

New species of *Loneura* (Ptiloneuridae: Psocoptera), from Argentina, Nicaragua and Mexico

ALFONSO N. GARCÍA ALDRETE*

Resumen. Se describen y ilustran dos especies de *Loneura*, de Argentina (Salta), Nicaragua (Volcán Mombacho) y México (Sierra Tarahumara), se describen e ilustran. Pertenecen a dos grupos de especies en el género, con base en que el esclerito central del hipandrio presente una o dos proyecciones posteriores. La localización de los tipos se indica en cada descripción.

Palabras clave: *Loneura*, Ptiloneuridae, nuevas especies, Argentina (Salta), Nicaragua (Volcán Mombacho), México (Sierra Tarahumara).

Abstract. One species each of *Loneura*, from Argentina (Salta), Nicaragua (Volcán Mombacho) and Mexico (Sierra Tarahumara), are here described and illustrated. They belong in two species groups of the genus, on basis of the central piece of the male hypandrium having one or two posterior projections. The location of the types is indicated in each description.

Key words: *Loneura*, Ptiloneuridae, new species, Argentina (Salta), Nicaragua (Volcán Mombacho), Mexico (Sierra Tarahumara).

Introduction

Loneura Navas is strictly American and predominantly neotropical; its species are known to occur from Madera Canyon, Santa Rita Mountains, Arizona, U.S.A. (Mockford 1993) (31°43'30"N: 110°52'48"W) to Salta, Argentina (24°15'S: 60°40'W).

The type species *L. crenata* Navas, was described from Costa Rica in 1927, and since then, other eight species have been described, two from Brazil, two from Bolivia, one from Peru, and three from Mexico, one of which extends also to Guatemala and Belize (Lienhard & Smithers 2002; personal, unpublished records).

*Instituto de Biología, UNAM. Departamento de Zoología. Apartado postal 70-153. 04510 México, D. F., C.E.: anga@servidor.unam.mx

The purpose of this paper is to present descriptions of three *Loneura* species, from the southernmost part of the range (Argentina), from the middle of the range (Nicaragua), and from the northernmost part of the range (México).

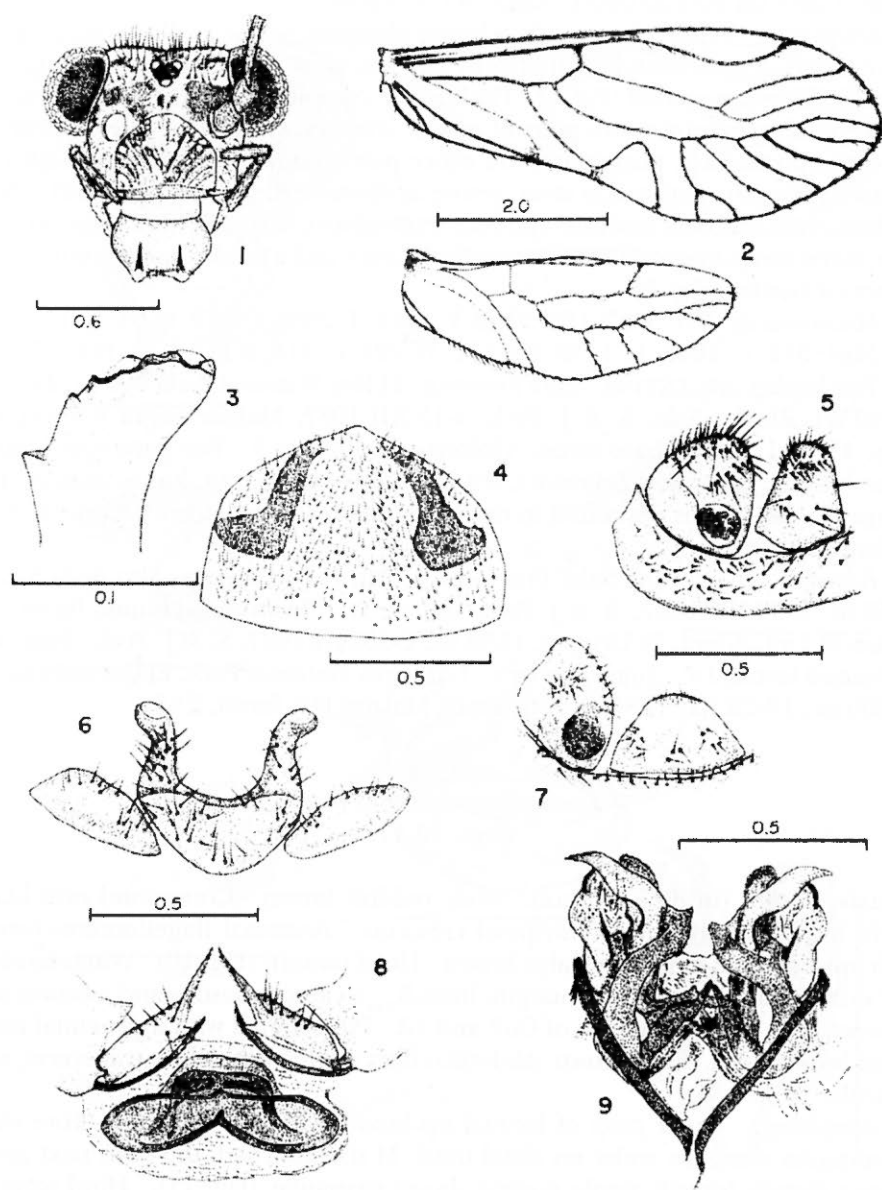
The specimens for microscopic study were dissected and their parts were mounted on slides in Balsam of Canada. Color was recorded by observation of the whole specimen placed in 80% alcohol, under the dissection microscope and illuminated with cold light at 60X. Measurements (given in microns) of parts mounted in slides were taken with a filar micrometer, whose measuring unit is 0.136 microns for wings and 0.053 microns for other parts. Abbreviations of parts measured are as follow: FW: length of right forewing; HW: length of right hind wing; F: length of right hind femur; T: length of right hind tibia; t_1 , t_2 , and t_3 , length of right hind tarsomeres; ctt_1 : number of ctenidia on t_1 ; Mx4: length of right fourth palpomere; $f_1 \dots f_n$: length of flagellomeres $f_1 \dots f_n$ 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 included in each description.

Loneura meridionalis n. sp.
(Figs. 1-9)

Female. Color (in 80% alcohol). Body chestnut brown, with ochre areas, as indicated below. Compound eyes black, ocelli hyaline, with ochre centripetal crescents. Head pattern (Fig. 1). Antennae with f_1 pale brown, apex white; other flagellomeres brown. Maxillary palps brown. Legs pale brown. Thoracic pleura with ochre, transverse subcuticular rings.

Morphology. Lacinal apices with outer cusp broad, with 5-6 denticles. FW pterostigma long, wider in the middle; areola postica approximately triangular; M six-branched. Hind wing M four-five branched (Fig. 2). Subgenital plate broad, with dense field of setae on surface; slightly projected apically; distinct pigmented areas near sides as illustrated (Fig. 4). Gonapophyses: V_1 long, slender, with field of microspines distally; V_{2+3} elongate, with dorsal field of setae; distal process straight, with a field of microspines along inner edge, and a short bulge on inner edge, near base of distal process (Fig. 8). Ninth sternum with a distinct, symmetrical, strongly pigmented area, as illustrated (Fig. 8). Paraprocts robust, almost triangular, setose as illustrated; sensory fields with 22-23 trichobothria on basal rosettes; epiproct elongate, with setae as illustrated, most on distal third (Fig. 5), and three mesal macrosetae.

Measurements. FW: 5977; HW: 3861; F: 1398; T: 2525; t_1 : 1074; t_2 : 97; t_3 : 154; ctt_1 : 33; Mx4: 350; f_1 : 1051; f_2 : 1125; IO: 609; D: 424; d: 300; IO/D: 1.43; PO: 0.70.



Figs. 1-9. *Loneura meridionalis* n. sp. 1. Front view of head, ♀. 2. Fore and hind wings, ♀. 3. Lacinal apex, ♀. 4. Subgenital plate, ♀. 5. Clunium, right paraproct and epiproct, ♀. 6. Hypandrium, ♂. 7. Right paraproct and epiproct, ♂. 8. Gonapophyses and ninth sternum, ♀. 9. Phallosome, ♂. Scales in mm. Fig. 7 to scale of Fig. 5. Fig. 8 to scale of Fig. 6.

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

Morphology. Hypandrium: side sclerites elongate, setose as illustrated; central piece broad, setose, rounded anteriorly, with two stout posterior projections, each apically dilated, rounded (Fig. 6). Phallosome complex, side struts V-shaped; external parameres robust; two pairs of phallic sclerites, symmetric, one pair curved outwards posteriorly, acuminate; the other pair straight, each distally with fine denticles (Fig. 9). Paraprocts stout, setose as illustrated; sensory fields with 33-35 trichobothria on basal rosettes; epiproct trapeziform, with a field of setae on each side, three mesal macrosetae near anterior margin and a field of microspines along posterior border (Fig. 7).

Measurements. FW: 5457; HW: 3749; F: 1334; T: 2366; t_1 : 972; t_2 : 81; t_3 : 151; $cutl$: 34; $Mx4$: 311; f_1 : 1092; f_2 : 1139; IO: 572; D: 424; d: 318; IO/D: 1.34; PO: 0.75.

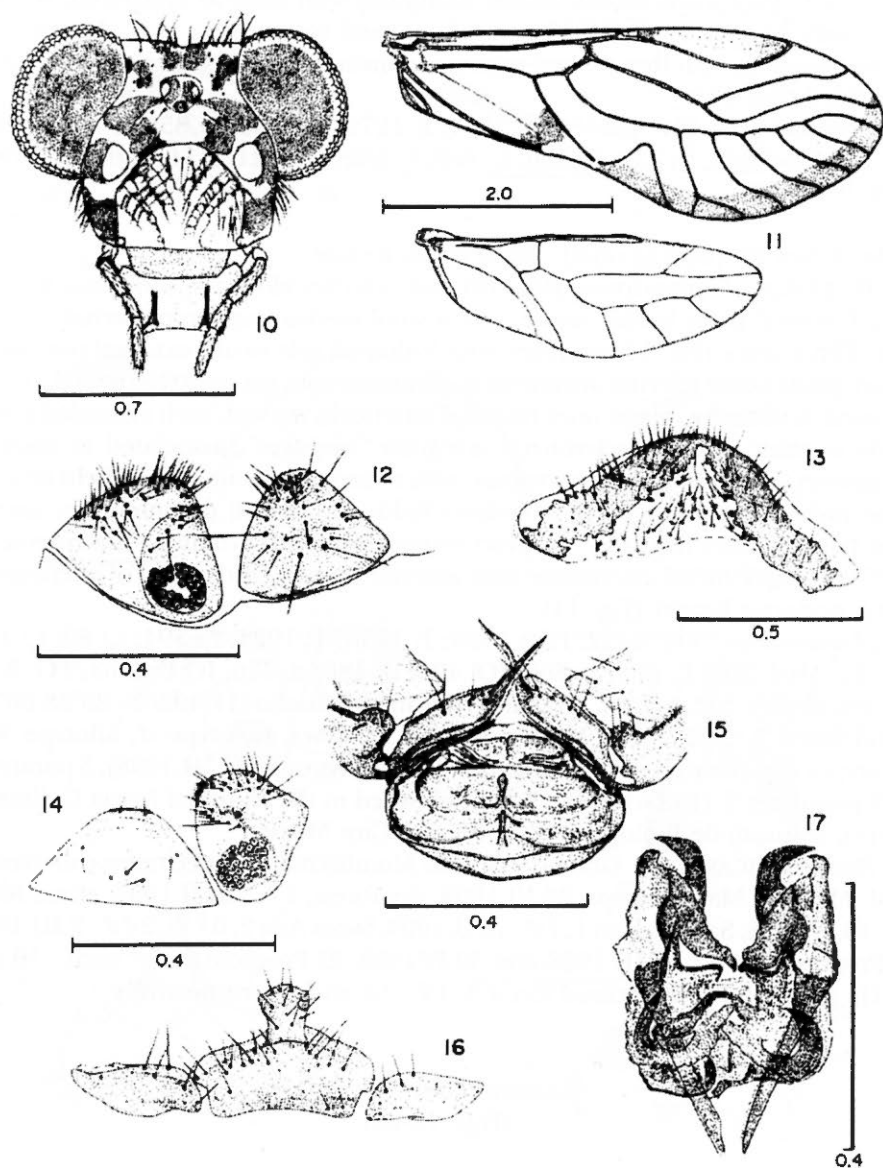
Type locality. ARGENTINA. Salta Province. El Rey National Park, 900 m (24°15'S; 60°40'W), Rfo La Sala, S. & J. Peck, 5-15.XII.1987, Malaise flight interception trap. Humid mossy Chaco forest. Holotype ♂, allotype ♀. Two paratypes female, same locality, dates and collectors, 950 m., Pozo Verde Trail, km 5, Malaise FIT, Yungas forest. Types deposited in the Museum of Natural History, Genève, Switzerland (MHNG).

Records. ARGENTINA. Salta Province. 17 km N La Caldera, Alto de la Sierra, 1550 m., 2-30.XII.1987, S. & J. Peck, Malaise FIT. Subtropical humid forest, 1♀. 22 km N La Caldera, El Ucumar, 1550 m., 2-30.XII.1987, S. & J. Peck. Subtropical humid forest, 1♂. Jujuy Province. Calilegua National Park, El Cortaderal, km 6, 800 m., 18-28.XII.1987, S. & J. Peck. Malaise FIT, forest, 2♀♀.

Loneura mombachensis n. sp.
(Figs. 10-17)

Female. Color (in 80% alcohol). Body reddish brown. Compound eyes black, ocelli hyaline, with ochre centripetal crescents. Antennal flagellomeres brown, with apices white; maxillary palps brown. Head pattern (Fig. 10). Wings hyaline, FW with a brown band along margin, from R_{4+5} to areola postica and a brown area between Cu1 and confluence of Cu2 and 1A. Pterostigma with a proximal and a distal brown band. Legs brown. Abdomen dirty white, with ochre, transverse, subcuticular rings.

Morphology. Outer cusp of lacinial tip broad, with 5-6 denticles. Fore wing: pterostigma elongate, wider on distal third; M six-branched, the stem next areola postica distally forked; areola postica almost triangular (Fig. 11). Hind wing: M four-branched. Subgenital plate (Fig. 13) broad, rounded posteriorly, with setae as illustrated and well defined concave pigmented area. Gonapophyses (Fig. 15): V_1 long, slender, V_{2+3} with sides almost parallel, 5-6 setae along outer edge and distal process almost straight, strongly sclerotized (Fig. 15). Ninth sternum (Fig. 15), as



Figs. 10-17. *Loneura mombachensis* n. sp. 10. Front view of head, ♂. 11. Fore and hind wings, ♂ (setae on veins not illustrated). 12. Right paraproct and epiproct, ♀. 13. Subgenital plate, ♀. 14. Epiproct and left paraproct, ♂. 15. Gonapophyses and ninth sternum, ♀. 16. Hypandrium, ♂. 17. Phallosome, ♂. Scales in mm. Fig. 16 to scale of Fig. 14.

illustrated. Paraprocts robust, almost triangular, with setae as illustrated; sensory fields with 37-39 trichobothria issuing from basal rosettes (Fig. 12). Epiproct almost triangular, with three mesal macrosetae near anterior border; other setae as illustrated (Fig. 12).

Measurements. FW: 4784; HW: 3291; F: 1279; T: 2036; t_1 : 853; t_2 : 98; t_3 : 125; ctt_1 : 32; Mx4: 303; f_1 : 839; f_2 : 806; f_3 : 802; f_4 : 662; IO: 521; D: 447; d: 281; IO/D: 1.16; PO: 0.62.

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

Morphology. Hypandrium (Fig. 16): side sclerites elongate, with setae as illustrated; central piece broad, setose, with a stout median tongue projected posteriorly. Phallosome (Fig. 17) complex, with V-shaped side struts; external parameres broad, phallosome sclerites symmetrical, posterior ones strongly sclerotized, curved outward, acuminate; mesal ones rounded anteriorly, curved, each extended posteriorly in stout, strongly sclerotized, irregular "sausages", associated to external parameres (Fig. 17). Paraprocts robust, with setae as illustrated and a field of small setae posteriorly, along margin; sensory fields with 34-36 trichobothria, issuing from basal rosettes (Fig. 14). Epiproct trapeziform, with two mesal macrosetae on each side, three mesal macrosetae near anterior margin, and a field of microspines along posterior border (Fig. 14).

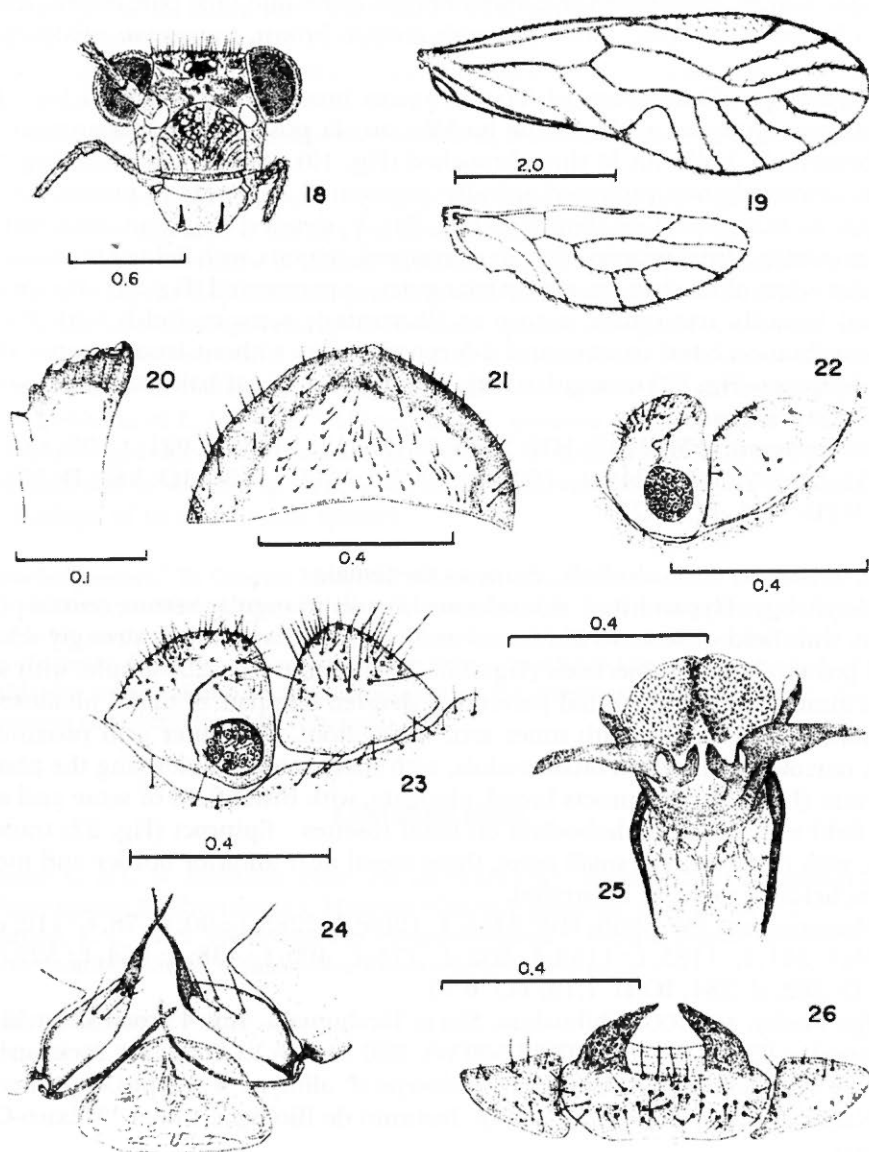
Measurements. FW: 4422; HW: 2999; F: 1150; T: 1924; t_1 : 894; t_2 : 80; t_3 : 110; ctt_1 : 31; Mx4: 292; f_1 : 888; f_2 : 860; IO: 404; D: 486; d: 336; IO/D: 0.83; PO: 0.69.

Type locality. NICARAGUA. Granada. Volcán Mombacho (11°49.9'N: 85°58.66'W), cloud forest 2, 30.IV.1998, Malaise trap, J. M. Maes, holotype ♂, allotype ♀, 6 paratypes ♂, 4 paratypes ♀. 2 paratypes ♀, 3 paratypes ♀ (31.III.1998); 3 paratypes ♂, 3 paratypes ♀ (15.IV.1998). Types deposited in the National Insect Collection (CNIN), Instituto de Biología, UNAM. México City, México.

Records. NICARAGUA. Granada. Volcán Mombacho. All specimens collected by J. M. Maes, in Malaise traps: 30.VI.1998, dry forest, 1 ♀. 16.III.1998, cloud forest 1 ♀. 15.IV.1998, San Joaquín 1, 1 ♂. 18.II.1999, Santa Ana 2, 6 ♀♀, 2 ♂♂. 2.III.1998, El Progreso 1, 1 ♂. 16.III.1998 and 30.IV.1998, El Progreso 2, 1 ♂ each. 16 and 31.III.1998, 15.IV.1998, cloud forest 3, 1 ♀, 1 ♂ and 1 ♀, respectively.

Loneura raramuri n. sp.
(Figs. 18-26)

Female. Color (in 80% alcohol). Body creamy white, with reddish brown areas as indicated below. Head pattern (Fig. 18). Maxillary palps white, except Mx4, pale brown. Scape, pedicel and antennal flagellomeres brown; proximal and distal ends of flagellomeres white. Wings hyaline, veins brown. Tergal lobes of meso and metathorax reddish brown; irregular brown bands on pleura, on each side of pleu-



Figs. 18-26. *Loneura raramuri* n. sp. 18. Front view of head, ♀. 19. Fore and hind wings, ♀ (setae on veins not illustrated). 20. Lacinial apex, ♀. 21. Subgenital plate, ♀. 22. Right paraproct and epiproct, ♂. 23. Right paraproct and epiproct, ♀. 24. Gonapophyses and ninth sternum, ♀. 25. Phallosome, ♂. 26. Hypandrium ♂. Scales in mm. Fig. 24 to scale of Fig. 23.

ral sulci. Coxae, trochanters and femora white, tibiae and tarsi pale brown; coxae with a brown distal spot. Abdomen with reddish brown, transverse subcuticular rings.

Morphology. Outer cusp of lacinial apices broad, with 6-7 denticles. FW pterostigma elongate, wider in the middle; areola postica almost triangular; M five-branched. HW with M three-branched (Fig. 19). Subgenital plate (Fig. 21) broad, setose; slightly projected apically; pigmented area next to postero-lateral margin, as illustrated. Gonapophyses (Fig. 24): V_1 slender; V_{2+3} stout, each with 4-5 setae mesally; distal process strongly sclerotized, sinuous, with field of microspines on outer edge; ninth sternum almost triangular, unpigmented (Fig. 24). Paraprocts robust, broadly triangular, setose as illustrated; sensory fields with 25-26 trichobothria on basal rosettes and 4-5 central setae, without basal rosettes (Fig. 23). Epiproct (Fig. 22) triangular, with setal field on distal half and three mesal, almost central macrosetae.

Measurements. FW: 5513; HW: 3786; F: 1284; T: 2438; t_1 : 921; t_2 : 95; t_3 : 119; ctt_1 : 33; $Mx4$: 223; f_1 : 1243; f_2 : 1222; f_3 : 1006; f_4 : 837; f_5 : 530; IO: 530; D: 361; d: 254; IO/D: 1.46; PO: 0.70.

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

Morphology. Hypandrium: side sclerites broadly triangular, setose; central piece broad, with field of setae as illustrated and two stout, acuminate, strongly sclerotized postero-lateral projections (Fig. 26). Phallosome (Fig. 25) simple, with side struts almost straight; external parameres slender, one pair of mesal phallosome sclerites, forked basally, with inner arm short, stout, and outer arm proximally wide, narrowing distally; a broad radula, with short spines, underlying the phallic structure (Fig. 25). Paraprocts broad, elongate, with distal field of setae and sensory field with 30-33 trichobothria on basal rosettes. Epiproct (Fig. 22) trapeziform, with distal field of small setae, three mesal near anterior border and meso-lateral fields of setae, as illustrated.

Measurements. FW: 5055; HW: 3455; F: 1205; T: 2283; t_1 : 90; t_2 : 78; t_3 : 110; ctt_1 : 32; $Mx4$: 301; f_1 : 1183; f_2 : 1138; f_3 : 938; f_4 : 775; f_5 : 490; f_6 : 438; f_7 : 364; f_8 : 322; IO: 453; D: 382; d: 284; IO/D: 1.18; PO: 0.75.

Type locality. MEXICO. Chihuahua. Sierra Tarahumara. Km. 43 road Samachique – Batopilas (27°06.970'N: 107°37.500'W), 960 m., 15.XI.2002; on rock surface covered with lichens, J.A. Casasola. Holotype ♂, allotype ♀. Types deposited in the National Insect Collection (CNIN). Instituto de Biología, UNAM. México City, México.

Discussion

Loneura meridionalis and *L. raramuri* present the same head pattern, the wings lack distinct pigmentation and the central piece of the hypandrium has two posterior

projections. In the latter, the female ninth sternum and the male phallosome are relatively simple, as compared with *L. meridionalis*.

On basis of the central piece of the hypandrium, these species belong in the same species group as *L. amazonica* New, *L. erwini* New & Thornton (both from the Amazonian basin), and *L. splendida* Mockford, from southeastern Mexico, Guatemala and Belize.

L. mombachensis differs from the other two species here described in head pattern, the forewings have a distinct pigmented band along part of the wing margin, the female ninth sternum is clearly distinct, as well as the phallosome, and the central piece of the hypandrium presents only one posterior projection. On this character, *L. mombachensis* belongs in the same species group as *L. crenata* Navas, *L. leonilae* García Aldrete, and *L. ocotensis* García Aldrete, the first one from Costa Rica and the latter two from southern Mexico. It is unfortunate that information on the genitalia of *L. boliviana* Williner, and *L. quinarya* Navas is not available.

Undescribed species of *Loneura* are known to occur in southern Arizona, in Nicaragua and in Venezuela. A revision of the genus seems necessary to assess the relationships of its constituent species.

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