Dugesiana 19(2): 135-141
Fecha de publicación: 21 de diciembre 2012

New species of *Triplocania* and *Lachesilla* from Sierra Juárez, Oaxaca, Mexico (Psocodea:'Psocoptera': Ptiloneuridae, Lachesillidae)

Nuevas species de *Triplocania* y *Lachesilla* de Sierra Juárez, Oaxaca, México (Psocodea:'Psocoptera': Ptiloneuridae, Lachesillidae)

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ABSTRACT

One species of *Triplocania*, as well as three species of *Lachesilla*, in the *Corona* species group, are herein described and illustrated. They are all endemic to Sierra Juárez, Oaxaca, and rise the number of psocid species recorded in Oaxaca to 153. The species of *Triplocania* is the first one of this genus recorded in Oaxaca, and the sixth known in Mexico; it is related to a group of species that occur mostly in the Amazonian Region. Eight other species of the *Corona* group of *Lachesilla*, also occur in Oaxaca. The types of the species herein described are deposited in the National Insect Collection (CNIN), Instituto de Biología, Universidad Nacional Autónoma de México, México City.

Key words: Taxonomy, Neotropics, species groups, endemism.

RESUMEN

Una especie de *Triplocania*, la primera que se registra en Oaxaca, y la sexta registrada en México, y tres especies de *Lachesilla* en el grupo *Corona*, son aquí descritas e ilustradas. Todas son endémicas a Sierra Juárez, Oaxaca, y elevan a 153 el número de especies de psócidos registrados en Oaxaca. La especie de *Triplocania* es afín a un grupo de especies que habita principalmente en la Región Amazónica. Otras ocho especies de *Lachesilla* en el grupo *Corona*, se encuentran también en Oaxaca. Los tipos de las especies descritas están depositados en la Colección Nacional de Insectos (CNIN), alojada en el Instituto de Biología, Universidad Nacional Autónoma de México, en México, D. F.

Palabras clave: Taxonomía, neotrópico, grupos de especies, endemismo.

INTRODUCTION

Sierra Juárez, Oaxaca, is an area of high biological richness and high levels of endemism for several groups of organisms (Flores Villela & Gerez, 1994; García González *et al.,* 2004; García Mendoza, 2004; García Mendoza & Meave, 2011). It is part of Conabio's Prioritary Terrestrial Region 130, Sierra Norte-Mixe (Arriaga *et al.,* 2000; Arriaga Cabrera *et al.,* 2009). Recent collecting of Psocoptera (Insecta) in the area, has revealed the presence of a large number of undescribed species in several genera, among others, a new genus of Psoquillidae, and a large number of *Lachesilla* in several species groups, that will be treated elsewhere. We now present descriptions of four species in two genera, one in the genus *Triplocania* (Ptiloneuridae), and three in the *Corona* species group of *Lachesilla* (García Aldrete, 1974) (Lachesillidae), the most speciose psocid genus.

MATERIAL AND METHODS

We studied 14 specimens; seven of them were dissected in 80 % ethyl alcohol, and their parts (head, legs, wings and genitals), were mounted on slides in Canada Balsam. Color was recorded by placing whole specimens in 80% alcohol under a dissecting microscope at 80X, illuminated with cold, white light; measurements, of parts on the slides, were taken with a filar micrometer, whose measuring unit is 136 µm for wings, and 53 µm for other parts. Abbreviations of parts measured are the following: FW and HW: lengths of fore- and hind- wings, F, T, t1, t2, and t3: lengths of femur, tibia and tarsomeres 1, 2 and 3 of right hind leg, Mx4: length of four segment of right maxillary palpus, f1…fn: lengths 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 are deposited in the National Insect Collection (CNIN), located in the Zoology Department, Instituto de Biología, Universidad Nacional Autónoma de México, México City.

RESULTS

Family Ptiloneuridae

Triplocania palaciosi García Aldrete & Casasola González, new species (♂)

(Figs. 2-9)

Diagnosis. Head with an ochre band between compound eyes (Fig. 2). Forewings with a brown marginal band from R_{4+5} to Cu_{1b}, a brown spot distally on Cu_2; M_3 forked. Occasionally M_2 also forked; hindwings mostly hyaline, veins brown, a brown spot distally on R_{4+5}. Areola postica tall, apically rounded, extended posteriorly (Fig. 3). Ninth sternum almost trapeziform, sclerotized, with three short, longitudinal mesal lines (Fig. 5). Hypandrium of

three pieces: a large, central sclerite flanked by elongate, setose, small sclerites; central sclerite setose, with a short, stout, middle projection, distally rounded (Fig. 8). Phallosome Y shaped anteriorly, external parameres stout, with posterior border straight, bearing pores; two pairs of endophallic sclerites, anterior pair robust, curved, proximally rounded, narrowing distally, acuminate; posterior pair strongly sclerotized proximally, curved, directed posteriorly, bent outwards, distally acuminate (Fig. 4).

Description. Female. Color. As in diagnosis, plus the following. Body chestnut brown, with ochre areas as indicated below. Compound eyes black, ocelli hyaline, with black centripetal crescents, in a group inscribed in a creamish area; small ochre spots on vertex, between epicranial sulcus and each compound eye; an ochre band between compound eyes, shaped like an inverted trapeze, limited posteriorly by the level of the third ocellus, and posteriorly by the epistomal sulcus; an ochre spot from each compound eye to antennal fossae; slender ochre bands in postclypeus, forming a broad Y (Fig. 2). Maxillary palps pale brown, with Mx4 distally dark brown. Antennae pale brown, flagellomeres with distal apices white. Legs creamy white, except for t_2 and t_3, dark brown. Coxae of forelegs white, coxae of mid and hindlegs brown. Episternum of mesothorax ochre. Tergal lobes of meso- and metathorax more pigmented than rest of the segments. Forewings mostly hyaline, veins brown, pterostigma with a proximal and a distal brown band; abdomen creamish, with ochre, transverse, subcuticular rings. Genital segments brown.

Morphology. As in diagnosis, plus the following. Outer cusp of lacinial tip broad, with 6-7 denticles (Fig. 7); pterostigma elongate, almost fusiform, wider in the middle. R_{2+3}, R_{4+5} and M_2 distally sinuous, M_3 forked (Fig. 3). Subgenital plate broad, setose, posteriorly rounded, pigmented area along side and posterior borders (Fig. 6). Gonapophyses: V_1 long, slender, strongly sclerotized, V_{2+3} with a mesal, membranous protuberance on inner border, distal process almost straight, with a field of microspines on inner border, V_2 with a row of ten long setae, almost on line (Fig. 5). Paraprocts broad, with field of setae on border opposite sensory fields, these almost circular, with 28-30 trichobothria on basal rosettes (Fig. 9). Epiproct almost straight anteriorly, rounded posteriorly, with field of setae on distal third, and a group of three mesal long setae, almost in a straight line (Fig. 9).

Measurements (in μm) FW: 6850, HW: 4352, F: 1496, T: 2785, t1: 1088, t2: 136, t3: 190, ctt1: 32, Mx4: 338, f1: 1237, f2: 1207, f3: 931, IO: 608, D: 423, d: 272, 10/D: 1.43, PO: 0.64.

Male. Color. Essentially same as the female.

Morphology. As in diagnosis, plus the following. Outer cusp of lacinial tip same as the female. Wing venation essentially same as the female, one specimen with M_2 and M_3 forked, another specimen with M_1 and M_2 simple, and M_3 with three branches, the last one not reaching the wing margin. Paraprocts robust, elliptic, setose as illustrated, sensory fields almost circular, with 37-38 trichobothria in basal rosettes. Epiproct straight anteriorly, rounded posteriorly, with three long setae mesally, almost in line, and setal fields on sides and along posterior border, with field of microsetae along posterior border.

Measurements (in μm). FW: 6652, HW: 4365, F: 1496, T: 2856, t1: 1097, t2: 141, t3: 168, ctt1: 34, Mx4:367, f1: 1267, f2: 1167, f3: 967, IO: 638, D: 544, d: 299, IO/D: 1.17, PO: 0.54.

Type locality. MEXICO. Oaxaca. 3 km SE Santa María Yavesia, 17° 13' 32.04" N: 96° 24' 30.55" W, 2160 m., 30.X.2007, on rock surface with lichens, José Arturo Casasola, holotype male, allotype female, 1 paratype male, 7 paratypes female.

Etymology. This species is dedicated, with pleasure, to Dr. José Guadalupe Palacios Vargas (Facultad de Ciencias, Universidad Nacional Autónoma de México), in recognition to his many and important contributions in the study of the Collembola and Acari.

Remarks. *Triplocania* presently includes 26 described species, and 58 undescribed ones (García Aldrete, 2012); six species, including *T. palaciosi*, occur in Mexico, and none had been recorded in Oaxaca. *T. palaciosi* belongs in a group, with *T. caudata* New, *T. caudatoides* García Aldrete, *T. lucida* Roesler, and *T. rondoniensis* García Aldrete (all of the latter, except *T. lucida*, from the Amazonian Region). The group is characterized by the males having an hypandrium of three sclerites: a large central one, flanked by two smaller ones, the central sclerite with a median posterior projection. In all the species in this group, except again for *T. lucida*, the forewings have a marginal pigmented band, from R_{4+5} to Cu_2. *T. palaciosi* is, so far, only known from its type locality in Sierra Juárez.

Family Lachesillidae

Lachesilla unsijensis García Aldrete & Casasola González, new species (♂)

(Figs. 10-14)

Diagnosis. Mx1 dark, chocolate brown; Mx2-4 brown. Hypandrium (Fig. 14), of two pieces, claspers fused to hypandrium, each clasper projected posteriorly, elongate, club shaped. A strongly sclerotized, transverse band, along border of median concavity. Phallosome apodemes fused basally, each arm long, slender, distally trifid (Fig. 14). Paraproctal prongs short, slender, distally truncate (Fig. 13). Epiproct bilobed posteriorly (Fig. 13).

Description. **Color.** Body pale brown, compound eyes black, ocelli hyaline, without centripetal crescents. Tergal lobes of meso- and metathorax dark brown. Abdomen creamish, with ochre, transverse centripetal crescents.

Morphology. As in diagnosis, plus the following. Wings (Fig. 11) hyaline, veins brown, forewing pterostigma long, wider posteriorly, Rs-M fused for a distance, areola postica wide, rounded apically. Hindwing Rs-M fused for a distance. Paraprocts broad, setose, sensory fields almost circular, with 11-12 trichobothria in basal rosettes, and one marginal trichobothrium without basal rosette (Fig. 13). Epiproct straight anteriorly, with a setal field on each posterior lobe (Fig. 13).

Measurements (in μm). FW: 2814, HW: 2120, F: 446, T: 917, t1: 261, t2: 111, ctt1: 17, Mx4: 110, f1:493, f2: 281, f3: 217, IO: 342, D: 172, d: 106, IO/d: 3.2, PO: 0.61.

Type locality. MEXICO. Oaxaca. Ixtlán de Juárez, Campus of the University of the Sierra Juárez (UNSIJ), 17° 18' 48" N: 96° 29' 4.2" W, 1945 m., 20.II.2008, on rock surface with mosses and lichens, José Arturo Casasola, holotype male.

Etymology. The specific name refers to the type locality, the campus of the UNSIJ.

Lachesilla lachataoensis García Aldrete & Casasola González, new species (♂)
(Figs. 15-18)

Diagnosis. R_1, bordering pterostigma, ochre. Hypandrium of two pieces, claspers fused to hypandrium, short, projected posteriorly, distally truncate, slightly extended on outer edge (Fig. 17). Phallosome apodemes basally fused, each arm proximally slender, strongly sclerotized, distally dilated, acuminate, with a field of spines anteapically (Fig. 17); a transverse, elongate sclerite at bottom of median concavity. Epiproct almost trapeziform, with a mid, posterior concavity to form two lobes, each lobe with a setal field on side and along posterior border (Fig. 18).

Description. Color. Body dark brown. Compound eyes black, ocelli hyaline, with ochre centripetal crescents. Wings almost hyaline, veins brown. Abdomen with ochre, transverse, centripetal crescents.

Morphology. As in diagnosis, plus the following. Forewing pterostigma long, wider posteriorly, Rs-M diverging from a point, areola postica broadly triangular, apically rounded; hindwing Rs-M fused for a short length (Fig. 16). Paraprocts broad, setose, with a short, distally truncate mesal prong, sensory fields circular, with 11-12 trichobothria in basal rosettes, and one marginal trichobothrium without basal rosette (Fig. 18).

Measurements (in µm). FW: 2366, HW: 1791, F: 374, T: 667, t1: 216, t2: 97, ctt1: 15, Mx4: 90, f1: 220, f2: 164, f3: 132, f4: 110, IO: 350, D: 162, d: 96, IO/d: 3.64, PO: 0.59.

Type locality. MEXICO. Oaxaca, Santa Catarina Lachatao, Las Vigas, 17° 10' 43" N: 96° 26' 51.6" W, 2689 m., 28.VI.2010, on tree trunk with mosses and lichens, holotype male, José Arturo Casasola. Same locality and date, on trunk of fallen tree, 6 male paratypes, M. Razo and J. A. Casasola.

Etymology. The specific name referes to the type locality, Santa Catarina Lachatao.

Lachesilla ixtlanensis García Aldrete & Casasola González, new species (♀)
(Figs. 19-26)

Diagnosis. Neotenic (Figs. 19-20). Ocelli absent. Wings vestigial, setose, without indication of veins (Fig. 23). Mesal flap of subgenital plate narrow anteriorly, broadly spatulate distally (Fig. 24). Gonapophyses elongate, with sides almost parallel, slightly projected distally, strongly pigmented along outer edge and distally, with a field of setae along outer edge and distally (Fig. 26) Ninth sternum broad, bilobed anteriorly, with anterior edge of lobes strongly sclerotized; a pigmented band along posterior border, and pigmented spots flanking spermapore, this with a pigmented rim extended anteriorly (Fig. 26).

Description. Color. Body chocolate brown. Compound eyes black. Abdomen with dark brown subcuticular rings.

Morphology. As in diagnosis, plus the following. Compound eyes below the level of the vertex (Fig. 21). Subgenital plate broad, setose, with pigmented area broadly concave anteriorly and postero-lateral corners slightly prominent (Fig. 24); paraprocts elliptic, setose, sensory fields not defined, two long setae in the location of the sensory field (Fig. 25); epiproct wide, narrow, elongate, with a median anterior concavity, bearing two-three setae on each side of the mid concavity (Fig. 25).

Measurements (in µm). Mx4: 84, F: 265, T: 401, t1: 124, t2: 61, f1: 75, f2: 53, f3: 55, f4: 53, IO: 337, D: 128, d: 76, IO/d: 4.43, PO: 0.59.

Type locality. MEXICO. Oaxaca. Ixtlán de Juárez, Campus of the University of the Sierra Juárez (UNSIJ), 17° 18' 48" N: 96° 29' 4.2" W, 1945 m., 22.II.2008, on dead branch of shrub with lichens and mosses, holotype female, José Arturo Casasola.

Etymology. The specific name refers to the type locality, Ixtlán de Juárez.

Remarks on the *Lachesilla* species. The three species belong in species group *Corona*, as diagnosed by García Aldrete (1974), a large group that presently includes 20 described species, and some 50 undescribed ones, mostly from Mexico. *L. unsijensis* and *L. lachataoensis* are known only from males, they are macropterous, present the same genital structural plan, and differ among themselves in genital details mostly (compare Figs. 14 and 17). They also differ from the described species in the group, on male genital details, mainly morphology of the hypandrium, claspers, phallosome apodemes, and shape of the paraproctal prongs and epiproct.

In the group *Corona*, *L. albertina* García Aldrete, from Alberta, Canada, and *L. michiliensis* García Aldrete, from Durango and Texas, are known only from neotenic females (García Aldrete, 1991; 1992; Young, 2012) In *L. mexica* García Aldrete, from D. F., state of México and Oaxaca (García Aldrete, 1982 and unpublished records), the males are macropterous and the females are brachypterous, and in *L. reyesi* García Aldrete, from Durango, Hidalgo, state of México and Michoacán, the males are macropterous, and the females are macropterous if found in oak or cedar foliage, and brachypterous if found in oak litter, so the brachyptery seems to be habitat-related (García Aldrete, 1991). *L. ixtlanensis* seems closer to *L. michiliensis*, in having short, primordial wings, as in immature stages; in both species the flap of the subgenital plate is distally rounded and spatulate, much shorter in the former species; in the other species (*L. albertina*, *L. mexica*, and *L. reyesi*) the wings in the females are distinct, rounded flaps, not immature like. In all cases, *L. ixtlanensis* can be separated from the other neotenic species, besides the wing differences, in genital details. The three species are so far known only from Sierra Juárez, which adds to the endemisms characteristic of this area.

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Recibido: 23 de octubre 2012
Aceptado: 5 de diciembre 2012

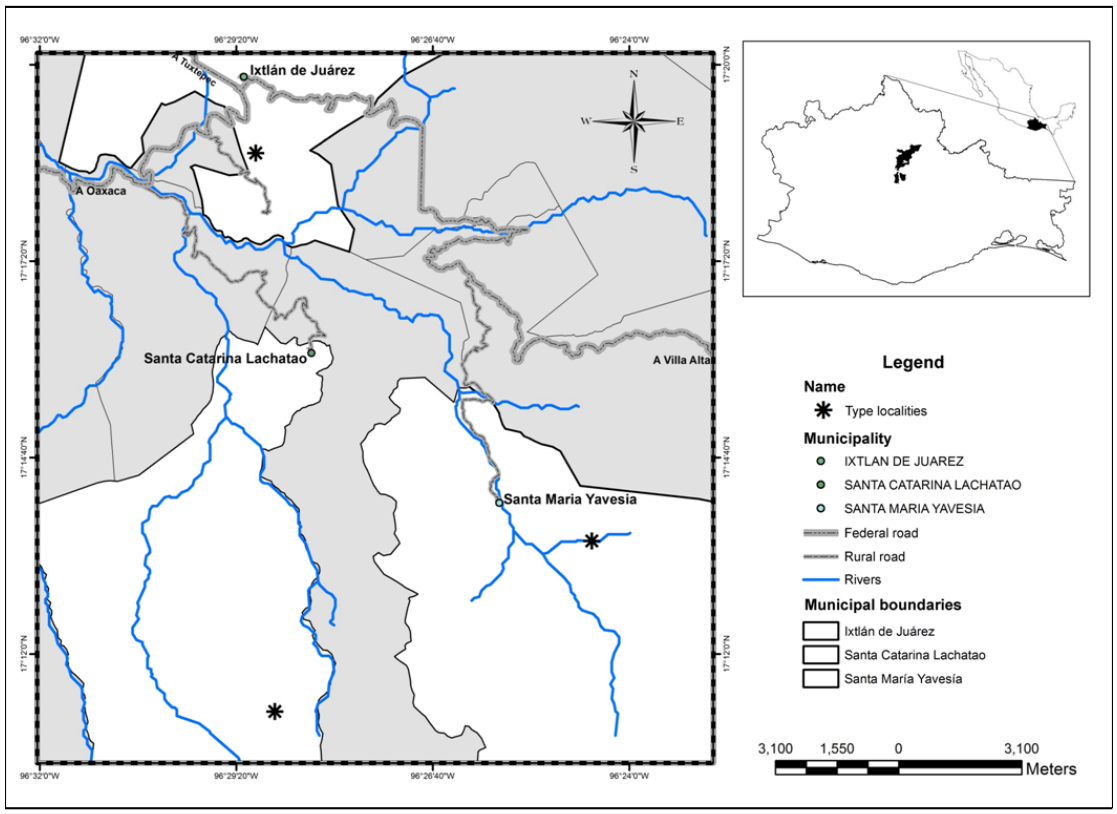

Figure 1. Map of collecting localities in Sierra Juárez, Oaxaca.

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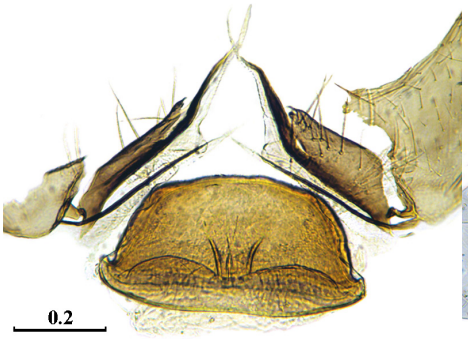

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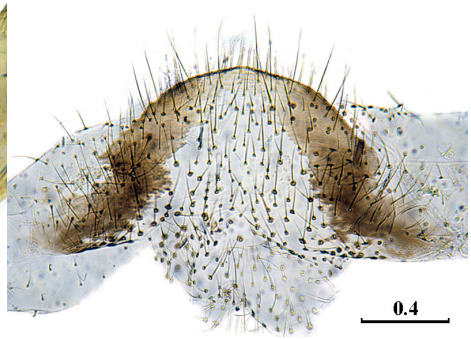

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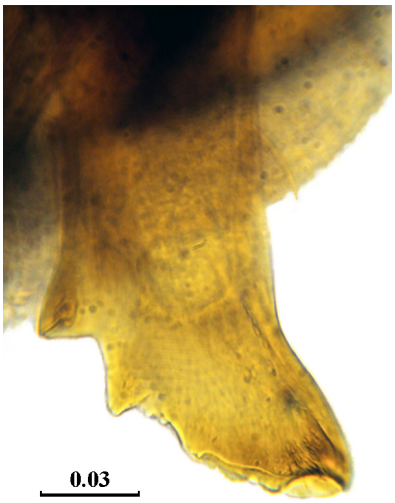

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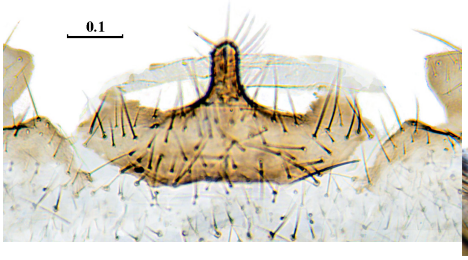

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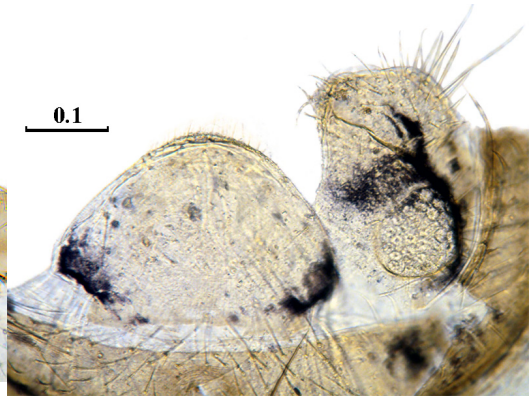

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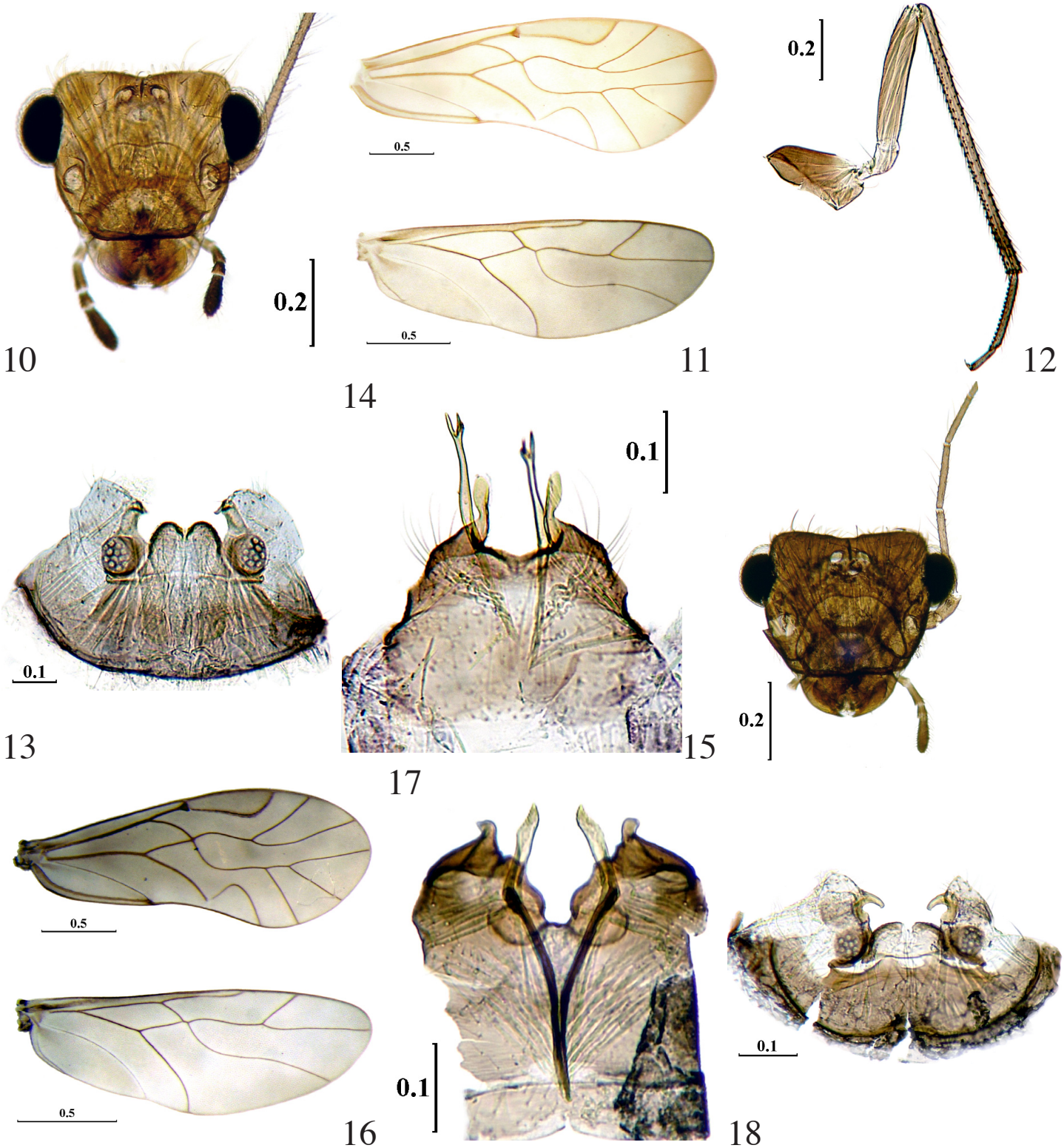
Figures 2-9. *Triplocania palaciosi* García Aldrete & Casasola González. 2. Front view of head. ♀. 3. Fore- and hind- wings. ♂. 4. Phallosome. ♂. 5. Gonapophyses and ninth sternum. ♀. 6. Subgenital plate. ♀. 7. Lacinial apex. ♂. 8. Hypandrium. ♂. 9. Left paraproct and epiproct. ♂. Scales in mm.



Figures 10-14. *Lachesilla unsijensis* García Aldrete & Casasola González (Male). 10. Front view of head. 11. Fore- and hind- wings. 12. Right hind leg. 13. Clunium, paraprocts and epiproct. 14. Hypandrium, claspers and phallosome apodemes. 15-18. *Lachesilla lachataoensis* García Aldrete & Casasola González (Male). 15. Front view of head. 16. Fore- and hind- wings. 17. Hypandrium, claspers and phallosome apodemes. 18. Clunium, paraprocts and epiproct. Scales in mm.

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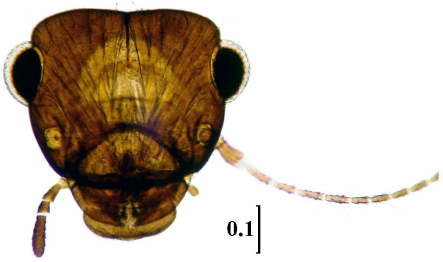

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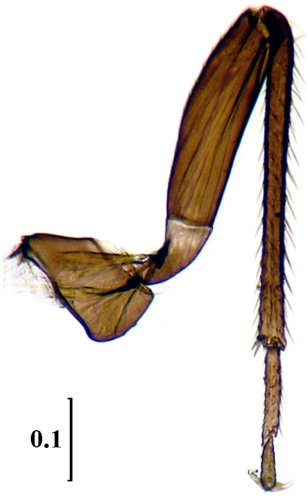

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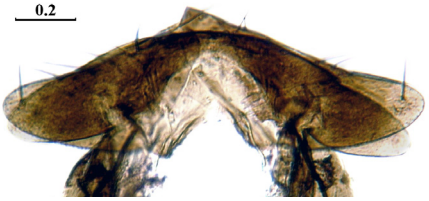

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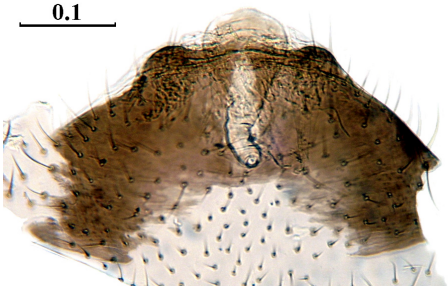

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Figures 19-26. *Lachesilla ixtlanensis* García Aldrete & Casasola González (Female). 19-20. Dorsal and ventral view of whole insect. 21. Front view of head. 22. Right hind leg. 23. Wings. 24. Subgenital plate. 25. Right paraproct and epiproct. 26. Gonapophyses and ninth sternum. Scales in mm.