Systematic Revision of the North American Syntropine Vaejovid Scorpion Genera Maaykuyak, Syntropis, and Vizcaino, with Description of the Adults of Syntropis williamsi

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Source: Bulletin of the American Museum of Natural History, 2016(405) : 1-68

Published By: American Museum of Natural History

URL: https://doi.org/10.1206/0003-0090-405.1.1

SYSTEMATIC REVISION OF THE NORTH AMERICAN SYNTROPINE VAEJOVID SCORPION GENERA *MAAYKUYAK*, *SYNTROPIS*, AND *VIZCAINO*, WITH DESCRIPTION OF THE ADULTS OF *SYNTROPIS WILLIAMSI*

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BULLETIN OF THE AMERICAN MUSEUM OF NATURAL HISTORY
Number 405, 67 pp., 30 figures, 5 tables
Issued June 24, 2016

ISSN 0003-0090

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ABSTRACT

Four distinct genera, forming two monophyletic groups, are basal in the phylogeny of the North American vaejovid scorpion subfamily Syntropinae Kraepelin, 1905: *Konetontli* González-Santillán and Prendini, 2013; *Maaykuyak* González-Santillán and Prendini, 2013; *Syntropis* Kraepelin, 1900; and *Vizcaino* González-Santillán and Prendini, 2013. All except the species of *Konetontli*, treated elsewhere, are revised in the present contribution. The two species of *Maaykuyak*, three species of *Syntropis*, and monotypic *Vizcaino* are redescribed; the adults of *Syntropis williamsi* Soleglad et al., 2007, described for the first time; keys to identification of the species of *Maaykuyak* and *Syntropis* presented; and new locality records and updated distribution maps provided for all species covered.

INTRODUCTION

Four distinct genera, forming two monophyletic groups, were placed basal in the phylogeny of the North American vaejovid scorpion subfamily Syntropinae Kraepelin, 1905, presented by González-Santillán and Prendini (2015a): *Konetontli* González-Santillán and Prendini, 2013; *Maaykuyak* González-Santillán and Prendini, 2013; *Syntropis* Kraepelin, 1900; and *Vizcaino* González-Santillán and Prendini, 2013. The 16 species accommodated within these genera, distributed across the Baja California Peninsula (*Syntropis*, *Vizcaino*, and one species each of *Konetontli* and *Maaykuyak*) and the Mexican mainland (nine species of *Konetontli* and one species of *Maaykuyak*), represent a morphologically and ecologically diverse assemblage, including three of the four ecomorphotypes observed in the subfamily (figs. 1–4). The 10 species of *Konetontli* and two species of *Maaykuyak* are lapidicolous, relative generalists sheltering under stones and among leaf litter in habitats ranging from subtropical dry forest to desert. In contrast, the three species of *Syntropis* are lithophilous, specialists inhabiting the cracks and crevices of weathered rock outcrops in stone deserts; and the monotypic *Vizcaino*, psammophilous, specialized for burrowing in soft sandy deserts. Despite their morphological and ecological disparity, the 16 species in these four genera share a striking similary of the male hemispermatophore, observed in only four other syntropine species: the terminal spinelike processes of the dorsal and ventral trough margins form a prominent, bifurcate hook on the dorsal margin of the lamina, a character previously recognized only in *Syntropis* (Stockwell, 1989).

In the present contribution, all except the species of *Konetontli*, treated elsewhere (González-Santillán and Prendini, 2015b), are redescribed in accordance with the new classification, terminology, and homology assessment proposed by González-Santillán and Prendini (2013, 2015a). The adults of *Syntropis williamsi* Soleglad et al., 2007, are described for the first time, keys to identification of the species of *Maaykuyak* and *Syntropis* presented, and new locality records and updated distribution maps provided for all species covered.

ON THE TAXONOMIC HISTORY OF THE SPECIES OF *MAAYKUYAK* AND *VIZCAINO*

The three species presently accommodated in the genera *Maaykuyak* and *Vizcaino* were originally placed in the “catchall” genus *Vaejovis* C.L Koch, 1836. Although both *Vaejovis viscainensis* Williams, 1970, and *Vaejovis vittatus* Williams, 1970, were initially assigned to the *eusthenura* group, Williams (1970a: 412), noted the distinctiveness of *V. viscainensis*, in particular, noting that it “is of systematic interest because it appears to represent a distinct branch from the *eusthenura* group of *Vaejovis*.”

Williams (1970b) compared *V. viscainensis* to two species from the Baja California Peninsula, *Vaejovis diazi* Williams, 1970, and *Vaejovis schwenkmeyeri* Williams, 1970, from which it

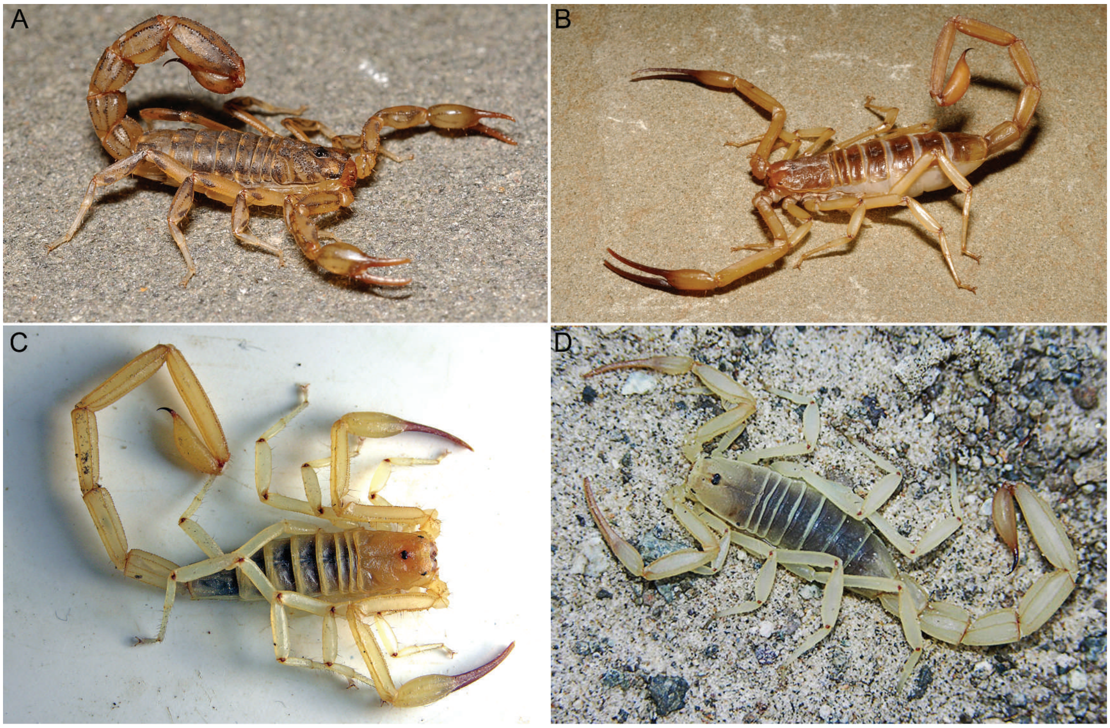

FIGURE 1. Live habitus of **A.** *Maaykuyak vittatus* (Williams, 1970), ♂ (AMNH); **B.** *Syntropis macrura* Kraepelin, 1900, ♀ (AMNH); **C.** *Syntropis williamsi* Soleglad et al., 2007, ♂ (AMNH); and **D.** *Vizcaino viscainensis* (Williams, 1970), ♂ (AMNH). Photos courtesy of Randy Mercurio (**A, B**).

could be separated on the basis of its longer pedipalp chela fingers without notches and lobes on the dentate margins and, later (Williams, 1980) and to another species from the peninsula, *Vaejovis puritanus* (Gertsch, 1958), from which it could be separated by its longer pedipalp chela fingers, lower pectinal tooth count, and greater pedipalp patella width to chela manus width ratio. Williams (1970a) also compared *V. vittatus* to *Vaejovis punctatus* Karsch, 1879, from which it could be separated on the basis of its smaller size, the presence of four or five rather than three pairs of setae on the posterior margin of the carapace, the absence of notches and lobes on the dentate margins of the pedipalp chela fingers, and granular rather than smooth ventral lateral carinae on metasomal segments I–IV.

Vejovis waueri Gertsch and Soleglad, 1972, was subsequently described and placed in the *spinigerus* group of *Vaejovis*. Although not formally diagnosed, the *spinigerus* group was incorporated in the *eusthenura* group by virtue of Williams' (1980) inclusion of *Vaejovis spinigerus* Wood, 1863, therein. Gertsch and Soleglad (1972) compared *V. waueri* to *Vaejovis bilineatus* Pocock, 1898, from which it could be separated on the basis of its smaller size, infuscate pedipalp chela manus and metasomal segment V, lower pectinal tooth count, and smooth rather than granular dorsal lateral and lateral median carinae of metasomal segments I–IV.

Vaejovis vittatus, *V. viscainensis*, and *V. waueri* remained in the *eusthenura* group of *Vaejovis* for several decades (Stockwell, 1992; Lourenço and Sissom, 2000; Sissom, 2000) until Soleglad and Fet (2008) presented a revised classification of Vaejovidae, in which a new genus, *Hoffmannius* Soleglad and Fet, 2008, was created to accommodate the species formerly assigned to the *eusthenura* group, including *Hoffmannius vittatus* (Williams, 1970),

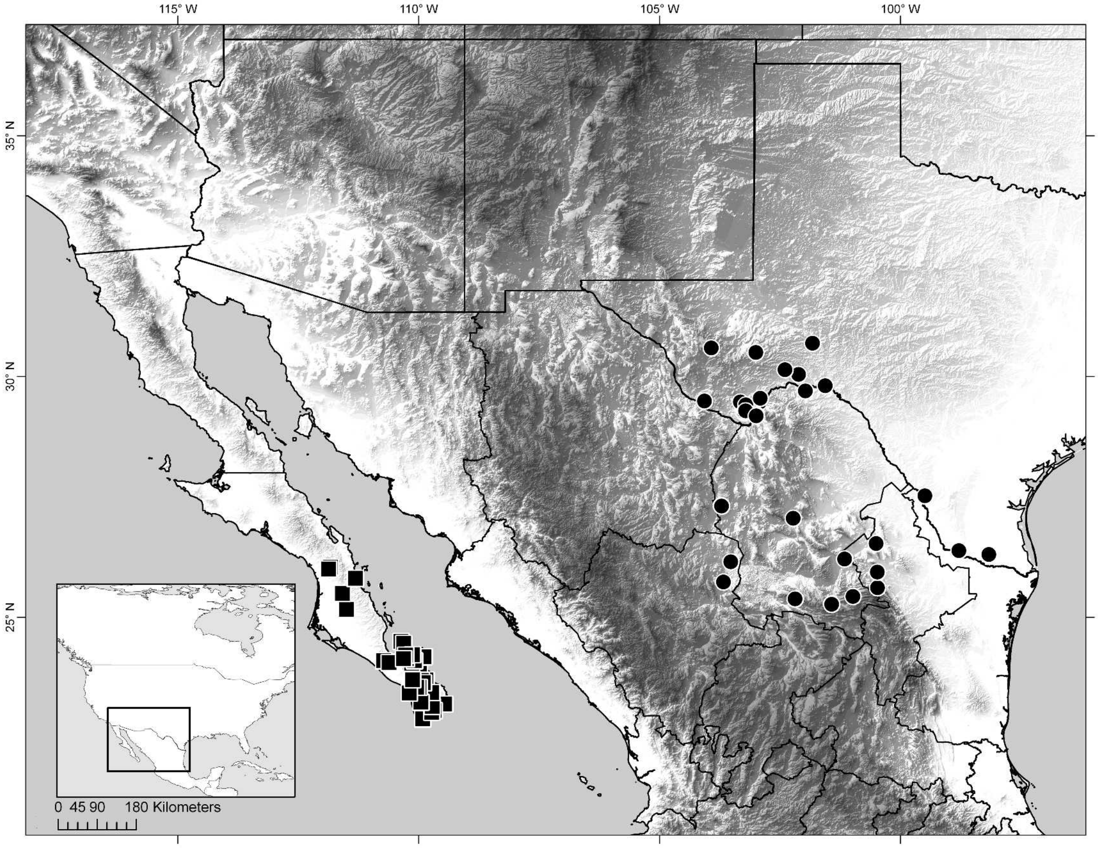

FIGURE 2. Map of northern Mexico and southern United States, plotting known locality records for two species in the vaejovid scorpion genus *Maaykuyak* González-Santillán and Prendini, 2013, based on data collected in the present study: *Maaykuyak vittatus* (Williams, 1970) (squares), *Maaykuyak waueri* (Gertsch and Soleglad, 1972) (circles).

H. viscainensis (Williams, 1970), and *H. waueri* (Gertsch and Soleglad, 1972). The classification presented by Soleglad and Fet (2008) was not based on quantitative phylogenetic analysis, however, and most of the new taxa proposed therein were demonstrably paraphyletic or polyphyletic when tested by an analysis based on morphological characters and DNA sequences from the nuclear and mitochondrial genomes (González-Santillán and Prendini, 2015a). Whereas the species assigned to *Hoffmannius*, i.e., the former *eusthenura* group of *Vaejovis*, were consistently polyphyletic in these analyses, those assigned to the four basal genera defined by González-Santillán and Prendini (2013) were consistently monophyletic and formed two monophyletic groups: (*Konetontli* + *Maaykuyak*) and (*Syntropis* + *Vizcaino*). In consequence, *Hoffmannius* was synonymized and the new genera *Maaykuyak* and *Vizcaino* created to account for the phylogenetic positions and unique, diagnostic character combinations of the species assigned to them (González-Santillán and Prendini, 2013). The various species of the former *eusthenura* group to which the species of *Maaykuyak* and *Vizcaino* had earlier been compared by Williams (1970a, 1970b, 1980) and Gertsch and Soleglad (1972), were transferred to three other genera, i.e., *Chihuahuanus* González-Santillán and Prendini, 2013, *Mesomexovis* González-Santillán and Prendini, 2013, and *Paravaejovis* Williams, 1980.

Maaykuyak presently comprises two species, *M. vittatus* (Williams, 1970), common in Baja

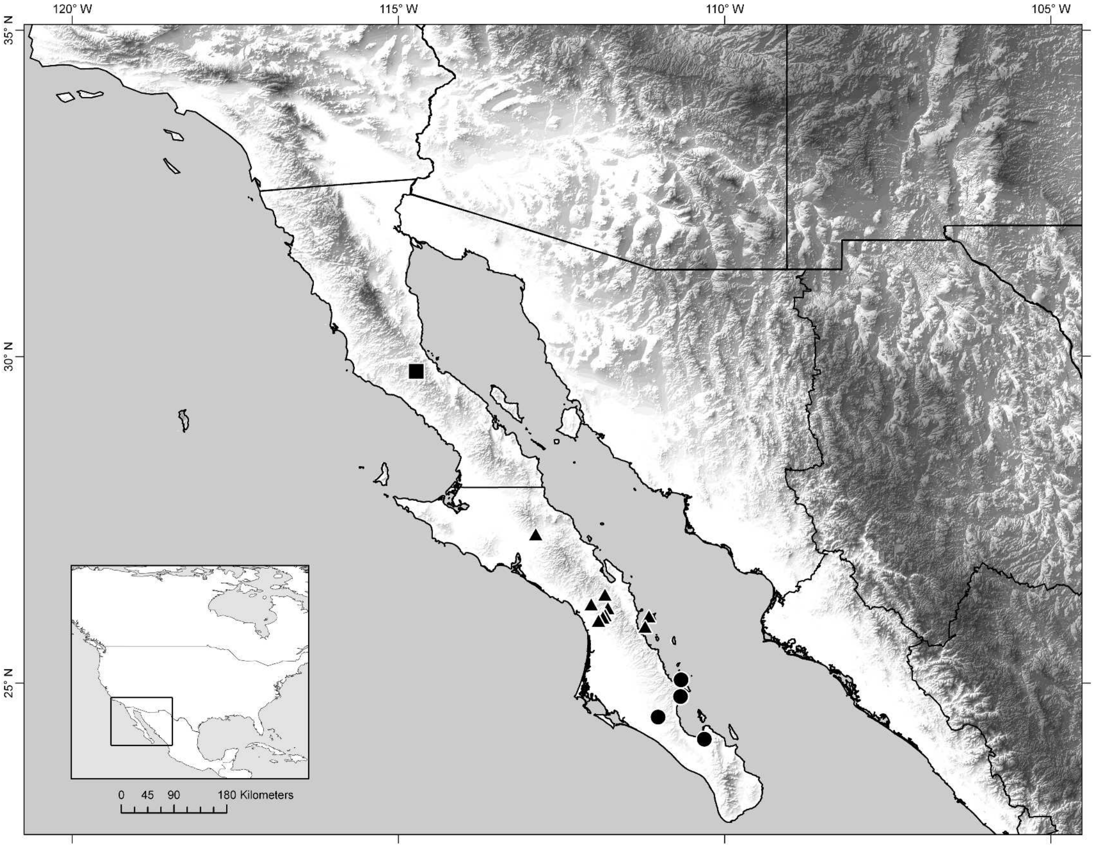

FIGURE 3. Map of northwestern Mexico and southwestern United States, plotting known locality records for three species in the vaejovid scorpion genus *Syntropis* Kraepelin, 1900, based on data collected in the present study: *Syntropis aalbui* Lowe et al., 2007 (square), *Syntropis macrura* Kraepelin, 1900 (circles), *Syntropis williamsi* Soleglad et al., 2007 (triangles).

California Sur, with a mottled appearance and average total length of 36 mm (Williams, 1980), and *M. waueri* (Gertsch and Soleglad, 1972), endemic to the Chihuahuan Desert, with a distinctly infuscate pedipalp chela manus and metasomal segment V, and average total length of 25 mm (Gertsch and Soleglad, 1972). The two species differ from their closest relatives, *Konetontli*, and other Syntropinae in possessing a medium-sized oval, whitish glandular area on the dorsomedian surface of the telson vesicle that, although present also in *Chihuahuanus*, is smaller and restricted to the base of the aculeus.

The monotypic *Vizcaino*, endemic to the Vizcaino Desert, is pale, immaculate, and gracile, reaching a total length of 50 mm (Williams, 1970b). Although most closely related to *Syntropis*, *Vizcaino viscainensis* (Williams, 1970) is unique among Syntropinae in possessing four primary subrows of denticles in the median denticle row of the pedipalp chela movable finger, the terminal subrow, which comprises one to three denticles in other genera of Syntropinae, being absent.

ON THE TAXONOMIC HISTORY AND COMPOSITION OF *SYNTROPIS*

Unlike the other species that form the subject of the present contribution, the generic placement of the species currently accommodated in *Syntro-*

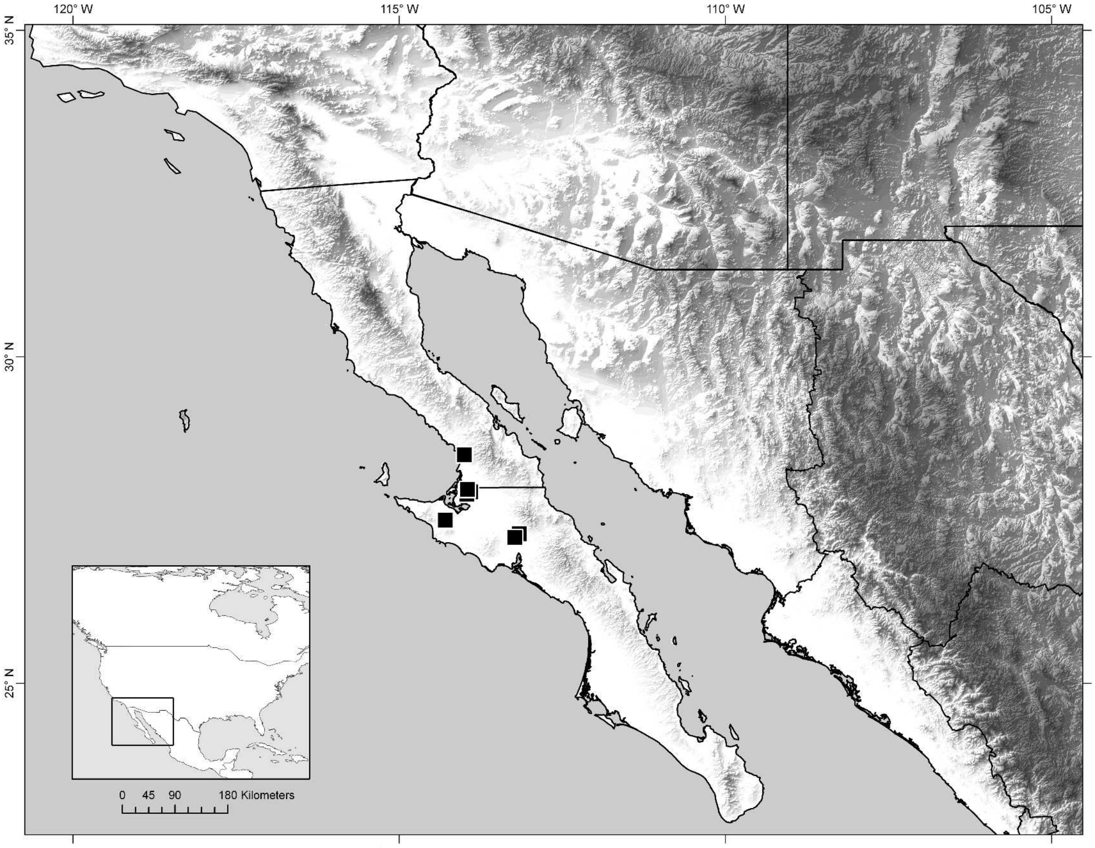

FIGURE 4. Map of Baja California Peninsula, plotting known locality records for species in the vaejovid scorpion *Vizcaino viscainensis* (Williams, 1970) (squares), based on data collected in the present study.

pis has never been questioned, although its species composition has altered with time. Originally created to accommodate *Syntropis macrura* Kraepelin, 1900, and defined on the presence of a single ventral median carina on metasomal segments I–IV (Kraepelin, 1905), *Syntropis* and the subfamily Syntropinae to which it was assigned, remained monotypic for almost 70 years (Birula, 1917; Werner, 1934; Mello-Leitão, 1945; Gertsch, 1958; Stahnke, 1974) until a second species, *Syntropis longiunguis* Williams, 1969, was described. Despite placing the new species in *Syntropis* based on the presence of a single ventral median carina on metasomal segments I–IV, Williams (1969: 290, 291) recognized significant morphological differences from the type species, *S. macrura*, which suggested closer affinities to other vaejovid taxa:

> Based on the single inferior median keel of the metasoma, *Syntropis macrura* would be the closest known relative of this species. However, these two species of *Syntropis* do not appear to be closely related, and even appear superficially very unrelated. In secondary morphological adaptation, ecology and behavior, *S. longiunguis* appears more like *Vejovis mesaensis* (Stahnke) [= *Smeringurus mesaensis* (Stahnke, 1957)] than any other North American scorpion. These two species should, therefore, be considered as ecological counterparts, *S. longiunguis* occurring in dune communities of the Viscaino desert, *V. mesaensis* occurring in dune communities of the Sonoran and Colorado deserts. *Syntropis macrura* on the other hand appears more like *Vejovis minckleyi* Williams [= *Franckeus minckleyi* (Williams, 1968)] in secondary morphological

> adaptation, ecology and behavior, *V. minckleyi* occurring in talus deposits and along rocky cliffs in Coahuila while *S. macrura* lives in similar habitats in the Sierra de la Giganta.

The genus *Vejovoidus* Stahnke, 1974, was subsequently created to accommodate *S. longiunguis* and assigned to Syntropinae by Stahnke (1974). Williams (1980) did not recognize Syntropinae or other subfamilies of Vaejovidae, but accepted the generic reassignment of *S. longiunguis*. Others criticized Stahnke's (1974) decision to retain *Vejovoidus* in Syntropinae, suggesting that the presence of a single ventral median carina on metasomal segments I–IV was acquired independently in *Syntropis* and *Vejovoidus* (Soleglad, 1976; Francke, 1982; Sissom, 1990) and implying that Syntropinae was not monophyletic. For example, Sissom (1990: 53) noted:

> Several authors have stated that this character has been overemphasized at the subfamilial level (Soleglad 1976, Francke 1981a, Lourenço 1985), and it has certainly evolved independently at least four times in Recent scorpions. If this character evolved independently in *Syntropis* and *Vejovoidus*, it would be considered a convergent similarity rather than a homology.

Stockwell (1992) subsequently proposed that *V. longiunguis* is more closely related to *Paravaejovis*, *Paruroctonus* Werner, 1934, and *Smeringurus* Haradon, 1983, than to *Syntropis*, and transferred it to Vaejovinae Thorell, 1876. According to Stockwell (1992), the absence of a serrula on the ventral margin of the cheliceral movable finger and the presence of setal combs on the leg basitarsi, and an unsclerotized hemimating plug of the male hemispermatophore are shared by *Paruroctonus*, *Smeringurus*, and *V. longiunguis*. Stockwell (1992: 408) further synonymized Syntropinae with the nominate subfamily Vaejovinae due to the presence, in *Syntropis* and the *eusthenura*, *intrepidus*, and *punctipalpi* species groups of *Vaejovis*, of a spinose distal barb margin on the hemimating plug of the male hemispermatophore and concluded that "*Syntropis* appears to be a slender, single-keeled *Vaejovis*."

When Soleglad and Fet (2008) presented their revised classification of Vaejovidae, subfamily Smeringurinae Soleglad and Fet, 2008 was created to accommodate *Paravaejovis*, *Paruroctonus*, *Smeringurus* Haradon, 1983, and *Vejovoidus*, while Syntropinae was revalidated to accommodate *Syntropis* and the former *eusthenura*, *intrepidus*, and *punctipalpi* groups of *Vaejovis*, for which the new names *Hoffmannius*, *Thorellius* Soleglad and Fet, 2008, and *Kochius* Soleglad and Fet, 2008, were devised. As mentioned above, the classification presented by these authors was not based on quantitative phylogenetic analysis and most of the new taxa proposed therein proved to be paraphyletic or polyphyletic when tested by González-Santillán and Prendini (2015a). Among other findings, the type species of *Hoffmannius* and *Paravaejovis* formed a monophyletic group, to the exception of other species of *Hoffmannius* and the exemplar species of *Paruroctonus* and *Smeringurus*, rendering *Hoffmannius*, Smeringurinae, and Syntropinae paraphyletic and requiring the redefinition and relimitation of Syntropinae and its component genera presented by González-Santillán and Prendini (2013).

A few years earlier, Soleglad et al. (2007) revised *Syntropis* and described two new species, *S. aalbui* Lowe et al., 2007, and *S. williamsi* Soleglad et al., 2007, separated from one another and from the type species, *S. macrura*, primarily on the basis of morphometrics. Unfortunately, small sample sizes and the absence of adults for *S. williamsi* prevented these authors from providing convincing diagnostic differences.

As defined by González-Santillán and Prendini (2013), *Syntropis* differs from all other Syntropinae in the absence of ventral submedian carinae and the presence of ventral median carinae on metasomal segments I–IV. *Syntropis* is endemic to the Baja California Peninsula and comprises the longest and most attenuated species of Syntropinae, which reach total lengths in excess of 90 mm (Soleglad et. al., 2007). The three species of the genus are morphologically similar, but may be separated on the basis of subtle differences in pigmentation and coloration of the integument

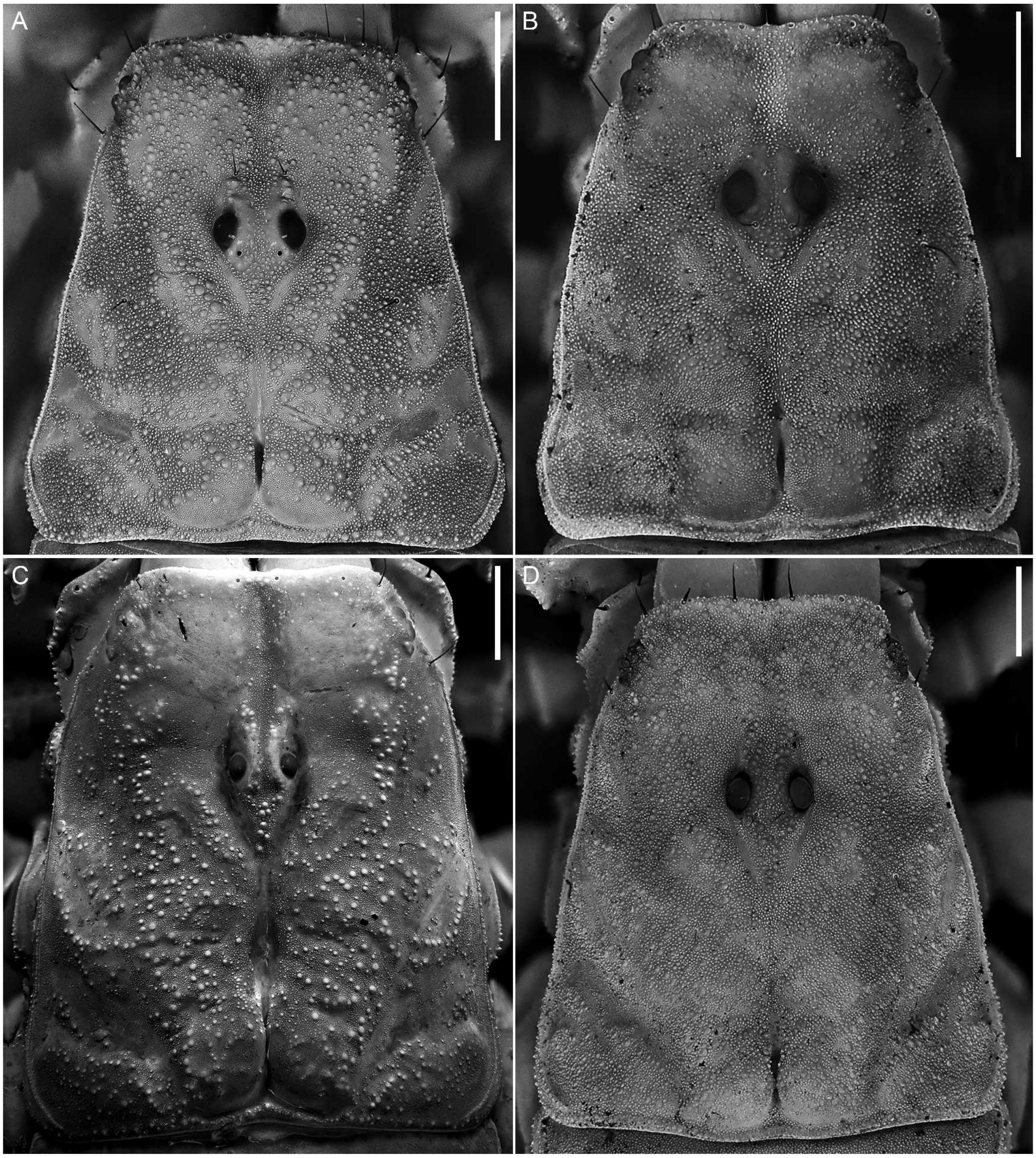

FIGURE 5. *Maaykuyak* González-Santillán and Prendini, 2013, *Syntropis* Kraepelin, 1900, and *Vizcaino* González-Santillán and Prendini, 2013, carapaces. **A.** *Maaykuyak vittatus* (Williams, 1970), ♂ (CNAN SC2047). **B.** *Maaykuyak waueri* (Gertsch and Soleglad, 1972), ♂ (CNAN SC2062). **C.** *Syntropis macrura* Kraepelin, 1900, ♂ (AMNH). **D.** *Vizcaino viscainensis* (Williams, 1970), ♂ (CNAN SC2245). Scale bars = 1 mm (**A, C**), 0.5 mm (**B, D**).

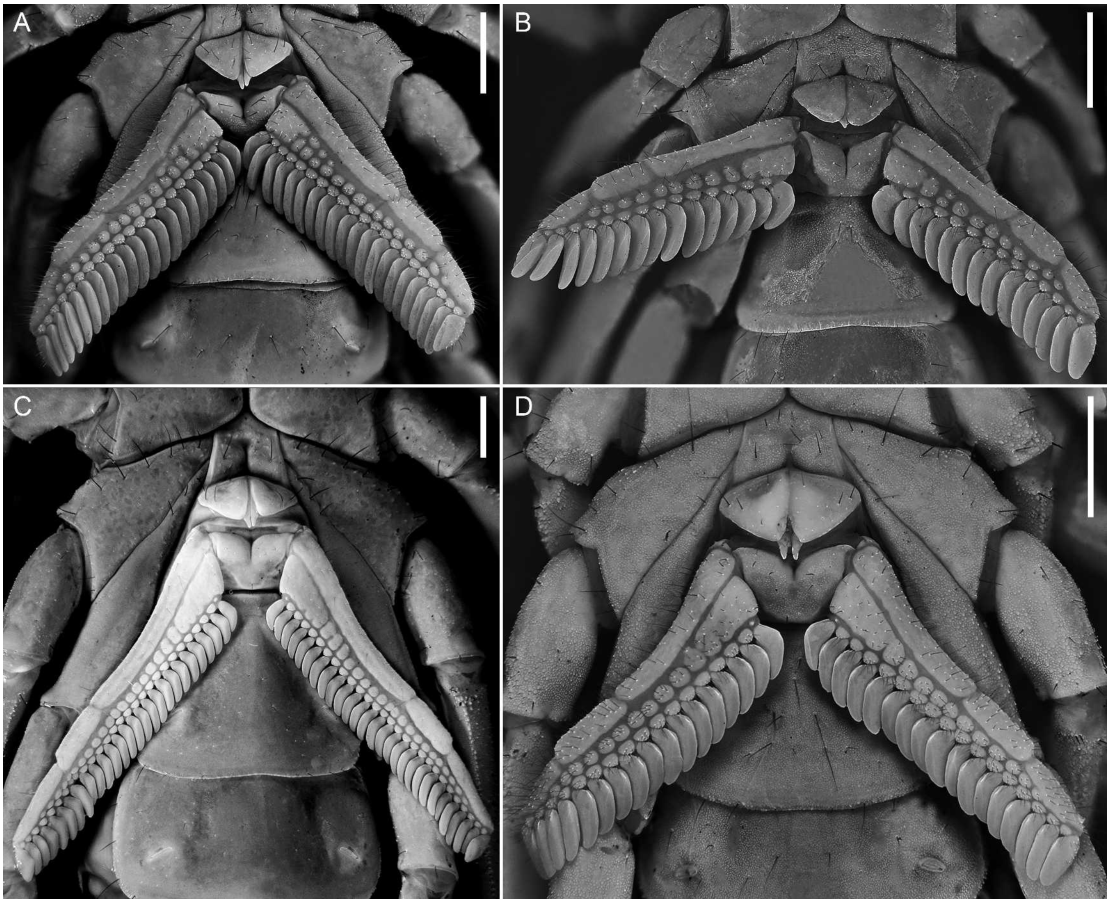

FIGURE 6. *Maaykuyak* González-Santillán and Prendini, 2013, *Syntropis* Kraepelin, 1900, and *Vizcaino* González-Santillán and Prendini, 2013, sternum, genital operculum, and pectines. **A.** *Maaykuyak vittatus* (Williams, 1970), ♂ (CNAN SC2047). **B.** *Maaykuyak waueri* (Gertsch and Soleglad, 1972), ♂ (CNAN SC2062). **C.** *Syntropis macrura* Kraepelin, 1900, ♂ (AMNH). **D.** *Vizcaino viscainensis* (Williams, 1970), ♂ (CNAN SC2245). Scale bars = 1 mm (**A, C, D**), 0.5 mm (**B**).

(varying from dark as in *S. macrura* to pale as in *S. williamsi*), morphometrics, and secondary sexual characters of the adults. Although additional material could not be obtained for *S. aalbui*, for which the adult male remains unknown, the present contribution improves upon Soleglad et al. (2007) by basing diagnoses on a sample of 19 specimens of *S. macrura* and five specimens of *S. williamsi*, including the first adults of the latter.

MATERIAL AND METHODS

Scorpion specimens were collected mostly by ultraviolet (UV) light detection at night (Stahnke, 1972) using portable UV lamps, comprising mercury vapor tubes attached to a chromium reflector, and powered by a 12V, 7 amp/hour battery, or Maglite flashlights modified with UV light emitting diode (LED) attachments. Some specimens were collected by turning rocks and other objects on the ground, during the day.

Material examined is deposited in the following collections: American Museum of Natural History, New York (AMNH), including tissue samples stored in the Ambrose Monell Cryocollection (AMCC); Colección de Aracnología y Entomología del Centro de Investigaciones Biológicas del Noroeste, Baja California Sur, La Paz, Mexico (CAECIB);

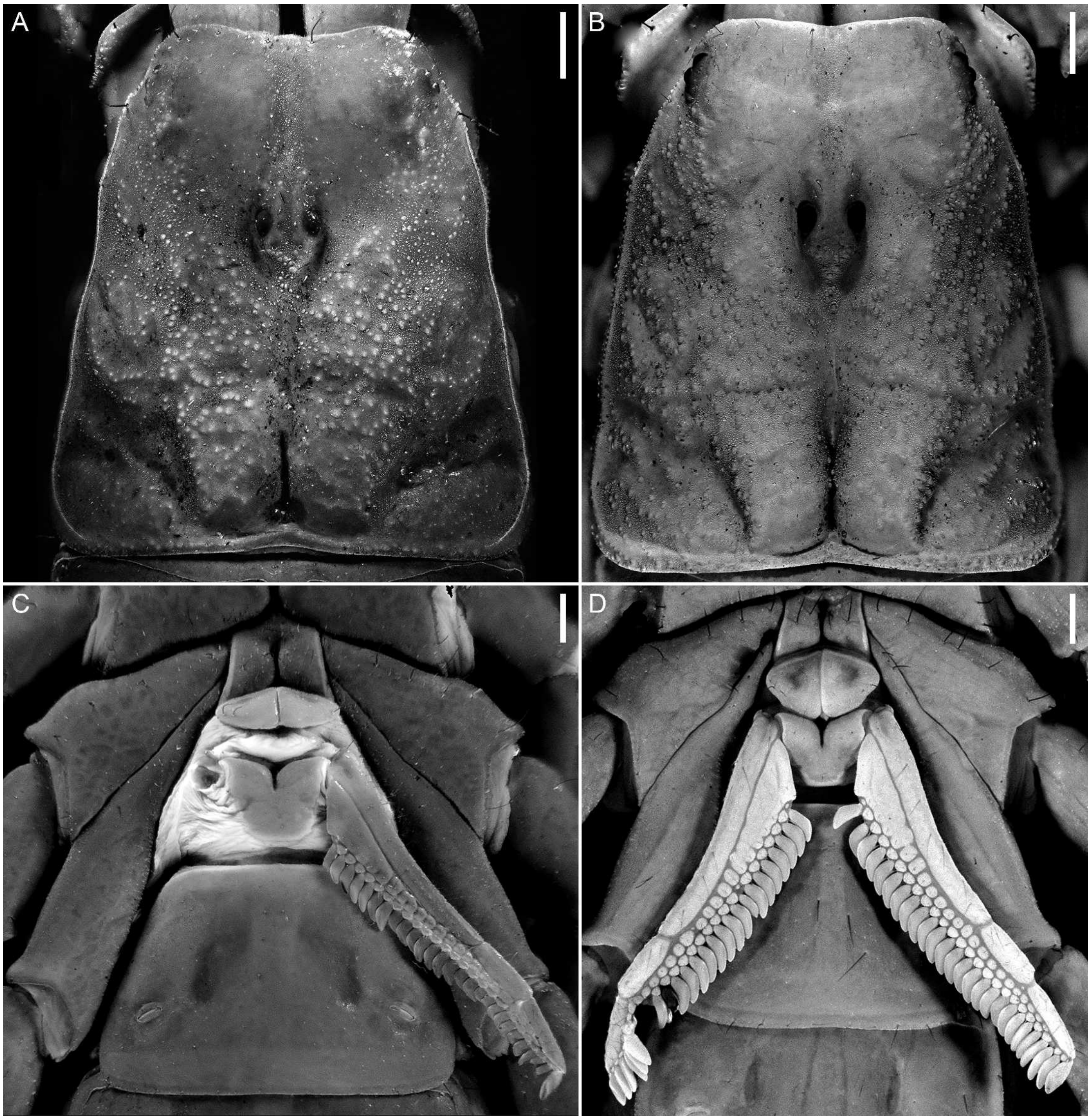

FIGURE 7. *Syntropis* Kraepelin, 1900, carapaces, sternum, genital operculum, and pectines. **A, C.** *Syntropis aalbui* Lowe et al., 2007, holotype ♀ (MNHG). **B, D.** *Syntropis williamsi* Soleglad et al., 2007, ♂ (AMNH [ARA 2825]). Scale bars = 1 mm.

California Academy of Sciences, San Francisco (CAS); Colección Nacional de Arácnidos, Instituto de Biología, Universidad Nacional Autónoma de México, Mexico City (CNAN); Muséum d'Histoire Naturelle de Genève, Switzerland (MHNG); Museum National d'Histoire Naturelle, Paris (MNHN); Ohio State University, Museum of Biological Diversity, Columbus, OH (OSAL), and W. David Sissom Personal Collection, Canyon, TX (WDS). Specimens at the AMNH, CAS and CNAN bearing ARA (Arachnida) numbers were collected during a U.S. National Science Foundation–funded "Revisionary Syntheses in Systematics" grant.

The sex and life stage of specimens were determined on the basis of pectinal tooth counts, the presence or absence of genital papillae, secondary

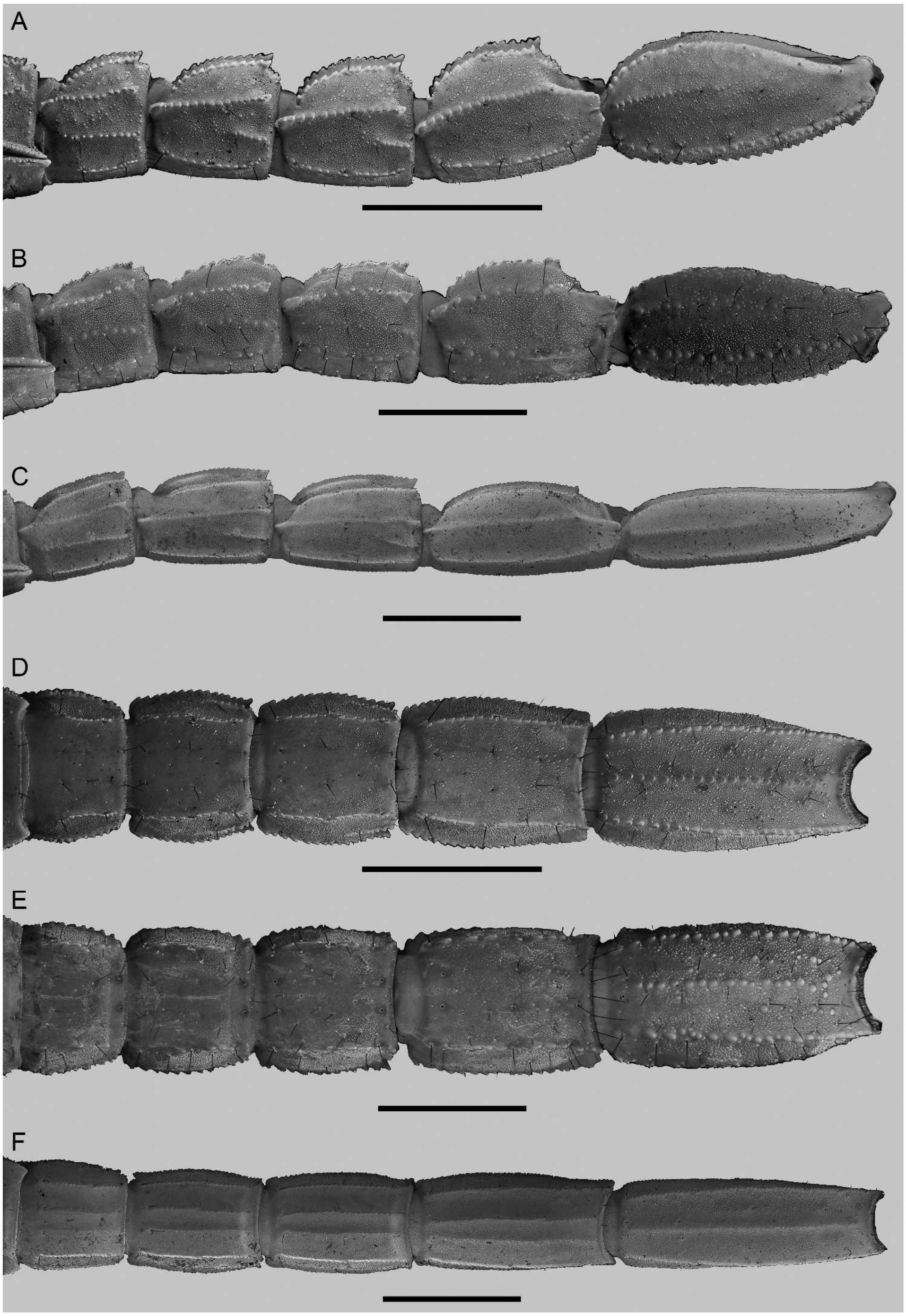

FIGURE 8. *Maaykuyak* González-Santillán and Prendini, 2013, and *Vizcaino* González-Santillán and Prendini, 2013, metasomal segments I–V, lateral (**A–C**) and ventral (**D–F**) aspects. **A, D.** *Maaykuyak vittatus* (Williams, 1970), ♂ (CNAN SC2047). **B, E.** *Maaykuyak waueri* (Gertsch and Soleglad, 1972), ♂ (CNAN SC2062). **C, F.** *Vizcaino viscainensis* (Williams, 1970), ♂ (CNAN SC2245). Scale bars = 3 mm (**A, C, D, F**), 1.5 mm (**B, E**).

sexual characters, and the presence of hemispermatophores or mature ovariuteri. Morphological terminology follows González-Santillán and Prendini (2013). Hemispermatophores were cleared with clove oil for illustration. Measurements (mm), following Sissom et al. (1990), were taken with an ocular micrometer and illustrations of external morphology produced using a Nikon SMZ 1000 or 1500 stereomicroscope fitted with a camera lucida. Digital images were taken under visible and UV light using a Microptics ML1000 digital imaging system. Images and illustrations were edited using Adobe Photoshop CS5.

Collection localities were georeferenced in the field with a portable GPS (Garmin® II Plus) or retroactively using GEOLocate (Rios and Bart, 2010) and Google Earth version 6.1.0.5001. Distribution maps were generated using ArcMap 9.3.1 (Environmental Systems Research Institute, Redlands, California), by superimposing point locality records on layers depicting the topography of North America, generated from digital elevation model files with 1 arc degree of resolution, obtained from the United States Geological Survey.

SYSTEMATICS

FAMILY VAEJOVIDAE THORELL, 1876

Subfamily Syntropinae Kraepelin, 1905

Maaykuyak González-Santillán and Prendini, 2013

Figures 1, 2, 5, 6, 8, 10–14; tables 1, 4

Vejovis vittatus Williams, 1970 [= *Maaykuyak vittatus* (Williams, 1970)], type species.

Vejovis spinigerus group (part): Gertsch and Soleglad, 1972: 605.

Vaejovis eusthenura group (part): Williams, 1980: 55; Sissom and Francke, 1985: 1; Sissom, 1991a: 26; Stockwell, 1992: 408, 409; Sissom, 1993: 68; Lourenço and Sissom, 2000: 120, 135; Sissom, 2000: 530, 532, 551; Armas and Martín-Frías, 2001: 8; Hendrixson, 2001: 52; Ponce-Saavedra and Sissom, 2004: 541; González-Santillán, 2004: 29; Francke and Ponce-Saavedra, 2005: 67; Sissom and Hendrixson, 2005a: 131; 2005b: 33, 34; Fet et al., 2006a: 7, 15, fig. 17, tables 1, 3; 2006b: 8; Graham and Fet, 2006: 7–10; Graham and Soleglad, 2007: 9, 11, 12; Soleglad et al., 2007: 134, 135; McWest, 2009: 8, 48, 52, 56, 61, 64, 98, 101–103, 108, table 1; Santibáñez-López and Sissom, 2010: 49.

Hoffmannius (part): Soleglad and Fet, 2008: 1, 26, 57, 60, 89, 91, 96, 102; Ayrey and Soleglad, 2011: 1.

Maaykuyak: González-Santillán and Prendini, 2013: 19, 26, 35, 38–40, 42, 43, 48, 56, 58, figs. 6, 21, 26, table 1; 2015b: 13; Teruel et al., 2015: 1, 2.

Diagnosis: *Maaykuyak* can be separated from other genera of Syntropinae by the presence of a medium-sized oval, whitish glandular area on the dorsal medial surface of the telson vesicle in adult males, which is reduced in adult females. Additional diagnostic characters of the genus are as follows: pedipalp chela manus, dorsal median, dorsal prolateral, dorsal retrolateral, dorsal retrosubmedian accessory, and prolateral dorsal carinae absent; dorsal intercarinal surfaces rounded, not concave, fixed finger trichobothrium *et* situated between retrolateral denticles III and IV, closer to IV; metasomal segments I–V lateral surfaces glabrous, segment V dorsal median carina faintly infuscate. *Maaykuyak* and its sister genus, *Konetontli*, each bear five fully developed retroventral macrosetae on the basitarsus of leg III, compared with other genera of Syntropinae, which bear at least six. *Maaykuyak waueri* further resembles the species of *Konetontli* in being one of the smallest species in the subfamily, adults measuring between 14 and 25 mm in total length. However, these genera can be separated by the presence of a subaculear tubercle in *Konetontli*, which is absent in *Maaykuyak*. Species of *Mesomexovis* González-Santillán and Prendini, 2013, resemble

TABLE 1

Measurements (mm) of selected specimens of *Maaykuyak vittatus* (Williams, 1970), *Maaykuyak waueri* (Gertsch and Soleglad, 1972), and *Vizcaino viscainensis* (Williams, 1970)

Specimens are deposited in the following collections: American Museum of Natural History (AMNH), New York, and Colección Nacional de Arácnidos (CNAN), Instituto de Biología, Universidad Nacional Autónoma de México, Mexico City.

			M. vittatus				*M. waueri*				*V. viscainensis*			
Collection			CNAN				CNAN		AMNH		CNAN			
Number			2047				2062		[ARA 2062]		2245			
Sex			♂	♂	♀	♀	♂	♂	♀	♀	♂	♂	♀	♀
Carapace		length	4.2	4.1	5.0	4.4	2.15	2.15	3.3	3.1	4.7	4.5	4.0	4.2
		ant. width	2.3	2.5	3.2	2.6	1.3	1.3	1.9	1.9	2.5	2.4	2.3	2.5
		post. width	3.6	3.7	4.8	4.0	2.2	2.2	4.1	3.0	4.0	3.7	3.9	3.9
Pedipalps	femur	length	3.0	3.1	3.5	3.0	1.6	1.6	2.3	2.2	4.5	4.4	3.5	3.7
		width	1.0	1.1	1.3	1.2	0.7	0.7	0.9	0.9	1.3	1.1	1.1	1.2
	patella	length	3.5	3.5	3.9	3.5	1.9	1.9	2.7	2.6	5.1	4.7	4.2	4.5
		width	1.3	1.3	1.6	1.5	0.8	0.8	1.1	1.1	1.6	1.5	1.5	1.5
	chela	length	5.3	5.4	6.1	5.5	2.8	2.8	4.0	3.9	7.0	7.0	5.9	6.2
		manus width	1.5	1.6	1.8	1.6	0.8	0.8	1.2	1.3	1.3	1.1	1.1	1.2
		manus height	1.6	1.7	1.8	1.5	0.8	0.8	1.2	1.2	1.2	1.2	1.2	1.2
		fixed finger length	2.5	2.5	2.7	2.4	1.2	1.2	1.7	1.6	4.1	4.1	3.2	3.6
		mov. finger length	3.3	3.5	3.6	3.1	1.6	1.6	2.3	2.7	5.0	5.0	4.1	4.5
Leg II	coxa	length	1.7	1.6	2.0	1.8	1.0	1.0	1.3	1.3	1.8	1.8	1.5	1.6
Leg IV	coxa	length	3.5	3.3	4.0	3.6	1.9	1.9	2.7	2.7	4.3	4.1	3.6	3.8
Sternum		length	0.6	0.6	0.8	0.8	0.5	0.5	0.7	0.6	1.0	0.9	0.9	1.1
		width	0.9	1.0	1.2	1.2	0.7	0.7	1.0	0.9	1.1	1.0	1.0	0.8
Mesosoma	tergites	length	6.9	7.7	9.8	8.7	5.0	5.0	8.6	8.1	9.8	9.1	8.6	9.2
Metasoma		length	13.8	13.7	15.2	13.8	7.9	7.9	10.4	10.4	20.2	20	15.5	16.1
	segment I	length	1.7	1.7	1.7	1.7	1.0	1.0	1.3	1.3	2.7	2.7	2	2.1
		width	2.5	2.6	2.9	2.6	1.5	1.5	2.1	2.0	2.6	2.5	2.3	2.3
		height	2.2	2.0	2.4	2.4	1.1	1.1	1.7	1.5	2.0	2.0	1.8	1.9
	segment II	length	2.1	1.9	2.2	2.0	1.1	1.1	1.6	1.6	3.2	3.2	2.3	2.5
		width	2.5	2.6	2.8	2.6	1.5	1.5	2.0	2.0	2.5	2.4	2.2	2.2
		height	2.2	2.0	2.3	2.3	1.1	1.1	1.6	1.5	2.0	2.0	1.8	1.9
	segment III	length	2.2	2.2	2.4	2.2	1.3	1.3	1.7	1.7	3.5	3.5	2.5	2.7
		width	2.5	2.5	2.8	2.6	1.5	1.5	2.0	2.0	2.5	2.4	2.1	2.1
		height	2.2	2.1	2.3	2.3	1.0	1.0	1.6	1.5	2.0	2.0	1.8	1.9
	segment IV	length	3.1	3.2	3.6	3.1	1.9	1.9	2.4	2.4	4.2	4.2	3.5	3.5
		width	2.4	2.3	2.7	2.5	1.5	1.5	2.0	2.0	2.4	2.3	2.1	2.1
		height	2.2	2.1	2.2	2.2	1.1	1.1	1.6	1.5	2.0	2.0	1.7	1.8
	segment V	length	4.7	4.7	5.3	4.8	2.7	2.7	3.6	3.5	6.6	6.4	5.2	5.3
		width	2.2	2.3	2.7	2.5	1.5	1.5	2.0	2.0	2.3	2.2	2.0	2.0
		height	2.0	2.0	2.2	2.0	1.2	1.2	1.5	1.4	1.8	1.8	1.5	1.6
Telson		length	4.3	4.3	4.9	4.4	2.5	2.5	3.4	3.5	5.5	5.4	4.6	4.6
	vesicle	length	2.7	2.7	3.0	2.7	0.9	0.9	2.2	2.3	3.5	3.3	2.6	2.6
		width	1.8	1.7	2.2	1.9	1.0	1.0	1.3	1.3	1.7	1.7	1.5	1.5
		height	1.3	1.4	1.7	1.4	0.8	0.8	1.1	1.1	1.5	1.4	1.3	1.3
	aculeus	length	1.6	1.6	1.9	1.7	1.6	1.6	1.2	1.2	2.0	2.1	2.0	2.0
Total		length	29.2	29.8	34.9	31.3	17.5	17.5	25.6	24.9	40.2	39.0	32.7	34.1

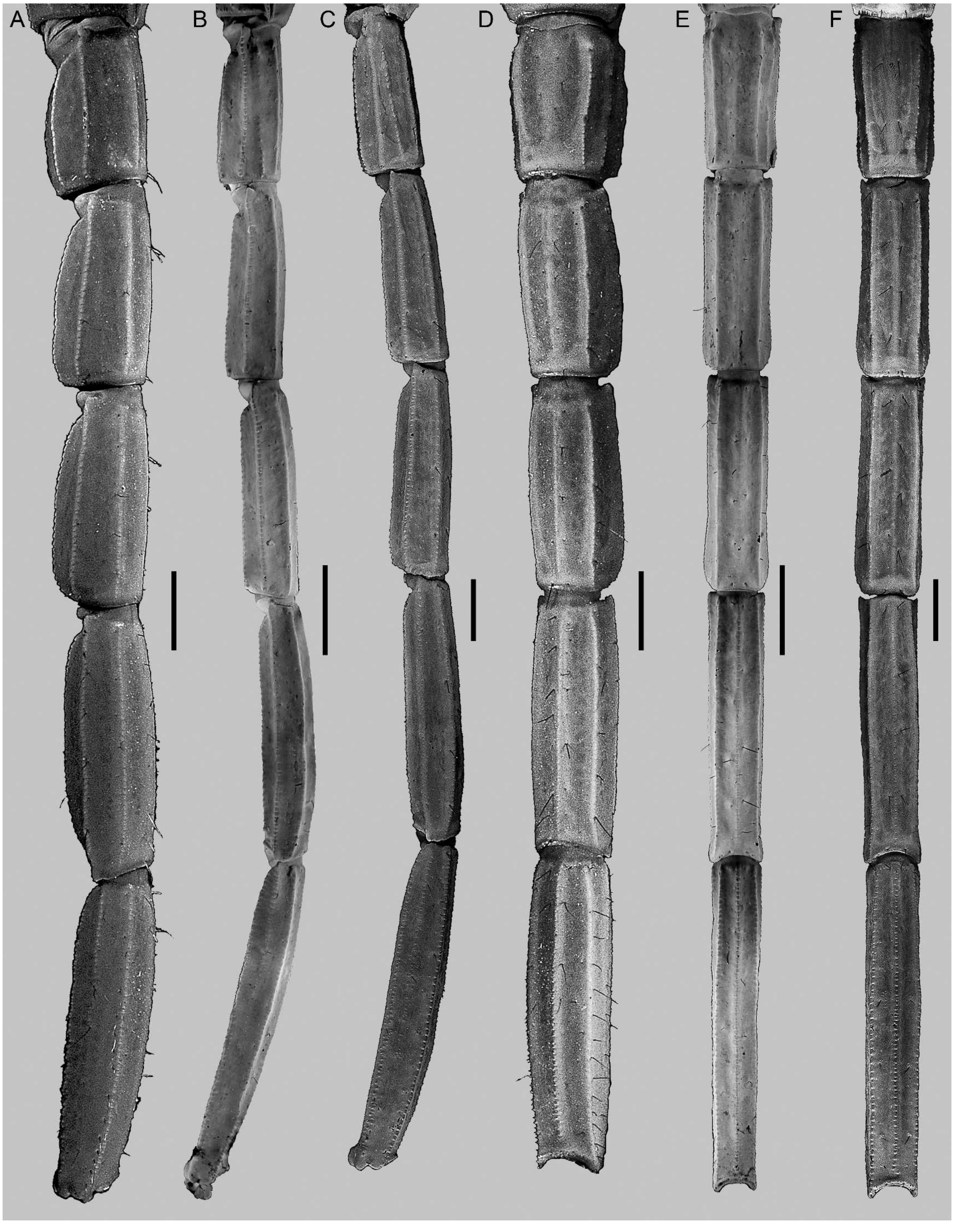

FIGURE 9. *Syntropis* Kraepelin, 1900, metasomal segments I–V, lateral (**A–C**) and ventral (**D–F**) aspects. **A, D.** *Syntropis aalbui* Lowe et al., 2007, holotype ♀ (MHNG). **B, E.** *Syntropis macrura* Kraepelin, 1900, ♂ (CAECIB). **C, F.** *Syntropis williamsi* Soleglad et al., 2007, ♂ (AMNH [ARA 2825]). Scale bars = 3 mm.

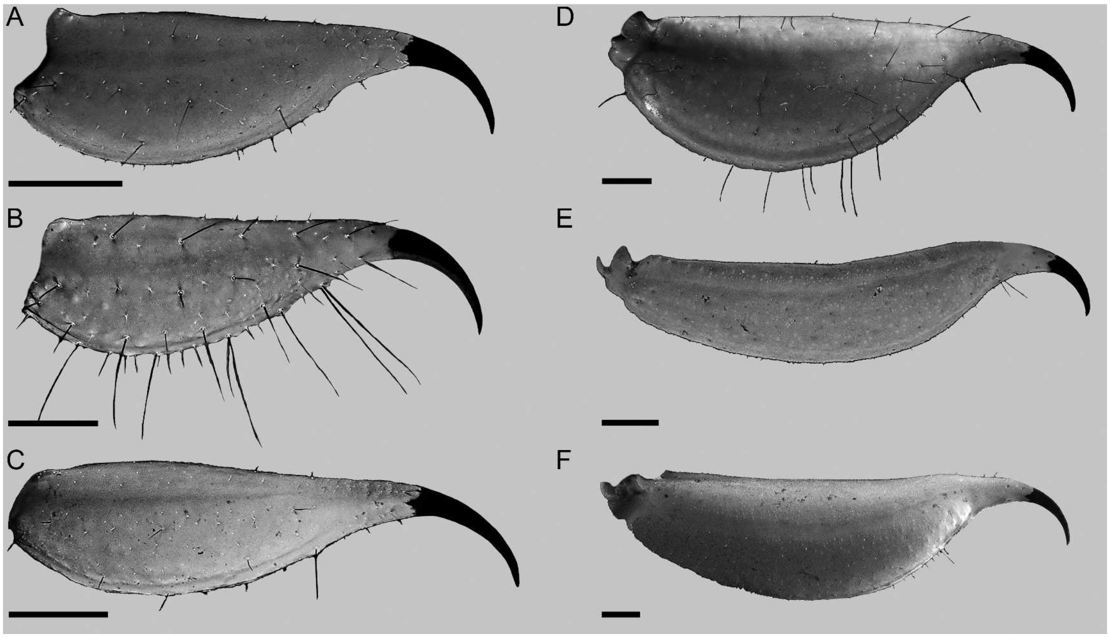

FIGURE 10. *Maaykuyak* González-Santillán and Prendini, 2013, *Vizcaino* González-Santillán and Prendini, 2013, and *Syntropis* Kraepelin, 1900, telson, lateral aspect. **A.** *Maaykuyak vittatus* (Williams, 1970), ♂ (CNAN SC2047). **B.** *Maaykuyak waueri* (Gertsch and Soleglad, 1972) ♂ (CNAN SC2062). **C.** *Vizcaino viscainensis* (Williams, 1970), ♂ (CNAN SC2245). **D.** *Syntropis aalbui* Lowe et al., 2007, holotype ♀ (MHNG). **E.** *Syntropis macrura* Kraepelin, 1900, ♂ (CAECIB). **F.** *Syntropis williamsi* Soleglad et al., 2007, ♂ (AMNH [ARA 2825]). Scale bars = 1 mm except **B** (0.5 mm).

Maaykuyak in the dense infuscation of the carapace and tergites I–VII and the partially to completely infuscate mesosomal sternite VII, but are larger (30–50 mm in total length) and lack a glandular area on the dorsal median surface of the telson vesicle. *Maaykuyak* shares with *Konetontli*, *Kuarapu* Francke and Ponce-Saavedra, 2010, *Syntropis*, *Vizcaino*, *Chihuahuanus bilineatus* (Pocock, 1898), *C. coahuilae* (Williams, 1968), and *Thorellius cristimanus* (Pocock, 1898) the presence of a secondary hook on the hemispermatophore, created by an extension of axial carina of the distal lamina, that forms a pronounced bifurcation with the primary hook.

Included Species: *Maaykuyak vittatus* (Williams, 1970); *Maaykuyak waueri* (Gertsch and Soleglad, 1972).

Distribution: *Maaykuyak* is endemic to Mexico (recorded from the states of Baja California Sur, Chihuahua, Coahuila, Durango, and Nuevo León) and the United States (recorded only from Texas). This genus has a disjunct distribution: *Maaykuyak vittatus* occurs in the southern third of the Baja California Peninsula, whereas *Maaykuyak waueri* inhabits the northern ranges of the Chihuahuan Desert. This distribution suggests that vicariance was promoted initially by the uplift of the Sierra Madre Occidental and subsequently by the separation of the Baja California Peninsula from the North American mainland.

Ecology: *Maaykuyak vittatus* inhabits subtropical deciduous forest from sea level to 850 m altitude, whereas *M. waueri* inhabits the Chihuahuan Desert, from 620–1922 m. Although commonly collected at night with UV light detection, both species have also been found during the day, by turning stones and disturbing leaf litter. Both species appear to prefer slightly mesic habitats, e.g., they are more abundant under forest canopy or near oases. The habitat and habitus of *Maaykuyak* are consistent with the lapidicolous ecomorphotype (Prendini, 2001).

KEY TO IDENTIFICATION OF THE SPECIES OF *MAAYKUYAK*

1. Pedipalp chela manus and proximal half of fingers partially infuscate, similar in color to pedipalp patella and femur; metasomal segment V, intercarinal surfaces partially infuscate, similar in color to segments I–IV; pedipalp chela fixed and movable fingers, median denticle rows respectively comprising six and seven primary subrows; pectinal tooth count, 19–21 (♂), 16–18 (♀); hemispermatophore median lobe ental terminus prominent and spiniform (fig. 15)..*M. vittatus*

– Pedipalp chela manus and proximal half of fingers completely infuscate, darker than pedipalp patella and femur; metasomal segment V, intercarinal surfaces completely infuscate, darker than segments I–IV; pedipalp chela fixed and movable fingers, median denticle rows each comprising five primary subrows; pectinal tooth count, 13–15 (♂), 10–13 (♀); hemispermatophore median lobe ental terminus moderate and rounded (fig. 17)..*M. waueri*

Maaykuyak vittatus (Williams, 1970)

Figures 1, 2, 5A, 6A, 8A, D, 10A, 11A, 12A, 13A, B, 14A, 15, 16; tables 1, 4

Vejovis vittatus Williams, 1970a: 290–297, figs. 10–12.

Vaejovis vittatus: Díaz Nájera, 1975: 7, 17; Williams, 1980: 54, 72, 73, fig. 74, 75; Due and Polis, 1986: 463, table 1; Kovařík, 1998: 148; Beutelspacher, 2000: 113, 138, 154, map 96; Lourenço, 2000: 73, fig. 3; Lourenço and Sissom, 2000: 135; Sissom, 2000: 536; Soleglad and Fet, 2003b: 9, 151, 152, 161, figs. B-1, B-2; Sissom and Hendrixson, 2005a: 127, 133, 134, table 6.2; Fet et al., 2006b: 2, 8; McWest, 2009: 19, 20, 55, 63, 119, figs. 179–184, table 1; Jiménez-Jiménez and Palacios-Cardiel, 2010: 72–74, table 1.

Hoffmannius vittatus: Soleglad and Fet, 2008: 4, 59, 71, 77, 91, tables 5, 9; Graham et al., 2014: 452, 454, 456, 461, figs. 2, 3, table 1, appendix S5.

Maaykuyak vittatus: González-Santillán and Prendini, 2013: 39, 42, 48.

Type Material: **MEXICO: Baja California Sur:** *Municipio de Comondús*: Holotype ♂ (CAS, Type No. 10430), San Miguel Comondú, 8 km SW, 2–3.vii.1968, S.C. Williams and M.A. Cazier. Paratypes: 1 ♀ allotype (CAS, Type No. 10430), same data as holotype; 4 ♂ (AMNH), San Miguel Comondú, 8–16 km SW, 304 m, 3.vii.1968, S.C. Williams and M.A. Cazier.

Diagnosis: *Maaykuyak vittatus* differs from its sister species, *M. waueri*, in the following respects. *Maaykuyak vittatus* is distinctly larger, with total length 29–36 mm, than *M. waueri*, with total length 18–26 mm. The pedipalp chela manus is partially infuscate and similar in color to the pedipalp patella and femur, and the intercarinal surfaces of metasomal segment V, partially infuscate, and similar in color to segments I–IV, in *M. vittatus*, whereas the chela manus is completely infuscate and darker than the pedipalp patella and femur, and the intercarinal surfaces of segment V, completely infuscate and darker than segments I–IV in *M. waueri* (figs. 15A–C, 17A–C). The median denticle rows of the pedipalp chela fingers comprise six primary subrows flanked by six prolateral denticles on the fixed finger and seven primary subrows flanked by seven prolateral denticles on the movable finger in *M. vittatus*, but five primary subrows flanked by five prolateral denticles on both fingers in *M. waueri*. The pectinal tooth counts of *M. vittatus* are higher, ranging from 19–21 in males and 16–18 in females, than those of *M. waueri*, ranging from 13–15 in males and 10–13 in females. The prolateral ventral macrosetae of the basitarsi are stouter on legs II–IV than on leg I in *M. vittatus*, but fine and equally devel-

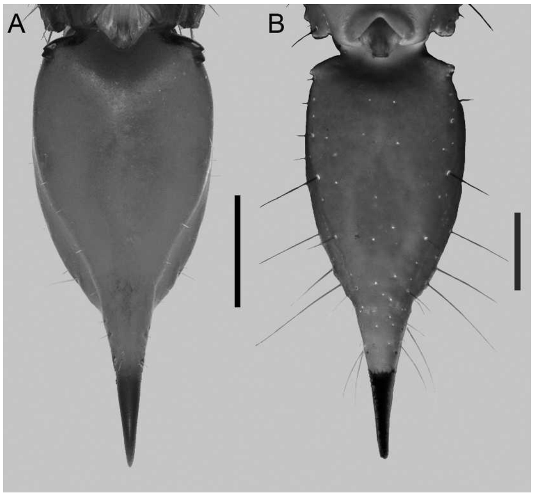

FIGURE 11. *Maaykuyak* González-Santillán and Prendini, 2013, telson, dorsal aspect. **A.** *Maaykuyak vittatus* (Williams, 1970), ♂ (CNAN SC2047). **B.** *Maaykuyak waueri* (Gertsch and Soleglad, 1972), ♂ (CNAN SC2062). Scale bars = 1 mm (**A**), 0.5 mm (**B**).

oped on legs I–IV in *M. waueri* (fig. 12A, B). Two pairs of ventral distal spinules are consistently present on the telotarsi of legs I–IV in *M. vittatus*, whereas one or occasionally two pairs are present in *M. waueri*. The ental terminus of the hemispermatophore median lobe is prominent and spiniform in *M. vittatus*, but moderate and rounded in *M. waueri* (fig. 14A, B).

Description: The following redescription, which is based on the type material and additional material examined, supplements the descriptions by Williams (1970a, 1980).

Color and infuscation: Cheliceral manus dorsal surface yellowish, immaculate, fingers darker. Carapace base color yellowish, partially infuscate. Pedipalps base color yellowish, chela fingers orange to reddish proximally; femur dorsal prolateral and dorsal retrolateral carinae partially infuscate; patella retrolateral dorsosubmedian and retrolateral median carinae intensely infuscate; chela manus and proximal half of fingers partially infuscate, similar in color to patella and femur, ventral retrosubmedian and ventral retrolateral carinae intensely infuscate, other carinae faintly infuscate (fig. 16G, H). Legs base color yellowish, prolateral surfaces partially infuscate. Coxosternal region, genital operculum, and pectines pale, immaculate. Mesosoma base color yellowish; tergites I–VII dorsal median carinae immaculate, dorsal lateral carinae and lateral margins infuscate, creating paired submedial and lateral stripes; sternites III–VII ventral surfaces pale, immaculate. Metasoma base color yellowish, segments I–V similar in color; lateral and ventral intercarinal surfaces, ventral lateral and ventral submedian carinae partially infuscate, especially around bases of macrosetae. Telson vesicle base color yellowish, similar to metasomal segment V, partially infuscate; aculeus reddish proximally, dark brownish distally.

Chelicerae: Manus, dorsal surface smooth, subdistal margin with one macroseta medially. Movable finger, ventral surface with serrula comprising 11/15 tines, in distal half.

Carapace: Length equal to or slightly greater than posterior width (table 1). Anterior margin sublinear, without median notch, with three pairs of macrosetae (fig. 5A). Three pairs of lateral ocelli, anterolateral and median lateral pairs equal in size, posterolateral pair approximately half the size. Median ocular tubercle raised, situated in anterior half of carapace, superciliary carinae costate, smooth, level with median ocelli. Median ocelli approximately twice the size of anterolateral ocelli. Anteromedian sulcus shallow; posteromedian and posterolateral sulci deep, narrow; posterior transverse sulci obsolete. Median surfaces shagreened, covered with fine and coarse granules; lateral surfaces matte, finely granular except on sulci, which are predominantly smooth.

Coxosternal region: Sternum subequilateral pentagonal; 1.6 times wider than long (table 1); median sulcus deep; ventral surfaces matte (fig. 6A); with three pairs of macrosetae anteriorly, medially and posteriorly on lobes. Coxa II, proximal margin uniformly finely granular; subproximally with three oblique slitlike structures, adjacent to moderate, sparsely granular protuberance; coxal endite proximal margin with deep

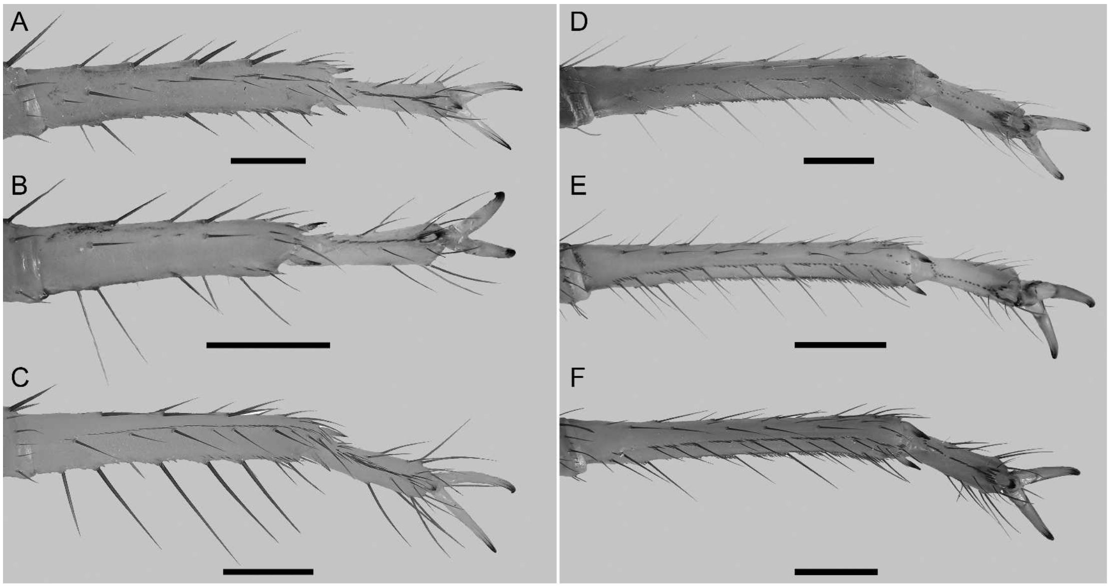

FIGURE 12. *Maaykuyak* González-Santillán and Prendini, 2013, *Vizcaino* González-Santillán and Prendini, 2013, and *Syntropis* Kraepelin, 1900, leg III, dextral basitarsus and telotarsus, ventral aspect. **A.** *Maaykuyak vittatus* (Williams, 1970), ♂ (CNAN SC2047). **B.** *Maaykuyak waueri* (Gertsch and Soleglad, 1972), ♂ (CNAN SC2062). **C.** *Vizcaino viscainensis* (Williams, 1970), ♂ (CNAN SC2245). **D.** *Syntropis aalbui* Lowe et al., 2007, holotype ♀ (MHNG). **E.** *Syntropis macrura* Kraepelin, 1900, ♂ (CAECIB). **F.** *Syntropis williamsi* Soleglad et al., 2007, ♂ (AMNH [ARA 2825]). Scale bars = 0.5 mm.

depression, medial margin smooth. Coxa IV twice length of coxa II (table 1).

Pedipalps: Femur intercarinal surfaces matte, except dorsal surface sparsely granular and ventral surface granular proximally (fig. 16A); dorsal prolateral, ventral prolateral, and dorsal retrolateral carinae complete, granular; retrolateral dorsosubmedian carina vestigial, reduced to proximal tubercle and three medial macrosetae; retrolateral ventral carina vestigial, reduced to few granules proximally; ventral median carina vestigial, reduced to few spiniform granules merging proximally with ventral prolateral carina; prolateral ventral carina partial, reduced to four spiniform granules, each with one macroseta, and two or three smaller granules, extending two-thirds the length of segment; prolateral ventrosubmedian vestigial, reduced to proximal tubercle and two spiniform granules, each with one macroseta, medially; other carinae absent or obsolete. Patella 1.2 times wider than femur (table 1); intercarinal surfaces matte (fig. 16B–E); dorsal prolateral and ventral prolateral carinae granular; dorsal retrolateral, retrolateral dorsosubmedian and retrolateral median carinae costate; ventral median carina vestigial, reduced to proximal row of granules; prolateral ventral carina reduced to low tubercle proximally and three macrosetae, medial seta smaller than proximal and distal setae, in medial third; prolateral median carina reduced to two large granules, proximally and distally, each with a macroseta, and row of six or more spiniform granules curving toward dorsal prolateral carina in distal third of segment; other carinae absent or obsolete. Chela 1.5 times longer than patella, 1.8 times longer than femur (table 1). Manus incrassate (fig. 16F–I), 1.2 times wider than patella, 1.5 times wider than femur; surfaces smooth, acarinate. Fixed and movable fingers dentate margins sublinear, notches and lobes absent; fixed finger median denticle row comprising six subrows flanked by six prolateral and retrolateral denticles,

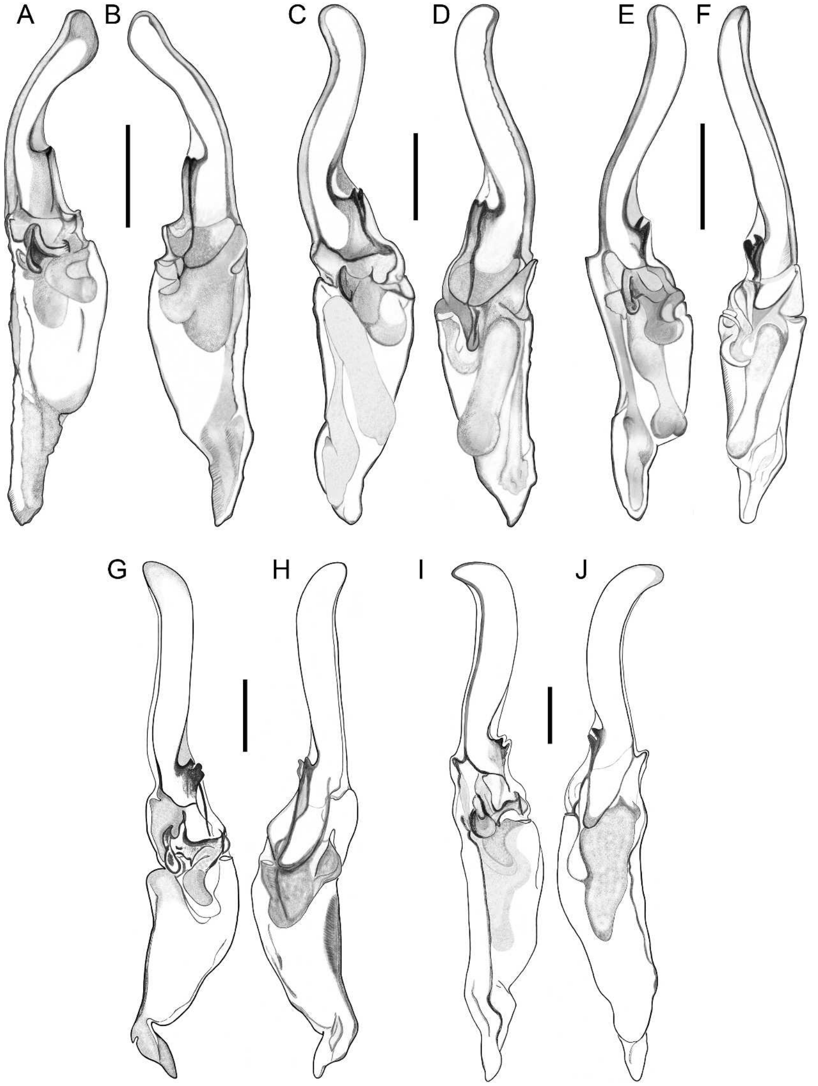

FIGURE 13. *Maaykuyak* González-Santillán and Prendini, 2013, *Vizcaino* González-Santillán and Prendini, 2013, and *Syntropis* Kraepelin, 1900, dextral hemispermatophore, ventral (**A, C, E, G, I**) and dorsal (**B, D, F, H, J**) aspects. **A, B.** *Maaykuyak vittatus* (Williams, 1970), ♂ (CNAN 2047). **C, D.** *Maaykuyak waueri* (Gertsch and Soleglad, 1972), ♂ (CNAN 2062). **E, F.** *Vizcaino viscainensis* (Williams, 1970), ♂ (CNAN 2245). **G, H.** *Syntropis macrura* Kraepelin, 1900, ♂ (CAECIB). **I, J.** *Syntropis williamsi* Soleglad et al., 2007, ♂ (AMNH [ARA 2825]). Scale bars = 1 mm (**A, B, E–J**), 0.5 mm (**C, D**).

retrolateral denticles comparatively smaller than prolateral denticles; movable finger median denticle row comprising seven subrows, flanked by seven prolateral and retrolateral denticles, subpaired, terminal subrow comprising one denticle. Trichobothrial pattern orthobothriotaxic Type C; chela trichobothrium *Db* situated on dorsal retrolateral carina, subproximal on manus; *Dt* situated near midpoint of manus; *ib* and *it* situated subproximal on fixed finger, between sixth prolateral denticle and seta demarcating position of seventh prolateral denticle; *db–dt* and *eb–et* distributed

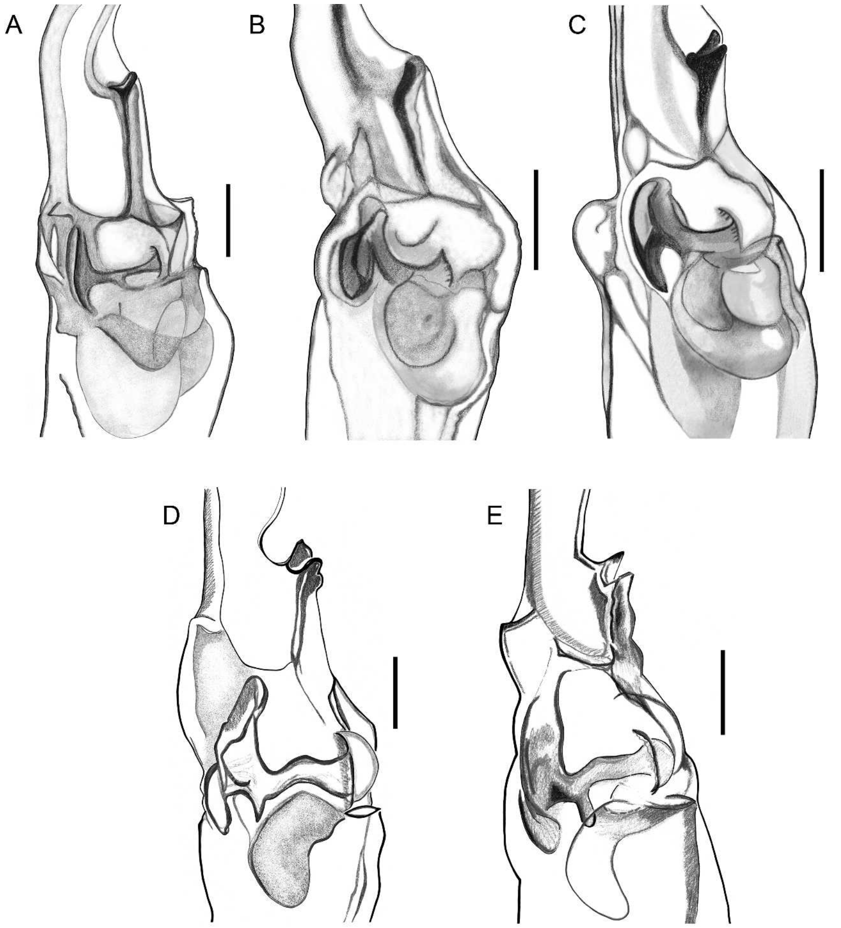

FIGURE 14. *Maaykuyak* González-Santillán and Prendini, 2013, *Vizcaino* González-Santillán and Prendini, 2013, and *Syntropis* Kraepelin, 1900, dextral hemispermatophore, detail of capsule. **A.** *Maaykuyak vittatus* (Williams, 1970), ♂ (CNAN 2047). **B.** *Maaykuyak waueri* (Gertsch and Soleglad, 1972), ♂ (CNAN 2062). **C.** *Vizcaino viscainensis* (Williams, 1970), ♂ (CNAN 2245). **D.** *Syntropis macrura* Kraepelin, 1900, ♂ (CAECIB). **E.** *Syntropis williamsi* Soleglad et al., 2007, ♂ (AMNH [ARA 2825]). Scale bars = 0.25 mm (**A–C**), 0.5 mm (**D, E**).

along entire length of fixed finger, with *db* and *eb* situated proximally.

Legs: Basitarsi prolateral ventral and retrolateral ventral spinule rows complete on legs I and II, prolateral ventral row absent on III and IV, retrolateral ventral row partial, restricted to distal half of III, absent on IV; retrolateral median row vestigial, reduced to few distal spinules on I–IV; retrolateral dorsal row partial, restricted to distal third of I–III, vestigial, reduced to few distal spinules on IV; macrosetal counts on I–IV, respectively: dorsal, 3:3:3:3; retrolateral dorsal, 3:3:3:4; prolateral ventral, 4:4:5:5; retrolateral ventral, 4:7:9:9; dorsal and retrolateral dorsal macrosetae arranged in two separate rows on I–IV; two medial prolateral ventral macrosetae spiniform, proximal four retrolateral ventral macrosetae major, and distal five minor on III and IV. Telotarsi I–IV, each with single ventromedian row of spinules, curved proximally, and two pairs of ventrodistal spinules (fig. 12A).

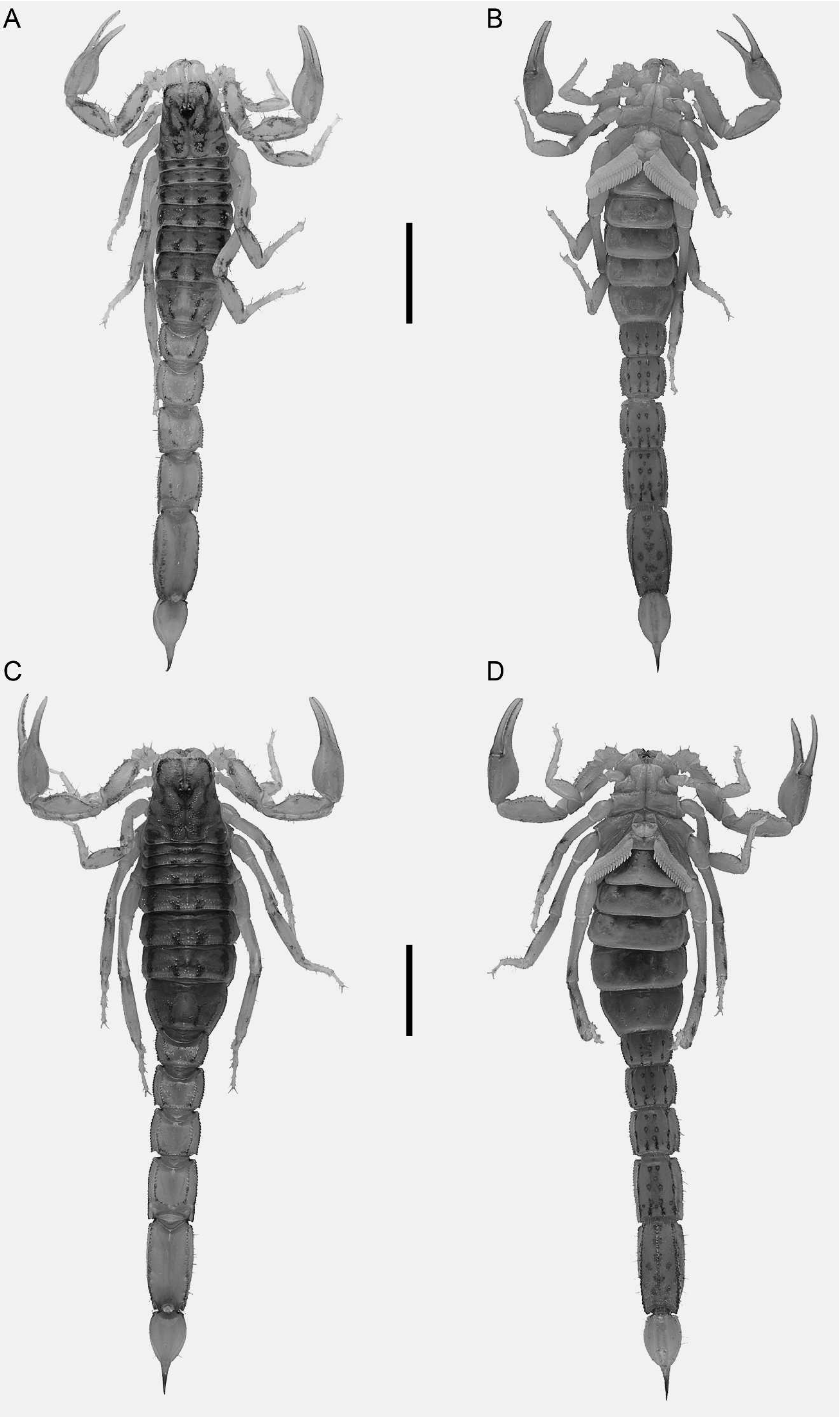

FIGURE 15. *Maaykuyak vittatus* (Williams, 1970), habitus, dorsal (**A, C**) and ventral (**B, D**) aspects. **A, B.** ♂ (CNAN 2047). **C, D.** ♀ (CNAN 2047). Scale bars = 5 mm.

Genital operculum: Genital operculum length equal to width (fig. 6A), with five (♂) or three (♀) pairs of macrosetae. Sclerites free at posterior margin, but unable to open more than 45° (♂) or fused longitudinally (♀). Genital papillae present, protruding posteriorly (♂) or absent (♀).

Hemispermatophore: Lamina 1.3 times longer than trunk (table 5). Median lobe, ental terminus prominent, spiniform. Dorsal trough margin long, narrow, curving proximally, well separated from ventral trough (fig. 13A). Dorsal and ventral trough margins, terminal spinelike processes fused into prominent, bifurcate hook, situated distally on lamina dorsal margin (figs. 13B, 14A). Inner lobe, basal plate situated adjacent to ventral trough. Hemimating plug developed from inner lobe; distal barb 0.9 times longer than basal plate length (table 5); distal barb margin with ca. 11 long spinules.

Pectines: Basal piece with two pairs of macrosetae (fig. 6A). Marginal lamella comprising three sclerites, moderately covered with macrosetae. Median lamella proximal three sclerites fused, 10–13 separate, subproximal 1–3 sclerites forming two rows. Fulcra, 18–20 (♂), 16–17 (♀). Pectinal teeth, 18–22 (♂), 15–18 (♀). Pectines relatively long, midpoint (♂) or distal margin (♀) of third (distal) sclerite of marginal lamella aligned with distal margin of coxa IV.

Tergites: Pretergites I–VII, surfaces matte. Posttergites I–VI, intercarinal surfaces shagreened, sparsely covered with fine and coarse granules (fig. 15A, B), dorsal median and dorsal lateral carinae obsolete, comprising few coarse granules in anterior half; VII, intercarinal surfaces shagreened, densely covered with fine and coarse granules, dorsal median carina partial, restricted to anterior half, costate to costate-granular; dorsal lateral and lateral median carinae converging anteromedially, costate-granular, posterior granules larger, spiniform.

Sternites: Sternites III–VI surfaces acarinate, punctate (fig. 15C, D), spiracles elongate, slitlike, length approximately twice width; V, posteromedian surface with hyaline glandular area between spiracles wide (♂) or vestigial (♀); VII, intercarinal surfaces matte, with vestigial hyaline glandular area posteromedially, ventral submedian and ventral lateral carinae obsolete, each with three pairs of macrosetae.

Metasoma: Metasoma 1.9 times longer than mesosoma (table 1). Segments I–V, respectively 1.5, 1.3, 1.1, 0.8 and 0.5 times wider than long; V, 1.4 times wider than telson. Segments I–V intercarinal surfaces smooth and glabrous, except dorsal surfaces of I–IV and ventral surface of V sparsely granular (fig. 8A, D); dorsal lateral carinae complete, serrate on I–V, terminating in enlarged spiniform granules posteriorly on I–IV; lateral median carinae complete, serrate, terminating in enlarged spiniform granules posteriorly on I–III, lobate posteriorly on IV, partial, reduced to granular row, becoming obsolete posteriorly, on anterior half of V; lateral inframedian carinae complete, serrate on I, partial, restricted to posterior third, serrate on II, partial, restricted to posterior quarter, serrate on III, absent on IV and V; ventral lateral carinae complete, serrate on I–V; ventral submedian carinae absent, reduced to macrosetae on I–III and V, absent or vestigial, reduced to few granules posteriorly on IV; ventral median carina complete, serrate on V. Macrosetal counts on carinae of I–V, respectively: dorsal lateral carinae, 0:0:1:2:4; lateral median carinae, 0:1:2:3:3; lateral inframedian carinae, 1:1:1:1:0; ventral lateral carinae, 2:3:3:3:7; ventral sublateral carinae, 0:0:0:0:2; ventral submedian carinae, 3:3:3:4:0; all macrosetae minor (♂) or major (♀); ventral submedian intercarinal surfaces with one or two major accessory macrosetae on segments II and III.

Telson: Vesicle globose; length 2.4 times greater than width, 2.6 times greater than aculeus length (table 1). Dorsal surface smooth, with slightly concave hyaline glandular area medially, occupying approximately one third of surface (♂) or vestigial (♀). Ventral surface smooth; ventral submedian and ventral sublateral carinae each reduced to one pair of enlarged crenulate granules anteriorly; carinae each with four or five pairs of macrosetae; subaculear tubercle vestigial, reduced to minute granule (fig. 10A). Aculeus

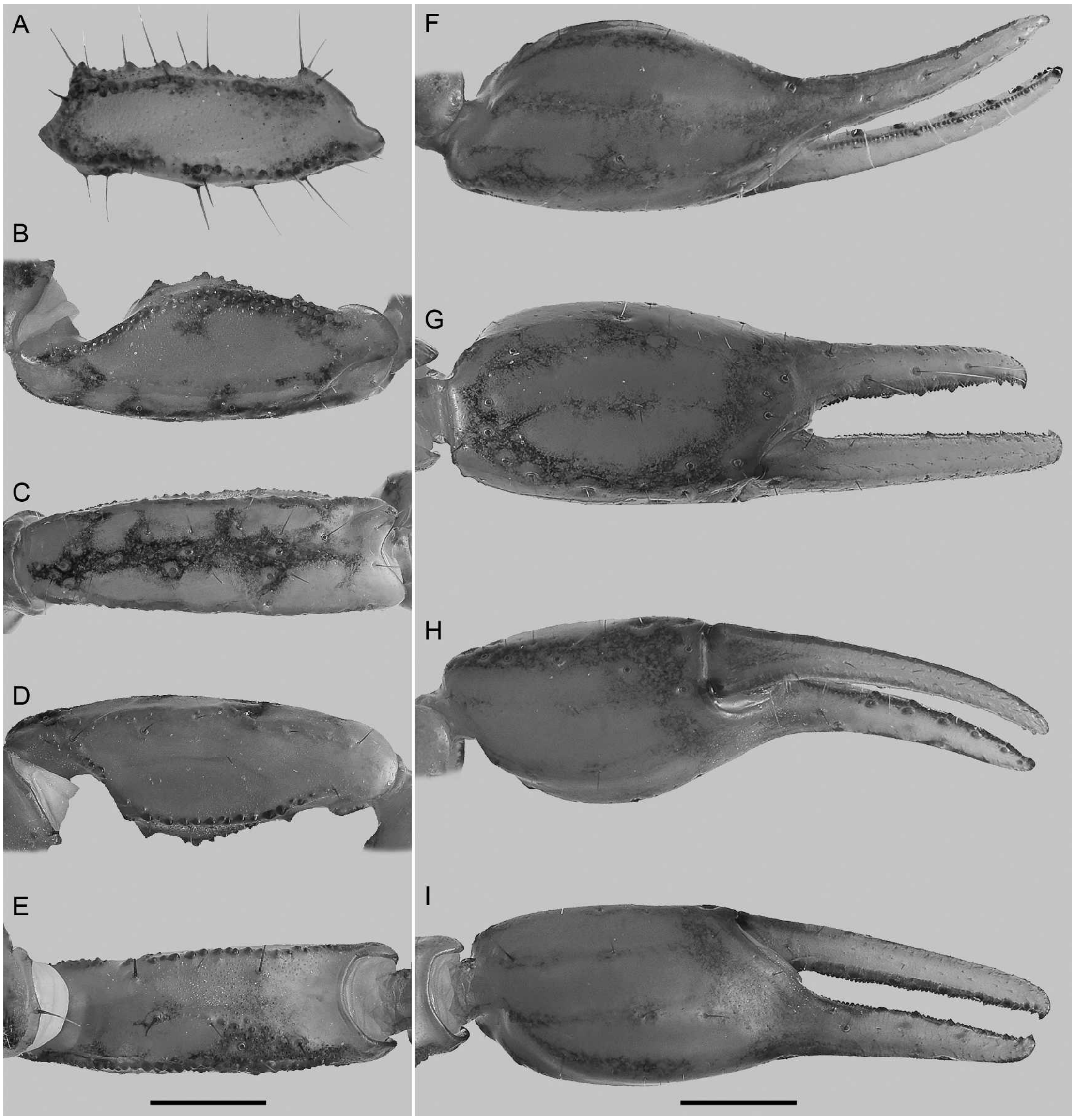

FIGURE 16. *Maaykuyak vittatus* (Williams, 1970), ♂ (CNAN 2047), dextral pedipalp femur (**A**), patella (**B–E**) and chela (**F–I**). **A, B, F.** Dorsal aspect. **C, G.** Retrolateral aspect. **D, H.** Ventral aspect. **E, I.** Prolateral aspect. Scale bars = 1 mm.

relatively short and gently curved; laterobasal microserration comprising 3–6 sharp spinules.

Distribution: *Maaykuyak vittatus* is endemic to Baja California Sur and adjacent islands in the Sea of Cortez, Mexico (fig. 2). The known distribution, reported by Williams (1970a) as the southern part of the Baja California Peninsula from Los Comondús to Los Cabos, was extended northward in the present contribution, to the oases of San Isidro and the La Purisima area in the central ranges of the Sierra de la Giganta. The distribution of *M. vittatus* on the peninsula is disjunct. The typical, northern population extends from San Isidro and La Purisima to the

Comondús, whereas the southern population extends from the Isthmus of La Paz to the Los Cabos area. Recent fieldwork in the vicinities of San Evaristo and El Pilar, respectively situated to the east and west of the Sierra de la Giganta, confirmed the absence of *M. vittatus* in the area intermediate between the northern and southern populations. *Maaykuyak vittatus* has been recorded on the following islands: Cerralvo, Coronados, Espíritu Santo, and Partida.

Ecology: *Maaykuyak vittatus* has been collected at altitudes ranging from sea level to 850 m, the highest record for the species in the Sierra de la Laguna. It appears to prefer mesic habitats, e.g., tropical deciduous forest to pine-oak forest on the lower slopes of the Sierra de la Laguna. According to Williams (1970a), this species is a burrower, preferring areas with rocks and compacted, finely textured soil. Most of the personally collected material reported in the present contribution was captured sitting or walking on the ground surface with UV light detection at night and it is unlikely, based on its morphology, that *M. vittatus* constructs burrows in open ground, although it is probably capable of constructing shallow scrapes under stones. The habitat and habitus of *M. vittatus* are consistent with the lapidicolous ecomorphotype (Prendini, 2001). Williams (1970a) reported that *M. vittatus* was the numerically dominant scorpion species within its distributional range, consistent with the findings of Jiménez-Jiménez and Palacios-Cardiel (2010), who reported that it was the most commonly encountered species in an assemblage of 16 species at five oases of Baja California Sur. *Maaykuyak vittatus* reproduces during the summer months of June and July, when adult males become more abundant on the surface than adult females and immatures (Williams, 1980). The chactid, *Nullibrotheas allenii* (Wood, 1863) was observed preying on *M. vittatus* in the Sierra de la Laguna.

Remarks: Williams (1970a) noted morphological variation in base color intensity, pectinal tooth count, and development of the ventral submedian carinae on metasomal segments III and IV, among populations of *M. vittatus* on the islands in the Sea of Cortez. Phylogenetic analyses based on samples from across the known distribution failed to uncover any pattern to the variation that could be used to diagnose additional species (González-Santillán and Prendini, in prep.).

Additional Material Examined: **MEXICO: Baja California Sur:** *Municipio de Comondú*: Colonia de La Toba [25°10′N 111°30′W], 27 km N, 30.i.1965, V. Roth, 2 ♂ (AMNH); El Crucero [Ciudad Constitución, 25°30′N 111°35′W], 16 km N, 15.ii.1966, V. Roth, 1 ♀ (AMNH); San Miguel de Comondú, 26°02′26.7″N 111°49′55.3″W, 220 m, 12.vii.2004, O.F. Francke, W.E. Savary, E. González and A. Valdez, collected at night with UV light, 16 ♂, 8 ♀ (AMNH [ARA 2554]), 3 ♂ (AMCC [LP 3180]), 10 ♂, 3 ♀, 2 subad. ♀ (CAS [ARA 1514]), 16 ♂, 6 ♀ (CNAN SC3855 [ARA 2047]); San Miguel de Comondú, 2 km SW, 26°00′18.5″N 111°52′01.3″W, 169 m, 12.vii.2004, E. González, O.F. Francke, W.E. Savary, and A. Valdez, collected at night with UV light, 5 ♂, 5 ♀ (AMNH [ARA 2549]), 3 ♂, 2 subad. ♀ (CAS [ARA 1509]), 5 ♂, 2 ♀, 1 subad. ♀ (CNAN SC3856 [ARA 2042]). *Municipio de La Paz*: El Triunfo [23°49.998′N 109°58.99′W], S of La Paz, 3.ii.1965, V. Roth, 1 ♂, 1 ♀ (AMNH); El Triunfo, 12 km W, 457 m, 12.x.1972, E.L. Sleeper and F.J. Moore, 2 ♂, 1 ♀, 3 subad. ♀ (OSAL); Isla Cerralvo [24°10.933′N 109°53.233′W], 6.vii.1921, 1 ♂ (AMNH), 4.viii.1986, L. Cervantes, 1 juv. (CNAN SC2859); Isla Espíritu Santo [24°30′N 110°22′W], 29.xii.2005, W. López-Forment, 1 ♀ (CNAN SC2858), 3.i.2009, W. López-Forment, 2 ♂ (CNAN SC2860), ii.2011, W. López-Forment, 2 ♂, 4 ♀ (CNAN SC2862), 2.i.2005, W. López-Forment, 1 ♀ (CNAN SC28657); Isla Espíritu Santo, Ensenada de la Ballena, 5.v.1988, W. López-Forment, 1 juv. (CNAN SC2861); Isla Espíritu Santo, Playa Bonanza, 24°27.364′N 110°18.471′W, 31.v.2008, E. González and I.G. Nieto 24°27.364′N 110°18.47′W, 0–50 m, bajada with cacti and scrub, collected at night with UV light, 7 ♂, 1 ♀, 2 subad. ♂ (AMNH [ARA 2859]), 1 ♀ (AMCC [LP 8800]), 8 ♂, 1 ♀, 2 subad. ♂ (CNAN SC3857 [ARA 2239]); La Paz, 15 km SE, 24°03′44.7″N 110°10′32″W, 474 m, 8.vii.2004, O.F. Francke, E. González and A. Valdez, collected at night with UV light, 19 ♂, 11 ♀, 7 subad. ♀ (AMNH [ARA 2547]), 2 subad. ♀ (CAS [ARA 1507]), 13 ♂, 9 ♀ (CNAN SC3858 [ARA 2040]); La Paz, 18 km SE, 24°02′45.9″N 110°08′51.9″W, 625 m, 8.vii.2004, O.F. Francke, E. González, and A. Valdez, collected at night with UV light, 28 ♂, 17 ♀, 3 subad. ♂, 11 subad. ♀ (AMNH [ARA 2553]), 6 subad. ♀ (CAS [ARA 1513]), 19 ♂, 8 ♀, 19 subad. ♀ (CNAN SC3859 [ARA 2046]); La Paz, 41 km NW, 24°04′36.2″N 110°36′57.1″W, 256 m, 7.vii.2004, O.F. Francke, E. González, and A. Valdez, collected at night with UV light, 4 ♂, 4 ♀ (AMNH [ARA 1510, 1511]), 2 ♂, 2 ♀ (CNAN SC3860 [ARA 2044]); La Paz, 50 km NW, 24°05′56.2″N 110°43′41″W, 256 m, 7.vii.2004, O.F. Francke, E. González, and A. Valdez, collected at night with UV light, 5 ♂, 1 ♀ (AMNH [ARA 1512, 2552]), 1 ♂, 1 ♀ (AMCC [LP 3179]), 2 ♂, 1 ♀ (CNAN SC3861 [ARA 2045]); La Paz, ca. 10 km SE on BCS 286 to San Juan de los Planes, 24°08.433′N 110°15.333′W, 106 m, 9.vii.2005, L. Prendini and R.J. Mercurio, collected at night with UV light, 1 ♀ (AMCC [LP 4427]); La Paz, ca. 38 km N, 1 km off Route 1 on Ley Federal de la Reforma Agraria, 24°03.609′N 110°36.777′W, 256 m, 9.vii.2005, W.E. Savary and E. González, collected at night with UV light, 2 ♂, 2 ♀ (AMNH [ARA 2559]), 1 ♂ (AMCC [LP 4442]); Las Cruces, 4 km NW, 24°13.511′N 110°07.410′W, 31 m, 24.vi.2008, H. Montaño and E. González, stones, granitic sand and pebbles, thorn-scrub and cacti, collected at night with UV light, 5 ♂, 2 ♀ (AMNH [ARA 2873]), 1 ♀ (AMCC [LP 8815]), 5 ♂, 2 ♀ (CNAN SC3862 [ARA 2258]); Libramiento to Pichilingue km 4 marker, near Punta Prieta Thermoelectric Station, 24°12.843′N 110°16.214′W, 105 m, 23.vi.2008, M. Correa, I.G. Nieto, and E. González, arroyo wash, stones and boulders, thorn-scrub and cacti, sandy area, cliffs and compacted sand hills, collected at night with UV light, 1 ♂ (AMNH [ARA 2872]), 1 ♂ (AMCC [LP 8810]), 2 ♂ (CNAN SC3864 [ARA 2257]); Los Aripes [24°08.533′N 110°18.65′W], 56 km NW, 1.viii.1975, Soleglad and Erickson, 2 ♀ (AMNH); Todos los Santos, S of, 23°25′47.6″N 110°11′36.1″W, 82 m, 10.vii.2004, O.F. Francke, W.E. Savary, E. González and A. Valdez, collected at night with UV light, 5 ♂, 4 ♀, 1 subad. ♂ (AMNH [ARA 2548]), 2 ♂ (AMCC [LP 3182]), 3 ♂, 2 ♀, 1 subad. ♀ (CAS [ARA 1508]), 5 ♂, 2 ♀, 1 subad. ♀ (CNAN SC3865 [ARA 2041]); Valle Perdido [23°42.186′N 110°07.5′W], 4.3 km SE, 549 m, 16.x.1972, E.L. Sleeper and F.J. Moore, 4 subad. ♂ (OSAL). *Municipio de Loreto*: Boca de la Sierra, near Miraflores [23°12′9.52″N 109°27′28.95″W], 10.ii.1966, V. Roth, 2 ♀ (AMNH); Loreto, 25 km S, on gravel road ca. 250 m E Route 1, 25°48.666′N 111°19.26′W, 6 m, 7.vii.2005, W.E. Savary, E. González, L. Prendini, and R.J. Mercurio, collected at night with UV light, 9 ♂, 3 ♀ (AMNH [ARA 2557]), 2 ♀ (AMCC [LP 4444]), 8 ♂, 3 ♀ (CNAN SC3863 [ARA 2050]); Puerto Escondido [25°48.6′N 111°18.55′W], 1.6 km S, 12 m, 12.xi.1972, E.L. Sleeper and F.J. Moore, 1 ♀ (OSAL); Santa Anita [23°09′N 109°43′W], 5 km N, 152 m, 2.xii.1972, E.L. Sleeper and F.J. Moore, 1 ♀ (OSAL). *Municipio de Los Cabos*: Cabo San Lucas [22°53.383′N 109°54.933′W], 15 mi. E, 1.vi.1999, M.E. Soleglad, 1 ♀ (AMCC [LP 1681]); San Bartolo, 6 km SW, 23°41.816′N 109°50.800′W, 100 m, 13.vii.2008, H. Montaño and E. González, mesic vegetation, collected at night with UV light, 13 ♂, 17 ♀, 9 juv. (AMNH [ARA 2853]), 1 ♂ (AMCC [LP 8842]), 13 ♂, 17 ♀, 9 juv. (CNAN SC3866 [ARA 2233]); San José del Cabo [23°03.906′N 109°40.65′W], 27 km N, 9.ii.1966, V. Roth, 1 ♂, 1 ♀ (AMNH); San José del Cabo, 9.7 km E, 27.x.1972, E.L. Sleeper and F.J. Moore, 1 ♀ (OSAL); San José del Cabo, ca. 10 km S off Route 1, 23°01.762′N 109°43.490′W, 50 m, 10.vii.2005, W.E. Savary, E. González, and R.J. Mercurio, collected at night with UV light, 10 ♂, 4 ♀ (AMNH [ARA 2558]), 3 ♂, 1 ♀ (AMCC [LP 4440]), 9 ♂, 3 ♀ (CNAN SC3867 [ARA 2051]); Santiago, 23°26′24.5″N 109°43′34.6″W, 225 m, 9.vii.2004, O.F. Francke, E. González, and A. Valdez, collected at night with UV light, 5 ♂, 10 ♀ (AMNH [ARA 2550]), 1 ♀ (AMCC [LP 3181]), 1 subad. ♀, 2 juv. (CAS [ARA 1510]), 3 ♂, 4 ♀, 1 subad. ♂, 4 subad. ♀ (CNAN SC3868 [ARA 2043]); Sierra de La Laguna, 23°14′17.1″N 109°57′07.9″W, 782 m, 10.vii.2004, A. Valdez, E. González, O.F. Francke, and W.E. Savary, tropical deciduous forest, collected at night with UV light, 1 ♂ (AMNH [ARA 2556]), 23°38′33.5″N 109°54′5.1″W, 717 m, 9.vii.2004, O.F. Francke, E. González, and A. Valdez, collected at night with UV light, transitional forest, under rock, 1 ♂ (AMNH [ARA 2555]), 23°41′10″N 109°56′41.1″W, 850 m, 9.vii.2004, O.F. Francke, E. González, and A. Valdez, transitional forest, under rock, 1 ♂, 1 ♀ (AMNH), 1 ♂ (CNAN SC3869 [ARA 2048]); Sierra de La Laguna, La Burrera, 18.x.1972, E.L. Sleeper and F.J. Moore, 4 ♀ (OSAL); Sierra de La Laguna, Ejido de La Burrera, 23°33′01.6″N 110°02′28.7″W, 517 m, 20.vii.2004, A. Valdez, E. González, O.F. Francke, and W.E. Savary, tropical deciduous forest, collected at night with UV light, 5 ♂, 1 ♀ (AMNH [ARA 2546]), 1 ♂, 1 ♀ (CAS [ARA 1506]), 2 ♂, 2 ♀ (CNAN SC3870 [ARA 2039]).

Maaykuyak waueri
(Gertsch and Soleglad, 1972)

Figures 2, 5B, 6B, 8B, E, 10B, 11B, 12B, 13C, D, 14B, 17, 18; tables 1, 4

Vejovis waueri Gertsch and Soleglad, 1972: 605, figs. 145, 146.

Vejovis bilineatus: Gertsch, 1939: 18 (misidentification).

Vaejovis waueri: Stahnke, 1974: 136; Díaz Nájera, 1975: 28, 32; Sissom and Francke, 1983: 70; Sissom, 1991b: 215, 221; Brown and Formanowicz, 1996: 41, 46; Yahia and Sissom, 1996: 86; Brown, 1997: 290; Kovařík, 1998: 148; Sissom and Jackman, 1997: 151, 155; Beutelspacher, 2000: 116, 143, 154, map 97; Lourenço and Sissom, 2000: 73, 77; Sissom, 2000: 537; 2001: 215, 217, 221; Hendrixson, 2001: 47, 49, 52, 54, figs. 1, 3; Brown et al., 2002: 409, 411–418, figs. 1, 3, 5; Brown, 2003: 2187, 2188; Sissom and Hendrixson, 2005a: 127, 133, 134, table 6.2; 2005b: 34, 41; Graham and Fet, 2006: 6, 9; Graham and Soleglad, 2007: 9; Barron and Weidlich, 2009: 400, 401; McWest, 2009: 16, 20, 41, 54, 55, 62–67, 99, 119, figs. 11, 19, table 1; Ross, 2009: 532, table 1; Warburg, 2011: 177, fig. 4; Bryson, 2014: 790, table 1.

Hoffmannius waueri: Soleglad and Fet, 2008: 4, 59, 68, 71, 77, 91, tables 5, 9.

Maaykuyak waueri: González-Santillán and Prendini, 2013: 35, 39, 42, 48, figs. 22, 26; 2015b: 13.

Type Material**: U.S.A.: Texas:** *Brewster Co.*: Holotype ♀ (AMNH), the Basin, Chisos Mountains, Big Bend National Park, 28.ix.1950, W.J. Gertsch, collected beneath stone in shaded arroyo.

Diagnosis: *Maaykuyak waueri* differs from its sister species, *M. vittatus*, in the following respects. *Maaykuyak waueri* is distinctly smaller, with total length 18–26 mm, than *M. vittatus*, with total length 29–36 mm. The pedipalp chela manus is completely infuscate and darker than the pedipalp patella and femur, and the intercarinal surfaces of metasomal segment V, completely infuscate and darker than segments I–IV in *M. waueri*, whereas the chela manus is partially infuscate and similar in color to the pedipalp patella and femur, and the intercarinal surfaces of segment V, partially infuscate and similar in color to segments I–IV, in *M. vittatus*. The median denticle rows of the pedipalp chela fingers comprise five primary subrows flanked by five prolateral denticles on both the fixed and movable fingers in *M. waueri*, but six primary subrows flanked by six prolateral denticles on the fixed finger and seven primary subrows flanked by seven prolateral denticles on the movable finger in *M. vittatus*. The pectinal tooth counts of *M. waueri* are lower, ranging from 13–15 in males and 10–13 in females, than those of *M. vittatus*, ranging from 19–21 in males and 16–18 in females. The prolateral ventral macrosetae of the basitarsi are fine and equally developed on legs I–IV in *M. waueri*, but stouter on legs II–IV than on leg I in *M. vittatus*. One or occasionally two pairs of ventral distal spinules are present on the telotarsi of legs I–IV in *M. waueri*, whereas two pairs are consistently present in *M. vittatus*. The ental terminus of the hemispermatophore median lobe is moderate and rounded in *M. waueri*, but prominent and spiniform in *M. vittatus*.

Description: The following redescription, which is based on the holotype and additional material examined, supplements the original description by Gertsch and Soleglad (1972).

Color and infuscation: Cheliceral manus dorsal surface yellowish, immaculate, fingers slightly darker. Carapace base color yellowish to orange, partially to almost entirely infuscate, variegated. Pedipalps base color yellowish to orange; femur and patella almost immaculate, except patellar retrolateral carinae infuscate; chela manus and proximal half of fingers completely infuscate, darker than pedipalp patella and femur, all carinae more intensely infuscate. Legs base color yellowish to orange, becoming paler distally, immaculate. Coxosternal region, genital operculum, and pectines pale, immaculate. Mesosoma base color yellowish to orange; tergites I–VII dorsal median carinae immaculate, dorsal lateral carinae infuscate, infuscation often extending to lateral margins, creating pale median stripe on I–VI; sternites III–VII ventral surfaces pale, immaculate. Metasoma base color pale yellow, segments I–IV, intercarinal surfaces immaculate, ventral lateral and ventral submedian carinae infuscate around bases of macrosetae only on I and II, continuously infuscate on III and IV; segment V, intercarinal surfaces completely infuscate, darker than segments I–IV. Telson vesicle base color bright orange to yellowish, contrasting with pale yellow metasomal segments I–IV and dark segment V, diffusely infuscate, more intensely at base of aculeus; aculeus reddish proximally, dark brownish distally.

Chelicerae: Manus, dorsal surface smooth, subdistal margin with one macroseta medially. Movable finger, ventral surface with serrula comprising 6/7 tines, in distal half.

Carapace: Length equal to posterior width (table 1). Anterior margin sublinear, without median notch, with three pairs of macrosetae (fig. 5B). Three pairs of lateral ocelli, anterolateral and median lateral pairs equal in size, posterolateral pair approximately half the size. Median ocular tubercle raised, situated in anterior third of carapace, superciliary carinae smooth, lower than median ocelli. Median ocelli approximately twice the size of anterolateral ocelli. Anteromedian, posteromedian and posterolateral sulci shallow; posterior transverse sulci obsolete. Entire surface matte, uniformly and finely granular.

Coxosternal region: Sternum subequilateral pentagonal; 1.3 times wider than long (table 1); median sulcus deep; ventral surfaces matte; with three pairs of macrosetae anteriorly, medially and posteriorly on lobes (fig. 6B). Coxa II, proximal margin smooth; subproximally with three oblique slitlike structures, adjacent to low, smooth protuberance; coxal endite proximal margin with broad depression, medial margin smooth. Coxa IV twice length of coxa II (table 1).

Pedipalps: Femur intercarinal surfaces matte (fig. 18A); dorsal prolateral, ventral prolateral, and dorsal retrolateral carinae complete, granular; retrolateral dorsosubmedian carina reduced to two medial macrosetae; ventral median carina vestigial, reduced to few spiniform granules merging proximally with ventral prolateral carina; ventral retrosubmedian carina vestigial, reduced to two or three granules proximally; prolateral ventral and prolateral ventrosubmedian carinae vestigial, each reduced to proximal tubercle and two spiniform granules, each with one macroseta, one in proximal third, the other medially; other carinae absent. Patella 1.2 times wider than femur (table 1); intercarinal surfaces matte (fig. 18B–E); dorsal prolateral and ventral prolateral carinae granular; dorsal retrolateral, retrolateral dorsosubmedian and retrolateral median carinae costate; ventral median carina vestigial, reduced to proximal row of granules; prolateral ventral carina vestigial, reduced to low tubercle medially and one macroseta distally; prolateral median carina reduced to two large granules proximally and distally, each with a macroseta, and row of six or seven spiniform granules curving toward dorsal prolateral

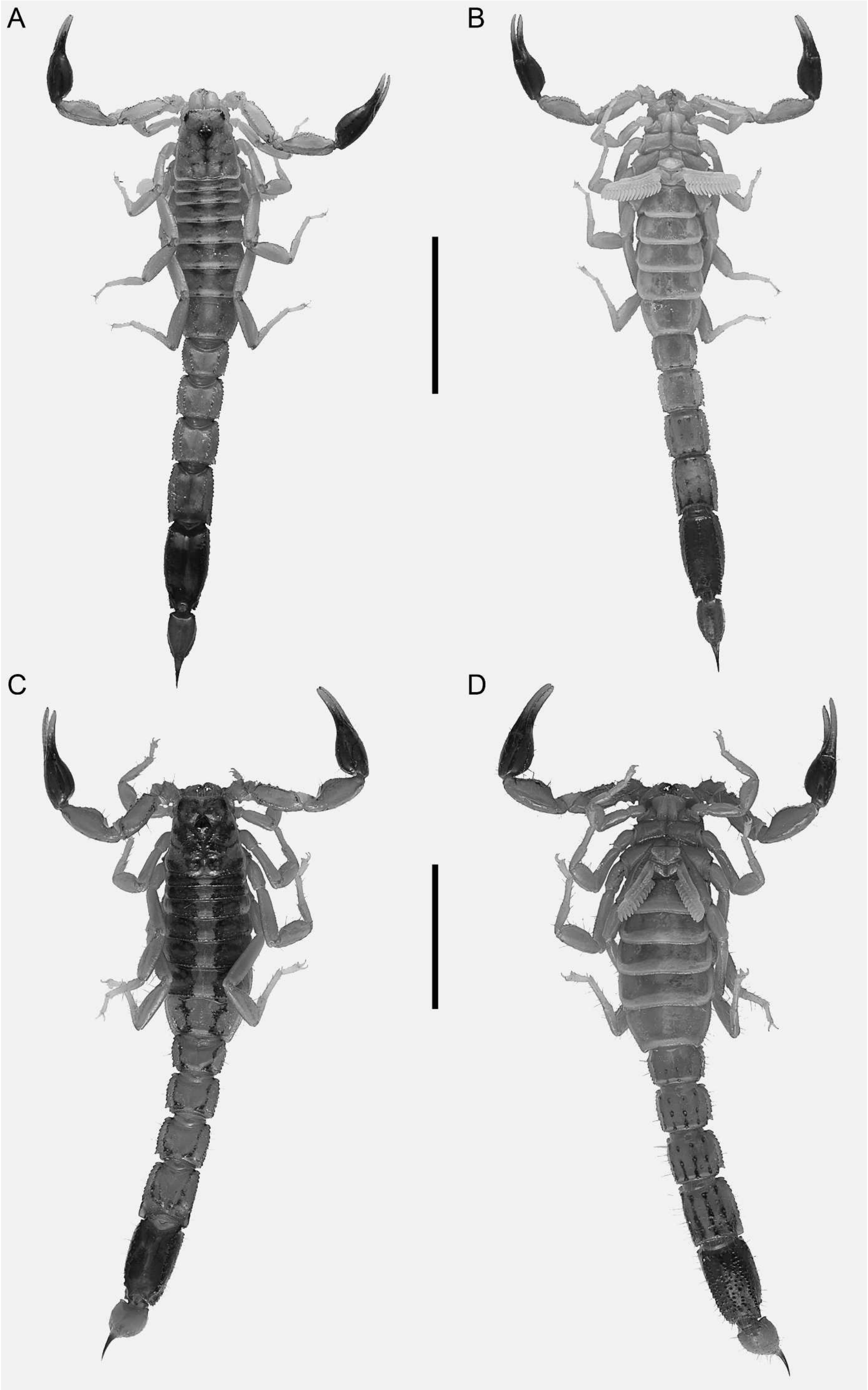

FIGURE 17. *Maaykuyak waueri* (Gertsch and Soleglad, 1972), habitus, dorsal (**A, C**) and ventral (**B, D**) aspects. **A, B.** ♂ (CNAN 2062). **C, D.** ♀ (AMNH). Scale bars = 2 mm.

carina in distal fifth of segment; other carinae absent or obsolete. Chela 1.5 times longer than patella, 1.8 times longer than femur (table 1). Manus relatively slender (fig. 18F–I), width equal to patella, 1.2 times greater than femur; surfaces smooth, acarinate. Fixed and movable fingers dentate margins sublinear, notches and lobes absent; median denticle rows each comprising five subrows flanked by seven prolateral and five retrolateral denticles, subpaired; movable finger terminal subrow comprising one denticle. Trichobothrial pattern orthobothriotaxic Type C; chela trichobothrium *Db* situated on dorsal retrolateral carina, subproximal on manus; *Dt* situated in proximal half of manus; *ib* situated at seventh prolateral denticle, and *it* situated between setae demarcating positions of sixth and seventh prolateral denticles; *db–dt* and *eb–et* distributed along entire length of fixed finger, with *db* and *eb* situated proximally.

Legs: Basitarsi prolateral ventral and retrolateral ventral spinule rows complete on legs I and II, partial, restricted to distal half of III, absent on IV; retrolateral median row vestigial, reduced to few distal spinules on I–IV; retrolateral dorsal row partial, restricted to distal third of I–III, vestigial, reduced to few distal spinules on IV; dorsal absent on I–IV; macrosetal counts on I–IV, respectively: dorsal, 3:3:3:3; retrolateral dorsal, 3:3:3:4; prolateral ventral, 3:3:3:3; retrolateral ventral, 3:4:4:5; dorsal and retrolateral dorsal macrosetae arranged in two separate rows on I–IV. Telotarsi I–IV, each with single ventromedian row of spinules, curved proximally, and one or occasionally two pairs of ventrodistal spinules (fig. 12B).

Genital operculum: Genital operculum wider than long, with three pairs of macrosetae. Sclerites free at posterior margin, but unable to open more than 45° (♂) or fused longitudinally (♀). Genital papillae present, protruding posteriorly (♂) or absent (♀).

Hemispermatophore: Lamina 1.2 times longer than trunk (table 5). Median lobe, ental terminus rounded. Dorsal trough margin long, narrow, curving proximally, well separated from ventral trough (fig. 13C). Dorsal and ventral trough margins, terminal spinelike processes fused into prominent, bifurcate hook, situated distally on lamina dorsal margin, and bent dorsally (figs. 13D, 14B). Inner lobe, basal plate well separated from ventral trough. Hemimating plug developed from inner lobe; distal barb 0.7 times longer than basal plate length (table 5); distal barb margin with ca. 10 short spinules.

Pectines: Basal piece with single pair of macrosetae (fig. 6B). Marginal lamella comprising three sclerites, densely covered with macrosetae. Median lamella proximal two or three sclerites fused, 7–9 separate, subproximal 1–3 sclerites forming two rows. Fulcra, 11–14 (♂), 10–14 (♀). Pectinal teeth, 12–15 (♂), 11–15 (♀). Pectines relatively short, midpoint (♂) or one fifth (♀) of third (distal) sclerite of marginal lamella aligned with distal margin of coxa IV.

Tergites: Pretergites I–VII, surfaces matte. Posttergites I–VI, intercarinal surfaces matte (fig. 17A, B), dorsal median and lateral carinae vestigial, comprising few granules in anterior half; VII, intercarinal surfaces matte, median carina obsolete, restricted to anterior third, lateral and lateral median carinae converging anteromedially, costate-granular, posterior granules larger, spiniform.

Sternites: Sternites III–VI surfaces acarinate, punctate (fig. 17C, D), spiracles elongate, slitlike, length approximately twice width; V, posteromedian surface without hyaline glandular area; VII, intercarinal surfaces matte, with (♂) or without (♀) vestigial hyaline glandular area posteromedially, lateral intercarinal surfaces with three to six pairs of macrosetae, submedian and lateral carinae obsolete, each with three pairs of macrosetae.

Metasoma: Metasoma 1.6 times longer than mesosoma (table 1). Segments I–V, respectively 1.6, 1.4, 1.2, 0.8 and 0.5 times wider than long; V, 1.5 times wider than telson. Segments I–V intercarinal surfaces matte (fig. 8B, E); dorsal lateral carinae complete, serrate, terminating in enlarged spiniform granules posteriorly on I–IV, complete, granular on V; lateral median carinae complete, serrate, terminating in enlarged spiniform granules posteriorly on I–III, lobate posteriorly on IV, partial, reduced to granular row, becoming obso-

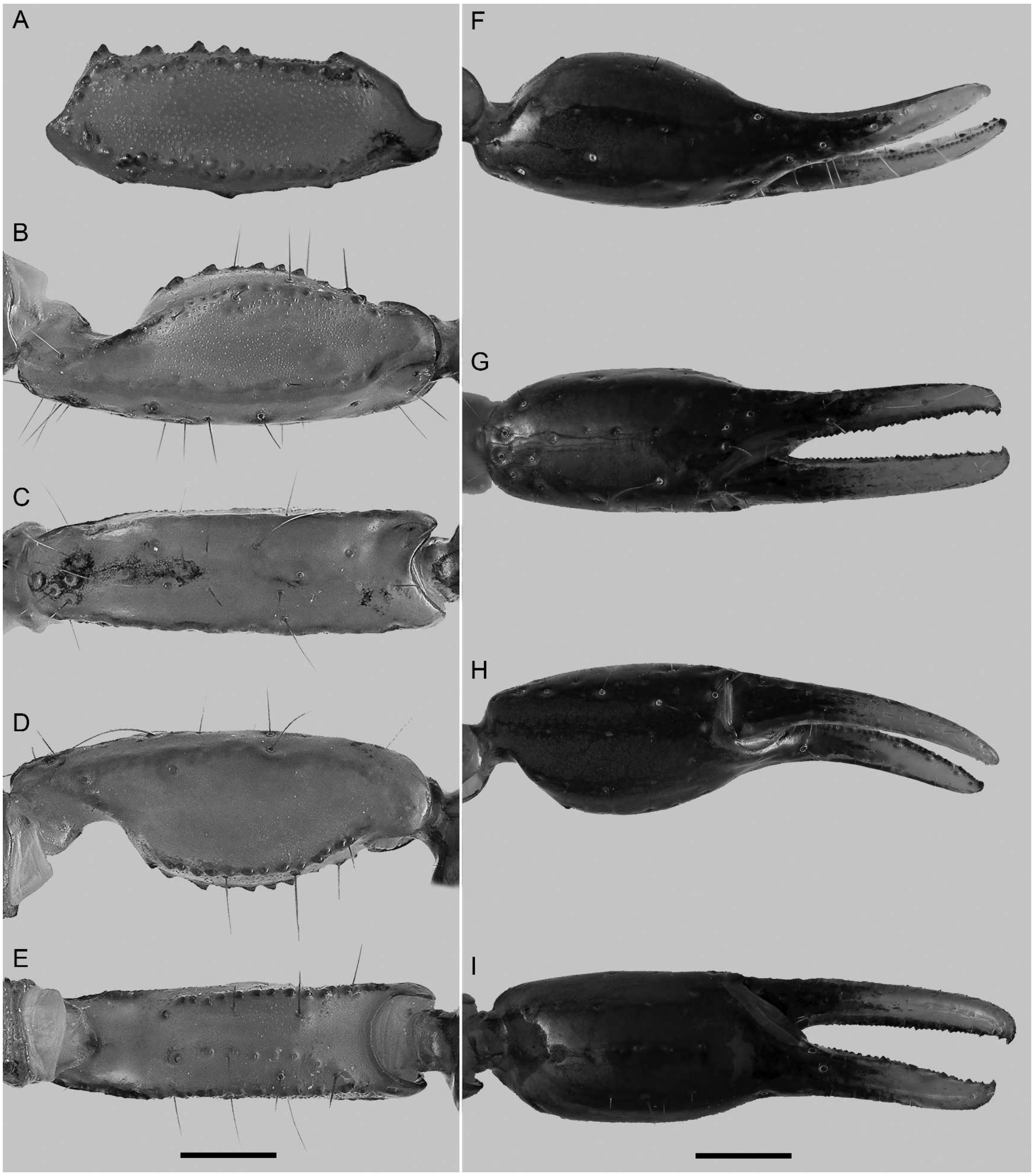

FIGURE 18. *Maaykuyak waueri* (Gertsch and Soleglad, 1972), ♂ (CNAN 2062), dextral pedipalp femur (**A**), patella (**B–E**) and chela (**F–I**). **A, B, F.** Dorsal aspect. **C, G.** Retrolateral aspect. **D, H.** Ventral aspect. **E, I.** Prolateral aspect. Scale bars = 0.25 mm.

lete posteriorly, in anterior half of V; lateral inframedian carinae complete, serrate on I, partial, restricted to posterior two-thirds, serrate on II, partial, restricted to posterior third, serrate on III, absent on IV and V; ventral lateral carinae complete, costate to serrate on I–III, serrate on IV and V; ventral submedian carinae absent, reduced to macrosetae on I–III, vestigial, reduced to few granules posteriorly on IV and V; ventral median carina complete, granular on V. Macrosetal counts on carinae of I–V, respectively: dorsal lateral carinae, 1:2:2:3:8; lateral median carinae, 1:2:3:5:13; lateral inframedian carinae, 4:4:5:5:0; ventral lateral carinae, 3:3:3:5:7; ventral sublateral carinae, 0:0:0:0:2; ventral submedian carinae, 3:3:3:4:0; posteroventral margin with three pairs of macrosetae on segment IV; ventral lateral and ventral submedian intercarinal surfaces with two or four accessory macrosetae on all segments.

Telson: Vesicle globose; length 2.5 times greater than width, 1.6 times greater than aculeus length (table 1). Dorsal surface smooth, with oval glandular area medially, occupying approximately one third of surface (♂) or vestigial (♀).Ventral surface shallowly granular; ventral submedian and ventral sublateral carinae each reduced to paired tubercles anteriorly; carinae each with six or seven pairs of macrosetae; subaculear tubercle vestigial, rounded (fig. 10B). Aculeus relatively short and gently curved; laterobasal microserration comprising five spinules.

Distribution: *Maaykuyak waueri* is endemic to the Chihuahuan Desert and has been recorded from the states of Coahuila, Durango, and Nuevo León in Mexico and Texas in the United States. Sissom (2000) and Sissom and Hendrixson (2005a) also reported this species from the Mexican state of Chihuahua, but no localities in the published literature or among the collections examined for the present contribution, have been identified to confirm this. The distribution map presented in figure 2 complements that of Hendrixson (2001: 48), plotting new records in the Mexican states of Coahuila, Durango, and Nuevo León.

Ecology: *Maaykuyak waueri* is a small, fast-moving scorpion that inhabits arid, rocky slopes at elevations of 619–1922 m. It is commonly collected from under rocks during the day and on the surface with UV light detection at night. It has also been collected by disturbing the upper layers of leaf litter during the day. The habitat and habitus of *M. waueri* are consistent with the lapidicolous ecomorphotype (Prendini, 2001). Brown et al. (2002) reported that *M. waueri* was the second most abundant species in an assemblage of eight scorpion species at Chandler Independence Creek Preserve (Terrell Co., Texas): *Centruroides vittatus* (Say, 1821); *Chihuahuanus crassimanus* (Pocock, 1898); *C. russelli* (Williams, 1971); *Diplocentrus lindo* Stockwell and Baldwin, 2001; *Mesomexovis coahuilae*; *Paruroctonus gracilior* Hoffmann, 1931; *Pseudouroctonus apacheanus* Gertsch and Soleglad, 1972. According to Brown et al. (2002), *M. waueri* exhibited greater surface activity during the nights of the rainy season in summer and fall, the period that corresponds to mating and parturition.

Remarks: Gertsch and Soleglad (1972) reported specimens of this species from Alamos, Sonora, which were later described as *Vaejovis pequeno* Hendrixson, 2001, restricting *M. waueri* to the Chihuahuan Desert. Although Hendrixson (2001) considered *V. pequeno* the closest relative of *M. waueri*, this species was found to be more closely related to *Serradigitus* Stahnke, 1974, and *Stahnkeus* Soleglad and Fet, 2006, than to the members of subfamily Syntropinae in the phylogenetic analyses presented by González-Santillán and Prendini (2015a).

Additional Material Examined: **MEXICO: Coahuila:** *Municipio de Cuatro Ciénegas*: Ojo de Agua, Ejido El Oso, 27°03.359′N 102°13.582′W, 1039 m, 19.vii.2006, O.F. Francke, et al., 2 ♂ (AMCC [LP 6544]), 1 subad. ♂ (CNAN SC3871). *Municipio de General Cepeda*: Sierra de la Concordia, 2 km S El Nogal, 25°16.788′N 101°25.775′W, 1730 m, 22.vii.2006, O.F. Francke, S. Grant, and A.J. Ballesteros, collected at night with UV light, 1 juv. (AMCC [LP 6565]), 5 km S El Nogal, 25°16.25′N 101°25.634′W, 1804 m, 22–23.vii.2006, O.F. Francke, S. Grant, and A.J. Ballesteros, collected at night with UV light, 3 ♂, 1 ♀ (AMNH [ARA 1132]), 2 ♂, 1 ♀ (AMCC [LP 6485]), 3 ♂ (CNAN SC3872). *Municipio de Monclova*: El Rayo Ranch, P. Brandant, 1 ♀ (CNAN SC3011). *Municipio de Parras*: Sierra Parras, ca. 8 km S Parras, 25°23.055′N 102°10.89′W, 1900 m, 21.vii.2006, B. Hendrixson, K.J. McWest, E. González, and S. Grant, scrubland, collected at night with UV light, 2 ♂ (AMNH [ARA 0075]), 2 ♂ (CNAN SC3873), 25°22.974′N 102°11.145′W, 1922 m, 21.vii.2006, B. Hendrixson, K.J. McWest, E. González, and S. Grant, scrubland, collected at night with UV light, 1 ♂ (AMCC [LP 6487]). *Municipio de Ramos Arizpe*: Sierra La Gavia, 26°12′44.8″N 101°09′35.9″W, 1153 m, 28.i.2006, P. Sprouse, 1 ♀, 2 juv. (AMCC [LP 6375]). *Municipio de Saltillo*: Saltillo [25°26.002′N 100°59.003′W], 22.viii.1947, W.J. Gertsch, 1 ♀ (AMNH). *Municipio de Sierra Mojada*: Sierra Mojada, 27°18.599′N 103°42.74′W, 1604 m, 20.vii.2006, W.D. Sissom, E. González, B. Hendrixson, and S. Grant, collected at night with UV light, 3 ♂ (AMNH [ARA 1106]), 1 ♂ (AMCC [LP 6453]), 27°19.188′N 103°43.135′W, 1605 m, 20.vii.2006, W.D. Sissom, E. González, B. Hendrixson, and S. Grant, 1 ♂ (AMCC [LP 6421]). **Durángo:** *Municipio de Gómez Palacio*: Dinamita, 25°44.089′N 103°40.4′W, 1328 m, 29.viii.2005, O.F. Francke, et al., collected at night with UV light, 2 ♂, 1 ♀ (AMCC [LP 5295]), 1 ♂, 1 ♀ (CNAN SC3874 [ARA 2062]). *Municipio de Tlahualilo*: Hwy 49, at deviation Montes Claros–Tlahualilo de Zaragoza, 26°09.242′N 103°31.284′W, 1107 m, 6.viii.2005, O.F. Francke, et al., collected at night with UV light, 1 ♀ (AMCC [LP 5270]). **Nuevo León:** *Municipio de Bustamante*: Bustamante [26°32.067′N 100°30.167′W], near town, 26.xii.1963, B. Russell, under rock, 1 ♀ (AMNH); Bustamante, 4.8 km S, at base of Sierra de Bustamante, 21.ii.1964, J. Reddell, 1 ♀ (AMNH); Bustamante, 6.4 km S, 26.iii.1964, B. Russell, under rock, 1 ♀ (AMNH). *Municipio de Mina*: Potrero de Chico, N of Monterrey, 25°56′24.40″N 100°28′41.15″W, 731 m, 3.v.2008, R.C. West, thorny scrub brush, under limestone slabs, 1 ♀ (AMCC [LP 8551]). *Municipio de Santa Catarina*: Cañón de La Huasteca, 25°36.88′N 100°28.53′W, 780 m, 24.vii.2006, O.F. Francke, et al., scrubland, collected at night with UV light, 2 ♂ (AMNH [ARA 1076]), 1 ♀ (AMCC [LP 6513]), 2 ♂ (CNAN SC3875 [ARA 0090]); La Huasteca Recreation Park, Santa Catarina Mountains, 723 m, 10.vi.2006, R.C. West, 1 ♀ (AMCC [LP 6217]). **U.S.A.: Texas:** *Brewster Co.*: Big Bend National Park: Basin [29°17′14.42″N 103°12′44.73″W], 3.ix.1968, J.A. Brubaker and F.J. Moore, 1 ♀ (AMNH); Basin, Chisos Mountains [29°28′25.80″N 103°19′23.10″W], 5.x.1938, S. Mulaik, 1 subad. ♂ (AMNH), 28.v.1952, 1 subad. ♀ (AMNH), 12.vii.1968, C.A. Triplehorn, 1 ♂ (AMNH). 4.ix.1972, J.A. Brubaker and F.J. Moore, 1 ♀ (OSAL); Chisos Mountains, Cat-tail Canyon [29°17′14.42″N 103°12′44.73″W], 20.iii.1977, Roth and Schroepfer, 1 ♀, 1 juv. (AMNH); Grapevine Hills, 22.viii.1959, W.E. and M.K. McAlister, 1 subad. ♂ (AMNH), 1 subad. ♀ (AMNH); Grapevine Hills, N side, 29°24.624′N 103°12.461′W, 1.viii.2008, W.D. Sissom, G. Casper and T. Anton, 1 ♂ (AMNH); Old One Road, 29°12.489′N 102°59.597′W, 619 m, 30.vii.2008, W.D. Sissom, G. Casper, and T. Anton, 1 ♂ (AMNH); Pine Canyon, 3.ix.1968, J.A. Brubaker and F.J. Moore, 1 ♂ (AMNH), 1 subad. ♂ (AMNH); Pine Canyon trail, Chisos Mountains, 29°16.071′N 103°14.225′W, 1.viii.2008, W.D. Sissom, G. Casper, and T. Anton, 1 ♂, 1 ♀ (AMNH); Rio Grande Village, 23.iii.1977, Roth and Schroepfer, 1 ♀ (AMNH); the Basin, Chisos Mountains, [29°17′14.42″N 103°12′44.73″W], 16.vii.1921, C.D. Duncan, 1 ♀, 16 juv. (AMNH), 26.vii.1938, S. Mulaik, 1 ♀ (AMNH), 5.viii.1938, S. Mulaik, 2 ♂, 1 ♀ (AMNH), 28.ix.1950, W.J. Gertsch, 1 ♂, 2 ♀ (AMNH), 1 ♀ (AMNH), 28.v.1952, Gertsch and Hastings, 17 ♀, 1 juv. (AMNH), 1828 m, 25.viii.1967, 2 ♂, 1 ♀ (AMNH). Black Gap Wildlife Management Area, 1.1 mi. down S fork of Camp 18 Road, 29°32.842′N 102°54.629′W, 18.vii.2004, L. Jarvis and T. Anton, 2 juv. (AMCC [LP 2973, 2974]); Bruce Ranch, Glass Mountains [30°30′N 103°W], 1430 m, 1.i.2005, P. Sprouse, 1 ♀ (AMCC [LP

3637]); Hot Springs [29°10.933′N 102°59.546′W], 16 km N, on Marathon Road, 21.vii.1938, S. Mulaik, 1 ♀ (AMNH), 1 subad. ♀ (AMNH). *Hidalgo Co.*: Edinburg [26°18.25′N 98°9.833′W], xii.1939, S. Mulaik, 2 ♂, 1 ♀ (AMNH), 1 subad. ♀ (AMNH). *Howard Co.*: Big Spring State Park, 32.2293°N, 101.48766°W, 30.iii.2012, A.D. Smith, 2 ♀ (AMCC [LP 11291]). *Jeff Davis Co.*: Fort Davis [30°35.750′N 103°55.55′W], 8.vi.1902, 1 ♀ (AMNH). *Presidio Co.*: Big Bend Ranch State Park, Ojito Adentro, 29°29.5′N 104°04′W, 3.x.2005, Platnick Expedition, D. Ubick, 2 ♂ (AMNH). *Starr Co.*: Rio Grande [26°23.025′N 98°47.091′W], 8 km E, 1.vi.1939, D. Mulaik, 1 ♀, 14 juv. (AMNH); Rio Grande City, 26°23.025′N 98°47.091′W, 25.viii.2008, T. Anton, G. Casper, V. Torti and W.D. Sissom, base of rocky hill on N side of town, 2 ♀ (AMNH), 1 subad. ♂ (AMCC [LP 11042]). *Terrell Co.*: Dryden [30°02.666′N 102°06.850′W], 14.5 km W, 13.i.1950, 1 ♀ (AMNH); Sanderson [30°08.467′N 102°23.75′W], 26.v.1952, M.A. Cazier, W.J. Gertsch, and R. Scrammel, 1 ♂ (AMNH), 1 ♀ (AMNH); Blackstone Ranch, 30.5 km S Sheffield [30°41.433′N 101°49.35′W], 16–17.vii.1958, W. McAlister, 5 ♀ (AMNH), 1 ♀ (AMNH). *Val Verde Co.*: Langtry [29°48.518′N 101°33.575′W], 19.iii.1960, W.J. Gertsch, W. Ivei, and Schrammel, 3 ♀ (AMNH); Pecos River [29°41.982′N 101°58.29′W], 3.ix.1972, J.A. Brubaker and F.J. Moore, 1 ♀ (OSAL). *Zapata Co.*: Laredo [27°31.467′N 99°29.436′W], 51 km SE, 11.xi.1934, S. Mulaik, 1 ♂, 4 ♀ (AMNH), 1 subad. ♂ (AMNH), 9.ii.1935, S. Mulaik, 1 ♀ (AMNH), 6.vi.1941, S. Mulaik, 3 ex. (AMNH).

Syntropis Kraepelin, 1900

Figures 1, 3, 5–7, 9, 10, 12–14; tables 2–4

Syntropis macrura Kraepelin, 1900, type species, by original designation.

Syntropis Kraepelin, 1900: 16, 17; Birula, 1917: 163; Werner, 1934: 281; Kästner, 1941: 272; Mello-Leitão, 1945: 118; Stahnke, 1965: 257, 258; Williams, 1969: 285; 1974: 15 (part); Stahnke, 1974: 113–120; Vachon, 1974: 914, 916; Díaz Nájera, 1970: 116, 117; 1975: 3, 6; Williams, 1980: 47; Francke, 1985: 13, 18, 20; Sissom and Francke, 1985: 264; Sissom, 1990: 110, 114; 1991: 26; Williams and Savary, 1991: 284; Nenilin and Fet, 1992: 9; Stockwell, 1992: 408, 409, 416, 419, fig. 44; Kovařík, 1998: 146; Beutelspacher, 2000: 6, 13, 21, 55, 70, 152, fig. IId, graph I, map 43, table 1, 2; Sissom, 2000: 526; Armas and Martín-Frías, 2001: 8; Ponce-Saavedra and Beutelspacher, 2001: 20; Soleglad and Fet, 2003b: 15, 36, 67, 144, 163, figs. 66, 79, 80, D-4, tables 3, 4, 9; Contreras-Garduño et al., 2005: 160; Fet and Soleglad, 2005: 4, 6, 7; Prendini and Wheeler, 2005: 482, table 10; Soleglad and Fet, 2005: 4, 6, 7; Fet et al., 2006a: 7, 9, table 1; Graham and Fet, 2006: 8; Soleglad and Fet, 2006: 13; Dupré, 2007: 11, 16; Graham and Soleglad, 2007: 11, 12; Soleglad et al., 2007: 119–136, figs. 1–37, tables I, II; Soleglad and Fet, 2008: 1, 4, 13, 27, 30, 32, 38, 46, 51, 69, 71–74, 82, 84, 85, 89–92, 95, 104, figs. 10, 27, 53, 82, 106, 110, 139, 151, 180, 203, tables 1–3, 9; Ayrey, 2011: 1; González-Santillán and Prendini, 2013: 7, 9, 10, 11, 17, 18, 35, 38, 39, 51–53, 56, 58, figs. 1, 4, 8, 12–14, 23, 24, tables 1–3; 2015b: 13.

Diagnosis: *Syntropis* differs from other Syntropinae in the carination of metasomal segments I–IV, where the ventral submedian carinae are absent (indicated by pairs of macrosetae only, no difference in ornamentation evident from the adjacent intercarinal surfaces), and the ventral median carinae distinct (protruding above the adjacent intercarinal surfaces), smooth to finely granular, and unpigmented (figs. 7D–F). Additional characters that separate *Syntropis* from other genera in the subfamily are as follows. The pedipalps, legs, and metasoma are greatly elongated and slender in adult male *Syntropis*, although less so in females and immatures. *Syntropis* is the only genus in the subfamily that consistently exhib-

TABLE 2

Measurements (mm) of selected specimens of *Syntropis aalbui* Soleglad et al., 2007, *Syntropis macrura* Kraepelin, 1900, and *Syntropis williamsi* Soleglad et al., 2007

Specimens are deposited in the following collections: American Museum of Natural History (AMNH), New York, Colección de Aracnología y Entomología del Centro de Investigaciones Biológicas del Noroeste (CAECIB), Baja California Sur, Mexico and Muséum d'Histoire Naturelle de Genéve (MNHG), Switzerland.

			S. aalbui	*S. macrura*		*S. williamsi*	
Type			Holotype				
Collection			MNHG	CAECIB		AMNH	
Number						[ARA 2825]	
Sex			♀	♂	♀	♂	♀
Carapace		length	8.4	5.6	8.0	8.7	9.2
		ant. width	4.4	4.3	4.5	4.7	4.8
		post. width	7.9	7.2	7.5	8.0	8.5
Pedipalp	femur	length	10.9	7.3	10.8	10.8	10.0
		width	1.8	1.3	1.8	1.9	2.1
	patella	length	11.2	7.7	11.0	11.5	11.2
		width	2.0	1.5	2.0	2.1	2.4
	chela	length	15.9	11.2	16.1	16.7	16.3
		manus width	2.3	1.8	2.4	3.0	3.1
		manus height	2.2	1.7	2.4	3.2	3.1
		fixed finger length	9.4	6.7	9.1	9.0	9.3
		mov. finger length	10.7	7.7	10.9	10.7	11.2
Leg II	coxa	length	3.7	2.3	3.5	3.3	3.6
Leg IV	coxa	length	7.5	4.8	7.1	6.7	7.5
Sternum		length	1.7	1.0	1.7	1.3	1.7
		width	2.2	1.3	2.0	1.8	2.2
Mesosoma	tergites	length	20.4	14.4	19.8	20.6	21.6
Metasoma		length	36.5	28.1	39.9	54.7	41.9
	segment I	length	5.0	3.8	5.2	7.3	5.7
		width	3.9	2.6	3.6	3.6	4.1
		height	3.4	2.1	3.0	2.9	3.5
	segment II	length	5.0	4.6	6.3	9.0	6.9
		width	3.4	2.3	3.1	3.4	3.5
		height	3.2	2.0	2.7	2.7	3.6
	segment III	length	6.4	5.0	7.1	9.9	7.4
		width	3.2	2.1	2.9	3.1	3.3
		height	3.0	2.1	2.6	2.7	3.1
	segment IV	length	8.7	6.5	9.4	12.5	9.8
		width	2.8	1.8	2.5	2.7	2.9
		height	2.9	1.7	2.6	2.7	2.9
	segment V	length	10.5	8.2	11.9	16.0	12.1
		width	2.8	1.7	2.2	2.6	2.9
		height	2.6	1.5	2.3	2.6	2.7
Telson		length	8.9	6.5	9.0	11.0	10.3
	vesicle	length	6.7	5.0	6.9	8.6	7.8
		width	3.1	1.9	2.8	3.0	4.1
		height	3.0	2.0	2.8	3.2	3.4
	aculeus	length	2.2	1.5	2.1	2.4	2.5
Total		length	74.2	54.6	76.7	95.0	83.0

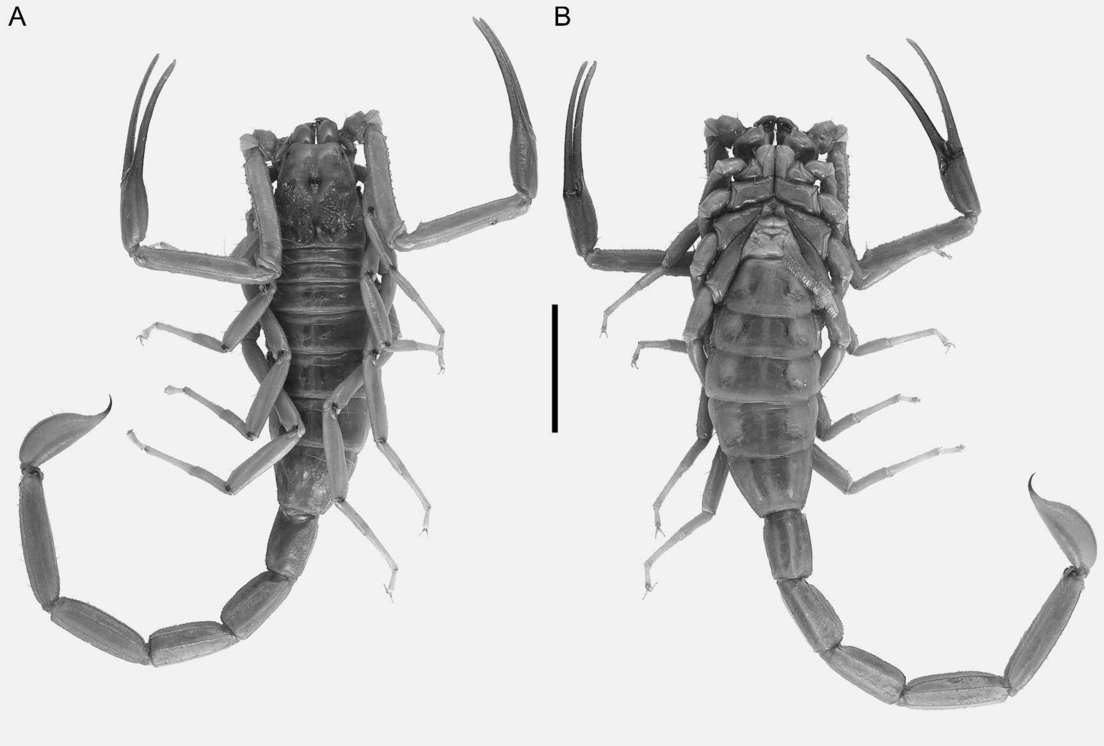

FIGURE 19. *Syntropis aalbui* Lowe et al., 2007, holotype ♀ (MHNG), habitus, **A.** dorsal and **B.** ventral aspects. Scale bar = 5 mm.

its eight prolateral denticles on the movable finger of the pedipalp chela. Although *Balsateres* González-Santillán and Prendini, 2013, and some *Thorellius* species occasionally exhibit eight prolateral denticles, the basal prolateral denticle is situated adjacent to the preceding prolateral denticle and up to three adjacent prolateral denticles are often observed, compared with *Syntropis*, in which the prolateral denticles are separate. Adult male *Syntropis* display a whitish glandular area between the ventral submedian carinae of mesosomal sternite VII, extending almost the entire length of the segment, which is reduced but still evident in females. The dorsal lateral and lateral median carinae of metasomal segments I–IV do not project posterolaterally in *Syntropis*, and the terminal granules of these carinae are not noticeably larger than the preceding granules, unlike most genera in the subfamily. Macrosetal counts on the leg basitarsi (23–28) and telotarsi (19–22) of *Syntropis* are greater than those on the basitarsi and telotarsi of other genera in the subfamily (e.g., 14–27 on the basitarsi and 14–17 on the telotarsi in *Chihuahuanus*; 16–21 on the basitarsi and 15–18 on the telotarsi in *Kochius*). *Syntropis* shares with *Kuarapu*, *Vizcaino,* and some species of *Paravaejovis* elongated pedipalp chela fingers and distally displaced trichobothria on the fixed finger, as a consequence of this elongation. However, the positions of trichobothria *ib* and *it* on the fixed finger, with respect to the prolateral denticles, differ among these genera as follows: *ib* and *it* are situated at the sixth prolateral denticle in *Syntropis*, whereas *ib* is situated at or closer to the sixth prolateral denticle and *it* is situated between the fifth and sixth prolateral denticles in *Kuarapu*, *Vizcaino,* and some species of *Paravaejovis*, such as *P. confusus* (Stahnke,

1940) and *P. waeringi* (Williams, 1970). *Syntropis* shares with *Konetontli*, *Kuarapu*, *Maaykuyak*, *Vizcaino*, *Chihuahuanus bilineatus*, *C. coahuilae*, and *Thorellius cristimanus* the presence of a secondary hook on the hemispermatophore, created by an extension of the axial carina of the distal lamina that forms a pronounced bifurcation with the primary hook.

Included Species: *Syntropis aalbui* Lowe et al., 2007; *Syntropis macrura* Kraepelin, 1900; *Syntropis williamsi* Soleglad et al., 2007.

Distribution: *Syntropis* is endemic to the Baja California Peninsula, Mexico, and recorded from the states of Baja California and Baja California Sur (fig. 3).

Ecology: *Syntropis* species have been collected in rocky desert habitats, from sea level to 556 m, with *S. aalbui* taken at the highest elevation. The three species of *Syntropis* inhabit the cracks and crevices of cliffs and rock walls, or hide in loose rock piles or under exfoliating rock flakes. The habitat and habitus, particularly the slender, elongated pedipalps, legs, and metasoma, well-developed superciliary carinae of the medial ocular tubercle, and the tarsal morphology are consistent with the lithophilous ecomorphotype (Prendini, 2001).

KEY TO IDENTIFICATION OF THE SPECIES OF *SYNTROPIS*

Pedipalp chela manus (♀), dorsal prolateral, ventral prosubmedian, and ventral prolateral carinae smooth; metasomal segment V, length 3.8 times greater than width (table 4); telson vesicle (♀), length 2.2 times greater than height............................*S. aalbui*

Pedipalp chela manus (♀), dorsal prolateral, ventral prosubmedian, and ventral prolateral carinae granular distally; metasomal segment V, length 4.3–4.9 times greater than width (table 4); telson vesicle (♀), length 3–3.4 times greater than height.......................2

Pedipalp chela fingers darker in proximal two-thirds, paler distally; chela manus ventral median carina bearing more than seven macrosetae; pedipalp patella retrolateral dorsosubmedian and retrolateral median carinae absent; metasomal segment V, length 7.2 times greater than width and height (table 4); telson vesicle (♂), length 4.6 times greater than width and 4.7 times greater than height...................................*S. macrura*

Pedipalp chela fingers uniform in color; chela manus ventral median carinae bearing fewer than five macrosetae; pedipalp patella retrolateral dorsosubmedian and retrolateral median carinae distinct and finely granular; metasomal segment V, length 5.9 times greater than width and 6 times greater than height (table 4); telson vesicle (♂), length 3.5 times greater than width and 3.4 times greater than than height..............*S. williamsi*

Syntropis aalbui Lowe, Soleglad, and Fet, 2007

Figures 3, 7A, C, 9A, D, 10D, 12D, 19–21; tables 2, 4

Syntropis macrura Kraepelin, 1900: Williams, 1980: 47; Lourenço, 2002: 140.

Syntropis aalbui Lowe et al. in Soleglad et al., 2007: 126–133, figs. 3, 16–23, 26, 27, 35, 36, tables I, II; Soleglad and Fet, 2008: 4, 27, 28, 46, 77, 92, figs. 27, 110, 139, tables 1, 9; González-Santillán and Prendini, 2013: 52, 53.

Type Material: **MEXICO: Baja California:** *Municipio de Ensenada*: Holotype ♀ (MHNG), Blue Palm Canyon [La Bocana Canyon], 5 km N Cataviña [29°46′34.64″N 114°43′32.48″W], 13.vii.1979, R. Aalbu.

Diagnosis: *Syntropis aalbui* may be separated from the other two species of the genus as follows. The pedipalp chela manus is smooth in *S. aalbui*, finely and sparsely granular distally, with granulation restricted to the dorsal prolateral, ventral prosubmedian, and ventral prolateral carinae, in *S. macrura*, and coarsely and densely granular distally, with granulation on the carinae extending to the intercarinal surfaces and the fixed finger, in *S. williamsi*. The macrosetal counts on the ventral lateral and ventral submedian carinae of metasomal segments I–V are higher in *S. aalbui*, with 3:4:5:6:13 and 5:6:6:7:4, respectively, than in *S. macrura* and *S. williamsi*, with 2:2:2:4:9 and 3:4:5:6:2, respectively. The length of metasomal segment V in the female is 3.8 times greater than its width in *S. aalbui*, 4.9 times greater in *S. macrura*, and 4.3 times greater in *S. williamsi* (table 4). The length of the telson vesicle of the female is 2.2 times greater than its height in *S. aalbui*, 3.4 times greater in *S. macrura*, and 3 times greater in *S. williamsi*. The ventral prosubmedian carina of the pedipalp chela manus bears four macrosetae in *S. aalbui*, but eight in *S. macrura*. The pedipalp chela fingers are uniform in color in *S. aalbui*, but darker in the proximal two-thirds, becoming paler distally, in *S. macrura*. The retrolateral dorsosubmedian and retrolateral median carinae of the pedipalp patella are absent in *S. aalbui*, but distinct and finely granular in *S. williamsi*.

Description: The following redescription, which is based on the holotype, supplements the original description by Soleglad et al. (2007).

Color and infuscation: Base color uniformly dark yellowish, except pedipalp chela fingers slightly reddish, genital operculum and pectines whitish, and aculeus brownish; immaculate, except carapace faintly infuscate.

Chelicerae: Manus, dorsal surface smooth, subdistal margin with one macroseta medially. Movable finger, ventral surface with serrula comprising 15/15 tines, in distal half.

Carapace: Length 1.1 times greater than posterior width (table 2). Anterior margin sublinear, without median notch, with three pairs of submarginal macrosetae (fig. 7A). Three pairs of lateral ocelli, anterolateral and median lateral pairs equal in size, posterolateral pair approximately half the size. Median ocular tubercle slightly raised, situated in anterior third of carapace, superciliary carinae smooth, slightly higher than median ocelli. Median ocelli approximately twice the size of anterolateral ocelli. Anteromedian and posterolateral sulci shallow; posteromedian sulcus deeper; posterior transverse sulcus obsolete. Interocular surface smooth; lateral and posteromedian surfaces shagreened, covered with predominantly coarse granules except on sulci, which are smooth.

Coxosternal region: Sternum subequilateral pentagonal; 1.2 times wider than long (table 2); median sulcus deep; ventral surfaces matte; with three pairs of macrosetae anteriorly, medially and posteriorly on lobes (fig. 7C). Coxa II, proximal margin smooth; subproximally with three oblique slitlike structures, adjacent to small, finely granular protuberance; coxal endite proximal margin with shallow depression, medial margin smooth. Coxa IV twice length of coxa II (table 2).

Pedipalps: Femur intercarinal surfaces matte (fig. 20A); dorsal prolateral, ventral prolateral, and dorsal retrolateral carinae complete, finely granular; retrolateral dorsosubmedian carina partial, comprising five large and several smaller granules, with six macrosetae becoming smaller distally; retrolateral ventral and ventral median carinae vestigial, reduced to row of spiniform granules at proximal margin; ventral retrosubmedian carina vestigial, reduced to several spiniform granules in proximal half; prolateral ventral carina complete, comprising discontinuous row of granules and five macrosetae medially; prolateral ventrosubmedian carina partial, comprising discontinuous row of granules and three minor macrosetae, gently curving dorsally; other carinae absent or obsolete. Patella 1.2 times wider than femur (tables 2, 4); intercarinal surfaces matte (fig. 20B–E); dorsal prolateral, dorsal retrolateral, ventral prolateral and ventral retrosubmedian carinae finely granular; ventral median carina vestigial, reduced to proximal row of granules; prolateral ventral carina vestigial, reduced to proximal tubercle and seven major and minor macrosetae; prolateral median carina partial, comprising proximal tubercle with associated macroseta and row of smaller granules with another macroseta, gently curving dorsally, and becoming obsolete distally; other carinae absent or obsolete. Chela 1.4 times longer than patella, 1.5 times longer than femur (tables 2, 4). Manus and fingers elongate and slender (fig. 21A–D); manus 1.2 times wider than patella, 1.3 times wider than femur; intercarinal surfaces smooth; prolateral median and prolateral ventrosubmedian carinae complete, finely granular; other carinae absent or obsolete. Fixed and movable fingers dentate margins sublinear, movable finger with very shallow lobe proximally; fixed finger median denticle row comprising six subrows flanked by six prolateral and seven retrolateral serrate denticles, retrolateral denticles slightly smaller than prolateral denticles; movable finger median denticle row comprising seven subrows, flanked by eight prolateral and seven retrolateral serrate denticles, proximal sixth and seventh prolateral denticles separated from subrows, terminal subrow comprising one median denticle; fingers each with whitish elevated glandular area terminally. Trichobothrial pattern orthobothriotaxic Type C; chela trichobothrium *Db* situated on dorsal retrolateral carina, subproximal on manus; *Dt* situated near midpoint of manus; *ib* and *it* situated at midpoint of fixed finger, near sixth prolateral denticle; *db–dt* and *eb–et* situated in distal two-thirds of fixed finger.

Legs: Basitarsi retrolateral dorsal and retrolateral ventral spinule rows complete, prolateral ventral and retrolateral median rows vestigial, reduced to few distal spinules, on legs I–III, spinule rows absent on IV; macrosetal counts on I–IV, respectively: dorsal, 3:3:3:3; retrolateral dorsal, 6:6:6:6; prolateral ventral, 9:9:9:9; retrolateral median, 0:0:1:1; retrolateral ventral, 9:9:12:12; dorsal and retrolateral dorsal macrosetae arranged in two separate rows on I–IV. Telotarsi I–IV, each with single ventromedian row of spinules, curved proximally, and two or three pairs of ventrodistal spinules (fig. 12D).

Genital operculum: Genital operculum wider than long (fig. 7C), with three pairs of macrosetae. Sclerites fused longitudinally. Genital papillae absent.

Hemispermatophore: Unknown.

Pectines: Basal piece with pairs of median and posterior macrosetae (fig. 7C). Marginal lamella comprising three sclerites. Medial lamella proximal five sclerites fused, 17 separate. Fulcra, 26. Pectinal teeth, 27. Pectines relatively long, third (distal) sclerite of marginal lamella aligned with midpoint of trochanter IV.

Tergites: Pretergites I–VII, surfaces smooth and glabrous. Posttergites I–VI, intercarinal surfaces smooth medially, sparsely and finely granular laterally (fig. 19A), dorsal median carinae smooth, costate, dorsal lateral carinae obsolete; VII, intercarinal surfaces finely granular medially, dorsal median carina partial, restricted to anterior third, granular, dorsal submedian carinae vestigial, reduced to anterior tubercle, dorsal lateral and lateral median carinae converging anteromedially, serrate, posterior granules enlarged.

Sternites: Sternites III–VI surfaces acarinate, smooth (fig. 19B), spiracles elongate, slitlike, length approximately twice width; VII, intercarinal surfaces smooth, with moderately developed hyaline glandular area, extending entire length of sternite, ventral submedian carinae obsolete, with two pairs of macrosetae, ventral lateral carinae costate anteriorly, becoming costate-granular posteriorly, with two pairs of macrosetae.

Metasoma: Metasoma 1.8 times longer than mesosoma (table 2). Segments I–V, respectively 1.3, 1.7, 2.0, 3.1, and 3.8 times longer than wide, decreasing in width posteriorly, especially on IV and V; V, 0.9 times wider than telson (tables 2, 4). Segments I–V intercarinal surfaces smooth (fig. 9A, D); dorsal lateral carinae complete, finely serrate on I–IV, granular, becoming obsolete posteriorly on V; lateral median carinae complete, finely serrate on I–IV, slightly lobate posteriorly on IV, partial, finely serrate, becoming obsolete posteriorly, on anterior half of V; lateral inframedian carinae, partial, discontinuous, serrate posteriorly on I, vestigial, reduced to few posterior granules on II, absent on III–V; ventral lateral carinae complete, serrate on I–V; ventral submedian carinae absent on I–V; ventral median carinae complete, costate on I and II, complete, costate to finely serrate on III and IV, complete, finely serrate on V. Macrosetal counts on carinae of I–V, respectively: dorsal lateral carinae, 0:1:2:3:11; lateral median carinae, 0:2:2:4:0; lateral inframedian carinae, 3:0:0:0:5; ventral lateral cari-

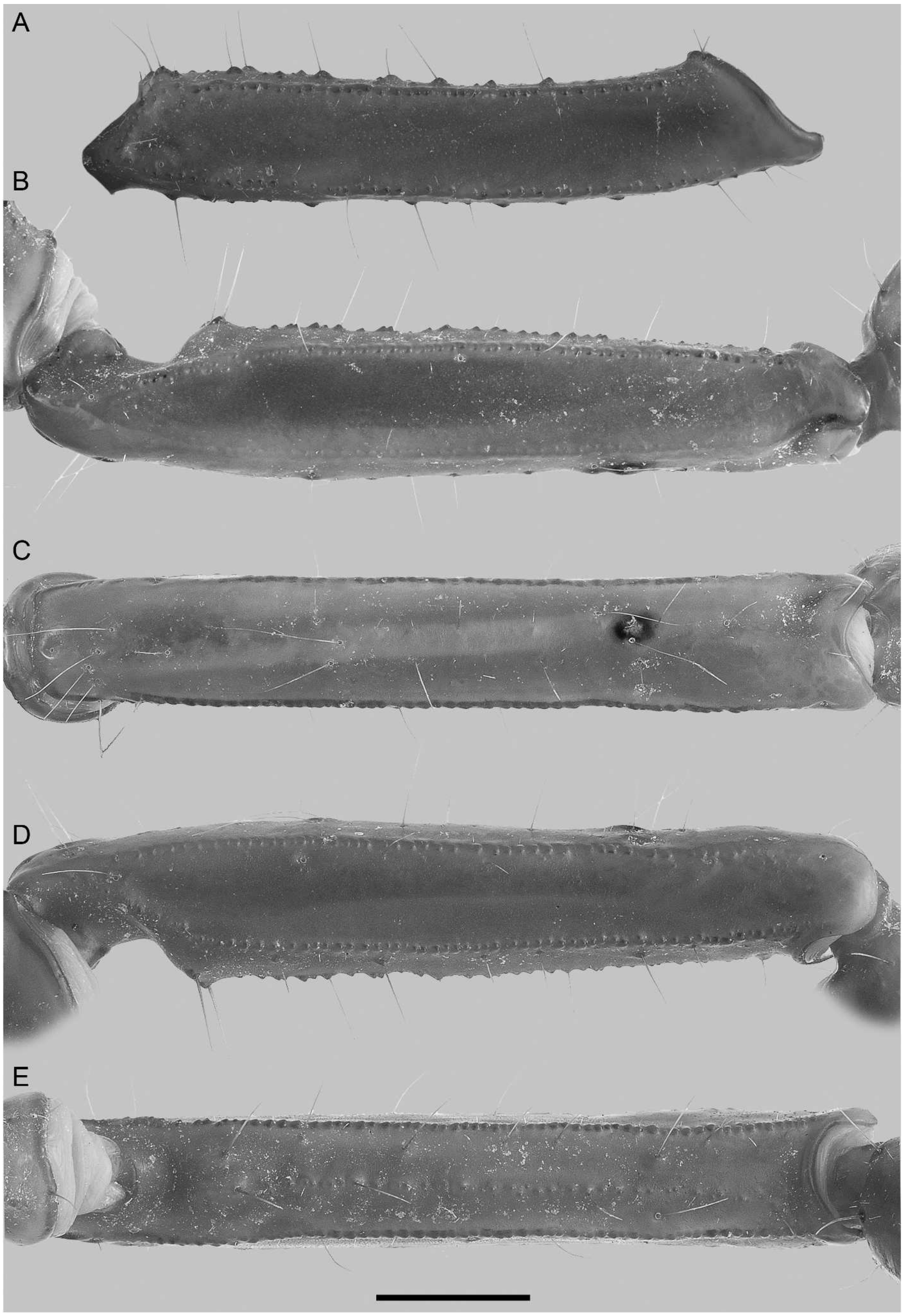

FIGURE 20. *Syntropis aalbui* Lowe et al., 2007, holotype ♀ (MHNG), dextral pedipalp femur (**A**) and patella (**B–E**). **A, B.** Dorsal aspect. **C.** Retrolateral aspect. **D.** Ventral aspect. **E.** Prolateral aspect. Scale bar = 1 mm.

FIGURE 21. *Syntropis aalbui* Lowe et al., 2007, holotype ♀ (MHNG), dextral pedipalp chela. **A.** Dorsal aspect. **B.** Retrolateral aspect. **C.** Ventral aspect. **D.** Prolateral aspect. Scale bar = 1 mm.

TABLE 3
Variation in selected measurements (mm) of *Syntropis macrura* Kraepelin, 1900, reported as means and standard deviations (SD) used for ratios in table 4
♂: *n* = 10, ♀: *n* = 9.

	Length		Width		Height	
	♂	♀	♂	♀	♂	♀
Metasomal segment I	6.09 (1.08)	4.80 (0.44)	3.03 (0.36)	3.31 (0.30)	2.70 (0.25)	2.78 (0.30)
Metasomal segment II	7.67 (1.35)	5.79 (0.53)	2.70 (0.27)	2.91 (0.26)	2.43 (0.21)	2.59 (0.24)
Metasomal segment III	8.57 (1.51)	6.48 (0.64)	2.46 (0.24)	2.70 (0.25)	2.28 (0.23)	2.48 (0.23)
Metasomal segment IV	11.19 (1.79)	8.49 (0.88)	2.25 (0.23)	2.39 (0.25)	2.16 (0.18)	2.36 (0.26)
Metasomal segment V	13.90 (2.17)	10.77 (1.15)	1.92 (0.21)	2.18 (0.20)	1.94 (0.18)	2.13 (0.26)
Telson vesicle	9.49 (1.55)	8.68 (1.50)	2.06 (0.23)	2.52 (0.25)	2.03 (0.24)	2.56 (0.24)
Pedipalp femur	10.06 (1.32)	9.63 (1.02)	1.74 (0.39)	1.72 (0.18)	-	
Pedipalp patella	10.41 (1.28)	10.10 (1.02)	1.78 (0.20)	1.92 (0.18)	-	
Pedipalp chela	14.77 (1.90)	14.61 (1.47)	2.39 (0.31)	2.26 (0.20)	-	

nae, 3:4:5:6:13; ventral sublateral carinae, 0:0:0:0:4; ventral submedian carinae, 5:6:6:7:4.

Telson: Vesicle relatively elongate; length 2.2 times greater than width, four times greater than aculeus length (tables 2, 4). Dorsal surface smooth and glabrous. Ventral surface smooth, acarinate; eight pairs of macrosetae demarcating positions of carinae; subaculear tubercle absent (fig. 10D). Aculeus short and curved; laterobasal microserration comprising 2–3 blunt tines.

Distribution: *Syntropis aalbui* is endemic to the state of Baja California, Mexico, and known only from the type locality, Blue Palm Canyon, in the vicinity of Cataviña in the Central Desert of the Baja California Peninsula.

Ecology: The type locality, named after the blue tree palm, *Brahea armata* S. Watson, which is common in the area, was incised by the La Bocana River, an episodic river draining from Aguatosa Mountain, an extinct volcano, to the Pacific coast at Puerto Canoas. The surrounding area is typical of the Central Baja California Desert, a subtype of the Sonoran Desert. The area is also known for the presence of rocky habitats where large boulders form "archipelagoes" among flat, sandy areas. As with other species of the genus, the habitat and habitus of *S. aalbui* are consistent with the lithophilous ecomorphotype (Prendini, 2001). Four other species were collected in sympatry at the locality: *Hadrurus concolor* Stahnke, 1969; *Hadrurus pinteri* Stahnke, 1969, *Paravaejovis schwenkmeyeri* (Williams, 1970), and *Serradigitus gertschi* (Williams, 1968).

Remarks: Several attempts by the first author to collect more material of *S. aalbui* at the type locality were unsuccessful.

Syntropis macrura Kraepelin, 1900

Figures 1, 3, 5C, 6C, 9B, E, 10E, 12E, 13G, H, 14D, 22–24; tables 2–4

Syntropis macrura Kraepelin, 1900: 270; Werner, 1934: 281; Gertsch, 1958: 14; Stahnke, 1965: 257–263, figs. 1, 2; Williams, 1969: 285, 290, 291 (part); Hjelle, 1974: 221–226, figs. 3, 5; Stahnke, 1974: 113; Vachon, 1974: 914, 916, figs. 140, 148–150; Díaz Nájera, 1975: 6, 12; Sissom and Francke, 1983: 69; Williams, 1980: 47, 48, figs. 49, 50, 108B (part); Due and Polis, 1986: 463, table 1; Sissom, 1993: 68; Kovařík, 1998: 146; Beutelspacher, 2000: 70, 136, 152, map 43 (part); Sissom, 2000: 526; Soleglad and Fet, 2003a: 6, fig. 7; 2003b: 8; Prendini and Wheeler, 2005: 451, 475,492, 493, fig. 24, table 3, 10; Fet et al., 2006a: 4, 7, table 1; Graham and Fet, 2006: 3; Soleglad and Fet, 2006: 6; Soleglad, et al., 2007: 119–123, 128–133, figs. 1, 24, 25, 31, 32, tables I, II; Soleglad and Fet, 2008: 4, 30,

TABLE 4

Selected ratios in *Syntropis aalbui* Lowe et al., 2007, *Syntropis macrura* Kraepelin, 1900, and *Syntropis williamsi* Soleglad et al., 2007, reported as means for samples with *n* >1.

		S. aalbui	*S. macrura*		*S. williamsi*	
sex		♀	♂	♀	♂	♀
n		1	10	9	2	3
Length/width	Metasomal segment I	1.3	2.0	1.5	2.0	1.5
	Metasomal segment II	1.7	2.8	2.0	2.6	2.0
	Metasomal segment III	2.0	3.5	2.4	3.1	2.3
	Metasomal segment IV	3.1	5.0	3.6	4.5	3.4
	Metasomal segment V	3.8	7.2	4.9	5.9	4.3
	Telson vesicle	2.2	4.6	2.5	3.5	2.9
	Pedipalp femur	6.1	5.8	5.6	5.7	5.0
	Pedipalp patella	5.6	5.9	5.3	5.4	5.6
	Pedipalp chela	6.9	6.2	6.5	5.4	5.7
Length/height	Metasomal segment I	1.5	2.3	1.7	2.4	1.7
	Metasomal segment II	1.8	3.2	2.2	3.8	2.1
	Metasomal segment III	2.1	3.8	2.6	3.6	2.4
	Metasomal segment IV	3.0	5.2	3.6	4.6	3.4
	Metasomal segment V	4.0	7.2	5.0	6.0	4.4
	Telson vesicle	2.2	4.7	3.4	3.4	3.0

32, 38, 39, 77, 82, 92, figs. 53, 82, 181, table 9; Kamenz and Prendini, 2008: 28, pl. 93; McWest, 2009: 19, 48, 51, 116, figs. 119–123, table 1; Ross, 2009: 532, table 1; Jiménez-Jiménez and Palacios-Cardiel, 2010: 72, 73, table 1; González-Santillán and Prendini, 2013: 51–53, figs. 1, 23, 24; 2015b: 6.

TYPE MATERIAL: **MEXICO:** Holotype ♂ (MNHN), “Lower California,” L. Diguet.

DIAGNOSIS: *Syntropis macrura* may be separated from the other two species of the genus as follows. The pedipalp chela manus is finely and sparsely granular distally, with granulation restricted to the dorsal prolateral, ventral prosubmedian, and ventral prolateral carinae, in *S. macrura*, coarsely and densely granular distally, with granulation on the carinae extending to the intercarinal surfaces and the fixed finger, in *S. williamsi*, and smooth in *S. aalbui*. The length of metasomal segment V in the female is 4.9 times greater than its width in *S. macrura*, 3.8 times greater in *S. aalbui*, and 4.3 times greater in *S. williamsi* (table 4). The length of the telson vesicle of the female is 3.4 times greater than its height in *S. macrura*, 2.2 times greater in *S. aalbui*, and 3 times greater in *S. williamsi*. The ventral prosubmedian carina of the pedipalp chela manus bears eight macrosetae in *S. macrura*, but four in *S. aalbui* and *S. williamsi*. The macrosetal counts on the ventral lateral and ventral submedian carinae of metasomal segments I–V are lower in *S. macrura*, with 2:2:2:4:9 and 3:4:5:6:2, respectively, than in *S. aalbui*, with 3:4:5:6:13 and 5:6:6:7:4, respectively. The pedipalp chela fingers are darker in the proximal two-thirds, becoming paler distally, in *S. macrura*, but uniform in color in *S. williamsi*. The retrolateral dorsosubmedian and retrolateral median carinae of the pedipalp patella are absent in *S. macrura*, but distinct and finely granular in *S. williamsi*. The pectinal tooth counts of *S. macrura* are higher, with 28–32 in the male and 27–31 in the female, than those of *S. williamsi*, with 25–27 in the male and 24–26 in the female. The dorsomedian surface of the telson vesicle is slightly concave in *S. macrura*, but level in *S. williamsi*.

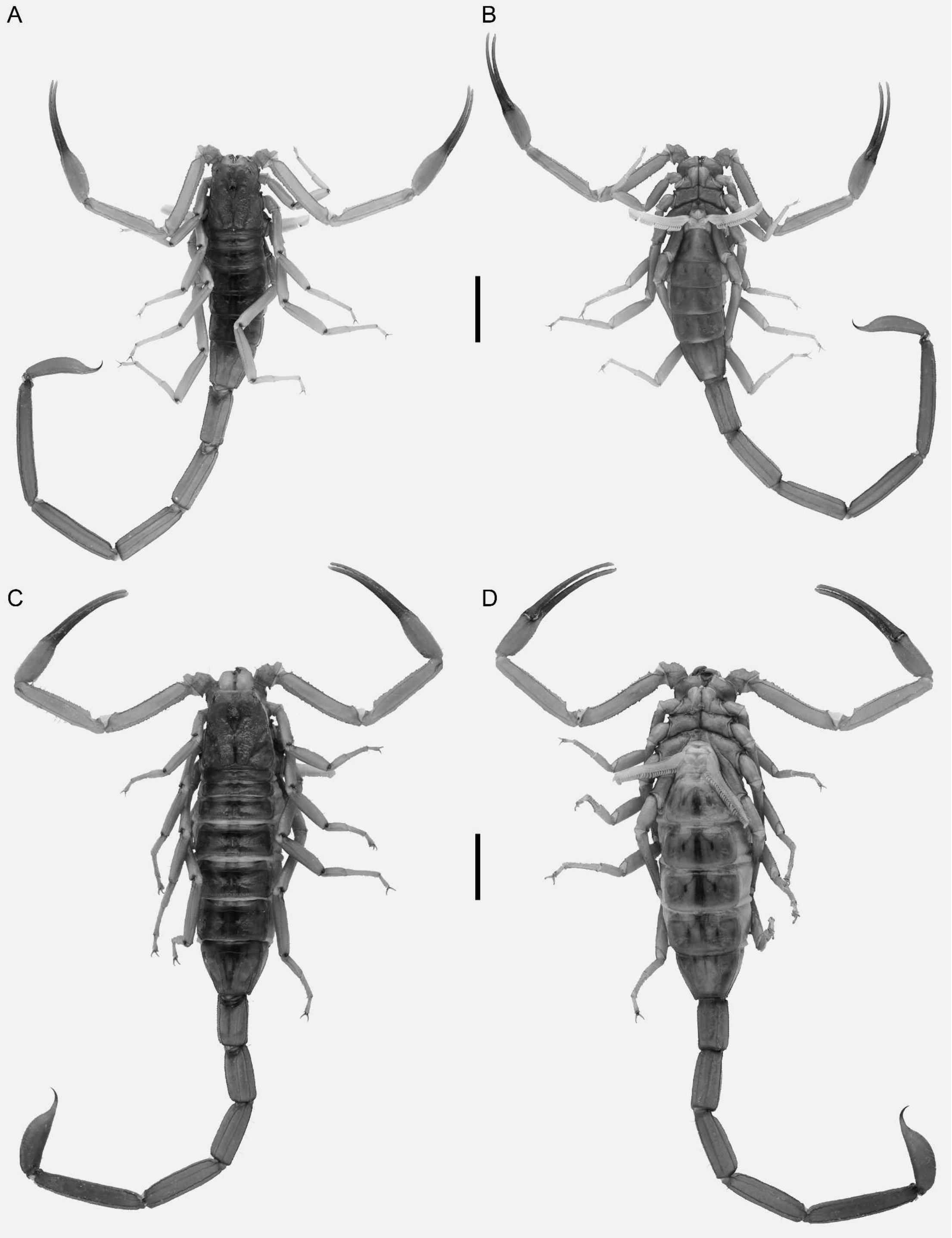

FIGURE 22. *Syntropis macrura* Kraepelin, 1900, habitus, dorsal (**A, C**) and ventral (**B, D**) aspects. **A, B.** ♂ (CAECIB). **C, D.** ♀ (CAECIB). Scale bars = 1 mm.

Description: The following redescription, which is based on the additional material examined, supplements the redescriptions by Williams (1980) and Soleglad et al. (2007).

Color and infuscation: Base color uniformly dark yellowish to brownish except pedipalp chela fingers dark reddish to brownish in proximal two-thirds, becoming paler distally, pedipalp patella, femur, and legs slightly paler, genital operculum and pectines whitish, and aculeus brownish; immaculate, except carapace faintly infuscate.

Chelicerae: Manus, dorsal surface smooth, subdistal margin with one macroseta medially. Movable finger, ventral surface with serrula comprising 18/18 tines, in distal half.

Carapace: Length 1.2 times greater than posterior width (table 2). Anterior margin shallowly emarginate, without median notch, with three pairs of submarginal macrosetae (fig. 5C). Three pairs of lateral ocelli, anterolateral and median lateral pairs equal in size, posterolateral pair approximately half the size. Median ocular tubercle slightly raised, situated in anterior half of carapace, superciliary carinae smooth, slightly higher than median ocelli. Median ocelli approximately twice the size of anterolateral ocelli. Anteromedian sulcus shallow and broad; posteromedian sulcus deeper; posterolateral sulci shallow; posterior transverse sulcus obsolete. Interocular surface smooth; lateral and posteromedian surfaces shagreened, covered with predominantly coarse granules except on sulci, which are smooth.

Coxosternal region: Sternum subequilateral pentagonal; 1.1 times wider than long (table 2); median sulcus deep; ventral surfaces matte; with three pairs of macrosetae anteriorly, medially and posteriorly on lobes (fig. 6C). Coxa II, proximal margin smooth; subproximally with three oblique slitlike structures, adjacent to moderate, finely granular protuberance; coxal endite proximal margin with shallow depression, smooth medially. Coxa IV 2.1 times longer than coxa II (table 2).

Pedipalps: Femur intercarinal surfaces matte, sparsely and finely granular (fig. 23A); dorsal prolateral, ventral prolateral, and dorsal retrolateral carinae complete, finely granular; retrolateral dorsosubmedian carina partial, comprising five large and several smaller granules, with four macrosetae; retrolateral ventral and ventral retrosubmedian carinae vestigial, reduced to several spiniform granules proximally; ventral median carina vestigial, reduced to row of spiniform granules at proximal margin; prolateral ventral carina complete, comprising discontinuous row of granules and five macrosetae; prolateral ventrosubmedian carina partial, reduced to few granules and three minor macrosetae in proximal half; other carinae absent or obsolete. Patella 1.1 times wider than femur (tables 2–4); intercarinal surfaces matte, sparsely and finely granular (fig. 23B–E); dorsal prolateral, dorsal retrolateral, ventral prolateral and ventral retrolateral carinae granular to serrate; ventral median carina vestigial, reduced to proximal row of granules; prolateral ventral carina vestigial, reduced to proximal tubercle and seven major and minor macrosetae; prolateral median carina partial, comprising proximal tubercle with associated macroseta and row of smaller granules, with five major and minor macrosetae, gently curving dorsally, and becoming obsolete distally; other carinae absent or obsolete. Chela 1.5 times longer than patella and femur (tables 2–4). Manus and fingers elongate and slender (fig. 24); manus 1.2 times wider than patella, 1.3 times wider than femur; dorsal and prolateral intercarinal surfaces finely granular in distal half, ventral and retrolateral surfaces smooth; dorsal prolateral, prolateral median, and ventral prolateral carinae partial, finely granular in distal half, ventral retrolateral carina complete, finely granular; other carinae absent or obsolete. Fixed and movable fingers dentate margins respectively with shallow notch and lobe, proximally, creating gap when fingers closed (♂) or sublinear, movable finger with shallow lobe proximally (♀); fixed finger median denticle row comprising six subrows flanked by six prolateral and retrolateral serrate denticles, retrolateral denticles slightly smaller than prolateral denticles; movable finger median denticle row comprising seven subrows, flanked by eight prolateral and seven retrolateral serrate denticles, dis-

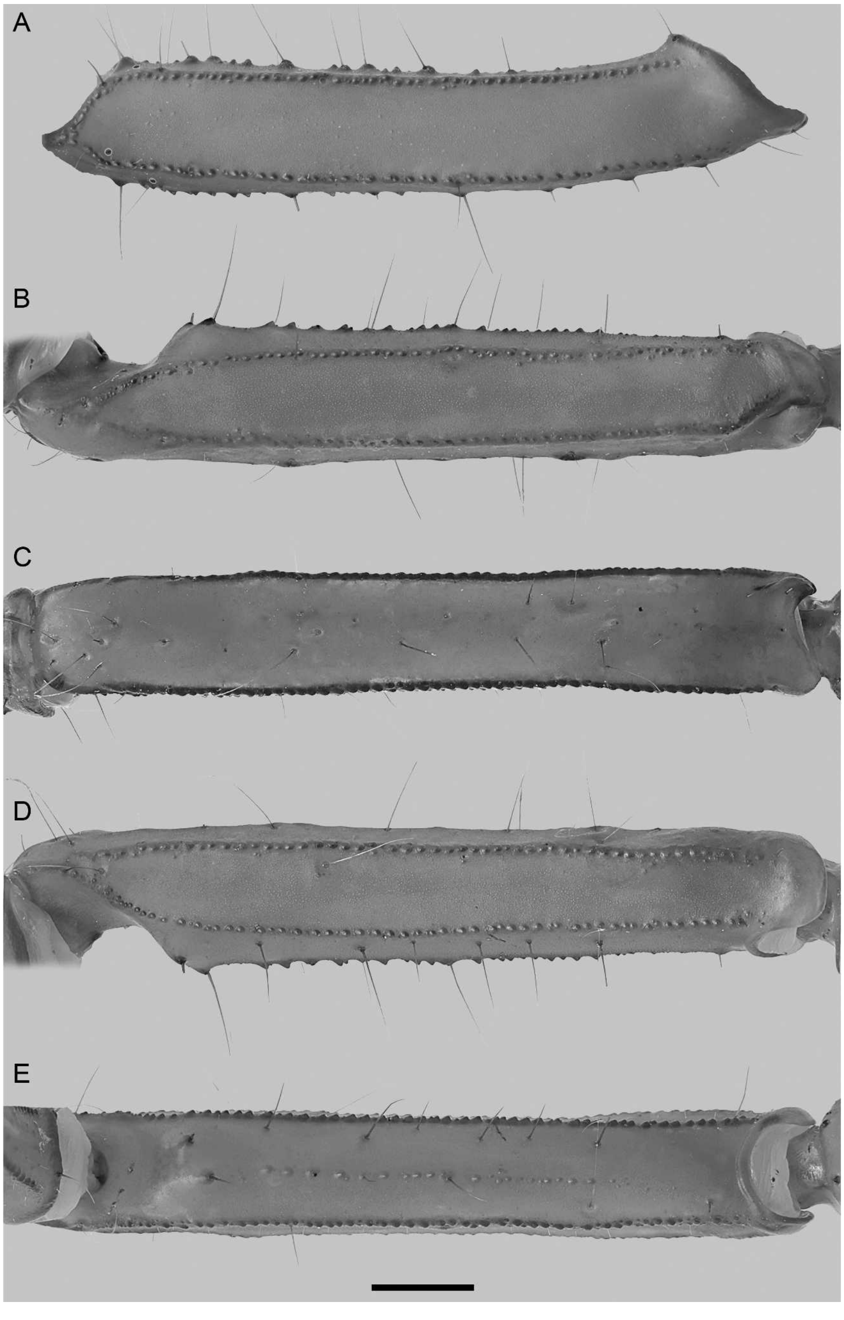

FIGURE 23. *Syntropis macrura* Kraepelin, 1900, ♂ (CAECIB), dextral pedipalp femur (**A**) and patella (**B–E**). **A, B.** Dorsal aspect. **C.** Retrolateral aspect. **D.** Ventral aspect. **E.** Prolateral aspect. Scale bar = 1 mm.

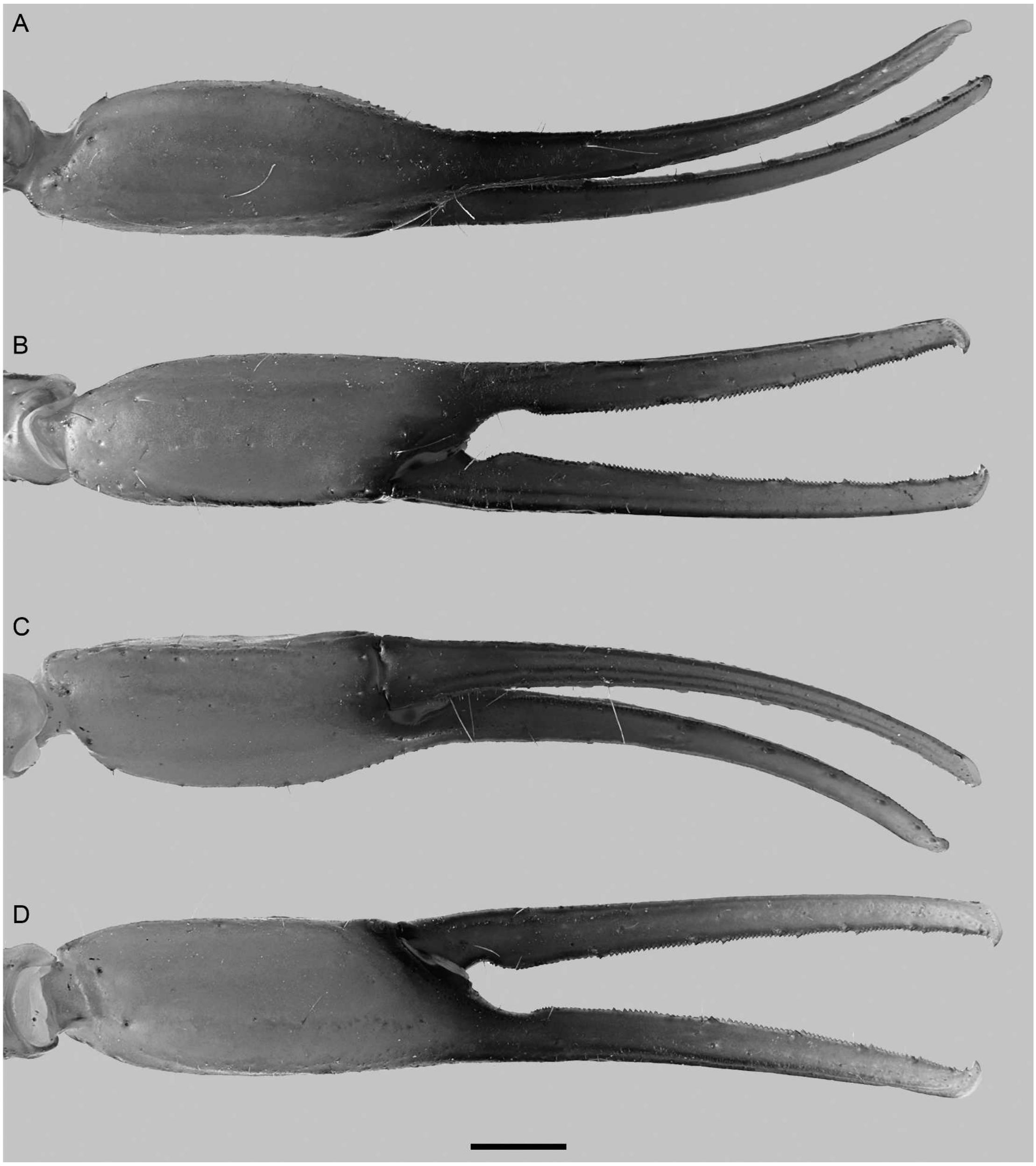

FIGURE 24. *Syntropis macrura* Kraepelin, 1900, ♂ (CAECIB), dextral pedipalp chela. **A.** Dorsal aspect. **B.** Retrolateral aspect. **C.** Ventral aspect. **D.** Prolateral aspect. Scale bar = 1 mm.

tal five prolateral and retrolateral denticles subpaired, proximal sixth and seventh prolateral denticles separated from subrows, terminal subrow comprising one median denticle; fingers each with whitish elevated glandular area terminally. Trichobothrial pattern orthobothriotaxic Type C; chela trichobothrium *Db* situated on dorsal retrolateral carina, subproximal on manus; *Dt* situated near midpoint of manus; *ib* and *it* situated at midpoint of fixed finger, near sixth prolateral denticle;

db–dt and *eb–et* situated in distal two-thirds of fixed finger.

Legs: Basitarsi prolateral ventral, retrolateral dorsal and retrolateral ventral spinule rows complete on I–III, absent on IV; retrolateral median row vestigial, reduced to few distal spinules on I–IV; macrosetal counts on I–IV, respectively: dorsal, 3:3:3:3; retrolateral dorsal, 6:6:6:6; prolateral ventral, 9:9:9:9; retrolateral median, 0:0:1:1 retrolateral ventral, 9:9:12:12; dorsal and retrolateral dorsal macrosetae arranged in two separate rows on I–IV. Telotarsi I–IV, each with single ventromedian row of spinules, curved proximally, and two or three pairs of ventrodistal spinules (fig. 12E).

Genital operculum: Genital operculum wider than long (fig. 6C), with four (♂) or three (♀) pairs of macrosetae. Sclerites free at posterior margin, but unable to open more than 45° (♂) or fused longitudinally (♀). Genital papillae present, protruding posteriorly (♂) or absent (♀).

Hemispermatophore: Lamina 1.1 times longer than trunk (table 5). Median lobe, ental terminus moderate and rounded. Dorsal trough margin long, narrow, curving proximally, well separated from ventral trough (fig. 13G). Dorsal and ventral trough margins, terminal spinelike processes fused into prominent, bifurcate hook with deep notch, situated distally on lamina dorsal margin (figs. 13H, 14D). Inner lobe, basal plate situated adjacent to ventral trough. Hemimating plug developed from inner lobe; distal barb 0.6 times longer than basal plate (table 5); distal barb margin with ca. 15 spinules interconnected by thin cuticular membrane throughout most of length.

Pectines: Basal piece with single pair of macrosetae posteromedially (fig. 6C). Marginal lamella comprising three sclerites. Medial lamella proximal five sclerites fused, 17–20 separate. Fulcra, 27–31 (♂), 26–30 (♀). Pectinal teeth, 28–32 (♂), 27–31 (♀). Pectines relatively long, third (distal) sclerite of marginal lamella aligned with midpoint of trochanter IV.

Tergites: Pretergites I–VII, surfaces smooth and glabrous. Posttergites I–VI, intercarinal surfaces smooth medially, sparsely and finely granular laterally (fig. 22A, C), dorsal median carinae smooth, costate, lateral carinae obsolete; VII, intercarinal surfaces finely granular medially, dorsal median carina partial, restricted to anterior third, granular, dorsal submedian carinae vestigial, reduced to anterior tubercle, dorsal lateral and lateral median carinae converging anteromedially, serrate, posterior granules enlarged.

Sternites: Sternites III–VI surfaces acarinate, smooth, and glabrous (fig. 22B, D), spiracles elongate, slitlike, approximately three times longer than wide; V and VI with (♂) or without (♀) moderately developed, whitish hyaline glandular area posteromedially, contrasting with darker base color; VII, intercarinal surfaces smooth, with well-developed hyaline glandular area, extending entire length of sternite, less developed in ♀, ventral submedian carinae obsolete, with two pairs of macrosetae, ventral lateral carinae finely serrate, each with eight pairs of macrosetae.

Metasoma: Metasoma twice length of mesosoma (table 2). Segments I–V, respectively 1.4, 2.0, 2.5, 3.8, 5.4 times longer than wide, decreasing in width posteriorly, especially on IV and V; V, 0.8 times wider than telson (tables 2–4). Segments I–V intercarinal surfaces smooth (figs. 9B, E); dorsal lateral carinae complete, serrate on I–IV, granular, becoming obsolete posteriorly on V; lateral median carinae complete, finely serrate on I–IV, slightly lobate posteriorly on IV, partial, finely serrate, becoming obsolete posteriorly, in anterior half of V; lateral inframedian carinae, partial, discontinuous, serrate in posterior half on I, vestigial, reduced to few posterior granules on II, absent on III–V; ventral lateral carinae complete, serrate on I–V; ventral submedian carinae absent on I–V; ventral median carinae complete, costate on I and II, serrate on III–V. Macrosetal counts on carinae of I–V, respectively: dorsal lateral carinae, 0:1:2:3:11; lateral median carinae, 0:2:2:4:0; lateral inframedian carinae, 3:0:0:0:10; ventral lateral carinae, 3:4:5:6:13; ventral sublateral carinae, 0:0:0:0:4; ventral submedian carinae, 5:6:6:7:4.

Telson: Vesicle elongate; length 4.6 times greater than width, 4.3 times greater than aculeus length (tables 2–4). Dorsal surface smooth and glabrous, slightly concave dorsomedially. Ventral surface smooth, acarinate; eight pairs of macrosetae demarcating positions of carinae; subaculear tubercle absent (fig. 10E). Aculeus short and curved; laterobasal microserration comprising 5–8 sharp tines.

Distribution: *Syntropis macrura* is endemic to Baja California Sur, Mexico. Beutelspacher (2000) erroneously listed the occurrence of *S. macrura* in Baja California and the United States (Sissom, 2000; Soleglad et al., 2007). The known locality records of *S. macrura* are situated in the Sierra de la Giganta of the Baja California Peninsula and on the island of El Carmen in the Sea of Cortez. Williams (1980) reported the distribution of *S. macrura* on the Peninsula as the area between San Ignacio and Los Aripes near La Paz whereas Soleglad et al. (2007) restricted it to the area between San Ignacio and San Miguel de Comondú, including the Sierra Guadalupe and Sierra de la Giganta.

Ecology: As with other species of the genus, the habitat and habitus of *S. macrura* are consistent with the lithophilous ecomorphotype (Prendini, 2001). Most personally collected specimens were captured on the surface of volcanic rock outcrops with UV light detection at night. However, specimens from the Comondús reported by Williams (1980) and Jiménez-Jiménez and Palacios-Cardiel (2010), and in the present contribution, were collected in old rock walls of houses and along roads, suggesting that *S. macrura* is synanthropic in this area. Population densities of *S. macrura* appear to be greater at such oases, perhaps due to a greater abundance of prey. Jiménez-Jiménez and Palacios-Cardiel (2010) also reported capturing *S. macrura* in pitfall traps in the Comondús and the vicinities of San Isidro and La Purisima, indicating that these scorpions will disperse across softer substrata between rocky outcrops. Hjelle (1974) described the life history of *S. macrura*, including the parturition and postparturition behavior of a gravid female collected on El Carmen Island, and reported similarities with other vaejovid scorpions, e.g., stilting posture during parturition, similar gestation time and average brood size, and the nonrandom, longitudinal orientation of first instars on the tergites of the mother. According to Hjelle (1974), the time to the first molt in *S. macrura* is similar to that in species of *Hadrurus* Thorell, 1876, which is noteworthy because, despite morphological and ecological disparity, these two genera resemble one another in their relatively large body size.

Remarks: The suggestion by Soleglad et al. (2007) that adults of *S. macrura* can reach lengths of ca. 100 mm requires confirmation. None of the more than 20 adult males and females examined for the present contribution exceeded 80 mm, except for a single female from El Carmen Island (total length, 88.2 mm). Although distinctly larger than the females from the Baja California Peninsula examined (total length of largest female, 76.7 mm), this specimen was not found to differ in other respects.

Additional Material Examined: **MEXICO: Baja California Sur:** *Municipio de Comondú*: La Purísima, 26°12′03″N 112°02′54″W, x.2002, C. Palacios, 1 ♂, 2 ♀ (CAECIB), 14.xii.2002, I.G. Nieto, collected at night with UV light, 1 ♂ (CAECIB); San Isidro, La Purísima [26°12.229′N 112°2.779′W], 24.xi.2002, mesic vegetation, pitfall trap, 1 ♂, 1 ♀ (CAECIB), 26.viii.2003, C. Palacios, mesic vegetation, pitfall trap, 1 ♀ (CAECIB), 11.x.2003, I.G. Nieto, xerophyte vegetation, pitfall trap, 1 ♂, 1 ♀ (CAECIB); San José de Comondú, 11.x.2003, M. Correa, 1 ♂ (CAECIB), 29.x.2003, C.M. Jiménez, 1 ♂ (CAECIB), 31.x.2003, Eva, 1 ♂ (CAECIB), 26°03.542′N 111°48.985′W, 7.vii.2005, L. Prendini, R.J. Mercurio, E. González, and W.E. Savary, collected at night with UV light, 3 juv. ♂ (AMCC [LP 4729]), 26°03′34″N 111°49′13″W, 27.viii.2006, C. Palacios, 1 ♂ (CAECIB); San José de Comondú, Arroyo, 26.viii.2003, I.G. Nieto, mesophyte vegetation, pitfall trap, 1 ♂, 1 ♀ (CAECIB), 27.viii.2003, C. Palacios, mesic vegetation, pitfall trap, 1 ♂ (CAECIB); San José de Comondú, 12 km N, 26°08.729′N 111°47.326′W, 504 m, 8.vii.2008, H. Montaño and E. González, rocky area, scrub-thorn vegetation, disturbed by cattle, collected at night with UV light, 1 ♀ (AMCC [LP 8708]); San José de Comondú, 30 km N, between Rosarito and San Isidro, 26°21.252′N 111°50.109′W, 258 m, 27.vi.2008, H. Montaño and E. González, bottom of canyon, boulders and cliffs, sandy area, thorny vegetation, collected at night with UV light, 1 ♀ (AMNH [ARA 2824]), 1 ♀ (AMCC [LP 8709]); San Miguel de Comondú, 26°02′26.7″N 111°49′55.3″W, 220 m, 12.vii.2004, O.F. Francke, W.E. Savary, E. González and A. Valdez, collected at night with UV light, 1 ♂, 1 ♀, 3 juv. (AMNH [ARA 3813]), 3 juv. (AMCC [LP 3146]), 3 juv. (CNAN SC3876 [ARA 2207]); San Miguel de Comondú, 2 km SW, 26°00′18.5″N 111°52′01.3″W, 169 m, 12.vii.2004, collected at night with UV light, E. González, O.F. Francke, W.E. Savary, and A. Valdez, collected at night with UV light, 1 juv. (AMNH), 2 juv. (AMNH [ARA 3081]), 1 juv. (CNAN SC3877 [ARA 2283]). *Municipio de Loreto*: El Carmen Island, Ensenada el Marquez, 25°51′51.84″N 111°13′12.16″W, 60 m, 17.v.1982, W.D. Sissom, 1 ♀ (WDS). *Municipio de Mulegé*: Microwave Station San Lucas, ca. 5 km SW of Santa Rosalia, 185 m, 5.vii.2005, 27°11.550′N 112°14.150′W, W.E. Savary and R.J. Mercurio, collected at night with UV light, 1 ♀ (AMNH [ARA 3810]), 6 juv. (AMCC [LP 5149]); San Ignacio, 3 km S on road to La Laguna, 27°16.533′N 112°53.366′W, 167 m, 12.vii.2005, E. González, W.E. Savary, L. Prendini, and R.J. Mercurio, collected at night with UV light, 1 juv. (AMCC [LP 4736]).

Syntropis williamsi Soleglad, Lowe, and Fet, 2007

Figures 1, 3, 7B, D, 9C, F, 10F, 12F, 13I, J, 14E, 25–27; tables 2–4

Syntropis williamsi Soleglad, Lowe, and Fet, 2007: 121–126, 128–133, figs. 2, 4–15, 28–30, 33, 34, tables I, II; Soleglad and Fet, 2008: 4, 45, 46, 50, 77, 92, figs. 10, 106, 151, 180, tables 3, 9; González-Santillán and Prendini, 2013: 52, 53, figs. 2, 8, 12–14.

Type Material: **MEXICO: Baja California Sur:** *Municipio de La Paz*: subad. ♀ holotype, subad. ♂ paratype, 2 subad. ♀ paratypes (MHNG), Los Aripes, N of, 25.vi.1985, W.R. Lourenço and G.A. Polis.

Diagnosis: *Syntropis williamsi* may be separated from the other two species of the genus as follows. The pedipalp chela manus is coarsely and densely granular distally, with granulation on the dorsal prolateral, ventral prosubmedian, and ventral prolateral carinae extending to the intercarinal surfaces and the fixed finger, in *S. williamsi*, finely and sparsely granular distally, with granulation restricted to the carinae, in *S. macrura*, and smooth in *S. aalbui*. The retrolateral dorsosubmedian and retrolateral median carinae of the pedipalp patella are distinct and finely granular in *S. williamsi*, but absent in *S. aalbui* and *S. macrura*. The length of metasomal segment V in the female is 4.3 times greater than its width in *S. williamsi*, 3.8 times greater in *S. aalbui*, and 4.9 times greater in *S. macrura* (table 4). The length of the telson vesicle of the female is 3 times greater than its height in *S. williamsi*, 2.2 times greater in *S. aalbui*, and 3.4 times greater in *S. macrura*. The macrosetal counts on the ventral lateral and ventral submedian carinae of metasomal segments I–V are lower in *S. williamsi*, with 2:2:2:4:9 and 3:4:5:6:2, respectively, than in *S. aalbui*, with 3:4:5:6:13 and 5:6:6:7:4, respectively. The ventral prosubmedian carina of the pedipalp chela manus bears four macrosetae in *S. williamsi*, but eight in *S. macrura*. The pedipalp chela fingers are uniform in color in *S. williamsi*, but darker in the proximal two-thirds, becoming paler distally, in *S. macrura*. The pectinal tooth counts of *S. williamsi* are lower, with 25–27 in the male and 24–26 in the female, than those of *S. macrura*, with 28–32 in the male and 27–31 in the female. The dorsomedian surface of the telson vesicle is level in *S. williamsi*, but slightly concave in *S. macrura*.

Description: The following redescription, which is based on the type material and additional material examined, supplements the original description by Soleglad et al. (2007). These

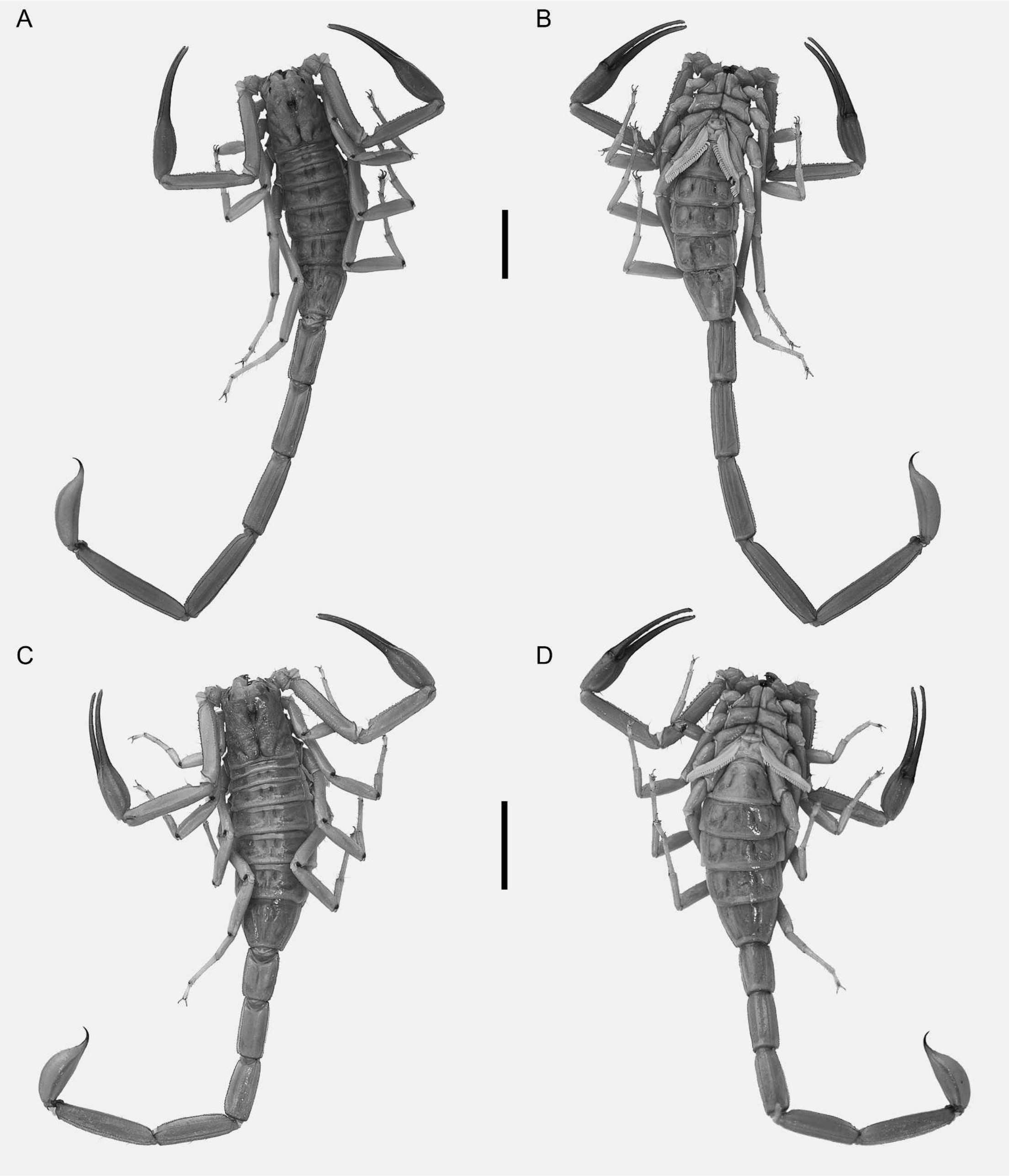

FIGURE 25. *Syntropis williamsi* Soleglad et al., 2007, habitus, dorsal (**A, C**) and ventral (**B, D**) aspects. **A, B.** ♂ (AMNH [ARA 2825]). **C, D.** ♀ (AMNH [ARA 2825]). Scale bars = 10 mm.

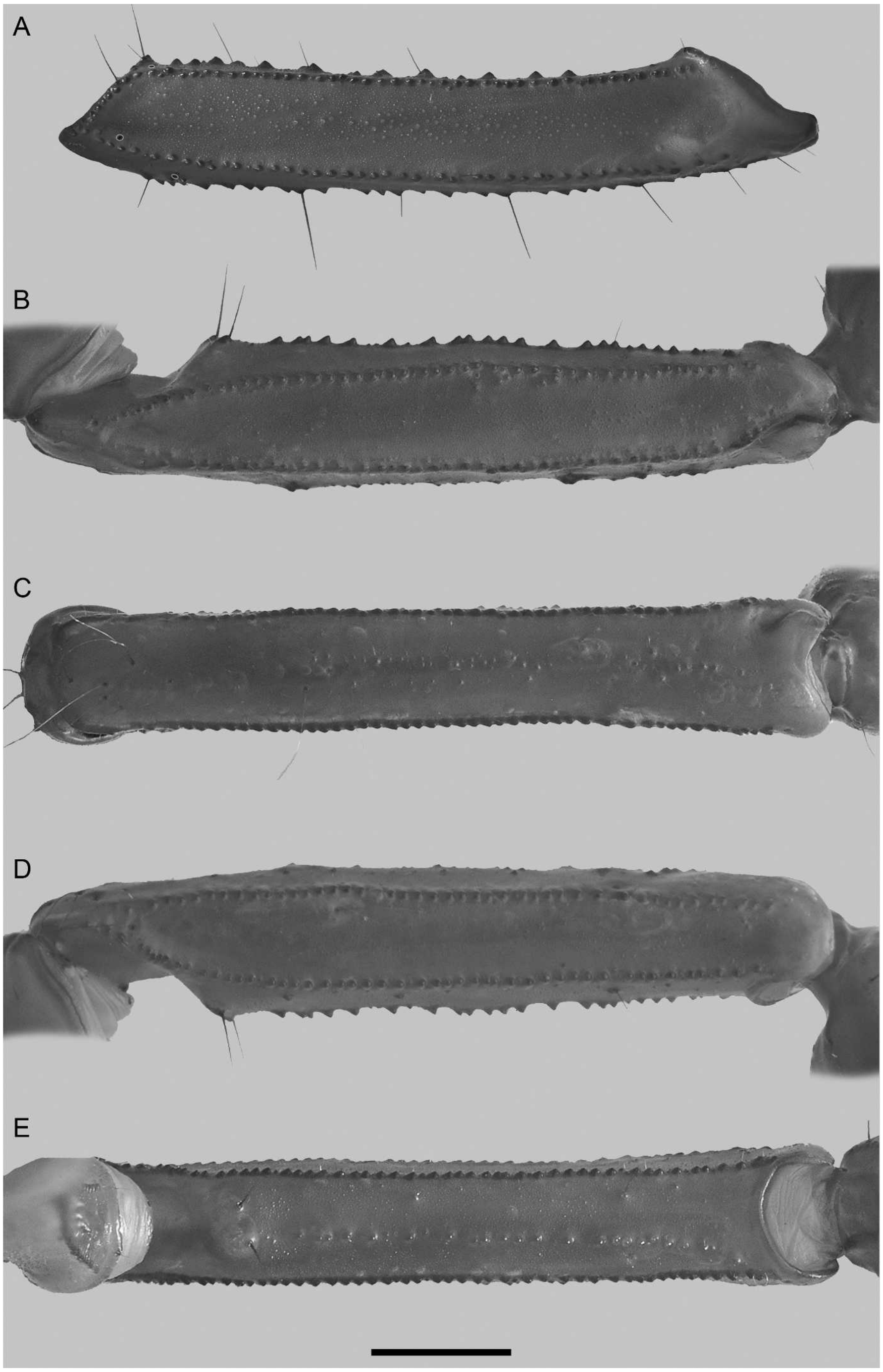

FIGURE 26. *Syntropis williamsi* Soleglad et al., 2007, ♂ (AMNH [ARA 2825]), dextral pedipalp femur (**A**) and patella (**B–E**). **A, B.** Dorsal aspect. **C.** Retrolateral aspect. **D.** Ventral aspect. **E.** Prolateral aspect. Scale bar = 2 mm.

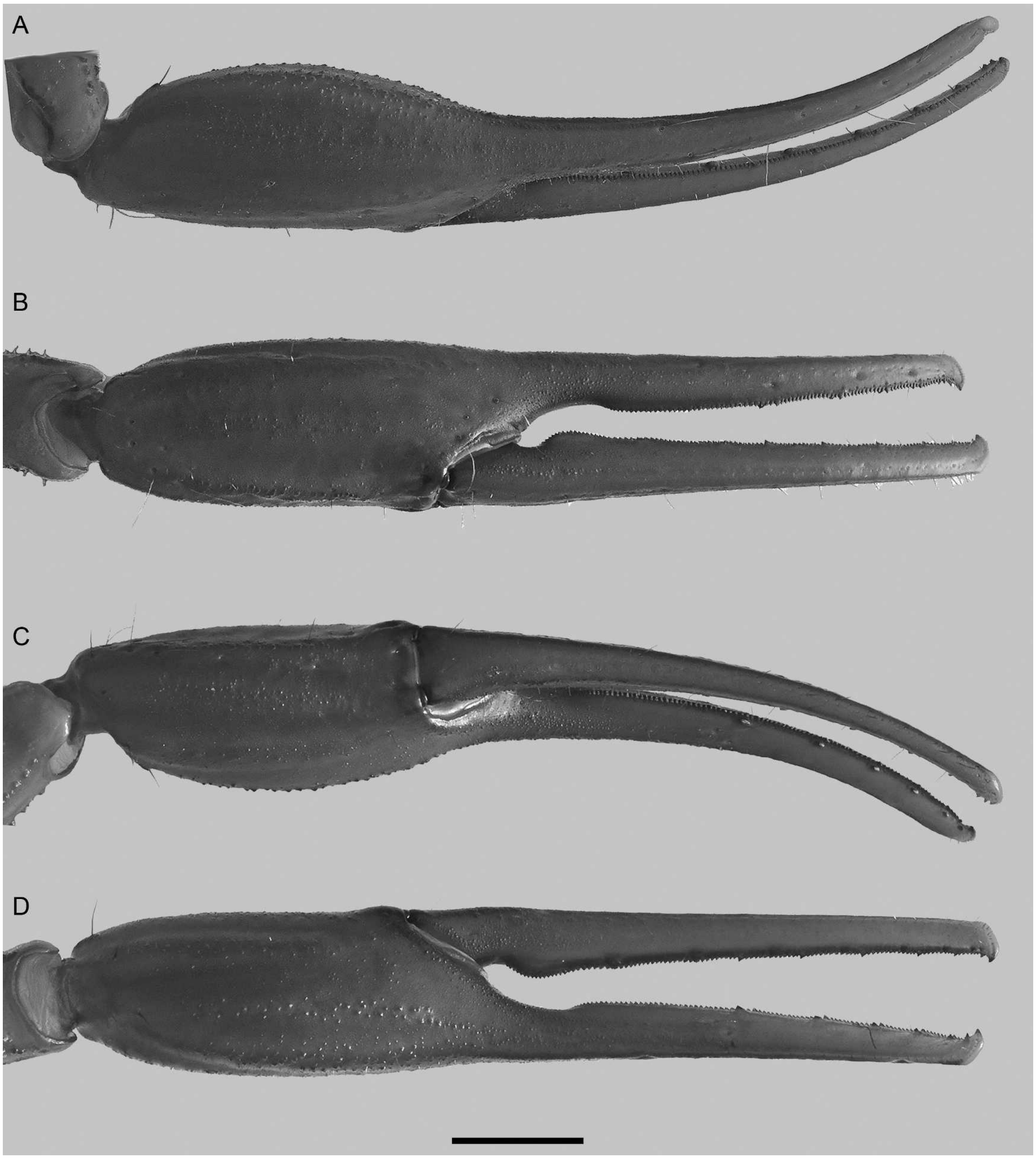

FIGURE 27. *Syntropis williamsi* Soleglad et al., 2007, ♂ (AMNH [ARA 2825]), dextral pedipalp chela. **A.** Dorsal aspect. **B.** Retrolateral aspect. **C.** Ventral aspect. **D.** Prolateral aspect. Scale bar = 2 mm.

authors relied almost entirely on morphometrics and coloration to delimit the species of *Syntropis*, but were limited by small sample sizes, including the absence of adults of *S. williamsi*. The adult male and female of *S. williamsi*, corroborated by the presence of hemispermatophore and mature female ovariuterus, are newly described in the present contribution. The availability of adults for the present contribution has revealed additional, secondary sexual characters concerning

TABLE 5

Hemispermatophore measurements for specimens of *Maaykuyak vittatus* (Williams, 1970), *Maaykuyak waueri* (Gerstch and Soleglad, 1972), *Syntropis macrura* Kraepelin, 1900, *Syntropis williamsi* Soleglad et al., 2007, and *Vizcaino viscainensis* (Williams, 1970)

Specimens are deposited in American Museum of Natural History, New York (AMNH), Colección de Aracnología y Entomología del Centro de Investigaciones Biológicas del Noroeste, La Paz, Baja California Sur (CAECIB), and Colección Nacional de Arácnidos, Instituto de Biología, Universidad Nacional Autónoma de México, Mexico City (CNAN).

	M. vittatus	*M. waueri*	*S. macrura*	*S. williamsi*	*V. viscainensis*
Collection	CNAN	CNAN	CAECIB	AMNH	CNAN
Number	2047	2062		[ARA 2825]	2245
Lamina length	2.33	1.43	3.70	3.76	2.43
Trunk length	1.83	1.16	3.33	4.1	2.23
Distal barb length	0.36	0.30	0.56	0.43	0.30
Basal plate length	0.40	0.23	0.96	1.26	0.53
Dorsal trough–laminar hooks	1.13	0.53	1.76	1.66	0.86
Ventral trough–laminar hooks	0.86	0.40	0.73	0.60	0.50

pedipalpal and metasomal carination for the diagnosis of *S. williamsi* and demonstrated that several putatively diagnostic morphometrics "inferred" by Soleglad et al. (2007: 129, 130, table 2) do not correspond to real measurements of this species (table 4). This is perhaps unsurprising given the small sample size available to these authors.

Color and infuscation: Base color uniformly yellow except carapace slightly orange, pedipalp chela fingers uniformly reddish, genital operculum and pectines pale, whitish; aculeus brownish; immaculate.

Chelicerae: Manus, dorsal surface smooth, subdistal margin with one macroseta medially. Movable finger, ventral surface with serrula comprising 4/7 tines, in distal half.

Carapace: Length 1.2 times greater than posterior width (table 2). Anterior margin sublinear, without median notch, with three pairs of minor (♂) or major (♀) submarginal macrosetae (fig. 7B). Three pairs of lateral ocelli, anterolateral and median lateral pairs equal in size, posterolateral pair approximately half the size. Median ocular tubercle slightly raised, situated in anterior third of carapace, superciliary carinae smooth, slightly higher than median ocelli. Median ocelli approximately twice the size of anterolateral ocelli. Anteromedian sulcus and posterolateral sulci shallow; posteromedian sulcus deeper; posterior transverse sulcus obsolete. Interocular surface smooth; lateral and posteromedian surfaces shagreened, covered with predominantly coarse granules except on sulci, which are smooth.

Coxosternal region: Sternum subequilateral pentagonal; 1.2 (♂) or 0.9 (♀) times wider than long (table 2); median sulcus deep; ventral surfaces matte; with three pairs of macrosetae anteriorly, medially and posteriorly on lobes (fig. 7D). Coxa II, proximal margin smooth; subproximally with three oblique slitlike structures, adjacent to small, finely granular protuberance; coxal endite proximal margin with shallow depression, smooth medially. Coxa IV 2.1 times longer than coxa II (table 2).

Pedipalps: Femur intercarinal surfaces smooth (fig. 26A); dorsal prolateral, ventral prolateral, and dorsal retrolateral carinae complete, granular; retrolateral dorsosubmedian carina partial, comprising smaller spiniform granules and six macrosetae medially; retrolateral ventral carina vestigial, reduced to few spiniform granules proximally; ventral retrosubmedian carina partial, reduced to several spiniform granules in proximal half; ventral median carina vestigial, reduced to row of granules at proximal margin; prolateral ventral carina partial, comprising discontinuous row of four spiniform granules, several smaller granules, and a macroseta; prolateral ventrosubmedian carina partial, reduced to proximal tubercle, oblique row of granules, and three macrosetae medially; other carinae absent or obsolete. Patella 1.1 times wider than femur (tables 2, 4); intercarinal surfaces matte (fig. 26B–E); dorsal prolateral, dorsal retrolateral, ventral prolateral and ventral retrolateral carinae costate-granular to serrate; retrolateral dorsosubmedian and retrolateral median carinae partial, comprising discontinuous row of granules medially; ventral median carina vestigial, reduced to proximal granules; prolateral ventral carina vestigial, reduced to proximal tubercle with associated macroseta and five or six major and minor macrosetae; prolateral median carina partial, comprising proximal tubercle with associated major macroseta, distal tubercle with minor macroseta, and row of smaller granules, gently curving dorsally toward dorsal prolateral carina, and becoming obsolete distally; other carinae absent or obsolete. Chela 1.5 times longer than patella and femur (table 2, 4); manus 1.4 times wider than patella and 1.6 times wider than femur. Manus and fingers elongate and slender (fig. 27); dorsal and to a lesser extent prolateral intercarinal surfaces matte, finely granular, more densely so in distal half, other surfaces smooth; dorsal prolateral and dorsal median carinae complete, finely granular, granulation extending distally to proximal third of fixed finger; ventral retrolateral and ventral prosubmedian carinae complete, finely granular; other carinae absent or obsolete; ventral prolateral carina partial, mostly smooth, becoming granular distally; prolateral median carina complete, finely granular; other carinae absent or obsolete. Fixed and movable fingers dentate margins respectively with shallow notch and lobe, proximally, creating gap when fingers closed (♂) or sublinear, movable finger with shallow lobe proximally (♀); fixed finger median denticle row comprising six subrows flanked by six prolateral and retrolateral serrate denticles, retrolateral denticles slightly smaller than prolateral denticles; movable finger median denticle row comprising seven subrows, flanked by eight prolateral and seven retrolateral serrate denticles, distal five prolateral and retrolateral denticles subpaired, proximal sixth and seventh prolateral denticles separated from subrows, terminal subrow comprising one median denticle; fingers each with whitish elevated glandular area terminally. Trichobothrial pattern orthobothriotaxic Type C; chela trichobothrium *Db* situated on dorsal retrolateral carina, subproximal on manus; *Dt* situated near midpoint of manus; *ib* and *it* situated at midpoint of fixed finger, near sixth prolateral denticle; *db*–*dt* and *eb*–*et* situated in distal two-thirds of fixed finger.

Legs: Basitarsi prolateral ventral, retrolateral dorsal and retrolateral ventral spinule rows complete on I–III; prolateral ventral and retrolateral ventral rows absent on IV; retrolateral dorsal row partial, restricted to distal two-thirds of IV; retrolateral median row vestigial, reduced to few distal spinules on I–IV; macrosetal counts on I–IV, respectively: dorsal, 5:3:3:3; retrolateral dorsal, 3:5:4:5; retrolateral median, 1:3:3:6; prolateral ventral, 5:6:6:6; retrolateral ventral, 12:14:14:11; dorsal and retrolateral dorsal macrosetae arranged in two separate rows on I–IV. Telotarsi I–IV, each with single ventromedian row of spinules, curved proximally, and two or three pairs of ventrodistal spinules (fig. 12F).

Genital operculum: Genital operculum wider than long (fig. 7D), with four (♂) or three (♀) pairs of macrosetae. Sclerites free at posterior margin, but unable to open more than 45° (♂) or fused longitudinally (♀). Genital papillae present, protruding posteriorly (♂) or absent (♀).

Hemispermatophore: Lamina 0.9 times longer than trunk (table 5). Median lobe, ental terminus moderate and rounded. Dorsal trough margin long, narrow, curving proximally, well separated from ventral trough (fig. 13I). Dorsal and ventral trough margins, terminal spinelike processes fused into prominent, bifurcate hook with deep notch, situated distally on lamina dorsal margin (figs. 13J, 14E). Inner lobe, basal plate situated adjacent to ventral trough. Hemimating plug developed from inner lobe; distal barb 0.3 times longer than basal plate (table 5); distal barb margin with ca. 25 spinules.

Pectines: Basal piece with single pair of macrosetae posteromedially (fig. 7D). Marginal lamella comprising three sclerites. Medial lamella proximal five sclerites fused, 16–19 separate. Fulcra, 25–26 (♂), 23–25 (♀). Pectinal teeth, 26–27 (♂), 24–26 (♀). Pectines relatively long, third (distal) sclerite of marginal lamella aligned with midpoint of trochanter IV.

Tergites: Pretergites I–VII, surfaces smooth and glabrous. Posttergites I–VI, intercarinal surfaces smooth medially, sparsely and coarsely granular laterally (fig. 25A, C), dorsal median and dorsal lateral carinae vestigial, reduced to minute granules anteriorly on I–III, restricted to anterior third, granular on IV–VI; VII, intercarinal surfaces matte, finely and sparsely granular, dorsal median carina vestigial, reduced to anterior fifth, granular, dorsal submedian carinae vestigial, reduced to anterior tubercle, dorsal lateral and lateral median carinae converging anteromedially, serrate, posterior granules enlarged.

Sternites: Sternites III–VI surfaces acarinate, smooth, and glabrous (fig. 25B, D), spiracles elongate, slitlike, approximately three times longer than wide; V and VI with (♂) or without (♀) moderately developed, whitish hyaline glandular area posteromedially; VII, intercarinal surfaces smooth, with well-developed hyaline glandular area, extending entire length of sternite, less developed in ♀, ventral submedian carinae obsolete, with two pairs of macrosetae, ventral lateral carinae serrate, each with two pairs of macrosetae.

Metasoma: Metasoma 2.7 times longer than mesosoma (tables 2, 4). Segments I–V, respectively 2.0, 2.6, 3.1, 4.5, 5.9 times longer than wide, decreasing in width posteriorly, especially on IV and V; V, 0.9 times wider than telson. Segments I–V intercarinal surfaces matte (fig. 9C, F); dorsal lateral carinae complete, finely serrate on I–IV, granular, becoming obsolete posteriorly on V; lateral median carinae complete, finely serrate on I–IV, slightly lobate posteriorly on IV, partial, finely serrate, becoming obsolete posteriorly, in anterior half of V; lateral inframedian carinae, complete, serrate on I, vestigial, reduced to few posterior granules on II and III, absent on IV and V; ventral lateral carinae complete, finely serrate on I–V; ventral submedian carinae absent on I–V; ventral median carinae complete, costate on I–III, complete, finely serrate on IV and V. Macrosetal counts on carinae of I–V, respectively: dorsal lateral carinae, 0:0:1:2:6; lateral median carinae, 0:2:2:2:0; lateral inframedian carinae, 2:0:0:0:3; ventral lateral carinae, 2:2:2:4:9; ventral sublateral carinae, 0:0:0:0:3; ventral submedian carinae, 3:4:5:6:2.

Telson: Vesicle elongate; length twice width, 3.6 times greater than aculeus length (tables 2, 4). Dorsal surface smooth and glabrous, level dorsomedially. Ventral surface smooth, acarinate; almost asetose (♂) or with five pairs of macrosetae demarcating positions of carinae (♀); subaculear tubercle vestigial, low and rounded (fig. 10F). Aculeus short and curved; laterobasal microserration comprising 5–7 sharp tines.

DISTRIBUTION: *Syntropis williamsi* is endemic to Baja California Sur, Mexico. The known locality records are restricted to low altitudes, from sea level to 92 m, at the southern end of the Sierra de la Giganta on the Baja California Peninsula, and on the island of San José.

ECOLOGY: All personally collected specimens of *S. williamsi* were captured on the surface at night with the aid of UV light detection. The specimens from El Pilar oasis were collected on sedimentary conglomerate walls along the San Francisco River, a rocky landscape with boulders and sandy to gravelly banks. The single juvenile from San José Island was collected on a bare, compacted sandy hill. The sedimentary deposits on which *S. williamsi* was collected contrast with the igneous (volcanic) substrates inhabited by *S. aalbui* and *S. macrura*. As with other species of the genus, the habitat and habitus of *S. williamsi* are consistent with the lithophilous ecomorphotype (Prendini, 2001).

ADDITIONAL MATERIAL EXAMINED: **MEXICO: Baja California Sur:** *Municipio de La Paz*: El Pilar, ca. 20 km NE Las Pocitas, 24°28.762′N 111°01.12′W, 92 m, 25.vi.2008, H. Montaño and E. González, oasis, compacted sand and granitic walls, stones and boulders, collected at night with

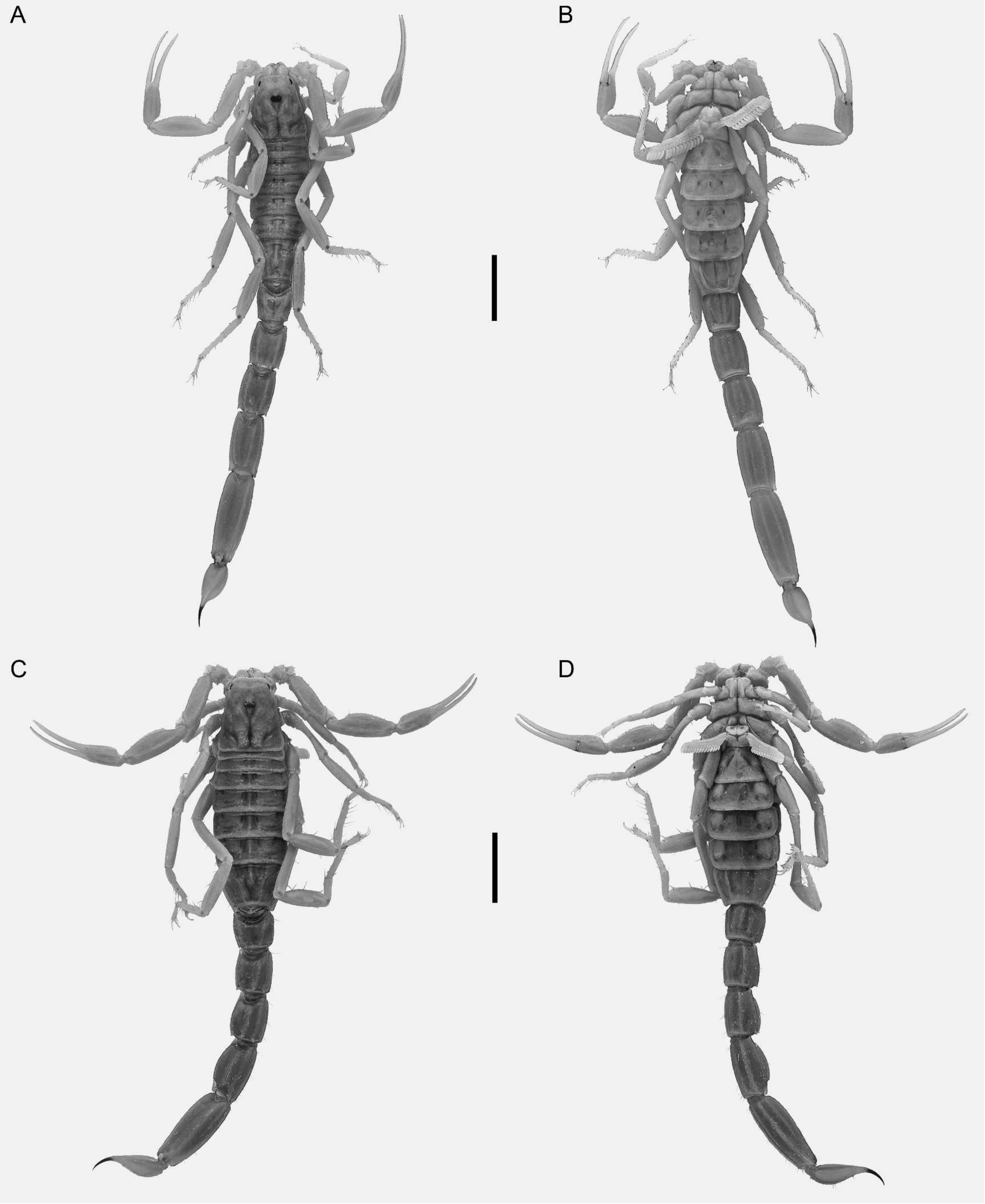

FIGURE 28. *Vizcaino viscainensis* (Williams, 1970), habitus, dorsal (**A, C**) and ventral (**B, D**) aspects. **A, B.** ♂ (CNAN 2245). **C, D.** ♀ (CNAN 2245). Scale bars = 3 mm.

FIGURE 29. *Vizcaino viscainensis* (Williams, 1970), ♂ (CNAN 2245), dextral pedipalp femur (**A**) and patella (**B–E**). **A, B.** Dorsal aspect. **C.** Retrolateral aspect. **D.** Ventral aspect. **E.** Prolateral aspect. Scale bar = 0.5 mm.

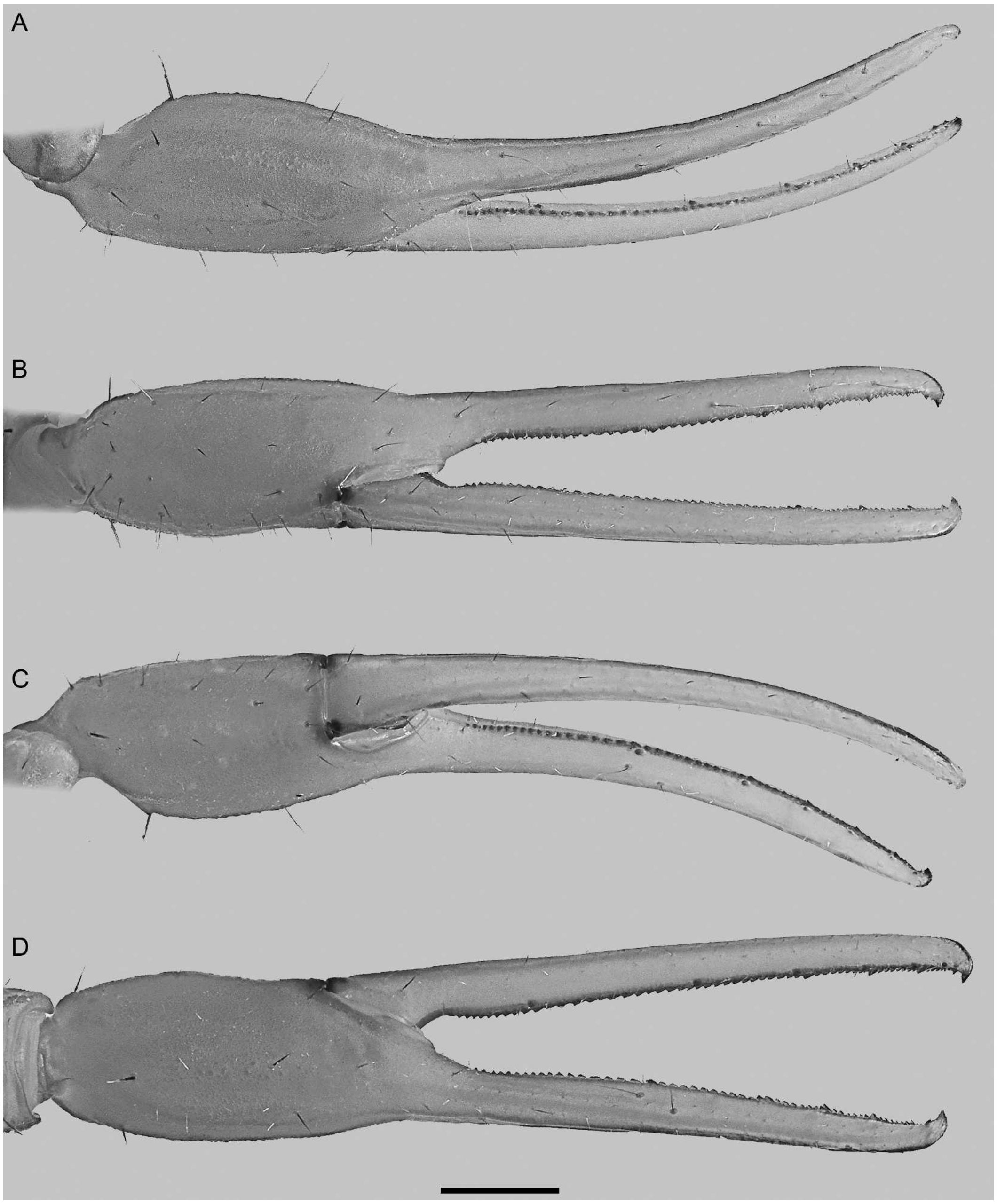

FIGURE 30. *Vizcaino viscainensis* (Williams, 1970), ♂ (CNAN 2245), dextral pedipalp chela. **A.** Dorsal aspect. **B.** Retrolateral aspect. **C.** Ventral aspect. **D.** Prolateral aspect. Scale bar = 0.5 mm.

UV light, 2 ♂, 2 ♀, 4 juv. (AMNH [ARA 1571, 2825]), 1 subad. ♀ (AMCC [LP 8706]), 2 ♂, 1 ♀ (CNAN SC3878 [ARA 2215]); Isla San José, Palma Sola fishing camp, 25°03.091′N 110°40.037′W, 0–50 m, 3.vi.2008, I.G. Nieto and E. González, arroyo wash, stones and boulders, thorn-scrub and cacti, sandy area, cliffs and compacted sand hills, collected at night with UV light, 1 juv. ♀ (AMCC [LP 8707]); San Evaristo, dirt road 10–15 km S, 24°47.757′N 110°40.502′W, 27–50 m, 12.vii.2008, H. Montaño and E. González, scrub-thorn and cacti, arroyo, on conglomerate sedimentary river cut with sand banks, collected at night with UV light, 1 ♂ (AMCC [LP 8826]).

Vizcaino González-Santillán and Prendini, 2013

Figures 1, 4–6, 8, 10, 12–14, 28–30; tables 1, 4

Vejovis viscainensis Williams, 1970 [= *Vizcaino viscainensis* (Williams, 1970)], type species, by monotypy.

Vaejovis eusthenura group (part): Williams, 1980: 55; Sissom, 1991a: 26; Stockwell, 1992: 408, 409; Sissom, 1993: 68; Lourenço and Sissom, 2000: 135; Sissom, 2000: 530, 532, 551; Armas and Martín-Frías, 2001: 8; González-Santillán, 2004: 29; Ponce-Saavedra and Sissom, 2004: 541; Francke and Ponce-Saavedra, 2005: 67; Sissom and Hendrixson, 2005b: 33, 34; Fet et al., 2006a: 7, 9; 2006b: 8; Graham and Fet, 2006: 7–10; Graham and Soleglad, 2007: 9, 11, 12; Soleglad et al., 2007: 134, 135; McWest, 2009: 8, 48, 52, 56, 61, 64, 98, 101–103, 108, table 1; Santibáñez-López and Sissom, 2010: 49.

Hoffmannius (part): Soleglad and Fet, 2008: 1, 26, 57, 60, 89, 91, 96, 102; Ayrey and Soleglad, 2011: 1.

Vizcaino: González-Santillán and Prendini, 2013: 18, 21, 35, 38, 39, 48, 51, 52, 55, 56, 58, figs. 1F, 6, 20C, 21C, table 1; 2015b: 13.

Diagnosis: *Vizcaino* is unique among Syntropinae in possessing four primary subrows of median denticles, separated by five retrolateral denticles, in the median denticle row of the pedipalp chela movable finger; the terminal subrow, comprising one to three denticles in the other genera of Syntropinae, is absent. The following combination of characters is also unique for the genus: pedipalp femur, retrolateral ventral carina smooth and costate; pedipalp patella width 1.2 times greater than pedipalp chela manus width; chela manus and fingers fairly elongated and slender; legs I–III, basitarsi (male and female) dorsoventrally compressed, each with dorsal and retrodorsal macrosetae elongated and arranged into a sublinear row, forming a setal comb; legs I–IV, telotarsi each with basal, ventromedian and distal series of spinules slender and elongate; metasomal segments I–IV, ventral submedian carinae distinct (protruding above adjacent intercarinal surfaces) and finely denticulate. *Vizcaino* appears superficially similar to some species of *Chihuahuanus* and *Paravaejovis* (e.g., *C. globosus*, *P. pumilis*, and, to a lesser extent, other species of *Paravaejovis* in the Baja California Peninsula) with which it shares setal combs on the basitarsi of legs I–III. In addition to the above-mentioned characters, *Vizcaino* differs from these taxa by possessing elongated pedipalp chela fingers, such that trichobothrium *eb* is situated on the fixed finger between the sixth retrolateral denticle and the macroseta situated at the position of the seventh retrolateral denticle (which is absent), *it* is situated on the fixed finger between the fifth and sixth prolateral denticles, and *ib* is situated on the fixed finger, at or close to the sixth prolateral denticle. Trichobothrium *eb* is situated at the seventh retrolateral denticle, *it* at the sixth prolateral denticle and *ib* between the sixth and seventh prolateral denticles in *Chihuahuanus* and most species of *Paravaejovis*, except *P. confusus*, and related species in which the positions of these trichobothria are similar to those of *Vizcaino*. *Paravaejovis confusus,* and related species are readily distinguished from *Vizcaino* by the dentition of the pedipalp chela movable finger, and the telotarsal spinules. *Vizcaino* shares with *Konetontli*, *Kuarapu*, *Maaykuyak*, *Syntropis*, *Chihuahuanus bilineatus*, *C. coahuilae*, and *Thorellius cristimanus* the presence of a secondary hook on the hemispermatophore, created by an extension of axial carina of the distal lamina that forms a pronounced bifurcation with the primary hook.

Included Species: *Vizcaino viscainensis* (Williams, 1970).

Distribution: *Vizcaino* is endemic to the Vizcaino Desert of the Baja California Peninsula, Mexico, and recorded from the states of Baja California and Baja California Sur (fig. 4).

Ecology: According to Williams (1970b), this species is rarely collected, and may have limited surface activity, spending most of its life inside burrows. The known specimens were collected at night with UV light detection on sparsely vegetated, semistabilized sand dunes, from sea level to 262 m. This species appears to be more abundant in areas where coastal fog is frequent. The habitat and habitus, especially the setal combs and elongated spinules on the leg tarsi, and the pale, immaculate integument, are consistent with the psammophilous ecomorphotype (Prendini, 2001).

Vizcaino viscainensis (Williams, 1970)

Figures 1, 4, 5D, 6D, 8C, F, 10C, 12C, 13E, F, 14C, 28–30; tables 1, 4

Vejovis viscainensis Williams, 1970b: 410–413, figs. 9, 10; Soleglad, 1973: 359, table 4.

Paruroctonus viscainensis: Stahnke, 1974: 138; Kovařík, 1998: 144.

Vaejovis viscainensis: Díaz Nájera, 1975: 7, 10, 17; Williams, 1980: 54, 70, 71, figs. 53O, 54L, 59, 73; 1986: 355; Due and Polis, 1986: 463, table 1; Beutelspacher, 2000: 113, 137, 138, 154, map 95; Lourenço and Sissom, 2000: 135; Sissom, 2000: 536; Soleglad and Fet, 2003b: 9, figs. 6, 70; Fet et al., 2006a: 5, 7–9, fig. 22, table 1, 2; 2006b: 2; 2006c: 2, 9, table 2; Sissom and Hendrixson, 2005a: 127, table 6.2; Soleglad and Fet, 2005: 6; Soleglad and Fet, 2006: 6; McWest, 2009: 4, 19, 54, 58, 62, 63, 98, 119, figs. 174–178, table 1.

Hoffmannius viscainensis: Soleglad and Fet, 2008: 4, 49, 50, 53, 56, 59, 60, 69, 73, 77, 82, 91, figs. 122, 150, 166, table 3, 5, 9.

Vizcaino viscainensis: González-Santillán and Prendini, 2013: 48, 55, 56, figs. 1F, 6, 20C, 21C.

Type Material: **MEXICO:** Holotype ♂ (CAS, Type No. 10429), **Baja California:** *Municipio de Ensenada*: Miller's Landing, 2 mi. [3.2 km] NW [ca. 5 km W Route Mexico 1, ca. 65 km N Guerrero Negro; 28°29′10.63″N 114°04′00.82″W], 21.vi.1968, S.C. Williams, M.A. Cazier, et al. Paratypes: 5 ♂, 4 ♀ (CAS), same data as holotype; allotype ♀ (CAS), **Baja California Sur:** *Municipio de Guerrero Negro*: Guerrero Negro, 14 mi. [23 km] S, 16.iv.1969, S.C. Williams.

Diagnosis: As for genus.

Description: The following redescription, which is based on the type material and additional material examined, supplements the descriptions by Williams (1970b, 1980).

Color and infuscation: Base color uniformly pale yellow, translucent, except pedipalp chela fingers pinkish, genital operculum and pectines whitish, telson reddish yellow, and aculeus reddish brown; immaculate.

Chelicerae: Manus, dorsal surface smooth and glabrous, subdistal margin with one macroseta medially. Movable finger, ventral surface with serrula comprising 10/12 tines, in distal half.

Carapace: Length 1.2 times greater than posterior width (table 1). Anterior margin sublinear, with vestigial (♂) or shallow (♀) median notch and three pairs of macrosetae (fig. 5D). Three pairs of lateral ocelli, anterolateral and median lateral pairs equal in size, posterolateral pair approximately half the size. Median ocular tubercle raised, situated in anterior third of carapace, superciliary carinae granular, higher than median ocelli. Median ocelli approximately twice the size of anterolateral ocelli. Anteromedian and posterolateral sulci shallow, posteromedian sulcus deep; posterior transverse sulci obsolete. Entire surface finely and densely granular with larger granules on interocular surface.

Coxosternal region: Sternum subequilateral pentagonal; as wide as long (table 1); median sulcus deep; ventral surfaces matte; with three pairs of setae anteriorly, posteromedially and posteriorly on lobes (fig. 6D). Coxa II, proximal margin smooth; subproximally with three oblique slitlike structures, adjacent to low, smooth protuberance; coxal endite proximal margin with depression, smooth medially. Coxa IV 2.3 times longer than coxa II (table 1).

Pedipalps: Femur intercarinal surfaces matte, except prolateral surface shagreened (fig. 29A); dorsal prolateral, ventral prolateral, and dorsal retrolateral carinae complete, finely granular; retrolateral dorsosubmedian carina vestigial, reduced to three macrosetae; retrolateral ventral and ventral median carinae vestigial, reduced to few spiniform granules proximally; prolateral ventral and prolateral ventrosubmedian carinae partial, each comprising discontinuous row of granules and three macrosetae; other carinae absent or obsolete. Patella 1.3 times wider than femur (table 1); intercarinal surfaces matte, densely and finely granular (fig. 29B–E); dorsal prolateral, dorsal retrolateral, ventral prolateral and ventral retrolateral carinae finely granular; ventral retrosubmedian and ventral median carinae vestigial, reduced to proximal rows of granules; prolateral ventral carina reduced to proximal and distal tubercles, each with associated macroseta; prolateral median carina complete, finely granular, curving toward dorsal prolateral carina in distal third of segment, proximal and distal spiniform granules each with associated macroseta; other carinae absent or obsolete. Chela 1.5 times longer than patella, 1.6 times longer than femur (table 1). Manus and fingers elongate and slender (fig. 30); patella and femur 1.2 times wider than manus; intercarinal surfaces matte; dorsal prolateral, dorsal median, dorsal retrosubmedian accessory, dorsal retrolateral, prolateral dorsal, prolateral median, and prolateral ventrosubmedian carinae finely granular, other carinae absent or obsolete. Fixed and movable fingers dentate margins sublinear, notches and lobes absent; fixed finger median denticle row comprising five subrows flanked by six prolateral and retrolateral denticles; movable finger median denticle row comprising four subrows, flanked by seven prolateral and five retrolateral denticles, subpaired, terminal subrow absent. Fingers each with whitish elevated glandular area terminally. Trichobothrial pattern orthobothriotaxic Type C; chela trichobothrium *Db* situated on dorsal retrolateral carina, subproximal on manus; *Dt* situated near midpoint of manus; *ib* and *it* situated at midpoint of fixed finger, respectively at sixth prolateral denticle and between fifth and sixth prolateral denticles, but closer to sixth; *db*–*dt* distributed along entire length of fixed finger; *eb*–*et* situated in distal two-thirds.

Legs: Basitarsi prolateral ventral, retrolateral ventral, and retrolateral dorsal spinule rows complete on legs I and II, partial, restricted to distal two-thirds on III, absent on IV; retrolateral median row absent on I–IV; macrosetal counts on I–IV, respectively: dorsal, 3:3:3:3; retrolateral dorsal, 4:4:4:4; prolateral ventral, 4:4:4:4; retrolateral ventral, 4:8:8:8; dorsal and retrolateral dorsal macrosetae aligned in sublinear row, forming setal comb; retrolateral ventral macrosetae variable in size (major or minor); proximal retrolateral ventral macrosetae, and medial and distal retrolateral dorsal macrosetae major, other macrosetae minor on IV. Telotarsi I–IV, each with single ventromedian row of elongate, slender, and acuminate spinules, clustered proximally and medially on II–IV, and two pairs of similarly elongate, slender, and acuminate ventrodistal spinules (fig. 12C).

Genital operculum: Genital operculum wider than long (fig. 6D), with two pairs of macrosetae. Sclerites free at posterior margin, but unable to open more than 45° (♂) or fused longitudinally (♀). Genital papillae present, protruding posteriorly (♂) or absent (♀).

Hemispermatophore: Lamina 1.1 times longer than trunk (table 1). Median lobe, ental terminus moderate and rounded. Dorsal trough margin long, narrow, curving proximally, well separated from ventral trough (fig. 13E). Dorsal and ventral trough margins, terminal spinelike processes fused into prominent, bifurcate hook, situated distally on lamina dorsal margin (figs. 13F, 14C). Inner lobe, basal plate situated adjacent to ventral trough. Hemimating plug developed from inner lobe; distal barb 0.5 times longer than basal plate (table 5); distal barb margin with ca. 13 long spinules.

Pectines: Basal piece with three pairs of macrosetae (fig. 6D). Marginal lamella comprising three sclerites. Medial lamella proximal four or five sclerites fused, 9–11 separate. Fulcra, 15–17. Pectinal teeth, 16–18 (♂), 13–16 (♀). Pectines relatively long, second (median) sclerite (♂) or third (distal) sclerite (♀) of marginal lamella aligned with distal margin of coxa IV.

Tergites: Pretergites I–VII, surfaces matte. Posttergites I–VI, intercarinal surfaces shagreened, sparsely and coarsely granular (fig. 6D), dorsal median and dorsal lateral carinae restricted to anterior third, granular; VII, intercarinal surfaces shagreened, sparsely and coarsely granular, dorsal median carina partial, restricted to anterior half, costate, dorsal sublateral carinae vestigial, reduced to oblique granular protuberance in posterior third, dorsal lateral and lateral median carinae converging anteromedially, serrate, posterior granules larger, spiniform.

Sternites: Sternites III–VI surfaces acarinate, smooth (fig. 28A, C), spiracles minute, slitlike, three or four times longer than wide; V and VI, posteromedian surface without hyaline glandular area; VII, intercarinal surfaces matte, ventral submedian carinae obsolete, with three pairs of macrosetae, ventral lateral carinae granular, with two pairs of macrosetae, lateral ventral carinae vestigial, each reduced to posterior tubercle and associated macroseta.

Metasoma: Metasoma twice length of mesosoma (table 1). Segment I, length equal to width, segments II–V, respectively 1.3, 1.4, 1.9 and 2.8 times longer than wide; V, 1.3 times wider than telson. Segments I–V intercarinal surfaces matte, uniformly finely granular, except dorsal lateral surfaces more coarsely granular (fig. 8C, F); dorsal lateral carinae complete, finely serrate, terminating in enlarged spiniform granules posteriorly on I–IV, finely granular, becoming obsolete posteriorly on V; lateral median carinae complete, finely serrate, terminating in spiniform granules posteriorly on I–III, lobate posteriorly on IV, partial, finely serrate, becoming obsolete posteriorly, in anterior half of V; lateral inframedian carinae complete, finely serrate on I, partial, restricted to posterior third, finely serrate on II, partial, restricted to posterior fifth, finely serrate on III, absent on IV and V; ventral lateral carinae complete, finely serrate on I–V; ventral submedian carinae complete, costate on I, costate to finely serrate on II–IV, absent on V; ventral median carina complete, finely serrate on V. Macrosetal counts on carinae of I–V, respectively: dorsal lateral carinae, 1:1:1:1:4; lateral median carinae, 1:1:1:2:2; lateral inframedian carinae, 1:0:0:0:2; ventral lateral carinae, 2:3:3:3:7; ventral sublateral carinae, 0:0:0:0:3; ventral submedian carinae, 3:3:3:4:2; all macrosetae minor (♂) or major (♀).

Telson: Vesicle relatively elongate; length 2.4 times greater than width, 1.7 times greater than aculeus length (table 1). Dorsal surface smooth and glabrous. Ventral surface smooth, glabrous, and acarinate; six pairs of macrosetae demarcating positions of carinae; subaculear tubercle vestigial, low, and rounded (fig. 10C). Aculeus relatively short and gently curved; laterobasal microserration comprising 10 sharp spinules.

DISTRIBUTION: As for genus. Miller's Landing, the type locality of *V. viscainensis*, is a beach ca. 5 km W of Route Mexico 1 and ca. 65 km N of Guerrero Negro, corresponding to the northern limit of the Vizcaino Desert.

ECOLOGY: As for genus.

REMARKS: Williams (1970b, 1980) originally assigned *V. viscainensis* to the *eusthenura* group of *Vaejovis*, for which Soleglad and Fet (2008) devised the name *Hoffmannius*, without quantitatively testing either its monophyly or composition. *Hoffmannius*, as defined by Soleglad and Fet (2008), was consistently polyphyletic in the phylogenetic analyses presented by González-Santillán and Prendini (2015a). *Vizcaino viscainensis* was not related to the species assigned to *Hoffmannius* by Soleglad and Fet (2008), forming a monophyletic group with *Syntropis* instead. González-Santillán and Prendini (2013) created a monotypic genus for this species on account of its phylogenetic position and unique, diagnostic character combination.

Additional Material Examined: **MEXICO: Baja California:** *Municipio de Ensenada*: Miller's Landing [28°29′10.63″N 114°04′0.82″W], 17.i.1965, V. Roth, 1 ♀ (AMNH). **Baja California Sur:** *Municipio de Guerrero Negro*: Guerrero Negro, 4 km SE towards Laguna Ojo de Liebre, 27°53.850′N 113°57.626′W, 10 m, 29.vi.2008, H. Montaño and E. González, sand dunes, collected at night with UV light, 1 juv. (AMCC [LP 8806]); Guerrero Negro, 11 km SE, W side Route 1, 27°54.916′N 113°55.333′W, 18 m, 4.vii.2005, L. Prendini and R.J. Mercurio, collected at night with UV light, 1 ♂, 1 subad. ♂ (AMCC [LP 4449]); Guerrero Negro, 12 km S, 27°56′05.8″N 113°54′23.1″W, 25 m, 15.vii.2004, E. González, O.F. Francke, W.E. Savary, and A. Valdez, collected at night with UV light, 2 ♂, 2 ♀, 6 juv. (AMNH [ARA 2567]), 1 ♂, 1 ♀ (AMCC [LP 3174]), 2 ♂, 1 subad. ♀, 2 juv. (CAS [ARA 1520]), 3 ♂, 2 subad. ♂, 2 subad. ♀ (CNAN SC3879 [ARA 2059]), 27°56.384′N 113°58.103′W, 4 m, 29.vi.2008, H. Montaño and E. González, sand dunes, collected at night with UV light, 8 ♂, 9 ♀, 13 juv. (AMNH [ARA 2863]), 1 ♀ (AMCC [LP 8786]), 7 ♂, 8 ♀, 14 juv. (CNAN SC3880 [ARA 2242]); Las Bombas, 3.2 km E [27°58.08′N 113°57.18′W], 30 m, 16.iv.1969, S.C. Williams, 2 ♀, 1 juv. (AMNH); Punta Abreojos, road marker 6 km, 27°17′23.6″N 113°09′28.1″W, 104 m, 17.vii.2004, E. González, O.F. Francke, W.E. Savary, and A. Valdez, collected at night with UV light, 1 ♀, 3 juv. (AMNH); San Angel dunes, 27°14.083′N 113°13.766′W, 25 m, 14.vii.2004, A. Valdez, E. González, O.F. Francke, and W.E. Savary, collected at night with UV light, 1 ♂, 1 ♀ (AMNH [ARA 2569]); Sierra del Placer, 21 km to junction Bahía Tortugas and Bahía Asunción, 98 km E Vizcaino towards Bahía Tortugas, 27°28.928′N 114°17.093′W, 262 m, 28.vi.2008, H. Montaño and E. González, stabilized sand dunes, collected at night with UV light, 8 ♂, 6 ♀, 13 juv. (AMNH [ARA 2855]), 2 juv. (AMCC [LP 8809]), 8 ♂, 6 ♀, 13 juv. (CNAN SC3881 [ARA 2245]); Vizcaino desert, 27°29′54.7″N 114°17′35.6″W, 223 m, 16.vii.2004, O.F. Francke, W.E. Savary, E. González, and A. Valdez, collected at night with UV light, 2 ♀ (AMCC [LP 3171]), 3 juv. (AMNH [ARA 2568]), 3 juv. (CNAN SC3882 [ARA 2060]).

ACKNOWLEDGMENTS

This research was funded by two grants from the Theodore Roosevelt Memorial Fund of the AMNH to E.G.-S., and by U.S. National Science Foundation grants DEB 0413453 and DEB 0640219, and a grant from the Richard Lounsbery Foundation to L.P. E.G.-S. was supported in part by U.S. National Science Foundation grant DEB 0413453, a CUNY Graduate Center Dissertation Fellowship, and a fellowship (167137/304429) from the Consejo Nacional de Ciencia y Tecnología (CONACYT), Mexico. We thank María Luisa Jiménez Jiménez and Carlos Palacios Cardel (CAECIB), Charles Griswold and Anthea Carmichael (CAS), Oscar F. Francke and Griselda Montiel-Parra (CNAN), and Hans Klompen (OSAL) for lending type and nontype material from the collections in their care; Tom Anton, A. Jesús Ballesteros, Gary Casper, Milagros Córdova, Miguel Correa, César Durán, Oscar F. Francke, Steve Grant, Brent Hendrixson, Abigail Jaimes, Lee Jarvis, Chad Lee, Randy J. Mercurio, Kari J. McWest, Hector Montaño, Irma Nieto, Warren E. Savary, W. David Sissom, Andrew Smith, Peter Sprouse, Alejandro Valdez, and Rick C. West for donating material and/or assisting with fieldwork; Ofelia Delgado-Hernández, Jeremy Huff, and Randy Mercurio for other logistical support and assistance; Ofelia Delgado-Hernández for producing illustrations; Randy Mercurio for live habitus photographs; Steve Thurston for preparing the plates; and Oscar Francke and Carlos Santibáñez-López for reviewing the manuscript. Fieldwork in Mexico was conducted under permits issued by the Dirección General de Vida Silvestre (SEMARNAT) to Oscar F. Francke (FAUT-0175), whom we also thank for assistance with import/export logistics from Mexico. E.G.-S. thanks Ofelia Delgado-Hernández for constant support throughout the project; Miguel Correa and Irma G. Nieto for hospitality in Baja California; and Fernando Alvarez Padilla (Facultad de Ciencias, UNAM) for access to his laboratory where part of the manuscript was completed.

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