

LACHESILLIDAE (PSOCODEA: 'PSOCOPTERA': PSOCOMORPHA) FROM RANCHO SANTA ELENA, HUASCA DE OCAMPO, HIDALGO, MEXICO, WITH DESCRIPTION OF A *Lachesilla* IN SPECIES GROUP *Corona*

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RESUMEN

Una especie de *Prolachesilla*, y 13 especies de *Lachesilla*, en seis grupos de especies, fueron recolectadas en Rancho Santa Elena, Huasca de Ocampo, Hidalgo, México, en trampas Malaise, entre 2002 y 2012. Rancho Santa Elena es una localidad neártica, más rica en especies de 'Psocoptera' que otras localidades neárticas de México, y ligeramente menos rica que localidades mexicanas neotropicales. Una de las 13 especies de *Lachesilla*, en el grupo de especies *Corona*, endémica del estado de Hidalgo, y afín a *L. lachataoensis* García Aldrete & Casasola, endémica de Oaxaca, es aquí descrita e ilustrada.

Palabras clave: Faunística, Neártico, nueva especie, taxonomía

SUMMARY

One species of *Prolachesilla*, and 13 species of *Lachesilla*, in six species groups, were found in Rancho Santa Elena, Huasca de Ocampo, Hidalgo, México, in Malaise traps, from 2002 to 2012. Rancho Santa Elena is a nearctic locality, which is richer in 'Psocoptera' species than other nearctic Mexican localities, and slightly less species rich than neotropical Mexican localities. One of the 13 species of *Lachesilla*, in species group *Corona*, endemic to the state of Hidalgo, and close to *L. lachataoensis* García Aldrete & Casasola, endemic to Oaxaca, is here described and illustrated.

Key words: Faunistics, Nearctic, new species taxonomy

INTRODUCTION

Rancho Santa Elena, located in Huasca de Ocampo, Hidalgo, Mexico (www.santaelena.com.mx, Menchaca Armenta, 2004; Méndez Ordóñez, 2009), is a locality in the southeastern Nearctic region, near the limits with the neotropics (Fig. 1). During 2002, 2003, 2005, 2006, 2010, 2011, and 2012, Atilano Contreras and his associates at the Autonomous University of Hidalgo, collected insects in Malaise traps at Rancho Santa Elena, mostly at Manantial de las Vigas (20°7'53.9"

N: 98°31'38.7" W, altitude 2480 m), and at Presa San Carlos (20°8'4.5" N, 98°30'49.9" W, altitude 2420 m). Among the insects taken, I found 14 families (Proctopsocidae, Amphientomidae, Liposcelidae, Epipsocidae, Amphipsocidae, Dasydemellidae, Caeciliusidae, Lachesillidae, Peripsocidae, Ectopsocidae, Philotarsidae, Elipsocidae, Psocidae and Myopsocidae), and 25 genera of Psocodea: 'Psocoptera'. In this paper, I will only deal with the family Lachesillidae.



Figure 1. Localization of Rancho Santa Elena, Huasca de Ocampo, Hidalgo, Mexico.

MATERIAL AND METHODS

1130 specimens were available for study. They were identified to species level utilizing a Zeiss dissection microscope, by observation of the specimens in 80 % ethanol. 10 males and 11 females belong to an undescribed species of *Lachesilla*, in species group *Corona*, that is here described and illustrated. Also, 3 males and 3 females of an undescribed species in species group *Q* (García Aldrete, 1974), were found. This species is not here described, because group *Q*, in which 10 species have been recognized, will be treated separately. Two males and two females of the new species in group *Corona* were dissected in 80 % ethanol, and their parts (head, right wings and legs, and genitalia) were mounted in Canada balsam following standard procedures. Color was recorded by placing whole specimens, before dissection, in 80 % ethanol, under a dissecting microscope, illuminated with cold, white light, at 50 X. Standard measurements were taken, on parts on the slides, with a filar micrometer mounted on the optic microscope; abbrevia-

tions of parts measured are as follows: FW: length of right forewing, HW: length of right hindwing, F, T, t1 and t2: lengths of femur, tibia, and tarsomeres 1 and 2 of right hind leg, fl...fn: lengths of flagellomeres 1...n of right hind leg, Mx4: length of fourth palpomere of right maxillary palpus, IO, D and d: minimum distance between compound eyes, antero-posterior diameter and transverse diameter of right compound eye, respectively, PO: d/D.

The types of the new species, and other specimens studied, are deposited in the National Insect Collection (CNIN), located in the Department of Zoology, Institute of Biology, National Autonomous University of Mexico.

RESULTS

Two genera of Lachesillidae were found, *Prolachesilla* Mockford & Sullivan, represented by one species, and *Lachesilla* Westwood, represented by 13 species, in seven species groups.

A list of the species, with their collecting data follows:

Lachesilla Westwood

Species group *Andra* (García Aldrete, 1974; Mockford, 1993; Mockford & García Aldrete, 2012).

Lachesilla dona Sommerman (N=1) Manantial de las Vigas. 29.XI.-26.XII.2005. 1 female.

L. punctata (Banks) (N=55) Manantial de las Vigas. 23.XI.-7.XII.2002. 3 females. 7.XII.2002-9.I.2003. 10 females. 9-29.I.2003. 7 females, 1 male. 29.I.-26.II.2003. 7 females, 7 males. 26.II.-26.III.2003. 2 females. 26.III.-9.IV.2003. 1 male. 19.VI.-3.VII.2003. 1 female. 16.VII.-9.VIII.2003. 2 females. 23.X.-22.XI.2003. 1 female. 29.XI.-26.XII.2005. 2 females, 1 male. 25.I.-23.II.2006. 1 female, 1 male. 23.II.-23.III.2006. 2 males. 13.III.-16.IV.2010. 2 females. 12.I.-21.II.2011. 1 female. Presa San Carlos. 21.IV.-6.V.2005. 1 female. 15-28.VII.2005. 1 female.

Hueyapan river, San Dionisio water system. 13.I.2011-21.II.2012. 1 male.

Species group *Corona* (García Aldrete, 1974; Mockford, 1993)

Lachesilla contrerasi n. sp. (N=21) (Figures 2-10)

Diagnosis. Belonging in species group *Corona*. Differing from *L. lachataoensis* García Aldrete & Casasola (2012), in that the distal processes of the male hypandrium are much more slender posteriorly, each process bearing a sclerotized, small acuminate projection proximally on inner side, and in having a transverse, strongly sclerotized area at the bottom of the median concavity.

Macropterous female. Color (in 80 % ethanol). Head and thorax reddish brown, abdomen pale brown, with subcuticular brown rings, less pigmented ventrally. Compound eyes black, ocelli hyaline, without pigmented centripetal crescents, and without pigmented bands from compound eyes to epistomal sulcus. Maxillary palps I-IV dark brown. Wings opaque, veins brown.

Morphology. Compound eyes below the level of vertex. Forewing pterostigma wider posteriorly, L/W=3.3. Forewing Rs-M veins fused for a distance, areola postica broadly triangular, forewing L/W=2.5. Subgenital plate broad, rounded posteriorly, setae as illustrated, posterior fourth glabrous, more pigmented than the anterior three fourths, with an unpigmented mid area, posterior to the mesal flap, this small, triangular, anteriorly convex (Fig. 5). Gonapophyses (Fig. 3) joined to the ends of clunium, sausage shaped, mesally directed, with setae as illustrated. Ninth sternum broad (Fig. 3), spermapore small, with pigmented rim, located posteriorly; a deeply pigmented area anteriorly, with an elongate concavity in the middle, unpigmented. Paraprocts (Fig. 7) almost elliptic, setose; sensory fields with eight trichobothria on basal rosettes and one marginal trichobothrium, without basal rosette. Epiproct (Fig. 7) broad, rounded posteriorly, slightly concave anteriorly, with field of setae on distal half.

Measurements (in μm). FW: 1889, HW: 1508, F: 412, T: 726, t1: 228, t2: 106, f1: 183, f2: 159, f3: 132, f4: 106, Mx4: 89, IO: 361, D: 165, d: 73, IO/d: 4.94, PO: 0.44.

Brachypterous female. Color and Morphology. Same as the macropterous female, but with neotenic characters as follows: Forewings scale-like, with dense field of microspines throughout the surface, with no trace of venation (Fig. 4). Hindwings very short, triangular. Paraprocts with a stout seta and a bifid cone apically, sensory fields small, with five trichobothria on basal rosettes, and one marginal trichobothrium without basal rosette (Fig. 6).

Measurements (in μm). FW: 351, HW: 196, F: 400, T: 624, t1: 204, t2: 113, f1: 151, f2: 128, f3: 112, Mx4: 92, IO: 387, D: 159, d: 83, IO/d: 4.66, PO: 0.52.

Male. Color. As the female.

Morphology. Forewing pterostigma wider posteriorly. Rs-M joined by a short crossvein, areola postica triangular (Fig. 8). Hypandrium of two pieces, posterior one concave as illus-

trated, each half projected posteriorly, distally bent outwards at right angle, distally acuminate; each half with a short, acuminate projection on inner side, directed posteriorly, at the start of the concavity, this with a sclerotized, transverse area, at the anterior end of the concavity (Fig. 10). Phallosome apodemes broadly rhomboid, fused proximally, each arm strongly sclerotized proximally, less so distally, acuminate, with a field of short spines next to apex (Fig. 10). Paraprocts with anterior half strongly sclerotized, distal half with a slender, blunt ended prong; sensory fields with 12 trichobothria on basal rosettes, and a marginal trichobothrium without basal rosette (Fig. 9). Epiproct bilobed posteriorly, each lobe with a strongly sclerotized band running along outer side and posterior border; a field of setae posteriorly (Fig. 9).

Measurements (in μm). FW: 2435, HW: 1792, F: 477, T: 871, t1: 283, t2: 115, f1: 270, f2: 212, Mx4: 97, IO: 350, D: 174, d: 106, IO/d: 3.30, PO: 0.60.

Type locality. MEXICO. Hidalgo. Huasca de Ocampo, Rancho Santa Elena, Manantial de Las Vigas, 2480 m., 9-29.I.2003. Holotype male. 2 male paratypes, same data as the holotype. 21.V.-3.VI.2003, 1 male paratype, 2 female paratypes (macropterous), 1 female paratype (brachypterous).

Records. 29.I.-26.II.2003, 3 males. 26.III.-9.IV.2003, 1 male. 27.IV.-7.V.2003, 1 male. 7-21.V.2003, 2 males. 3-19.VI.2003, 1 male, 1 macropterous female. 19.VI.-3.VII.2003, 2 macropterous females. 3-16.VII.2003, 1 macropterous female. 13.V.-12.VI.2010, 1 male. MEXICO. Hidalgo. 6 km W Acaxochitlán. 5.VII.1967. Sifting oak leaf litter from shallow depression. E. L. Mockford & J. Manzano, 3 brachypterous females. 37 Km NE Tulancingo, 20°8'44.9" N: 98°9'38.9" W, 2141m., 1.VII.2014, on dead, hanging leaves of herbaceous plants, A. N. García Aldrete, 1 brachypterous female.

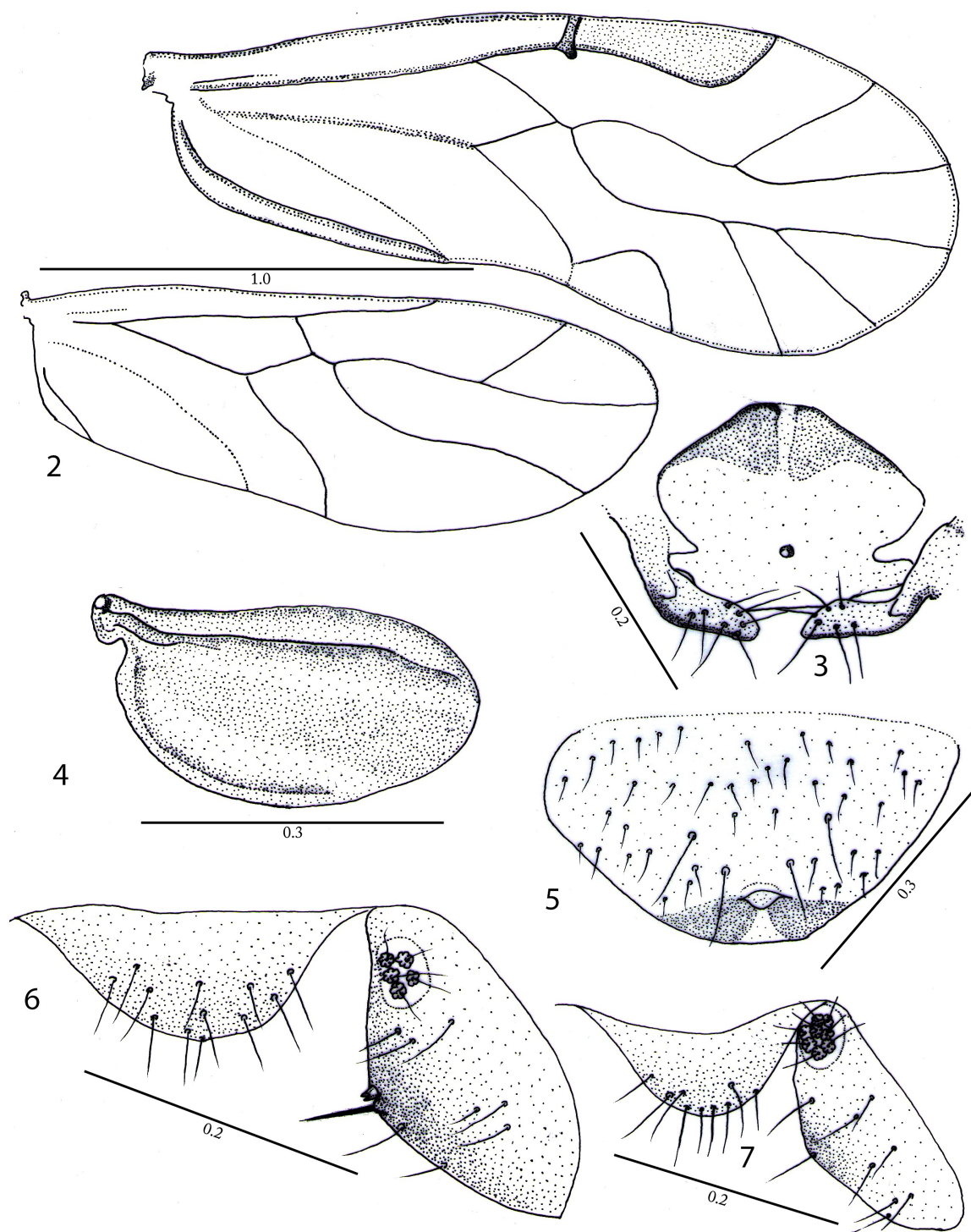
Etymology. This species is gratefully dedicated to Dr. Atilano Contreras, of the Instituto

de Biología, UNAM, whose team conducted the protocol of Malaise traps sampling in Rancho Santa Elena, while at the Autonomous University of Hidalgo, also in recognition to his studies on the taxonomy of Megaloptera and Neuroptera.

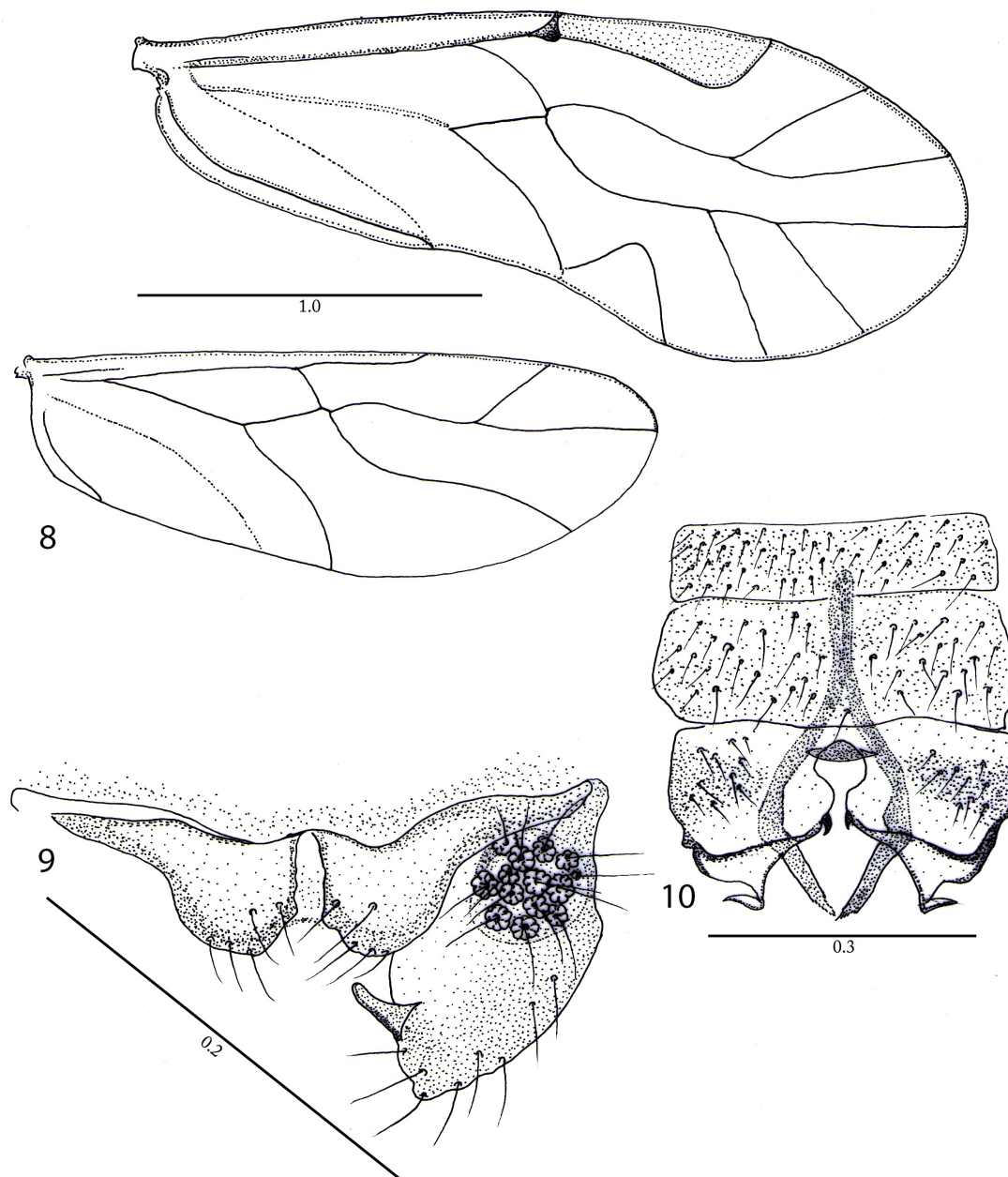
Remarks. This species is, so far, endemic to the Mexican state of Hidalgo. Males are macropterous, and the females are either macropterous or brachypterous.

L. picticeps Mockford (N=210) Manantial de las Vigas. 23.XI.-7.XII.2002. 2 females. 7.XII.2002-9.I.2003. 18 females, 1 male. 9-29.I.2003. 32 females, 9 males. 29.I.-26.II.2003. 32 females, 20 males. 26.II.-26.III.2003. 6 females, 5 males. 26.III.-9.IV.2003. 1 female. 9-23.IV.2003. 1 female. 7-21.V.2003. 1 male. 21.V.-3.VI.2003. 4 females, 1 male. 3-19.VI.2003. 5 females, 2 males. 19.VI.-3.VII.2003. 3 females. 16.VII.-19.VIII.2003. 1 female. 23.X.-22.XI.2003. 2 females. 17.III.-4.IV.2005. 1 male. 21.IV.-6.V.2005. 2 males. 6-21.V.2005. 4 females. 21.V.-3.VI.2005. 2 females. 3-17.VI.2005. 2 females. 15-28.VI.2005. 1 female. 17.VI.-3.VII.2005. 5 females. 3-15.VII.2005. 3 females. 15-28.VII.2005. 1 male. 31.X.-29.XI.2005. 2 females. 29.XI.-26.XII.2005. 9 females, 2 males. 26.XII.2005-25.I.2006. 4 females, 3 males. 25.I.-23.II.2006. 7 females, 3 males. 13.III.-16.IV.2010. 2 females. 16.IV.-14.V.2010. 1 female. 13.V.-12.VI.2010, 6 females, 8 males. 12.VI.-12.VII.2010. 4 females, 1 male. 12.I.-21.II.2011. 1 female. Presa San Carlos. 17.III.-7.IV.2005. 1 female, 6 males. 7-21.IV.2005. 2 females, 12 males. 21.IV.-6.V.2005. 7 females, 9 males. 6-21.V.2005. 5 females, 9 males. 21.V.-3.VI.2005. 11 females, 3 males. 17.VI.-3.VII.2005. 14 females, 4 males. 25.I.-23.II.2006. 3 females, 1 male. 23.II.-23.III.2006. 1 female, 2 males.

L. reyesi García Aldrete (N=5) Manantial de las Vigas. 29.XI.-26.XII.2005. 1 male. 13.V.-12.VI.2010. 1 female. Presa San Carlos. 21.IV.-6.V.2005. 1 macropterous female. 21.V.-3.VI.2005. 1 male. 23.II.-23.III.2006. 1 male.



Figures 2-7. *Lachesilla contrerasi* n. sp. Female. 2. Fore- and hind- wings. 3. Gonapophyses and IX sternum. 4. Forewing, brachypterous female. 5. Subgenital plate. 6. Epiproct and right paraproct, brachypterous female. 7. Epiproct and right paraproct, macropterous female. Scales in mm.



Figures 8-10. *Lachesilla contrerasi* n. sp. Male. 8. Fore- and hind- wings. 9. Epiproct and right paraproct. 10. Hypandrium and phallosome apodemes. Scales in mm.



Figure 11. *Lachesilla contrerasi* n. sp. Brachypterous female.

Species group *Fuscipalpis* (García Aldrete, 1974; Mockford, 1993)

L. curvipila García Aldrete (N=2) Manantial de las Vigas. 26.II.-26.III.2003. 1 female. Presa San Carlos. 23.II.-23.III.2006. 1 female.

L. fuscipalpis Badonnel (N=1) Manantial de las Vigas. 21.V.-3.VI.2005. 1 female.

Species group *Pedicularia* (García Aldrete, 1974; Mockford, 1993)

L. tectorum Badonnel (N=6) Manantial de las Vigas. 29.I.-26.II.2003. 1 female. 3-19.VI.2003. 1 female. 19.VI.-3.VII.2003. 1 female. 3-16.VII.2003. 1 female. Presa San Carlos. 6-21.V.2005. 1 female. 21.V.-3.VI.2005. 1 female.

L. pedicularia (Linnaeus) (N=2) Manantial de las Vigas. 3-19.VI.2003. 1 female. Presa San Carlos. 21.IV.-6.V.2005. 1 female.

Species group *Rufa* (García Aldrete, 1974, 1990; Mockford, 1993)

L. abiesicola García Aldrete (N=1) Manantial de las Vigas. 7.XII.2002-9.I.2003, 1 male.

L. gurneyi García Aldrete (N=2) Manantial de las Vigas. 9-29.I.2003, 1 female. 12.VII.-17.VIII.2010, 1 female.

Species group *Q* (García Aldrete, 1974)

L. Q-7 (N=6) Manantial de las Vigas. 9-29.I.2003, 1 female. 29.I.-26.II.2003, 1 male. 13.IV.-14.V.2010, 1 male. 17.VIII.2010,

1 female in tray with light. Presa San Carlos. 21.V.-3.VI.2005, 1 male. Hueyapan river. San Dionisio water system. 13.VII.2010, 1 female in tray with light.

Species group *Texcocana* (García Aldrete, 1974 [as species group B]; García Aldrete, 1985; Mockford, 1993)

L. texcocana García Aldrete (N=16) Manantial de las Vigas. 7.XII.2002-9.I.2003, 2 females. 9-29.I.2003, 1 female, 1 male. 29.I.-26.II.2003, 2 females, 1 male. 13.V.-12.VI.2010, 1 male. 12.VI.-12.VII.2010, 1 female, 1 male. Presa San Carlos. 7-21.IV.2005, 1 female, 1 male. 21.IV.-6.V.2005, 1 female. 17.VI.-3.VII.2005, 2 females. 3-15.VII.2005, 1 female.

Prolachesilla mexicana Mockford & Sullivan (N=801) Manantial de las Vigas. 23.XI.-3.XII.2002, 1 male. 7.XII.2002-9.I.2003, 4 females, 1 male. 9-29.I.2003, 2 females. 26.II.-26.III.2003, 2 males. 21.V.-3.VI.2003, 2 females, 1 male. 3-19.VI.2003, 12 females, 7 males. 19.VI.-3.VII.2003, 17 females, 5 males. 3-16.VII.2003, 4 females. 16.VII.-19.VIII.2003, 2 females. 19.VIII.-19.IX. 2003, 1 male. 19.IX.-23.X.2003, 1 female. 23.X.-22.XI.2003, 3 females. 17.III.-4.IV.2005, 1 female, 1 male. 21.IV.-6.V.2005, 3 females, 6 males. 6-21.V.2005, 14 females, 13 males. 21.V.-3.VI.2005, 15 females, 10 males. 3-17.VI.2005, 20 females, 11 males. 15-28.VI.2005, 30 females, 20 males. 17.VI.-3.VII.2005, 110 females, 53 males. 3-15.VII.2005, 73 females, 55 males. 28.VII.-11.VIII.2005, 23 females, 4 males. 11.VIII.-5.IX.2005, 2 females, 2 males. 3-31.X.2005, 4 females, 1 male. 31.X.-29.XI.2005, 1 female, 2 males. 29.XI.-25.XII.2005, 2 females, 1 male. 26.XII.2005-26.I.2006, 2 males. 25.I.-23.II.2006, 1 male. 23.II.-23.III.2006, 1 female, 6 males. 13.III.-16.IV.2010, 1 female, 4 males. 13.IV.-14.V.2010, 7 females, 7 males. 13.V.-12.VI.2010, 17 females, 19 males. 12.VI.-12.VII.2010, 32 females, 21 males. 12.VII.-17.VIII.2010, 1 female. 17.VIII.-21.IX.2010, 1 male. 21.IX.-19.X.2010, 1 female. 19.X.-16.XI.2010, 6 females, 8 males. 6.XII.2010-12.I.2011, 1 female, 1 male. 12.I.-21.II.2011, 1 female. Presa San Carlos. 17.III.-7.IV.2005, 8 males. 7-21.IV.2005, 3 females, 7 males. 21.IV.-6.V.2005, 10 females, 7 males. 6-21.V.2005, 3 females, 2 males. 21.V.-3.VI.2005, 2 females, 6 males. 17.VI.-

3.VII.2005, 15 females, 7 males. 3-15.VII.2005, 16 females, 3 males. 15-28.VII.2005, 6 females, 2 males. 28.VII.-11.VIII.2005, 2 males. 5.IX.-3.X.2005, 1 female, 2 males. 3-31.X.2005, 8 females, 3 males. 31.X.-29.XI.2005, 2 males. 23.II.-23.III.2006, 7 females.

DISCUSSION

Table 1 shows that the neotropical localities indicated, are slightly more species rich than the nearctic ones. Rancho Santa Elena is more diverse than Sierra Tarahumara and La Michilía; it shares one species with the former (*L. picticeps* Mockford), and it shares three species with the latter (*L. fuscipalpis* Badonnel, *L. picticeps* Mockford, and *L. reyesi* García Aldrete). Mockford & García Aldrete (1996), recorded three genera of Lachesillidae in the

state of Hidalgo, 1 species each of *Anomopsocus* and *Prolachesilla*, and 36 species of *Lachesilla*, in nine species groups. Then the 14 species of Lachesillidae found in Rancho Santa Elena represent 36.8 % of the state total, which points to the significant richness of the area.

The most abundant species was *Prolachesilla mexicana* Mockford & Sullivan (N=801), followed by *Lachesilla picticeps* Mockford (N=210), *L. punctata* (Banks) (N=55), and *L. contrerasi* n. sp. (N=21). The rest of the species were represented by few individuals (see especies list above), and six species were rare (*L. curvipila* García Aldrete, *L. gurneyi* García Aldrete, and *L. pedicularia* (Linnaeus), represented by 2 individuals, and *L. abiesicola* García Aldrete, *L. dona* Sommerman, and *L. fuscipalpis* Badonnel, represented by one individual.

Table 1. Number of species in genera of Lachesillidae in several localities in Mexico, and number of species groups of *Lachesilla*.

	<i>Anomopsocus</i>	<i>Prolachesilla</i>	<i>Lachesilla</i>	<i>Lachesilla</i> species groups
State of Hidalgo	1	1	36	9
R. Santa Elena (N)	-	1	13	7
La Michilía, Dgo. (N)	-	1	11	6
Sierra Tarahumara, Chih. (N)	-	1	6	3
Los Tuxtlas, Ver. (NT)	1	2	19	6
Chamela, Jalisco (NT)	-	-	13	6

N: Nearctic, NT: Neotropical. Sources: Mockford García & Aldrete (1996), García Aldrete (1988, 1991, 2002), García & Aldrete, Mockford & García F. (1997).

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