



A new species of *Lachesilla* in the *pedicularia* group and new records of Psocoptera (Insecta: Psocodea) from Paraguay

Una especie nueva de *Lachesilla* en el grupo *pedicularia* y nuevos registros de Psocoptera (Insecta: Psocodea) de Paraguay

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Abstract. A new species of *Lachesilla* in the *pedicularia* group is here described and illustrated. It belongs in an assemblage of species occurring in South America and southern Mexico. The types are deposited in the National Insect Collection (CNIN), Instituto de Biología, UNAM. Records of 9 species of Psocoptera, in 4 genera previously unknown in Paraguay are presented.

Key words: taxonomy, Neotropics, South America, San Bernardino.

Resumen. Se describe e ilustra una especie nueva de *Lachesilla* en el grupo de especies *pedicularia*. Pertenece a un conjunto de especies sudamericanas y del sureste de México. Los tipos están depositados en la Colección Nacional de Insectos (CNIN), Instituto de Biología, UNAM. Se presentan 9 registros nuevos de especies de Psocoptera en 4 géneros para Paraguay.

Palabras clave: taxonomía, neotrópico, Sur América, San Bernardino.

Introduction

Lienhard and Smithers (2002) listed 19 species of Psocoptera from Paraguay (<http://www.ville-ge.ch/mhng/psocoptera/page/ps05par.htm>). Twelve of these species were collected by K. Fiebrig in June and August, 1906; July, 1906; and July, 1907 in San Bernardino, on the east margin of Ypacaraí Lake. The specimens collected were made available to Günther Enderlein, leading authority in the taxonomy of the Psocoptera at that time who, in 1910 (a and b), described the genera *Pelmatocoria* (now *Steleops*), *Steleops*, *Lichenomima*, *Phlotodes* (now *Myopsocus*), *Rhaptoneura* (now *Myopsocus*), *Euplocania*, *Labocoria* (now *Mesopsocus*), *Colposeopsis* (now *Syllysis*), *Notolepium*, and *Trigonosceliscus* (now *Embidopsocus*), and described 12 species in the above genera, excluding *Phlotodes* and *Labocoria*, and in the genera *Amphigerontia* (the species described was later transferred to *Metylophorus*), *Clematostigma*, *Caecilium* (now *Valenzuela*), and *Echmepteryx*. Since 1906, almost no psocid collecting was done in the country, and only seven species were added to those described by Enderlein; so the

psocid fauna of Paraguay, neighbor to the highly species rich Bolivia, Brazil and Argentina, must be extremely underestimated. In July, 2013, I collected Psocoptera in San Bernardino and neighboring areas, totalling 20 man/hours of collecting effort; some of the results are presented herewith. A new species of *Lachesilla* in the *pedicularia* group is described, and new records for the Paraguayan fauna are presented.

Materials and methods

For purposes of this work, 65 specimens were studied; they belong to 4 genera and 10 species previously unrecorded in Paraguay. The 2 specimens of *Lachesilla* here described 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 the whole specimens, before dissection, under a stereoscopic microscope, illuminated with cold, white light, and observed at 40-50X. Parts on the slides were measured with a filar micrometer mounted on an optic microscope. Abbreviations of parts measured are the following: 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, ctt_1 : number of ctenidia on t_1 , Mx4: length

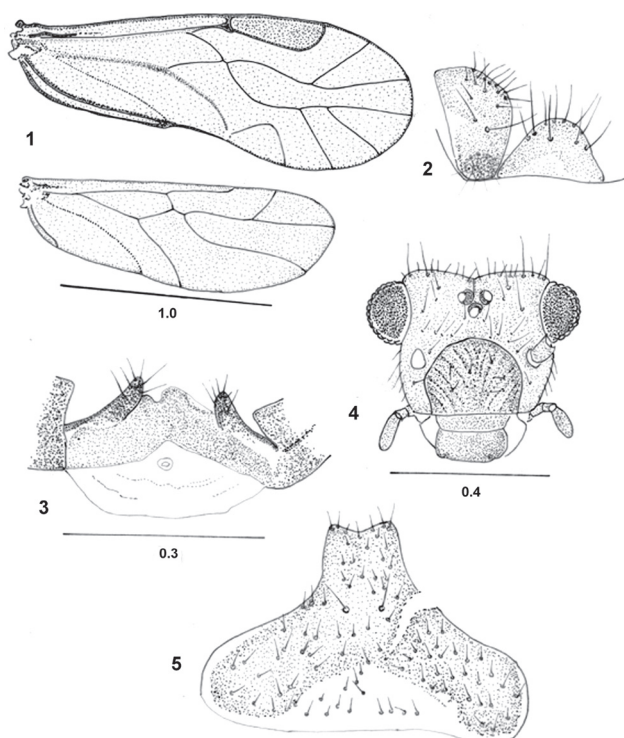
of fourth segment of right maxillary palp, f_1 , f_n : length of flagellomeres 1.n of right antenna, IO, D and d: minimum distance between compound eyes, antero-posterior diameter and transverse diameter of right compound eye, respectively, in dorsal view of head, PO: d/D. The types and other specimens studied are deposited in the National Insect Collection (CNIN), Departamento de Zoología, Instituto de Biología, UNAM, México, D. F.

Description

Lachesilla lugoi García-Aldrete, n. sp. Female (Figs. 1-5)

Diagnosis. Belonging in the *pedicularia* species group (García-Aldrete, 1974; Mockford, 1993). Differing from *L. brasiliensis* García-Aldrete, *L. carioca* García-Aldrete, *L. iguazuensis* García-Aldrete, and *L. veneper* García-Aldrete in the shape of the projection of the subgenital plate, in the pigmented area of the subgenital plate, and in the shape of the gonapophyses and pigmentation of the ninth sternum.

Color (in 80% ethanol). Body reddish brown. Compound eyes black, ocelli hyaline, with ochre centripetal crescents.



Figures 1-5. *Lachesilla lugoi* n. sp. Female. 1, fore- and hind-wings; 2, right paraproct and epiproct; 3, gonapophyses and ninth sternum; 4, front view of head; 5, subgenital plate. Scales in mm. Figures 2 and 5, to scale of Figure 3.

Maxillary palps brown. Wings almost hyaline, with a reddish brown hue; R_1 reddish, other veins brown. Legs pale brown. Abdomen creamy, with ochre, transverse subcuticular bands.

Morphology. Forewing pterostigma almost rectangular, wider posteriorly; veins Rs and M diverging from a point or fused for a short distance; areola postica broadly triangular, wide based, with apex rounded; hindwing with Rs-M fused for a distance (Fig. 1). Subgenital plate broad, with setae as illustrated, projected posteriorly, with posterior border slightly obtusely concave; pigmented area concave anteriorly (Fig. 5). Gonapophyses elongate, directed posteriorly; ninth sternum wide, with posterior pigmented area, anterior border of pigmented area concave; anterior half unpigmented, spermapore rounded, with slender rim (Fig. 3). Paraprocts semi-elliptic, with setae as illustrated; sensory fields with 10 trichobothria issuing from basal rosettes, and one marginal trichobothrium without basal rosette (Fig. 2). Epiproct (Fig. 2) straight anteriorly, broadly triangular, posteriorly rounded, with setal field on distal third.

Measurements (in μm). FW: 1911, HW: 1496, F: 371, T: 689, t_1 : 229, t_2 : 95, ctt_1 : 17, Mx4: 88, f_1 : 179, f_2 : 165, f_3 : 145, f_4 : 114, IO: 318, D: 142, d: 93, 10/d: 3.4, PO: 0.65.

Taxonomic summary

Distribution. Paraguay.

Types. Holotype female. **Paraguay:** Cordillera, San Bernardino, 25.VII.2013, beating cut tree branches with dead leaves, A. N. García-Aldrete. Paratype female, ca. Tobatí, 24.VII.2013, beating shrub branches, same collector as holotype.

Etymology. This species is dedicated to Mr. Isabelino Lugo, from Asunción, Paraguay, for his valuable help and logistic support in the San Bernardino area, that facilitated in much my psocid collecting there, and above all, for his friendship.

Remarks. *L. lugoi* sp. n., belongs in a complex of South American species in which the female subgenital plate, gonapophyses and ninth sternum are built on the same plan. An undescribed species, from the state of Chiapas, in southern Mexico, also belongs in that complex. The described species included are *L. brasiliensis* García-Aldrete and *L. carioca* García-Aldrete, from Brazil, *L. iguazuensis* García-Aldrete, from Argentina, and *L. veneper* García-Aldrete, from Venezuela and Peru. The females in this complex differ in the shape of the projection of the subgenital plate, in the pigmented area of the subgenital plate, and in the shape of the gonapophyses and pigmentation of the ninth sternum. In the males of *L. iguazuensis* and *L. veneper* the epiproct has two projections, short in the former and very long in the latter, so it may be predicted that in *L. lugoi* sp. n., *L. brasiliensis* and *L. carioca*, as well as in

the undescribed Mexican species, the male epiprocts have similar projections.

New records of Psocoptera for Paraguay

Stenopsocidae

Graphopsocus cruciatus (Linnaeus)

Hemerobius cruciatus Linnaeus, 1768: 225.

Cordillera, San Bernardino, 25.VII.2013, beating branches of shrubs and trees, 1 female.

Remarks. In South America this species has been recorded in Argentina, Brazil and Colombia (Lienhard and Smithers, 2002; personal information).

Lachesillidae

Lachesilla cuala García-Aldrete

Lachesilla cuala García-Aldrete, 1988: 41.

Cordillera, ca. Caacupé, I. Lugo's home, 24.VII.2013, beating cut branches with dead leaves, 1 male; San Bernardino, 25.VII.2013, beating cut branches with dead leaves, 1 male.

Remarks. This species is widely distributed, extending from southern Mexico to Argentina, it belongs in the *forcepeta* species group (García-Aldrete, 1974; Mockford, 1993). In South America it has been recorded in Trinidad, Brazil, Colombia and Argentina (Lienhard and Smithers, 2002; García-Aldrete, 2004; 2009; García-Aldrete and Mockford, 2009; González et al., 2013).

Lachesilla lapadoce García-Aldrete and da Silva-Neto

Lachesilla lapadoce García-Aldrete and da Silva-Neto, 2013: 394.

Cordillera, Ca. Tobatí, 24.VII.2013, beating cut tree branches with dead leaves, 1 female; San Bernardino, 25.VII.2013, on dead leaves of cut tree branches, 1 female.

Remarks. This species was only known from the Chapada Diamantina, Bahia, Brazil (García-Aldrete and da Silva-Neto, 2013). It belongs in the *andra* species group (García-Aldrete, 1974; Mockford, 1993).

Lachesilla matogrossensis García-Aldrete

Lachesilla matogrossensis García-Aldrete, 1997: 214.

Cordillera, ca. Tobatí, 24.VII.2013, beating cut branches with dead leaves, 1 female.

Remarks. This species was only known from Campo Grande, Mato Grosso, Brazil (García-Aldrete, 1997). It belongs in the *riegeli* species group (García-Aldrete, 1982; Mockford, 1993).

Lachesilla pereirorum García-Aldrete

Lachesilla pereirorum García-Aldrete, 2004: 212.

Cordillera, ca. Tobatí, 24.VII.2013, beating dead oil palm fronds, 6 females, 3 males.

Remarks. This species was only known from Wanda, Misiones, Argentina (García-Aldrete, 2004). It belongs in

the *palmera* species group, the diagnosis of which is here presented for the first time (García-Aldrete, 2004, 2008; New, 1971; New and Thornton, 1975):

Female. Wings unmarked. Subgenital plate with sides converging to a slightly pointed apex, or posteriorly rounded, or slightly bilobed posteriorly. Gonapophyses blunt ended, directed mesally. Ninth sternum mostly membranous, Spermapore surrounded by a pigmented ring of variable thickness.

Male. Wings as in the female. Hypandrium approximately rectangular, claspers on sides of hypandrium, elongate, either stout, distally acuminate, or slender, with projections of variable length on inner and outer margins. One phallosome apodeme, diverging distally to form two broad lamellae, or forming a pointed projection. Paraprocts with slender, mesal sclerotized prongs. Epiproct with one or two posterior projections of variable length, either pointed or blunt ended.

Species included: *L. acuminiproctus* García-Aldrete (Peru), *L. amarilla* New (Brazil), *L. bicornata* New and Thornton (Brazil, Colombia), *L. capreola* New (Brazil), *L. palmera* New (Brazil), and *L. pereirorum* García-Aldrete (Argentina, Paraguay).

Lachesilla rugosa García-Aldrete

Lachesilla rugosa García-Aldrete, 1996: 111.

Cordillera, ca. Hotel Ruta del Sol, 8 km N San Bernardino, 23.VII.2013, beating shrubs and tree branches with dead leaves, 2 females, 2 males; ca. Tobatí, 24.VII.2013, beating cut tree branches with dead leaves, 3 females, 1 male; ca. Caacupé, 24.VII.2013, I. Lugo's home, beating cut tree branches with dead leaves, 3 females, 3 males; San Bernardino, 25.VII.2013, on dead leaves of cut tree branches, 7 females, 7 males.

Remarks. This species is known from Argentina, Brazil, Colombia, Peru and Trinidad (García-Aldrete, 1996; 2004; González et al., 2013). It belongs in the *forcepeta* species group.

Lachesilla tectorum Badonnel

Lachesilla tectorum Badonnel, 1931: 238.

Cordillera, ca. Hotel Ruta del Sol, 8 km N San Bernardino, 23.VII.2013, beating shrubs and tree branches with dead leaves, 3 females.

Remarks. This species is widely distributed (see García-Aldrete, 1996; Lienhard and Smithers, 2002). In South America it has been recorded in Argentina, Colombia and Brazil (García-Aldrete, 1996; 2009). It belongs in the *pedicularia* species group (García-Aldrete, 1974; Mockford, 1993).

Ectopsocidae

Ectopsocopsis cryptomeriae (Enderlein)

Ectopsocus cryptomeriae Enderlein, 1907: 100.

Cordillera, ca. Hotel Ruta del Sol, 8 km N San Bernardino, 23.VII.2013, beating shrubs and tree branches with dead leaves, 8 females, 3 males; San Bernardino, 25.VII.2013, 1 female, 1 male.

Remarks. This is a widely distributed species (Lienhard and Smithers, 2002). In South America it is known in Argentina, Brazil and Colombia (García-Aldrete, 2009; García-Aldrete and Mockford, 2009).

Pseudocaeciliidae

Pseudocaecilius citricola (Ashmead)

Psocus citricola Ashmead, 1879: 228.

Cordillera, ca. Tobatí, 24.VII.2013, beating shrubs branches, 2 females; San Bernardino, 25.VII.2013, 2 females.

Remarks. A pantropical species, known in South America in Colombia, Ecuador, French Guiana and Venezuela (Lienhard and Smithers, 2002).

Discussion

Little psocid collecting has been conducted in Paraguay since 1906. As a result, the checklist of Psocoptera for the country is rather small, consisting of 29 species, including the 10 species dealt with in this work (see online checklist of Psocoptera for Paraguay, based on Lienhard and Smithers, 2002: <http://www.ville-ge.ch/mhng/psocoptera/page/ps05par.htm>). Six species seem to be endemic to Paraguay: *Notolepium paraguayense* Enderlein, *Echmepteryx armillata* Enderlein, *Syllysis sinipennis* (Enderlein), *Lachesilla lugoi* García-Aldrete, *Clematostigma paraguayense* Enderlein, and *Myopsocus dispar* (Enderlein). The other 23 species are also known in other South American countries (Lienhard and Smithers, 2002).

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Literature cited

Ashmead, W. H. 1879. On a new *Psocus*. Canadian Entomologist 11:228-229.
Badonnel, A. 1931. Contribution á l'étude de la faune de Mozambique. Voyage de M. P. Lesne (1928-1929). 4e note. Copéognathes. Annales de Sciences Naturelles, Zoologie (10) 14 (16):229-260.
Badonnel, A. 1963. Psocoptères terricoles, lapidicoles et corticoles du Chili. Biologie de l'Amérique Australe 2:291-338.

Enderlein, G. 1907. Neue Beiträge zur Kenntnis der Copeognathen Japans. Stettiner Entomologische Zeitung 68:90-106.
Enderlein, G. 1910a. Eine Dekade neuer Copeognathengattungen. Sitzungsbericht der Gesellschaft naturforschender Freunde zu Berlin 2:63-77.
Enderlein, G. 1910b. Neue aussereuropäische Copeognathen. Zoologischer Anzeiger 36:161-169.
García-Aldrete, A. N. 1974. A classification above species level of the genus *Lachesilla* Westwood (Psocoptera: Lachesillidae). Folia Entomológica Mexicana 27:1-88.
García-Aldrete, A. N. 1982. The species group "riegeli" of the genus *Lachesilla* (Psocoptera: Lachesillidae). Zoologischer Anzeiger 209:196-210.
García-Aldrete, A. N. 1988. Species of *Lachesilla* (Psocoptera: Lachesillidae) from the coast of the Mexican state of Jalisco. Folia Entomológica Mexicana 77:33-61.
García-Aldrete, A. N. 1996. Species of *Lachesilla* in the Caribbean islands and Trinidad (Insecta: Psocoptera: Lachesillidae). Insecta Mundi 10:105-138.
García-Aldrete, A. N. 1997. New South American *Lachesilla* (Psocoptera: Lachesillidae). Revista de Biología Tropical 44/45:209-223.
García-Aldrete, A. N. 2004. Records and descriptions of *Lachesilla* (Psocoptera: Lachesillidae) from Argentina. Studies on Neotropical Fauna and Environment 39:207-215.
García-Aldrete, A. N. 2008. Lachesillidae (Insecta: Psocoptera) from the Tambopata Reserved Zone, Madre de Dios, Peru. Publicaciones Especiales 21. Instituto de Biología, Universidad Nacional Autónoma de México. México, D. F. 92 p.
García-Aldrete, A. N. 2009. New species and records of Psocoptera (Insecta) from Argentina. Zootaxa 2219: 1-17.
García-Aldrete, A. N. and E. L. Mockford. 2009. A list of Psocoptera (Insecta: Psocodea) from Brazil. Revista Mexicana de Biodiversidad 80: 665-673.
García-Aldrete, A. N. and A. M. da Silva-Neto, 2013. Two new species of *Lachesilla* in the *andra* group, from the Chapada Diamantina, Bahia, Brazil (Psocodea: 'Psocoptera': Lachesillidae). Zootaxa 3736:392-396.
González-Obando, R., C. S. Saldaña-Guzmán and A. N. García-Aldrete. 2013. Lachesillidae (Psocodea: "Psocoptera") de Valle del Cauca y PNN Gorgona, Colombia. Boletín del Museo de Entomología de la Universidad del Valle 14:51-69.
Lienhard, C. and C. N. Smithers. 2002. Psocoptera (Insecta). World catalogue and bibliography. Instrumenta Biodiversitatis V. Genève, Muséum d'Histoire Naturelle. 745 p.
Linnaeus, C. 1768. Systema Naturae. Ed. 13. Stockholm (Holmiae).
Mockford, E. L. 1993. North American Psocoptera (Insecta). Flora and Fauna Handbook No. 10. Sandhill Crane Press, Inc. Gainesville, Florida/ Leiden. 455 p.
Mockford, E. L. and D. M. Sullivan. 1986. Systematics of the Graphocaeciliine psocids with a proposed higher classification of the family Lachesillidae (Psocoptera). Transactions of the American Entomological Society 112:1-80.

New, T. R. 1971. Species of *Lachesilla* (Psocoptera) associated with palm trees in central Brazil. Zoological Journal of the Linnean Society of London 50: -447.

New, T. R. and I. W. B. Thornton. 1975. Psocomorpha (Psocoptera) collected on recent expeditions to South America. Journal of Entomology (B) 44:27-80.