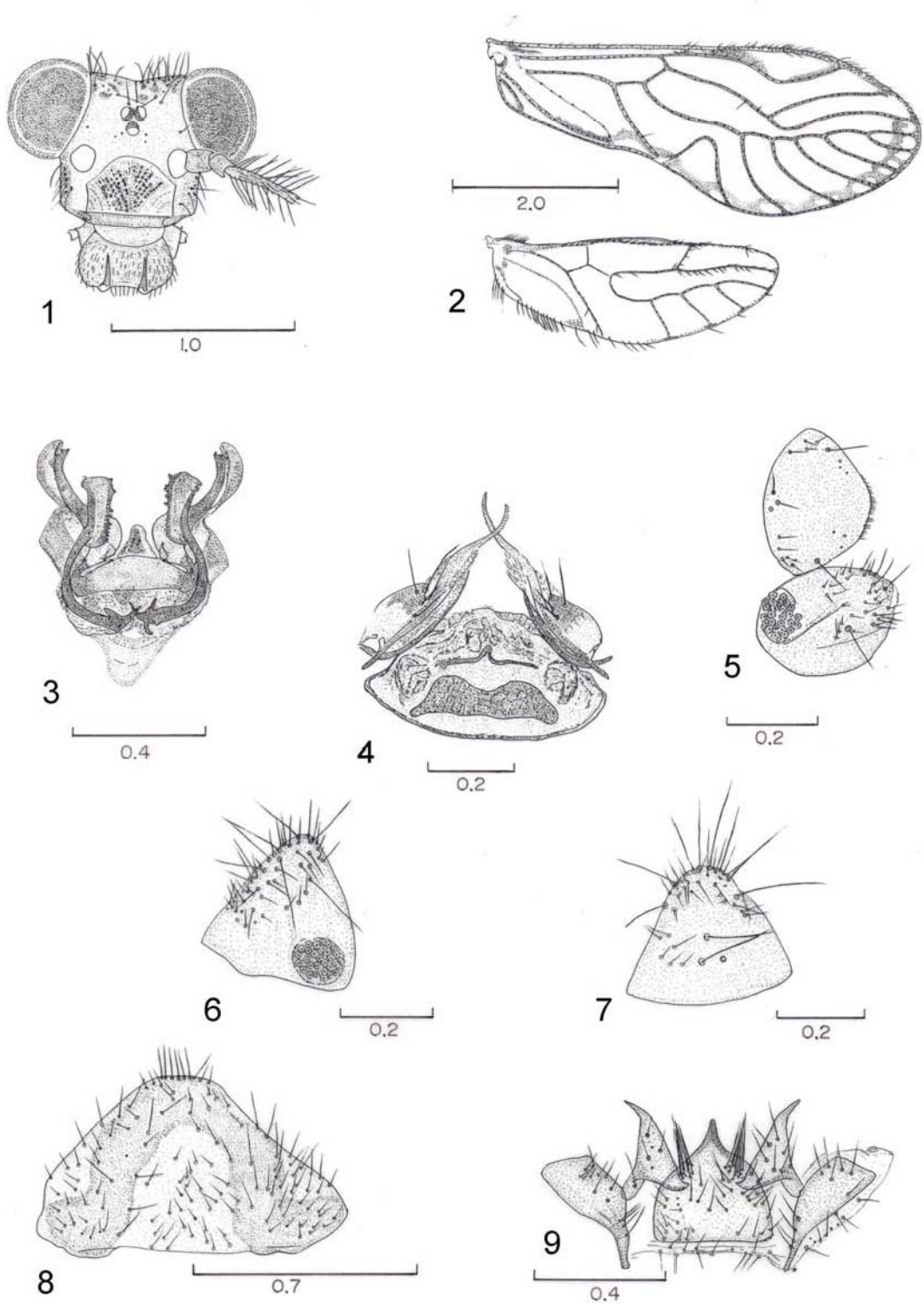
## Taxonomic summary

Holotype male, two paratype females. Nicaragua. Jinotega. Peñas Blancas, 1300m. 13°17'N: 85°38'W. 25.VIII.1997. Jean Michel Maes. National Insect Collection (CNIN), Departamento de Zoología, Instituto de Biología, Universidad Nacional Autónoma de México, México City.

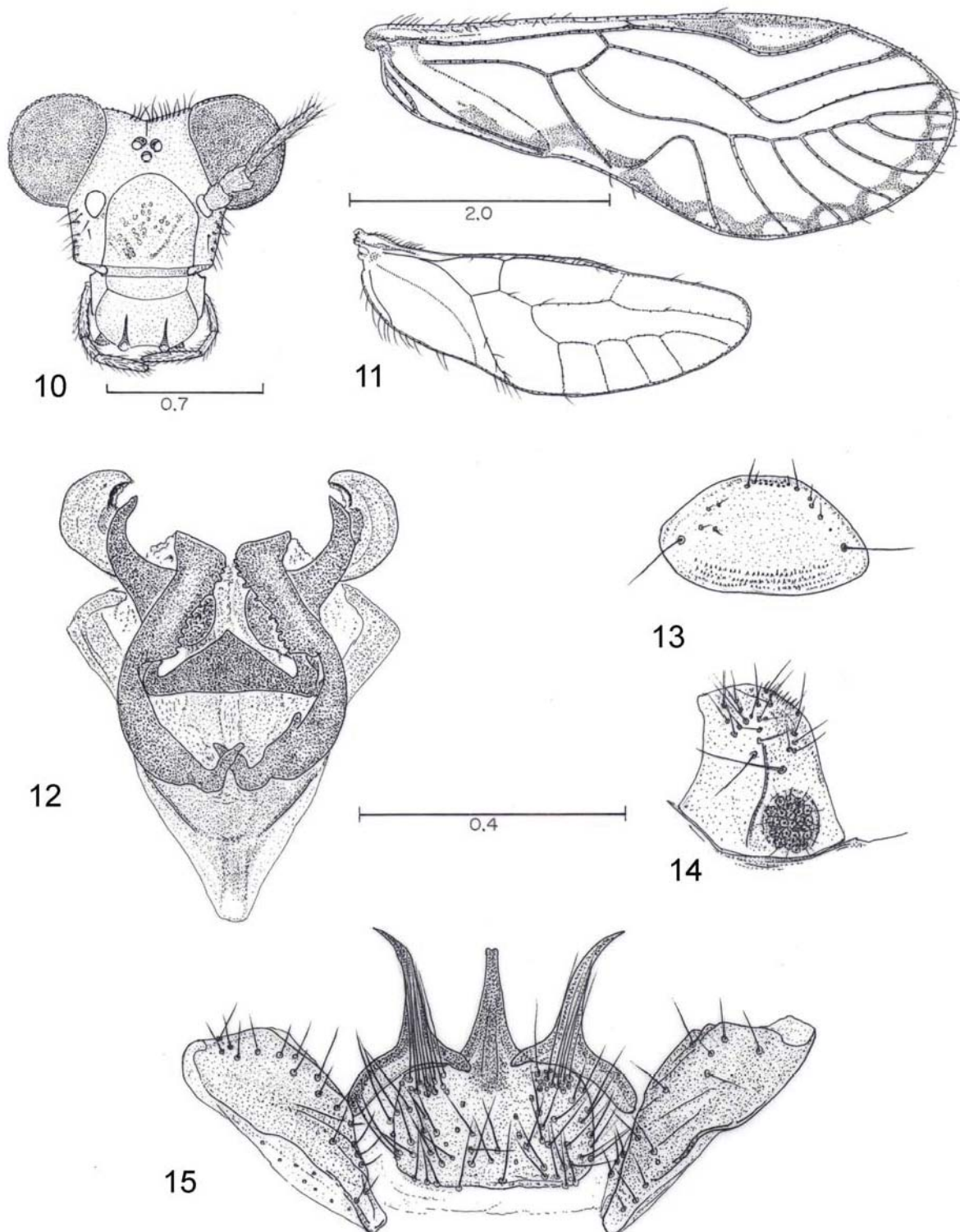
*Etymology*. The specific name makes reference to the type locality.

### *Loneura mirandaensis* n. sp. (male). (Figs. 10-15).

*Color* (in 80% alcohol). Body creamy white, with ochre spots as indicated below. Compound eyes black, ocelli hyaline, with ochre centripetal crescents. Postclypeus with oblique, brown bands. Mx4 pale brown, other palpomeres white. Scape and pedicel brown, flagellomeres pale brown, with distal ends white. Thoracic pleura with irregular ochre spots. Legs pale brown, coxae with proximal and distal brown spots. Abdomen with dark brown, transverse subcuticular rings, more pigmented dorsally. Forewings hyaline, veins brown. Pterostigma dark brown, with large,



**Figures 1-9.** *Loneura jinotegaensis* n. sp. 1, front view of head, male; 2, fore and hind wings, male; 3, phallosome, male; 4, gonapophyses and ninth sternum, female; 5, epiproct and left paraproct, male; 6, right paraproct, female; 7, epiproct, female; 8, subgenital plate, female; 9. Hypandrium, male. Scale in mm.



**Figures 10-15.** *Loneura mirandaensis* n. sp. male. 10, front view of head; 11, fore and hind wings; 12, phallosome; 13, epiproct; 14, right paraproct; 15, hypandrium. Scales in mm. Figs. 12-15 to common scale.



unpigmented area on distal half. Slender brown band along wing margin, from R4+5 to distal half of A1, with clear fenestrae next to wing margin as illustrated (Fig. 11). Hindwings hyaline, veins brown.

**Morphology.** Outer cusp of lacinial apex broad, with 7-8 denticles. Forewing pterostigma elongate, wider in the middle; areola postica tall, apically rounded; Rs 2 branched, M 6 branched. Hindwing M 5 branched (Fig. 11). Hypandrium (Fig. 15), with central sclerite broad, almost rectangular, projected posteriorly to form a long, sclerotized prong; dense field of long setae on each side, next to posterior margin, other setae as illustrated. Side sclerites long, robust, narrow anteriorly, wide posteriorly. A very wide based sclerite, with a long, acuminate posterior projection, curved outward, on each side of central sclerite, posteriorly. Phallosome (Fig. 12), with side struts broad, V-shaped; external parameres short, crescent shaped, rounded posteriorly. Two pairs of endophallic sclerites, outer pair narrow based, wider in the middle, curved, narrowing distally, basally arising from each side of transverse, low, strongly pigmented triangular area; inner sclerites robust, curved, with proximal halves smooth, basally bent posteriorly, acuminate; distal halves dilated, broad, with row of short, blunt protuberances along inner edge. Epiproct (Fig. 13) trapeziform, with a field of peripheral microspines, wider anteriorly; posterior border with a row of 7 small setae, flanked by 2 larger setae, other setae as illustrated. Paraprocts (Fig. 14), broad, robust, with a field of microspines mesally on outer edge, other setae as illustrated; sensory fields circular, with 23-24 trichobothria issuing from basal rosettes.

**Measurements.** FW: 4576, HW: 3162, F: 952, T: 1292, t1: 632, t2: 99, t3: 139, ctt1: 18, Mx4: 261, f1: 1007, f2: 627, IO: 374, D: 500, d: 438, IO/D: 0.74, PO: 0.87.

### Taxonomic summary

Holotype male. Venezuela. Miranda. Guatopo NP El Lucero, 28 km N Altagracia, 620m. 1-14.VI.1987. UV light trap. J. Peck. Muséum d'Histoire Naturelle, Genève, Switzerland.

**Etymology.** The specific name refers to the type locality.

### Remarks

The 2 species described above share several characters that, as a whole, place them close to each other (e. g., large, protuberant compound eyes, shape of the forewing pterostigma and areola postica, pattern of forewing pigmentation, and structure of the male hypandrium and

phallosome). Differences between both species are the following: Hindwing M 5 branched in *L. mirandaensis* vs. hindwing M 4 branched in *L. jinotegaensis*. Phallosome sclerites more robust, external parameres shorter and more curved, and transverse area between outer sclerites triangular in the former species vs. phallosome sclerites and external parameres slender, and transverse area between outer sclerites not triangular in the latter species. The hypandrium in both species conforms to the same structural plan, but the mid prong of the central sclerite is much longer in *L. mirandaensis*, and the shapes of the central sclerite and the posterior sclerites are clearly distinct in both species (compare Figs. 9 and 15, and Figs. 3 and 12 for phallosome differences).

The pair of species described above, besides being sister species, clearly constitute a well defined species group in *Loneura*. It is based on the forewing pattern of pigmentation, shape of the pterostigma and areola postica, and structure of the hypandrium and phallosome; the presence of the acuminate sclerites posterior to the central sclerite of the hypandrium, and the tufts on the posterior border of it, are unique in the genus, and are strongly reminiscent of the tufts in the central sclerite of the hypandrium in *Ptiloneura bidorsalis* Enderlein, which also presents a similar pattern of forewing pigmentation and pterostigma shape. On structure of the hypandrium, 2 additional species groups in *Loneura* are recognizable: one in which the central piece bears one projection (species included: *L. crenata* Navás, *L. leonilae* García Aldrete, and *L. mombachensis* García Aldrete), and another in which the central piece bears 2 projections (species included: *L. amazonica* New, *L. boliviana* Williner, *L. erwini* New and Thornton, *L. maracaensis* García Aldrete, *L. raramuri* García Aldrete, and *L. splendida* Mockford).

Pairs of closely related species are relatively common in the Psocoptera (e.g., *Lachesilla nuptialis*-*L. aethiopica*, cf. Badonnel and García Aldrete 1980, several pairs in *Goja* Navás, cf. Casasola González and García Aldrete 2002, among others).

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