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Source: Bulletin of the American Museum of Natural History, 2019(426) : 1-151

Published By: American Museum of Natural History

URL: https://doi.org/10.1206/00030090-426.1.1

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Museo Argentino de Ciencias Naturales "Bernardino Rivadavia" – CONICET

Buenos Aires, Argentina

BULLETIN OF THE AMERICAN MUSEUM OF NATURAL HISTORY

Number 426, 151 pp., 89 figures

Issued February 15, 2019

ISSN 0003-0090

CONTENTS

ABSTRACT

Filistatidae is one of the most phylogenetically enigmatic spider groups, and the genus *Kukulcania* Lehtinen includes the commonest representatives of the family. Its type species, *K. hibernalis* (Hentz, 1842), remains a favorite candidate for studies on spider phylogeny and comparative morphology. However, little is known about the taxonomy, species limits, and distribution of its closest relatives, because no generic revision has ever been undertaken. We present the first comprehensive assessment of the taxonomy of *Kukulcania*. The species *K. hibernalis, K. arizonica* (Chamberlin and Ivie, 1935), *K. utahana* (Chamberlin and Ivie, 1935), *K. hurca* (Chamberlin and Ivie, 1942), *K. brignolii* (Alayón, 1981) comb. nov. (transferred here from *Filistata* Latreille), *K. tractans* (O. Pickard-Cambridge, 1896), and *K. geophila* (Chamberlin and Ivie, 1935) are redescribed based on our examination of type material. We show that the name *Filistata brevipes* Keyserling, 1883, which had previously been placed in *Kukulcania*, actually belongs to a prithine spider, and propose the new combination *Pikelinia brevipes* (Keyserling, 1883). *Filistata geophila wawona* Chamberlin and Ivie, 1942, is newly synonymized with *Kukulcania geophila*. Eight new species of *Kukulcania* are described: *K. cochimi*, sp. nov. (from Baja California), *K. gertschi*, sp. nov. (northern Mexico), *K. mexicana*, sp. nov. (central Mexico), *K. santosi*, sp. nov. (southern Mexico to northern South America; previously misidentified as *K. brevipes*), *K. tequila*, sp. nov. (western Mexico), *K. chingona*, sp. nov. (western Mexico), *K. benita*, sp. nov. (endemic to the San Benito Islands in Baja California) and *K. bajacali*, sp. nov. (Baja California). With this, the number of recognized species in the genus is increased to 15. All species have their distributions mapped and both sexes illustrated. The first identification key to the genus is presented. A study on the morphology of the genus is undertaken using light and scanning electron microscopy, and the phylogenetic position of *Kukulcania* within the Filistatinae is briefly discussed. A novel putative synapomorphy for the subfamily is proposed.

INTRODUCTION

Among the commonest spiders found in houses and towns across the American continents are a group of odd-looking, velvety, black spiders that weave messy webs in crevices and corners (figs. 1–2). In Argentina, they are popularly called *arañas de los timbres* ("doorbell spiders"), while in the United States they are often referred to as *southern house spiders*. Their peculiar appearance, almost intermediate between mygalomorph and araneomorph spiders, is not without a reason: they belong in an ancient family of spiders, the Filistatidae, or crevice weavers. Filistatids are the sole survivors of an antique lineage that became separated from its closest relatives during the Mesozoic (Fernández et al., 2018). These shy, cribellate spiders have a global distribution and unremarkable species richness (ca. 165 species in 19 genera; WSC, 2018). They reach their maximum diversity in subtropical arid and semiarid regions. Thus, it is unsurprising that they are important faunal representatives of the dry ecosystems of Mexico and the southwestern United States. At least four genera of the family are found in North America: *Filistatoides* F.O. Pickard-Cambridge, 1899 (see Ubick, 2005), *Filistatinella* Gertsch and Ivie, 1936 (Magalhaes and Ramírez, 2017), *Antilloides* Brescovit, Sánchez-Ruiz, and Alayón, 2016 (Magalhaes, 2018), and *Kukulcania* Lehtinen. The last of these includes the southern house spider and its relatives and is the subject of this contribution.

The fact that filistatids represent a phylogenetically unique lineage of spiders led many researchers to include them as exemplars in studies of deep spider relationships and comparative morphology (e.g., Platnick et al., 1991; Griswold et al., 2005; Ramírez, 2014; Wheeler et al., 2017; Fernández et al., 2018) as well as descriptions of silk, web structure, and web-building behavior (Eberhard, 1988; Eberhard and Pereira, 1993; Craig et al., 1994; Swanson et al.,

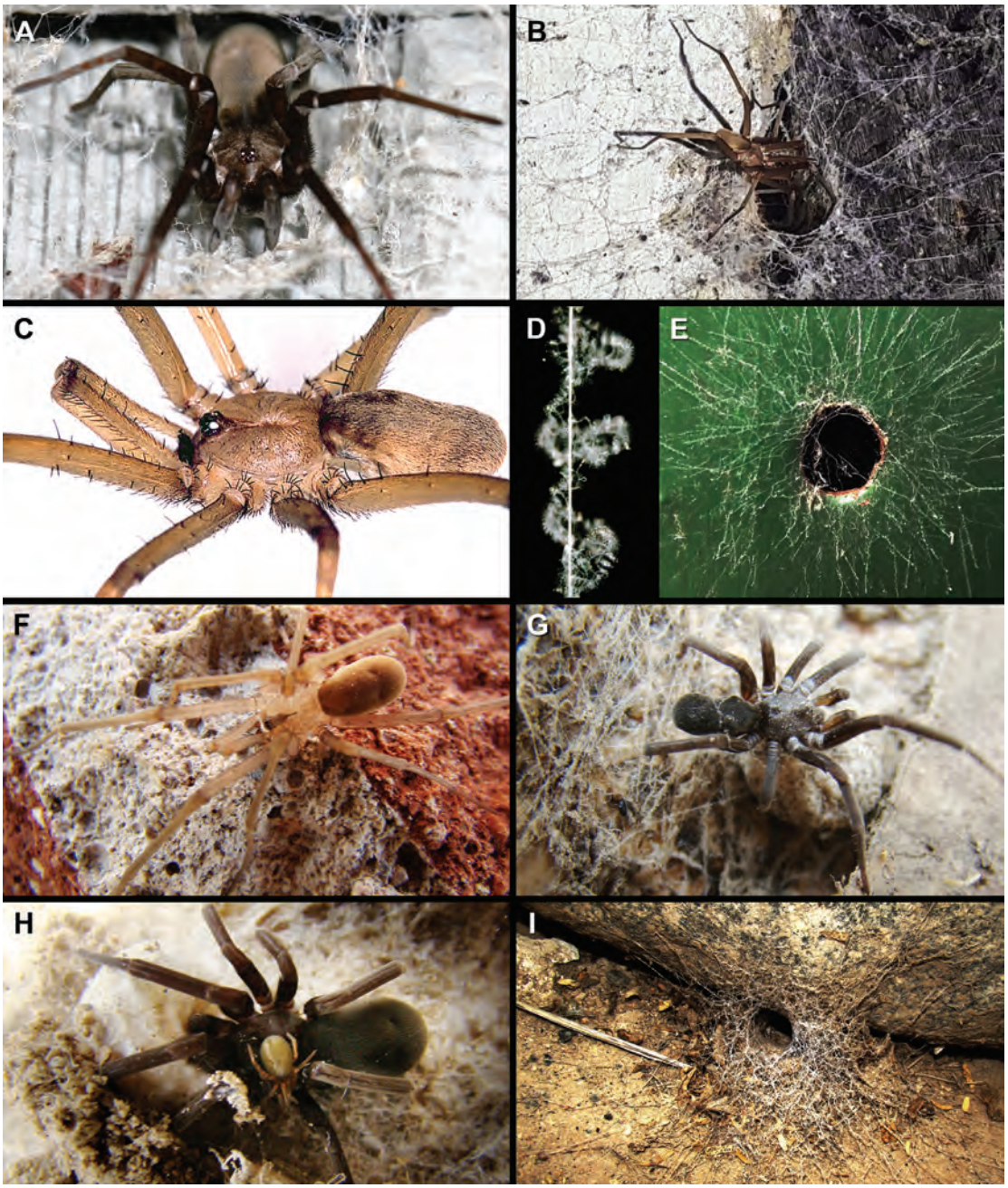

FIGURE 1. *Kukulcania* spp., living specimens. **A–D.** *K. hibernalis* (Hentz, 1842). **A.** Female from North Carolina, Harkers Island. Photo by M. Hedin. **B.** *K. hibernalis*, male entering female's burrow in Colombia. Photo by S. Crews. **C.** Male from Buenos Aires, Argentina. **D.** Cribellate thread of immature from Buenos Aires. **E.** Web in Corrientes, Argentina. **F–I.** *Kukulcania santosi*, sp. nov. from Peru. Photos by A.J. Santos. **F.** Male. **G.** Female with eggsac. **H.** Female with immature. **I.** Web beneath boulders.

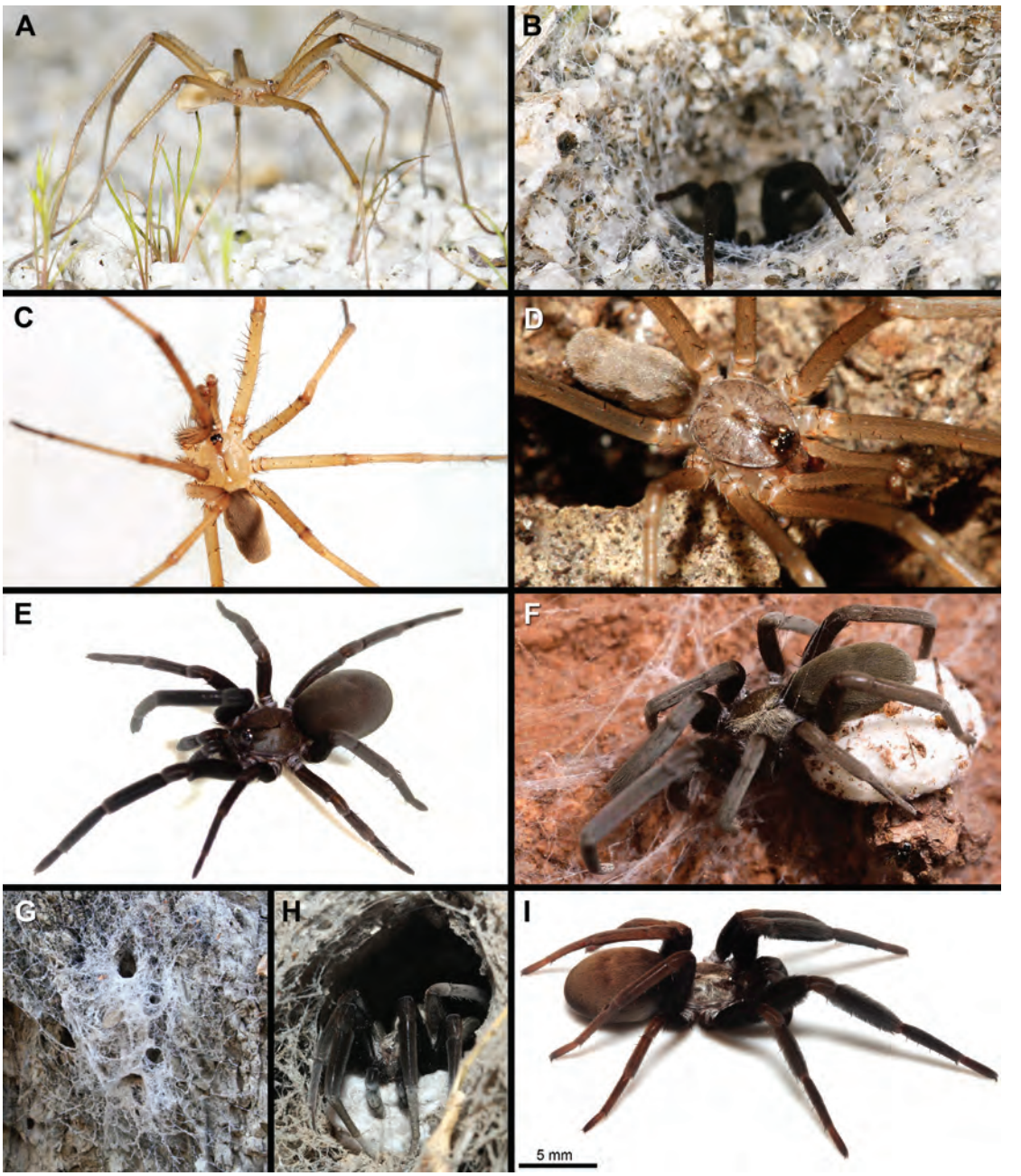

FIGURE 2. *Kukulcania* spp., living specimens. **A.** *K. hurca* (Chamberlin and Ivie, 1942), male from California, San Diego Co., Anza-Borrego Desert State Park (SDSU). Photo by M. Hedin. **B.** Kukulcania sp. from California. Photo by M. Hedin. **C.** *K. arizonica* (Chamberlin and Ivie, 1935), male (MACN-Ar 33844). **D.** *K. tequila*, sp. nov., male from Mexico, Colima, Cuauhtémoc. Photo by S. Longhorn.. **E.** *K.geophila* (Chamberlin and Ivie, 1935), female from California (CAS 9058471). Photo by K.-I. Ueda. **F.** *Kukulcania* sp., probably *K. brignolii* (Alayón, 1981), comb. nov., female with eggsac from Mexico, Puebla, Reserva de la Biosfera Tehuacán-Cuicatlán. Photo by F. Vol. **G–I.** *Kukulcania tractans* (O.Pickard-Cambridge, 1896) from Mexico, Guerrero. Photos by S. Longhorn. **G.** Webs in stone wall in Xochipala. **H.** Female guarding eggsac in Venta Vieja (=Venta del Zopilote). **I.** (Subadult?) female from Amula.

2006; Lopardo and Ramírez, 2007). Among these, most studies used *Kukulcania hibernalis* (Hentz, 1842) as representative of this family. This species is among the first filistatids ever to be described, second only to *Filistata insidiatrix* (Forsskål, 1775), the type species of the family. It is also the most common and widespread member of the genus, occurring throughout most of the American continent, while other species have more restricted distributions (figs. 3–4). In spite of *K. hibernalis* being a model in spider phylogenetics and morphology, little has been done to elucidate the taxonomy of its closest relatives. The genus hitherto contains seven species and one subspecies (WSC, 2018), all of which were originally placed in the genus *Filistata* Latreille, 1810. Due to the relative morphological uniformity of the members of Filistatidae, most of the classical authors were reluctant to recognize more than one genus in the family (e.g., Simon, 1893). The first to provide a global overview of the generic diversity of the family was Lehtinen (1967) in his classical monograph on cribellate spiders. He correctly recognized that American species placed in *Filistata* differed in many aspects from the Old World generotype, and erected *Kukulcania* Lehtinen to accommodate the New World forms. However, this transfer was not accompanied by a revision at the specific level, and since then, little has been done to clarify the identities of the described species.

The first species of *Kukulcania* were described in largely faunistic works dealing with the spiders from particular geographic regions (e.g., Hentz, 1842; O. Pickard-Cambridge, 1896; Chamberlin and Ivie, 1942). Chamberlin and Ivie (1935) presented the first comparative plate for the genus, depicting the morphology of the male palps of species then known to occur in the United States. Unfortunately, they did not illustrate female genitalia or provide means for diagnosing females. Brescovit and Santos (2013) published a revision of South American *Kukulcania*, which are represented solely by two introduced species: the widespread *K. hibernalis* and a second one that has been misidentified in the literature as *K. brevipes* (Keyserling, 1883). However, most species of the genus are restricted to North America. *Kukulcania* are very abundant in collections, but females are much more commonly collected than males, and identifying them was nearly impossible until now. As a consequence, almost all the material was sorted only to the genus level. Furthermore, the lack of a comprehensive revision prevented a correct knowledge of the distribution of the known species. For example, *K. arizonica* (Chamberlin and Ivie, 1935) was known in the taxonomic literature from only its type locality even though we report it from ~150 localities. Additionally, many undescribed species sat on museum shelves. Willis J. Gertsch, former curator of the AMNH arachnid collection, was well aware of this issue. During his field trips to Mexico and the southwestern United States in search of brown recluse spiders, he collected hundreds of *Kukulcania*—the ecosystems and microhabitats occupied by these spiders are very similar. Evidently, he was planning a taxonomic revision of American filistatids as well: several vials in the AMNH collection were identified with his manuscript names, and some of his unpublished drawings and notes can still be found in the AMNH records (fig. 5). Unfortunately, Gertsch passed away before he could complete this entrerprise.

The objective of this contribution is to fill in the gap of knowledge regarding *Kukulcania* taxonomy. We present the first genus-level revision of their diversity based on the examination of as many specimens as possible, redescribe and illustrate all known species based on the examination of their type material, provide new records, and map their distributions. We present the descriptions of eight new taxa, and propose generic transfers to accommodate misplaced species. The first complete identification key to the genus, including females, is presented. Finally, we present a study of the morphology of the species of *Kukulcania* by means of light and scanning microscopy, hoping this will be an important resource for those interested in spider morphology.

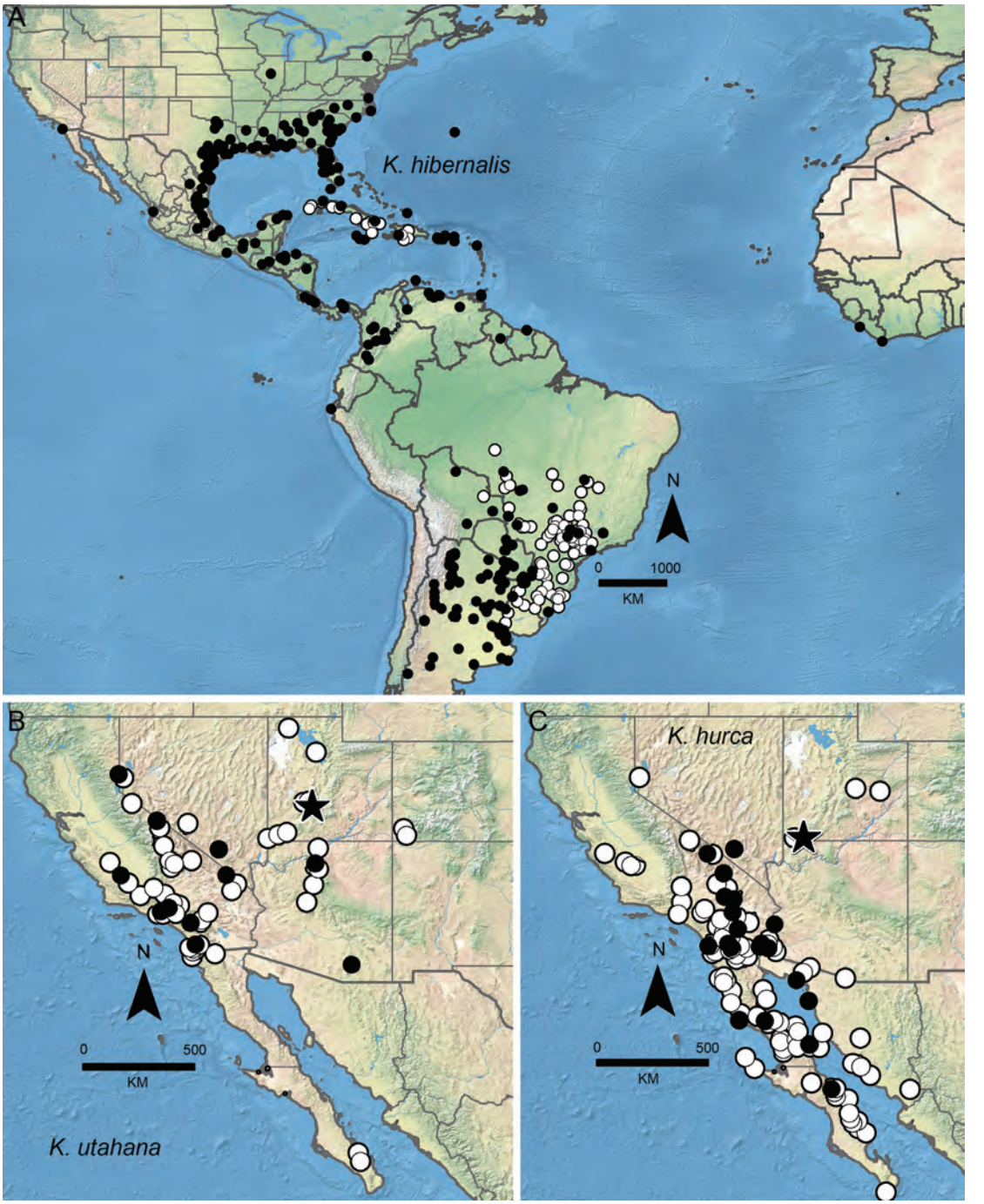

FIGURE 3. Distribution map of **A.** *Kukulcania hibernalis* (Hentz, 1842), **B,** *K. utahana* (Chamberlin and Ivie, 1935) and **C,** *K. hurca* (Chamberlin and Ivie, 1942). In A, black dots represent specimens examined by us, and white dots represent records from the recent literature (Brescovit and Santos 2013, Brescovit et al. 2016). In B and C, stars represent the type locality, black dots are records based on males, and white dots are records based on females only.

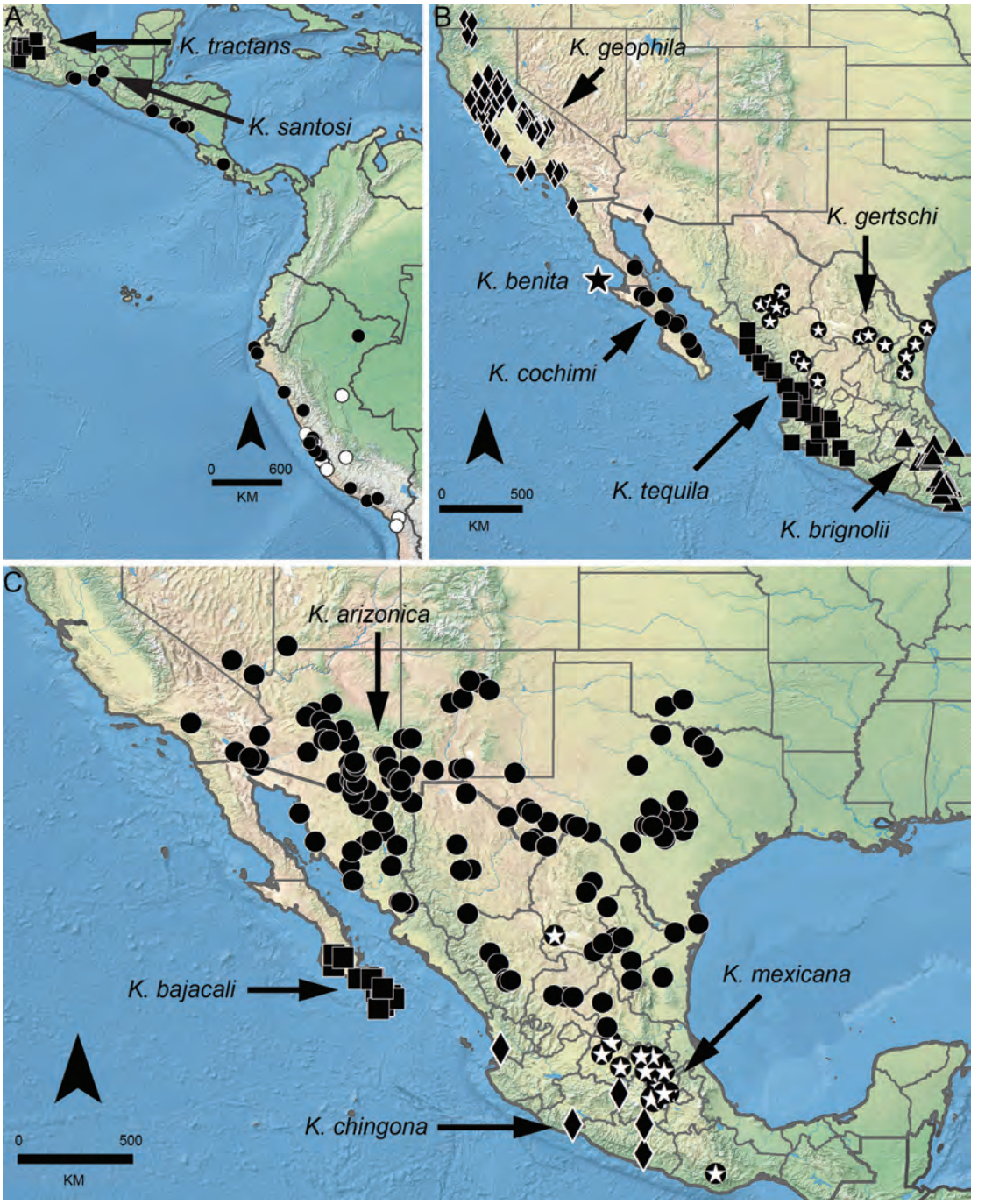

FIGURE 4. Distribution map of **A,** *Kukulcania tractans* (O. Pickard-Cambridge, 1896) and *K. santosi*. (white dots represent literature records from Brescovit and Santos, 2013), **B,** *K. benita*, sp. nov., *K. brignolii* (Alayón, 1981), comb. nov., *K. cochimi*, sp. nov., *K. geophila* (Chamberlin and Ivie, 1935), *K. gertschi*, sp. nov., and *K. tequila*, and **C,** *K. arizonica* (Chamberlin and Ivie, 1935), *K. bajacali*, sp. nov., *K. chingona*, sp. nov., and *K. mexicana*, sp. nov.

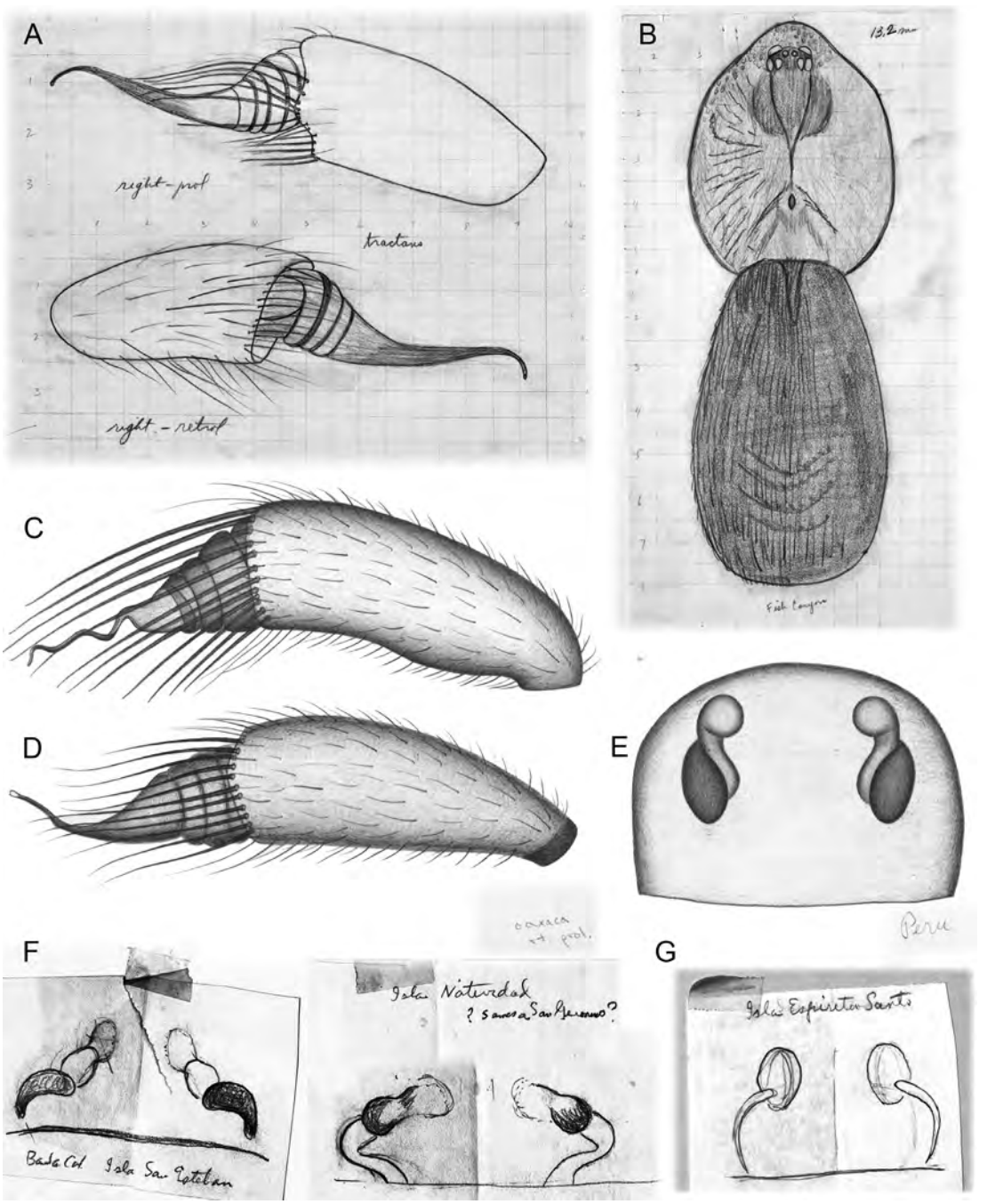

FIGURE 5. W.J. Gertsch's unpublished drawings and sketches of *Kukulcania* spp., AMNH Library Archives DR 191, reproduced with permission from the AMNH library. **A.** *K. tractans* (O. Pickard-Cambridge, 1896), male right bulb. **B.** *K. geophila* (Chamberlin and Ivie, 1935), female habitus, dorsal. **C.** *K. utahana* (Chamberlin and Ivie, 1935), male bulb. **D.** *K. brignolii* (Alayón, 1981), male bulb. **E.** *K. santosi*, spermathecae. **F.** *K. hurca* (Chamberlin and Ivie, 1942), spermathecae. **G.** *K. cochimi*, spermathecae. Scale bars = 0.1 mm.

MATERIAL AND METHODS

This revision is based on the examination of ~3400 individuals of *Kukulcania*, including ~530 males, ~1800 females, and ~1100 immatures. These specimens belong to the following collections and institutions (see curators and curatorial assistants in Acknowledgments): **AM,** Australian Museum (Sydney, Australia); **AMNH,** American Museum of Natural History (New York); **CAECIB,** Colección de Aracnología y Entomología, Centro de Investigaciones Biológicas del Noroeste (La Paz, Mexico); **CAI,** Colección Aracnológica del Instituto Argentino de Investigaciones de Zonas Aridas (Mendoza, Argentina); **CAS,** California Academy of Sciences (San Francisco); **CNAN-Ar**, Colección Nacional de Arácnidos, Universidad Nacional Autónoma de México (Distrito Federal, Mexico); **DU,** Darrell Ubick, personal collection (San Francisco); **DZUB,** Departamento de Zoologia da Universidade de Brasília (Brasília, Brazil); **FMNH,** Field Museum of Natural History (Chicago); **IBSP,** Instituto Butantan (São Paulo, Brazil); I**CN-Ar**, Instituto de Ciencias Naturales, Universidad Nacional de Colombia (Bogotá, Colombia); **INBIO,** Instituto Nacional de Biodiversidad (Santo Domingo, Costa Rica); **MACN-Ar**, Museo Argentino de Ciencias Naturales "Bernardino Rivadavia" (Buenos Aires, Argentina); **MCVR,** Museo Civico di Storia Naturale (Verona, Italy); **MCZ,** Museum of Comparative Zoology, Harvard University (Cambridge, Massachusetts); **MNRJ,** Museu Nacional (Rio de Janeiro, Brazil); **MUSM,** Museo de Historia Natural de la Universidad Nacional Mayor de San Marcos (Lima, Peru); **MZSP,** Museu de Zoologia da Universidade de São Paulo (São Paulo, Brazil); **NHM,** Natural History Museum (London, England); **OUMNH,** Oxford University Museum of Natural History (Oxford, England); **SDSU,** San Diego State University (San Diego); **SMF,** Senckenberg Museum (Frankfurt, Germany); **UCB,** University of California (Berkeley, California); **UFMG,** Centro de Coleções Taxonômicas da Universidade Federal de Minas Gerais (Belo Horizonte, Brazil); **USNM,** National Museum of Natural History, Smithsonian Institution (Washington, D.C.); **ZMB,** Zoologisches Museum Berlin (Berlin, Germany). The material from UCB had apparently been borrowed by W.J. Gertsch and was found at the AMNH collection. About half of all specimens examined for this study come from the collection of the AMNH.

Female genitalia were digested using a pancreatin solution for dissolving soft tissues (following Álvarez-Padilla and Hormiga, 2008); for observation of palpal tendons, a *K. hibernalis* palp was similarly digested. For imaging, genitalia were mounted on temporary slides using lactic acid (spermathecae) or clove oil (some palps, for observation of internal structures). Specimens were photographed and measured with a Leica M165C stereoscopic microscope using Leica Application Suite 3.6 (reflected light photos) or in an Olympus BH–2 compound microscope (transmitted light photos). Stacked-focus images were obtained with Helicon Focus 6. Drawings were made with the aid of a camera lucida. Variation in specimen measurements is expressed as the range between minimum and maximum values, with the mean stated in parentheses. Measurements for male tarsi are only approximate because they are often curved due to pseudosegmentation. Material for scanning electron microscopy was dissected, dehydrated using a series of ethanol solutions of increasing concentration, critical-point dried, mounted to aluminium stubs using adhesive copper tape and sputter-coated with gold-palladium. Images were taken using a FEI XL 30 TMP scanning electron microscope at MACN.

Altitudes given in feet have been converted to meters for the lists of examined material, but labels containing localities given in miles or kilometers from a particular landmark have been left as in the original. Lots without geographic coordinates were georeferenced using Google Earth; these coordinates are indicated between brackets as in "[S34.60°, W58.43°]", while lots whose labels contained coordinates have them indicated between parentheses as in "(S34.60°, W58.43°)." Image vouchers have

been identified with a unique code (IFM-####). These are only reported in the cases where they belong to collections that do not have unique identifier numbers for all the specimens.

Leg macrosetae, especially in males, vary greatly in number and position; this is aggravated by the fact that filistatines have many more leg macrosetae than prithines, making it impossible to trace homologies for individual macrosetae. For this reason, it was difficult to make a more accurate description of them as in our previous contributions (e.g., Magalhaes and Ramírez, 2017). Thus, in the present descriptions we have simply stated the number of macrosetae that could be counted along each face (dorsal, prolateral, ventral, retrolateral) of each article of the legs.

Abbreviations used in the descriptions are: **ALE,** anterior lateral eye; **AME,** anterior median eye; **fe,** femur; **mt,** metatarsus; **pa,** patella; **PLE,** posterior lateral eye; **PME,** posterior median eye; **ta,** tarsus; **ti,** tibia. Abbreviations used in figures are listed in their respective legends.

DISCUSSION

Relationships among *Kukulcania* and Other Filistatinae Genera

A quantitative test of the relationships and monophyly of filistatine genera are well beyond the scope of this revision; nevertheless, some morphological characters hint at the position of *Kukulcania*. Filistatinae monophyly has so far been supported by studies using different data sources (Gray, 1995; Ramírez and Grismado, 1997; Wheeler et al., 2017), and the subfamily contains at least four genera: *Filistata*, *Kukulcania*, *Zaitunia* Lehtinen, 1967, and *Sahastata* Benoit, 1968. Previously recognized synapomorphies for this subfamily include the pseudosegmented tarsi of males, the loss of teeth from the calamistrum setae and the calamistrum located in a cuticular ridge (Gray, 1995), tarsal macrosetae (Ramírez and Grismado, 1997), calamistrum setae medially incrassate, a triangular anal tubercle tergite bearing long setae, claviform cribellum spigots, major ampullate gland spigots interspersed among the piriform gland spigots, macrosetae in the male palpal femur, and an embolic keel (Magalhaes and Ramírez, 2017). Based on our own observations, we here propose one further putative synapomorphy for the subfamily: an internal crest in the cymbium, embracing the base of the bulb (figs. 6, 26). This character state has been observed by us in the four genera mentioned and is absent in prithine spiders. Gray (1995) suggested *Microfilistata* Zonstein, 1990, bears some resemblance with filistatines, but the relationships of this genus remain obscure. It displays the highly coiled sperm duct typical of filistatines (a character of unclear polarity), but lacks tarsal macrosetae and pseudosegmented tarsi; it also seems to lack the cymbium internal crest (see Zamani and Marusik, 2018). Other character states that might aid in placing the genus are currently unknown as the genus is known only from the type specimens of its three species (see Zonstein, 2009; Zamani and Marusik, 2018).

Regarding internal relationships, Gray (1995) and Ramírez and Grismado (1997) recovered a topology wherein *Kukulcania* is more closely related to *Filistata* than to *Sahastata*. However, the clade *Filistata* + *Kukulcania* was supported by a single synapomorphy, the staggered rows of setae in the calamistrum. It should also be noted that their sample of characters and terminals was limited; for instance, *Zaitunia* was not among the sampled taxa. Zonstein and Marusik (2016) presented a survey of filistatine characters and concluded that *Filistata* and *Zaitunia* shared a long list of character states, at least one of which seems to be synapomorphic (the medial gap in the setae rows of the calamistrum). The monophyly of this pair of genera is also suggested by sequence data (Wheeler et al., 2017). Zonstein and Marusik (2016) did not discuss the relationships of the pair *Filistata* + *Zaitunia* with *Sahastata* or *Kukulcania*.

We here suggest that *Kukulcania* presents several similarities with the Old World genus *Sahastata*. The latter occurs in the Saharan region, eastward through most of the Middle East, and

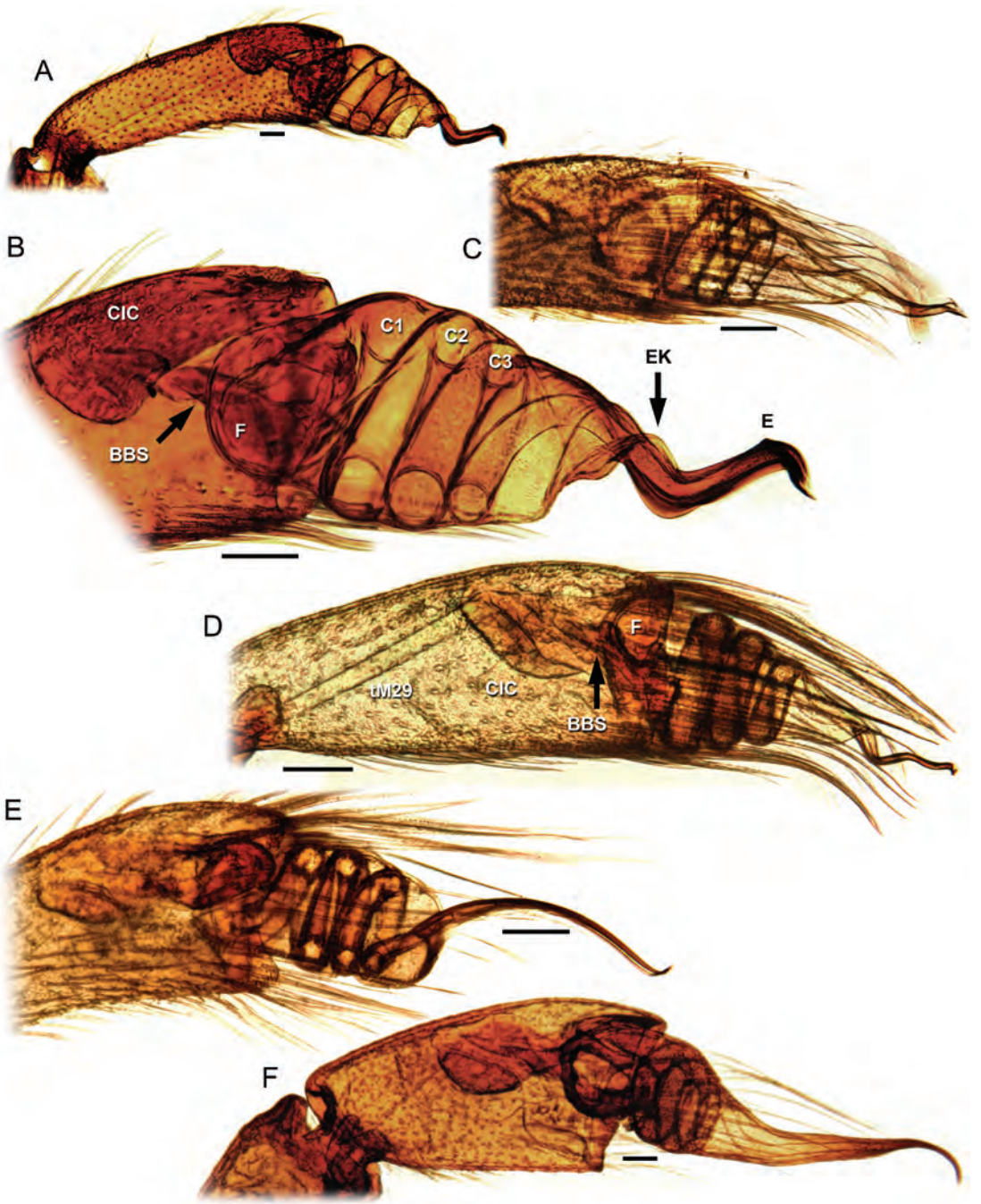

FIGURE 6. *Kukulcania* spp., male bulbs, prolateral, clove oil cleared. **A–B.** *K. hibernalis* (Hentz, 1842) (MACN-Ar 20625). **C.** *K. santosi*, paratype (AMNH IFM-1646). **D.** *K. hurca* (Chamberlin and Ivie, 1942) (AMNH IFM-1648). **E.** *K. geophila* (Chamberlin and Ivie, 1935) (AMNH IFM-1647). **F.** *K. tractans* (O. Pickard-Cambridge, 1896) (AMNH IFM-1649). Abbreviations: **BBS**, basal bulb sclerite; **CIC,** cymbium internal crest; **C1,** sperm duct coil 1; **C2,** coil 2; **C2,** coil 3; **E,** embolus; **EK,** embolus keel; **F,** fundus; **tM29,** tendon of the claw flexor muscle. Scale bars = 0.1 mm.

into western India (WSC, 2018). First, these two genera include the largest filistatids; all other genera include only medium-sized to minute spiders. Second, they are the only two genera in the family to present sexual dimorphism in color, with brown to black females and cream to light-brown males. At least these two characters could be synapomorphies uniting the two genera. They also share two characters of unclear significance and polarity, mainly because none of these are constant in either of the two genera: the possession of a hirsute sternum and legs in females, and the presence of a membranous portion in the spermathecae apex (figs. 7, 30, 60H: MPS; Marusik et al., 2017, figs. 2, 6–10). To our knowledge, the internally arcuate chelicerae margins observed in *Kukulcania* males (figs. 10B, 32F, 45E, 73C) are not present in other genera of the family, and thus might represent a synapomorphy of the genus. Undoubtedly, the relationships and limits between the two genera will be better understood when a complete taxonomic revision of *Sahastata* is undertaken.

Species Groups and Internal Relationships of *Kukulcania*

For practical purposes and to facilitate species identification, we here divide *Kukulcania* into two informal species groups. At least the *Kukulcania hibernalis* species group might represent a monophyletic assemblage, with two putative synapomorphies: a ring of setae along the entire border of the cymbium, partly concealing the bulb (fig. 6C–D), and the presence of sclerotized bars alongside the spermathecae (figs. 7–8). The *Kukulcania tractans* species group apparently lacks synapomorphies and might be paraphyletic, being diagnosed on the basis of symplesiomorphies (e.g., the lack of sclerotized bars; fig. 9).

Species Limits

As usual with filistatids, making taxonomic decisions can sometimes be a prickly issue—chiefly when populations with deviant morphology are known only from females. As one will certainly perceive from the illustrations in the Taxonomy section, each species displays several variants of genital morphology. We have tried to illustrate the full range of variants we examined to ease identifications. In some cases, such as in *K. hibernalis*, it seems safe to assume that all the variation observed can be accounted for as intraspecific variability. In other species, the scarcity of males hampers taxonomic decisions. For example, some populations of *K. gertschi* could belong to yet another species, but we have examined only three males assignable to this species, and thus refrained from creating additional names. Generally, females are more difficult to identify than males, mainly because their genital morphology is more variable. The extension of morphological variation of each species often approaches the morphology of closely related species, although overlaps are not frequent. Luckily, aberrant or difficult-to-diagnose females usually have been collected in the same areas as males or females with typical morphology, allowing us to assign them to a particular species with certainty. We are confident that, except for one particular case (see next paragraph), the diagnoses outlined in the Taxonomy section work well even for species with strong morphological variability.

Identification uncertainty because of specific variation reaches its extreme with the pair *Kukulcania utahana* (Chamberlin and Ivie, 1935) and *K. hurca* (Chamberlin and Ivie, 1942). *Kukulcania hurca* was originally described based on three females from Utah and California. Chamberlin and Ivie (1942) did not examine their genitalia and did not realize the species is similar to *K. utahana*, so compared it to *K. geophila*: "This species is close to *F. geophila*.… It differs in the female in its larger size, longer legs, more elevated eye tubercle, and different color markings in the carapace…." The limits between these two species could not be resolved by us in an entirely satisfactory manner. The type locality of both names is Utah. The genitalic variation in these species is rampant not only in females, but also in males

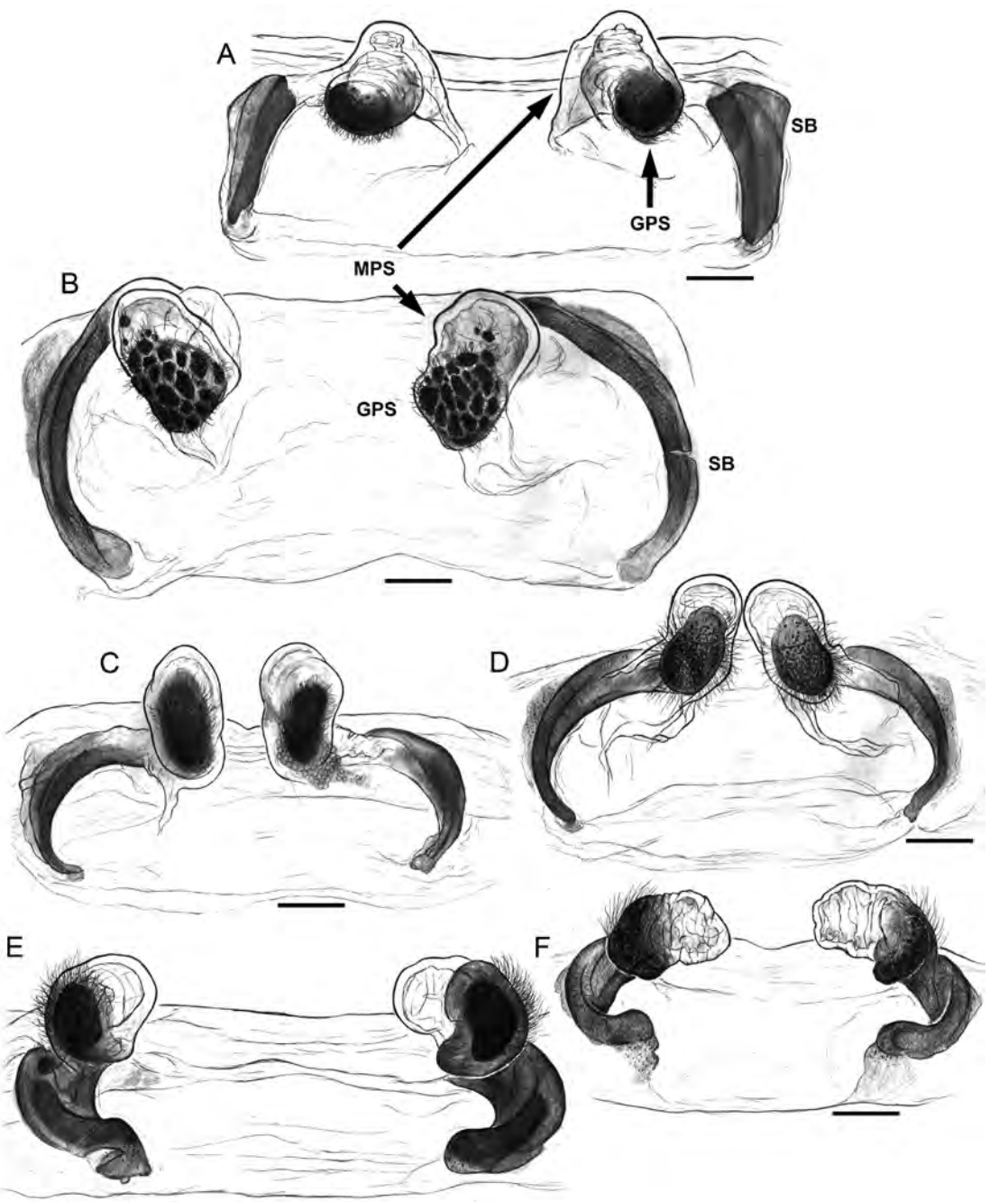

FIGURE 7. *Kukulcania* spp., female spermathecae, ventral. **A.** *K. hibernalis* (Hentz, 1842) (FMNH 2857669). **B.** *K. cochimi*, paratype (AMNH IFM-1635). **C.** *K. arizonica* (Chamberlin and Ivie, 1935), paratype (AMNH IFM-1531). **D.** *K. gertschi*, paratype (AMNH IFM-1512). **E.** *K. utahana* (Chamberlin and Ivie, 1935), paratype (AMNH IFM-1532). **F.** *K. hurca* (Chamberlin and Ivie, 1942) (AMNH IFM-1659). Abbreviations: **GPS,** glandular portion of spermathecae apex; **MPS,** membranous portion of spermathecae apex; **SB,** sclerotized bars. Scale bars = 0.1 mm.

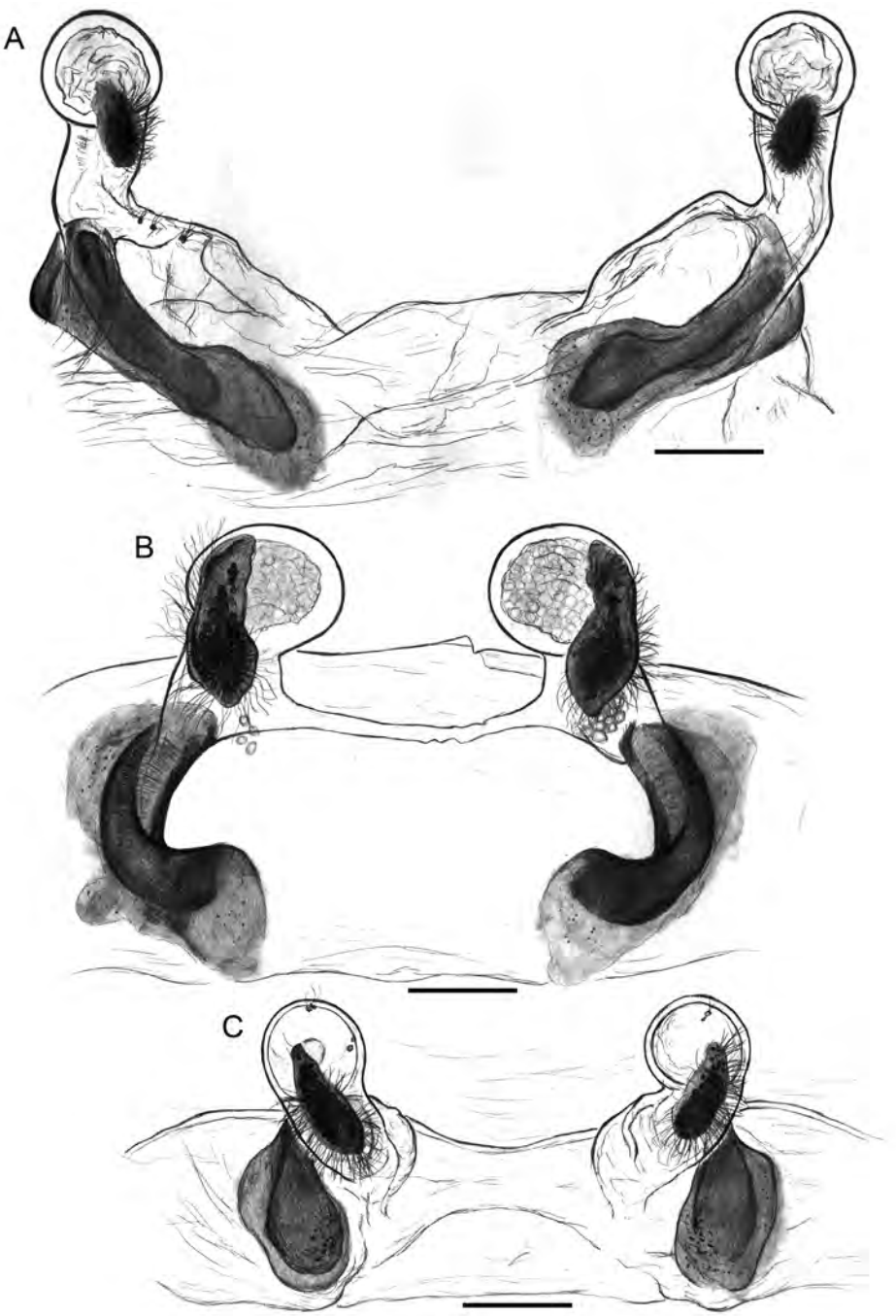

FIGURE 8. *Kukulcania* spp., female spermathecae, ventral. **A.** *K. brignolii* (Alayón, 1981), comb. nov. (AMNH IFM-1524). **B.** *K. mexicana*, paratype (CNAN-Ar DNA0043). **C.** *K. santosi*, paratype (AMNH IFM-1528). Scale bars = 0.1 mm.

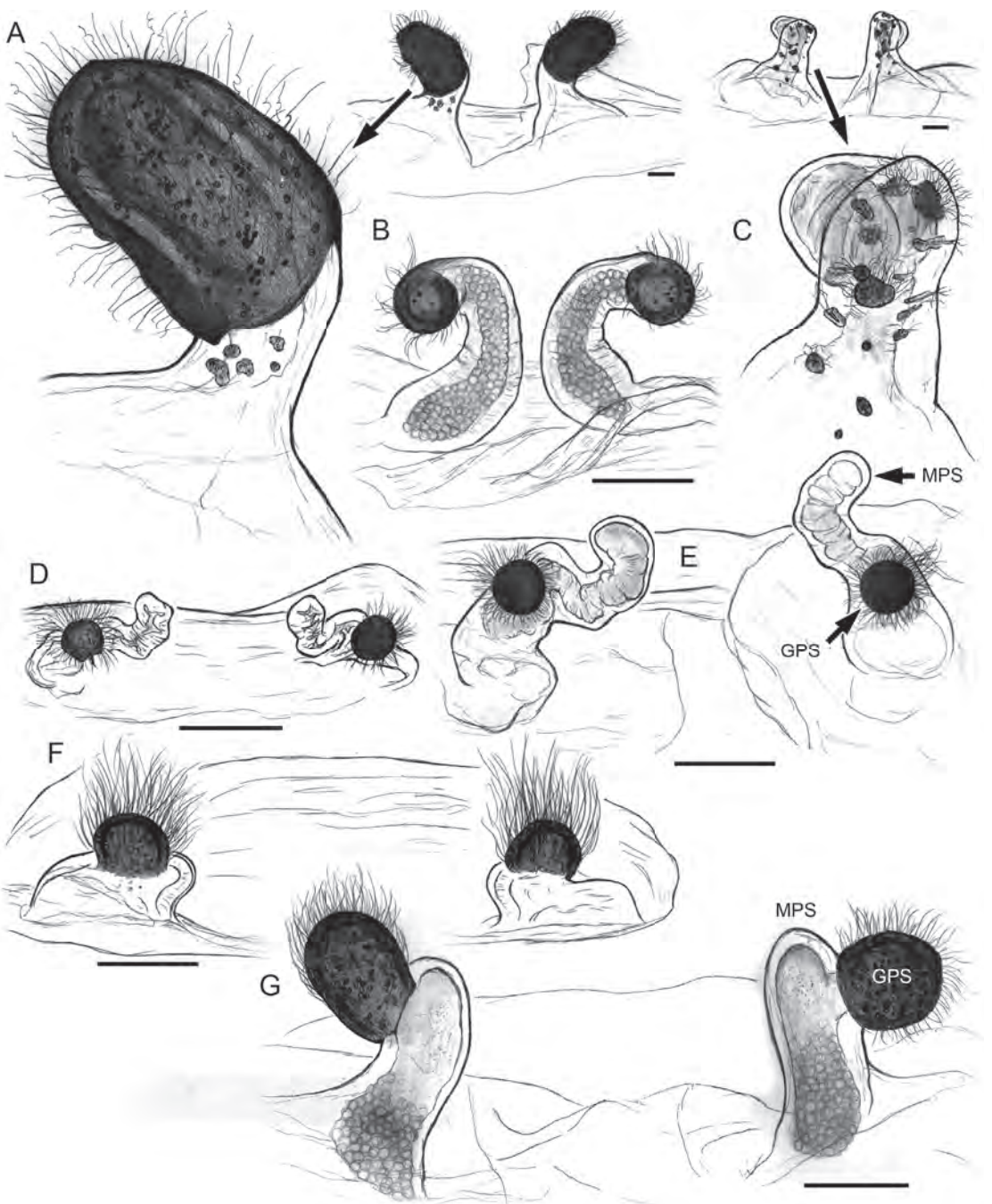

FIGURE 9. *Kukulcania* spp., female spermathecae, ventral. **A.** *K. tractans* (O. Pickard-Cambridge, 1896) (AMNH IFM-1508). **B.** *K. tequila*, paratype (AMNH IFM-1513). **C.** *K. chingona*, holotype (CAS 9057614). **D.** *K. geophila wawona* (Chamberlin and Ivie, 1942), holotype (AMNH IFM-1225). **E.** *K. geophila* (Chamberlin and Ivie, 1935), paratype (AMNH IFM-1536). **F.** *K. benita*, paratype (USNM IFM-1277). **G.** *K. bajacali*, holotype (CAECIB 0336). Abbreviations: **GPS,** glandular portion of spermathecae apex; **MPS,** membranous portion of spermathecae apex. Scale bars = 0.1 mm.

(see figs. 50, 52, 54, 56). At least two large groups of morphs have been recognized by us, corresponding to the number of coils in the embolus of the male palps. However, these species are sympatric throughout most of their ranges (from Utah to northern Baja California state, Mexico), females rarely have been collected with males, and the genitalic variation in females collected with males of each species overlaps. Moreover, the holotype of *K. hurca* is a female that is not quite identical with females collected with males (compare figs. 56A and 56C–D). Until males are collected from the type locality of *K. hurca*, the identity of this species should be taken with caution—could it be a synonym of *K. utahana*, with recognition of the females in fig. 56C–D as a new species? Bearing this in mind, our identifications of *K. utahana* and *K. hurca* females, especially from those localities where no males have been sampled, are only tentative and should be viewed with extreme caution.

Interestingly enough, several other spider groups from this same region (California and Baja California peninsula) represent species complexes, display rampant genitalic variation, or are taxonomically intractable. To cite some examples, what Levi (1957) considered to be a single, variable species of *Steatoda* Sundevall, 1833, was later split by Gertsch (1960) into four closely related species. Different groups of mygalomorph spiders from this region display deep genetic divergences that are not reflected in morphology, suggesting they represent cryptic species (Leavitt et al., 2015), or making taxonomic decisions based only on morphological data difficult (Hamilton et al., 2016). Finally, even well-delimited species in the genus *Homalonychus* Marx, 1891, display intraspecific genitalic variation that is not correlated with variation in molecular markers (Crews and Hedin, 2006; Crews, 2009). Maybe there is a common evolutionary or biogeographic process causing organisms in this region to be currently in a "gray zone" of the speciation process (see Queiroz, 2007)?

We would like to stress that we view taxonomic species as hypotheses. The somewhat loose limits we propose on some of the names here can and should be tested in the future with additional data (e.g., additional specimens, natural history observations, sequence data). We do hope that most of our species will outlive further scientific scrutiny.

TAXONOMY

Family Filistatidae Ausserer

Subfamily Filistatinae Ausserer

Genus *Kukulcania* Lehtinen, 1967

Kukulcania Lehtinen, 1967: 242. Type species *Filistata hibernalis* Hentz, 1842, by original designation.

Diagnosis: *Kukulcania* are the only members of the Filistatinae in the New World, and can be easily distinguished from other American genera by having pseudosegmented tarsi (in males) and tarsal macrosetae (in females). They can be distinguished from other filistatines, except for *Sahastata,* by (1) the sexual dimorphism in color, with females much darker than males, (2) having the calamistrum uninterrupted (in *Filistata* and *Zaitunia*, the calamistrum rows have a medial area without setae; Zonstein and Marusik, 2016: fig. 2D), (3) the evenly hirsute carapace (in *Filistata* and *Zaitunia*, there are only a few large setae). *Kukulcania* and *Sahastata* are difficult to distinguish, especially considering that males of the latter genus are largely unknown. *Kukulcania* males have distally arcuate median margins in the chelicerae (fig. 10C: AMC) and never display the ordered rows of short macrosetae in the retrolateral faces of femora I–II as do those of *Sahastata*, or the slightly notched margin of the cymbium in dorsal view (Marusik and Zamani, 2015). *Kukulcania* females usually have calamistrum rows with 9–11 setae each (rarely reaching 14–15), while *Sahastata* usually have 15–20+ per row (see Marusik et al., 2014, 2017).

Descr iptio n: Medium to large spiders, ranging from 3.63 (*K. gertschi* male) to 18–19 mm (*K. arizonica*, *K. tractans* and *K. hibernalis* females) in total length, appendages excluded.

Color and pattern: Coloration sexually dimorphic, with females brown to very dark brown and males yellowish cream to very light brown (figs. 1–2). Carapace usually uniform, finely stippled with darker coloration and marble pattern around the clypeus (figs. 32, 35). Slightly darker, V-shaped median pattern present posterior to the eyes. Sternum and chelicerae uniformly colored. Legs usually with light-colored longitudinal bands in females. Leg rings or annulations absent. Abdomen with uniform coloration, usually grayish cream (males) to brown (females) (figs. 32, 35); the cardiac area might be slightly darker.

Prosoma: Carapace longer than wide, with well-marked thoracic fovea. Clypeus short in males. Eyes united in a low tubercle (slightly higher in males), AME subequal to the ALE. Eye apodemes, feathery setae, and white setae absent. Sternum longer than wide, with two pairs of sigillae, sometimes indistinct in males (figs. 10, 11, 12). Female palpal tarsal macrosetae present (figs. 13C, 14E). Chelicerae with acute cheliceral lamina and large promarginal lobe bearing a small tooth (see fig. 16A, inset), with posterior face glabrous (figs. 13B, 14B, 15B, 16A–B). Cheliceral gland flat. Subdistal margin of the internal face of chelicerae in males slightly arcuate (figs. 10B, 32F, 45E, 73C). Leg formula 1423, except in the males of some species (*K. utahana*, *K. hurca*, *K. bajacali*, *K. geophila*: 4123). Femora macrosetae usually present dorsally on all legs. Tibiae and metatarsi macrosetae present; males in the *K. hibernalis* species group often with numerous short macrosetae on the prolateral face of tibia and metatarsus I. Tarsi macrosetae present. Male tarsi pseudosegmented (fig. 17D). The tarsal organ is variable: capsulate in palps and fourth legs of *K. hurca* (fig. 14), with a wider opening in first legs of male *K. hibernalis* and palps and legs of female *K. tractans* (figs. 10F, 15E–F, I), and a mixed morphology in *K. geophila* (16E, G). Trichobothria with socket ringlike, present on tibiae and metatarsi, in the latter not reaching the distal end; metatarsus stopper narrow, with asymmetrical lyriform organ (figs. 14G, 15H, 17B, 16F). Male leg II unmodified. Calamistrum on a crest, composed of three parallel rows set very closely together in a staggered fashion (fig. 15K, 16I), setae incrassate, lacking teeth; retrolateral row with smaller setae that are not incrassate (figs. 13F, 14I–J, 15J–K, 16H–I).

Abdomen: Suboval. Spiracle slitlike, positioned midway between epigastric furrow and spinnerets. Posterior respiratory system consisting of third abdominal entapophyses and a transverse duct; lateral tracheae present as two small subtriangular flaps in adults (fig. 18D), several leaves in dispersing stage immatures (fig. 19D). Anal tubercle modified, protruding into a triangular fleshy lobe, densely hirsute (figs. 20, 21A, 22A, 23A, 24B, 25A).

Spinnerets (figs. 20–25): Cribellum bipartite, with each spinning field about as wide as long, cribellum spigots strobilate, absent in males. ALS with anterior row of setae, with three major ampullate gland spigots interspersed among the piriform gland spigots in adults, and about 75–150 piriform gland spigots in females. Dispersing stage immatures with a single major ampullate gland spigot (fig. 19F). PMS pyramidal, with filiform setae, and up to 10 (usually less) aciniform gland spigots, one minor ampullate gland spigot, and three paracribellar gland spigots, all set close together and positioned apically. PLS with about 40–90 aciniform gland spigots, and two paracribellar gland spigots.

Male genitalia (figs. 6, 26–29): Palpal femur straight, bearing long macrosetae at least on the ventral face, and usually on the dorsal face as well. Palpal tibia long, slender, seldom slightly incrassate, bearing thin setae on the ventral face. Cymbium cylindrical, up to 3× as long as high, with an internal crest embracing the basal bulb sclerite. In some species the cymbium bears a ring of setae in the apex that partially conceal the bulb, in others it bears incrassate or modified setae in the prolateral face. Bulb subconical to rounded, devoid of spines, excavations of micro-

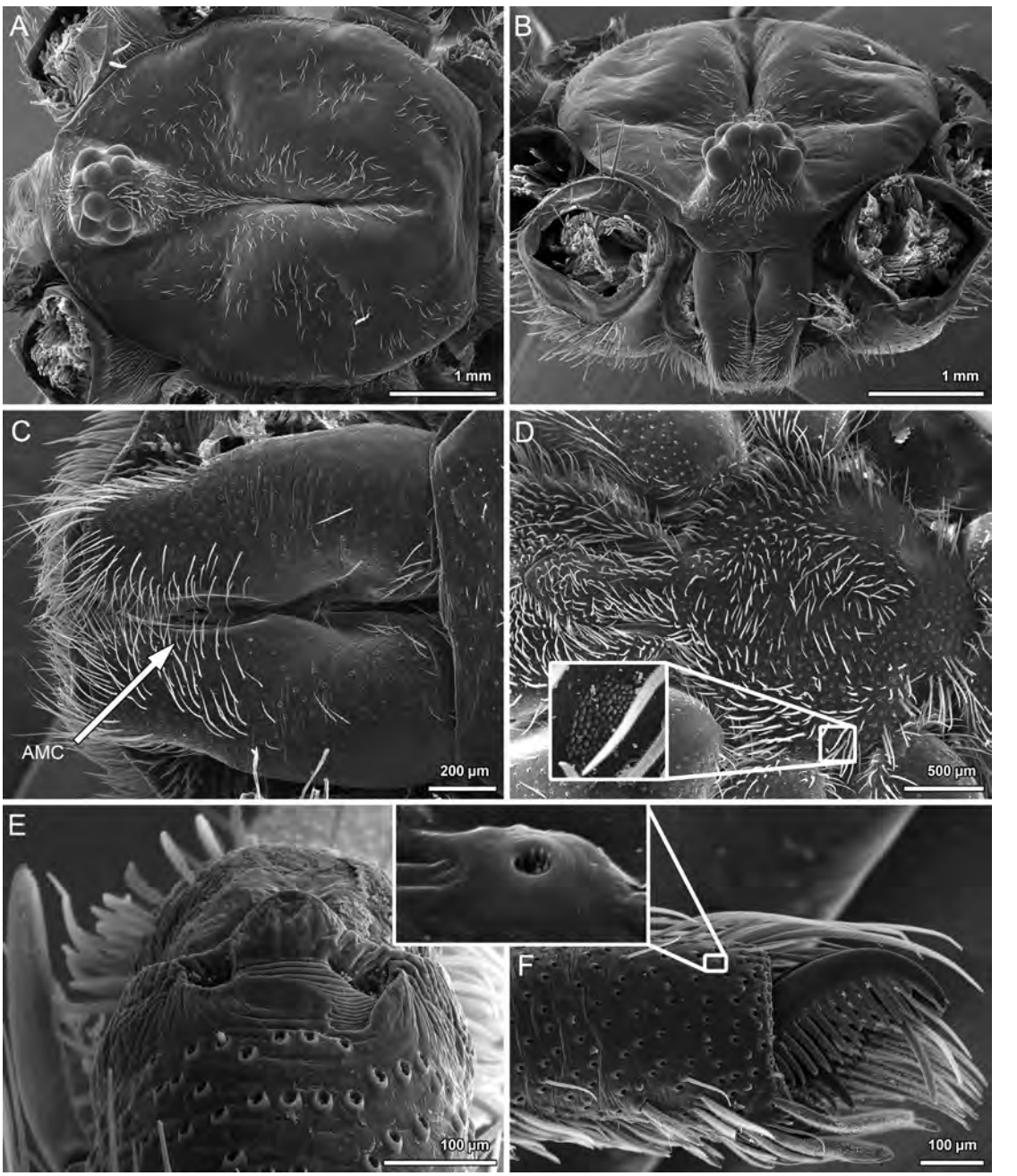

FIGURE 10. *Kukulcania hibernalis* (Hentz, 1842), male from Argentina, Buenos Aires (MACN-Ar 20625). **A.** Carapace, dorsal. **B.** Carapace, anterior. **C.** Chelicerae, anterior. **D.** Sternum, ventral. Inset showing sigillum. **E.** Left metatarsus stopper I, dorsal. **F.** Left tarsus I, claws, prolateral. Notice tarsal pseudosegmentation. Inset showing tarsal organ. Abbreviation: **AMC,** arcuate margin of the chelicerae.

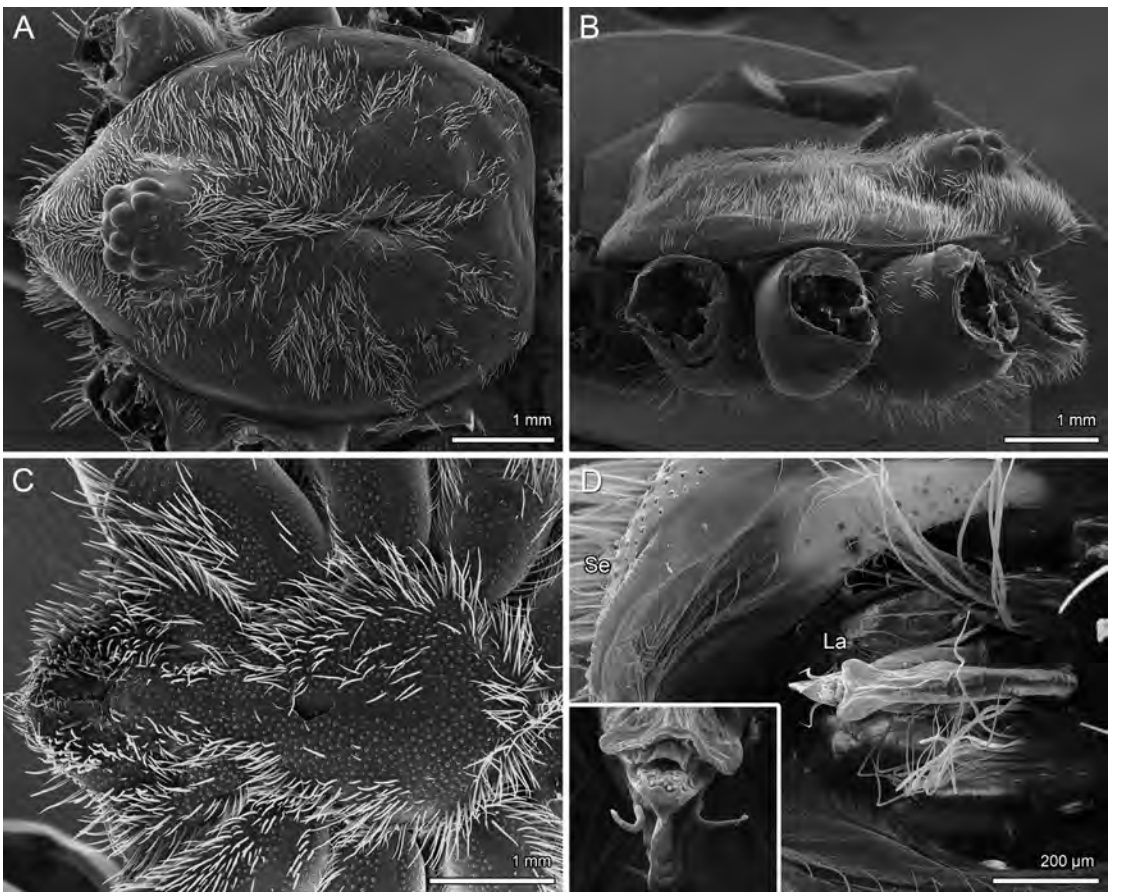

FIGURE 11. *Kukulcania hibernalis* (Hentz, 1842), female from Argentina, Buenos Aires (MACN-Ar 10427). **A.** Carapace, dorsal. **B.** Carapace, lateral. **C.** Sternum, ventral. **D.** Labrum and left serrula, anterior. Inset showing apex of labral tongue. Images by F.M. Labarque. Abbreviations: **La,** labrum; **Se,** serrula.

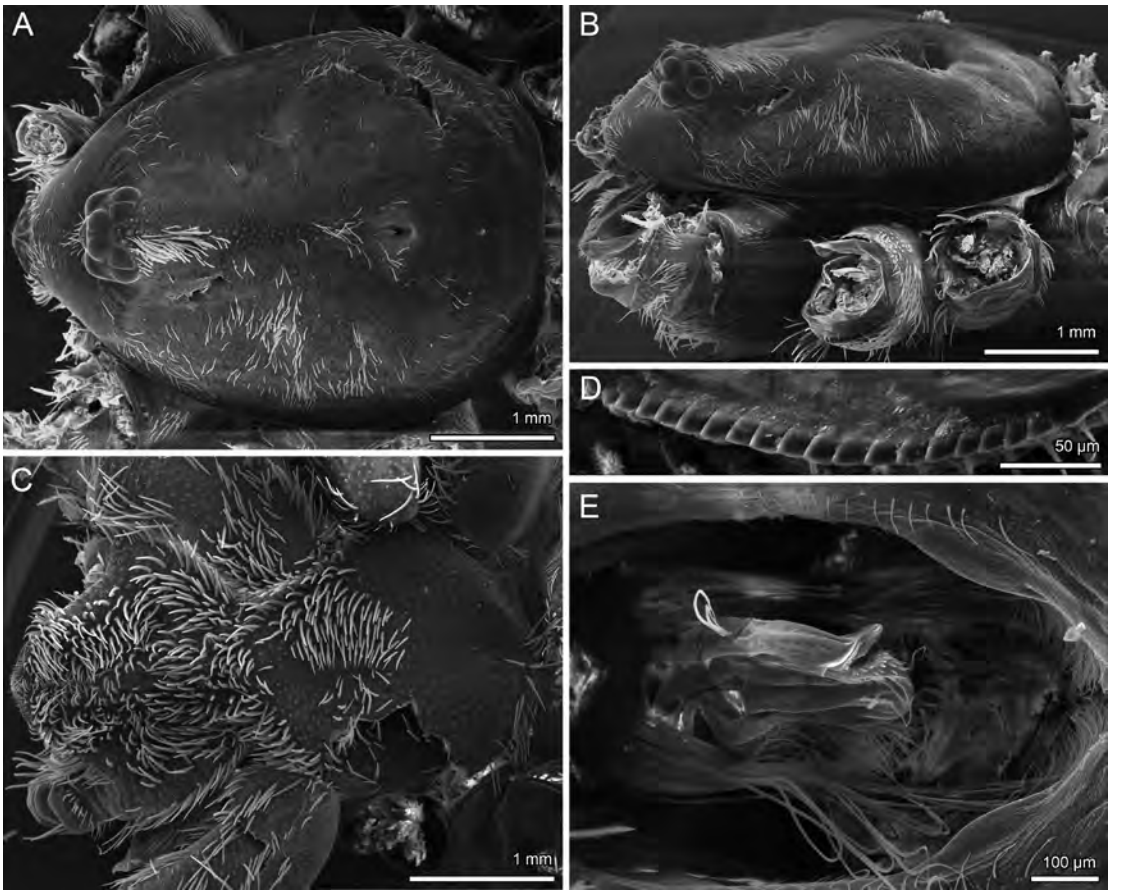

FIGURE 12. *Kukulcania geophila* (Chamberlin and Ivie, 1935), female from California, Sonoma Co. (AMNH IFM-1391). **A.** Carapace, dorsal. **B.** Carapace, lateral. **C.** Sternum, ventral. **D.** Right serrula, anterior. **E.** Labrum, subdorsal.

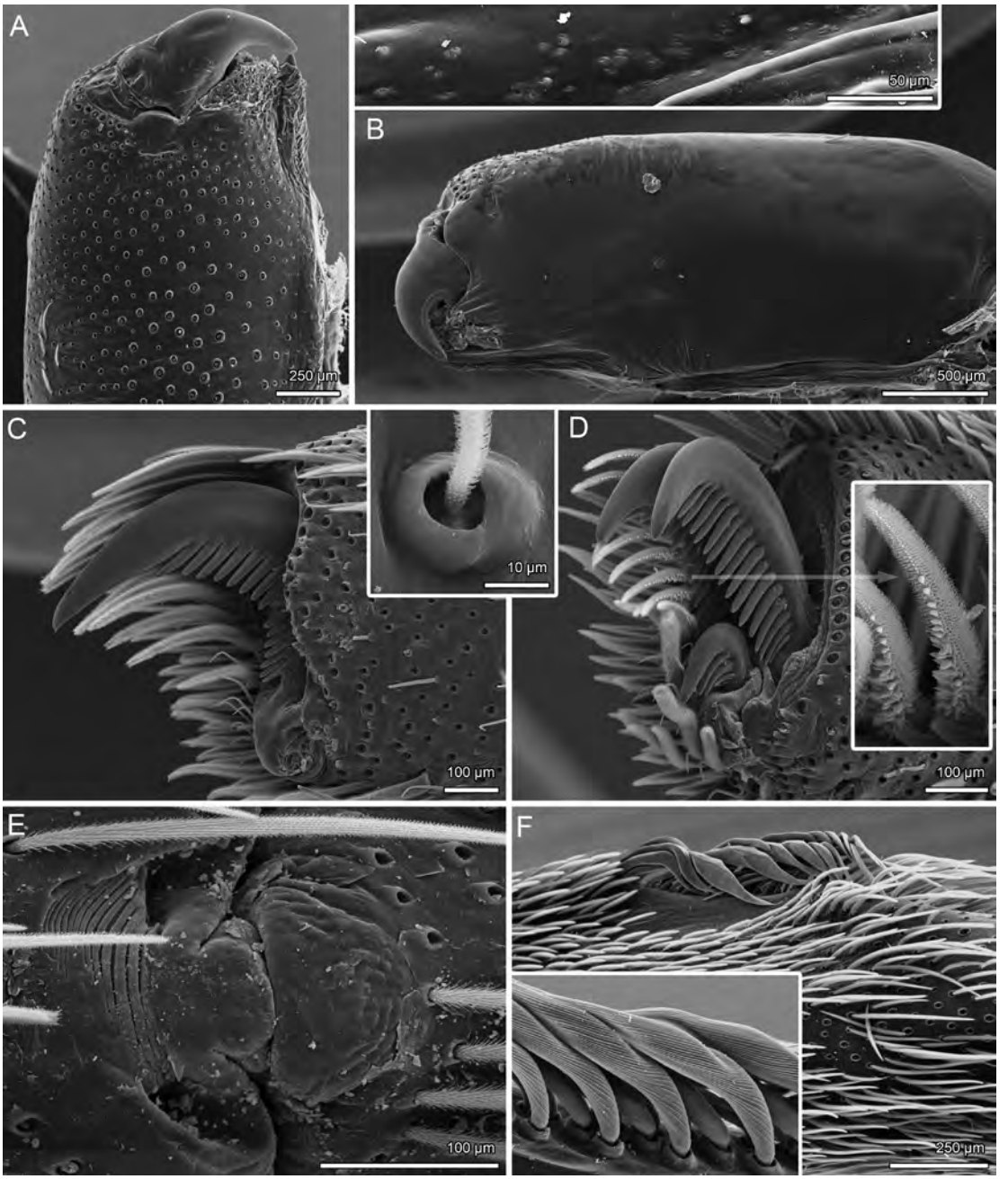

FIGURE 13. *Kukulcania hibernalis* (Hentz, 1842), female from Argentina, Buenos Aires (MACN-Ar 10427). **A.** Left chelicera, promargin. **B.** Left chelicera, retromargin. Inset showing cheliceral gland. **C.** Left palpal claw, retrolateral. Inset showing palpal tibia trichobothrial base. **D.** Left tarsal claws I, apico-retrolateral. Inset showing detail of setae. **E.** Left metatarsus stopper IV, dorsal. **F.** Calamistrum, dorsal. Inset showing detail of calamistrum setae, retrolateral. Images by F.M. Labarque.

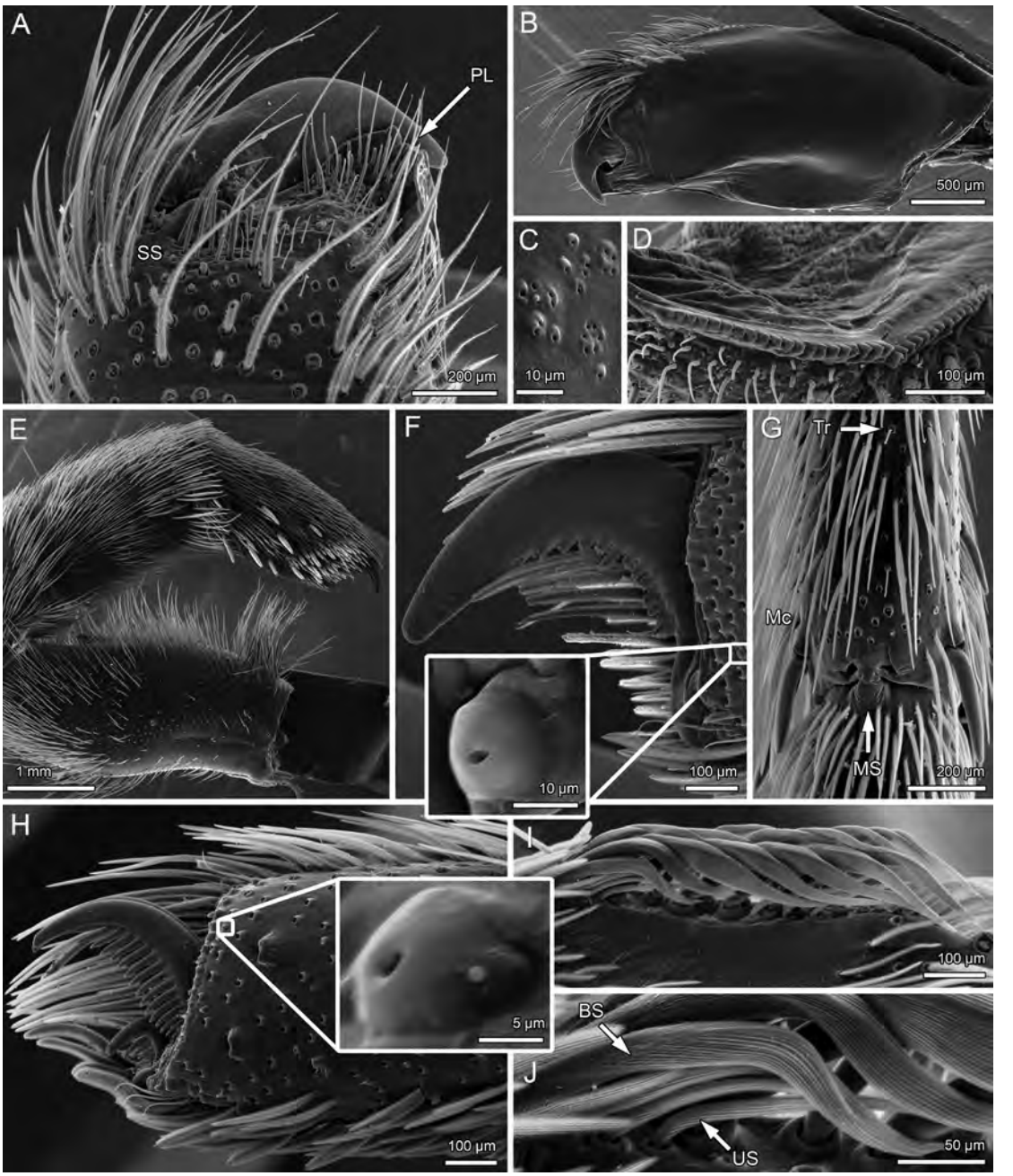

FIGURE 14. *Kukulcania hurca* (Chamberlin and Ivie, 1942), female from California, El Cajón (AMNH IFM-1402). **A.** Left chelicera, promargin. **B.** Left chelicera, retromargin. **C.** Part of cheliceral gland, mesal. **D.** Left serrula, anterior. **E.** Left palp, prolateral. **F.** Left palpal claw, retrolateral. Inset showing tarsal organ. **G.** Left metatarsus stopper IV, dorsal. **H.** Left tarsal claws IV. Inset showing tarsal organ. **I.** Left calamistrum, dorsal. Note row with smaller, unmodified setae. **J.** Detail of calamistrum setae. Abbreviations: **BS,** broadened seta; **Mc,** macroseta; **MS,** metatarsus stopper; **PL,** promarginal lobe; **SS,** slit sensilla; **Tr,** trichobothria; **US,** unmodified seta.

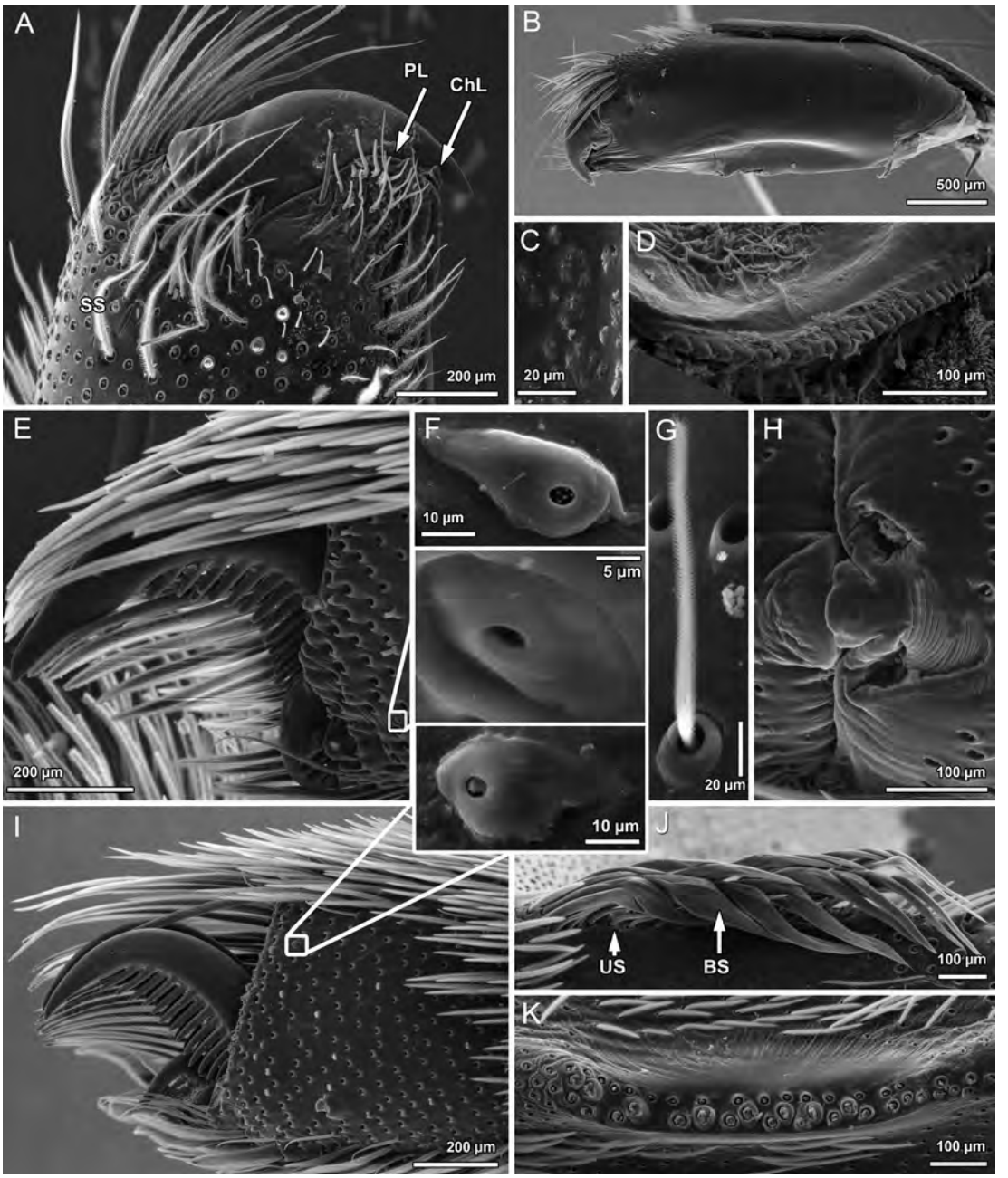

FIGURE 15. *Kukulcania tractans* (O. Pickard-Cambridge, 1896), female from Mexico, Guerrero, 7 miles S Chilpancingo (AMNH IFM-1446). **A.** Left chelicera, promargin. **B.** Left chelicera, retromargin. **C.** Part of cheliceral gland, mesal. **D.** Left serrula, anterior. **E.** Left palpal claw, retrolateral. Inset showing tarsal organ. **F.** Right tarsal organ IV. **G.** Left leg IV, trichobothria. **H.** Left metatarsus stopper I, dorsal. **I.** Left tarsal claws I, retrolateral. Inset showing tarsal organ. **J.** Left calamistrum, dorsal. Note row with smaller, unmodified setae. **K.** Right calamistrum with setae removed, dorsolateral. Abbreviations: **BS,** broadened seta; **ChL,** cheliceral lamina; **PL,** promarginal lobe; **SS,** slit sensilla; **US,** unmodified seta.

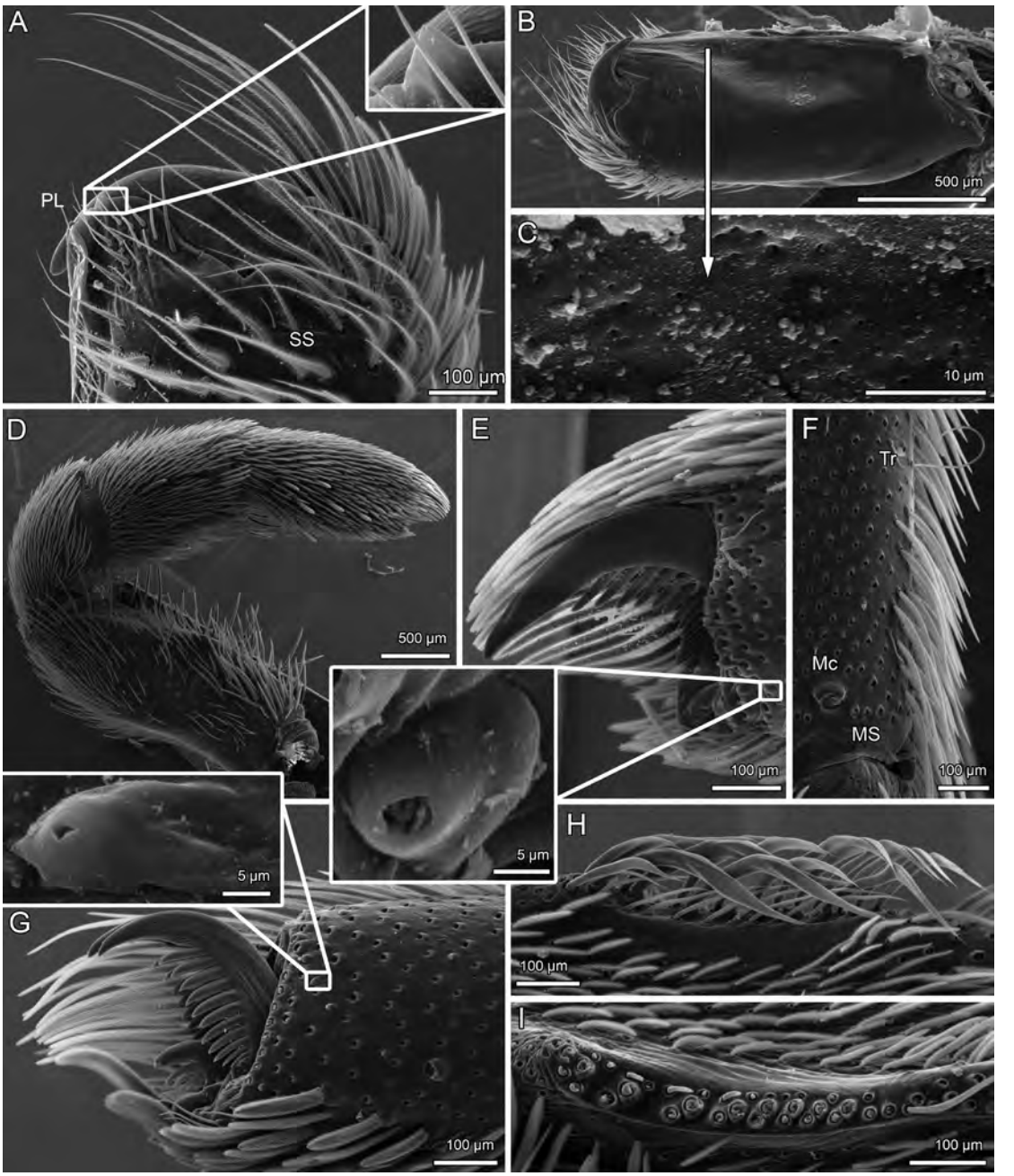

FIGURE 16. *Kukulcania geophila* (Chamberlin and Ivie, 1935), female from California, Sonoma Co. (AMNH IFM-1391). **A.** Right chelicera, promargin. Inset showing tooth on promarginal lobe. **B.** Right chelicera, retromargin. **C.** Cheliceral gland, mesal. **D.** Left palp, prolateral. **E.** Left palpal claw, retrolateral. Inset showing tarsal organ. **F.** Right metatarsus IV, retrolateral. **G.** Left tarsal claws IV. Inset showing tarsal organ. **H.** Left calamistrum, dorsal. Note row with smaller, unmodified setae. **I.** Right calamistrum with setae removed, dorsolateral. Abbreviations: **Mc,** macroseta base; **MS,** metatarsus stopper; **Tr,** trichobothria.

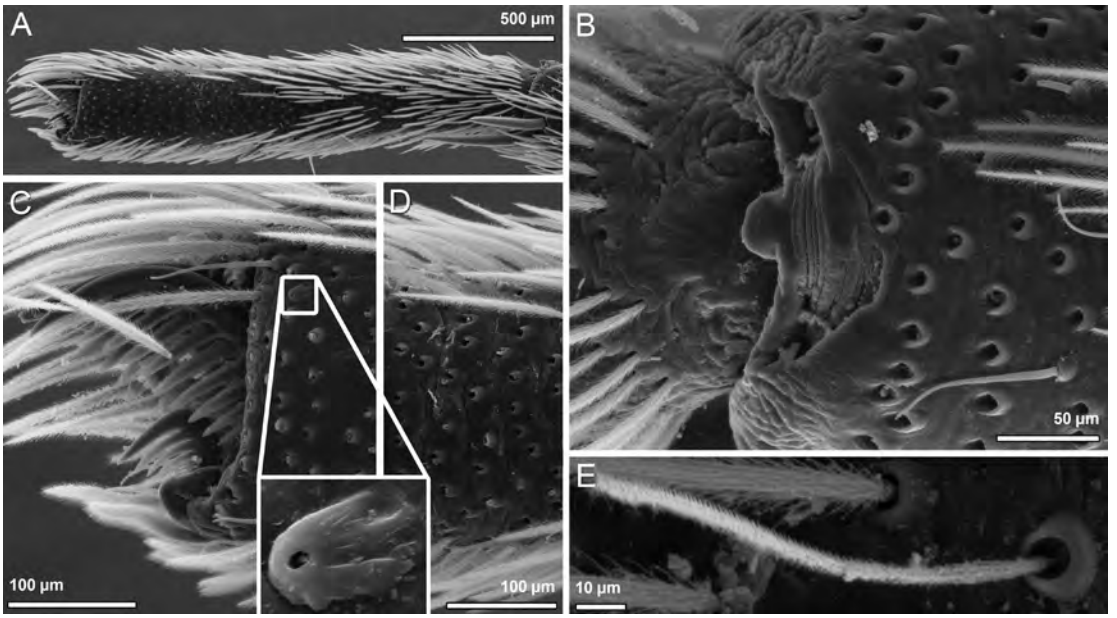

FIGURE 17. *Kukulcania geophila* (Chamberlin and Ivie, 1935), male from California, Tulare Co. (CAS 9057643). **A.** Left tarsus I, retrolateral. **B.** Left metatarsus stopper I, dorsal. **C.** Left tarsal claws I, retrolateral. Inset showing tarsal organ. **D.** Detail of tarsal pseudosegmentation. **E.** Metatarsus I, trichobothria, dorsal.

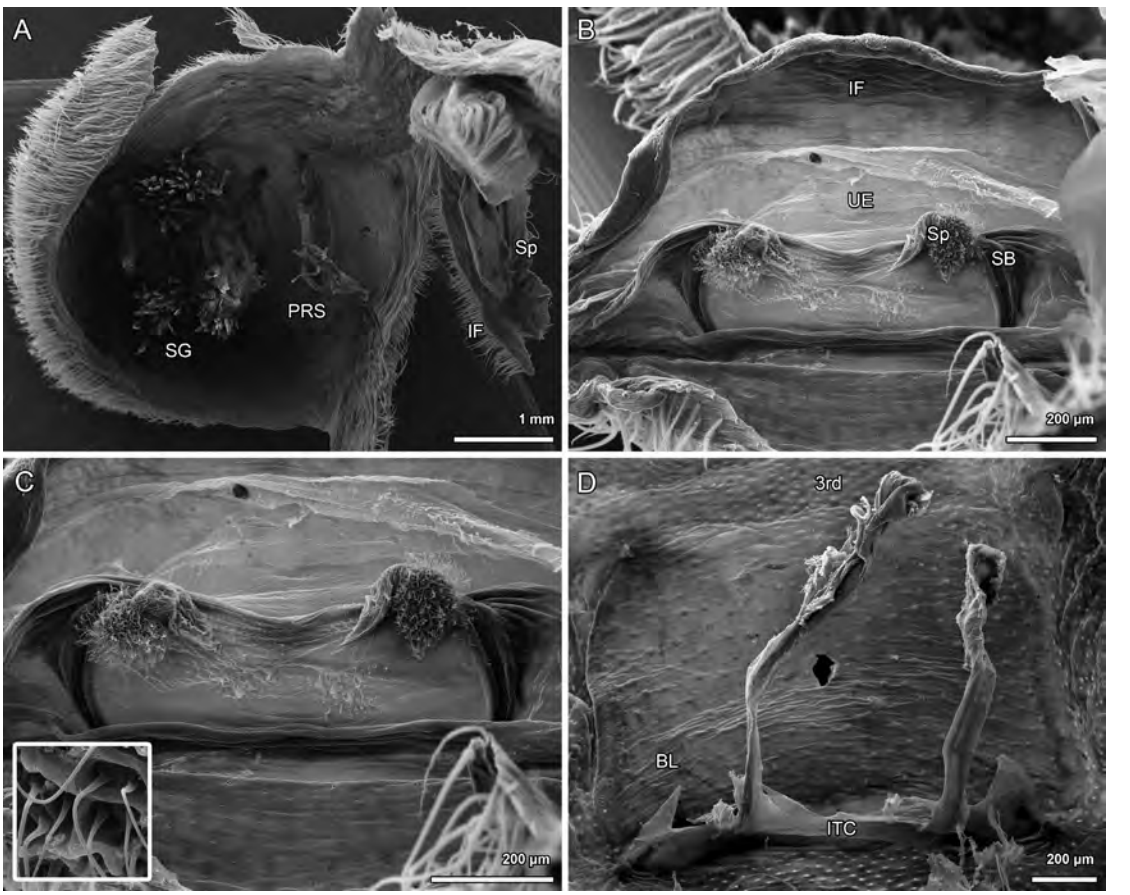

FIGURE 18. *Kukulcania hibernalis* (Hentz, 1842), female from Argentina, Buenos Aires (MACN-Ar 20653). **A.** Abdomen, KOH digested, dorsal. **B–C.** Spermathecae, ventral. Inset showing glandular pores. **D.** Posterior respiratory system, dorsal. Abbreviations: **3rd,** 3rd abdominal entapophyses; **BL,** posterior book lungs; **IF,** interpulmonary fold; **ITC,** intertracheal canal; **SB,** sclerotized bars; **SG,** silk glands; **Sp,** spermathecae; **PRS,** posterior respiratory system; **UE,** uterus externus.

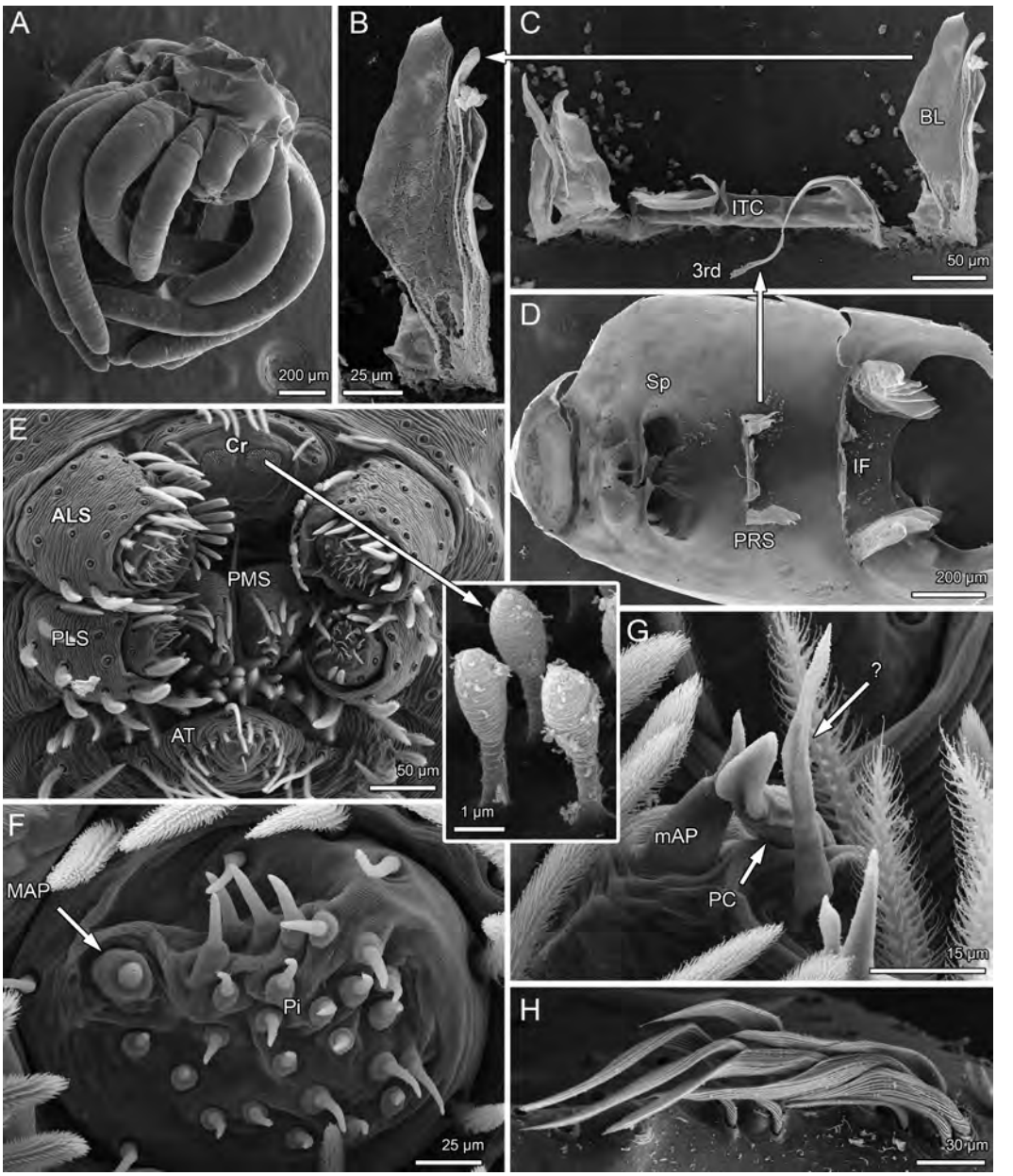

FIGURE 19. *Kukulcania hibernalis* (Hentz, 1842), early spiderlings from Argentina, Santa Fe, Vera (MACN-Ar). **A–D.** First instar (stage without setae). **A.** General view. **B.** Posterior book lungs, note the presence of several leaves. **C.** Posterior respiratory system. **D.** Abdomen, digested, dorsal view. **E–H.** Third instar (dispersing stage). **E.** Spinnerets, ventral view. Inset showing cribellum spigots. **F.** Left ALS, ventral view. **G.** Left PMS, sublateral view. **H.** Right calamistrum, prolateral. Abbreviations: **3rd,** 3rd abdominal entapophyses; **ALS,** anterior lateral spinnerets; **AT,** anal tubercle; **BL,** posterior book lungs; **Cr,** cribellum; **IF,** interpulmonary fold; **ITC,** intertracheal canal; **MAP,** major ampullate gland spigot; **mAP,** minor ampullate gland spigot; **PC,** paracribellar gland spigot; **Pi,** piriform gland spigot; **PLS,** posterior lateral spinnerets; **PMS,** posterior median spinnerets; **PRS,** posterior respiratory system; **Sp,** spinnerets.

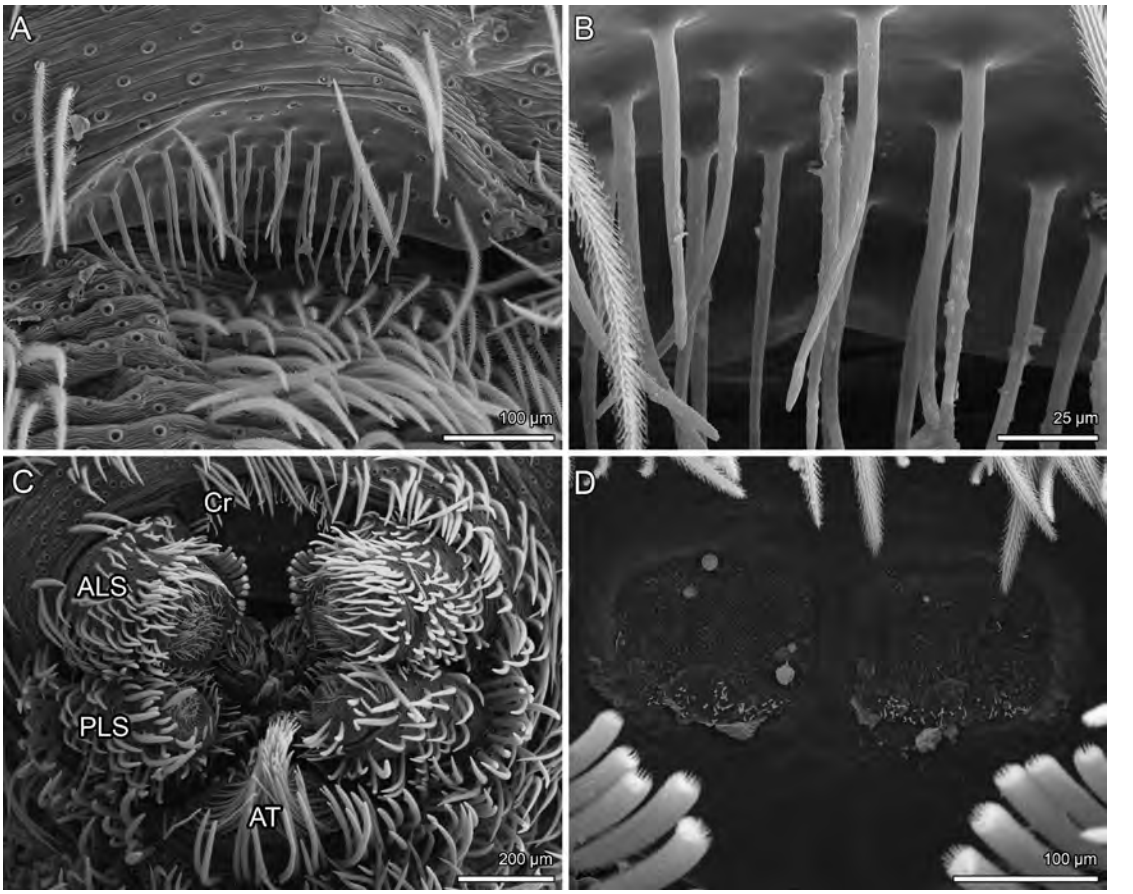

FIGURE 20. *Kukulcania hibernalis* (Hentz, 1842), male from Argentina, Buenos Aires (MACN-Ar 10422). **A.** Epiandrium, ventral. **B.** Epiandrium spigots. **C.** Spinnerets, ventral. **D.** Cribellum, ventral. Images by F.M. Labarque. Abbreviations: **ALS,** anterior lateral spinnerets; **AT,** anal tubercle; **Cr,** cribellum; **PLS,** posterior lateral spinnerets.

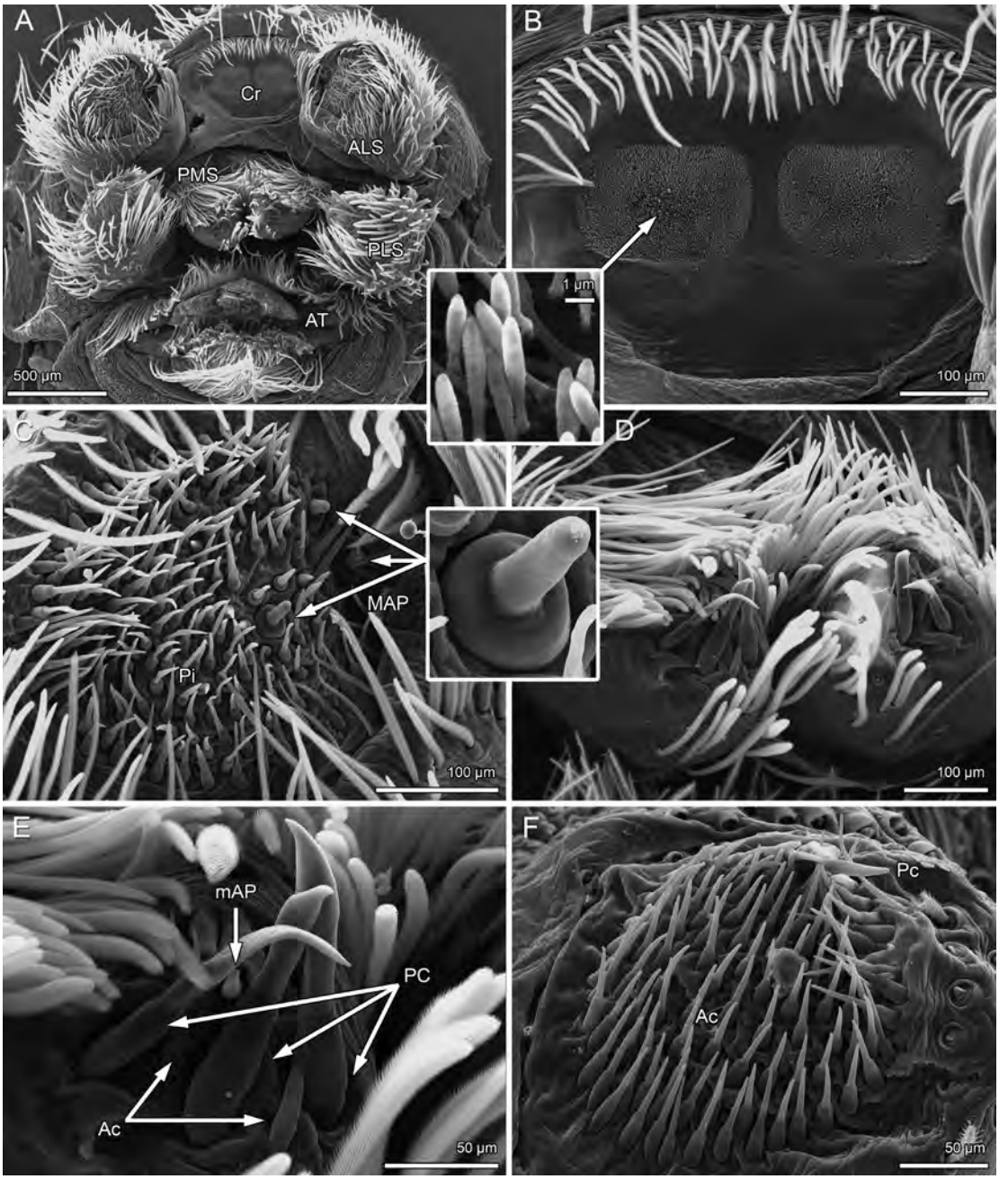

FIGURE 21. *Kukulcania hibernalis* (Hentz, 1842), female from Argentina, Buenos Aires (MACN-Ar 10427). **A.** Spinnerets, ventral. **B.** Cribellum, ventral, inset showing cribellum spigots. **C.** Right ALS, ventral. Inset showing MAP. **D.** PMS, ventral. **E.** Right PMS, ventral. **F.** PLS, ventral. Images by F.M. Labarque. Abbreviations: **Ac,** aciniform gland spigots; **ALS,** anterior lateral spinnerets; **AT,** anal tubercle; **Cr,** cribellum; **MAP,** major ampullate gland spigot; **mAP,** minor ampullate gland spigot; **PC,** paracribellar gland spigot; **Pi,** piriform gland spigot; **PLS,** posterior lateral spinnerets; **PMS,** posterior median spinnerets.

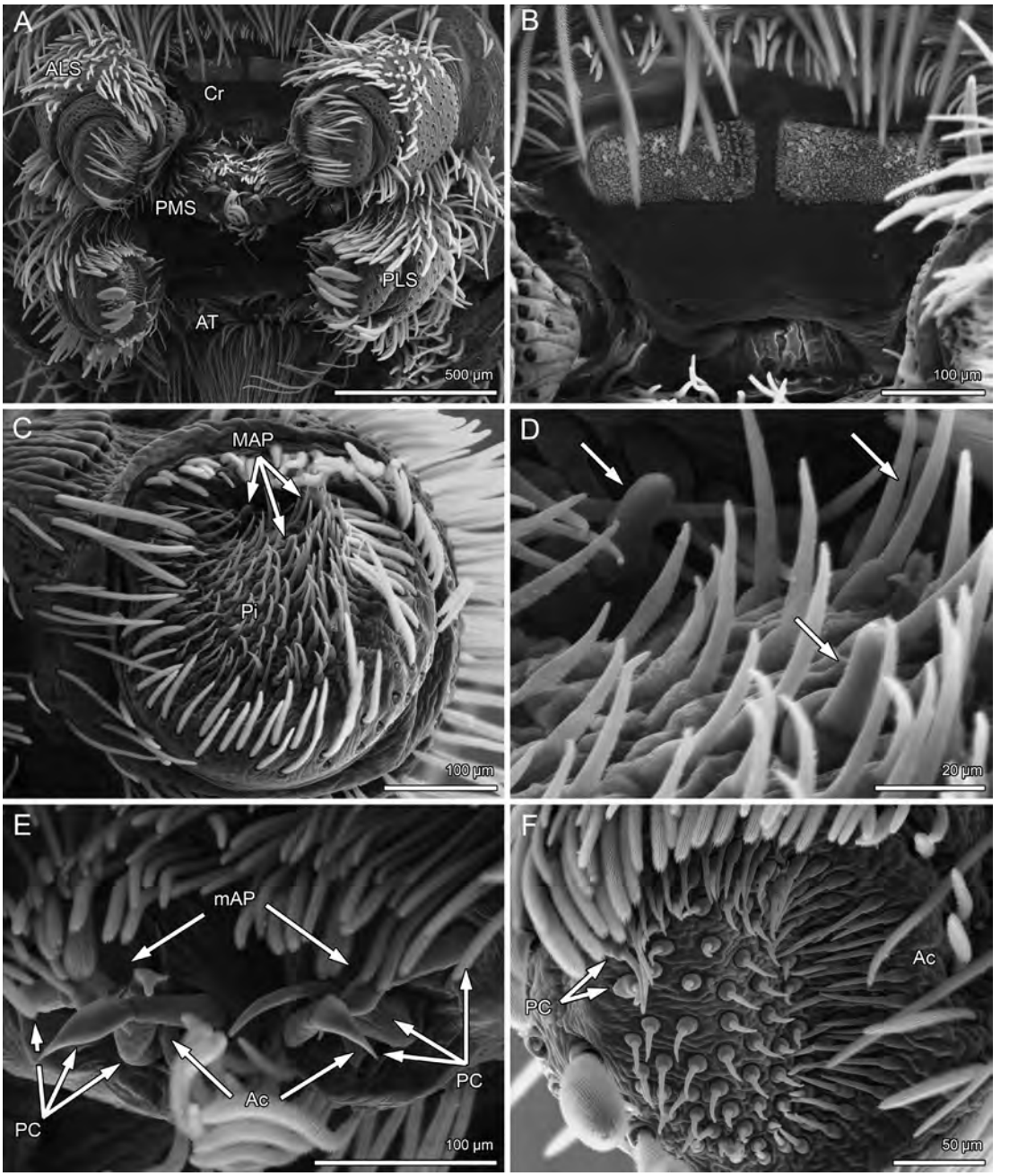

FIGURE 22. *Kukulcania hurca* (Chamberlin and Ivie, 1942), female from California, El Cajón (AMNH IFM-1402). **A.** Spinnerets, ventral. **B.** Cribellum, ventral. **C.** Left ALS, ventral. **D.** Same, detail, arrows to major ampullate gland spigots. **E.** PMS, subventral. **F.** Right PLS, ventral. Abbreviations: **Ac,** aciniform gland spigots; **ALS,** anterior lateral spinnerets; **AT,** anal tubercle; **Cr,** cribellum; **MAP,** major ampullate gland spigot; **mAP,** minor ampullate gland spigot; **PC,** paracribellar gland spigot; **Pi,** piriform gland spigot; **PLS,** posterior lateral spinnerets; **PMS,** posterior median spinnerets.

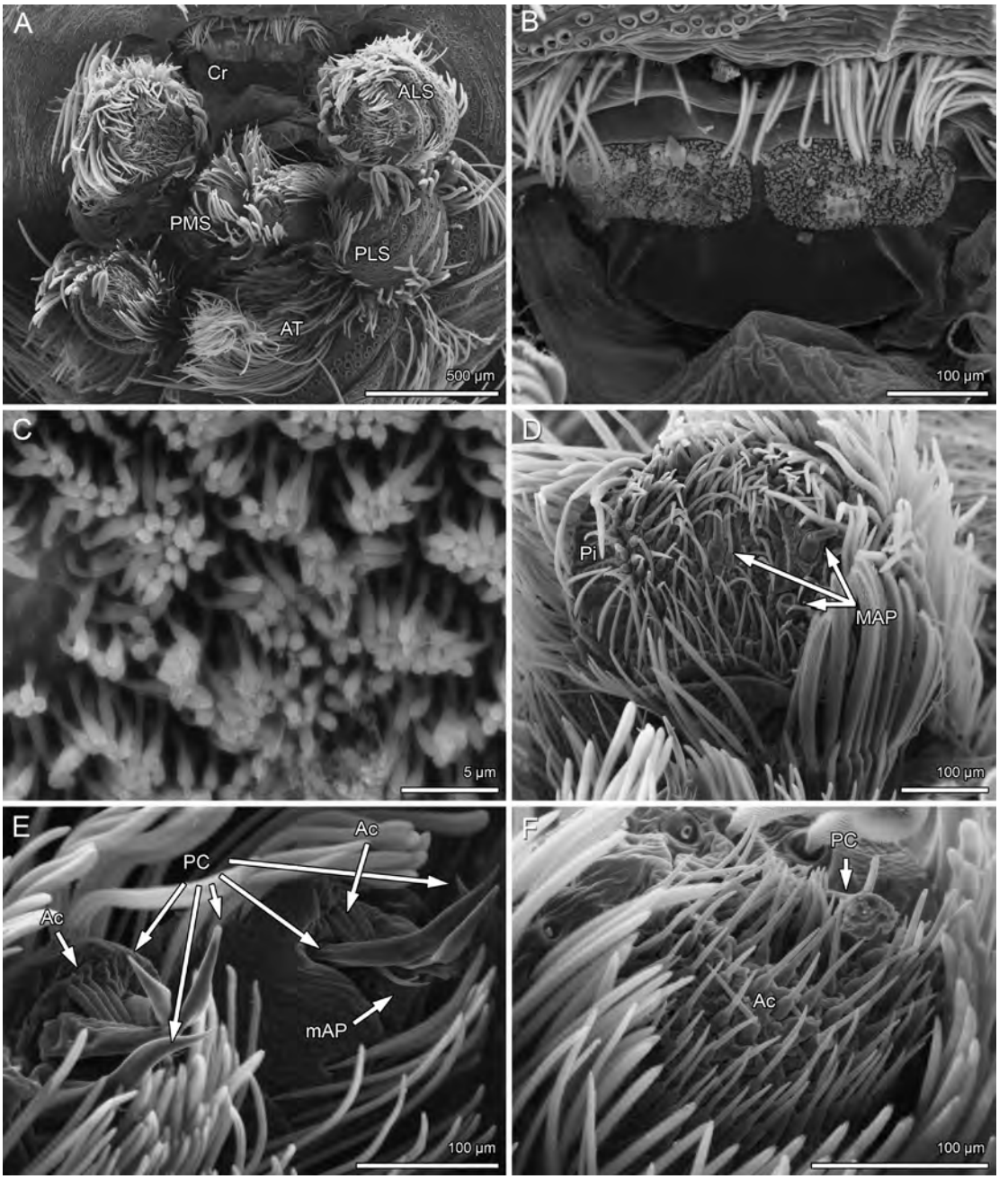

FIGURE 23. *Kukulcania tractans* (O. Pickard-Cambridge, 1896), female from Mexico, Guerrero, 7 miles S Chilpancingo (AMNH IFM-1446). **A.** Spinnerets, ventral. **B.** Cribellum, ventral. **C.** Cribellum spigots. **D.** Right ALS, ventral. **E.** PMS, subanterior. **F.** Right PLS, ventral. Abbreviations: **Ac,** aciniform gland spigots; **ALS,** anterior lateral spinnerets; **AT,** anal tubercle; **Cr,** cribellum; **MAP,** major ampullate gland spigot; **mAP,** minor ampullate gland spigot; **PC,** paracribellar gland spigot; **Pi,** piriform gland spigot; **PLS,** posterior lateral spinnerets; **PMS,** posterior median spinnerets.

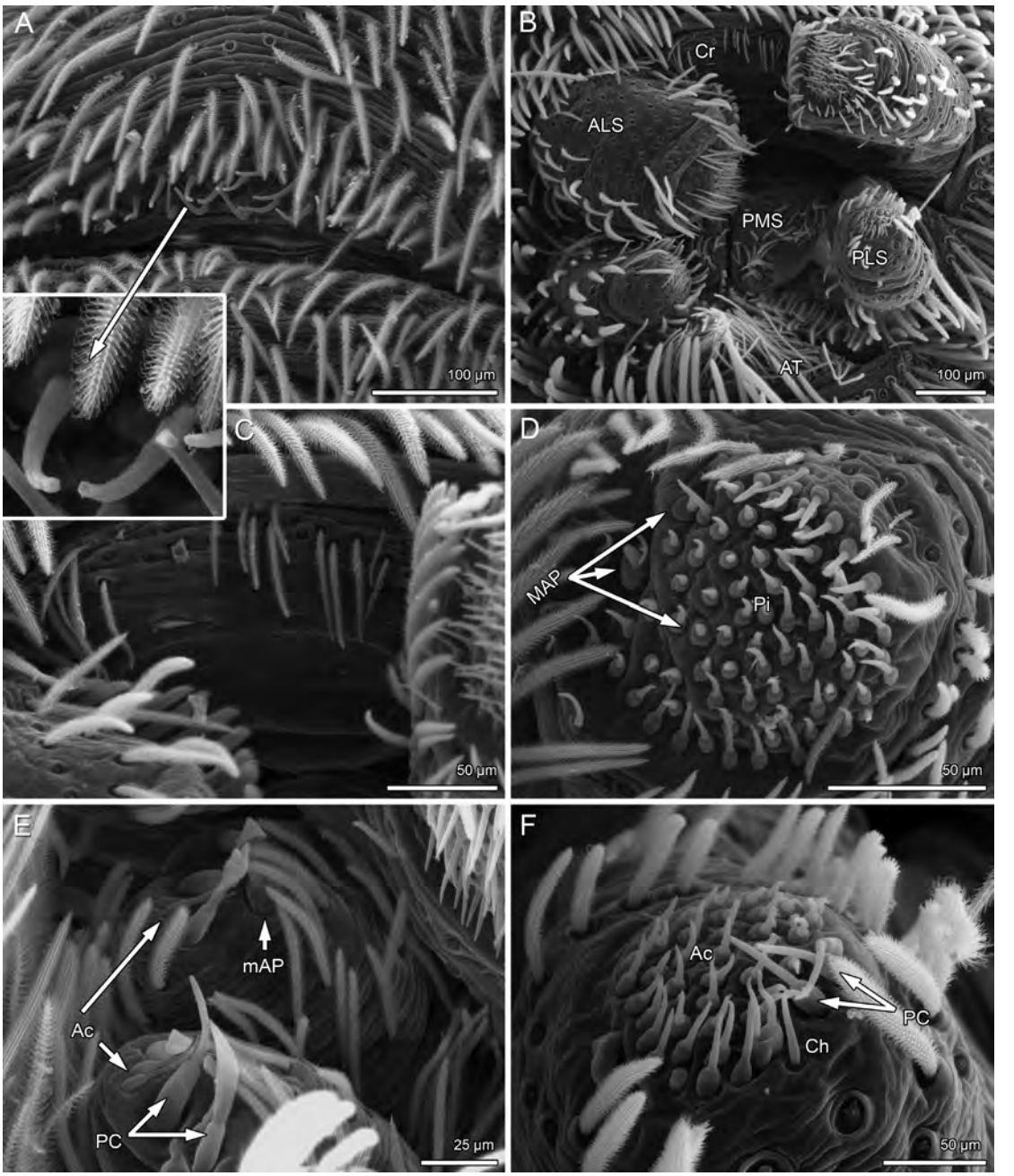

FIGURE 24. *Kukulcania geophila* (Chamberlin and Ivie, 1935), male from California, Tulare Co. (CAS 9057643). **A.** Epiandrium, ventral. Inset showing spigots. **B.** Spinnerets, ventral. **C.** Cribellum, ventral. **D.** Left ALS, ventral. **E.** PMS, sublateral. **F.** Left PLS, ventral. Abbreviations: **Ac,** aciniform gland spigots; **ALS,** anterior lateral spinnerets; **AT,** anal tubercle; **Ch,** chemosensory seta; **Cr,** cribellum; **MAP,** major ampullate gland spigot; **mAP,** minor ampullate gland spigot; **PC,** paracribellar gland spigot; **Pi,** piriform gland spigot; **PLS,** posterior lateral spinnerets; **PMS,** posterior median spinnerets.

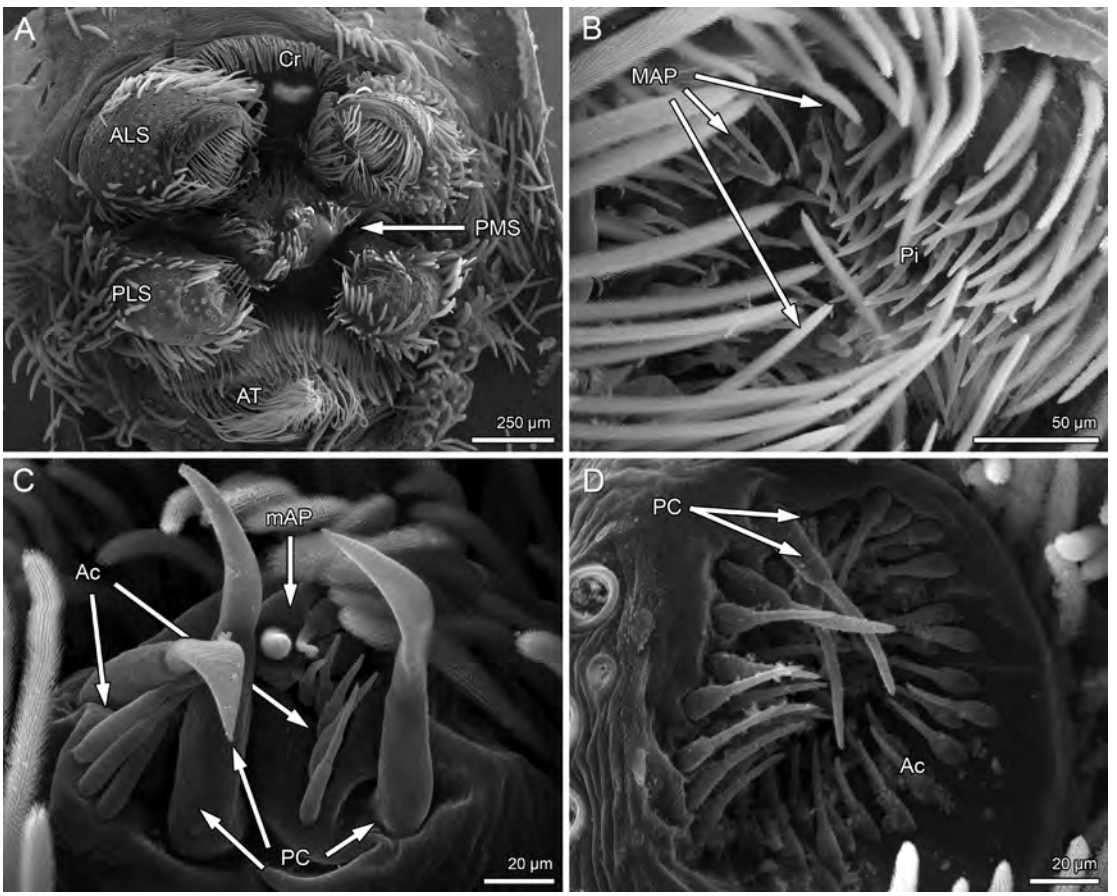

FIGURE 25. *Kukulcania geophila* (Chamberlin and Ivie, 1935), female from California, Sonoma Co. (AMNH IFM-1391). **A.** Spinnerets, ventral. **B.** Left ALS, ventral. **C.** Left PMS, sublateral. **D.** Right PLS, ventral. Abbreviations: **Ac,** aciniform gland spigots; **ALS,** anterior lateral spinnerets; **AT,** anal tubercle; **Cr,** cribellum; **MAP,** major ampullate gland spigot; **mAP,** minor ampullate gland spigot; **PC,** paracribellar gland spigot; **Pi,** piriform gland spigot; **PLS,** posterior lateral spinnerets; **PMS,** posterior median spinnerets.

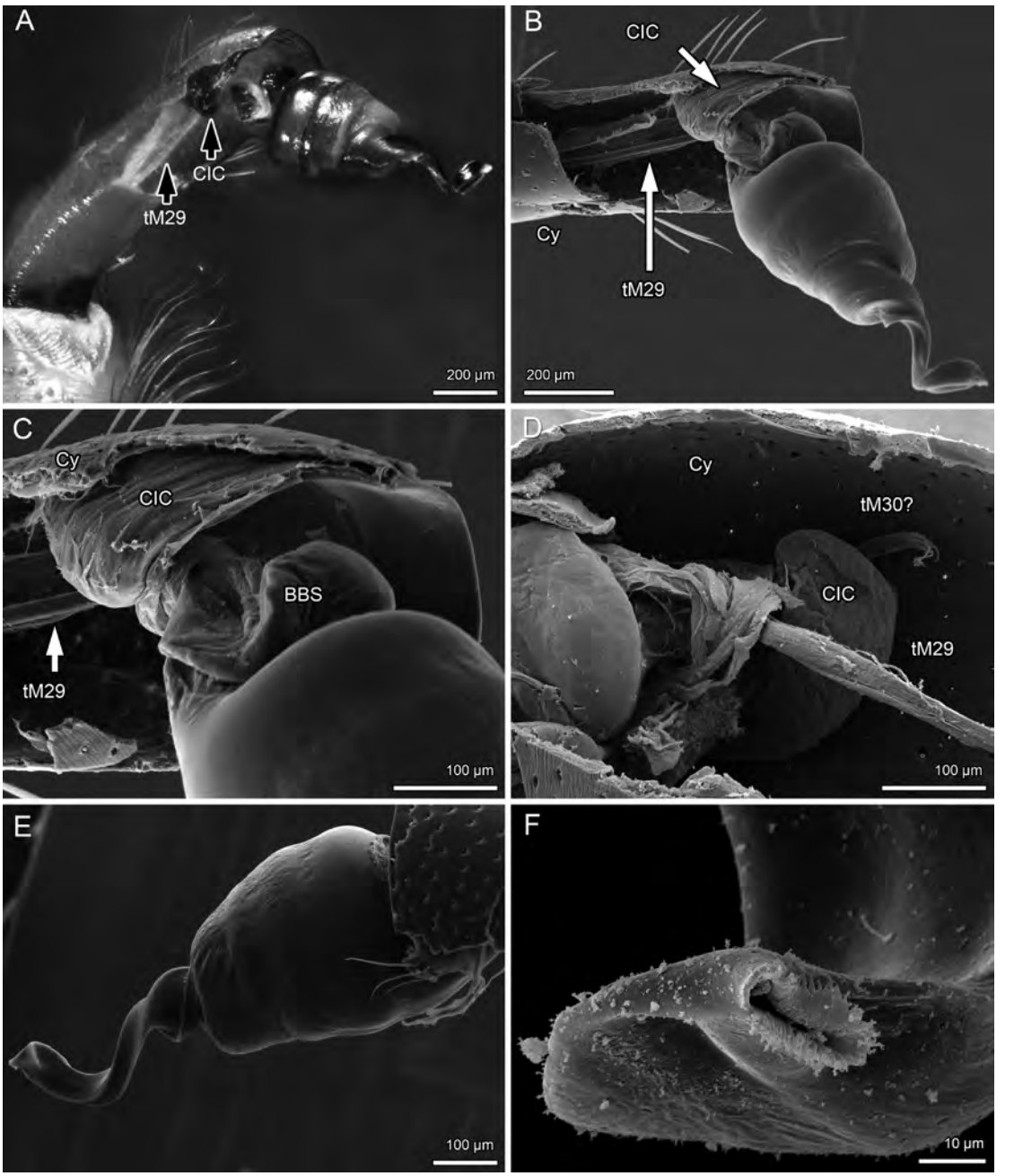

FIGURE 26. *Kukulcania hibernalis* (Hentz, 1842), male palps with part of the cymbium wall removed and pancreatin digested. **A–C, E.** Argentina, Buenos Aires (MACN-Ar 20625), right palp, mirrored**. A–C.** Prolateral. **D.** Georgia, Savanna (AMNH), retrolateral. **E.** Retrolateral. **F.** Argentina, Buenos Aires (MACN-Ar 10422), embolus opening. Image by F.M. Labarque. Abbreviations: **CIC,** cymbium internal crest; **Cy,** cymbium; **tM29,** tendon of the claw flexor muscle; **tM30?**, putative tendon of the claw extensor muscle.

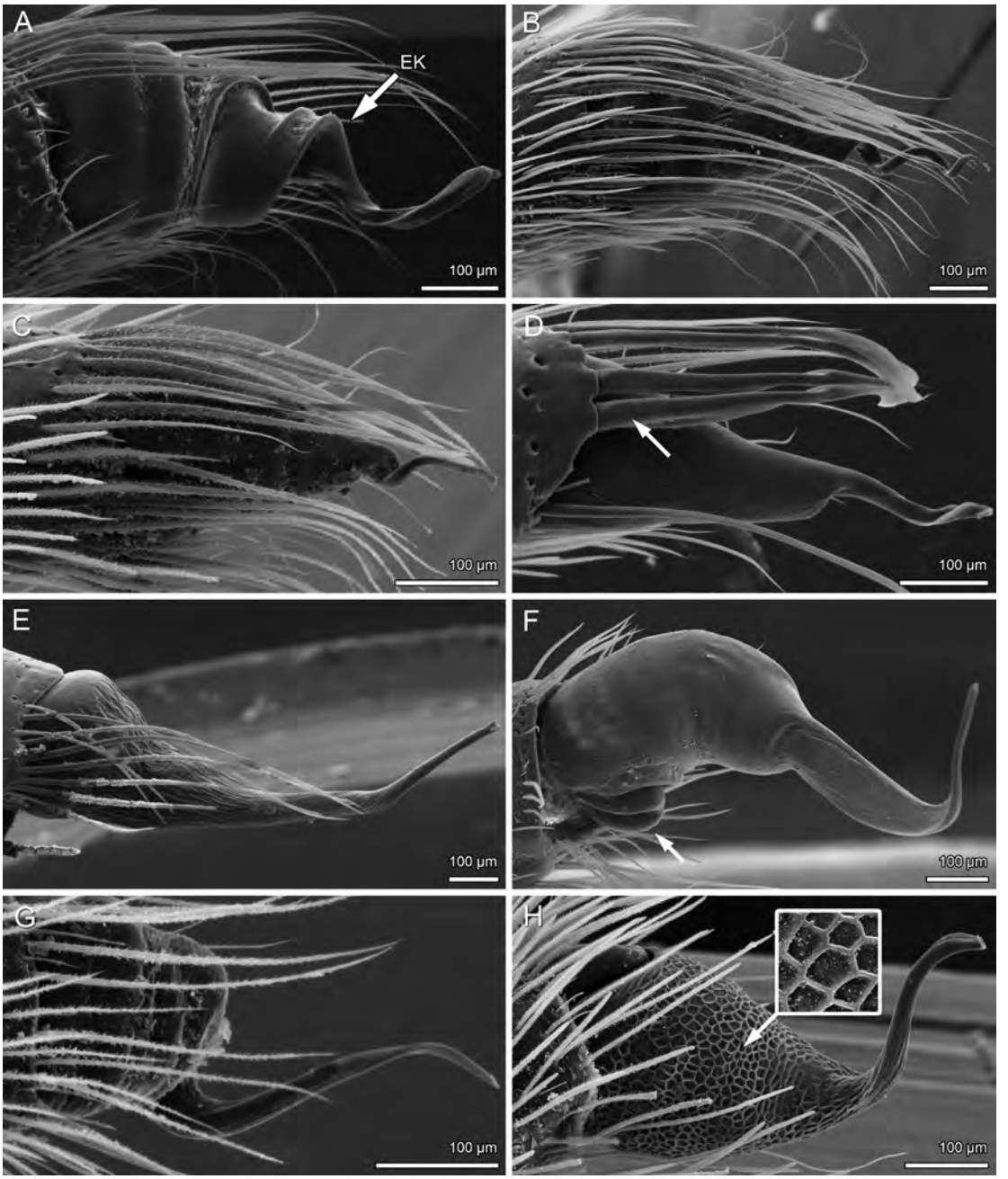

FIGURE 27. *Kukulcania* spp., male left bulbs except where noted, prolateral view. **A.** *K. arizonica* (Chamberlin and Ivie, 1935) (AMNH IFM-1392). **B.** *K. utahana* (Chamberlin and Ivie, 1935) (AMNH IFM-1395). **C.** *K. hurca* (Chamberlin and Ivie, 1942) (AMNH IFM-1394). **D.** *K. santosi*, (AMNH IFM-1404), right palp, mirrored, arrow to spatulate setae. **E.** *K. tractans* (O. Pickard-Cambridge, 1896) (AMNH IFM-1408). **F.** *K. tequila*, paratype (AMNH IFM-1549), right palp, mirrored. **G.** *K. geophila* (Chamberlin and Ivie, 1935) (CAS 9057643). **H.** *K. bajacali* (AMNH IFM-1622), right palp, mirrored. Inset showing texture of the tegulum. Abbreviation: **EK,** embolus keel.

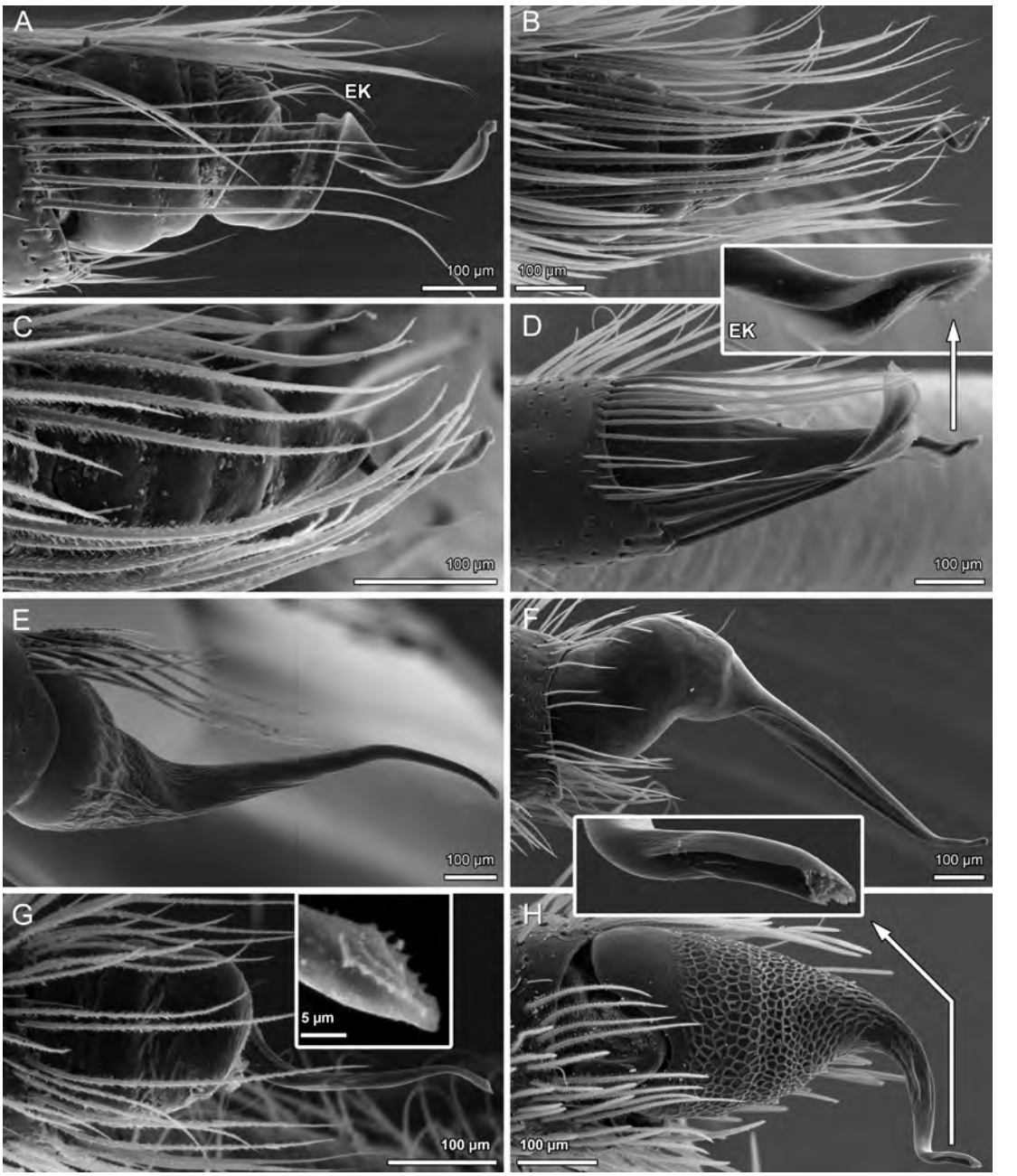

FIGURE 28. *Kukulcania* spp., male left bulbs except where noted, dorsal view. **A.** *K. arizonica* (Chamberlin and Ivie, 1935) (AMNH IFM-1392). **B.** *K. utahana* (Chamberlin and Ivie, 1935) (AMNH IFM-1395). **C.** *K. hurca* (Chamberlin and Ivie, 1942) (AMNH IFM-1394). **D.** *K. santosi* (AMNH IFM-1404), right palp, mirrored. Inset showing embolus. **E.** *K. tractans* (O. Pickard-Cambridge, 1896) (AMNH IFM-1408). Bulb rotated in relation to cymbium. **F.** *K. tequila*, paratype (AMNH IFM-1549), right palp, mirrored. **G.** *K. geophila* (Chamberlin and Ivie, 1935) (CAS 9057643). Bulb rotated in relation to cymbium. Inset showing embolus opening in apical view. **H.** *K. bajacali* (AMNH IFM-1622), right palp, mirrored. Inset showing embolus slit. Abbreviation: **EK,** embolus keel.

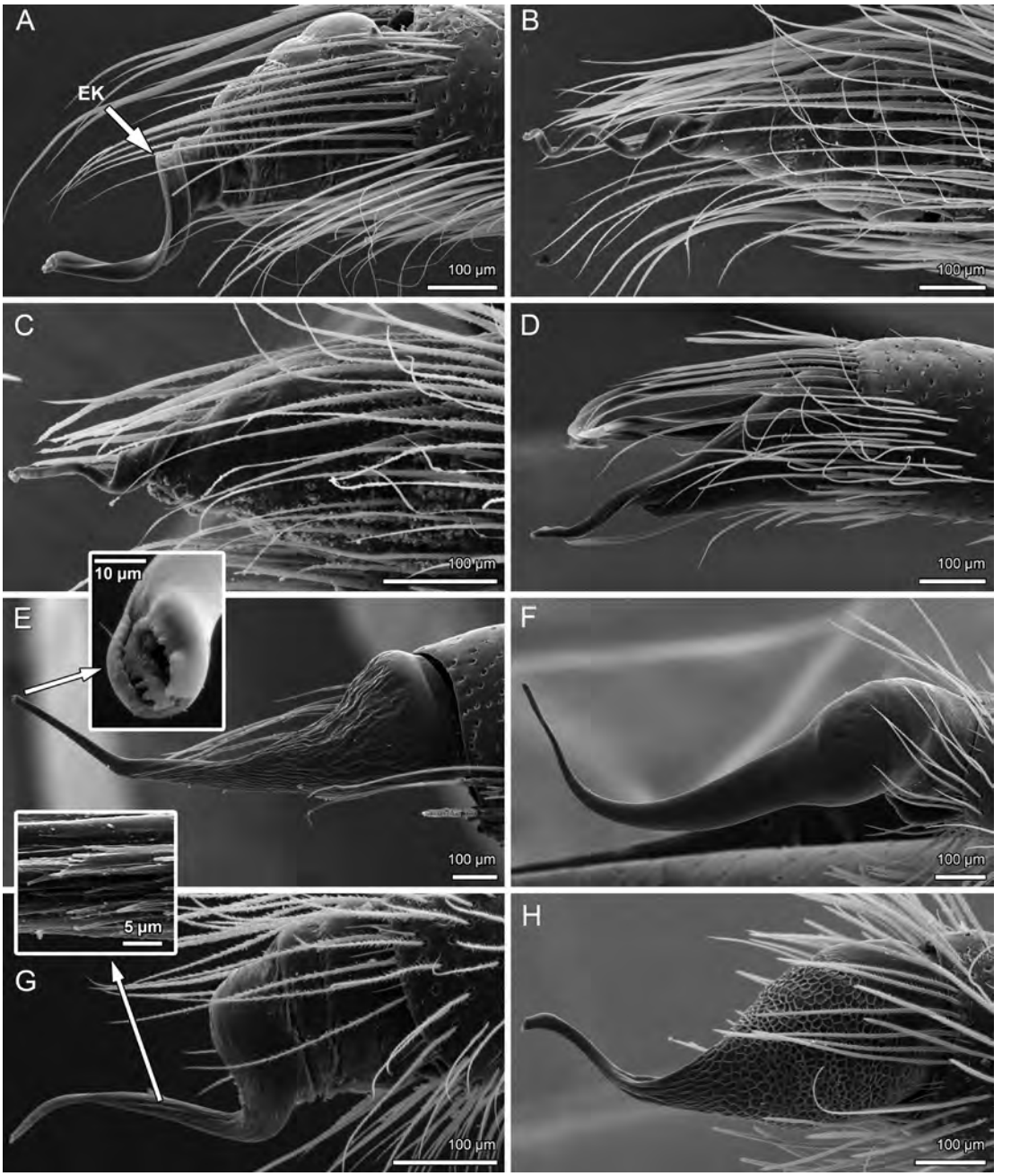

FIGURE 29. *Kukulcania* spp., male left bulbs except where noted, retrolateral view. **A.** *K. arizonica* (Chamberlin and Ivie, 1935) (AMNH IFM-1392). **B.** *K. utahana* (Chamberlin and Ivie, 1935) (AMNH IFM-1395). **C.** *K. hurca* (Chamberlin and Ivie, 1942) (AMNH IFM-1394). **D.** *K. santosi* (AMNH IFM-1404), right palp, mirrored. **E.** *K. tractans* (O. Pickard-Cambridge, 1896) (AMNH IFM-1408). Inset showing embolus opening in apical view **F.** *K. tequila*, paratype (AMNH IFM-1549), right palp, mirrored. **G.** *K. geophila* (Chamberlin and Ivie, 1935) (CAS 9057643). Inset showing texture of the tegulum. **H.** *K. bajacali*. (AMNH IFM-1622), right palp, mirrored. Abbreviation: **EK,** embolus keel.

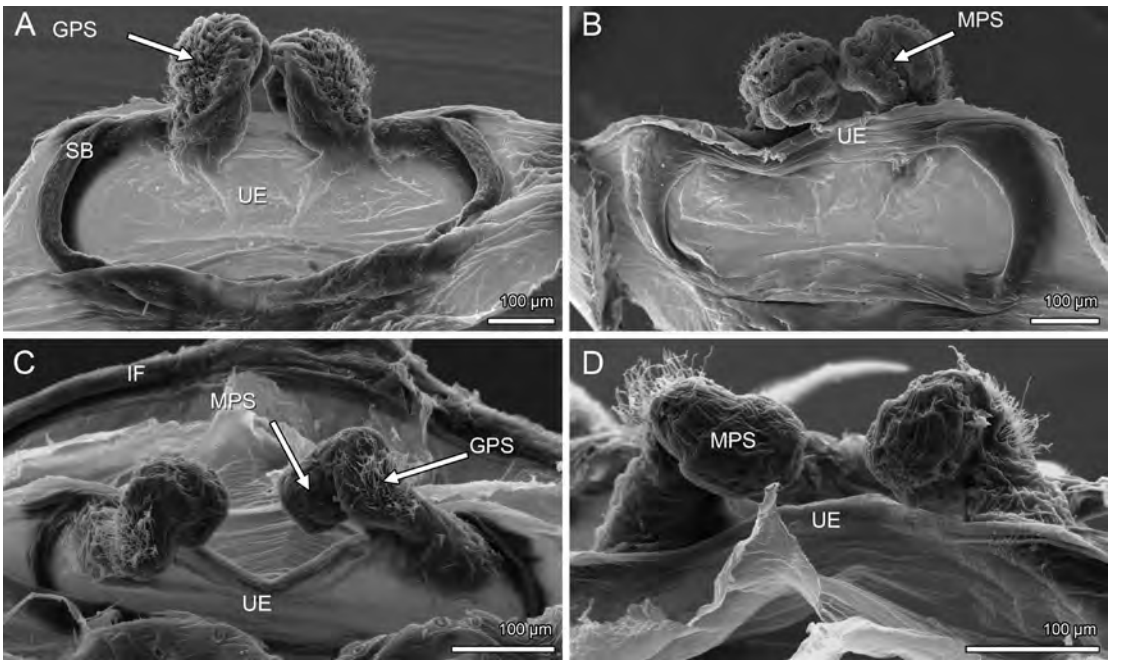

FIGURE 30. *Kukulcania* spp., female spermathecae. **A.** *K. arizonica* (Chamberlin and Ivie, 1935) (AMNH IFM-1393), ventral. **B.** Same, dorsal. **C.** *K. gertschi*, paratype (AMNH IFM-1407), ventral. **D.** Same, dorsal. Abbreviations: **GPS,** glandular portion of spermathecae apex; **IF,** interpulmonary fold; **MPS,** membranous portion of spermathecae apex; **SB,** sclerotized bars; **UE,** uterus externus.

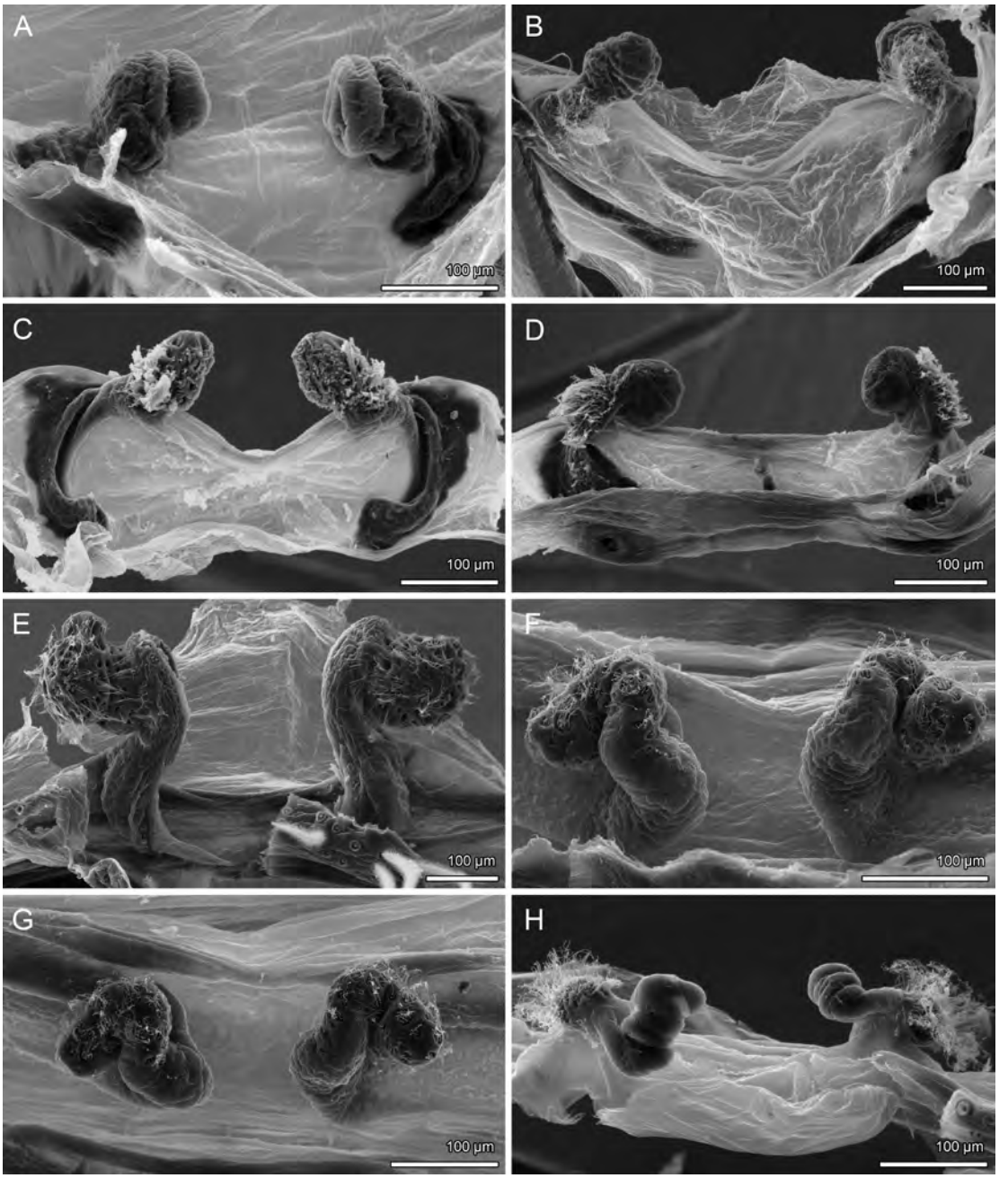

FIGURE 31. *Kukulcania* spp., female spermathecae, ventral view except where noted. **A.** *Kukulcania hurca* (Chamberlin and Ivie, 1942) (AMNH IFM-1402). **B.** *K. brignolii* (Alayón, 1981), comb. nov. (AMNH IFM-1406). **C.** *K. mexicana* (AMNH IFM-1405). **D.** *K. santosi* (AMNH IFM-1403), dorsal. **E.** *K. tractans* (O. Pickard-Cambridge, 1896) (AMNH IFM-1416). **F.** *K. tequila*, paratype (AMNH IFM-1666). **G.** Same, anterior. **H.** *K. geophila* (Chamberlin and Ivie, 1935) (AMNH IFM-1391).

teeth (except for *K. geophila*, with microteeth). Paraembolic lamina absent. Embolus S-shaped to strongly coiled; embolus opening with microteeth. Embolus keel absent (e.g., *K. tractans*) to very large and conspicuous (e.g., *K. cochimi*). Sperm duct with three to four coils, usually tightly packed. Fundus large. Basal bulb sclerite cone shaped (fig. 6).

Female genitalia (figs. 7–9, 18, 30–31): External region unsclerotized, not particularly hirsute. Interpulmonary fold with rounded margin, very large, covering the spermathecae completely in dorsal view. Uterus externus membranous. Apex of spermathecae divided in a membranous portion, unsclerotized and without glandular ducts, and a glandular portion, sclerotized and with several pores with long ducts arising from them; the two portions are partly fused in most species. Sclerotized bars absent or present.

Relationships: *Kukulcania* appears to be most closely related to *Sahastata* (see Discussion).

Composition: Fifteen species, eight of which here described. *Kukulcania hibernalis* (Hentz, 1842), *K. cochimi*, sp. nov., *K. arizonica* (Chamberlin and Ivie, 1935), *K. gertschi*, sp. nov., *K. utahana* (Chamberlin and Ivie, 1935), *K. hurca* (Chamberlin and Ivie, 1942), *K. brignolii* (Alayón, 1981), comb. nov., *K. mexicana*, sp. nov., *K. santosi*, sp. nov., *K. tractans* (O. Pickard-Cambridge, 1896), *K. tequila*, sp. nov., *K. chingona*, sp. nov., *K. geophila* (Chamberlin and Ivie, 1935), *K. benita*, sp. nov., *K. bajacali*, sp. nov.

Distribution: New World, native to the United States and Mexico, with some species naturally extending their distributions into Central America. Some species have been introduced to other regions: *Kukulcania hibernalis* (to South America, Liberia, and possibly the Antilles) and *K. santosi* (Peru and Chile).

Natural history: *Kukulcania* are sedentary spiders that weave apparently irregular, cribellate webs in cracks, crevices, and burrows. The messy appearance of the webs, especially of the older specimens, is deceiving. Newly laid webs are much more ordered, with radial lines that extend from the center of the retreat (fig. 1E). To achieve this design, the spider weaves strands of noncribellate silk as it leaves the retreat, then returns to the center adding cribellate threads. Older webs (fig. 1I) look messy because the spider keeps adding new threads on the top of old ones, and because of the accretion of debris, prey remains and dust. They will often live under rocks or logs, or under bark. Some specimens weave their webs directly in burrows in the ground, especially in soft soils, such as fine sand (fig. 2B). This suggests that females might have some ability to dig. Perhaps the long setae present in the femora and tibiae of legs I–II in females of some species aid in their burrowing activity. They inhabit mostly subtropical arid and semiarid environments in the United States and Mexico, though most (if not all) species are synanthropic and will be often found in the vicinities of human dwellings; their presence in more humid, tropical areas is probably due to human-mediated introduction. They appear to be generalist sit-and-wait predators, though not much is recorded on what prey items are captured in their webs. Mating takes place in the female's web (fig. 1B). The male approaches and courts the female by vibrating his abdomen and adding threads to the web, then proceeds to hook the female's claws with his own and pulls her gently while touching her with the legs (Barrantes and Ramírez, 2013). The mating position is similar to that of mygalomorphs. Females care for the egg sacs and the young remain in her web for some time; the juveniles capture and feed on prey collectively (see Curtis and Carrell, 1999, Cokendolpher and MacDonald, 2008, Barrantes and Ramírez, 2013, Brescovit and Santos, 2013).

Key to the Species of *Kukulcania*

1a. Males (the male of *K. chingona* is unknown) ...2
1b. Females.....15
2a (1). Cymbium with a ring of long setae around its whole border, partly concealing the bulb; embolus keel usually conspicuous; embolus usually with at least one coil (figs. 6C–D, 27B–C) .....3 (*Kukulcania hibernalis* species group)

2b (1). Cymbium without a ring of long setae around its whole border; embolus keel inconspicuous to absent; embolus S-shaped, uncoiled (figs. 6E–F, 27E–H) ....11 (*Kukulcania tractans* species group)

3a (2). Setae on the prolateral face of the cymbium not incrassate (figs. 27B–C, 33B, 46B) 4

3b (2). With at least three setae on the prolateral face of the cymbium incrassate (figs. 27D, 58D, 62B, 66B).....9

4a (3). Embolus keel conspicuous (figs. 27A, 33B, 38B, 42B, 46B) 5

4b (3). Embolus keel inconspicuous; embolus thin and corkscrew shaped (figs. 27B–C, 50, 54) 8

5a (4). Embolus keel broad, with uniform size along the entire length of the embolus, making embolus look broad at apex (figs. 33B–D, 38B–D) 6

5b (4). Embolus keel barely noticeable, tapering toward the apex of the embolus, making embolus look thin at apex (figs. 42B, 46B) 7

6a (5). Embolus keel small; metatarsus I with more than 10 short prolateral macrosetae; eastern United States, coastal Gulf of Mexico, Antilles, Central and South America (figs. 3A, 32–33) ....*Kukulcania hibernalis* (Hentz, 1842)

6b (5). Embolus keel large, translucent, bladelike; metatarsus I with fewer than 10 prolateral macrosetae; Baja California peninsula (figs. 4B, 37–38) ..... *Kukulcania cochimi*

7a (5). Embolus keel delimiting a lozenge-shaped area in the retrolateral face of the bulb; embolus relatively short; ventral face of femur I with unusually long macrosetae; southwestern United States and northern Mexico (figs. 4C, 41–42) ..... *Kukulcania arizonica* (Chamberlin and Ivie, 1935)

7b (5). Embolus keel delimiting a leaf-shaped area in the retrolateral face of the bulb; embolus relatively long; femur I macrosetae not particularly long; northern Mexico (figs. 4B, 45–46) ..... *Kukulcania gertschi*

8a (4). Embolus with two coils; southwestern United States (figs. 3B, 49–50) ..... *Kukulcania utahana* (Chamberlin and Ivie, 1935)

8b (4). Embolus with a single coil; southwestern United States and northwestern Mexico (figs. 3C, 53–54) ..... *Kukulcania hurca* (Chamberlin and Ivie, 1942)

9a (2). Embolus long, coiled; femur I with unusually long macrosetae; central Mexico (figs. 4C, 61–62) ..... *Kukulcania mexicana*

9b (2). Embolus short, uncoiled; femur I macrosetae not particularly long (figs. 57–58, 65–66) 10

10a (9). Embolus bent upward; cymbium with ~10 incrassate setae on the prolateral face, their apices unmodified; central to southern Mexico (figs. 4B, 57–58) .... *Kukulcania brignolii* (Alayón, 1981)

10b (9). Embolus nearly straight; cymbium with ~4 strongly incrassate setae on the prolateral face, their apices clearly spatulate; southern Mexico to Costa Rica, introduced to Peru and Chile (figs. 4A, 65–66) .... *Kukulcania santosi*

11a (2). Palpal tibia very slender, ~10× longer than high; cymbium prolateral edge slightly protruding, bearing a group of ~7 strong setae; embolus long, drawn out, S-shaped; central Mexico (figs. 4A, 69, 70) … *Kukulcania tractans* (O. Pickard-Cambridge, 1896)

11a (2). Palpal tibia stouter, at most ~8× longer than high, usually less; cymbium prolateral edge not protruding; embolus shorter (figs. 74, 80, 87) 12

12a (11). Palpal bulb strongly twisted in apical or dorsal views, with its base with a prolateral concavity and embolus directed retrolaterad; western coastal states of Mexico from Sinaloa to Guerrero (figs. 4B, 73–74) .... *Kukulcania tequila*

12-b (11). Palpal bulb not strongly twisted in apical or dorsal views (figs. 80, 87) 13

13a (12). Cymbium with two strong prolateral setae; dorsal face of the bulb without an exposed membranous area; texture of the

bulb smooth, unremarkable (figs. 27, 80, 83) 14

13b (12). Cymbium without strong prolateral setae; dorsal face of the bulb with a large exposed membranous area; bulb with a peculiar honeycomb texture (difficult to see under light microscopy); Baja California Peninsula (figs. 4B, 86, 87) .... *Kukulcania bajacali*

14a (13). Palpal tibia ~6× longer than high; California and adjacent areas of Oregon, Arizona and Baja California (figs. 4B, 79, 80) .... *Kukulcania geophila* (Chamberlin and Ivie, 1935)

14b (13). Palpal tibia ~8× longer than high; San Benito islands in Baja California (figs. 4B, 83) .....*Kukulcania benita*

15a (1). Genitalia with sclerotized bars alongside spermathecae (figs. 7–8) .... 16 (*Kukulcania hibernalis* species group)

15b (1). Genitalia without sclerotized bars alongside spermathecae (fig. 9) .... 24 (*Kukulcania tractans* species group)

16a (15). Sclerotized bars almost straight, tapering posteriorly; membranous portion of apex of spermathecae subtriangular; eastern United States, coastal Gulf of Mexico, Antilles, Central and South America (figs. 7A, 35–36) ..... *Kukulcania hibernalis* (Hentz, 1842)

16b (15). Sclerotized bars curved or, if straight, not tapering posteriorly; membranous portion of the apex of spermathecae rounded to lobed (figs. 7B–F, 8) 17

17a (16). Sclerotized bars straight to gently curved, describing an open, slender arc; glandular portion of the spermathecae apex positioned ventrally or (more rarely) laterally to the membranous portion; sternum and legs I–II mildly hirsute (figs. 7B–D, 8) 18

17b (16). Sclerotized bars strongly bent, comma shaped; glandular portion of the spermathecae apex semicircular and embracing the entire base of the membranous portion; sternum and legs I–II usually very hirsute, with long setae (figs. 7E–F; 51–52, 55–56) 21

18a (17). Spermathecae barely reaching the anterior margin of the uterus externus; membranous portion of the spermathecae apex short, lobed; glandular portion of the spermathecae ill-defined, forming several small patches; Baja California peninsula (figs. 4B, 7B, 39, 40) ..... *Kukulcania cochimi*

18b (17). Spermathecae extending well beyond the anterior margin of the uterus externus; membranous portion of the spermathecae apex forming a rounded apex; glandular portion of the spermathecae well defined, forming a single large patch (7C–D, 8) 19

19a (18). Sclerotized bars tapering posteriorly; membranous portion of the spermathecae apex bent dorsally, often hook shaped (figs. 7C–D, 30, 44, 48) 20

19b (18). Sclerotized bars not tapering, with uniform width across its length; membranous portion of the spermathecae not bent dorsally (figs. 8, 60, 64, 68)..... 22

20a (19). Glandular portion of the spermathecae apex forming a large patch, concealing most of the membranous portion in ventral view; membranous portion short and not strongly curved; southwestern United States and northern Mexico (figs. 4C, 7C, 30A–B, 43–44) ..... *Kukulcania arizonica* (Chamberlin and Ivie, 1935)

20b (19). Glandular portion of the spermathecae apex forming a small patch; membranous portion long and strongly curved, often hook shaped; northern Mexico (figs. 4B, 7D, 30C–D, 47–48) ..... *Kukulcania gertschi*

21 (17). This step leads to *K. utahana* and *K. hurca*. The limits between the two species are ill defined and identifications based on females only are tentative. The diagnostic characters below vary intraspecifically and may not be reliable.

21a (17). Spermathecae usually well separated (by more than the length of the spermathecae); sclerotized bars usually with little sculpturing; membranous portion of the spermathecae apex short; southwestern United States with some records in adjacent Mexico (figs. 3B, 7E, 51–52) .....*Kukulcania utahana* (Chamberlin and Ivie, 1935)

21b (17). Spermathecae usually set closer together (separated by less than the length of the spermathecae); sclerotized bars usually sculptured; membranous portion of the spermathecae apex long; southwestern United States and northwestern Mexico (figs. 3C, 7F, 55–56) ..... *Kukulcania hurca* (Chamberlin and Ivie, 1942)

22a (19). Sclerotized bars short, almost as long as wide, straight, subquadrate; southern Mexico to Costa Rica, introduced to Peru and Chile (figs. 4A, 8C, 67–68) .... *Kukulcania santosi*

22b (19). Sclerotized bars much longer than wide, almost straight to strongly curved (fig. 8A–B) 23

23a (22). Glandular portion of the spermathecae apex a small ventral patch; membranous portion with a relatively small rounded apex; central to southern Mexico (figs. 4B, 8A, 59–60) .....*Kukulcania brignolii* (Alayón, 1981)

23b (22). Glandular portion of the spermathecae longer than wide and placed laterally to the membranous portion; membranous portion with a relatively large rounded apex; central Mexico (figs. 4C, 8B, 63–64) .... *Kukulcania mexicana*

24a (15). Membranous portion of the spermathecae apex absent; spermathecae with a single sclerotized head (fig. 9A–B)..... 25

24b (15). Membranous portion of the spermathecae apex present; spermathecae with two heads, one with glandular pores and the other lacking them (fig. 9C–G) 26

25a (24). Membranous base of the spermathecae apex short; glandular portion not curved ventrally; sternum and legs I–II very hirsute, with long setae; central Mexico (figs. 4A, 9A, 71–72) ..... *Kukulcania tractans* (O. Pickard-Cambridge, 1896)

25b (24). Membranous base of the spermathecae apex long; glandular portion strongly curved ventrally; sternum and legs I–II mildly hirsute; western coastal states of Mexico from Sinaloa to Guerrero (figs. 4B, 9B, 75– 76) ... .*Kukulcania tequila*

26a (24). Glandular portion of the spermathecae ill-defined, dispersed in several small patches; western Mexico, in Michoacán and Guerrero (figs. 4C, 9C, 77–78) .... *Kukulcania chingona*

26b (24). Glandular portion of the spermathecae well-defined in a single rounded or lobed patch (fig. 9D–G) 27

27a (26). Membranous portion of the spermathecae apex long, fingerlike and with a ~90° degree proximal bend; California and adjacent areas of Oregon, Arizona, and Baja California (figs. 4B, 9D–E, 81–82) ... *Kukulcania geophila* (Chamberlin and Ivie, 1935)

27b (26). Membranous portion of the spermathecae apex short, not fingerlike 28

28a (27). Membranous base of the spermathecae apex very short; glandular portion spherical; coloration light orange brown; San Benito islands in Baja California (figs. 4B, 9F, 84–85) ..... *Kukulcania benita* sp.nov.

28b (27). Membranous base of the spermathecae apex relatively long; glandular portion spherical to lobed; coloration brown to very dark brown; Baja California Peninsula (figs. 4C, 9G, 88–89) .....-.. *Kukulcania bajacali* sp.nov.

The *Kukul cani a hiber nalis* Species Gro up

Dia gnos is: Males possess a ring of long setae around the entire border of the cymbium, partially concealing the bulb and usually presents a conspicuous embolus keel (figs. 33, 62C); females present sclerotized bars alongside the spermathecae (figs. 36, 64).

Kukulcania hibernalis (Hentz, 1842)

Figures 1A–E, 3A, 6A–B, 7A, 10–11, 18–21, 26, 32–36

Filistata hibernalis Hentz, 1842: 227, plate 8, fig. 9a–b. Syntype males and females from "South Carolina on the sea-coast, North Alabama on the banks of the Tennessee," presumably lost (Levi, 1971), not examined.

Keyserling, 1879: 348; F.O. Pickard-Cambridge, 1899: 47, plate 3, fig. 8; Banks, 1909: 156; Petrunkevitch, 1911: 115; Chamberlin and Ivie, 1935: plate 4, figs. 28–30; Mello-Leitão, 1943: 153; Alayón, 1972: 5, f. I–III, plates I–II.

Filistata capitata Hentz, 1842: 228, plate 8, fig. 7. Holotype male from Georgia, presumably lost (Levi, 1971), not examined. Keyserling, 1879: 347, plate IV, fig. 33; Simon, 1893: 257, figs. 212–219. First synonymized by Petrunkevitch (1911): 115.

Teratodes depressus C. L. Koch, 1842: 103, fig. 755. Syntype males from South America (ZMB), examined. First synonymized with *F. capitata* by Keyserling (1879).

Filistata cubaecola Lucas, 1857: 26, plate IV, fig. 2. Female syntypes from Cuba: Habana and Santo Domingo, presumably deposited in the MNHN but lost (Levi, 1971), not examined. First synonymized by Banks, 1909.

Filistata distincta Blackwall, 1867: 202. Male and two immature female syntypes from Jamaica, presumably deposited in the HDEO but lost (Levi, 1971), not examined. First synonymized by F.O. Pickard-Cambridge (1899).

Mygale muritelaria Holmberg, 1876: 7. Female syntypes from Argentina, lost. First synonymized by Mello-Leitão (1943).

Kukulcania hibernalis: Lehtinen, 1967: 242, fig. 19; Gray, 1995: 83, figs. 18, 24; Ramírez and Grismado, 1997: 348, figs. 1, 4, 7, 107–111; Griswold et al., 2005: 27, figs. 166D, 167D; Brescovit and Santos, 2013: 311, figs. 1D–F, 2D–F, 3B; Brescovit, Sánchez-Ruiz and Alayón, 2016: 429.

Filistata isolinae Alayón, 1972: 7, plates III–IV. Immature lectotype and paralectotype, designated by Alayón (1975), from Cuba, Santo Antonio de los Baños, deposited in MNHNCu, not examined. First synonymized by Brescovit et al., 2016.

Kukulkania isolinae: Alayón, 1975: 2.

Examined type material: Syntypes of *Teratodes depressus*: Two pinned males with uncertain locality, possibly South America ("Ungewiss, wahrscheinlich Südamerika"), (ZMB_Araneae_S00018), examined through photographs (fig. 34). One of the labels associated with the specimens is handwritten and somewhat illegible, but reads something similar to "La Guajira" (fig. 34C), a peninsula in northern South America which is one of the localities from where this species has been recorded (see fig. 3).

Remarks: Hentz (1842) described this species under two different names in the same contribution. His types are presumed to be lost: in 1971, Herbert W. Levi compiled a list of type repositories of classical authors and stated that these types were deposited in the Boston Science Museum, but eaten up by beetles. However, Hentz's original illustrations and localities leave no doubt about the identity of this species, since this is the only *Kukulcania* occurring in the eastern United States. F.O. Pickard-Cambridge (1899) synonymized *F. distincta* with *F. hibernalis* with some reservations and was followed by subsequent authors. He was also the first to suggest that *F. hibernalis* and *F. capitata* might be the same species; Petrunkevitch (1911) formally synonymized the two names. We have not been able to examine the types of *F. cubaecola, F. distincta, M. muritelaria* (all of them presumed to be lost; Levi, 1971) and *F. isolinae* to confirm the synonymies. However, their original descriptions indicate their generic placement is correct and they all come from areas where *K. hibernalis* is the only species known to occur. Thus, we have no reason to doubt the synonymies. Lehtinen's illustration (1967: fig. 19) depicts a palp with a thin embolus that more closely resembles *K. arizonica* than *K. hibernalis*. We have not reexamined the material used by him to erect the genus. This species has been figured several times in faunistic lists and phylogenetic/morphological studies; not all of these have been referred to in the synonymic list above, and anyone interested in a more exhaustive reference list should see the WSC (2018).

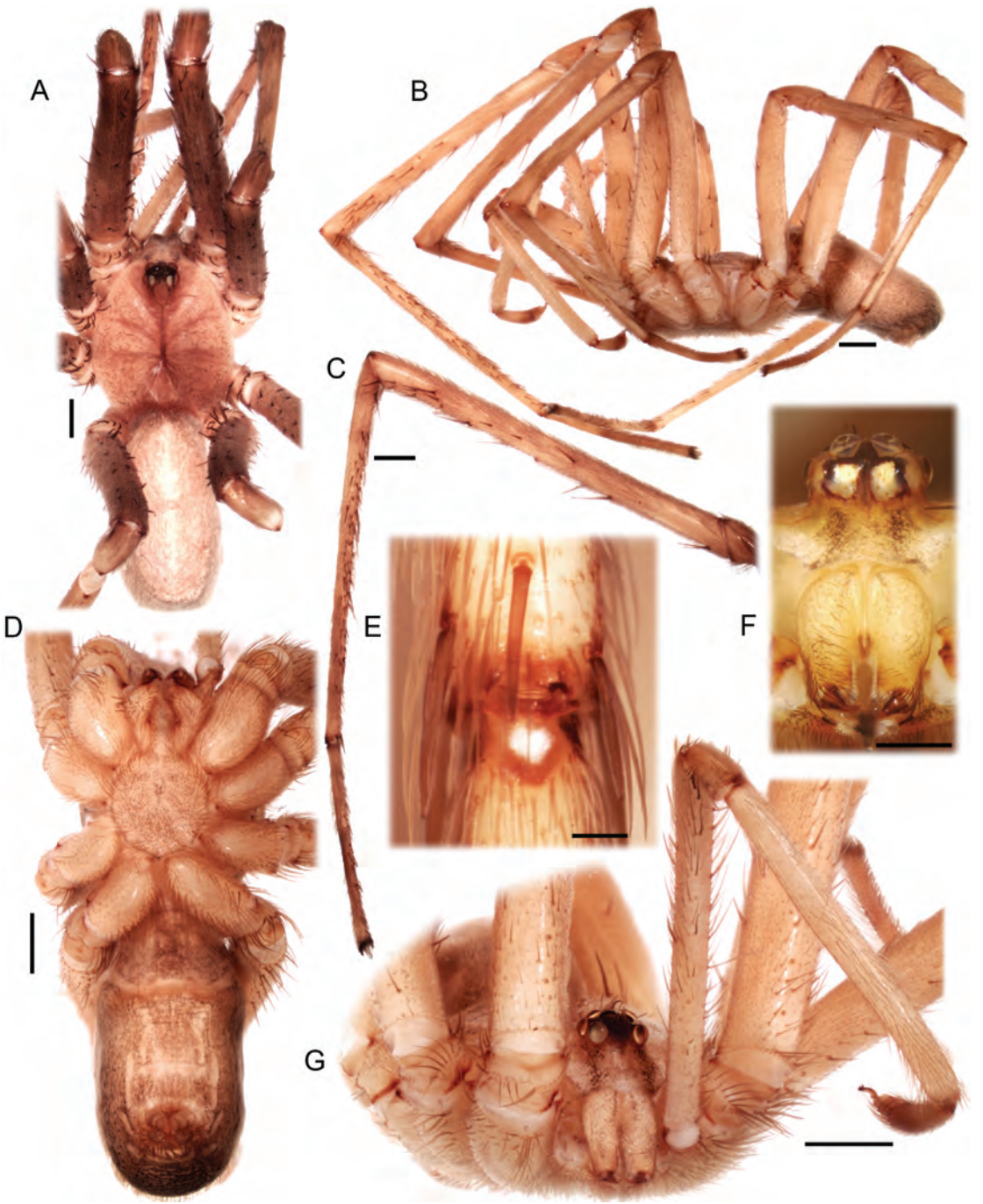

FIGURE 32. *Kukulcania hibernalis* (Hentz, 1842), males. **A, C.** South Carolina, Lexington (FMNH 2857662). **A.** Habitus, dorsal. **C.** Right leg I, prolateral. **B, D, E, G.** Turks and Caicos, Grand Turk (USNM IFM-1654). **B.** Habitus, lateral. **D.** Same, ventral. **E.** Right metatarsus stopper III, dorsal. **F.** Argentina, Buenos Aires (MACN-Ar 10422), eyes and chelicera, anterior. Subanterior. **G.** Habitus, subanterior. Scale bars = 1 mm except for E (0.1 mm) and F (0.5 mm).

FIGURE 33. *Kukulcania hibernalis* (Hentz, 1842), male palps. **A–D.** South Carolina, Lexington (FMNH 2857662). **A–B.** Prolateral. **C.** Dorsal. **D.** Retrolateral. **E.** Alabama, Mobile (USNM IFM-1653), prolateral. **F.** Brazil, Rio Grande do Sul, Santana do Livramento (MCN), retrolateral. Scale bars = 0.5 mm.

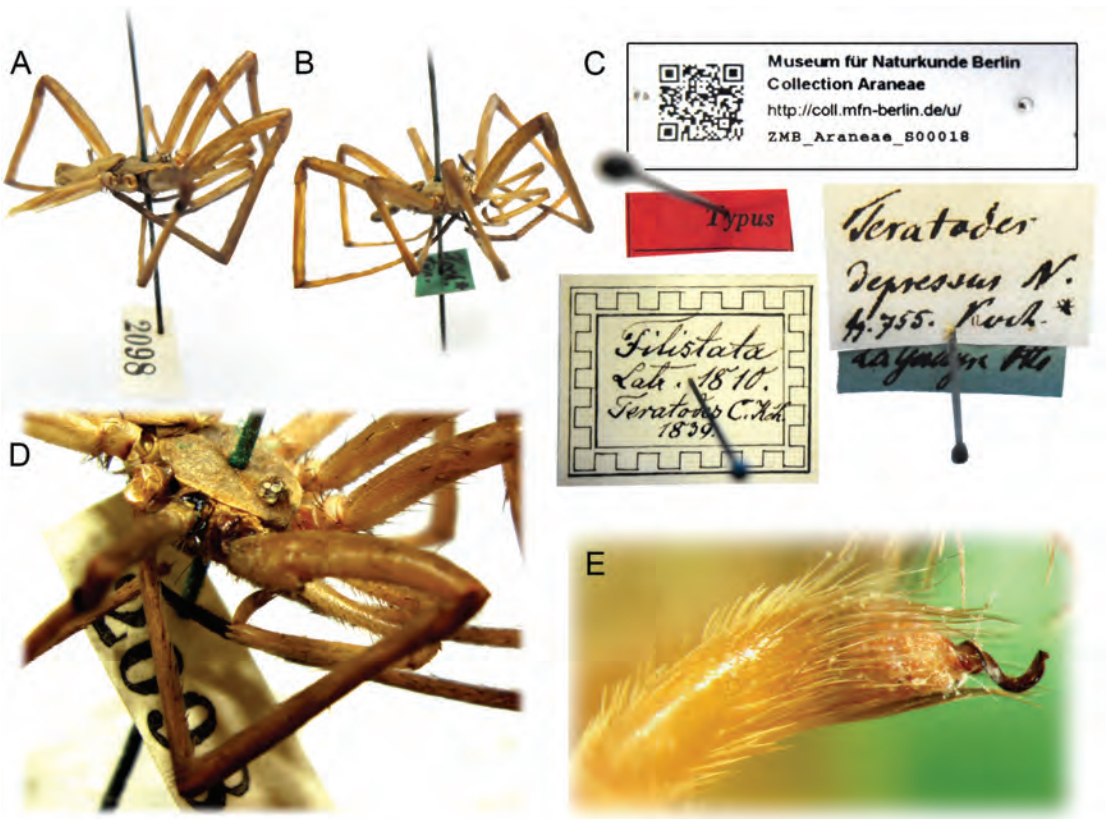

FIGURE 34. *Kukulcania hibernalis* (Hentz, 1842), male syntypes of *Teratodes depressus* C.L. Koch, 1842 (MfN). **A–B.** Lateral. **C.** Labels. **D.** Syntype 2098, subanterior. **E.** Unnumbered syntype, right palp, retrolateral. Photographs by C.J. Grismado. Figures not to scale.

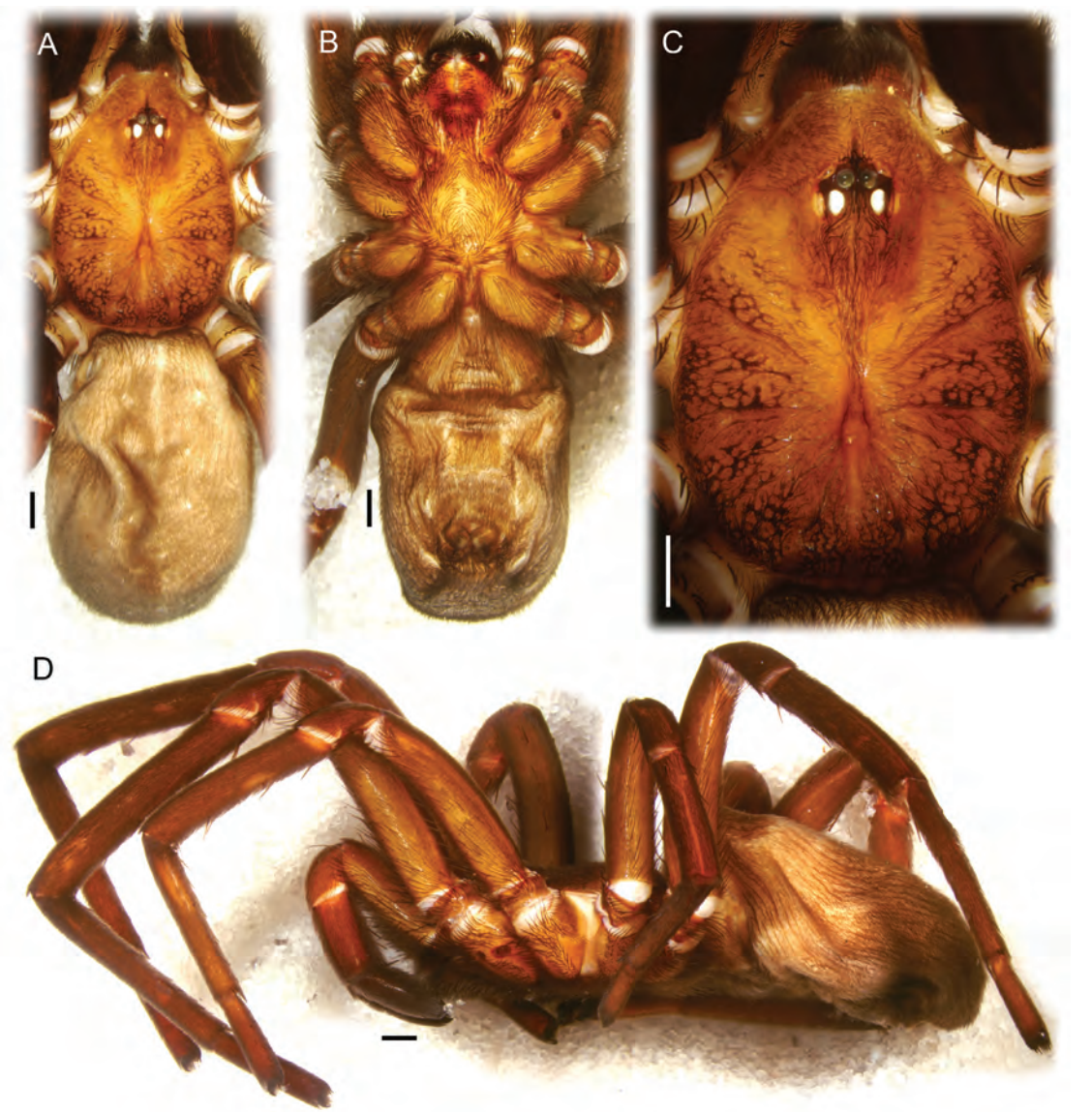

FIGURE 35. *Kukulcania hibernalis* (Hentz, 1842), female from Argentina, Buenos Aires (MACN-Ar 10427), habitus. **A.** Dorsal. **B.** Ventral. **C.** Carapace, dorsal. **D.** Lateral. Photographs by P.M. Favre. Scale bars = 1 mm.

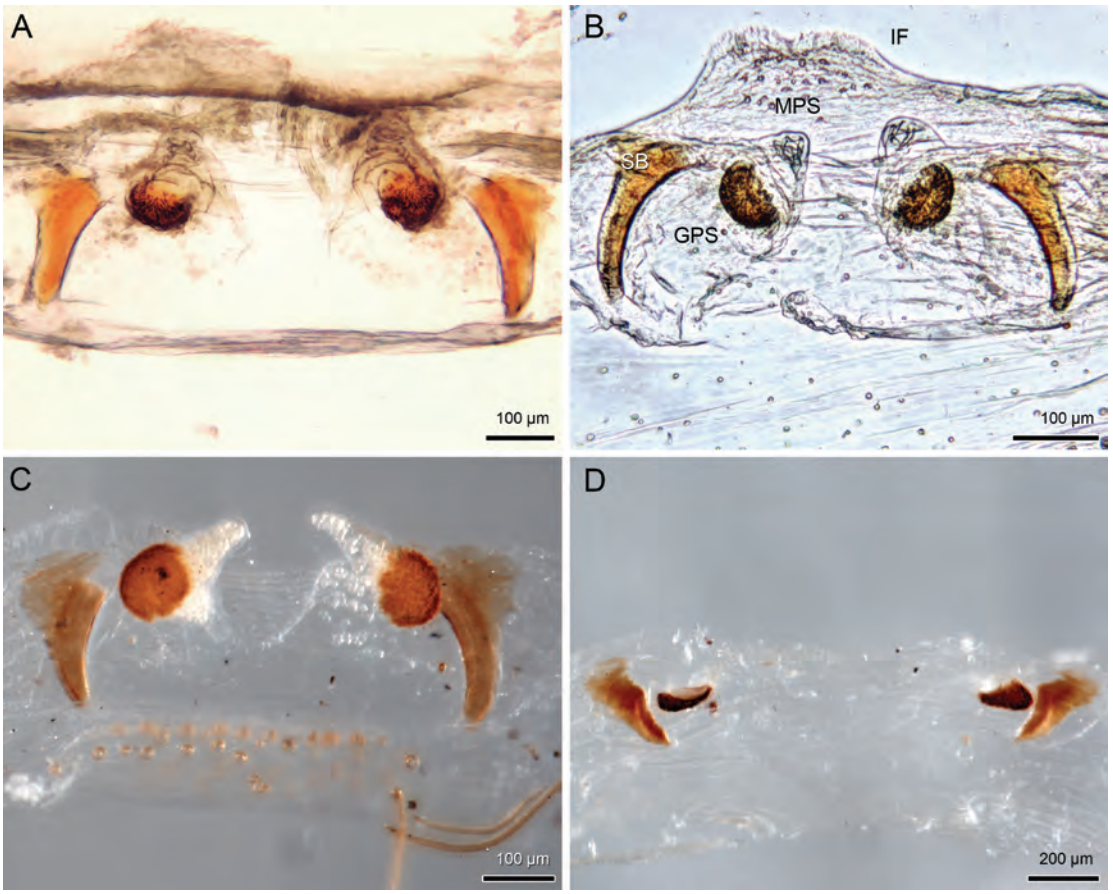

FIGURE 36. *Kukulcania hibernalis* (Hentz, 1842), female spermathecae, ventral. **A.** South Carolina, Lexington (FMNH 2857669). **B.** Mexico, Hidalgo, Huachinango (AMNH IFM-1509). **C.** Colombia, Huila (CAS 9060628). **D.** United States, laboratory reared specimen (CAS 9034219). This specimen is the voucher for some *K. hibernalis* sequences in GenBank. Abbreviations: **GPS,** glandular portion of spermathecae apex; **IF,** interpulmonary fold; **MPS,** membranous part of the spermathecae apex; **SB,** sclerotized bars.

Diagnosis: Males are distinguished by the unusually long and slender palps, with the tibia around 10× longer than high (fig. 33A), and the broad embolus with a single coil and conspicuous keel (fig. 33B); they also have fewer macrosetae on the first legs (fig. 32C) compared to similar species (e.g., *K. arizonica*). Females differ from other species with sclerotized bars in having the membranous portion of the spermathecae apex subtriangular, often pointing slightly inward, by the semicircular glandular portion of the spermathecae apex, and by the robust, almost straight or only slightly curved sclerotized bars (figs. 7A, 36). They are also usually larger and more lightly colored than similar species (e.g., *K. arizonica*, *K. utahana*) and lack the fringe of long setae on the sternum and first pairs of legs.

Description: Male from Lexington, South Carolina (AMNH IFM-1652). Coloration yellowish orange. Carapace sparsely stippled with light brown, with brown coloration on median area. Abdomen dorsum brownish gray. Clypeus short. Sternum oval, with two pairs of sigillae. Total length 9.64. Carapace length 4.49, width 3.71, clypeus length 0.42. Eye diameters and interdistances: AME 0.25; PME 0.29; ALE 0.32;

PLE 0.28; AME–AME 0.08; PME–PME 0.3. Sternum length 2.13, width 1.98. Palp: femur length 5.44, height 0.54; tibia length 4.98, height 0.45. Leg I: femur (fe) 9.11; patella (pa) 2.09; tibia (ti) 9.34; metatarsus (mt) 9.43; tarsus (ta) 4.86. II: fe 7.25; pa 1.83; ti 6.5; mt 7.03; ta 3.38. III: fe 6.37; pa 1.63; ti 5.45; mt 6.53; ta 4.22. IV: fe 8.1; pa 1.7; ti 7.57; mt 8.78; ta 4.7. Abdomen: length 5.35, width 2.91. Palp macrosetae long, in several rows along femur ventral and dorsal faces. Leg macrosetae: fe I 8d, 10p, 20v, 11r, the ventral ones very short; ti I 8p, 9v, 1r; mt I 32p, 19v, 1r; ta I 18v; fe II 6d, 5p, 9v, 6r; ti II 1d, 2p, 7v, 1r; mt II 6p, 10v, 3r; ta II 10v; fe III 10d, 4p, 8v, 3r; ti III 2d, 2p, 5v, 3r; mt III 2d, 7p, 14v, 4r; ta III 21v; fe IV 13d, 2p, 20v, 8r; ti IV 1d, 2p, 4v, 3r; mt IV 2p, 16v, 4r; ta IV 22v. Palp: cymbium long, about 3× as long as high, with anterior border bearing a ring of setae that ends close to the embolus; bulb short, robust; sperm duct with four tightly packed coils; embolus with a single coil, broad, spatulate, with a conspicuous keel. State of the specimen: good, both palps dissected, left leg I and both legs IV disarticulated from tibia.

Female from Mobile, Alabama (USNM). Coloration orange brown. Abdomen dorsum brownish gray. Anterior margin of the carapace unmodified. Sternum oval, with two pairs of sigillae. Total length 16.85. Carapace length 6.44, width 4.8, clypeus length 0.82. Eye diameters and interdistances: AME 0.24; PME 0.32; ALE 0.35; PLE 0.38; AME–AME 0.06; PME–PME 0.377. Sternum length 2.97, width 2.8. Palp: femur length 3.49, height 1.18; tibia length 2.05, height 1.05. Leg I: femur (fe) 7.31; patella (pa) 2.42; tibia (ti) 7.01; metatarsus (mt) 6.25; tarsus (ta) 3.32. II: fe 5.77; pa 2.25; ti 5.08; mt 4.9; ta 2.73. III: fe 5.03; pa 1.9; ti 3.87; mt 4.27; ta 2.24. IV: fe 6.46; pa 2.39; ti 6.19; mt 5.61; ta 2.82. Abdomen: length 11.07, width 8.6. Palp macrosetae on ventral surface of tibia and tarsus. Leg macrosetae present on ventral surfaces of tibiae, metatarsi and tarsi; all femora with 5–10 dorsal macrosetae. Calamistrum with three rows with 9–11 setae each. Interpulmonary fold large, rounded, covering the spermathecae dorsally. Sclerotized lateral bars present, subtriangular, widest anteriorly, parallel to each other; membranous portion of the spermathecae apex subtriangular, slightly pointing inward; glandular portion of the spermathecae semicircular, with glandular pores with long ducts hanging from them. State of the specimen: regular, soft tissues not well preserved, left legs III and IV missing from tibia, genitalia dissected.

Intraspecific variation: Males (N = 5): total length 8.67–11.31 (10), carapace length 3.81–4.75 (4.36), femur I length 7.78–9.93 (8.68), tibia I length 8–10.38 (8.99), femur/carapace ratio 1.84–2.11 (1.99). Females (N = 5): total length 10.36–17.95 (15.86), carapace length 4.09–7.2 (6.16), femur I length 4.47–8.67 (6.98), tibia I length 6.61–8.28 (7.27), femur/carapace ratio 1.04–1.2 (1.13). Female spermathecae are typically similar to those in figure 36A–B, although variants exist (fig. 36C–D).

Natural history: This species is synanthropic in most of its range, often found in association with buildings; it is among the most common species in Argentinian towns. Accordingly, most specimens whose labels state the collection site refer to a synanthropic setting (garages, basements, walls, houses, etc.). A female has been collected from primary tropical rainforest in Rupununi, Guyana, and another from rock outcrops in Chiapas, Mexico. Females and immatures weave irregular cribellate webs in cracks, crevices, and corners or under bark. The dry side of trunks of old, large trees may be covered by webs of dozens of individuals. The courtship, mating and egg-sac construction behaviors have been described by Barrantes and Ramírez (2013). Curtis and Carrell (1999) observed extended maternal care, cooperative prey capture and communal feeding by spiderlings of this species; Barrantes and Ramírez (2013) add that sometimes young will feed on prey items captured by their mother. Deyrup et al. (1988) found that *K. hibernalis* is preyed upon by the wasp *Allochares azureus* (Pompilidae), which appears to be a *Kukulcania* specialist. The web structure and spinning behavior have been briefly discussed by Lopardo and Ramírez (2007). Despite

being an introduced species, at least in Argentina it often cooccurs with native prithine filistatids, suggesting that they do not displace autochthonous species.

Distr ibutio n: Widely distributed in the New World (fig. 3A), ocurring from Virginia to Texas in the United States; around the Gulf of Mexico; the Antilles, Central America, and northern South America; eastern and southern Brazil and Bolivia; most of Paraguay and Argentina. Four records based on a single male each from California, Illinois, and New York (United States) and Nayarit (Mexico) are well outside the core distribution of the species and might be incidental introductions, but have been included on the map nonetheless. It is hard to speculate the original distribution of *K. hibernalis*, although it is most probably native to the eastern United States and the Gulf of Mexico coast. The species was almost surely introduced into southern South America, as well as into the Old World (Liberia). At first we thought the records from Liberia were mislabeled specimens, but they were recorded in two localities (Monrovia and Cape Palmas) and S.L. Zonstein (in litt.) also recorded this species from that country, providing evidence that there is a true established population in Africa. Collecting dates suggest the species had already attained a wide distribution by the early 1900s: there are century-old records from Liberia (1895, USNM), Paraguay (1902, ZMB), Argentina (1906, MACN-Ar), Suriname (1908, ZMB), Panamá (1913, MCZ) and Brazil (1919, AMNH). The record from Chile by Taucare-Ríos (2010) is a misidentified *Kukulcania santosi* (see below).

Additio nal ma ter ial examined: **Ar gentin a. Buenos Aires:** *Almirante Brown,* Adrogué (S34.80344°, W58.39023°), Pujals, i.1972, 1 imm. (MACN-Ar 20743); Burzaco, Ferrocarril Central General Roca (S34.82936°, W58.39088°), 2♂ 2♀ (MACN-Ar 20664); 1938, 1♀ (MACN-Ar 20641); *Avellaneda,* Sarandí (S34.6799°, W58.33396°), D. Grismado, 20.i.2003, 1♀ (MACN-Ar 20610); *Bahía Blanca (*S38.71862°, W62.2691°), B.S. Gerschman de Pikelin and R.D. Schiapelli, iv.1939, 2♂ 1♀ (MACN-Ar 20629); *Balcarce,* Sierra Larga (S37.88158°, W58.5846°), C. Wappers, ii.1948, 1♀ (MACN-Ar 2569); *Campana,* Estación Río Luján (S34.278°, W58.89017°), C.J. Grismado, 9.vi.2007, 2 imm. (MACN-Ar 12635); *Chascomús* (S35.58199°, W58.01452°), 18.x.1947, 1♀ (MACN-Ar 20623); *Escobar,* Escobar (S34.34566°, W58.80609°), P. Paupy, iv.2009, 1♂ (MACN-Ar 20658); *Florencio Varela,* Florencio Varela, Ferrocarril General Roca (S34.81124°, W58.27725°), F. Monrós, xii.1939, 1♂ (MACN-Ar 20674); *General Pueyrredón,* Chapadmalal (S38.20606°, W57.69701°), S. Ibrahim, i.1948, 1♂ (MACN-Ar 20697); *La Plata* [S34.9205°, W57.95357°], L.A. Pereira, xi.1987, 1 imm. (USNM); *Isla Martín García* (S34.18256°, W58.25135°), J.M. Viana, 1♀ (MACN-Ar 584); iv.1938, 1 imm. (MACN-Ar 412); *Merlo,* Pontevedra (S34.75061°, W58.70188°), R. Maniglia, ii.1947, 1♂ 17♀ (MACN-Ar 20595); *Moreno* (S34.64969°, W58.78741°), J. Pereyra, 21.xii.1953, 1♀ (MACN-Ar 3730); R.D. Schiapelli, iii.1947, 2 imm. (MACN-Ar 2350); *Pilar,* Zelaya (S34.37205°, W58.87625°), C.B. Pereyra, ii.1938, 2♂ 1♀ (MACN-Ar 516); H. Hepper, ii.1938, 1♂ (MACN-Ar 518); Pereyra, v.1938, 1 imm. (MACN-Ar 447); *San Fernando* (S34.45668°, W58.5622°), J.B. Daguerre, 3♀ 4 imm. (MACN-Ar 20653); 1954, 1♂ 4♀ (MACN-Ar 20608); *San Miguel,* Bella Vista (S34.57621°, W58.69846°), J. M. Gallardo, i.1964, 1♂ (MACN-Ar 20725); *San Pedro,* San Pedro (S33.6821°, W59.66089°), 2♀ (MACN-Ar 20721); Vuelta de Obligado (S33.59705°, W59.81573°), Cesari and Toth, vi.1974, 3♀ 1 imm. (MACN-Ar 20656); Vuelta de Obligado, Caverna La Salamanca (S34.55485°, W58.46133°), C. Cesari, 30.vii.1972, 3♀ 2 imm. (MACN-Ar 20680); *Tres de Febrero,* Caseros (S34.61023°, W58.5673°), 1♀ (MACN-Ar 20638), 6♀ (MACN-Ar 20639); x.1947, 1♀ (MACN-Ar 20637); 14.xii.1946, 6♀ 1 imm. (MACN-Ar 20636); 31.i.1947, 1♀ (MACN-Ar 20594); W. Partridge, xii.1940, 1♀ (MACN-Ar 20631); *Vicente López,* Florida (S34.53276°, W58.49148°), C. Cimini, v.2005, 1♀ (MACN-Ar 20592). **C.A. Buenos Aires:** (S36.41299°, W60.40202°), 11.x.1946, 1♂ (MACN-Ar 20605); A. Bachmann, xi.1947, 1♀ (MACN-Ar 20607); B.S. Gerschman de Pikelin, viii.1940, 1♀ (MACN-Ar 20747); C. Kopuchian, 30.xii.2008, 1♀ (MACN-Ar 20660); Rivas, 1♀ (MACN-Ar 20719); Rodríguez and Goñi, 1♂ 3♀ (MACN-Ar 20713); (S34.61562°, W58.433°), Grecco, ii.1948, 1♀ (MACN-Ar 20699); J. Arias Obarrio, vii.1963, 1♀ (MACN-Ar 20630); J.M. Gallardo, ii.1958, 1 imm. (MACN-Ar 20627); 5.ix.1946, 1♂ (MACN-Ar 20613); J.M. Viana,

ii.1945, 1♀ (MACN-Ar 20615); L.N. Piacentini, 17.xii.2008, 1♂ (MACN-Ar 20593); M.J. Ramírez, ii.2000, 1♂ (MACN-Ar 20611); 11.x.2007, 1♂ (MACN-Ar 20589) [S34.60372°, W58.38159°], H. Wollfhugel, 1913, 1 imm. (ZMB); Rengel G., 1913, 3♂ 3♀ 1 imm. (ZMB 487) (S34.61562°, W58.433°), 1944, 1♂ (MACN-Ar 20723); x.1953, 1♂ 1♀ (MACN-Ar 20622); 15.i.1906, 1♂ 3 imm. (MACN-Ar 20763); A.G. Frers, 8.viii.1917, 1♂ (MACN-Ar 20681); Carpintero, ii.1950, 1♂ 1♀ (MACN-Ar 20773); E. Masoia, 17.xi.1962, 1♂ (MACN-Ar 20711); F. Monrós, iv.1940, 1♀ 1 imm. (MACN-Ar 20753); J. Brèthes, 24.iii.1912, 1♀ (MACN-Ar 20759); J.A. de Carlo, ii.1964, 1♂ (MACN-Ar 20727); J.B. Daguerre, 1931, 1♀ 2 imm. (MACN-Ar 20751); Lafuente, 1♂ (MACN-Ar 20764); M. Benedictto and L. Damer, iv.1948, 1 imm. (MACN-Ar 20715); M. Greaven, 28.i.1948, 1♂ (MACN-Ar 20694); M.J. Ramírez, 25.x.1999, 1♀ (MACN-Ar 20600); Pirán, v.1963, 1♀ (MACN-Ar 20739); Pujals, xii.1967, 1♂ (MACN-Ar 20734); R.J. Rodríguez, 1♀ 3 imm. (MACN-Ar 20651); S. Ibrahim, ii.1948, 2 imm. (MACN-Ar 20735); (S34.61765°, W58.43327°), R. Rivas, xii.1942, 1♀ (MACN-Ar 1245); A. Bachmann, 11.xi.1952, 1♂ (MACN-Ar 9412); B.S. Gerschman de Pikelin, xii.1950, 1♀ (MACN-Ar 3298); Belinzoni, xii.1961, 1♂ (MACN-Ar 5450); E. Massoia, 16.x.1961, 1♂ (MACN-Ar 5142); F. Monrós, 1944, 2♀ (MACN-Ar 2100); J. Rimer, 15.iv.1952, 2 imm. (MACN-Ar 3681); Pallochi, viii.1953, 1♀ (MACN-Ar 3731); Avenida Warnes 42 (S34.60417°, W58.43797°), M.J. Ramírez, 15.ii.2009, 1♂ (MACN-Ar 20596); Delta del Río Paraná, Río Luján [S34.39699°, W58.60326°], F. Monrós, ix.1940, 1♀ (MACN-Ar 20700); Flores (S34.63533°, W58.45762°), Massoia, 20.xii.1962, 1♀ (MACN-Ar 20731); Museo Argentino de Ciencias Naturales "Bernardino Rivadavia" (S34.60541°, W58.4378°), several dates and collectors, (MACN-Ar 20588, 20599, 20649, 20590, 32732, 32731, 20668, 20584, 20625, 20736, 20586, 20598, 20587, 20591, 10441); Parque Patricios (S34.63788°, W58.40158°), Carpintero, x.1948, 1♂ 3♀ 1 imm. (MACN-Ar 20688); Saavedra (S34.55448°, W58.48931°), F. Castillo, ii.1935, 1♀ (MACN-Ar 20726); iii.1938, 1 imm. (MACN-Ar 20717); xi.1935, 1♂ 1♀ (MACN-Ar 20609); xii.1935, 1 imm. (MACN-Ar 20704); xii.1937, 1♂ 1 imm. (MACN-Ar 20718); Villa Lugano (S34.67481°, W58.47606°), R.J. Rodríguez, 13♀ 7 imm. (MACN-Ar 20706). **Catamarca:** *Santa Rosa,* Manantiales (S28.14394°, W65.49743°), Apóstol and Tonima, i.1961, 2♂ 2♀ 1 imm. (MACN-Ar 20740); *Tinogasta,* Tinogasta (S28.06339°, W67.56401°), J.A. Cranwell, 1947, 1♂ (MACN-Ar 2830). **Chaco:** [S26.79081°, W60.43642°], 1♂ 1♀ 1 imm. (MNRJ 2130); *Bermejo,* Río de Oro (S26.87536°, W58.79772°), Apóstol and Tonima, xi.1961, 3♂ 3♀ 1 imm. (MACN-Ar 5159); *Comandante Fernandez,* Presidencia Roque Sáenz Peña (S26.79081°, W60.43642°), F. Ohneiser, ix.1922, 1♀ (MACN-Ar 20602); ix.1932, 1 imm. (MACN-Ar 20716); *Doce de Octubre,* General Pinedo (S27.32563°, W61.2826°), A. Giai and J.A. Cranwell, x.1946, 1 imm. (MACN-Ar 1705); O. Casal, 17.vii.1952, 2 imm. (MACN-Ar 3761); *Resistencia,* Resistencia (S27.45879°, W58.98746°), Freiberg, 1♀ (MACN-Ar 20671); x.1943, 2♀ (MACN-Ar 20754); 27.x.1943, 1♂ 3♀ 4 imm. (MACN-Ar 20733); G. Aguilera, xii.1971, 3♀ (MACN-Ar 9411). **Córdoba:** *Calamuchita,* Villa Cañada del Sauce (S32.36717°, W64.6392°), J.M. Viana, xii.1941, 1 imm. (MACN-Ar 20710); *Marcos Juárez,* Leones (S32.65895°, W62.30067°), ii.1946, 1♀ (MACN-Ar 20634); 23.xii.1945, 2 imm. (MACN-Ar 20624); 28.i.1946, 1♂ (MACN-Ar 20628); A. Partridge, 11.x.1946, 2♀ (MACN-Ar 20603); W. Partridge, i.1966, 1♂ (MACN-Ar 20597); 11.x.1946, 1♂ (MACN-Ar 20604); *Punilla,* Villa Carlos Paz (S31.41657°, W64.50737°), C. Merti, v.1940, 2 imm. (MACN-Ar 20729). **Corrientes:** Guía del Peregrino, Estancia El Socorro, W. Partridge, 1963, 1♀ (MACN-Ar 20619); *Mburucuyá,* Manantiales (S27.92237°, W58.10148°), Apóstol and Tonima, i.1961, 1♀ 1 imm. (MACN-Ar 5198); *Paso de los Libres,* Paso de los Libres (S29.71486°, W57.09436°), Bejarano, ii.1971, 5 imm. (MACN-Ar 20755); ii.1974, 1♂ 1♀ (MACN-Ar 9413); iii.1972, 3 imm. (MACN-Ar 20618); vii.1974, 1 imm. (MACN-Ar 20626); Paso de los Libres, Barrio Oficiales, Casa 16 (S29.7297°, W57.10274°), 11.viii.1968, 1♂ (MACN-Ar 20686); *San Cosme,* Paso de la Patria (S27.31804°, W58.57091°), M.E. Galiano, 28.viii.1963, 1♀ 1 imm. (MACN-Ar 20616); *San Roque,* Santiago Alcorta (S28.78858°, W58.70078°), M. Birabén, vi.1943, 1♂ 17 imm. (MACN-Ar 20687). **Entre Ríos:** *Concordia,* Concordia (S31.38107°, W58.01981°), J.B. Daguerre, 1931, 2♀ (MACN-Ar 20606); *Federal,* Federal (S30.95013°, W58.78562°), 21.ii.1931, 1♀ (MACN-Ar 20762); *Islas del Ibicuy,* Delta del Río Paraná, Arroyo Ibicuycito (S33.84236°, W58.89506°), F. Castillo, iv.1939, 1 imm. (MACN-Ar 20724); *Paraná,* Paraná (S31.74034°, W60.52213°), R.J. José, iii.1971, 1♀

(MACN-Ar 20745). **Formosa:** (S24.79716°, W60.28449°), Rios, 1♂ 1♀ 2 imm. (MACN-Ar 2379); [S26.18578°, W58.17557°], P. Jorgensen, ii.1918, 1♀ (MCZ 40969), 1♀ (MCZ 40967), 3♀ 1 imm. (MCZ 40966); iii.1918, 5♀ 4 imm. (MCZ 40964); *Pilcomayo,* Parque Nacional Pilcomayo, seccional Estero Poi (S25.03954°, W58.22876°), C.J. Grismado et al., 28–29.ii.2004, 1♂ (MACN-Ar 32554); in brick wall, 2♂ (MACN-Ar 32553); *Puerto Santos,* H. Hepper, 1♂ 1♀ (MACN-Ar 1023). **Jujuy:** *General Manuel Belgrano,* San Salvador de Jujuy (S24.1843°, W65.29702°), E.A. Maury, i.1966, 1♀ (MACN-Ar 20738); *Ledesma,* Fraile Pintado (S23.94191°, W64.80185°), x.1967, 1 imm. (MACN-Ar 6037); 24.i.1966, 1 imm. (MACN-Ar 20748), 1 imm. (MACN-Ar 20758); *San Antonio,* San Antonio (S24.19937°, W64.78884°), G. Casal, xi.1965, 1♀ (MACN-Ar 20621); *San Pedro,* San Pedro (S24.23231°, W64.86821°), M. Birabén, v.1947, 1♀ (MACN-Ar 20601). **La Pampa:** *Capital,* Santa Rosa (S36.618°, W64.28237°), 1♂ 4♀ 3 imm. (MACN-Ar 20583); *Puelén,* 25 de Mayo, house walls (S37.77352°, W67.71613°), A. Pérez-González, 13.i.2014, 1♀ (MACN-Ar 32714). **La Rioja:** (S29.85755°, W67.51169°), Gómez, 27.iv.1931, 1♂ (MACN-Ar 20698); *Chepes,* in hotel room [S31.33639°, W66.59184°], M. Irwin and F. Parker, 1.ix.1999, 1♀ (CAS 9057810); *Chilecito,* Chilecito (S29.16397°, W67.49653°), L. Yivoff, xi.1962, 1♀ (MACN-Ar 33828). **Mendoza:** *Mendoza* [S32.89047°, W68.844°], 24.ii.2001, 1♀ (CAI 3461); J. Criach, 10.xi.2003, 1♀ (CAI 3463); S. Roig, x.2004, 1♂ (CAI 3459); T. Pérez, 17.vi.2004, 1♀ (CAI 3460); 5a sección, 23.x.2003, 1♂ (CAI 3457). **Misiones:** no further data (S26.94022°, W54.57814°), Armanini, Fonseca and Scavaglieri, i.1942, 1♂ 1♀ (MACN-Ar 1178); *Apóstoles,* Apóstoles (S27.91351°, W55.7566°), F. Castillo, 1 imm. (MACN-Ar 20693); R. Ward, 4♀ 5 imm. (MACN-Ar 229); *Candelaria,* Santa Ana (S27.3695°, W55.58242°), 1♂ 1♀ (MACN-Ar 20783); *Capital,* Posadas (S27.40671°, W55.91203°), F. D'Amico and J.A. De Carlo, xi.1947, 1 imm. (MACN-Ar 2428); *Concepción,* Santa María (S27.8919°, W55.35367°), J.M. Viana, xi.1952, 1♀ (MACN-Ar 20708); xii.1943, 1♂ 1 imm. (MACN-Ar 1455); *Eldorado* (S26.28°, W54.43°), A. Kovacs, 1. ix–15.xi.1964, 2♀ (AMNH); *San Ignacio,* San Ignacio (S27.25799°, W55.53712°), A. Zotta, xi.1940, 1♂ 7 imm. (MACN-Ar 1052). **Neuquén:** *Huiliches,* Junín de los Andes (S39.94421°, W71.07252°), P. Carnotto, 22.vii.1970, 4♀ 2 imm. (MACN-Ar 20635). **Salta:** *Capital,* Salta (S24.81212°, W65.42022°), J. P. Duret, 6.vi.1952, 1♀ (MACN-Ar 20659); *La Viña,* Talapampa (S25.54013°, W65.56258°), C.J. Grismado, 20.xii.1994, 1 imm. (MACN-Ar 20682); *Rosario de la Frontera,* Rosario de la Frontera (S25.79546°, W64.96606°), O. Donado, x.1986, 16♀ (MACN-Ar 20585). **San Juan:** *Valle Fértil* (S30.8141°, W67.41618°), J.M. Viana, xi.1970, 2♂ (MACN-Ar 20714); Parque Provincial Valle Fértil, Camping municipal (LNP-loc-015) (S30.63339°, W67.48344°), L.N. Piacentini et al., 02–07.xii.2014, 1♀ (MACN-Ar 34022). **San Luis:** *Junín,* Merlo (S32.34226°, W65.01326°, 470m), M.J. Ramírez, 18.i.2017, 1♂ (MACN-Ar 38353). **Santa Fe:** (S31.18424°, W60.87651°), Pignarelli, ix.1963, 1♂ 2♀ (MACN-Ar 20737); *Garay,* Colonia Mascías (S30.80077°, W60.01758°), J.M. Viana, xi.1942, 1♀ (MACN-Ar 1371); *San Cristobal,* San Guillermo (S30.35995°, W61.91599°), Hepper and Casal, xi.1962, 1♀ (MACN-Ar 9414). **Santiago del Estero:** (S27.79928°, W64.2643°), Havrylenko, xi.1963, 3 imm. (MACN-Ar 20732); xii.1963, 1♀ (MACN-Ar 20744); 15.xi.1963, 1♀ (MACN-Ar 20612); 20. ix.1963, 1♂ (MACN-Ar 20614); [S27.79641°, W64.2738°], 1♂ 1♀ (MNRJ 2097); *Capital,* Santiago del Estero (S27.79641°, W64.2738°), Havrylenko, 4.vi.1963, 1♀ 3 imm. (MACN-Ar 20692); *Termas de Río Hondo* [S27.49856°, W64.86054°], M.L. Aczel, 21–28.iii.1950, 2♂ 3♀ 3 imm. (AMNH). **Tucumán:** (S27.00969°, W65.32484°), S. Núñez, 11.x.1948, 1♂ (MACN-Ar 20617); *Capital,* San Miguel de Tucumán (S26.82085°, W65.20107°), A.G. Frers, 24.xi.1916, 1♀ (MACN-Ar 20650); J.B. Daguerre, 26.xii.1950, 2♂ (MACN-Ar 2081); Parque 9 de Julio (S26.82533°, W65.18694°), A.O. Porta, iii.2015, 1♀ 10 imm. (MACN-Ar 34837); [S26.80829°, W65.21759°], H.W. Levi, 4.iv.1965, 1♀ several imm. (MCZ 41006). **No further locality:** 2♂ 2♀ (MNRJ 960); [S32.89047°, W68.844°], López, iii.2001, 1♀ (CAI 3464); T. Pérez, 20.xi.2000, 1♀ (CAI 3462); Patagonia, 1♀ (SMF 996). **Bermudas**. No further locality, [N32.29731°, W64.78103°], collector illegible 20. ix.1907, 1♀ (ZMB). **Bolivia**. **Beni:** *San Joaquín* [S13.04864°, W64.66587°], C.E. Yunker, 5.vi.1963, 1♀ (MCZ 39061). **Santa Cruz:** *Charaguay,* B. Malkin, 27.x.1986, 1♂ 1♀ (AMNH); *Roboré* [S18.333°, W59.75°], C. Cans and F. Pereira, 28.ii–1.iii.1954, 1♀ (MNRJ 3426); *San Antonio de Parapetí* [S20.0006°, W63.17523°], B. Malkin, 8–24.v.1985, 1♂ 1♀ (AMNH); *Santa Cruz de Pt.,* 11–17.i.1985, 1♂ (AMNH). **Brazil** . **Goiás:** *Alto Paraíso,* RPPN

Fazenda Brancas, pitfall trap [S14.13944°, W47.51931°], P.C. Motta, 4.vi.2010, 2 imm. (DZUB 5568); *Jataí,* Nova Orlândia [S17.8796°, W51.72068°], Martim et al., 1♀ (MZSP 8421); *Mineiros*, Parque Nacional das Emas (S18.2641°, W52.892°, 790m), M.D.F. Magalhães, 30–7.vi–vii.2016, 1♂ (UFMG 19930); *Santa Leopoldina,* 1♂ 1♀ (MNRJ 2095). **Mato Grosso:** no further locality [S20.19056°, W56.50528°], 1♂ 1♀ 1 imm. (MNRJ 962); *Chapada dos Guimarães* [S15.4583°, W55.75246°], M. Acuarensa, xi.1963, 1♀ (AMNH); *Cuiabá* [S15.60141°, W56.09789°], 21.iii.1958, 1♀ 1 imm. (MZSP 8324); M. Alvarenga, xi.1963, 1 imm. (AMNH), 1♀ (AMNH); *Salobra* [S20.19056°, W56.50528°], 2♂ 2♀ (MNRJ 561); *Utiariti* [S13.02193°, W58.28749°], K. Lenko, 12.viii.1961, 1♀ 1 imm. (MZSP 8496); vii.1961, 1♀ 4 imm. (MZSP 8514); viii.1961, 1♂ 1♀ (MZSP 8529). **Mato Grosso do Sul:** *Corumbá* [S19.00817°, W57.65155°], 14–23.xii.1919, 1♀ (AMNH). **Minas Gerais:** *Chapada Gaúcha*, Parque Nacional Grande Sertão Veredas, Mata de Santa Rita, in abandoned house [S15.2256°, W45.6423°, 736m], J.P.P. Pena-Barbosa et al., 14.viii.2011, 2♂ 2♀ (UFMG 7601); *Lavras* [S21.24849°, W45.00138°], J.P. Mattos, 2.ii.1947, 1♀ (MNRJ 2133); *Unaí*, Grapuava (S16.0894°, W46.5528°), E.A. Araujo, 3.x.2015, 1♀ (UFMG 19364). **Paraná**: *Paranaguá*, Parque Nacional de Saint-Hilaire, (S25.6606°, W48.5959°, 80m), L.S. Carvalho, 11.x.2014, 1♀ (UFMG 17020). **Rio Grande do Sul:** *Bagé*, around houses [S31.3314°, W54.1069°, 212m], E.O. Machado, 12.i.2000, 1♂ 1♀ (UFMG 602); *Derrubadas*, Parque Estadual do Turvo, in walls, (S27.2475°, W53.9578°, 440m), G.H.F. Azevedo and A.J. Santos, 21.iii.2011, 3♀ (UFMG 10248), 1♂ 2 imm. (UFMG 10249); (S27.2501°, W53.9487°, 423m), V.S.R. Diniz and L.E.C. Schmidt, 8.viii.2015, 2♀ (UFMG 19102), 2♂ (UFMG 19103); *Pelotas* [S31.7654°, W52.33759°], J.L. Mantovani-Biezanko, viii.1961, 2 imm. (MCZ 40941). **São Paulo:** *Jaboticabal* [S21.25251°, W48.32568°], W., L. Miller, 1979, 1♀ (MCZ 40961); W.L. Miller, 1979, 2♂ 5 imm. (MCZ 41288); *Lins* [S21.6733°, W49.74714°], A.M. Olalla, 1942, 3♀ (MZSP 11550); *São José do Rio Preto* [S20.81176°, W49.37623°], Vizotto, 1965, 1♀ (MZSP 4449); *São Paulo* [S23.55052°, W46.63331°], Pe. Pereira, 1941, 1♀ 1 imm. (MZSP 9310); Instituto Butantan [S23.55052°, W46.63339°], 2♀ (MNRJ 2131). **Colombia**. **Antioquia:** *Envigado* [N6.16961°, W75.58736°, 1500m], M.A. Serna, 5.vii.1950, 1♀ (MCZ 69200); *Medellín* [N6.2442°, W75.58121°, 1700–1900m], A.B. Schneble, 1973, 1♂ (MCZ 145014); [1700m], P.B. Schneble, i.1964, 1♂ 1♀ (MCZ 145016); ix–x.1962, 1♂ (MCZ 145018); 1962, 3♂ (MCZ 145017); La Estrella [N6.2442°, W75.58121°, 1700m], P.B. Schneble, 1 imm. (MCZ 145019); ix–x.1963, 1♂ (MCZ 145015); [1900m], P. Schneble, vi.1973, 2♂ (MCZ 69253); [N6.2442°, W75.58121°, ca. 1900m], 3♂ (MCZ 145013); *Salgar* [N5.96334°, W75.96394°], M.A. Serna, 1969, 1♀ (MCZ 145020). **Boyacá:** *Muzo,* in house [N5.53163°, W74.10302°], J. Bequaert, 1936, 1♀ (MCZ 69199). **Cauca:** *Popayán* [N2.44481°, W76.61474°], P.R. and D.L. Craig, 6–7.ii.1965, 1♀ 3 imm. (CAS 9053485). **Cundinamarca:** *Bogotá* [N4.59806°, W74.07583°], 1♂ 2♀ (MNRJ 2036); *Mesitas del Colegio,* Vda. Santa Cecilia, Finca El Naranjal [N4.58398°, W74.44626°], A. García and J. Díaz, 23–30.xii.2011, 1♀ 1 imm. (ICN-Ar 5439). **Huila:** *Parque Arqueológico de San Agustín* [N1.88719°, W76.29509°], C. Gold, 9. xi.1980, 1♀ (CAS 9060628). **Tolima:** *Ibagué,* Barrio Versalles [N4.44066°, W75.24414°], L.F. García, 29. vi.2000, 1♀ (ICN-Ar 928); *Veredas de Coello Cocora* [N4.40539°, W75.29731°], 14.vii.2000, 1♀ 1 imm. (ICN-Ar 5630). **Valle del Cauca:** *Buga* [N3.90051°, W76.30219°], W. Eberhard, 29.ix–x.1969, 1♀ (MCZ 69221). **Costa Rica**. **Cartago:** *Moravia de Chirripó,* K.A. Arnold, 21.xii.1962, 1♀ (MCZ 145026). **Limón:** [N9.52843°, W83.46436°], G. Harvey, 1965, 7♂ 1 imm. (CAS 9057584). **Oca:** *San Pedro Mts.,* M. Valerio, ix.1966, 1♂ (MCZ 145025). **Puntarenas:** *Monteverde,* cloud forest [N10.27497°, W84.82551°, 1500m], D. Ubick, 12.v.1987, 1♀ (DU 87.05.12). **San José:** [N9.92807°, W84.09073°], 1♂ 1♀ (MCZ 69202); M. Valerio, 1♀ (MCZ 145022); *San Antonio de Escazú* (N9.933°, W84.133°), J. Coddington, 28–31.iii.1989, 1♀ (USNM); [N9.88997°, W84.13824°, 1300m], W. Eberhard, ii.1981, 1♀ (MCZ 145023), 2♂ (MCZ 145024); [N9.933°, W84.133°, 1300m], xi.1988, missing spermathecae, 1♀ 1 imm. (USNM); *San José* [N9.92753°, W84.09121°], Stieler, no date, 1♂ 1♀ (ZMB); *San Pedro,* in house [N9.93015°, W84.0511°], B.A. Huber, ii.1995, 2♂ (MCZ 69203); iii.1995, 1♂ (MCZ 145021). **Cuba**. **Havana:** *Havana* [N23.11359°, W82.3666°], Baker, 1♂ (MCZ 145030); *Soledad* [N20.41848°, W75.46215°], 6.iv.1940, 1♀ (MCZ 145029). **Santa Clara:** *Las Villas* [N22.4244°, W79.94166°], F. Alemán, 20.ix.1944, 1♀ (AMNH); 20.x.1945, 1♂ (AMNH). **Guatemala**. **Guatemala City:** [N14.63492°, W90.50688°], L. Waghorn, 30. xii.1982, 1♀ 2 imm. (DU 82.12.30). **Zacapa:** *Estan-*

zuela [N14.99399°, W89.5757°], B. Patterson, 13.x.1971, 1♀ 1 imm. (MCZ 41322); 14.x.1971, 1♀ 2 imm. (MCZ 41330). **Guyana**. **Rupununi:** *Iwokrana forest,* Turtle Mountain, primary tropical rainforest (N4.73173°, W58.71803°), S. Meyers, 15.viii.2004, 1♂ (AMNH). **Haiti** . no further locality, Linnaea V., 1♀ (ZMB). **Port au Prince:** [N18.5944°, W72.30743°], W.M. Mann, 1♂ 2♀ (MCZ 145034). **Honduras**. **Atlantida:** *west of Tela R.R.* near Rio Ulna [N15.77326°, W87.46535°], Stadelmann, 1♂ (MCZ 41335); Los Indios Farm, 1♂ (MCZ 41335). **Lancetilla:** [N15.73433°, W87.45617°], A.M. Chickering, vii.1929, 1♀ 2 imm. (MCZ 145028). **Puerto Castillo:** [N16.01733°, W85.95855°], J.B. Duncan, i–ii.1943, 1♀ 1 imm. (AMNH). **San Pedro Sula:** [N15.51492°, W87.99227°], N.L.H. Krauss, viii.1975, 1♀ (AMNH). **Subirana:** *Yoro* [N15.20216°, W87.44801°], Stadelmann, 6♂ (MCZ 41332), 1♀ (MCZ 41333), 1♀ (MCZ 41333). **Zacapa:** *Estanzuela* [N14.99399°, W89.5757°], B. Patterson, 13.xii.1971, 1♀ 1 imm. (MCZ 41322); [N14.99958°, W89.56681°], 14.ix.1971, 3 imm. (MCZ 41330). **Jamaica** . **Mandeville:** [N18.03129°, W77.50461°], Thomas Barbour, iii–iv.1909, 1♂ (MCZ 145035). **Montego Bay:** [N18.47622°, W77.89389°], D. Miller, 19.vi.1965, 1♀ 1 imm. (CAS 9057631). **Port Royal:** [N17.93677°, W76.8411°, 0m], L. Pinter, 31.xii.1968, 1♂ 4♀ (MCZ 145036). **Liberia**. **Cape Palmas:** [N4.36889°, W7.72861°], 1♀ (MCZ 68771). **Monrovia:** [N6.29074°, W10.76052°], iii.1895, 1♀ (USNM); vi.1894, 1♀ (USNM); near houses [N4.36889°, W7.72861°], iii.1895, subadult♀ (USNM). **Mexico**. **Campeche:** *San José (?)* [N19.83579°, W90.54032°], H. Wagner, xii.1946, 1♂ 6♀ 9 imm. (AMNH). **Chiapas:** [N16.75693°, W93.12924°], H.M. Smith, iv–v.1940, 1♀ (USNM); *6 miles S Tuxtla Gutiérrez* [N16.7516°, W93.10299°], J. and W. Ivie, 21.viii.1966, 1♀ (AMNH); *near Soluuchiapa on Rte. 195,* rock outcrops [N17.42978°, W93.03555°, 500m], F.A. Coyle, 17.vi.1982, 1♂ (MCZ 39919). **Distrito Federal:** [N19.43261°, W99.13321°], H. Wagner, fall/1940, 1♀ 4 imm. (AMNH). **Hidalgo:** *Huachinango* [N20.1757°, W98.06289°], Goodnight and Bordas, 24.viii.1946, 1♀ 1 imm. (AMNH IFM-1509). **Nayarit:** *25 miles E San Blas,* 21.7 miles N Tepic, in bathroom [N21.6913°, W105.05364°], H. and H. Campbell, 17.iii.1961, 1♂ (CAS 9058474). **Nuevo León:** *Cola de Caballo Falls* [N25.36232°, W100.16347°], J.E. Carico, 31.viii.1968, 1♂ 2 imm. (USNM); *Horsetail Falls* [N25.36631°, W100.16142°], J.A. Beatty, 20.vi.1963, 1♀ (AMNH). **Oaxaca:** *Salina Cruz* [N16.18428°, W95.20876°], B. Malkin, 9–13.vii.1947, 1♂ 2♀ (AMNH). **Puebla:** *Pahuatlán* [N20.27693°, W98.15016°, 1100m], H. Wagner, 5–6.iv.1946, 1♀ (AMNH); *Zoquitlán* [N18.3336°, W97.01806°], A.G. Grubbe, 30.xii.1978, 1♂ (AMNH). **Quintana Roo:** *Lázaros Cardenas,* Reserva Ecológica El Éden, Rancho El Éden, night collecting (N21.19611°, W87.16618°, 35m), R. Paredes and G. Montiel, 7.vii.2007, 1♀ (CNAN-Ar 6502), 1♀ (CNAN-Ar 6504), 1♀ (CNAN-Ar 6503). **San Luis Potosí:** *1 mile SW Tamazunchale* (N21.15°, W98.49°), J. and W. Ivie, 25.vii.1966, 1♀ (AMNH); *3 miles W El Naranjo,* route 80 [N22.52191°, W99.32536°], J.A. Beatty, 22.vi.1963, 2♂ (AMNH); *Valles,* Hotel Covadonga [N21.9919°, W98.99082°], L. Steude, 1961, 1♂ (AMNH), 1♀ (AMNH). **Tabasco:** *Bocal del Cerro* [N17.4523°, W91.42853°], M. Guerra, iii.1945, 1♀ (AMNH). **Tamaulipas:** *10 km SW Aldama,* Cueva de los Cuarteles [N22.86095°, W98.23746°], J. Reddell, D. and M. McKenzie and S. Murphy, 23.xii.1972, 1♂ 1♀ (AMNH); *10 miles SW Mante* [N22.59659°, W99.03363°], J. Reddell, 28.v.1968, 1♂ 2♀ 3 imm. (AMNH); *Ciudad Victoria* [N23.73692°, W99.14112°, 300m], E.I. Schlinger, 13.viii.1977, 2♂ 1♀ 6 imm. (UCB); *Cruillas, Rancho El Milagro* [N24.7551°, W98.53684°], Dice and Bartlett, 1930, 1♀ 2 imm. (MCZ 40255); L.R. Dice, H.H. Bartlett, 1930, 1♀ 2 imm. (MCZ 40255); *Jaumave* [N23.41143°, W99.37936°], H. Wagner, 10.v.1946, 1♂ 1♀ 1 imm. (AMNH); *Reynosa* [N26.05084°, W98.2979°], L.E. Diamond, iv.1937, 2♂ (AMNH), 7♀ 13 imm. (AMNH); *Tamazunchale* (N21.15°, W98.48°), W.J. Gertsch and W. Ivie, 19.iv.1963, 4♀ 3 imm. (AMNH). **Veracruz:** *Boca del Río,* on tin house [N19.10627°, W96.10632°], G. Dingerkus et al., 12.viii.1975, 1♂ (AMNH); *Fortín de Las Flores* (N18.54°, W97.01°), J. and W. Ivie, 4.viii.1966, 1♀ (AMNH); *Sanborns,* on walls in the R.R. Station [N19.17259°, W96.18869°], A. Petrunkevitch, vii–viii.1909, 1♀ 8 imm. (AMNH). **Yucatán:** *Chichen Itzá* (N20.68429°, W88.56778°), V. Roth and B. Roth, 11.i.1984, 1♀ (CAS 9057625); [N20.68429°, W88.56778°], L.J. Cole, 14.ii.1904, 1♂ 3♀ (MCZ 145032); 14.vii.1904, 2♂ (MCZ 40224); R.V. Chamberlin, 1♂ 3♀ (MCZ 145031); *Colonia Yucatán* [N21.2125°, W87.72583°], Pallister, 21.viii.1964, 1♀ (AMNH). **Uncertain locality:** *Paso Real,* Río Tonto, H. Wagner, 30.vii.1946, 1♂ (AMNH). **Netherland Antilles** . **Aruba:** [N12.51803°, W70.03666°], H. Campbell, ix.1963, 1♀ (MCZ 145033). **Nicaragua**. **Bonanza:**

[N14.0312°, W84.59296°], W.J. Smit, 6.vi.1968, 1♀ (AMNH). **Panamá. Ancón:** *Canal Zone* [N9.05282°, W79.61652°], Lundy, iii.1960, 1♀ (AMNH); V. Ordonez, 27.xii.1960, 1♂ (MCZ 41324), 1♂ (MCZ 41324); *Colón* [N9.3317°, W79.90073°], vii.1913, 1♂ (MCZ 69201); *Experimental Gardens,* A.M. Chickering, 12.viii.1954, 1♂ (MCZ 145027). **Taboga Island:** [N8.78719°, W79.55753°], N.L.H. Krauss, 12.xi.1961, 2♀ (AMNH). **Paraguay. Asunción:** [S25.2822°, W57.6351°], vii.1961, 3♀ 2 imm. (AMNH); *Asunción,* J.D. Anisits, 15.ii.1902, 3 imm. (ZMB); 1903–1904, 2♂ 2♀ 4 imm. (ZMB); 4.ix.1902, 1♂ (ZMB); 6.ix.1902, 1 imm. (ZMB); 6.x.1902, 1♀ (ZMB); 1 imm. (ZMB). **Central:** *Villeta* [S25.50702°, W57.55894°], L. Fogarty, ii–iii.1983, 1♂ 2 imm. (MCZ 69259). **Concepción:** Puerto Valle Mi (S22.15775°, W57.95191°), A. Bachmann, 8.v.1952, 1♀ (MACN-Ar 20757); *Puerto Max* [S22.6833°, W57.733°], S. Anisits, 19.x.1902, 1♂ 4♀ 1 imm. (ZMB); *Villa Sana* [S22.833°, W57.1°], 19.i.1903, 1♂ 6♀ (ZMB). **Itapua:** *Obligado,* near Hohenau [S27.07849°, W55.6455°], B. Malkin, ix.1984, 1♂ (AMNH). **Northern Paraguay:** *Colonia Risso* [S22.6833°, W57.733°], 1♀ 3 imm. (ZMB). **Paraguarí:** *Sapucai* (S25.70258°, W56.9511°), E.J. Hammer, 1♀ (MACN-Ar 20665); [S25.66776°, W56.95556°], S. Anisits, xii.1904, 1♂ 4♀ 2 imm. (ZMB); Sapucai (S25.66659°, W56.95346°), E.J. Hammer, 1 imm. (MACN-Ar 20666). **Postillón:** *Postillón* [S25.2822°, W57.6351°], J.D. Anisits, 1. ix.1902, 1 imm. (ZMB). **Uncertain locality:** *Faramuran, 100 Km N de Estigarribia,* J.A. Vellard, viii.1972, 1♂ 2♀ (MACN-Ar 20655). **Label illegible:** [S25.2822°, W57.6351°], no date, 1♀ (ZMB). **No further locality:** (S23.56393°, W58.01456°), W. Hanke, 1939, 1♀ 5 imm. (MACN-Ar 20707); (S23.56393°, W58.14557°), 5 imm. (MACN-Ar 20709); [S25.2822°, W57.6351°], Fiebrig, no date, 1♂ (ZMB 2521), 1♀ 1 imm. (ZMB 3949); J.D. Anisits, 3.ix.1902, 1 imm. (ZMB), 1 imm. (ZMB); no date, 4 imm. (ZMB). **Peru. Piura:** *Negritos* [S4.65064°, W81.30418°], D.L. Frizzell, 31.iii.1939, 1♀ (CAS 9057801); D.L. Frizzell and H. Exline-Frizzell, 31.iii.1939, 3♀ 6 imm. (CAS 9057821); H. Exline-Frizzell, iii.1941, 2♀ (CAS 9057838); x.1939, 1♂ (CAS 9057796). **Puerto Rico. Bo. Bosque:** *San Germán* [N18.08419°, W67.04284°], D. Nazario, 1♂ (AMNH). **Cabo Rojo:** [N18.08663°, W67.14574°], 4♀ 3 imm. (AMNH); C.E. Seda, 2♀ 3 imm. (AMNH); iv.1983, 1♀ 4 imm. (AMNH). **Ensenada:** [N17.96788°, W66.9303°], 14–19.vi.1915, 1♀ (AMNH). **Guanica:** [N17.99813°, W66.92732°], C.E. Seda, 2♀ 3 imm. (AMNH). **Mayaguez:** [N18.20135°, W67.14515°], D. Fabón, iii.1962, 4♀ (AMNH). **San Germán:** *calle El Río* [N18.08419°, W67.04284°], D. Nazario, 1♀ 1 imm. (AMNH). **San Juan:** [N18.46633°, W66.10572°], i.1910, 1♀ (USNM). **Santa Isabel:** *Bo. Arus,* in packing warehouse [N17.96562°, W66.40476°], S. Modina et al., iii.1984, 4♀ (AMNH). **Santa Rita:** [N18.39922°, W66.05424°], E.G. Smyth, 22.i.1915, 1♂ (USNM); iv.1915, 1♀ (USNM); iv.1916, 1♂ 1♀ (USNM). **No further locality:** [N18.39922°, W66.05424°], Gundlach, 1♀ (ZMB), 2♀ (ZMB). **Surinname. Paramaribo:** *Paramaribo* [N5.85204°, W55.20383°], C. Heller, no date, 1 imm. (ZMB); in house, 27.vii.1908, 1♂ (ZMB 1632); Paramaribo Botanical Gardens [N5.83405°, W55.1549°], A. Reynes, 1♂ 1♀ (MCZ 39059). **Trinidad y Tobago. Arima Valley:** [N10.61719°, W61.27437°], C. Seiderman, vi.1983, 1♀ (AMNH). **Team Drive:** Diego Martín [N10.37572°, W61.23356°], N. Nieves, 16.ii.1959, 1 imm. (AMNH). **Turks and Caicos. Grand Turk:** *Mitch's,* Front Street [N21.47313°, W71.14804°], G. Hormiga, 24.iii.1988, 4♂ 12♀ 2 imm. (USNM IFM-1654). **U.S. Virgin Islands. Saint Croix:** [N17.7246°, W64.8348°], 1922, 1♂ (MCZ 145037). **Saint Thomas:** [N18.3381°, W64.8941°], C.R. Shoemaker, vii.1915, 1♀ (USNM), subadult♀ 2 imm. (USNM). **USA: Alabama:** *Baldwin Co.*: Silver Hill [N30.54547°, W87.75166°], G. Nelson, vii.1945, 2♂ 2♀ (MCZ 144989); *Cleburne Co.*: Cheaha State Park, Mt. Cheaha [N33.48526°, W85.809°], A.F. Archer, 21.iv.1948, 1♀ (AMNH); *Dallas Co.*: Selma [N32.40736°, W87.0211°], Marx Collection, 2♀ (USNM); *Lee Co.*: Auburn [N32.60986°, W85.48078°], 1♀ (MCZ 144988); *Mobile Co.*: [N30.69537°, W88.03989°], Marx Collection, 1♀ (USNM), 1♂ (USNM IFM-1653); *Tuscaloosa Co.*: [N33.20844°, W87.56899°], 1939, 1♀ 2 imm. (AMNH). **California:** *San Clemente Island Co.*: label reads: "Marx collection, careful of loc. data" –specimen certainly mislabeled, 1♀ (USNM); *San Diego Co.*: 2980 E Street, on wall (N32.7151°, W117.1302°), J. Perez, 10.v.2008, 1♂ (SDSU). **Florida:** *Alachua Co.*: [N29.79381°, W82.49442°], J.D. McCrone and L.A.W., iii.1958, 1♂ (MCZ 144991); Gainesville [N29.65163°, W82.32483°], W. Ivie, 14.vi.1935, 2♂ 4♀ 1 imm. (AMNH), 1♀ 5 imm. (AMNH); *Charlotte Co.*: Punta Gorda [N26.92978°, W82.04537°], H. Ramstadt, 25.iv.1948, 1♂ (FMNH 2857696); Ramstadt, ii.1941, 1♂ 2♀ 5 imm. (AMNH); *Citrus*

Co.: Inverness [N28.83545°, W82.3314°], M.J. O'Brien, vi.1979, 1♂ (MCZ 145007); *Hardee Co.*: Zolfo Springs [N27.49337°, W81.79592°], A.G. Rueckert, 21.vi.1945, 1♀ (FMNH 2857694); 30. iii.1940, 1 imm. (FMNH 2857689); 31.i.1945, 1 imm. (FMNH 2857664); 6.ix.1944, 1♀ (FMNH 2857686); 9.iv.1945, 1♀ (FMNH 2857690); ii–iii.1947, 1♀ (FMNH 2857693), 1♂ 2♀ (FMNH 2857691); vii.1946, 1♀ 1 imm. (FMNH 2857695); *Highlands Co.*: 8 miles S Lake Placid, Archbold Biological Station [N27.18286°, W81.35208°], A.M. Chickering, iii.1968, 1♂ 1♀ 2 imm. (MCZ 145005); C.E. Griswold and L. Vincent, 26–28.vi.1978, 1♂ 3♀ (UCB); G. Dingerkus, 5.i.1972, 1♂ (AMNH); Herbert W. Levi, 25.ii.1976, 1♂ (MCZ 145006); Highland Hammock State Park [N27.47362°, W81.53042°], P. Sierwald, 3.viii.1994, 1♀ (FMNH 2857659); Sebring, Highlands Hammock State Park [N27.45706°, W81.53839°], A.R. Brady, 6.vi.1961, 1♂ (MCZ 144999); *Hillsborough Co.*: Clearwater Pinilla [N28.06416°, W82.42139°], O. Paulus, 1963, 4♂ 4♀ 1 imm. (CAS 9057601); *Marion Co.*: Ocala National Forest, Juniper Spring, web on wall [N29.16692°, W81.79147°], D. Ubick, 7.viii.1981, 1♂ (DU 81.08.07); *Miami-Dade Co.*: Dade [N25.76168°, W80.19179°], D.C. Lowrie, vii.1938, 2♂ (AMNH); in hotel room, N.L.H. Krauss, 7.viii.1971, 1♂ (AMNH); Miami, M. Gribbins, 20.x.1934, 1♀ (FMNH 2857697); 30.iv.1935, 1 imm. (FMNH 2857699), 1♀ (FMNH 2857698); 30.xi.1935, 1♀ (FMNH 2857685); Miami-Dade, 29.iii.1935, 1♀ (FMNH 2857692), 1♀ (FMNH 2857700); Wardlow, vii.1934, 1♀ (FMNH 2857688); *Monroe Co.*: Keys [N24.67909°, W81.36438°], R. Jackson, i.1970, 1♂ (CAS 9058475); *Okaloosa Co.*: Crestview, in service station [N30.75418°, W86.5728°], A. Moreton, 2. vii.1966, 2♀ (AMNH); *Orange Co.*: Rock Springs [N28.75638°, W81.50146°], A. Jung, 7.x.1972, 1♀ 1 imm. (CAS 9060365); *Putnam Co.*: Welaka Conservation Reserve, night collecting [N29.46864°, W81.65909°], 23.iii.1966, 5♀ 5 imm. (USNM); *Saint Lucie Co.*: Fort Pierce, Harbor Branch [N27.53562°, W80.35971°], PMM, 13.viii.1992, 1♂ (FMNH 2857674); Ft. Pierce, Harbor Branch Foundation, in sink at men's room, P.M. Mikkelsen, 29.iv.1986, 1♂ (USNM); *Sarasota Co.*: Eaglewood [N26.96201°, W82.3526°], A. Sommerman, ix.1952, 1♀ (USNM); *vicinity of Pensacola Co.*: (N30.333°, W87.25°), L. Malito, winter/1953, 2♂ 1♀ (AMNH). **Georgia:** *Bulloch Co.*: Statesboro [N32.44879°, W81.78317°], W.W. Liddell, 16.x.1984, 1♂ (USNM); Evermore House Farm, hay barn, T. Sullivan, 1.i.2006, 2♂ (AMNH); *Camden Co.*: Little Cumberland (N30.96667°, W81.41667°), W.E. Steiner et al., 3. vii.1996, 3♂ 3♀ (USNM); Little Cumberland I., 27.xi.1997, 1♀ (USNM); *Chatham Co.*: Savannah, in garage [N32.08354°, W81.09983°], T. Sullivan, 27. viii.2005, 1♂ (AMNH); *Chattahoochee Co.*: Ft. Benning, main post [N32.36234°, W84.94926°], P.R. Craig, 20.iii.1960, 1♂ (CAS 9057591); *Hall Co.*: Gainesville [N34.29788°, W83.82407°], B.J. Kaston, viii.1944, 1♂ 1♀ (MCZ 144987); *Liberty Co.*: Midway, Saint Catherine's Island [N31.62889°, W81.1527°], D. Lavender, 15.ix.1984, 1♀ (USNM); *Thomas Co.*: Thomasville (N30.833°, W83.98333°), H. Field, iv.1940, 2♂ 1♀ (AMNH); *Walton Co.*: Monroe, Forsyth [N33.79484°, W83.71323°], A.F. Archer, 1963–1964, 1♂ (AMNH). **Illinois:** *Logan Co.*: Chestervale [N40.09227°, W89.32176°], 29. vi.1952, 1♂ (AMNH). **Louisiana:** *Calcasieu Co.*: Lake Charles, Sam Houston State Park [N30.2266°, W93.21738°], A. Moreton, 25–30.v.1966, 1♀ (AMNH); *East Baton Rouge Co.*: Baton Rouge [N30.45828°, W91.14032°], Marx Collection, 1♂ (USNM); sweet potato storage, F.W. Howard, 13. viii.1975, 1♂ (AMNH); East Baton Rouge Parrish, Baton Rouge Western Union office [N30.45069°, W91.15289°], C.E. Parker, 20.iii.1963, 1♀ (CAS 9057597); *Lincoln Co.*: Ruston [N32.52321°, W92.63793°], M.A. Cazier, 10.vii.1950, 2♀ 2 imm. (CAS 9057855); *Orleans Co.*: New Orleans [N29.95107°, W90.07153°], 1886, 1♀ (ZMB); *Saint Martin Co.*: St. Martinville, Longfellow-Evangeline State Park [N30.13728°, W91.82318°], A. Moreton, 14–19.v.1966, 2♀ (AMNH). **Mississippi:** *Forrest Co.*: Hattiesburg [N31.32712°, W89.29034°], C.D. Michener, 2.vii.1944, 1♂ 4 imm. (AMNH); *Harrison Co.*: Biloxi [N30.39603°, W88.88531°], 1♀ (USNM); *Hinds Co.*: Clinton [N32.34153°, W90.32176°], J.W. Bailey, 1926, 1♂ 1♀ 6 imm. (AMNH); *Jackson Co.*: Gautier, shrubs, garage [N30.38576°, W88.61169°], A. Moreton, 16.xii.1971, 1♂ (MCZ 145012); Ocean Springs [N30.41131°, W88.82781°], 1.iv.1966, 1♂ (MCZ 145011); 21–28.iii.1989, 1♂ 1♀ (USNM); in building, A.K. Jacobson, 8–12.iv.1968, 1♀ (FMNH 2857658), 1 imm. (FMNH 2857660); under cottage; both in web, A. Moreton, 18.vi.1967, 1♂ 1♀ (MCZ 145009). **New Mexico:** *Las Cruces Co.*: Marx Collection, label reads: "Marx collection, careful of loc. data" –specimen certainly mislabeled, 1♀ (USNM). **New York:** *Tompkins Co.*: Ithaca [N42.44396°, W76.50188°], G. Dingerkus, 15.v.1975, 1♂ (AMNH).

North Carolina: *Hyde Co.*: Ocracoke Island Blackbeard's Hammock [N35.11462°, W75.98101°], J. Coddington, 25.viii.1976, 4♀ (MCZ 145008); *Mecklenburg Co.*: Davidson, basement [N35.4993°, W80.84869°], x.1953, 1♀ (AMNH); *New Hanover Co.*: Wilmington, Saint James Church Yard, shrubbery and walls [N34.23507°, W77.94536°], W.F. Adams, 10.ix.1986, 2♀ (USNM); *Orange Co.*: Chapel Hill [N35.9132°, W79.05585°], G.F. Atkinson, 12.iv.1886, 13♀ 8 imm. (USNM); Marx Collection, 1♂ (USNM). **South Carolina:** *Aiken Co.*: Jackson, in house [N33.32542°, W81.78789°], W. Tarpley, 1.vi.1969, 1♂ (AMNH); *Charleston Co.*: Charleston [N32.77648°, W79.93105°], 1♂ 1♀ (MCZ 144993); Edisto Beach [N32.49712°, W80.30899°], T. Sullivan, 6.viii.2003, 1♂ (AMNH); *Hampton Co.*: Yemassee [N32.69018°, W80.85066°], J. Dean, v.1969, 1♀ (MCZ 144992); *Lexington Co.*: 5 miles S Leesville [N33.91014°, W81.53733°], L. Brodie, 1 imm. (FMNH 2857671), 1♀ (FMNH 2857661); 28.xi.1965, 1 imm. (FMNH 2857668); 30.vi.1964, 2♂ 1♀ 1 imm. (FMNH 2857670); 7.vii.1964, 1♂ (FMNH 2857662); 9.x.1965, 1♀ (FMNH 2857669); Leesville, "Rockwood", L. Ross, 15.v.1952, 1 imm. (FMNH 2857673); *Pickens Co.*: Clemson University, Entomology Lab, shore of Hartwell Lake [N34.67609°, W82.83642°, 213m], S. Crews, 5.viii.2000, 1♀ (CAS 9060618); Clemson University, on shore of Hartwell Lake, entomology lab (N34.64233°, W82.836°), I. Agnarsson, 18.vii.1998, 1♀ 1 imm. (USNM). **Texas:** *Angelina Co.*: Lufkin, on floor of PC lab [N31.33824°, W94.7291°], H.A. Pase, 1.xii.1975, 1♂ (AMNH); *Aransas Co.*: Arkansas [N28.13588°, W96.98694°], W. McAlister, 10.vi.1956, genitalia mounted in a slide, original specimen not seen, 1♀ (AMNH); Goose Island State Park, eaves of buildings, A.R. Brady, 15.vi.1961, 1♂ (MCZ 144998); *Austin Co.*: 8 miles NE of New Ulm [N29.97558°, W96.42134°], R.O. Albert, 20.viii.1961, 2♂ (MCZ 144986); *Bexar Co.*: San Antonio [N29.42412°, W98.49363°], 2♂ 1♀ (CAS 9039667); E.M. Nelson, 1967–1970, 4♀ 2 imm. (MCZ 145002), 2♀ 2 imm. (MCZ 145003); J. Griffith, 7–9.v.1940, 4♂ (AMNH); W.J. Gladney, 20.vii.1976, 2♂ 2♀ (AMNH); *Brazoria Co.*: 5 miles NE Rosenberg (N29.36°, W95.48°), J. and W. Ivie, 12.viii.1964, 1♂ 5♀ 1 imm. (AMNH), 4♀ 7 imm. (AMNH); *Brazos Co.*: [N30.65041°, W96.32261°], 1♂ 3♀ (MCZ 144984); *Cameron Co.*: 1.4 mile S San Benito [N26.13258°, W97.6311°], D. Campbell and P.R. Craig, 2.v.1960, 1♂ (CAS 9058476); 3 miles NW Brownsville [N25.9598°, W97.50971°], D.C. Lowrie, 27.xii.1941, 1♀ 5 imm. (AMNH); Brownsville, pack rat nest [N25.90175°, W97.49748°], Lt. Gentry, 26.i.1962, 1♀ (AMNH); Laguna Atasconsa Wildlife Refuge, east shore of Cayo Atascosa, near damsite [N26.22835°, W97.34865°], B.A.B., 29.i.1959, 1♂ (AMNH); Leguna Atascosa Wildlife Refuge, 29.i.1959, 1♀ (AMNH); *Comal Co.*: Bracken Bat Cave [N29.68742°, W98.34123°], H.L. Keegan, i.1952, 4♀ 3 imm. (AMNH); *Dallas Co.*: Dallas [N32.77666°, W96.79699°], M. Keating, 1972, 1♂ (MCZ 145004); *Fannin Co.*: Sherman (N33.39°, W96.35°), K.W. Haller, 25.vii.1963, 1♂ (AMNH); *Fayette Co.*: La Grange [N29.9055°, W96.87665°], J. and W. Ivie, 18.vii.1966, 1♀ (AMNH); *Galveston Co.*: La Marque [N29.36857°, W94.97131°], W.A. Benton, 1♂ 2♀ (MCZ 144997); *Grayson Co.*: 2 miles W Pottsboro [N33.75927°, W96.66944°], K.W. Haller, vii.1967, 1♂ (AMNH); 3 miles SW Pottsboro, viii.1967, 1♀ (AMNH); Sherman [N33.63566°, W96.60888°], ix.1964, 1♂ 1 imm. (AMNH); vii.1967, 3♂ 1 imm. (AMNH); *Hidalgo Co.*: Bentsen-Rio Grande Valley State Park [N26.1855°, W98.37944°], W.J. Pulawski, 28–29.iv.1985, subadult♀ (CAS 9057606); Edinburg [N26.30174°, W98.16334°], 29.xii.1949, 1♀ (AMNH); S. Mulaik, 24.vii.1937, 3♂ (AMNH); 7.iv.1937, 1♂ (AMNH); Edinburg-Eninburg Lane, J.E. Carico, 28.vii.1968, 1♂ (USNM); Edinburgh, D. Mulaik, 2♂ 2♀ 8 imm. (AMNH); Monte Alto, Reservoir [N26.37313°, W97.97167°], J.E. Carico, 28.vii.1968, 3♀ (USNM); San Juan [N26.18924°, W98.15529°], D. Campbell and P.R. Craig, 1.v.1960, caught in the middle of an imaginal molt, 1♀ (CAS 9057615); 1.vi.1960, 1♀ 1 imm. (CAS 9057616); *Jefferson Co.*: Beaumont [N30.08017°, W94.12656°], E.D. Palmer iv–vi.1946, 1♂ (MCZ 144990); *Jim Wells Co.*: Alice [N27.75225°, W98.06973°], R.O. Albert, 15–30.v.1961, 1♂ (MCZ 144994); *Karnes Co.*: Helena [N28.95361°, W97.82305°], W.P. Maddison, 23–28.v.1983, 1♂ (MCZ 144995); *Kenedy Co.*: 29 miles S Sarita [N26.78959°, W97.77569°], A.R. Brady, 14.xi.1958, 1♀ (MCZ 144996); *Montgomery Co.*: Montgomery [N30.38826°, W95.69634°], G. Jowell, 15.viii.1975, 1♂ 1 imm. (DU 75.08.15); *Nueces Co.*: Corpus Christi [N27.80058°, W97.39638°], F. Packard, 10.viii.1946, 1♀ (AMNH); in garage, K. Nichols, 20.xii.1975, 1♂ (MCZ 145001); *Refugio Co.*: 8 miles NE Sinton (N28.08°, W97.26°), J. and W. Ivie, 12.viii.1964, 5♀ 11 imm. (AMNH); *San Patricio Co.*: 7 miles N Sinton, Welder Wildlife Foundation, route 77, on wall of headquarter building [N28.03668°,

W97.50916°], 26.vii.1982, 1♂ (AMNH); *Travis Co.*: Austin [N30.26715°, W97.74306°], B. Vogel, 10. xii.1971, 1♀ (USNM); 15.iii.1969, 1♀ (USNM); 25.ix.1969, 1♂ (USNM); 29.vii.1972, 1♂ (USNM); 30.vii.1983, 1♂ (USNM); x.1972, 1♀ (USNM); R.A. Stirton, 14.vi.1952, 1♂ (AMNH); McNiel [N30.45009°, W97.71888°], D. Campbell and P.R. Craig, 27.v.1960, 1♀ (CAS 9057595); U. T. Brackenridge Fieldlab [N30.28431°, W97.77825°], B. Vogel, 17.vii.1970, 1♂ (USNM); *Victoria Co.*: Victoria [N28.80527°, W97.0036°], D.C. Lowrie, 25.v.1919, 4♀ (AMNH). **Virginia:** *Portsmouth Co.*: U.S. Naval Hospital, in buildings, around windows [N36.845°, W76.3063°], E. Sabath, 7.vii.1968, 2♀ 2 imm. (MCZ 144985). **No further locality:** lab reared specimen, S. Crews, DNA voucher: H. Wood (Palpimanoidea), D. Polotow (Lycosoidea), 1♀ (CAS 9034219). **Venezuela**. **Anzoategui:** *San Tomé* [N8.94153°, W64.13008°], T. Briceno-Maaz, 1♀ (AMNH). **Aragua:** *Girardot,* Maracay [N10.24694°, W67.59611°], E.H. Cordero, 18.iv.1929, 1♀ (MNRJ 526). **Caracas:** [N10.46964°, W66.80372°], Rothe, 1♀ (ZMB); *San José del Ávila* [N10.52059°, W66.91516°], C. Vogl, 1940, 1♂ 1♀ (AMNH). **Falcón:** Morrocoy, Los Llanos [N10.83121°, W68.26238°], J.A. Vellard, iv.1936, 1♀ (MACN-Ar 20620). **Mérida:** inside buildings [N8.6°, W71.15°], A.L. Edgar, 30.vi.1974, 1♀ several imm. (MCZ 40866); *Mérida* [N8.6°, W71.15°, 2500m], P. Briceno, no date, 1♂ 12♀ 14 imm. (ZMB); in house [N8.6°, W71.15°, 1700m], C. Sobrevila, 20.ix.1983, 1♀ (USNM). **Miranda:** *Caracas suburbs,* caves near Cementerio del Este [N10.45038°, W66.81118°], J.A. Coddington, vii.1986, 1♀ (USNM). **Puerto Cabello:** [N10.46667°, W68.01667°], A. Zilchi, 9.iv.1957, 1♂ 2♀ 1 imm. (SMF 8797/4). **San Estebán:** [N10.39638°, W67.96429°], P. Andruze, 26.i.1940, 5♀ 12 imm. (AMNH). **No further locality:** [N10.52059°, W66.91516°], 1♀ (AMNH); [N8.6°, W71.15°], F. Kamerow, 2♀ 4 imm. (ZMB), 1♀ (ZMB). **West Indies. Antigua:** *St. John's* [N17.12741°, W61.84677°], N.L.H. Krauss, 25.vii.1971, 1♀ 1 imm. (AMNH). **Label illegible :** 1♀ 1 imm. (ZMB), with egg sac, 1♀ (ZMB), 1♀ (ZMB); 1 imm. (MACN-Ar 20646); 19.iii.1902, 2♀ 7 imm. (ZMB). **No data:** 1♀ (MNRJ 2129); 1♀ (MACN-Ar 20643), 1♂ (MACN-Ar 20644), 1♀ (MACN-Ar 20640), 1♀ (MACN-Ar 20645), 1 imm. (MACN-Ar 20766), 1 imm. (MACN-Ar 20776), 2♀ (MACN-Ar 20767), 1♂ (MACN-Ar 20775), 1♂ (MACN-Ar 20772), 1♀ (MACN-Ar 20768), 1♀ (MACN-Ar 20784), 1♀ (MACN-Ar 20774), 2♀ (MACN-Ar 20782), 1♀ (MACN-Ar 20771), 1♂ (MACN-Ar 20770), 1♀ (MACN-Ar 20722), 1♂ (MACN-Ar 20701), 1♀ 5 imm. (MACN-Ar 20695), 1 imm. (MACN-Ar 20673); 1♀ (MACN-Ar 20765); A.G. Frers, 1 imm. (MACN-Ar 20642); Castellanos, x.1946, subadult♀ (MACN-Ar 20633); D.M. Rees, 30.vii.1964, 1♂ (AMNH); E. Prano, 1♀ (MACN-Ar 20781); F. Castillo, 1♀ (MACN-Ar 20741); M. Acembauch, vi.1975, 1♂ (MACN-Ar 6853); S. Castillo, 3♀ (MACN-Ar 226).

Kukulcania cochimi, sp. nov.

Figures 4B, 5G, 7B, 37–40

Type material: Holotype: **Mexico. Baja California:** *Bahía de Los Angeles,* in building [N28.95192°, W113.56243°], V. Roth, 15.i.1965, 1♂, in the same vial as 2 imm. (AMNH IZC00326328, IFM-1594). Paratypes: **Mexico. Baja California:** *Isla Espiritu Santo* [N24.46739°, W110.3428°], B. Firstman, 23.iii.1953, 1♀ (AMNH). **Baja California Sur:** no further data, 1♀ (CAS 9060649); *13.4 miles S Loreto,* Chuenque [N25.82848°, W111.3319°], D. Ubick, 13.i.1982, 1♀ (CAS 9060494); under volc. cbl., 2.i.1982, 1♀ (CAS 9060436); *Isla Carmen,* Puerto Ballandro [N25.97747°, W111.15335°], collector illegible, 21.v.1921, 1♀ (MCZ 145040); *Isla San José,* night collecting [N24.97103°, W110.62881°], B. Firstman, 25.iii.1953, 5♀ 3 imm. (AMNH IZC00326324, IFM-1635), night collecting, 3♀ 3 imm. (AMNH); 1♀ 3 imm. (AMNH); near boy's prison, 2♀ 1 imm. (AMNH); *Isla Tortuga* [N27.43608°, W111.88683°], J.C. Chamberlin, 11.v.1921, 1♀ (MCZ 145038), 1♀ (MCZ 145039); *La Purísima* [N26.18554°, W112.07596°], 1♂ (CAS 9060641); *road to Sierra San Francisco,* mostly under rocks, night collecting (N27.4899°, W113.1881°), M. Hedin, P. Paquin and S. Crews, 31.iii.2002, 1♂ (SDSU G264); *San Ignacio,* palm grove, under cbl. [N27.28207°, W112.89545°], D. Ubick, 31.xii.1981, 1♀ (CAS 9060464); *San José de Comondú,* canyon [N26.05858°, W111.8237°], V. Roth, 15.ii.1966, 1♀ 1 imm. (AMNH). **No data** . Marx Collection, label reads: "Galapagos,

Marx collection, careful of loc. data"—specimen certainly mislabeled, 1♀ (USNM).

Etymology: The Cochimi were indigenous people originally inhabiting parts of the Baja California peninsula before the arrival of the Spanish in America. Their language and culture became extinct around 1900, after their population declined due to contact with Old World diseases. To be treated as a noun in apposition.

Diagnosis: Males are easily recognizable by the very large and conspicuous keel in the embolus (fig. 38D–E) and by the first tibia and metatarsus bearing few prolateral macrosetae (fig. 37E). Females can be distinguished by the slender, curved, and long sclerotized bars, by the subrounded membranous portion of the spermathecae apex, and by having the spermathecal pores distributed in several small patches (instead of a single, large patch) (figs. 7B, 40). Females can also be distinguished from other species from the Baja California Peninsula by their orange brown coloration (usually darker in other species) and by their relatively longer and more slender legs.

Description: Male holotype from Bahía de Los Angeles, Baja California, Mexico (AMNH IZC00326328) (figs. 37, 38A–D). Coloration faded light orange. Carapace with radial brownish-orange markings. Abdomen dorsum grayish yellow. Clypeus short. Sternum oval, with two pairs of barely visible sigillae. Total length 6.08. Carapace length 2.79, width 2.39, clypeus length 0.3. Eye diameters and interdistances: AME 0.139; PME 0.187; ALE 0.221; PLE 0.219; AME–AME 0.073; PME–PME 0.223. Sternum length 1.44, width 1.38. Palp: femur length 3.84, height 0.36; tibia length 3.54, height 0.42. Leg I: femur (fe) 6.85; patella (pa) 1.38; tibia (ti) 7.56; metatarsus (mt) 8.01; tarsus (ta) 3.54. II: fe 5.56; pa 1.09; ti 5.44; mt 6.15; ta 2.79. III: fe 4.86; pa 1.17; ti 4.3; mt 5.6; ta 2.62. IV: fe 6.27; pa 1.26; missing from tibia. Abdomen: length 3.49, width 1.64. Palp macrosetae in several rows along femur ventral and dorsal faces. Leg macrosetae: fe I 11d, 1p, 30v, 32r; ti I 3p, 12v, 2r; mt I 2p, 16v, 2r; ta I 6v; fe II 10d, 1p, 17v, 4r; ti II 3d, 4p, 7v, 3r; mt II 2d, 4p, 11v, 4r; ta II 9v; fe III 10d, 2p, 17v, 1r; ti III 3d, 3p, 5v, 3r; mt III 3d, 4p, 9v, 4r; ta III 8v; fe IV 9d, 17v, 1r; ti IV ?; mt IV ?; ta IV ?. Palp: cymbium about as long as bulb, with anterior border bearing a ring of setae that end close to the embolus; bulb short, robust; sperm duct with three tightly packed coils; embolus short, curved, with a broad, flattened and very conspicuous keel. State of the specimen: poor, right legs I and II and both legs IV missing from tibia, left palp dissected, missing most of the setae and macrosetae.

Female paratype from Isla San José, Baja California, Mexico (AMNH IZC00326324). Coloration dark orange-brown. Carapace stippled with dark brown. Sternum orange, not particularly hirsute. Legs not particularly hirsute, with light-brown longitudinal stripes on coxae, femora and tibiae. Abdomen dorsum brown. Anterior margin of the carapace unmodified. Sternum oval, with two pairs of sigillae. Total length 10.91. Carapace length 4.8, width 3.64, clypeus length 0.85. Eye diameters and interdistances: AME 0.21; PME 0.266; ALE 0.331; PLE 0.312; AME–AME 0.058; PME–PME 0.248. Sternum length 2.39, width 2.38. Palp: femur length 2.84, height 0.91; tibia length 1.76, height 0.798. Leg I: femur (fe) 6.41; patella (pa) 1.62; tibia (ti) 6.33; metatarsus (mt) 5.49; tarsus (ta) 3.05. II: fe 4.96; pa 1.63; ti 4.56; mt 4.24; ta 2.34. III: fe 4.25; pa 1.51; ti 3.48; mt 3.97; ta 2.09. IV: fe 5.7; pa 1.58; ti 4.88; mt 4.99; ta 2.38. Abdomen: length 6.42, width 3.5. Palp macrosetae on ventral surface of tibia and tarsus. Leg macrosetae present on ventral surfaces of tibiae, metatarsi, and tarsi; all femora 4–6 dorsal macrosetae, metatarsus III with two dorsal macrosetae. Calamistrum with three rows with 9–14 setae each. Interpulmonary fold large, rounded, covering the spermathecae dorsally. Sclerotized lateral bars present, slender, curved, posteriorly slightly notched; membranous portion of the spermathecae apex lobelike, wide; glandular portion present as several small patches bearing glandular pores, positioned ventrally to the membranous portion. State of the specimen: good, genitalia dissected.

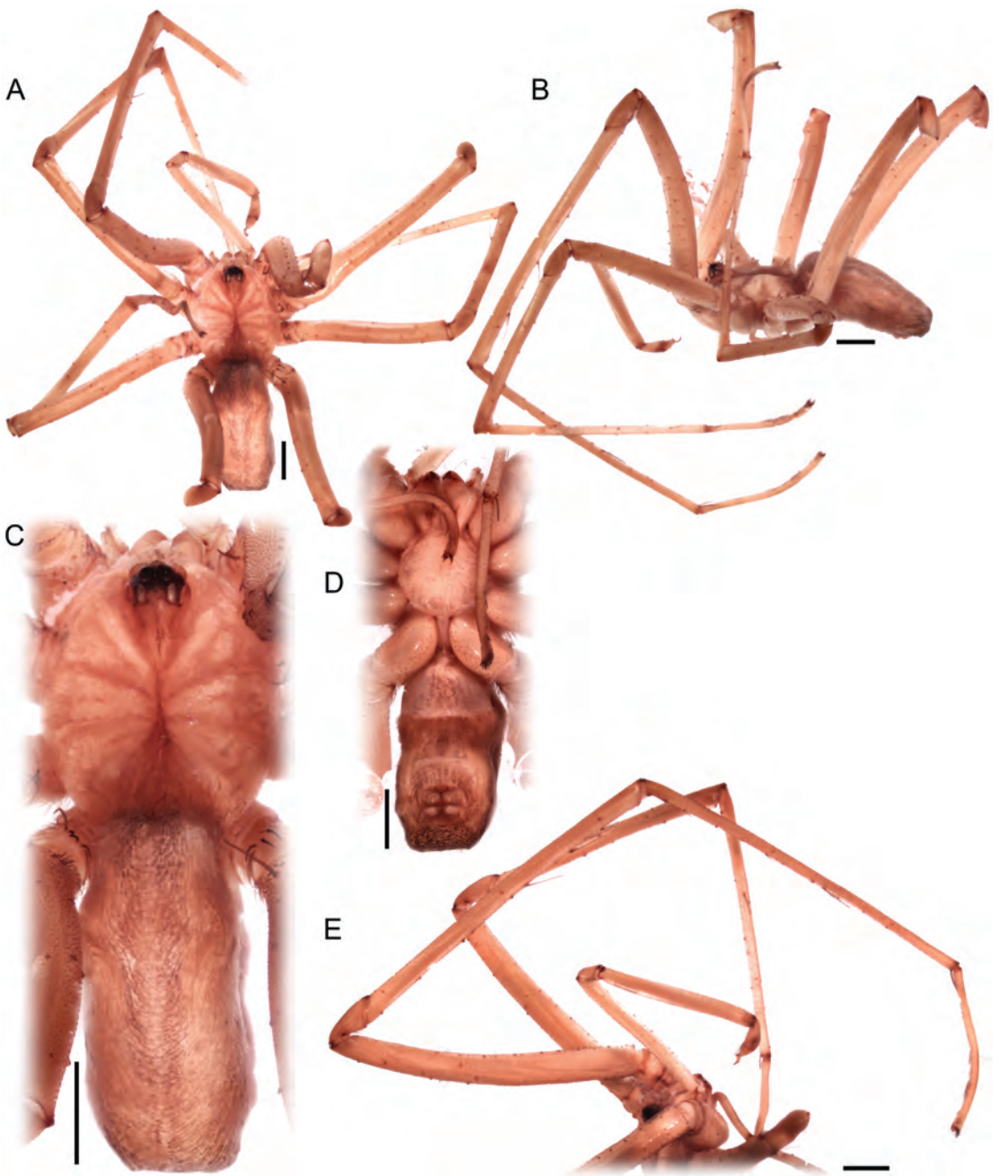

FIGURE 37. *Kukulcania cochimi*, male holotype from Mexico, Baja California, Bahía de Los Angeles (AMNH IFM-1594), habitus. **A, C.** Dorsal. **B.** Lateral. **D.** Ventral. **E.** Left legs I–II, prolateral. Scale bars = 1 mm.

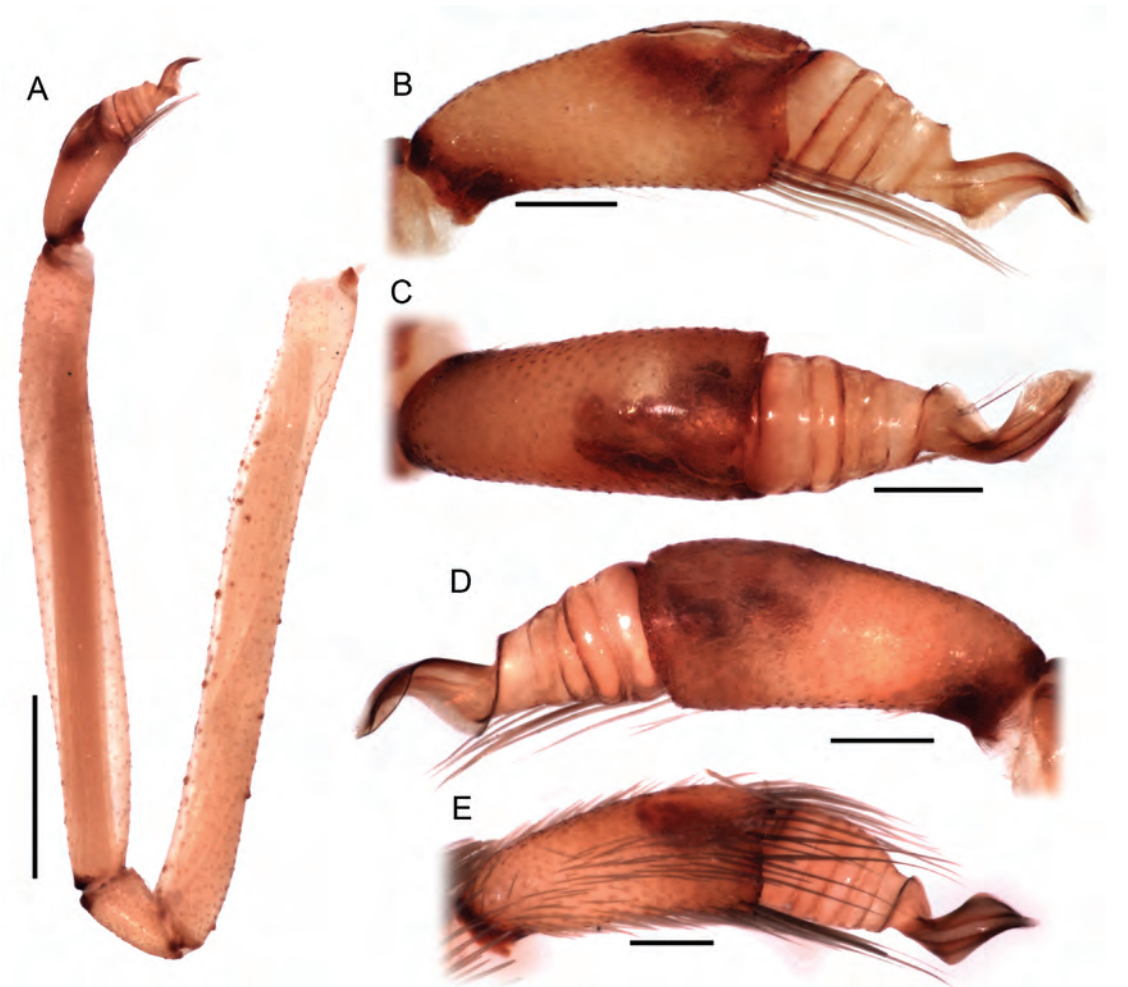

FIGURE 38. *Kukulcania cochimi*, left male palps. **A–D.** Holotype from Mexico, Baja California, Bahía de Los Angeles (AMNH IFM-1594). **A–B.** Prolateral. **C.** Dorsal. **D.** Retrolateral. **E.** Paratype from Baja California Sur, road to Sierra San Francisco (SDSU G264). Scale bars = 0.2 mm except for A, 1 mm.

FIGURE 39. *Kukulcania cochimi*, female paratype from Mexico, Baja California Sur, Isla San José (AMNH IFM-1635), habitus. **A.** Dorsal. **B.** Ventral. **C.** Lateral. **D.** Left calamistrum, dorsal. Scale bars = 1 mm except for D, 0.2 mm.

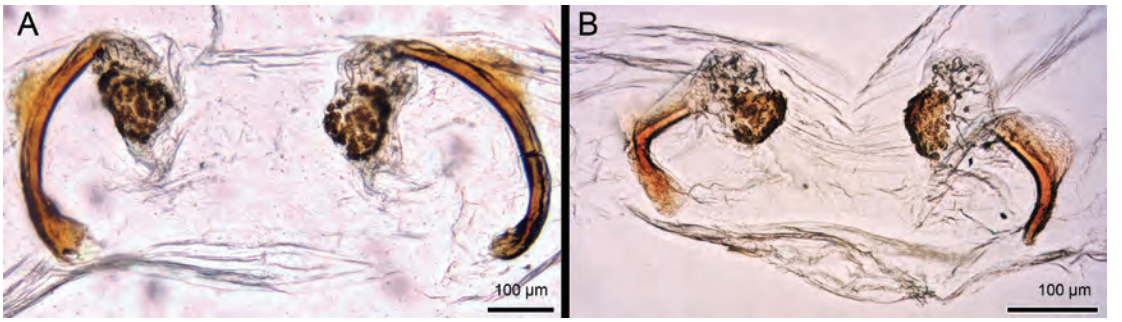

FIGURE 40. *Kukulcania cochimi*, female spermathecae, ventral. **A.** Paratype from Mexico, Baja California Sur, Isla San José (AMNH IFM-1635). **B.** Paratype from Baja California Sur, Isla Tortuga (MCZ 145038).

Intraspecific variation: Females (N = 3): total length 10.51–11.32 (10.91), carapace length 4.09–4.8 (4.55), femur I length 5.82–6.41 (6.17), tibia I length 6.33–6.37 (6.35), femur/carapace ratio 1.32–1.42 (1.36). The shape of the sclerotized bars varies among females (fig. 40).

Natural history: Label data indicate specimens have been collected in palm groves, under stones and under volcanic cobble. The male holotype was collected in a building, suggesting this species might be found in synanthropy.

Distribution: Mexico, in Baja California Sur and the southern part of Baja California Norte, including some islands in the Gulf of California (fig. 4B).

Additional material examined: None.

Kukulcania arizonica (Chamberlin and Ivie, 1935)

Figures 2C, 4C, 7C, 27A, 28A, 29A, 30A–B, 41–44

Filistata arizonica Chamberlin and Ivie, 1935: 4, plate 4, figs. 24–25. Male and female types from Arizona (AMNH), examined.
Kukulcania arizonica: Lehtinen, 1967: 242.

Examined type material: Holotype: **USA**: **Arizona:** *Gila Co.*: 8 miles N Roosevelt Dam [N33.82314°, W111.29501°], W. Ivie, 11.iv.1935, 1♂ in the same vial as 1♀. Paratypes: Same data as the holotype, 1♂ 1♀ (AMNH IFM-1531), 1♂ 3♀ 1 imm. (AMNH IFM-1198, IFM-1655), 1♂ 1♀ 1 imm. (AMNH); *Yavapai Co.*: 20 miles SW Prescott [N34.35076°, W112.7482°], 8.iv.1935, 1♀ (AMNH). **Texas:** *Terrell Co.*: Sanderson [N30.14241°, W102.39403°], S. Mulaik, 4.vii.1934, 1♂ (AMNH).

Diagnosis: Males are similar to *K. mexicana* in having long macrosetae on femur I (figs. 2C, 41A), but differ by lacking incrassate setae on the cymbium. They can be further distinguished by the bulb with a single coil, conspicuous keel, and the tapering embolus that becomes gradually thinner toward the apex. Females are very similar to those of *K. gertschi* in the shape of the spermathecae (fig. 7C, 30A, B, 44): the sclerotized bars are gently curved and tapered posteriorly, the membranous portions of the spermathecae apex are digitiform, extend well beyond the margin of the uterus externus, and are slightly bent dorsally, and the glandular portions form a well-defined ventral patch. Distinguishing between the two species is often difficult, but specimens of *K. arizonica* usually have the spermathecae shorter, with a more subtle bend, and a larger glandular portion (figs. 30A, B, 44); they are often larger and have slightly more slender legs (fig. 43) than specimens of *K. gerstchi*.

Description: Male paratype from 8 miles N of Roosevelt Dam, Arizona (AMNH IFM-1198). Coloration light orange except where noted. Chelicerae, labium, and sternum cream. Abdomen dorsum brownish orange. Clypeus short.

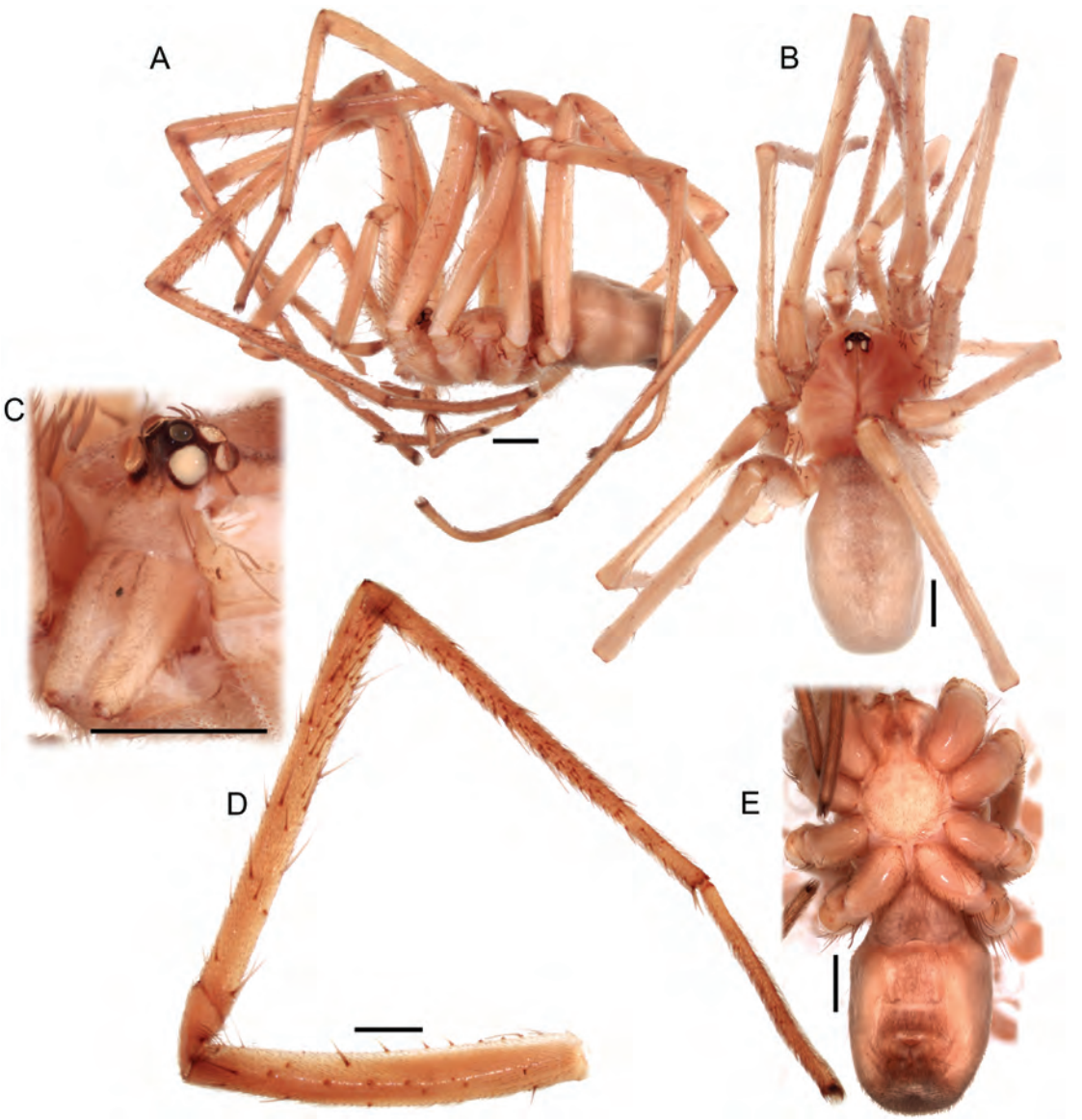

FIGURE 41. *Kukulcania arizonica* (Chamberlin and Ivie, 1935), male paratype from the type locality (AMNH IFM-1198), habitus. **A.** Lateral. **B.** Dorsal. **C.** Clypeus, sublateral. **D.** Left leg I, prolateral. **E.** Ventral. Scale bars = 1 mm.

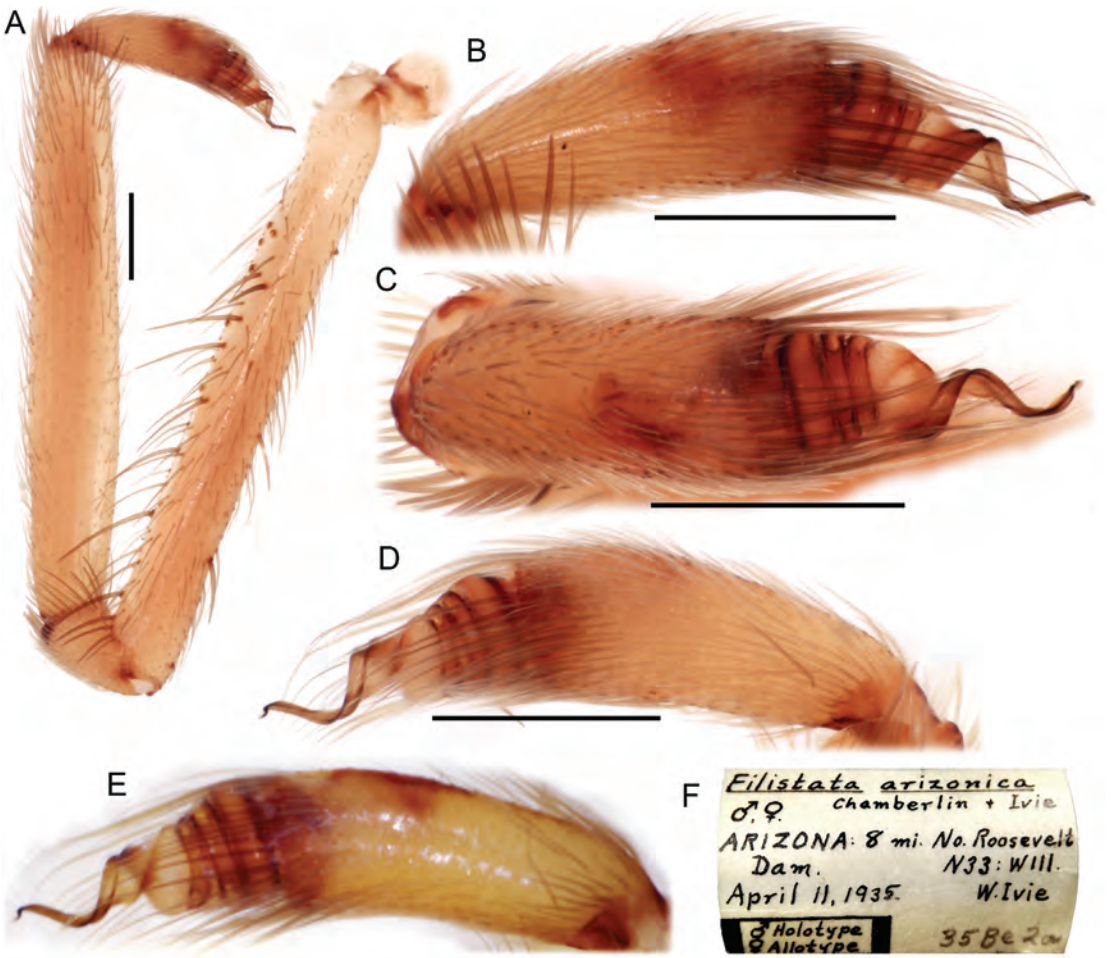

FIGURE 42. *Kukulcania arizonica* (Chamberlin and Ivie, 1935), male palps. **A–D.** Male paratype from the type locality (AMNH IFM-1198). **A–B.** Prolateral. **C.** Dorsal. **D.** Retrolateral. **E.** Male holotype, right palp, retrolateral, mirrored (not to scale). **F.** Label associated with the holotype. Scale bars = 0.5 mm.

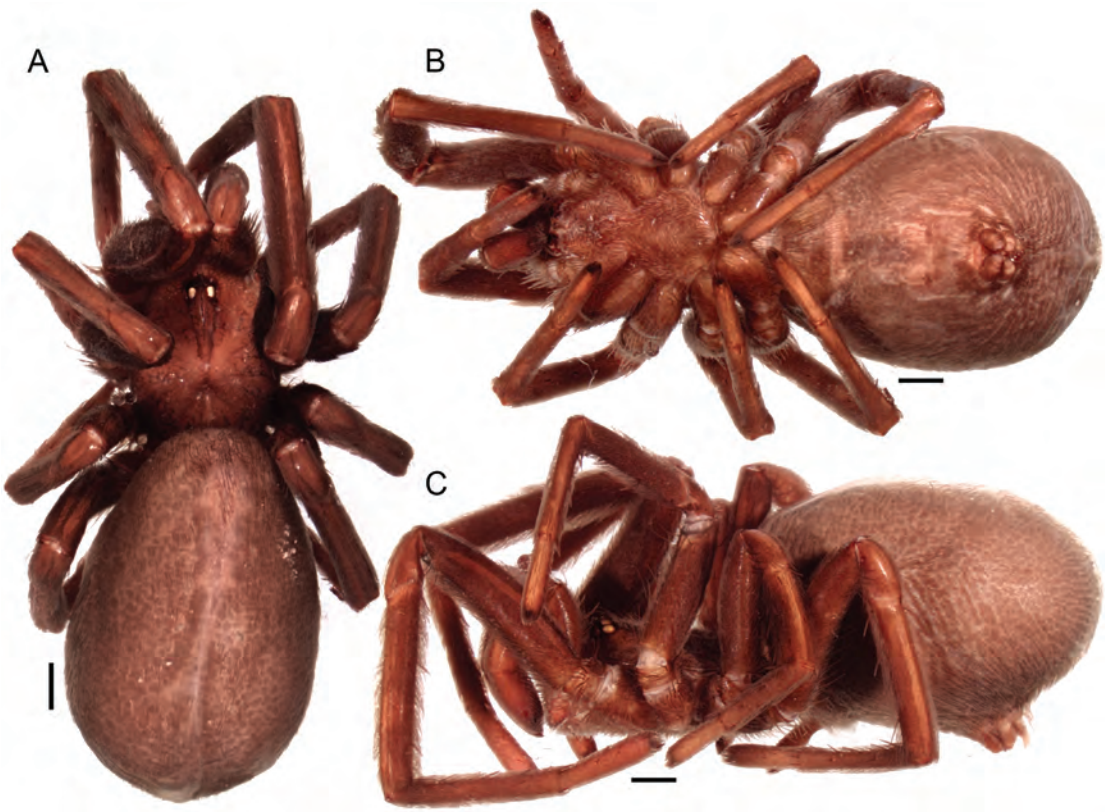

FIGURE 43. *Kukulcania arizonica* (Chamberlin and Ivie, 1935), female paratype from the type locality (AMNH IFM-1655), habitus. **A.** Dorsal. **B.** Ventral. **C.** Lateral. Scale bars = 1 mm.

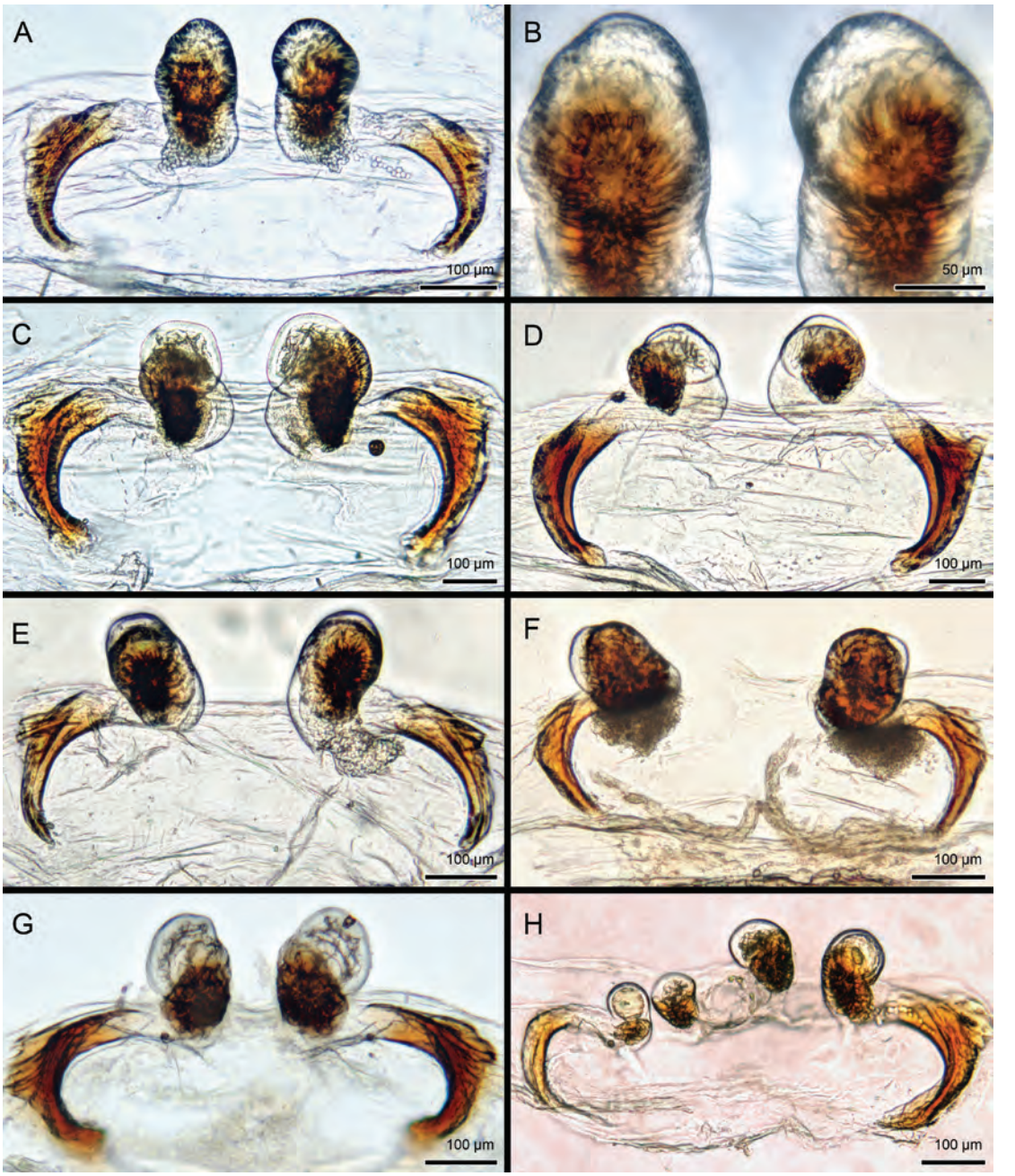

FIGURE 44. *Kukulcania arizonica* (Chamberlin and Ivie, 1935), female spermathecae, ventral. **A–B.** Paratype from the type locality (AMNH IFM-1531). **C.** Arizona, Tucson (AMNH-1560). **D.** Arizona, Portal (AMNH-1561). **E.** Arizona, Pinal (MACN-Ar 36219). **F.** Mexico, Durango, near San Andres Atotonilco (CNAN-Ar 8186). **G.** Mexico, Coahuila, Sierra de la Concordia (CNAN-Ar 8187). **H.** Teratological individual from Mexico, Tamaulipas (AMNH IFM-1633).

Sternum oval, with two pairs of barely visible sigillae. Total length 7.1. Carapace length 3.02, width 2.6, clypeus length 0.158. Eye diameters and interdistances: AME 0.146; PME 0.219; ALE 0.251; PLE 0.238; AME–AME 0.076; PME–PME 0.2. Sternum length 1.5, width 1.46. Palp: femur length 3.68, height 0.45; tibia length 3.35, height 0.54. Leg I: femur (fe) 6.13; patella (pa) 1.45; tibia (ti) 6.35; metatarsus (mt) 6.82; tarsus (ta) 3.47. II: fe 5.17; pa 1.27; ti 4.6; mt 5.24; ta 2.49. III: fe 4.59; pa 1.18; ti 3.92; mt 5.01; ta 3.44. IV: fe 6.16; pa 1.25; ti 5.74; mt 7.09; ta 3.42. Abdomen: length 4.39, width 2.53. Palp macrosetae long, in several rows along femur ventral and dorsal faces. Leg macrosetae: fe I 7d, 9p, 13v, 13r, the ventral ones long; ti I 10d, 39p, 10v, 3r; mt I 5d, 44p, 32v, 5r; ta I 12v; fe II 5d, 5p, 15v, 4r; ti II 3d, 2p, 6v, 3r; mt II 3d, 5p, 12v, 4r; ta II 15v; fe III 8d, 1p, 7v, 3r; ti III 3d, 3p, 6v, 3r; mt III 3d, 3p, 9v, 7r; ta III 13v; fe IV 9d, 9v; ti IV 3d, 2p, 6v, 2r; mt IV 3d, 6p, 14v, 2r; ta IV 16v. Palp: cymbium long, with anterior border bearing a ring of setae that end close to the embolus; bulb short, robust; sperm duct with four tightly packed coils; embolus with a single coil, tapering and acute in the apex, with a conspicuous keel; tibia slightly incrassate. State of the specimen: good, left palp and left leg I dissected.

Female paratype from the type locality (AMNH IFM-1655). Coloration reddish brown. Carapace stippled with dark brown. Coxae, tibiae, and femora with longitudinal light-brown stripes, first femora and tibiae hirsute, with long setae. Abdomen dorsum brown. Anterior margin of the carapace unmodified. Sternum oval, with two pairs of sigillae. Total length 11.8. Carapace length 4.15, width 3.26, clypeus length 0.625. Eye diameters and interdistances: AME 0.16; PME 0.237; ALE 0.32; PLE 0.298; AME–AME 0.071; PME–PME 0.255. Sternum length 1.84, width 1.98. Palp: femur length 2.36, height 0.85; tibia length 1.44, height 0.78. Leg I: femur (fe) 4.88; patella (pa) 1.52; tibia (ti) 4.62; metatarsus (mt) 4.02; tarsus (ta) 2.2. II: fe 3.76; pa 1.34; ti 3.18; mt 2.93; ta 1.75. III: fe 3.16; pa 1.4; ti 2.47; mt 2.6; ta 1.59. IV: fe 4.34; pa 1.47; ti 3.74; mt 3.55; ta 1.84. Abdomen: length 8.12, width 5.48. Palp macrosetae on ventral surface of tibia and tarsus. Leg macrosetae present on ventral surfaces of tibiae, metatarsi and tarsi; femora II–IV and metatarsi III–IV with 2–4 dorsal macrosetae. Calamistrum with three rows with 8–11 setae each. State of the specimen: good.

Female paratype from the type locality (AMNH IFM-1531). Interpulmonary fold large, rounded, covering the spermathecae dorsally. Sclerotized bars present, slightly curved; membranous portion of the spermathecae apex anteriorly elongate and with a dorsal, rounded cul-de-sac; glandular portion positioned ventrally to the membranous portion in a large, oval patch.

Intra specific variation: Males (N = 5): total length 6.33–7.35 (6.79), carapace length 3.02–4.6 (3.44), femur I length 5.83–7.91 (6.39), tibia I length 6.21–7.66 (6.62), femur/carapace ratio 1.72–2.03 (1.87). Females (N = 5): total length 11.8–19.08 (13.88), carapace length 4.15–7.29 (5.19), femur I length 4.88–8.35 (6.13), tibia I length 4.62–8.06 (5.82), femur/carapace ratio 1.14–1.28 (1.18). Although the number of prolateral macrosetae on the male leg I is usually high, it varies greatly: in three males we examined, the number varied from 14 to 43 on the tibia and from 20 to more than 100 on the metatarsus. Females vary in coloration: some are brown, others almost black, and others have the legs darker than the carapace. The shape of the genitalia is also slightly variable, although the general shape is fairly conserved (fig. 44). We recorded a teratogenic female (fig. 44H), which has two pairs of spermathecae within a single pair of sclerotized bars. The fact that this abnormality was observed in a single female (of about 100 we had the chance to dissect) suggests it is quite rare.

Natural history: Label data indicate this species is usually collected under rocks or logs or in stone walls and that it can be found in rocky woodlands, pine and oak forests, thorn forests, desert scrubs, chalk cliffs, walnut groves, and along roadsides. This species has also been collected in a variety of synanthropic habitats throughout its range, including porches, hotel

rooms, restrooms, libraries, around houses, garages, among others. A male has been collected in a web of a female *Physocyclus enaulus* Crosby (Pholcidae) while being eaten; another male has been collected in a can trap. A female from Imperial Co., California, collected with an open egg sac and its spiderlings, had two sets of spermathecae, suggesting it was about to molt after having oviposited.

Distr ibutio n: Southwestern United States, in the states of Texas, Arizona, and New Mexico, with a few records in neighboring areas of Oklahoma, Nevada, Utah, and California; and most of northern Mexico, in the states of Sonora to Durango and San Luis Potosí to Tamaulipas (fig. 4C).

Additio nal mater ial examined: **Mexic o**. **Chihuahua:** *12 miles NW Gran Morelos* [N28.33287°, W106.68477°], R. Smith, 16.viii.1950, 1♀ (AMNH); *23 miles S Chihuahua* [N28.35459°, W106.26728°], E.J. Schlinger, 9.vii.1954, 1♀ (UCB); *Las Canoas Babicora* [N26.62389°, W106.40391°], W.J. Gertsch, 3.vii.1947, 1♂ 5 imm. (AMNH); *near Primavera,* Cañon Prieta, 30.vi.1947, 1♀ (AMNH), 1♀ (AMNH); *Samalayuca* [N31.34139°, W106.47833°], 25.vi.1947, 3♀ (AMNH); *Sierra de En Medio,* Nogales Ranch [N30.98644°, W108.59738°, 1524–1737m], W.S. Creighton, 25–30.ix.1951, 1♀ (AMNH); *Sierra del Nido,* Arroyo del Álamo (N29.33°, W106.833°), V. Roth, 14.x.1969, subadult♀ (AMNH); *summit W of Primavera,* W.J. Gertsch, 2.vii.1947, 1♂ 6♀ 3 imm. (AMNH), 3♀ 10 imm. (AMNH). **Coahuila:** *1 mile S Cedritos* [N27.45639°, W101.77°], R. Zweifel, 23.vi.1957, 2♀ 3 imm. (AMNH); *20 miles E Saltillo* [N25.45685°, W100.65425°], W.J. Gertsch and V. Roth, 18.vii.1956, 1♀ 3 imm. (AMNH); *20 miles E Saltillo on Rt. 40* [N25.68679°, W100.60631°], F.A. Coyle, 3.vii.1982, 2♀ 2 imm. (MCZ 39918); *5 miles W Saltillo* [N25.45212°, W101.08545°], Davis, 5.vii.1936, 1♀ 1 imm. (AMNH); *56 km E Monclova,* Cueva de Las Animas [N26.88366°, W100.92261°], W. Bell and J. Reddell, 21.ii.1966, 1♀ (AMNH); *Muzquiz,* Rancho Los Ojos [N27.87549°, W101.5177°], G. Hoese, 25.xi.2009, 1♀ (CNAN-Ar 8180); *Sierra de La Concordia,* 9 km S La Casita, diurnal hand collecting (N25.14382°, W101.4573°, 2380m), O. Francke et al., 23.vii.2006, 2♀ (CNAN-Ar 8187). **Durango:** *15 miles W Durango* [N23.93455°, W104.8739°], W.J. Gertsch, 12.viii.1947, with egg sac, 2♀ 1 imm. (AMNH); *2 miles W Durango,* on highway 40 [N23.99556°, W104.73322°, 1928m], S.C. Williams, 10.vi.1969, 1♀ (CAS 9060629); *km 9 Carretera 36, between San Andres Atotonilco and La Laguna de Chaparra* (N25.08843°, W105.5255°, 2095m), O. Francke et al., 11.viii.2005, 1♀ (CNAN-Ar 8186); *Palos Colorados* [N24.03992°, W104.90891°, 2400m], W.J. Gertsch, 5.viii.1947, 1♀ (AMNH); *San Isidro,* 60 miles NW Durango [N24.63946°, W105.20289°], 19.viii.1947, 1♀ (AMNH). **Nuevo León:** *29 miles W Linares* [N24.74912°, W99.99261°], S.B. and S.A. Mulaik, ix.1956, 4♀ 2 imm. (AMNH); *6 miles S Micondra de Presa,* creosote country (N24°, W99.96667°), V. and B. Roth, 17.ii.1984, 1♀ (CAS 9060612); *Monterrey* [N25.68661°, W100.31611°], R.H. Crandall, 30.xii.1940, 4♀ 1 imm. (AMNH). **San Luis Potosí:** *Charcas* [N23.12789°, W101.11362°], A.M. Chickering, vii.1934, 2♀ 1 imm. (MCZ 39057); *Charcas,* hillside, 10.vii.1934, 2♀ 2 imm. (MCZ 39056); 19.vii.1934, 3♀ 1 imm. (MCZ 39055); 7.vii.1934, 3♀ 1 imm. (MCZ 39063); 8.vii.1934, 1♂ 1♀ 1 imm. (MCZ 39054); *Highway 70, km 199,* W. Graham, 22.ii.1973, 1♀ (AMNH); *Rt. 70, 70 miles W of Valles,* under stones by roadside [N22.15313°, W100.93359°], J.A.L. Cooke, 19.ii.1970, 1♀ 2 imm. (AMNH). **Sonora:** *10 miles S Cananea,* Sierra Manzanal [N30.733°, W110.25°], V. Roth, 17.ix.1970, with two egg sacs, 3♀ (AMNH); *10 miles S Nacorazi,* Hwy. 10, entrance to old copper mine [N30.22803°, W109.72427°], B.A. Brance, 16.viii.1959, 1♀ (AMNH); *10 miles W Alamos* [N27.08241°, W109.08339°], W.J. Gertsch, 19.vii.1954, 2♀ 9 imm. (AMNH); *11 miles S Cumpas* [N29.85812°, W109.66722°], V. Roth and N. Bucknall, 3.x.1966, 1♀ (AMNH); *30 miles W Cananea* [N30.89231°, W110.68508°], D. Ubick, 8.vii.1975, 1♀ (CAS 9060491); *41 miles N of Guaymas on Rt. 15; on Microondas Rd.* [N28.4952°, W111.04549°], F.A. Coyle, 19.v.1982, 1♀ (MCZ 39050); *5 miles W Álamos* [N27.06427°, W109.01817°], D. Ubick, 12.vii.1975, 1♀ (CAS 9060440); *7 miles NE Tesopaco,* thorn forest (N28.5°, W109.4°), V. Roth, 16.ix.1982, 1♀ (AMNH); *8 miles W Tepoca* (N29.3°, W109.17°, 914m), 6.viii.1986, 1♀ (CAS 9060614); *Agua Caliente* (N29.5°, W110.17°), V. and B. Roth, 13.ii.1988, 1♀ (CAS 9058497); *Álamos* [N27.06427°, W109.01817°], V. Roth and W. Gertsch, 7.viii.1956, 1♀ (AMNH); *Desemboque* [N30.56833°, W113.00667°], B. Malkin, 15–31.vii.1935, 1♂ 3♀ (AMNH); *Guaymas,* in room in town [N27.91787°, W110.90894°], M. Cardenas, 6.xi.1944, 1♀

(AMNH); *Hermosillo* [N29.07297°, W110.95592°], B. Malkin, 18.viii.1953, 1♀ (AMNH); B. Malkin and V.E. Thatcher, 20.ix.1952, 1♀ (AMNH); *Isla Medio,* B. Osorio, 29.iv.1944, 1♀ 3 imm. (AMNH); *Minas Nuevas* [N27.06196°, W109.00735°], P. and C. Vaurie, 8.viii.1952, 1♂ (AMNH); *near Sierra Manzanal,* oak, rocky [N30.733°, W110.25°], 13.vii.1970, 1♂ (AMNH); *S. Puerto Libert.,* Tidepool Beach (N29.45°, W112.4°), B. Roth, 26.iii.1981, 1♂ (AMNH); *San Luis Río Colorado* [N32.45189°, W114.77171°], V. Roth, 4.xii.1955, 1♂ (AMNH); *San Miguel de Horcasitas* (N29.3°, W110.45°), 4.x.1966, 1♀ (AMNH); *Sierra Álamos* [N27.01482°, W108.74702°] (collector illegible), 1♀ 1 imm. (AMNH); *Sierra de Los Ajos* (N31.05°, W109.933°), V. Roth, 20.vii.1971, 1♀ (AMNH). **Tamaulipas:** J.A.L. Cooke, 18.iii.1972, 1♀ 1 imm. (AMNH IFM-1633); *10 miles S Reynosa* [N25.87425°, W98.26907°], W.S. Creighton, 6.xi.1951, female missing, only genitalia remains in the vial, 1♂ 1♀ (AMNH); *Highway 101, km 152.5* [N24.10985°, W98.74616°], C. Soileau, 23.ii.1973, 1♀ (AMNH); *Mumulique Pass.,* 25.xii.1947, 1♀ (AMNH). **Zacatecas:** *27 miles NNW Fresnillo* (N23.35°, W102.58°), J. and W. Ivie, 7.ix.1964, 1♀ (AMNH); *45 miles NE Zacatecas* [N23.34835°, W102.27046°], L. Erickson and M.E. Soleglad, 8.viii.1974, 1♀ (AMNH); *on route 45, 120 miles SE Durango* [N23.40496°, W103.033°], A. Aschwanden, 8.ix.1961, 1♀ (AMNH). **No data :** 2♀ 4 imm. (AMNH). **Uncertain locality:** *San Diego, plain* (*? label illegible),* A.M. Chickering, 20.vii.1934, 3♀ 1 imm. (MCZ 39058). **USA**: **Arizona:** *Cochise Co.*: 1 Mile E Portal (N31.92°, W109.15°), W.J. Gertsch, 20.ii.1982, 1♀ (AM KS.32580); 5 miles W Portal [N31.9107°, W109.22673°, 1600m], S. Johnson, 26.vii.1976, 1♂ (AMNH); 29.vii.1976, 2♂ (AMNH IFM-1392); S.W.R.S. [N31.9137°, W109.14145°, 1646m], D. Ubick, 7.vii.1972, 1♂ (DU 72.07.07); D. Ubick, 19–22.vii.1975, 1♂ (DU 75.07.19); N. Platnick, 13–22.viii.1972, 1♀ 1 imm. (MCZ 145369); 9 miles W Portal, East Turkey Creek [N31.9137°, W109.14145°], W.J. Gertsch, 11.v.1972, 1♀ (AMNH); Bowie [N32.32593°, W109.48706°], V. Roth, v.1972, 1♀ (DU 72.05); Chiricahua Mountains [N31.92981°, W109.38229°, 1981m], A.Jung, 9.vii.1971, 1♂ 1♀ (DU 71.07.09); [N31.92981°, W109.38229°], F.C. Baptista, 23.v.1981, 1♂ (AMNH); J.A.L. Cooke, vii–viii.1972, 1♀ (AMNH); R.O. Schuster and L.M. Smith, 6.viii.1958, 1♀ (AMNH); Cave Creek Canyon, can traps [N31.92981°, W109.38229°, 1554–1615m], V. Roth, 14.x.1981, 1♂ (AMNH); Cave Creek Canyon, Sunny Flat Camp Ground [N31.92981°, W109.38229°], Caziers and Favreaus, 18.viii.1974, 1♀ (AMNH); Turkey Cr. Near Forest, rt. 42, S. Johnson, 20.viii.1976, 1♀ 5 imm. (AMNH), 1♀ (AMNH); Lower Carr Canyon, Huachuca Mts. (N31.48787°, W110.40828°), W.J. Gertsch, 21.vii.1955, 1♂ 2♀ 1 imm. (MACN-Ar 20557); near Portal [N31.9137°, W109.14145°], F.N. Young, 2.vii.1956, 1♀ (AMNH); Paradise [N31.93481°, W109.21895°, 1646m], F.W. Zweifel, xii.1998, 1♀ (AMNH); Portal [N31.9137°, W109.14145°], D.M. Tuttle, 1969, 1♀ (AMNH); M. van Buskirk, 4.vii.1971, 2♂ (CAS 9060466); W. Spofford, ii.1982, 1♀ (AMNH IFM-1561); W.J. Gertsch, x.1978, in web of *Physocyclus enaulus*, being eaten by a female, 1♂ (AMNH); at house, V. Roth, xi.1995, 1♂ (CAS 9057629); in house, W.J. Gertsch, 19.vi.1980, 1♂ (AMNH); on porch (N31.92°, W109.15°), 17.xii.1976, 2♂ (AM KS.32579); on wall at light [N31.9137°, W109.14145°], D. Ubick, 11.viii.1981, 1♂ (DU 81.08.11); ranch house, B. Hölldobler, viii.1974, 1♀ (MCZ 145370); *Coconino Co.*: 4 miles E Sedona, Schnebly Hill Road, retreats under logs and rocks [N34.86974°, W111.76099°], C.P. Kristensen, 17.xi.1980, 1♀ (CAS 9060605); *Graham Co.*: Safford, Mt. Graham [N32.83396°, W109.70758°], W.J. Gertsch and V. Roth, 14.vii.1956, 2♂ 7♀ 5 imm. (AMNH); Solomonville [N32.81412°, W109.62948°], D. and S. Mulaik, 7.ix.1939, caught in the middle of an imaginal molt, 1♀ (AMNH); *Maricopa Co.*: 5 mi. E of Cave Creek [N33.83337°, W111.9507°], W. Eberhard, 3.vii.1965, subadult♀ (MCZ 145386); 6 mi. NE of Cave Creek, viii.1966, 2♀ 2 imm. (MCZ 145387); Cactus, under rock [N33.59865°, W112.03043°], G. Langer, 23.ii.1956, 1♀ (MCZ 145375); Gila Bend (N32.95°, W112.7°), W. Ivie, 12.ix.1941, 1♀ (AMNH); Mesa [N33.41518°, W111.83147°], E. Sanders, 11.ix.1935, 2♀ 4 imm. (MCZ 145389); 12.x.1935, 2♂ (CAS 9057573), 5♀ 8 imm. (MCZ 145390); 15.ix.1935, 2♀ 16 imm. (MCZ 145391); H.L. Stahnke, 13.x.1960, 1♀ (MCZ 145374); [N33.42227°, W111.82264°], E. Sanders, 30.x.1935, 2♂ (MCZ 68731); in box [N33.41518°, W111.83147°], R. Wheeler, 28.ii.1956, 1♀ (MCZ 145372); two spiders taken from the same web, E. Sanders, 10.viii.1935, 2♀ (MCZ 145388); Phoenix [N33.44838°, W112.07404°], H.L. Stahnke, 26.x.1960, 1♀ (MCZ 145381); 27.x.1969, 1♀ (MCZ 145376); 6.xi.1960, 1♀ (MCZ 145377); N. Banks, 1♀ (MCZ 145393); P. Martin, 14.ii.1955, 1♀ (MCZ 145373); W. Eberhard, ix.1964, 2♀ (MCZ 145385);

vii.1964, 1♂ 1♀ 1 imm. (MCZ 145383), with egg sac, 1♀ (MCZ 145384); Phoenix, grounds of Phoenix Zoo [N33.4499°, W111.9466°], C. Rickabaugh, vi.1987, 1♀ (USNM); Scottsdale [N33.49417°, W111.92605°], G. Teller, 20.iii.1960, 1♀ (MCZ 145379); Tempe [N33.42551°, W111.94001°], E. Amberg, 22.ii.1956, 1♂ (MCZ 145378); H.L. Stahnke, 2.xi.1960, 1♀ (MCZ 145380); 30.x.1960, 1♂ (MCZ 145417); under brick, C. Fuller, 27.ii.1956, 1♀ (MCZ 145382); Tempe, Arizona State University, bookstore, breakroom [N33.4234°, W111.928°], R. Meyer and D. Dahlmeier, 8.vi.1988, 1♂ (USNM); bookstore, near restroom, K. Wissman, 13.iv.1988, 1♂ 1♀ (USNM); *Pima Co.*: base of Tortolita Mountains, southern side, found dead in swimming pool [N32.49035°, W111.06177°, 1000m], R.S. Beal, 25. vii.1984, 1♀ (CAS 9057853); Buenos Aires N.W.R., Brown Canyon, at night in stream valley, under rocks and stone walls (N31.7729°, W111.5593°, 1530m), A. Schönhofer, 25.iii.2012, 1♂ (SMF); *Quercus* and *Pinus edulis*, under cobbles and boulders (N31.7717°, W111.5769°, 1530m), 1♀ (SMF); Coronado National Forest, Madera Canyon, Proctor Area, 53mk S Tucson (MJR-Loc-157), dry forest on rocky hillside, under rocks and logs (N31.73856°, W110.88673°), M.J. Ramírez, 28.ii.2014, 1♂ (MACN-Ar 33844); Greaterville [N31.76398°, W110.75008°], S. and D. Mulaik, 29.xii.1940, 1♀ (AMNH); Green Valley [N31.85425°, W110.9937°], ii.1990, 1♀ (AMNH); Santa Catalina Mountains, Molimo Basin, under granite [N32.443°, W110.788°], D. Ubick, 28.vii.1997, 1♀ (CAS 9060659); Tucson [N32.22174°, W110.92648°], W. Ivie, vii–viii.1935, 1♂ 2♀ (AMNH IFM-1560); [N32.22178°, W110.92645°], F. Russell, 2♀ (AMNH); P. Steckler, vii–viii.1935, 1♂ (MCZ 68732); 722 N. Avenida Calma [N32.23156°, W111.00647°], M.J. and A. O'Brien, summer/1985, 1♂ (MCZ 145394); near Tucson [N32.22174°, W110.92648°], W.W. Wheeler, 23.ii.1931, 3♀ (MCZ 145395); *Pinal Co.*: Biosphere 2, WSW Oracle, E32.5802°, W110.84899°, 1186m, M.J. Ramírez, 27.ii.2016, 1♀ (MACN-Ar 39469); Oak Flat, Tonto National Forest (MJR-Loc-250) (N33.30832°, W111.05859°, 1781m), 25.ii.2016, 1♀ (MACN-Ar 36219); S. Biosphere Rd. near Biosphere 2, WSW Oracle (MJR-Loc-150), desert, under rocks (N32.57426°, W110.85561°), 20–22.ii.2013, subadult♀ (MACN-Ar 32717); *Santa Cruz Co.*: Madera Canyon [N31.72509°, W110.88009°], 10.v.1945, 1♀ (AMNH); Nogales [N31.34038°, W110.93425°], S.P. Van Dupel, 4.iv.1921, 1♀ (MCZ 145392); *Townsend Co.*: 2♂ (MCZ 68733); *Yavapai Co.*: Bumble Bee (MJR-Loc-249) (N34.18545°, W112.16866°, 1133m), M.J. Ramírez, 24.ii.2016, 1♀ (MACN-Ar 36218); Prescott [N34.54002°, W112.4685°], 11.vi.1987, 2♂ (AMNH); *Yuma Co.*: [N32.69265°, W114.62769°], 4.v.1918, 1♀ (AMNH); xi.1949, subadult♀ (AMNH); N. Banks, 1♀ (MCZ 145397); in greenhouse, D.M. Tuttle, 1.iii.1977, 2♀ (AMNH); MACG, in warehouse, ii.1971, 1♀ (AMNH); Yuma, D.M. Tuttle, 3.ix.1983, 4♀ (AMNH); P. Covington, 13. ii.1956, 1♀ (MCZ 145396). *Uncertain locality*: García, N. Banks, 1♂ (MCZ 145371). **California:** *Imperial Co.*: Brawley [N32.97866°, W115.53027°], caught in the middle of an imaginal molt, with several early instar juveniles, 1♀ 10 imm. (USNM); J.Y. Sandoval, xii.1971, 1♀ (USNM); Imperial Valley [N32.73755°, W114.9633°], V. Roth, v.1960, 1♂ (AMNH); *Riverside Co.*: Blythe [N33.61777°, W114.58826°], Linsley, MacSwain and R.F. Smith, 12.vii.1945, 1♂ (AMNH); P.D. Hurd and W.F. Barr, 9.viii.1946, 1♂ (AMNH); in garage [N33.61777°, W114.58826°, 76m], E. Sanders, 11.vii.1935, 2♂ 1♀ (MCZ 145398); *San Bernardino Co.*: San Bernardino, 389 Court Street [N34.10835°, W117.28977°], Minnoo B. Madon, 24.viii.1967, 1♂ (CAS 9058473). **Nevada:** *Clark Co.*: area Indian Springs, house on desert [N36.56968°, W115.67058°], F.E. Russell, 27.vi.1961, with egg sac, 2♀ (AMNH); Lake Mead [N36.0056°, W114.8052°], S. Schwab, v.1968, 1♂ (USNM). **New Mexico:** *Bernalillo Co.*: Albuquerque [N35.08533°, W106.60555°], N. Banks, 2♀ 3 imm. (MCZ 145399); *Catron Co.*: 13 miles NE Glenwood, Deep Creek [N33.48698°, W108.93296°], A. Grubbs, 30.vii.1979, 1♀ (AMNH); Sierra, Gila National Forest, 19 km W Hillsboro, highway 90 [N33.50184°, W108.62222°], S.C. Williams, 16.viii.1974, 1♀ (CAS 9060619); *Dona Ana Co.*: Las Cruces, Chihuahua desert scrub, around house (N32.31994°, W106.76365°), L. Prendini and M. Nishiguchi, 12.ix.2002, 1♂ (AMNH); Organ Mountains, Aguirre Springs National Recreation Area, oak-juniper, under granite [N32.32612°, W106.55599°], D. Ubick, 9.ix.1989, 1♀ (CAS 9060415); *Eddy Co.*: Carlsbad Caverns National Park, found house [N32.14786°, W104.55671°], W.C. Welboun, 2.v.1975, 1♂ (AMNH); *Hidalgo Co.*: 5 miles NE Lordsburg [N32.41576°, W108.67974°], W. Ivie, 8.ix.1941, 1♀ (AMNH); 7 miles W Animas [N31.93587°, W108.93072°], B. Tomberlin and T. Snell, 26.vi.1988, 1♀ (AMNH); 8 miles SE Rodeo, Peloncillo Mountains [N31.82969°, W109.03504°], J.O. Hood, 14.vii.1954, with egg sac, 1♂ 1♀

(AMNH); Guadalupe Canyon [N31.42644°, W109.04506°], V. Roth and T. Gee, 15.vii.1994, 1♂ (CAS 9057590); *Luna Co.*: Deming, around house [N32.2687°, W107.75864°], S.E. Ruebush, 1976, 2♀ (MCZ 145400); *San Miguel Co.*: 8 miles E Rowe [N35.4164°, W105.56031°], C.C. Hoff, 1♀ (AMNH); *Sandoval Co.*: Los Alamos, Bandelier National Monument [N35.76506°, W106.32205°, 91m], W. Pippin, vi.1979, 1♀ (CAS 9060632); *Santa Fe Co.*: Santa Fe, W of Santa Fé, under rock [N35.68698°, W105.9378°], D.C. Lowrie, 10.x.1977, 1♂ (AMNH); SW of Santa Fe, D.C.Lowrie, 27.viii.1977, caught in the middle of an imaginal molt, with several early instar juveniles, 1♀ (AMNH); *Valencia Co.*: 5 miles SE Suwanee (N34.9°, W107.08333°), W. Ivie, 5. ix.1941, 1♀ (AMNH). **Oklahoma:** *Comanche Co.*: Wichita Mts. [N34.75951°, W98.6434°], C.J. Goodnight, 3.ix.1949, 1♀ 1 imm. (AMNH); *Grady Co.*: Chickasha, Washita R. Bank [N35.05257°, W97.93643°], L. Hook, 4.vi.1944, 1♂ (AMNH). **Texas:** *Archer Co.*: Wichita Falls, Lake Kickapoo [N33.6458°, W98.82249°], J.Y. Sandoval, 28.vi.1968, 1♀ 3 imm. (USNM); *Bexar Co.*: 0.5 mile N Heliotes [N29.57801°, W98.68975°], D. Campbell and P.R. Craig, 4.v.1960, 2♀ (CAS 9057577); Bandera, near Helotes, under rocks [N29.54947°, W98.66298°], E. Nelson, 5.viii.1973, 1♀ (MCZ 145401); Helotes creek [N29.63222°, W98.71755°], S.A. Murray, 11.x.1940, 1♀ (AMNH); *Blanco Co.*: 1 mile N of Rt. 290 on Rd. 3232 to Pedernales Falls State Park [N30.30807°, W98.25773°], F. Coyle, 11.v.1982, 1♀ (MCZ 145402); *Brewster Co.*: Basin of Chisos Mountains [N29.27°, W103.3°], W. Necker, summer/1937, 1♀ (AMNH); Big Bend National Park, Chisos Basin, campgroud area [N29.2499°, W103.25016°], E. Sabath, 24–25.v.1967, 1♀ (MCZ 145403); headquarters building, Panther Junction, 1♀ (MCZ 145404); Chisos Mountains [N29.27°, W103.3°, 2286m], W.L. Necker and D.C. Lowrie, vii.1937, 2♀ (AMNH); under stones [N29.27°, W103.3°, 1676–1859m], 1937, 1♀ (AMNH); Big Bend State Park [N29.26665°, W103.29873°], W.J. Gertsch, 28.ix.1950, 1♂ 2♀ 3 imm. (AMNH); The Basin [N29.27°, W103.3°], C. Soileau, 27.i.1973, 1♀ (AMNH); Marathon [N30.20517°, W103.24462°], M.A. Cazier, 12. vi.1948, 1♀ (AMNH); Presidio, MSU Dalquest Research Site, 18 miles NE Sauceda, under rocks, desert scrub (N29.55667°, W103.79417°), N. Platnick and D. Ubick, 4.x.2005, 1♀ (AMNH); Window Trail, under large rock [N29.27553°, W103.31621°], C.L. Reid, 17.ix.1960, with egg sac, 1♀ (MCZ 145405); *Burnet Co.*: Hays, 4 km NW Wimberley, at Little Twin Sisters Peaks (N30.51667°, W98.11667°), W.E. Steiner et al., 9–10.iii.1995, 1♀ (USNM); *Cameron Co.*: Laguna Atascosa Wildlife Refuge, east shore of Cayo Atascosa, near dam site [N26.22835°, W97.34865°], 29.i.1959, 1♀ (AMNH); *Dallas Co.*: [N32.77666°, W96.79699°], E.P.C., spring/1940, 1♂ (MCZ 145406); *Denton Co.*: in dormitory [N33.21484°, W97.13307°], 30.x.1945, 1♂ (MCZ 145407); Frame St., under stones [N33.22401°, W97.12472°], 15.vii.1944, 1♀ (MCZ 145409); TSCW campus [N33.21484°, W97.13307°], 1. iv.1946, 1♀ (MCZ 145408); *Gillespie Co.*: Llano, 27.8 miles N Fredericksburg, junct. 16 and 965 [N30.2752°, W98.87198°], J.C. Cokendolpher, 13. iii.1982, 1♀ (AMNH); *Hays Co.*: 2.2 miles W of San Marcos [N29.88328°, W97.94139°], H. Campbell and H. Campbell, 1.iv.1961, 1 imm. (CAS 9057630); *Jeff Davis Co.*: Davis, Davis Mountain junction [N30.75015°, W104.0838°], C. and P. Vaurie, 9. vii.1948, 2♂ (AMNH); Fort Davis, walnut grove [N30.58821°, W103.89463°], D. Ubick, 11.viii.1981, 1♀ (DU 81.08.11); *Kerr Co.*: Hunt, MO Ranch, 10 mi. W of Hunt [N30.07104°, W99.33798°], R.O. Albert, 20.iv.1962, 1♀ (MCZ 145410); Kerrville [N30.04743°, W99.14032°], S. and D. Mulaik, vii.1940, 1♀ (AMNH); Raven Ranch, A. Mulaik, vi.1941, 2♀ (AMNH); S. and D. Mulaik, iv.1941, 2♀ 1 imm. (AMNH); vi.1941, 1♀ (AMNH); [N30.09453°, W99.45616°], D. Mulaik, viii.1939, 1♂ 2 imm. (AMNH); *Lampasas Co.*: 2 miles S Lampasas, on Route 281 [N31.06378°, W98.1817°], D.C. Lowrie, 24.xii.1941, 1♀ (AMNH); under rocks, 24.xii.1941, 1♀ 1 imm. (AMNH); *Llano Co.*: 23 miles SE Llano [N30.53875°, W98.94858°], B. Vogel, 14.iii.1970, 1♀ 1 imm. (USNM); *Mason Co.*: Mason [N30.74879°, W99.23061°], J. Rosen and R. Schrammel, 15.iv.1961, 2♂ 6 imm. (AMNH); *Montague Co.*: Montague, 3 miles SW Forestburg [N33.53316°, W97.55669°], B. Patterson, 12.v.1951, 1♀ (FMNH 2857676); 18–24.iv.1954, 1♀ (FMNH 2857672); *Presidio Co.*: Big Bend Ranch State Park, Natural Arca [N29.47°, W103.95667°], T.G. Anton, 7.vii.1994, 1♀ (FMNH 104076); Big Bend Ranch State Park, Sauceda, desert scrub, under volcanic rocks (N29.47°, W103.95667°), D. Ubick, 3–8.x.2005, 1 imm. (AMNH); Porvenir [N30.41848°, W104.84438°], J.H. Quinn, 1.xi.1946, 1♀ (FMNH 2857675); 23.x.1946, 1♀ (FMNH 2857682); 6. xi.1946, 1 imm. (FMNH 2857678); J.M. Schmidt, 23.x.1946, 1♀ (FMNH 2857681); *Taylor Co.*: Abilene

[N32.44874°, W99.73314°], M.M. Wills, summer/1943, 1♂ 1 imm. (AMNH); *Terrell Co.*: 0.5 mile E Dryden [N30.04469°, W102.11438°], 14.i.1948, 1♀ (AMNH); *Travis Co.*: 12 miles W Jonestown, Turkey Bend of the Colorado River [N30.48709°, W98.07139°], B. Vogel, 25.x.1969, 1♂ (USNM); Austin [N30.26715°, W97.74306°], 1903, 2♂ (AMNH); Bull Creek, 7.5 miles NW Austin [N30.36327°, W97.7868°], B. Vogel, 13.iv.1969, 1♂ (USNM); *Uvalde Co.*: Laguna, chalk cliffs [N29.41912°, W100.00562°], D.C. Lowrie, 25. xii.1941, 1♀ (AMNH); *Val Verde Co.*: Langtry [N29.80856°, W101.55968°], S. and D. Mulaik, 3. vi.1941, 1♀ 2 imm. (AMNH). **Utah:** *Washington Co.*: [N37.13054°, W113.50829°], 1♀ 2 imm. (AMNH). **No further locality:** 1♀ 4 imm. (AMNH).

Kukulcania gertschi, sp. nov.

Figures 4B, 7D, 30C–D, 45–48

Type material. Holotype: **Mexico. Chihuahua:** *1 mile E La Sauceda* [N26.9167°, W106.0167°, 2100m], W.J. Gertsch, 21.vii.1947, 1♂ (AMNH IFM-1551), in the same vial as 2♀ and 1 imm. (IFM-1512). Paratypes: same data as the holotype, 1♂ 3♀ 1 imm. (AMNH). **Chihuahua:** *Santa Bárbara* [N26.80132°, W105.82009°, 1900m], G.M. Bradt, 20.i.1947, subadult♀ (AMNH); [N26.80132°, W105.82009°, 1920m], 15.ii.1947, 1♀ (AMNH); [N26.80132°, W105.82009°], W.J. Gertsch, 17.vii.1947, 1♀ (AMNH); 18.vii.1947, 1♀ (AMNH), 2♀ (AMNH). **Coahuila:** *16 km SE Saltillo, Rt. 57* [N25.28334°, W100.78577°, 2225m], J.K. Liebherr, 27.v.1981, 1♀ (AMNH); *Sierra de La Concordia,* 14 km S "el Nogal" (N25.14426°, W101.25826°, 1915m), D. Sissom and B. Hondiixon, 22.vii.2006, 2♀ (CNAN-Ar 8183). **Nuevo León:** *4 miles W Iturbide,* near León [N24.72287°, W99.9008°], E.S. Ross, 9.xi.1946, 1♀ (AMNH). **Tamaulipas:** *Guayalejo* [N23.22181°, W98.82213°], W. Graham, 18.ii.1973, 3♀ (AMNH).

Remarks: W.J. Gertsch recognized this species under the manuscript name "*Filistata encina*."

Etymology: The name is a patronym in honor of the late Willis J. Gertsch, former curator of the arachnology collection at the AMNH, in recognition of his contributions to the study of North American spiders. Gertsch collected and sorted many of the specimens examined by us for the completion of this revision, including the holotype of this species. He also had started a revision of American filistatids himself, which he unfortunately could not complete before passing away. He was the first to recognize this species as new (which he identified under the manuscript name "*Filistata encina*"), and we find it fitting to name it in his honor.

Diagnosis: Males resemble *K. mexicana* in the shape of the bulb and the long embolus with two loose, drawn-out coils (fig. 46B), but differ by lacking incrassate setae on the cymbium. Males differ from *K. utahana* (which also have two coils in the embolus) by the more conspicuous embolus keel. They can be further distinguished from *K. mexicana*, *K. utahana*, and *K. arizonica* by the short macrosetae of femur I and by having fewer macrosetae on the prolateral faces of the first tibiae and metatarsi. Females are very similar to those of *K. arizonica* in the shape of the spermathecae (figs. 7D, 30C–D, 48,): the sclerotized bars are gently curved and tapered posteriorly, the membranous portions of the spermathecae apex are digitiform, extend well beyond the margin of the uterus externus, and are slightly bent dorsally, and the glandular portion forms a well-defined ventral patch. Distinguishing between the two species is often difficult, but specimens of *K. gertschi* usually have the spermathecae longer and with a stronger bend, sometimes resembling the hooked handle of an umbrella, and a smaller glandular portion (figs. 30C–D, 48); they are often smaller in size and the legs are slightly stouter (fig. 47) than those of *K. arizonica*.

Description: Male holotype from 1 mile E of La Sauceda, Chihuahua, Mexico (AMNH IFM-1551). Coloration light yellow. Abdomen dorsum grayish cream, with brown cardiac area. Clypeus short. Sternum oval, sigillae not visible. Total length 4.82. Carapace length 2.14, width 1.82, clypeus length 0.135. Eye diameters and interdistances: AME 0.159; PME 0.142; ALE 0.17; PLE

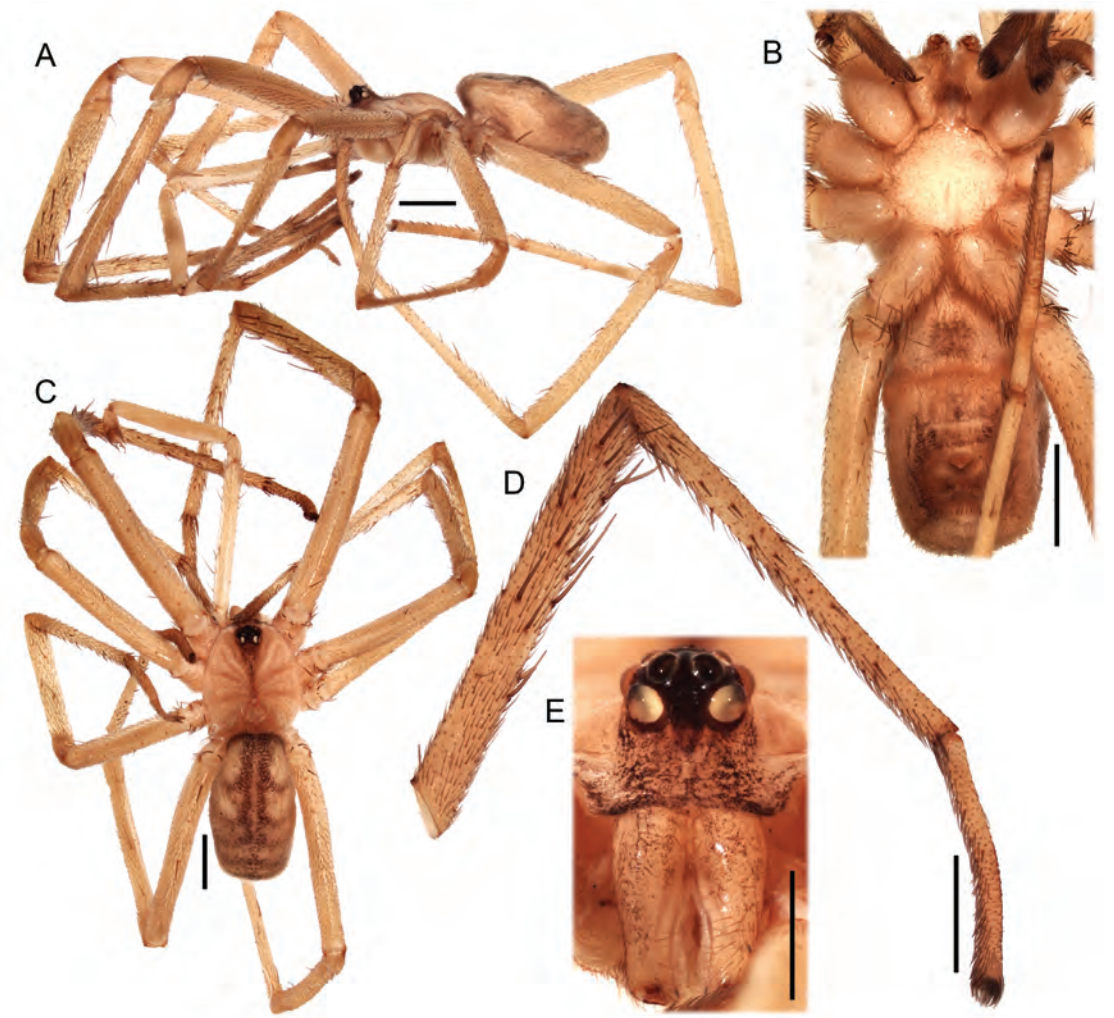

FIGURE 45. *Kukulcania gertschi*, male holotype from Mexico, Chihuahua, 1 mile E La Sauceda (AMNH IFM-1551), habitus. **A.** Lateral. **B.** Ventral. **C.** Dorsal. **D.** Left leg I, prolateral. **E.** Clypeus, anterior. Scale bars = 1 mm except for E, 0.5 mm.

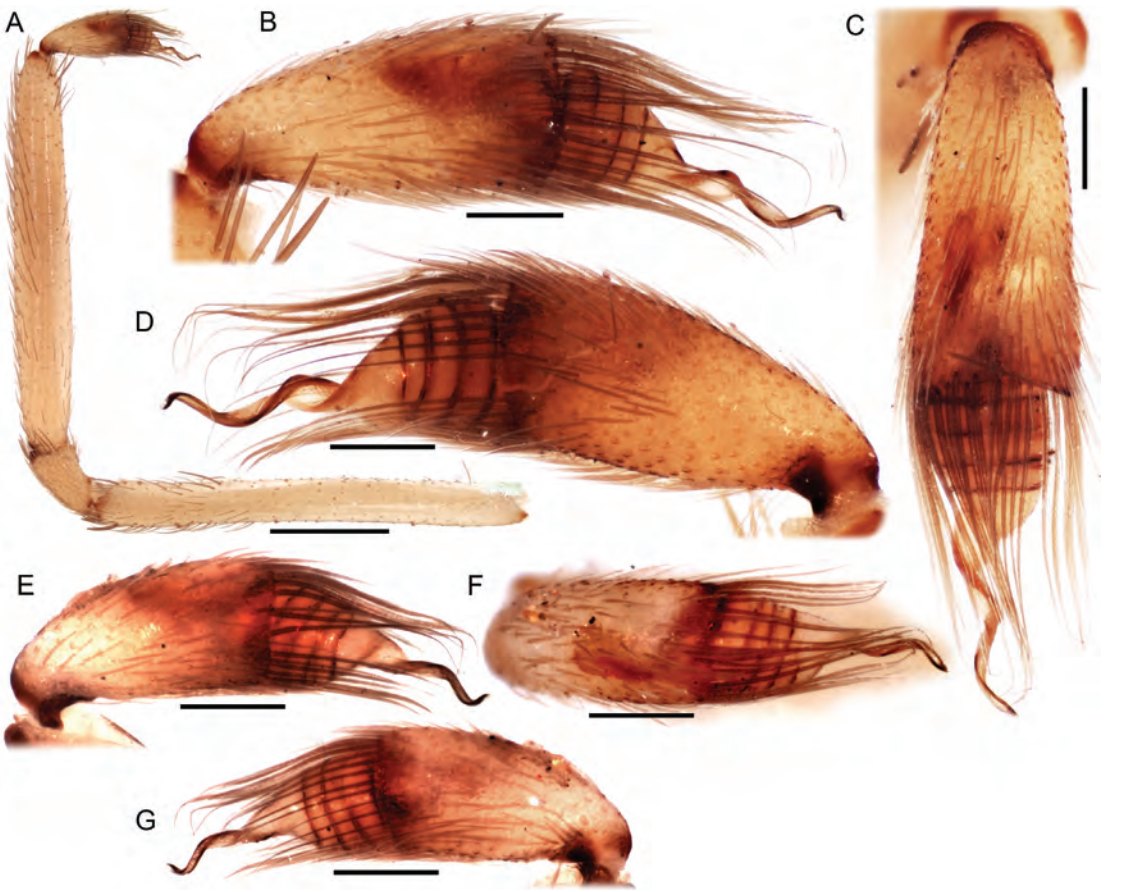

FIGURE 46. *Kukulcania gertschi*, males. **A–D.** Holotype from Mexico, Chihuahua, 1 mile E La Sauceda (AMNH IFM-1551), right palp, mirrored. **A–B.** Prolateral. **C.** Dorsal. **D.** Retrolateral. **E–G.** Male from Chihuahua, 25 miles W Camargo (AMNH IFM-1595), left palp. **E.** Prolateral. **F.** Dorsal. **G.** Retrolateral. Scale bars = 0.2 mm except for A, 1 mm.

FIGURE 47. *Kukulcania gertschi*, female paratype from Mexico, Chihuahua, 1 mile E La Sauceda (AMNH IFM-1407), habitus. **A.** Dorsal. **B.** Ventral. **C.** Lateral. Scale bars = 1 mm.

0.161; AME–AME 0.051; PME–PME 0.178. Sternum length 1.09, width 1.15. Palp: femur length 3.49, height 0.346; tibia length 3.35, height 0.483. Leg I: femur (fe) 3.87; patella (pa) 1.09; tibia (ti) 3.89; metatarsus (mt) 4.08; tarsus (ta) 2.14. II: fe 3.2; pa 0.87; ti 2.58; mt 3.22; ta 1.57. III: fe 2.99; pa 0.83; ti 2.23; mt 3.01; ta 1.63. IV: fe 3.74; pa 0.95; ti 3.59; mt 4.3; ta 2.32. Abdomen: length 2.86, width 1.58. Palp macrosetae long, in several rows along femur ventral and dorsal faces. Leg macrosetae: fe I 7d, 1p, 10v, 1r; ti I 3d, 9p, 6v, 1r; mt I 2d, 14p, 10v, 3r; ta I 10v; fe II 4d, 6v; ti II 2p, 6v; mt II 1d, 3p, 10v, 4r; ta II 6v; fe III 7d, 6v; ti III 2p, 4v, 2r; mt III 3d, 3p, 8v, 3r; ta III 6v; fe IV 4d; ti IV 4v, 1r; mt IV 2d, 4p, 11v, 2r; ta IV 12v. Palp: cymbium about as long as bulb, with anterior border bearing a ring of setae that end close to the embolus; bulb short, robust; sperm duct with three tightly packed coils; embolus long, with two loose coils and inconspicuous keel. State of the specimen: good, left palp and left leg I dissected, some leg articles artificially flattened.

Female paratype from 1 mile E of La Sauceda, Chihuahua, Mexico (AMNH IFM-1407). Coloration light, reddish brown. Carapace finely stippled with brown. Sternum and legs not particularly hirsute. Legs brown, with light-brown longitudinal stripes on coxae, femora, and tibiae. Abdomen dorsum grayish brown. Anterior margin of the carapace unmodified. Sternum oval, with two pairs of sigillae. Total length 11.39. Carapace length 3.95, width 3.22, clypeus length 0.4. Eye diameters and interdistances: AME 0.134; PME 0.187; ALE 0.31; PLE 0.261; AME–AME 0.006; PME–PME 0.23. Sternum length 1.77, width 1.88. Palp: femur length 2.28,

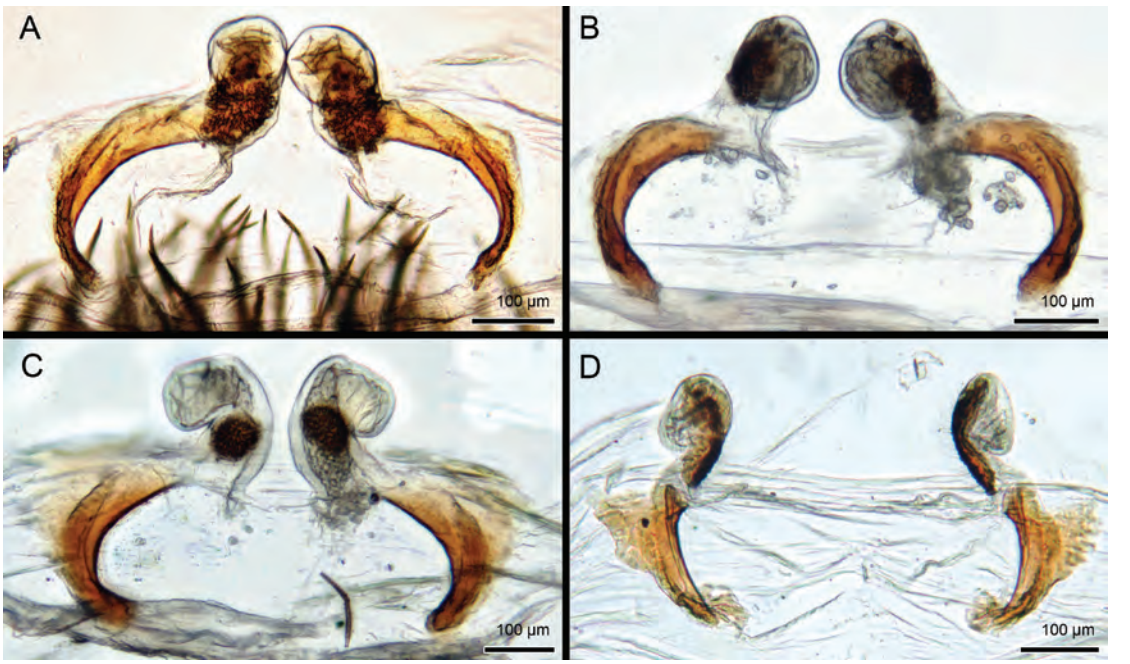

FIGURE 48. *Kukulcania gertschi*, female spermathecae, ventral. **A.** Paratype from Mexico, Chihuahua, 1 mile east of La Sauceda (AMNH IFM-1512). **B.** Paratype from Chihuahua, Crucero Guajanache (CNAN-Ar 6501). **C.** Paratype from Coahuila, Sierra de la Concordia (CNAN-Ar 8183). **D.** Aberrant female from Durango, 3 miles west of Lerdo (AMNH IFM-1571).

height 1.06; tibia length 1.4, height 0.85. Leg I: femur (fe) 4.28; patella (pa) 1.59; tibia (ti) 3.74; metatarsus (mt) 3.25; tarsus (ta) 1.82. II: fe 3.44; pa 1.56; ti 2.71; mt 2.86; ta 1.25. III: fe 2.9; pa 1.27; ti 2.15; mt 2.27; ta 1.23. IV: fe 3.87; pa 1.49; ti 3.12; mt 2.92; ta 1.47. Abdomen: length 8.22, width 5.6. Palp macrosetae on ventral surface of tibia and tarsus. Leg macrosetae present on ventral surfaces of tibiae, metatarsi, and tarsi; all femora with 2–4 dorsal macrosetae, metatarsus III with one dorsal macroseta. Calamistrum with three rows with 8–10 setae each. Interpulmonary fold large, rounded, covering the spermathecae dorsally. Sclerotized bars present, slightly curved and slender; membranous portion of the spermathecae apex elongate and curved dorsally, without glandular pores; glandular portion positioned ventrally to the membranous portion in a small, subrounded patch. State of the specimen: good, right leg III missing from tibia, genitalia dissected and mounted for SEM.

Intra specific var iatio n: Males (N = 3): total length 3.63–5.77 (4.74), carapace length 1.73–2.56 (2.14), femur I length 3.21–4.98 (4.02), tibia I length 3.89–5.02 (4.46), femur/carapace ratio 1.81–1.95 (1.87). Females (N = 5): total length 10.32–13.04 (11.49), carapace length 3.95–4.67 (4.33), femur I length 4.28–4.84 (4.57), tibia I length 3.74–4.1 (3.97), femur/carapace ratio 1.02–1.08 (1.06). Only three males are known, two from the type locality and a third one from near Camargo, Chihuahua; this last one is significantly smaller and has a distinct bulb morphology, with the embolus less coiled (fig. 46E–G). As we have examined only a few specimens, we prefer to be conservative and consider them as morphological variations until more material becomes available. The genital morphology of females varies as well, especially in the length of the membranous portion of the spermathecae apex (fig. 48). A single female specimen from Lerdo, Durango (fig. 48D), seems

aberrant but is more similar to this species than to any other; a male from the same locality is needed to ascertain its identity.

Natural history: Unknown; the few specimens present in collections do not have natural history data on their labels.

Distribution: Northeastern Mexico, from the states of Chihuahua to Tamaulipas (to the east) and to Zacatecas (to the south) (fig. 4B).

Additional material examined: **Mexico. Chihuahua:** *25 miles W Camargo* [N27.6283°, W105.53105°], W.J. Gertsch, 13.vii.1947, 1♂ (AMNH IFM-1595); *Catarinas* [N26.64025°, W105.5234°, 1760m], 25.vii.1947, 1♀ (AMNH); [N26.64025°, W105.5234°], 1♀ (AMNH); *Crucero Guajanache* (N26.9552°, W106.68665°, 2556m), O. Francke et al., 3.viii.2005, 1♀ (CNAN-Ar 6501); *Huejotitán* [N27.05578°, W106.18112°], W.J. Gertsch, 20.vii.1947, 1♀ (AMNH); *Santa Bárbara* [N26.80154°, W105.82006°], 18.vii.1947, 1♀ (AMNH); *Torrecillas* [N26.86667°, W105.98333°, 2100m], G.M. Bradt, 17.viii.1947, 1♀ (AMNH). **Durango:** *3 miles W Lerdo* [N25.54473°, W103.52634°], C.M. Bogert, 24.viii.1946, 1♀ (AMNH IFM-1571); *La Quebrada* [N26.01167°, W106.17056°], W.J. Gertsch, 30.vii.1947, subadult female, 2♀ (AMNH); *Las Puentes,* 23.vii.1947, 1♀ (AMNH); *Ojo de Los Encinos,* G.M. Bradt, 4–5.vi.1947, 2♀ (AMNH); *Providencia* [N24.01477°, W104.65769°, 2350m], A.M. Davis, 24.viii.1947, 1♀ (AMNH). **Tamaulipas:** *Highway 101, km 14* [N25.66337°, W97.60483°], T.R. Mollhagen and C. McConnell, 22.ii.1973, 2♀ (AMNH); *Highway 101, km 152.5* [N24.10985°, W98.74616°], 22–23.ii.1973, 3♀ (AMNH); *Highway 101, km 92* [N24.75547°, W98.24228°], T.R. Mollhagen, 22.ix.1973, 1♀ (AMNH). **Zacatecas:** *25 km SW Valparaiso* [N22.77091°, W103.56972°], W.J. Pulawski, 6.ix.1984, 1♀ (CAS 9057607); *25 km W San Juan Capistrano* (N23.66667°, W104.333°), 7.ix.1984, 1♀ (CAS 9057594).

Kukulcania utahana (Chamberlin and Ivie, 1935)

Figures 3B, 27B, 28B, 29B, 7E, 49–52

Filistata utahana Chamberlin and Ivie, 1935: 5, plate 4, figs. 26–27. Male and female types from Utah and Colorado states (AMNH), examined.

Kukulcania utahana: Lehtinen, 1967: 242; Jiménez, 2004: 272 (unverified record).

Examined type material: Holotype: **USA: Utah:** *Piute Co.*: N of Marysville [N38.44875°, W112.22992°], R.V. Chamberlin, 11.vi.1927, 1♂ (AMNH). Paratypes: **USA: Colorado:** *Montezuma Co.*: 10 miles N Cortéz [N37.49307°, W108.58554°], W. Ivie, 17.vi.1934, 1♀ (AMNH IFM-1557). **Utah:** *Beaver Co.*: Sulphurdale [N38.56028°, W112.58111°], 7.vi.1934, 1♀ 1 imm. (AMNH IFM-1532); *Washington Co.*: Beaver Dam Wash [N37.10535°, W114.02501°], W. Ivie, 18.iv.1932, 1♀ 1 imm. (AMNH), 1♀ (AMNH).

Diagnosis: *K. utahana* and *K. hurca* are likely sibling species that are very difficult to tell apart. Males are similar to *K. hurca* in having a thin, corkscrew-shaped embolus with inconspicuous keel; they can be distinguished by the longer embolus with two clear coils (fig. 50) (in *K. hurca*, the first coil is well defined and the second is absent or barely noticeable). Males of *K. utahana* might also be darker colored (fig. 49F–G), although light variants exist (fig. 49A, D). We have not been able to find diagnostic characters for distinguishing the females of the two species unambiguously, and all records based on females only are tentative (see Discussion on species limits above); both species have medially directed, lobed membranous portions of the spermathecae whose base is embraced by the glandular portion of the spermathecae, and strongly bent, comma-shaped sclerotized bars. Specimens assigned to *K. utahana* usually have the spermathecae widely spaced and not well projected anteriorly beyond the uterus externus, with a shorter membranous portion of the spermathecae, and with less sculpturing of the sclerotized bars (fig. 52). Female *K. utahana* are also generally larger, with wider carapaces and stouter legs (fig. 51).

Description: Male from San Diego Co., California (AMNH IFM-1559). Coloration orange-brown. Carapace finely stippled with brown, with

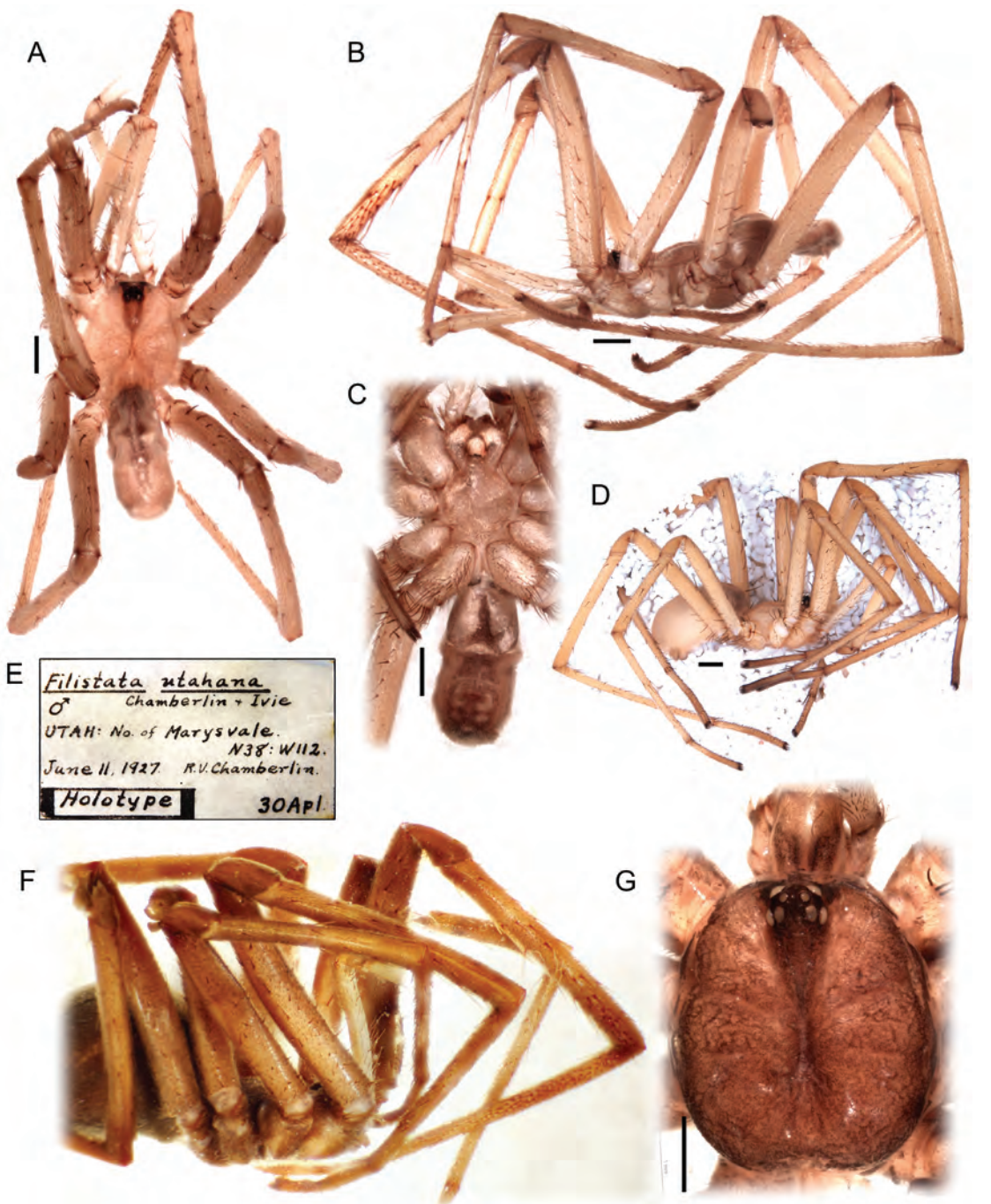

FIGURE 49. *Kukulcania utahana* (Chamberlin and Ivie, 1935), males, habitus. **A–C.** Nevada, Nye Co. (AMNH IFM-1657). **A.** Dorsal. **B.** Lateral. **C.** Ventral. **D.** Arizona, Pima Co. (DU 96.08.01). Notice absence of typical macrosetae on tibia and metatarsus I. **E–F**. Holotype in lateral view and its associated label. **G.** Arizona, Grand Canyon National Park (CAS 9057578), carapace, dorsal. Scale bars = 1 mm.

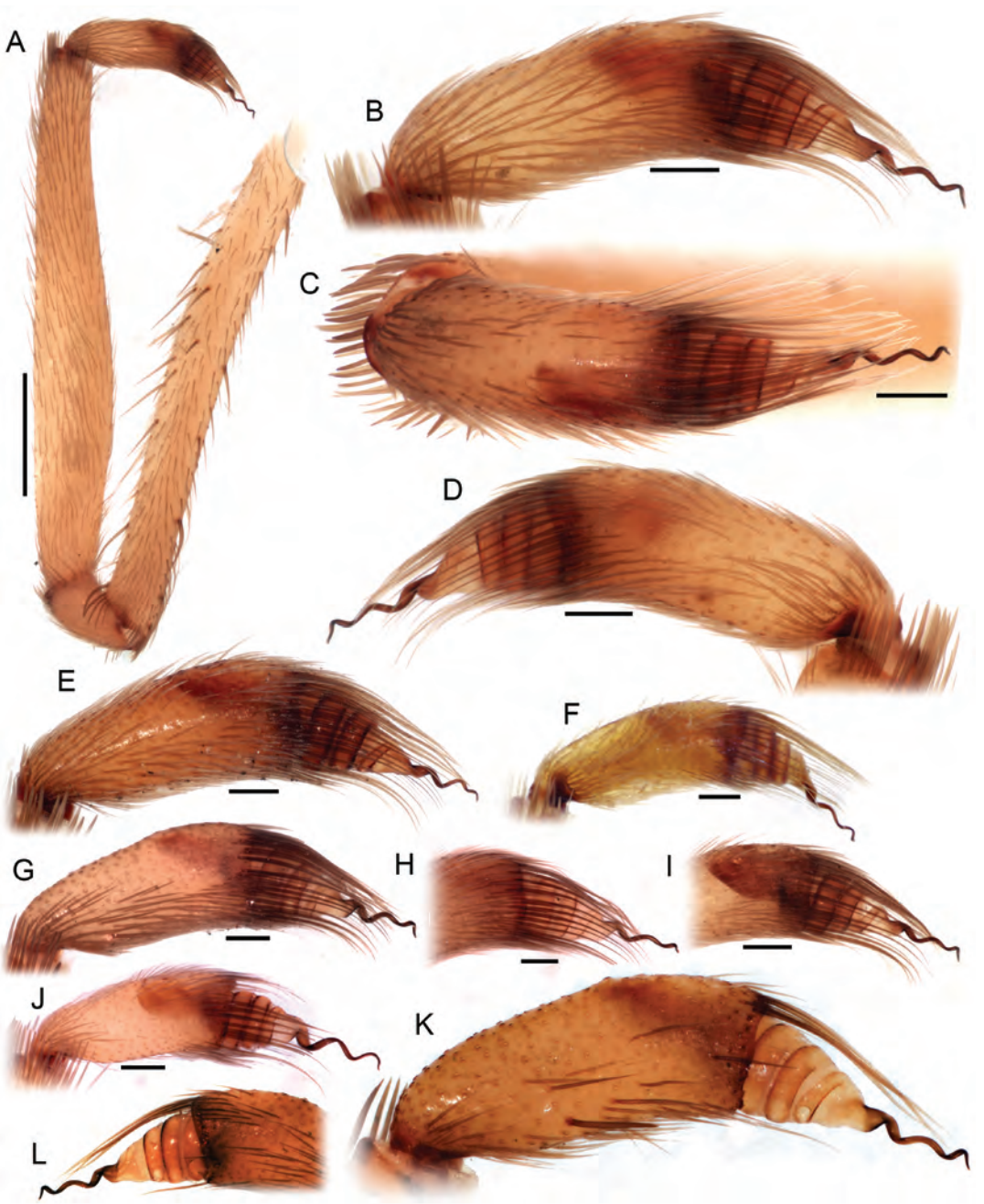

FIGURE 50. *Kukulcania utahana* (Chamberlin and Ivie, 1935), left male palps, prolateral view except where noted. **A–D.** Nevada, Nye Co. (AMNH IFM-1199). The palpal tibia in A is slightly compressed laterally, thus giving the impression of a ventral bump in the tibia; it is actually straight. **C.** Dorsal. **D.** Retrolateral. **E.** California, San Diego Co. (AMNH IFM-1559). **F.** California, Angeles National Forest (AMNH IFM-1590). **G.** Arizona, Grand Canyon National Park (CAS 9057578). **H.** California, Kings Co. (CAS 9025726). **I.** Nevada, Nye Co. (AMNH IFM-1657), right palp, mirrored. **J.** Arizona, Pima Co. (DU 96.08.01). **K–L.** Holotype, not to scale. **L.** Retrolateral. Scale bars = 0.2 mm except for A, 1 mm.

FIGURE 51. *Kukulcania utahana* (Chamberlin and Ivie, 1935), female paratype from Utah, Sulphurdale (AMNH IFM-1532), habitus. **A.** Dorsal. **B.** Ventral. **C.** Lateral. **D.** Sternum, ventral. Scale bars = 1 mm.

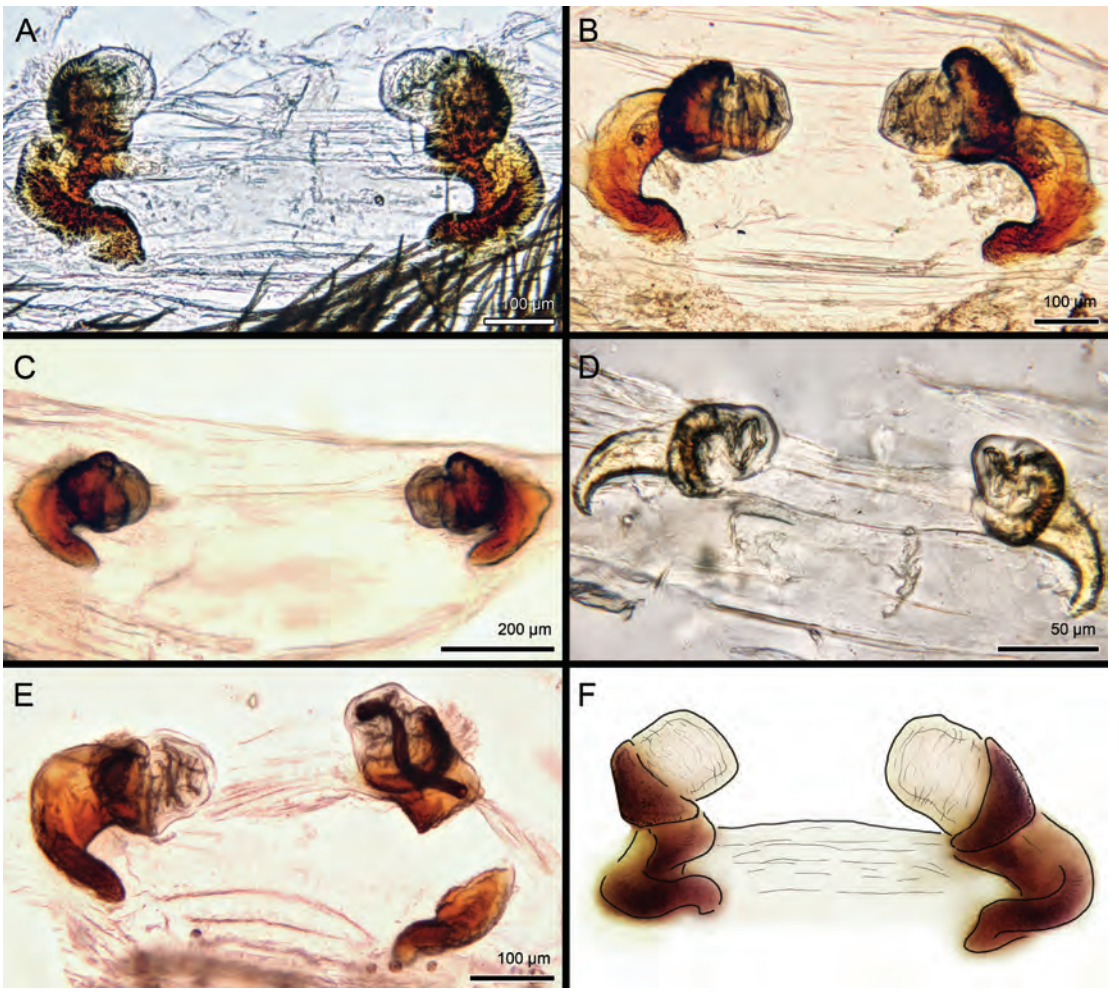

FIGURE 52. *Kukulcania utahana* (Chamberlin and Ivie, 1935), female spermathecae, ventral. **A.** Paratype from Utah, Sulphurdale (AMNH IFM-1532). **B.** Colorado, 10 miles N Cortez (AMNH IFM-1557). **C.** California, San Diego Co. (USNM IFM-1545). **D.** California, San Diego Co. (USNM IFM-1556). **E.** California, west of Death Valley (AMNH IFM-1638). **F.** Arizona, Grand Canyon (MCZ 145366) (digital reconstruction based on photograph).

brown V-shaped pattern posteriorly to the eyes. Sternum with white markings. Leg coxae and femora with longitudinal light-brown stripes. Abdomen dorsum brownish gray. Clypeus short. Sternum oval, with two pairs of sigillae. Total length 10.23. Carapace length 4.76, width 4.05, clypeus length 0.31. Eye diameters and interdistances: AME 0.196; PME 0.23; ALE 0.291; PLE 0.265; AME–AME 0.086; PME–PME 0.274. Sternum length 2.31, width 2.29. Palp: femur length 5.6, height 0.47; tibia length 5.24, height 0.49. Leg I: femur (fe) 8.8; patella (pa) 2.28; tibia (ti) 8.83; metatarsus (mt) 10.12; tarsus (ta) 3.84. II: fe 7.56; pa 1.8; ti 6.8; mt 8.89; ta 3.37. III: fe 6.62; pa 1.89; ti 5.77; mt 8.56; ta 3.09. IV: fe 8.49; pa 2.11; ti 7.91; mt 11.07; ta 4.32. Abdomen: length 5.99, width 2.62. Palp macrosetae long, in several rows along femur ventral and dorsal faces. Leg macrosetae: fe I 6d, 12p, 19v, 10r; ti I 9d, 43p, 17v, 3r; mt I 11d, 82p, 18v, 12r; ta I 9v; fe II 6d, 5p, 13v, 3r; ti II 6d, 4p, 7v, 3r; mt II 6d, 9p, 14v, 6r; ta II 10v; fe III 5d, 3p, 12v, 5r; ti III 3d, 3p, 7v, 3r; mt III 5d, 6p, 9v, 7r; ta III 11v; fe IV 9d, 14v, 4r; ti IV 5d, 3p, 6v, 3r; mt IV 5d, 7p, 17v, 7r; ta IV 11v. Palp: cymbium long, with anterior border bearing a ring of setae that end close to the embolus; bulb short, subtriangular at base; sperm duct with three tightly packed coils; embolus corkscrew shaped, with two coils, slender, with inconspicuous keel. State of the specimen: good, left palp dissected, right leg I disarticulated from tibia, right leg IV missing from tibia.

Female paratype from Sulphurdale, Utah (AMNH IFM-1532). Carapace orange-brown, finely stippled with brown. Labium, endites orange. Sternum dark brown, very hirsute, with long setae. Legs brown, with orange longitudinal stripes on coxae, femora and tibiae, first and second femora and tibia very hirsute, with long setae. Abdomen dorsum brownish gray. Anterior margin of the carapace unmodified. Sternum oval, with two pairs of sigillae. Total length 13.9. Carapace length 5.39, width 4.83, clypeus length 0.578. Eye diameters and interdistances: AME 0.17; PME 0.27; ALE 0.33; PLE 0.321; AME–AME 0.124; PME–PME 0.295. Sternum length 2.58, width 2.77. Palp: femur length 3.13, height 1.4; tibia length 2.01, height 1.13. Leg I: femur (fe) 6.43; patella (pa) 2.34; tibia (ti) 5.45; metatarsus (mt) 5.29; tarsus (ta) 2.52. II: fe 5.1; pa 2.01; ti 4.01; mt 4.24; ta 2.25. III: fe 4.17; pa 1.89; ti 3.24; mt 3.62; ta 1.92. IV: fe 5.48; pa 2.33; ti 4.4; mt 4.73; ta 2.39. Abdomen: length 9.13, width 7.06. Palp macrosetae on ventral surface of tibia and tarsus. Leg macrosetae present on ventral surfaces of tibiae, metatarsi, and tarsi; all femora and metatarsi II–IV with 2–4 dorsal macrosetae. Calamistrum with three rows of 7–10 setae each. Interpulmonary fold large, rounded, covering the spermathecae dorsally. Sclerotized bars present, strong, bent and comma shaped; membranous portion of the spermathecae apex short, semicircular, medially directed; glandular portion positioned ectally to the membranous portion and embracing its base.

Intra specific var iatio n: Males (N = 5): total length 6.26–10.79 (8.71), carapace length 3.03–4.76 (3.81), femur I length 6.28–8.8 (7.62), tibia I length 6.53–8.83 (7.74), femur/carapace ratio 1.85–2.19 (2.02). Females (N = 5): total length 13.16–17.7 (14.54), carapace length 4.19–7.33 (5.64), femur I length 4.14–6.96 (6.17), tibia I length 3.74–5.83 (5.07), femur/carapace ratio 0.95–1.28 (1.1). The number of macrosetae in the first pair of legs in males varies greatly; the male from Arizona lacks the short, numerous prolateral macrosetae (fig. 49D) that are usually present in other specimens (fig. 49B, F). Color also varies, with some males darker than the others (fig. 49). The coils of the male embolus might be looser (fig. 50J) or tighter (fig. 50G), the two coils might be subequal in size (fig. 50E), and the embolus might be downward directed (fig. 50F). The shape of the spermathecae and the sclerotized bars varies as well (fig. 52).

Natural his t ory: Label data indicate this species has been collected under rocks and logs, in fallen trunks, in webs in holes in the ground, and from Joshua trees (*Yucca brevifolia*). Males and females have been collected in pitfall traps. Some specimens have been collected in houses and buildings. A female has been found with a

broken piece of embolus inside one of her spermathecae; the adjacent sclerotized bar is also broken (fig. 52E). This indicates the embolus reaches the blind end of the membranous portion of the spermathecae apex during mating. Although breakage of palpal sclerites during mating commonly occurs in some spider groups (e.g., *Latrodectus, Micrathena*), we believe this case was accidental, as we have only one observation among several hundreds of *Kukulcania* spermathecae dissected by us.

Distribution: Southwestern United States, from Utah to Arizona and California, with records in neighboring areas of Colorado and Nevada; Mexico, Baja California, near the border with the United States; records from southern Baja California Sur are based on females only and could belong to *K. hurca* (fig. 3B).

Additional material examined: **Mexico**. **Baja California:** *3.7 miles SW La Rumorosa* [N32.49132°, W116.11945°], E.L. Sleeper, 10.v.1963, 1♀ (CAS 9060660); *Rosarito* [N32.36582°, W117.06165°], 9.iv.1937, subadult♀ (AMNH); *Rosarito Beach* [N32.3661°, W117.06176°], E.S. Ross, 5.iv.1939, 1♀ (CAS 9060637); under stone, 2.iv.1939, 2♀ (CAS 9060621); *Sierra Juárez,* 5 miles SW La Rumorosa [N32.48128°, W116.14218°, 1372m], S.C. Williams, iv.1969, 1♀ (CAS 9060679). **Baja California Sur:** *Isla Ballena* [N24.48235°, W110.40312°], J.C. Chamberlin, 9.vi.1921, 2♀ (MCZ 145354), 2♀ (MCZ 145353); *La Paz* [N24.14264°, W110.31275°], V. Roth, 1–3.ii.1965, 1♀ (AMNH). **Uncertain locality:** *Mexico Gulf, Isla Pelican,* J.C. Chamberlin, 6.vii.1921, 1♀ (MCZ 145358). **USA**: **Arizona:** *Coconino Co.*: 11 miles E Jacobs Lake [N36.71572°, W112.00024°], M.A. Cazier, 10.viii.1950, with egg sac, 1♀ (AMNH); 15 miles E Jacobs Lake, W.J. Gertsch, 17.vii.1940, 1♀ (AMNH); Grand Canyon [N36.10697°, W112.113°, 2134m], 25.v.1905, 1♀ (AMNH); [N36.10697°, W112.113°, 610m], W.M. Meeler, 19.iii.1919, 1♀ (MCZ 145366); [N36.10697°, W112.113°], Lutz, 31.vii.1934, 1♀ (AMNH); Grand Canyon National Park, Tsean Cho, in wall [N36.10697°, W112.113°, 1500m], R. deSaussure, 7.xii.1954, 1♂ (AMNH IFM-1656); Kaibab Forest [N35.88°, W112.00418°], W.J. Gertsch, 10.vii.1931, 1♀ (AMNH); Tusayan [N35.9736°, W112.12656°], 1♀ (MCZ 68567); Williams [N35.24946°, W112.191°], Schwarz and Barber, 10.vi.1901, 1♀ 1 imm. (USNM); *Pima Co.*: 3 miles E Veil (N32.03694°, W110.66417°), D. Ubick, 1.viii.1996, 1♂ (DU 96.08.01); *Yavapai Co.*: Prescott [N34.54002°, W112.4685°], C. and P. Vaurie, 30.vii.1948, 1♀ (AMNH). **California:** *Fresno Co.*: Coalinga [N36.13968°, W120.36015°], W.M. Pearce, 12.ii.1950, 1♀ (AMNH); 15.i.1949, 2♀ (AMNH); *Inyo Co.*: Haiwee Spring, 3 miles N Coso Hot Spring [N36.0802°, W117.7702°], W. Savary, 29.v.1997, 1♀ (DU 97.05.29); Independence, under stone [N36.80271°, W118.2001°], J.T. Doyen, 21.ix.1974, 1♀ (UCB); just W of Death Valley, Roger's Peak [N36.21787°, W117.0854°], C. Parrish, 5.ix.1962, with a piece of broken embolus inside spermathecae, 1♀ 10 imm. (AMNH IFM-1638); Little Lake [N35.93661°, W117.90674°], W. Ivie, 6.viii.1931, genitalia mounted in a slide, original specimen not seen, 1♀ (AMNH), 1♀ (AMNH); Upper Haiwee Res. [N36.20049°, W117.95869°], S. and D. Mulaik, 17.iii.1941, 1♀ (AMNH); *Kern Co.*: 1 mile N Rosamond [N34.86415°, W118.16341°], E.G. Linsley and J.W. McSwain, 12.v.1956, 1♀ (UCB); 10 miles SE Tehachapi [N35.11605°, W118.60057°], J. Buttram, 2.v.1964, 1♀ (CAS 9058496); Kings, near Parejo Hill (N35.62056°, W119.91444°), D. Ubick, 18.v.1997, reached maturity in captivity, 1♂ (CAS 9025726); McKittrick [N35.30552°, W119.62262°], W.M. Pearce, 31.x.1949, 1♀ (AMNH); *Los Angeles Co.*: [N34.05223°, W118.24369°], collector illegible, xi–xii.1922, 3♀ 5 imm. (AMNH); J. Bell, iv.1920, 1♀ (AMNH); 15 miles E Palmdale, Joshua tree [N34.50336°, W117.82048°], M.H. Muma and J.O.B. Larrea, 12.vii.1975, 1♀ (AMNH); Angeles National Forest, big pines [N34.31582°, W118.00609°], M.E. Thompson, 17.vii.1966, 1♂ (AMNH IFM-1590); Burbank [N34.18084°, W118.30897°], F. Sala, 9.viii.1957, 1♂ (AMNH); Claremont [N34.09668°, W117.71978°], 1♀ (AMNH); San Gabriel Mountains, Angeles Crest Highway, near highest point [N34.37758°, W117.73847°, 2134m], W.P. Maddison, 27.vi.1985, 1♀ (MCZ 145365); Valyermo, Big Rock Creek [N34.39585°, W117.80722°, 1280m], K. Cowles, 12.vi.1943, 1♀ (AMNH); Westwood Village [N34.0635°, W118.44552°], D. Verrity, K. Cowles and D. Cowles, viii–x.1942, 1♀ (AMNH); *Mono Co.*: 4 miles S Coleville [N38.51467°, W119.47621°], L.M. Smith, 11.v.1959, 1♀ (AMNH); Benton Station [N37.81854°, W118.47726°], W.M. Pearce, 15.vii.1941, 1♂ (AMNH); 25.vii.1941, 1♂ (AMNH); 30.vii.1941, 1♀ (AMNH); Chalfant [N37.52937°, W118.36345°], 27.vi.1941, 1♀ (AMNH); *Riverside*

Co.: 1 mile N Winchester, Double Butte, on building [N33.7235°, W117.12339°], W. Icenogle, 7.viii.1975, 1♂ (AMNH), 1♂ (AMNH); under rock, S. Johnson, 5.iii.1977, 1♀ several imm. (AMNH); S.C. Johnson, 25.vii.1975, 1♂ (AMNH); Idyllwind [N33.74675°, W116.71526°], W.J. and J.W. Gertsch, 7.vii.1953, 2♀ (AMNH); San Jacinto Mountains, Pine Cove [N33.81446°, W116.67918°], E.S. Ross, 2.vi.1939, 1♀ (CAS 9058480); Winchester, house, dry hillside [N33.7235°, W117.12339°], H. Levi and W. Icenogle, 22.viii.1978, 1♀ (MCZ 145362); on web in hole, W. Icenogle, 29.vii.1967, 1♀ (AMNH); *San Bernardino Co.*: [N35.63351°, W115.68836°], Schriede, no date, 2♂ (ZMB 1013); Fairmont, Mojave desert [N35.01099°, W115.47336°], L. Moszkowski, ix.1955, 1♀ (AMNH); Keystone Canyon [N35.27166°, W115.27554°], J. Doyen, 21.iv.1977, 1♀ (UCB); Phelan [N34.42629°, W117.57256°], W.J. Gertsch, Ivie and Schrammel, 19.iv.1960, 2♀ (AMNH); Yucca Valley [N34.11417°, W116.43224°], L. Lilly, 28.i.1971, 1♀ (CAS 9060664); V. Roth, 15.iv.1961, 1♀ (AMNH); 3 miles NW, R.L. Langston, 10.iv.1965, 1♀ (UCB); *San Diego Co.*: [N32.71574°, W117.16108°], 1924, 1♀ (AMNH); M. Schulze, 7.iii.1972, 1♀ 1 imm. (USNM IFM-1545); pitfall trap, B.M.C., x.1970, subadult♀ (USNM IFM-1556); Alpine [N32.83251°, W116.76634°], W.M. Pearce, 9.v.1947, 1♀ (AMNH); 9.vi.1948, 1♀ (AMNH); El Cajón [N32.79477°, W116.96253°], 11.vi.1947, 1♀ (AMNH); Lakeside, Eucalyptus Hills [N32.85727°, W116.92224°], M. Cox, 30.vii.1976, 1♂ (AMNH IFM-1559); Otay Mesa, Johnson Canyon [N32.55947°, W116.97347°], S.C. Johnson, 9.iv.1976, 1♀ (AMNH); San Ysidro [N32.55556°, W117.04704°], W.M. Pearce, 30.iv.1953, 1♀ (AMNH); Sunnyside [N32.66331°, W117.0325°], 26.vii.1965, 1♀ (AMNH); *Sierra Co.*: Peavine [N39.67769°, W120.00659°], 24.x.1946, 1♀ (AMNH); 31.v.1940, 1♂ (AMNH); 5.vii.1940, 1♂ 1 imm. (AMNH); *Ventura Co.*: Kern, Mt. Pinos [N34.81284°, W119.14543°], Roth and Roth, 31.vii.1961, 1♀ (AMNH); *uncertain locality*: high desert, fallen trunk of Joshua tree, L. Jacobson, spring/1970, 1♀ (MCZ 145361). **Colorado:** *Montezuma Co.*: Mesa Verde National Park [N37.23087°, W108.46183°], B. Malkin, 20.viii.1952, 1♀ (AMNH). **Nevada:** *Esmeralda Co.*: Goldfield [N37.70845°, W117.23571°, 1740m], D. Weissman and V.F. Lee, 18.iv.1998, 1♀ (CAS 9058499); *Nye Co.*: Mercury, can traps [N36.66051°, W115.99448°], D. Thomas, 5.vi.1971, 1♂ (CAS 9057578); Nevada Test Site, 10.vii.1963, 1♂ (AMNH); 10.viii.1964, 1♂ (AMNH); 15.vii.1961, 1♂ (AMNH); 22.iii.1962, 1♀ (AMNH); 28.vi.1961, 1♂ (AMNH IFM-1199); 9.vii.1960, 1♂ (AMNH); Nevada Test Site, CETO, 20.vii.1972, 1♂ (CAS 9058472); *Washoe Co.*: N. of Reno, sage brush [N39.52963°, W119.8138°], B.T. Gardner, viii.1965, 1♀ (MCZ 145364); Reno, UNLR [N39.54243°, W119.8163°], x.1939, 2♀ (AMNH). **Utah:** *Box Elder Co.*: Kosmo [N41.53801°, W113.1918°], G.F. Knowlton, 18.iv.1974, 1♀ (MCZ 145360); *Salt Lake Co.*: Copperton, dry sage slope [N40.56467°, W112.09744°, 1500m], H. Levi, 18.iv.1961, 1♀ (MCZ 145363); *Sevier Co.*: Sevier Canyon [N38.58913°, W112.40188°], B. Malkin, 25.vi.1947, 1♀ (AMNH); W.J. Gertsch, 18.vii.1940, 1♀ (AMNH); *Washington Co.*: 10 miles N Saint George [N37.24618°, W113.6277°], 21.vii.1952, 1♀ (AMNH); Pintura [N37.34082°, W113.27412°, 1067m], O. Bryant, 23.iv.1952, 1♀ (CAS 9060616).

Kukulcania hurca (Chamberlin and Ivie, 1942)

Figures 2A–B, 3C, 5F, 6D, 7F, 14, 22, 27C, 28C, 29C, 31A, 53–56

Filistata hurca Chamberlin and Ivie, 1942: 3. Female types from Utah and California states (AMNH), examined.

Kukulcania hurca: Lehtinen, 1967: 242.

Type material. Holotype: **Utah:** *Washington Co.*: 3 miles W of Hurricane, under a rock on a dry hillside (N37.16667°, W113.2°), W. Ivie, iii.1939, 1♀ (AMNH IFM-1598). Paratype: **USA: California:** *Imperial Co.*: Seeley [N32.79311°, W115.69111°], University of U. Expedition, 10.iv.1937, genitalia mounted on a slide, 1 ♀ (AMNH).

Remarks: The holotype is a rather small female, but it is assumed to be a fully adult individual because it was collected with an open egg sac and several spiderlings.

Diagnosis: *K. utahana* and *K. hurca* are likely sibling species that are very difficult to tell apart. Males are similar to *K. utahana* in having a thin, corkscrew-shaped embolus with inconspicuous keel; they can be distinguished by the shorter embolus with a single coil (fig. 54) (in *K. utahana*

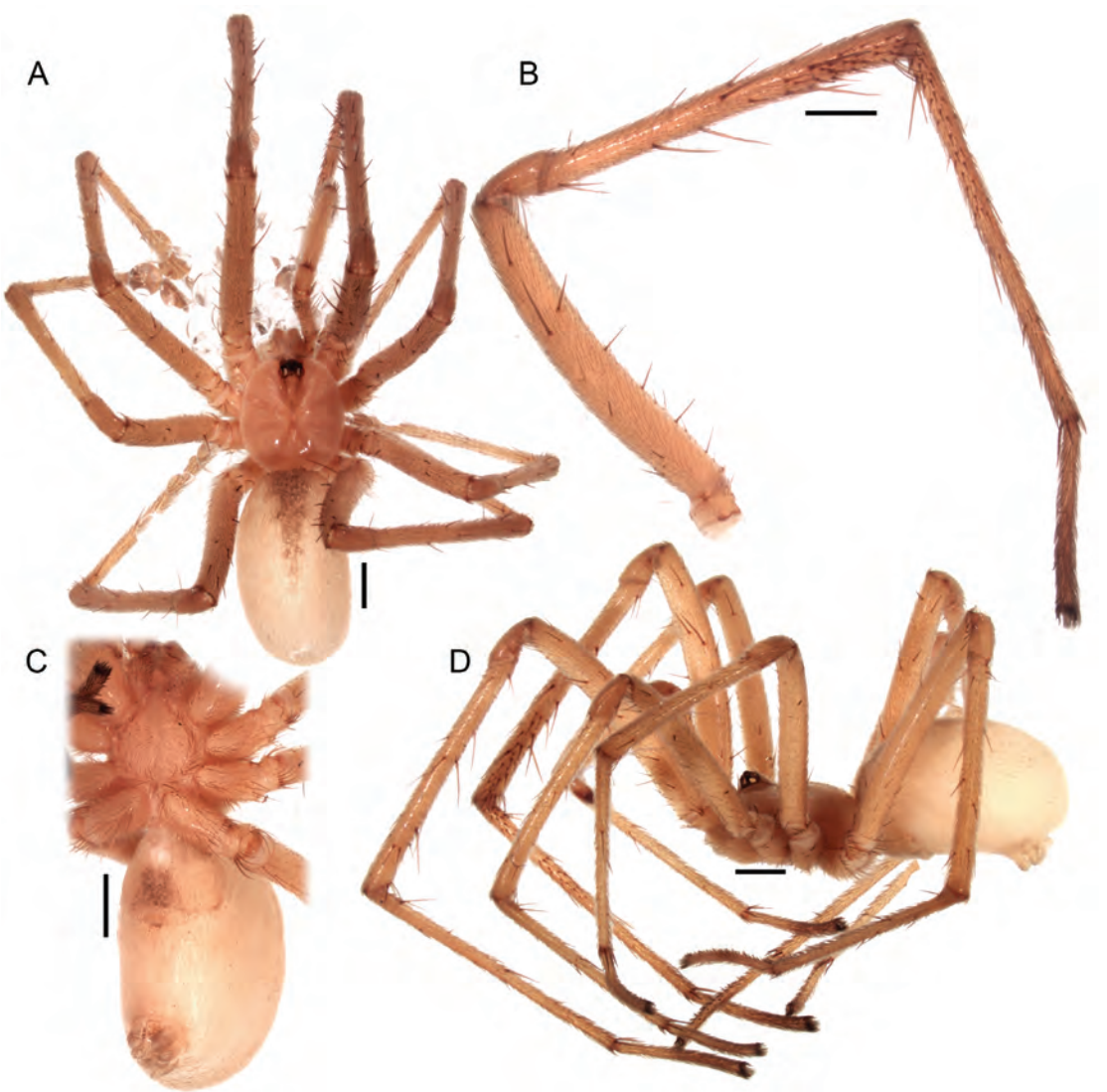

FIGURE 53. *Kukulcania hurca* (Chamberlin and Ivie, 1942), male. **A–B.** Nevada, Nye Co. (AMNH IFM-1200). **A.** Habitus, dorsal. **B.** Left leg I, prolateral. **C.** Habitus, ventral. **D.** Same, lateral. Scale bars = 1 mm.

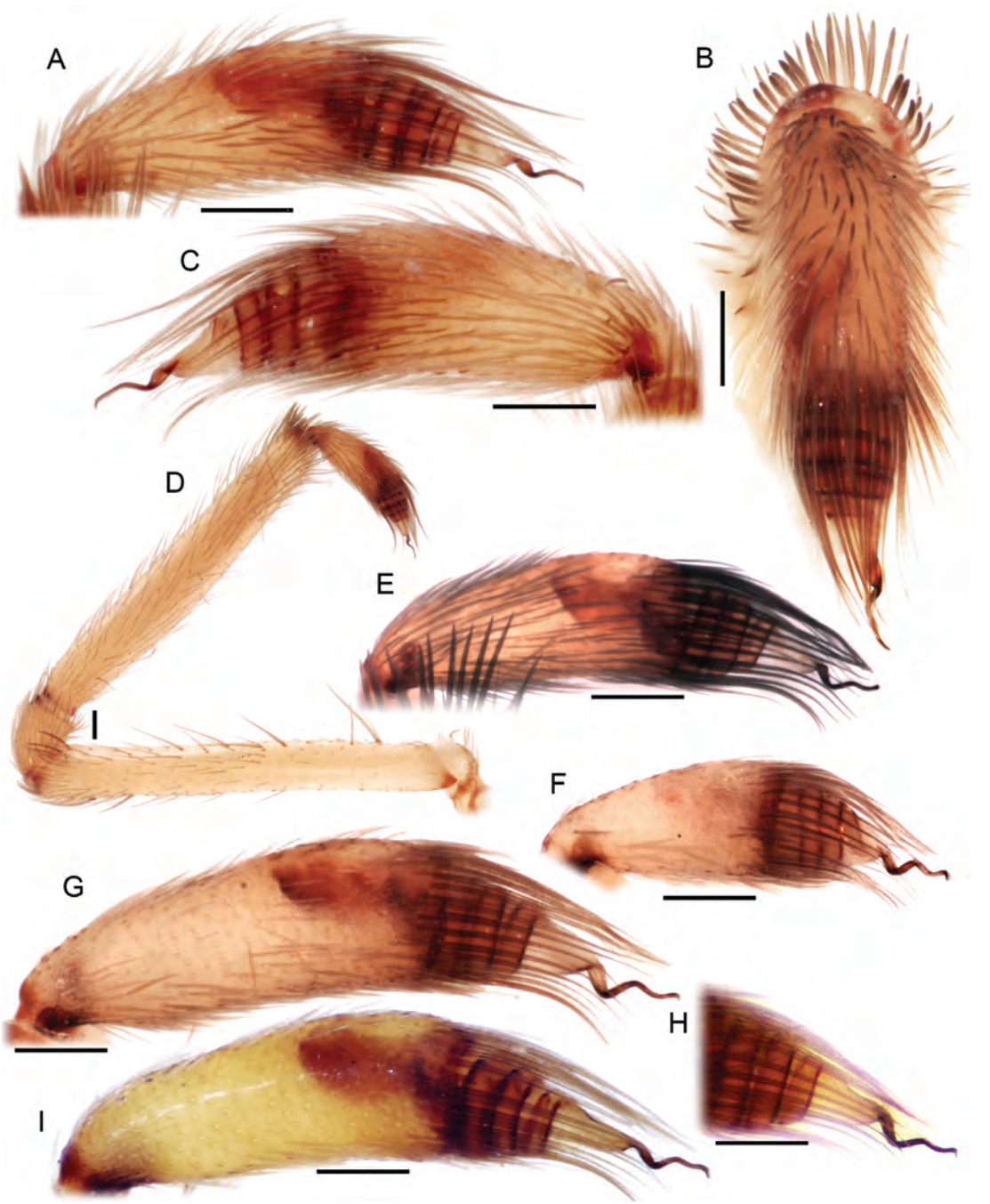

FIGURE 54. *Kukulcania hurca* (Chamberlin and Ivie, 1942), male palps. **A–D.** Nevada, Nye Co. (AMNH IFM-1200). **A.** Prolateral. **B.** Dorsal. **C.** Retrolateral. **D.** Prolateral. **E.** California, San Bernardino Co. (SDSU G256), prolateral. **F.** California, Imperial Co. (AMNH IFM-1596), prolateral. **G.** Mexico, Baja California Sur, 24 km S Santa Rosalia (CAS 9057599), prolateral. **H.** Mexico, Baja California, 9 km north of Rancho Santa Inés (MCZ 39053), prolateral. **I.** Mexico, Baja California, Isla San Gerónimo (AMNH IFM-1593), prolateral. Scale bars = 0.2 mm.

FIGURE 55. *Kukulcania hurca* (Chamberlin and Ivie, 1942), females, habitus. **A–D.** California, San Bernardino Co. (AMNH IFM-1659). **A.** Dorsal. **B.** Lateral. **C.** Right calamistrum, dorsal. **D.** Ventral. **E–F.** Female holotype (AMNH). **E.** Dorsal. **F.** Ventral. **G.** Label associated to the holotype. Scale bars = 1 mm.

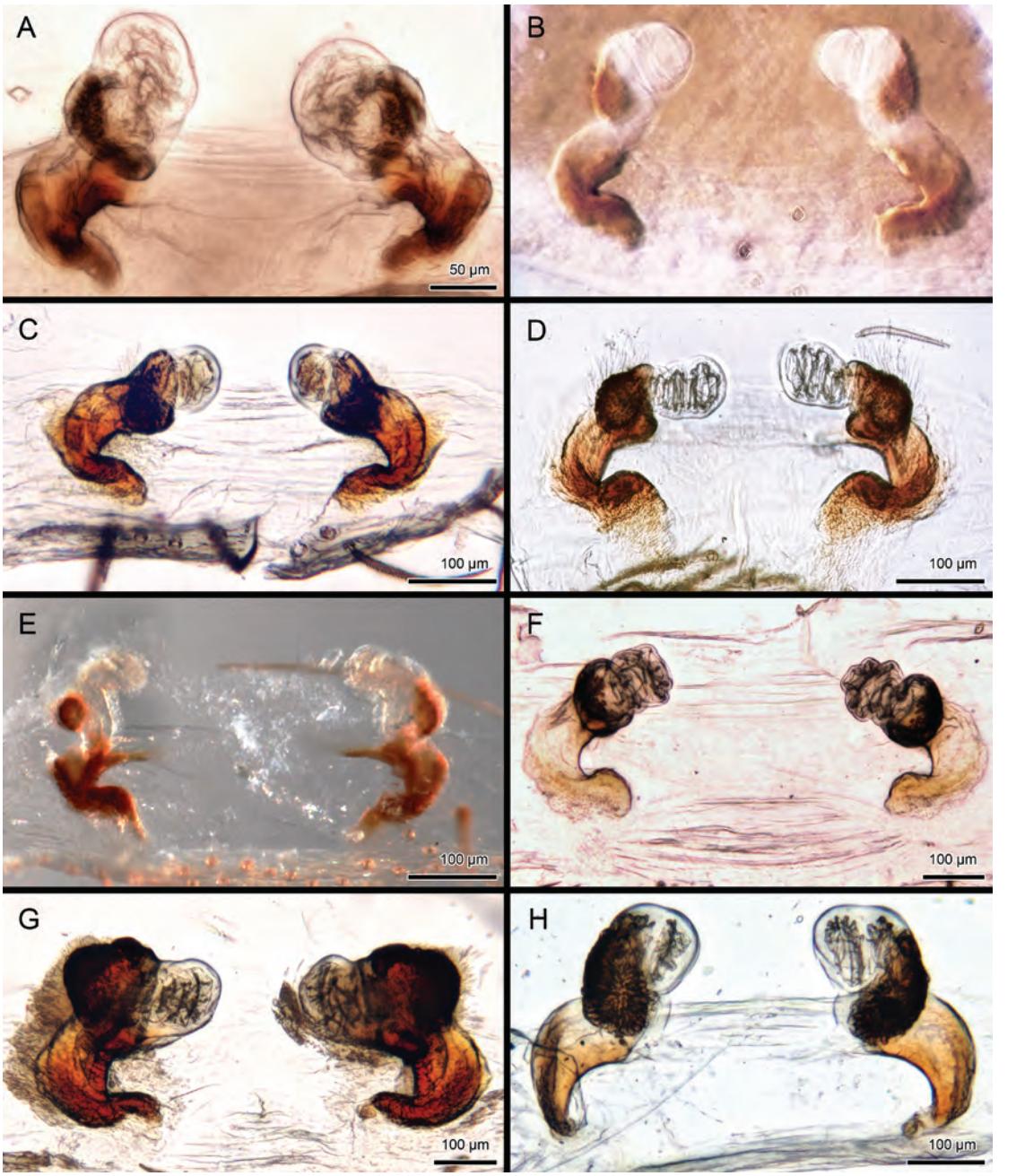

FIGURE 56. *Kukulcania hurca* (Chamberlin and Ivie, 1942), female spermathecae, ventral. **A.** Holotype (AMNH). **B.** Paratype from California, Seeley (AMNH), preserved in a permanent slide mounted by W.J. Gertsch. **C–E.** Females collected with males, C and D with the most typical morphology. **C.** Mexico, Baja California Sur, 24 km south of Santa Rosalia (CAS 9057599). **D.** Mexico, Baja California, 9 km north of Rancho Santa Inés (MCZ 39052). **E.** California, Imperial Co. (CAS 9060620). **F–H.** Females with atypical morphology. **F.** Utah, St. George (AMNH IFM-1641). **G.** California, Fresno Co. (CAS 9057610). **H.** Mexico, Sonora, Guaymas (CAECIB).

there are two well-defined coils). We have not been able to find diagnostic characters for distinguishing the females of the two species unambiguously, and all records based on females only are tentative (see Discussion on species limits above); both species have medially directed, lobed membranous portions of the spermathecae in which the base is embraced by the glandular portion of the spermathecae, and strongly bent, comma-shaped sclerotized bars. Specimens assigned to *K. hurca* usually have the spermathecae close together and well projected anteriorly beyond the uterus externus, with a longer membranous portion of the spermathecae, and the sclerotized bars sculptured and broad posteriorly (fig. 56). Female *K. hurca* are also generally smaller, with more slender legs. and a less hirsute sternum (fig. 55).

Descr iptio n: Male from Mercury, Nevada (AMNH IFM-1200). Coloration yellowish orange. Abdomen dorsum cream with light-brown cardiac area. Clypeus short. Sternum oval, with two pairs of barely visible sigillae. Total length 6.99. Carapace length 2.64, width 2.32, clypeus length 0.24. Eye diameters and interdistances: AME 0.13; PME 0.168; ALE 0.19; PLE 0.167; AME–AME 0.07; PME–PME 0.218. Sternum length 1.4, width 1.36. Palp: femur length 3.53, height 0.43; tibia length 2.56, height 0.42. Leg I: femur (fe) 5.26; patella (pa) 1.3; tibia (ti) 5.34; metatarsus (mt) 5.98; tarsus (ta) 2.64. II: fe 4.57; pa 1.11; ti 4.23; mt 5.11; ta 2.13. III: fe 4.31; pa 1.04; ti 3.73; mt 4.95; ta 1.84. IV: fe 5.43; pa 1.13; ti 5.16; mt 6.47; ta 2.74. Abdomen: length 4.38, width 2.47. Palp macrosetae long, in several rows along femur ventral and dorsal faces. Leg macrosetae: fe I 9d, 2p, 9v, 5r; ti I 6d, 20p, 11v, 4r; mt I 6d, 30p, 10v, 4r; ta I 5v; fe II 2d, 3p, 9v, 3r; ti II 3d, 3p, 6v2r; mt II 3d, 3p, 8v, 4r; ta II 4v; fe III 2d, 2p, 8v, 1r; ti III 2d, 3p, 4v, 2r; mt III 2d, 4p, 8v, 2r; ta III 5v; fe IV 4d, 2p, 8v, 1r; ti IV 3d, 3p, 3v, 3r; mt IV 3d, 3p, 9v, 2r; ta IV 11v. Palp: cymbium long, with anterior border bearing a ring of setae that end close to the embolus; bulb short, subtriangular at base; sperm duct with three coils; embolus thin, with a V-shaped coil near the base followed by a straight section and a distal ventral bend, with incospicuous keel. State of the specimen: good, left palp and left leg I dissected.

Female from Pisgah Crater, California (AMNH IFM-1659). Coloration dark brown, except where noted. Carapace light brown, stippled with dark brown. Sternum not particularly hirsute. Legs with light brown longitudinal stripes on coxae, femora, and tibiae, femora and tibia I–II hirsute, with long setae. Anterior margin of the carapace unmodified. Sternum oval, with two pairs of sigillae. Total length 9.75. Carapace length 4.04, width 3.3, clypeus length 0.59. Eye diameters and interdistances: AME 0.146; PME 0.213; ALE 0.295; PLE 0.284; AME–AME 0.082; PME–PME 0.238. Sternum length 1.85, width 1.83. Palp: femur length 2.29, height 0.8; tibia length 1.5, height 0.72. Leg I: femur (fe) 5.84; patella (pa) 1.8; tibia (ti) 6.03; metatarsus (mt) 5.08; tarsus (ta) 2.33. II: fe 4.5; pa 1.48; ti 3.99; mt 3.69; ta 1.83. III: fe 3.56; pa 1.32; ti 2.85; mt 3.09; ta 1.49. IV: fe 4.81; pa 1.44; ti 4.12; mt 4; ta 1.8. Abdomen: length 5.95, width 4.42. Palp macrosetae on ventral surface of tibia and tarsus. Leg macrosetae present on ventral surfaces of tibiae, metatarsi, and tarsi; all femora and metatarsi III-IV with 2–4 dorsal macrosetae. Calamistrum with three rows with 9–11 setae each. Interpulmonary fold large, rounded, covering the spermathecae dorsally. Sclerotized bars present, comma shaped, strongly curved and broad posteriorly; membranous portion of the spermathecae apex long, semicircular, medially directed; glandular portion positioned ectally to the membranous portion and embracing its base. State of the specimen: good, genitalia dissected, left leg I missing from tibia.

Intra specific var iatio n: Males (N = 6): total length 4.22–6.99 (5.67), carapace length 1.9–3.09 (2.52), femur I length 3.16–6.36 (5.13), tibia I length 3.56–7.22 (5.63), femur/carapace ratio 1.66–2.56 (2.03). Females (N = 10): total length 7.64–16.08 (11.43), carapace length 3.23–6.81 (4.81), femur I length 3.61–7.26 (5.75), tibia I length 3.39–7.51 (5.51), femur/carapace ratio 1–1.45 (1.21). The number of prolateral macro-

setae on the male first legs varies: 2–20 on the tibiae and 7–33 on the metatarsi ($N = 4$ males); the legs generally have fewer macrosetae than in *K. utahana*. Male palpal morphology is variable: the cymbium can be long (fig. 54G, I) or very short (fig. 54F); the embolus might be straight after the first coil (fig. 54A), but in most populations it is slightly curved (fig. 54E–I). The sternum is usually not particularly hirsute, although in some populations it might be as hirsute as that of *K. utahana*. Female genitalia show rampant variation: spermathecae might be closely (fig. 56D) or widely spaced (fig. 56B, E), the glandular portion of the spermathecae apex might be enlarged and projected (fig. 56G), the sclerotized bars might be simple (fig. 56H) or sculptured (fig. 56D), and the membranous portion of the spermathecae apex might be short (fig. 56A, F) or long (fig. 56D).

Natural history: Label data indicate specimens have been collected in xerophilic chaparral, under stones and logs, in open deserts, on beaches, on sand dunes, under salt crusts, on cliffs, under bridges, and under bark. Several specimens have been collected in burrows or holes in the ground or in areas of fine sand. This suggests this species might have a burrowing habit, in contrast to other *Kukulcania*, which generally take advantage of preexisting cracks or crevices. One label states the spider was collected in an 8–9 inches (20–22 cm) silk-lined tube under a rock. Males have been collected in walls.

Distribution: Southwestern United States, in Utah, California, and adjacent areas of Nevada and Arizona; Mexico, in Sonora and the Baja California Peninsula, including several small islands in the Gulf of California (fig. 3C).

Additional material examined: **Mexico. Baja California:** *0.6 miles E San Borjas,* C. Parrish, 25.xi.1961, 1♀ (AMNH); *1.2 mile E San Borjas,* 1♀ (AMNH); *1.5 mile NW Catauñia,* under rocks, D. Ubick, 29.xii.1981, 1♀ (DU 81.12.29); *10 miles E El Rosario* [N30.05955°, W115.72575°], W.J. Gertsch and V. Roth, 5.v.1961, with egg sac, 4♀ 2 imm. (AMNH); *10 miles N Punta Prieta* [N28.92889°, W114.15556°], 19.xii.1972, 1♀ (AMNH); *10 miles S Cataviña* [N29.67016°, W114.64138°], E.S. Ross and R. Stecker, 22.ix.1988, 1♀ (CAS 9057611); *10–15 miles S La Rumurosa* [N32.39472°, W115.90333°], V. Roth, 4.vii.1961, 1♀ (CAS 9060678); *14 miles N Laguna Hanson* [N32.24245°, W115.90766°], 30.v.1960, 1♀ 1 imm. (AMNH), 1♀ (AMNH); *16 miles E San José,* La Jolla Canyon, W.J. Gertsch and V. Roth, 3.v.1961, 1♀ 1 imm. (AMNH); *19 miles SE Bahía de Los Angeles,* in stream [N28.70897°, W113.46913°], V. Roth, 15.i.1965, 2♀ (CAS 9060672); *2 miles NW Santa Inés Ranch,* under rocks in tube-lined burrows [N29.76667°, W114.76667°], J.T. Doyen, 27.iii.1973, 1♀ 3 imm. (UCB); *24 miles NNW Manuela* [N28.51022°, W114.02235°], S.C. Williams et al., 22.vi.1968, 1♀ (AMNH); *25 miles S Punta Prieta* [N28.62657°, W114.02838°], I. La Rivers, 9.ii.1947, 1♀ (UCB); *41 miles E El Rosario,* San Fernando Mission [N29.95812°, W115.08262°], V. Roth, 11.i.1965, 1♀ 1 imm. (CAS 9060688); *42 miles S Ensenada* [N31.38749°, W116.32074°], W.J. Gertsch, 29.iv.1961, 1♀ (AMNH); *5 miles E San José,* Meling Ranch, W.J. Gertsch and V. Roth, 1.v.1961, 2♀ (AMNH); *8 miles W of Tecate* [N32.54328°, W116.75922°, 213m], W.S. Creighton, 16.v.1952, 1♀ (AMNH); *9 km N Rancho Santa Inés* [N29.76667°, W114.76667°], P. E. Blom, 16.ix.1980, 1♂ (MCZ 39053), 1♀ (MCZ 39052), 1♀ (MCZ 39051); 30.vi.1979, 1♀ (AMNH); T.E. Arehart, 7.iv.1977, 1♀ (AMNH); *9 miles NW Rancho Rosarito,* Paul Elias, 20.i.1972, 2♀ (MCZ 69249); *Bahía de Los Angeles,* Isla Cabeza Caballo [N28.97139°, W113.47861°], V. Roth, 14.vii.1965, 1♀ (AMNH); Isla Calaveras, rocks on top of bird roost, R.E. Rykman, E. Ryckman, C.P. Christianson, 28.v.1962, 2♀ (AMNH); *Bahía de San Luis Gonzaga* [N29.79537°, W114.40032°], J.C. Chamberlin, 29.iv.1921, 1♀ (MCZ 145351), 1♀ (CAS 9058478); silk-lined burrows on beach, M.M. Bentzien, 13.vi.1968, 2♀ (CAS 9060686); *costa W,* Isla San Martín [N30.49085°, W116.11526°], Osorio y Tafall, 2.vi.1944, 1♀ (AMNH); *Desengano,* 37 miles NW Bahía de Los Angeles, in silk lined 8–9″ long tube under rock [N29.05074°, W114.12486°], S.L. Szerlip, 1.iv.1973, 1♀ (UCB); *Ensenada,* Punta Calamajue, sand dune and rocky slopes (N29.68532°, W114.1629°, 5m), H. Montaño and E. González, 1.vii.2008, 1♀ 1 imm. (AMNH); *Isla Ángel de la Guardia* [N29.33956°, W113.42998°], J.C. Chamberlin, 30.vi.1921, 1♀ (MCZ 145343), 1♀ (MCZ 145344); Van Duzee, 30.vi.1921, 1♀ (CAS 9058479); south end, V.F. Lee, 13.iii.1971, 1♀ (CAS 9060673); *Isla Granito* [N29.56387°, W113.53812°], J.C. Chamberlin, 21.v.1921, 2♀ (MCZ 145349); *Isla Jorobado,* pit-

fall trap (N29.01667°, W113.51667°), R. Aalbu, 10.iii–11.v.1999, 1♀ (CAS 9060624); *Isla Rasa* [N28.82361°, W112.98°], Pal. Osorio Tafall, 7.v.1944, 3♀ 1 imm. (AMNH); under rock, K. Lucas, 28.iv.1966, 1♀ (AMNH); under rocks, M. Cardenas, 21–22.xii.1944, all three female genitalia missing from the vial, 1♂ 3♀ (AMNH); *Isla Salsipuedes* [N28.72905°, W112.95801°], J.C. Chamberlin, 9.vi.1921, 1♀ (MCZ 145347); *Isla San Benito* [N28.30245°, W115.54299°], T. Cozana, 27.xii.1971, 2♀ (USNM IFM-1276); *Isla San Esteban* [N28.70083°, W112.57694°], J.P. Figg-Hoblyn, 1.iv.1953, subadult♀ (AMNH); 2.iv.1953, 1♀ (AMNH); *Isla San Gerónimo,* hillside, under rocks [N29.79137°, W115.79228°], 10.iii.1953, 1♀ 1 imm. (AMNH); on sea cliff, B. Firstman, 10.iii.1953, 1♂ 3♀ 2 imm. (AMNH IFM-1593), 3♀ 2 imm. (AMNH); under rocks, 10.iii.1953, 1♀ 2 imm. (AMNH); *Puerto Santo Tomas* [N31.53263°, W116.40982°], R. Schick, 14–15.vii.1956, 3♀ 1 imm. (AMNH); *Punta Diggs,* found in fine sand [N30.64216°, W114.70795°], 1.ii.1921, 1♀ 8 imm. (AMNH); *Roca Blanca,* B. Osorio y Tafall, 6.v.1944, 1♀ (AMNH); *S of Mexicali,* Cocopa Mountains [N32.36831°, W115.46314°], V. Roth, 2–19.xii.1960, 2♀ 1 imm. (CAS 9060670); *S. End of Cocopa Mountains,* on sand dune, 18.vi.1958, 1♀ (AMNH); *San Felipe,* in hole in desert ground [N31.02507°, W114.84078°], R. Fisher, iv.1957, 1♀ (AMNH); *San José,* Meling Ranch [N31.46564°, W116.59507°], W.J. Gertsch and V. Roth, 1–4.v.1961, 3♀ 6 imm. (AMNH); *San Quintín,* Old English Mill, Motel, RB-3 [N32.48157°, W116.86613°], P.R. Craig and D.L. Dailey, 24.xi.1962, 1♀ (CAS 9057626); *San Telmo de Arriba* [N30.96806°, W116.09166°], W.J. Gertsch and V. Roth, 3.v.1961, 1♀ 3 imm. (AMNH); *Santa Inéz Islands* [N27.05°, W111.91667°], 18.v.1921, 2♀ 4 imm. (AMNH); J.C. Chamberlin, 18.v.1921, 3♀ (AMNH); *Sierra Juárez,* Cantil Canyon [N32.39414°, W115.90355°], W.E. Savary, 22–27.iii.1975, 1♀ (CAS 9054055); Tajo-Cantil Canyon System [N32.39472°, W115.90333°], S.C. Williams, 14–18.iv.1973, 1♀ (CAS 9060680). **Baja California Sur:** *13 miles S Loreto* [N25.82848°, W111.3319°], V. Roth, 29.i.1965, 2♀ (CAS 9060613); *15 miles S Mulegé* [N26.72668°, W111.91092°], C.E. Griswold and L. Vincent, 29.xii.1976, 2♀ (UCB); *16 miles NW Mulegé* [N27.06688°, W112.11058°], V. Roth, 26.i.1965, 2♀ (CAS 9060687); *24 miles S of Santa Rosalia,* near ruins of stone dam and windmill, in burrows [N27.03256°, W112.09051°], E.L. Sleeper, 30.v.1973, 1♂ 2♀ (CAS 9057599), 3♀ (CAS 9057603); *26 miles S Loreto* [N25.67019°, W111.24211°], C. Griswold and L. Vincent, 1–2.i.1977, 3♀ (UCB); *3 miles NW San Ignacio* [N27.28206°, W112.89545°], V. Roth, 22.ii.1966, 3♀ (AMNH); *4 miles NW Loreto* [N26.0718°, W111.37567°], 27.i.1965, 2♀ (CAS 9060675); *8.1 miles off Highway 1 on main road to El Arco,* under rotting wood, J.V. Olmstead, 18.i.1974, 1♀ (AMNH); *Agua Verde Bay* [N25.50797°, W111.06777°], J.C. Chamberlin, 20.i.1921, 1♀ (CAS 9058477); *Cabo San Lucas* [N22.89053°, W109.91674°], J.P. Figg-Hoblyn, 16.iii.1953, 1♀ (AMNH); *Isla Las Galeras* [N25.74167°, W111.04444°], J.C. Chamberlin, 13.vi.1921, 2♀ 1 imm. (MCZ 145348); *Isla Natividad* [N27.86582°, W115.18002°], B. Osorio y Tafall, 2♀ 1 imm. (AMNH); 5–6.vi.1945, 6♀ (AMNH), 3♀ 4 imm. (AMNH); south end, V.F. Lee and D.C. Lightfoot, 12.vii.1983, 4♀ (CAS 9060682); *Isla San Ildefonso,* bird refuge, under rocks [N26.63222°, W111.43°], B. Firstman, 30.iii.1953, 1♀ (AMNH); *Isla Santa Cruz* [N25.27981°, W110.71818°], J.T. Doyen, 3.iv.1974, 1♀ (CAS 9057624); *Isla Santa Inés* [N27.03778°, W111.91167°], E.P. Van Duzee, 13.v.1921, 1♀ (MCZ 145350); *La Cumbre de Santa Martha,* under rocks, hand collecting [N25.45024°, W111.02884°], F. Cota, 14.iii.2003, 1♀ (CAECIB IFM-1567); *Mulegé* [N26.89222°, W111.98358°], V. Roth, 26.i.1965, 2♀ (CAS 9060681); *Punta Cabras,* NW of El Destiladero (N31.31328°, W116.42567°, 39m), R. Mercurio and M. Nishiguchi et al., 17.v.2004, 1♀ (AMNH); *San Ignacio* [N27.28207°, W112.89545°], 21.xii.1972, 1♀ (AMNH); xerophilic matorral (N27.29861°, W112.86667°), M.L. Jiménez, 8.xi.1994, 1♀ (CAECIB 1396). **Sonora:** *10 miles W Sonoyta* [N31.89566°, W112.95578°, 1200m], J. Doyen, 20.iii.1980, 1♀ (CAS 9057840); *25 miles W Sonoyta* [N31.71137°, W113.21709°], V. Roth, 28.xii.1960, 2♀ (AMNH); *5 km N San Carlos* [N29.08247°, W110.93297°], W. López, 14.x.1988, 1♀ (CNAN-Ar 8182); *Álamos* [N27.02549°, W108.94131°], C.M. Bogert, 1942, 1♀ (AMNH); *Desemboque* [N30.56833°, W113.00667°], B. Malkin, 1–10.ix.1953, 1♀ (AMNH); 15–31.vii.1935, only a♂ palp in a vial with 4 individuals of *K. arizonica* (AMNH); *Guaymas* [N27.91787°, W110.90893°], E.R. Van Dyke, 9.iv.1921, 2♀ (CAS 9057586); [N27.91787°, W110.90894°], E.P. Van Duzee, 9.vi.1921, 1♀ (MCZ 145345); J.C. Chamberlin, 12.iv.1921, 2♀ (MCZ 145357); 15.iv.1921, 2♀ (MCZ 145346), 1♀ (MCZ 145356); M. Cardenas, 15.

vii.1945, genitalia mounted on a slide, original specimen not seen, 1♀ (AMNH); on beach (N27.59°, W110.54°), J. and W. Ivie, 13.ix.1966, 5♀ (AMNH); under a rock [N27.91787°, W110.90894°], W. Shear, 3.iv.1964, 2♀ (AMNH); under stone, in web [N27.91787°, W110.90893°], 4.iv.1964, 1♀ (AMNH); under stones [N27.91787°, W110.90894°], 14. iv.1921, 4♀ (CAS 9060685); 15.iv.1921, 2♀ (AMNH), 1♀ (AMNH); Cañon Nacapule, under rocks (N28.01544°, W111.05736°, 168m), C. Palacios, 6.xii.2011, 3♀ (CAECIB IFM-1568); *Isla Patos* [N29.27177°, W112.46044°], B. Osorio y Tafall, 2.v.1944, 1♀ 2 imm. (AMNH); *Punta Peñasco* [N31.39151°, W113.49687°], Creighton, 15.vii.1950, 1♂ (AMNH); *San Pedro Bay* [N28.05867°, W111.24264°], J.C. Chamberlin, 7.vii.1921, 1♀ (MCZ 145359). **Uncertain locality:** *close to border with Arizona,* monument 179, V. Roth, 27.xii.1980, 1♂ (AMNH). **USA**: **Arizona:** *La Paz Co.*: Yuma, on wall at light [N33.64647°, W114.377°], D. Ubick, 14.viii.1981, 1♂ (DU 81.08.14); *Pima Co.*: N of Sasabe [N31.4887°, W111.54205°], S. and D. Mulaik, 1.i.1941, 1♀ (AMNH); *Yuma Co.*: [N32.69265°, W114.62769°], V. Roth, 25.vii.1958, 1♀ (AMNH); 3.v.1958, 1♂ (AMNH); Blaisdell, in soil cracks [N32.7125°, W114.42667°], 23.xii.1956, 2♀ (CAS 9060615); Central, near Sheep Tank Mine [N32.69265°, W114.62769°], 29.x.1958, with egg sac, 1♀ (AMNH); Fortuna Mine [N32.55172°, W114.33078°], 7.ii.1960, 1♀ (AMNH); nr. Castle Dome [N32.69037°, W114.6289°], 6.xi.1955, 2♀ (CAS 9057605). **California:** *Fresno Co.*: 4 miles W Coalinga [N36.13968°, W120.36015°], H.B. Leech, 28.viii.1952, 1♀ (CAS 9057610); *Imperial Co.*: 15 miles E Ocotillo [N32.77181°, W115.73792°], C.E. Griswold, iii.1973, eggs laid and hatched in captivity, 1♀ (UCB); 5 miles W Ogilby [N32.8664°, W114.90138°], V. Roth, 25.vii.1959, 1♂ (AMNH IFM-1596); 28.vii.1959, died in xii.1962, 1♀ (CAS 9060620); Calexico [N32.67895°, W115.49888°], E.J. Schlinger, 20.viii.1957, 1♀ (AMNH); Fish Springs, Salton Sea [N33.41667°, W116.05°], W. Ivie, 12. iii.1941, 2♀ (AMNH), 2♀ (AMNH); Imperial Valley [N32.73755°, W114.9633°], 9.ii.1969, 1♂ (AMNH); Mountain Springs [N32.67445°, W116.1056°], W. Ivie, 13.ix.1941, 1♀ (AMNH); Picacho [N33.0231°, W114.61107°], V. Roth, 9.x.1960, 1♀ (AMNH); Picacho Road, 4.8 miles N AA canal, ironwood, Palo Verde, creosote wash (N32.85866°, W114.64139°, 152m), M. Hedin, P. Paquin, S. Crews and J. Starrett, 3.xi.2001, 1♀ (SDSU G257); San Diego, Mountain Springs, near Desert View Tower [N32.65918°, W116.09985°], W.J. Gertsch, Ivie and Schrammel, 29.iii.1960, 1♀ (AMNH); *Inyo Co.*: Death Valley, Furnace Creek (N36.45°, W116.86667°), W. Ivie, 23.iii.1941, 1♀ (AMNH); Death Valley National Monument, Grapevine Ranger Station [N36.48185°, W117.07853°], H. Packard, 1.xii.1953, 1♂ (AMNH); Saline Range [N37.0141°, W117.78786°], D. Giuliani, 23.iv.1975, 1♀ (CAS 9060635); *Kern Co.*: 7 miles N Mojove, under bark [N35.14642°, W118.10797°], D. Ubick, 31.iii.1980, 1♀ (DU 80.03.31); Junction Staff, W.M. Pearce, 13.xi.1948, 1♀ (AMNH); *Kings Co.*: Avenal [N36.00412°, W120.12903°], 10.ii.1949, 2♀ (AMNH), 5♀ (AMNH); Milham city [N36.0081°, W119.96166°], E.G. Linsley and J.W. McSwain, 23. xi.1949, 1♀ (AMNH); *Los Angeles Co.*: [N34.05223°, W118.24366°], G. Grant, 1936, 1♀ (FMNH 2857684); 6.ii.1938, 1♀ (FMNH 2857667); [N34.05223°, W118.24369°], N. Banks, 1♀ (MCZ 145352); South of Palmdale (N34.533°, W118.1°), W. Ivie, 22.iii.1941, 1♀ (AMNH); *Riverside Co.*: Anza [N33.55512°, W116.67416°], Gertsch, Ivie and Schrammel, 28.iii.1960, subadult♀ (AMNH); California Highway 195 at US Highway 60 [N33.56881°, W116.09253°], collector illegible, 16.xii.1967, 1♀ 2 imm. (CAS 9060663); Dead Man's Canyon, W.M. Pearce, 3.v.1950, 1♀ (AMNH); Desert center, in hole in the ground [N33.71265°, W115.40035°], E.J. Schlinger, 21.ii.1958, 1♀ (AMNH); Magnesia Canyon [N33.7278°, W116.44251°], E.I. Schlinger, 21.iv.1951, 1♀ (AMNH); Palm Desert [N33.72225°, W116.37446°], V. Roth and W. Gertsch, 13.viii.1959, 1♀ (AMNH); Palm Springs [N33.8303°, W116.54529°], J.C. Chamberlin, 5.iv.1925, 1♀ (AMNH IFM-1544); P.H. Arnaud, 11.i.1954, 1♀ (CAS 9060661), 1 imm. (CAS 9060668); Salt Creek, NW of Salton Sea, under salt crust (N33.44847°, W115.84552°, 50m), S. Crews and M. Brandley, 9. iii.2003, 1♂ (SDSU); Salton Sea [N33.52671°, W116.07416°], W. Ivie, 12.iii.1941, 1♀ 1 imm. (AMNH); Fish Springs [N33.50843°, W115.91807°], W.J. and J.W. Gertsch, 30.vi.1958, 1♀ (AMNH); San Bernardino, 5 miles N Yucca Valley and Joshua Tree National Park [N33.93853°, W115.89328°], W.J. Gertsch, Ivie and Schrammel, 19.iv.1960, 1♀ 1 imm. (AMNH); *San Benito Co.*: Pinnacles National Monument, near Charlone Creek Campground [N36.49057°, W121.18249°], P.R. Craig, 20.vi.1969, 1♀ 1 imm. (CAS 9060658); *San Bernardino Co.*: 2 miles W Amboy Crater, off National Trails Highway (N34.64568°, W116.01107°, 448m), M. Brandley, S.

Crews, J. Starrett and P. Szewczyk, 10.xi.2001, 1♂ (SDSU G256); Cronese Valley, 16 miles SW Baher, in web under bridge [N35.09998°, W116.27335°], D. Ubick, 12.iv.1979, 1♀ (DU 79.04.12); Death Valley, Saratoga Springs [N35.68163°, W116.42364°], R. Schick, 23–24.iv.1955, 1♀ (AMNH); dry ground under metal sheet, male in female's web, 19.ii.1955, missing spermathecae, 1♂ 1♀ (AMNH); Fort Irwin, Bitter Springs [N35.26284°, W116.68464°], D. Ubick, 28.v.1997, 1♀ (CAS 9060666); Lake Arrowhead Mat. [N34.24834°, W117.18921°], V. Roth, 13.viii.1961, 1♀ (AMNH); Los Angeles, 6 miles W of San Bernardino, Highway 6 [N34.10835°, W117.28977°], H.W. Campbell, 17.xii.1961, 1♀ (CAS 9057580); Pisgah Crater [N34.74497°, W116.37537°], Norris and Heath, 25.xi.1961, 1♂ (AMNH IFM-1648), 1♂ (AMNH), 1♂ (AMNH), 1♀ (AMNH IFM-1659); 7.iv.1962, 1♀ (AMNH); 7.x.1961, 1♀ (AMNH); iii.1961, subadult♀ (AMNH); [N34.74528°, W116.37528°], 6.v.1961, 1♀ (AMNH); Twentynine Palms [N34.13556°, W116.05417°], J.H. Branch, 1–15.vii.1945, 2♂ (AMNH); *San Diego Co.*: 0.6 mile NE Hayden Springs, W of Ocotillo (N32.7122°, W116.1158°, 470m), 7–8.xi.2009, 1♂ (SDSU); under rock, M. Dietz, 7–8.xi.2009, 1♂ (SDSU); 16 miles E Julián [N33.13411°, W116.34096°], V. Roth, 1. ix.1956, 1♀ 1 imm. (AMNH); 2.5 miles N Lakeside [N32.85727°, W116.92225°], C. Parrish, 9.xii.1961, 1♀ (CAS 9057800); 5 miles E Jacumba [N32.61768°, W116.18742°, 914m], W.J. Gertsch, 26.iv.1961, 1♀ (AMNH); 5 miles W Vallecito [N32.96101°, W116.34685°], R.L. Aalbu, 23.ii.1974, 1♀ (CAS 9060665); Agua Caliente [N32.95051°, W116.30552°], D.P. Lowie, 25.vi.1958, 1♀ (AMNH); *Anza-Borrego Desert State Park* [N33.26022°, W116.43431°], J.A. Anderson, xi.1940, 1♀ (AMNH); [N33.26022°, W116.43431°], D. Merkel and V. Roth, 5.iv.1960, 1♀ (CAS 9060662); Borrego Valley, D.E. Merkel, 8.x.1957, 1♀ (AMNH); Indian George, 0.25 mile W mouth Torote Canyon, at night, in desert wash habitat (N32.86923°, W116.2374°, 350m), M. Hedin, 17.iii.2013, 1♂ (SDSU); Truckhaven trail [N33.26022°, W116.43431°], D.E. Merkel, 22.ii.1958, 1♀ (AMNH); Indian George Road, from Sweeny Pass Road/Imperial Highway, under stones and logs in open desert (N32.871°, W116.235°, 1100m), A. Schönhofer, 18–19.xii.2010, 1♀ (SMF); El Cajón [N32.79477°, W116.96253°], P. Smock, 4.v.1969, 4♀ 2 imm. (AMNH); La Mesa, 7576 Parkway, walking by plant (N32.7751°, W117.0337°, 150m), J. Weatherly, 20.x.2006, 1♂ (SDSU); Mountain Springs, 1 mile NW Desert View Tower [N32.67442°, W116.10838°], S.C. Johnson, 2.iv.1976, 1♀ (AMNH); Ocotillo Wells, under rock [N33.14238°, W116.1215°], D. Ubick, 9.iv.1979, 1♀ (CAS 9060462); Scissors Crossing, under rocks on hillside [N33.09643°, W116.47529°], C. Parrish, 19.x.1964, 1♀ (CAS 9060667). **Nevada:** *Nye Co.*: Mercury, Nevada Test Site [N36.66051°, W115.99448°], 10. iv.1961, 1♂ (AMNH), 1♂ (AMNH); 12.v.1960, 1♀ (AMNH IFM-1553); 13.iv.1961, 1♂ (AMNH); 16. iii.1961, 1♂ (AMNH); 22.v.1961, 1♂ (AMNH); 27. iii.1961, 1♂ (AMNH), 1♂ (AMNH IFM-1200); 3.iv.1961, 1♂ (AMNH); 4.v.1961, 1♂ (AMNH); *Washoe Co.*: Reno (N39.533°, W119.8°), U.N. Lar, 9.x.1939, 2♀ 1 imm. (AMNH). **Utah:** *Emery Co.*: Ferron [N39.09358°, W111.13323°], H.A. Rasmussen, 13.iv.1933, paratype of *K. utahana*, 1♀ 1 imm. (AMNH); *Grand Co.*: Elgin, burrow in soil, sage brush area [N38.98803°, W110.14541°], H.B. Leech, 2.viii.1964, 1♀ (CAS 9053494); *Washington Co.*: St. George (N37.11667°, W113.58333°), W. Ivie, 12. vi.1934, 1♀ (AMNH IFM-1641).

Kukulcania brignolii **(Alayón, 1981)**, comb. nov.

Figures 2F, 4B, 5D, 8A, 31B, 57–60

Filistata brignolii Alayón, 1981: 2, figs. 1–2. Male holotype from Mexico, Oaxaca (MCVR), examined.

Examined type material: Holotype: **Mexico**. **Oaxaca:** *Monte Albán* [N17.0438°, W96.76811°], P. Brignoli, 7.viii.1973, 1♂ (MCVR).

Remarks: Alayón (1981) described this species under *Filistata* stating that Lehtinen's (1967) decision to erect *Kukulcania* for New World filistatines was not well justified and that additional studies on the phylogenetic relationships of the family were necessary. He did not explicitly state his reasons to doubt the validity of *Kukulcania*. The possession of sclerotized bars in the spermathecae of *K. brignolii* is a character so far recorded only in *Kukulcania,* indicating this species belongs here and not in *Filistata.* Hence, a new combination is proposed. With this transfer, all American species once placed in *Filistata* have

been accommodated in New World genera. In the years before the publication of Alayón's (1981) work, W.J. Gertsch recognized this species under the manuscript name "*Filistata tehuana*."

Diagnosis: Males are similar to those of *K. mexicana* and *K. santosi* in having incrassate, strong setae in the prolateral border of the cymbium. They differ in having a short, uncoiled embolus (long, two coils in *K. mexicana*) and by the simple apex of the incrassate setae on the cymbium (fig. 58) (spatulate in *K. santosi*). Females are similar to *K. mexicana* in having long, curved sclerotized bars that do not taper posteriorly, and spermathecae that project anteriorly to the margin of the uterus externus. *K. brignolii* might be distinguished by the smaller glandular portion of the spermathecae apex, which is placed ventrally to the membranous portion (larger, ectally placed glandular portion in *K. mexicana*), and by the usually less bent sclerotized bars (fig. 60).

Description: Male holotype from Monte Albán, Oaxaca, Mexico (MCVR). Coloration yellowish cream. Carapace finely stippled with light brown. Abdomen dorsum light brown around cardiac area and in posterior end. Clypeus short. Sternum oval, with two pairs of sigillae. Total length 7.45. Carapace length 3.36, width 2.81, clypeus length 0.27. Eye diameters and interdistances: AME 0.15; PME 0.214; ALE 0.249; PLE 0.235; AME–AME 0.074; PME–PME 0.233. Sternum length 1.54, width 1.62. Palp: femur length 4.33, height 0.54; tibia length 4.43, height 0.64. Leg I: femur (fe) 7.21; patella (pa) 1.43; tibia (ti) 7.29; metatarsus (mt) 8.37; tarsus (ta) 4.11. II: fe 5.68; pa 1.32; ti 5.11; mt 5.84; ta 2.5. III: fe 4.67; pa 1.11; ti 4.36; mt 5.67; ta 3.64. IV: fe 6.39; pa 1.4; ti 6.2; mt 7.72; ta 3.42. Abdomen: length 4.33, width 2.1. Palp macrosetae long, in several rows along femur ventral face. Leg macrosetae: fe I 1d, 15p, 4v, 8r; ti I 4p, 7v; mt I 1p, 14v, 1r; ta I 7v; fe II 4d, 6p, 5v, 4r; ti II 2p, 6v; mt II 3p, 12v, 3r; ta II 9v; fe III 5d, 5p, 12v, 1r; ti III 1d, 3p, 4v, 3r; mt III 1d, 2p, 16v, 2r; ta III 11v; fe IV 5d, 3p, 6v, 3r; ti IV 1p, 2v, 2r; mt IV 2p, 15v, 2r; ta IV 11v. Palp: cymbium long, with prolateral edge slightly protruding and bearing a forelock of incrassate setae; bulb short, piriform; sperm duct with three tightly packed coils; embolus short, pointing dorsally, with a small keel near the base. State of the specimen: well preserved but very fragile, left leg I broken from the base of the femur, left leg II loose, left palp dissected, missing some of the prolateral thick setae.

Female from Monte Albán, Oaxaca, Mexico (AMNH IFM-1637). Coloration dark yellowish brown. Carapace stippled with dark brown. Sternum and first femora and tibiae hirsute, with long setae. Legs brown, except for yellowish-brown metatarsi and tarsi, coxae with lighter, longitudinal markings. Abdomen dorsum brown. Anterior margin of the carapace unmodified. Sternum oval, with two pairs of sigillae. Total length 10.29. Carapace length 4.55, width 3.34, clypeus length 0.64. Eye diameters and interdistances: AME 0.142; PME 0.252; ALE 0.302; PLE 0.327; AME–AME 0.114; PME–PME 0.28. Sternum length 1.98, width 2.01. Palp: femur length 2.56, height 0.89; tibia length 1.4, height 0.75. Leg I: femur (fe) 5.05; patella (pa) 1.72; tibia (ti) 4.9; metatarsus (mt) 4.34; tarsus (ta) 2.1. II: fe 4.06; pa 1.65; ti 3.45; mt 3.16; ta 1.76. III: fe 3.21; pa 1.37; ti 2.62; mt 2.81; ta 1.58. IV: fe 4.55; pa 1.5; ti 3.96; mt 3.68; ta 1.73. Abdomen: length 5.88, width 3.59. Palp macrosetae on ventral surface of tibia and tarsus. Leg macrosetae present on ventral surfaces of tibiae, metatarsi and tarsi; femora with 2–4 dorsal macrosetae. Calamistrum with three rows with 7–10 setae each. Interpulmonary fold large, rounded, covering the spermathecae dorsally. Sclerotized lateral bars present, elongate, slightly curved, positioned posteriorly to receptacles; membranous portion of the spermathecae apex subrounded; glandular portion positioned ventrally to the membranous portion. State of the specimen: good, many setae missing, right legs I and II missing from tibia, genitalia dissected.

Intraspecific variation: Males ($N = 2$): total length 7.45–8.34 (7.9), carapace length

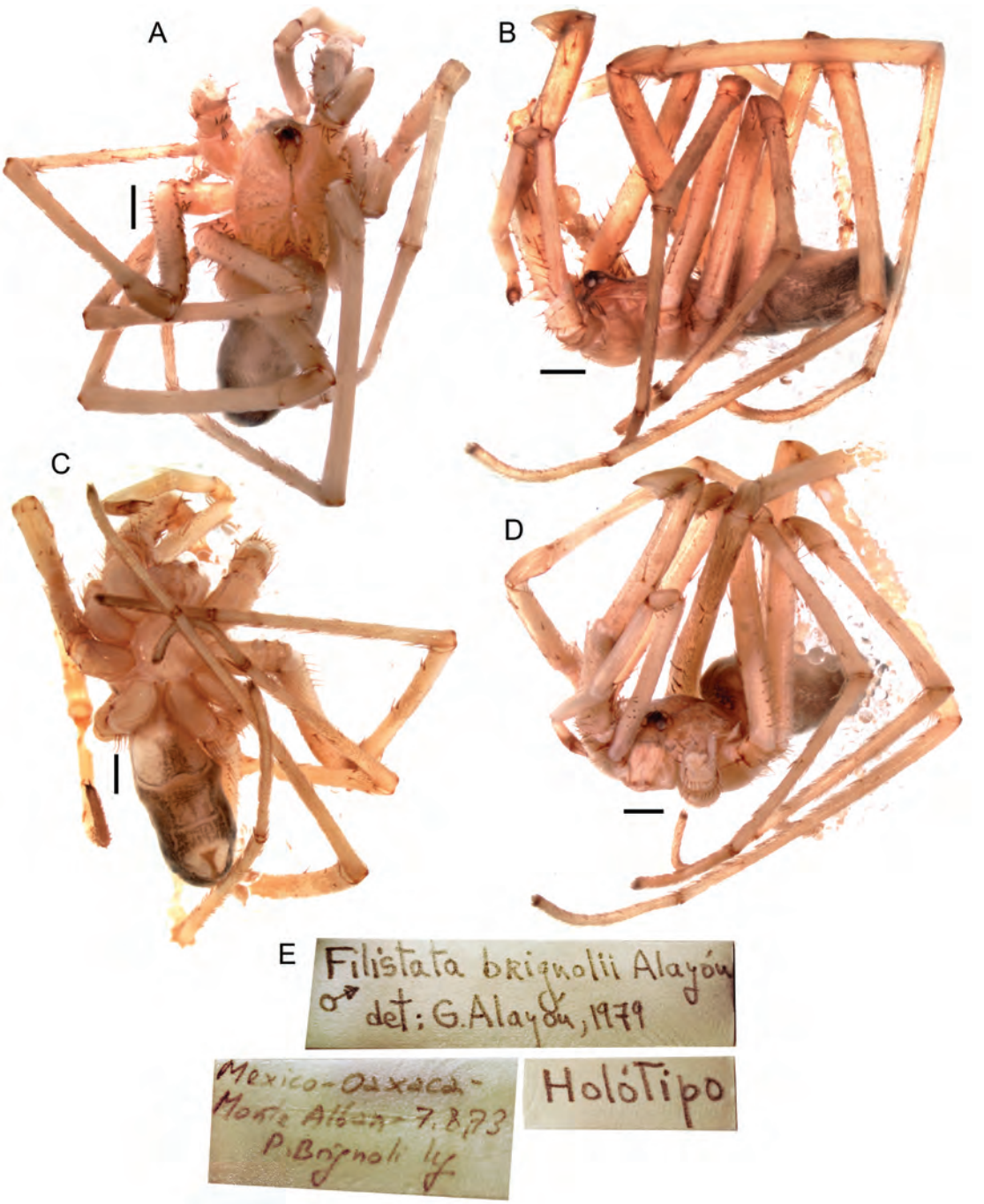

FIGURE 57. *Kukulcania brignolii* (Alayón, 1981), comb. nov., male holotype from Mexico, Oaxaca, Monte Albán (MCVR), habitus. **A.** Dorsal. **B.** Lateral. **C.** Ventral. **D.** Subanterior. **E.** Labels associated to the holotype. Scale bars = 1 mm.

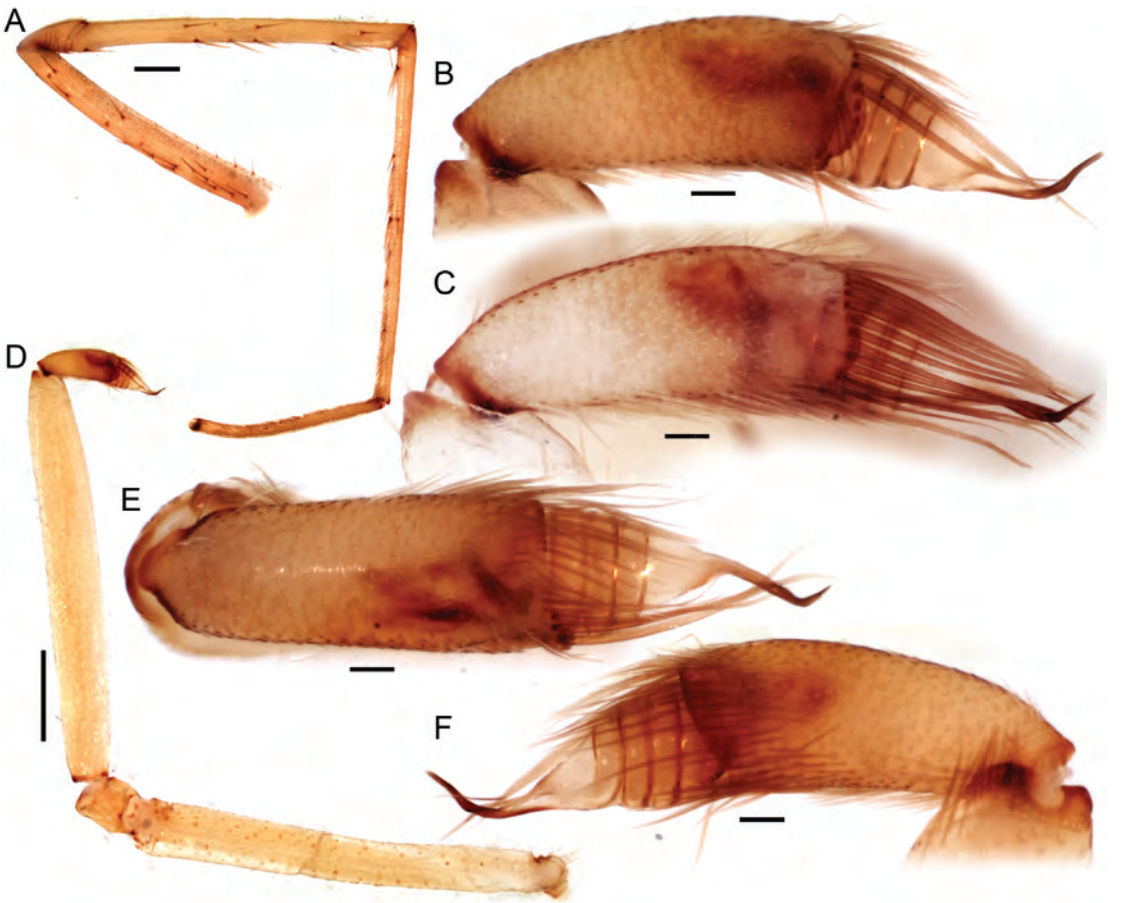

FIGURE 58. *Kukulcania brignolii* (Alayón, 1981), comb. nov., male holotype from Mexico, Oaxaca, Monte Albán (MCVR), leg I and genitalia. **A.** Left leg I, prolateral. **B.** Left bulb, prolateral. **C.** Right bulb, prolateral, mirrored. **D.** Left palp, prolateral. **E.** Left bulb, dorsal. **F.** Left bulb, retrolateral. Scale bars = 1 mm (A–B), 0.1 mm (C–F).

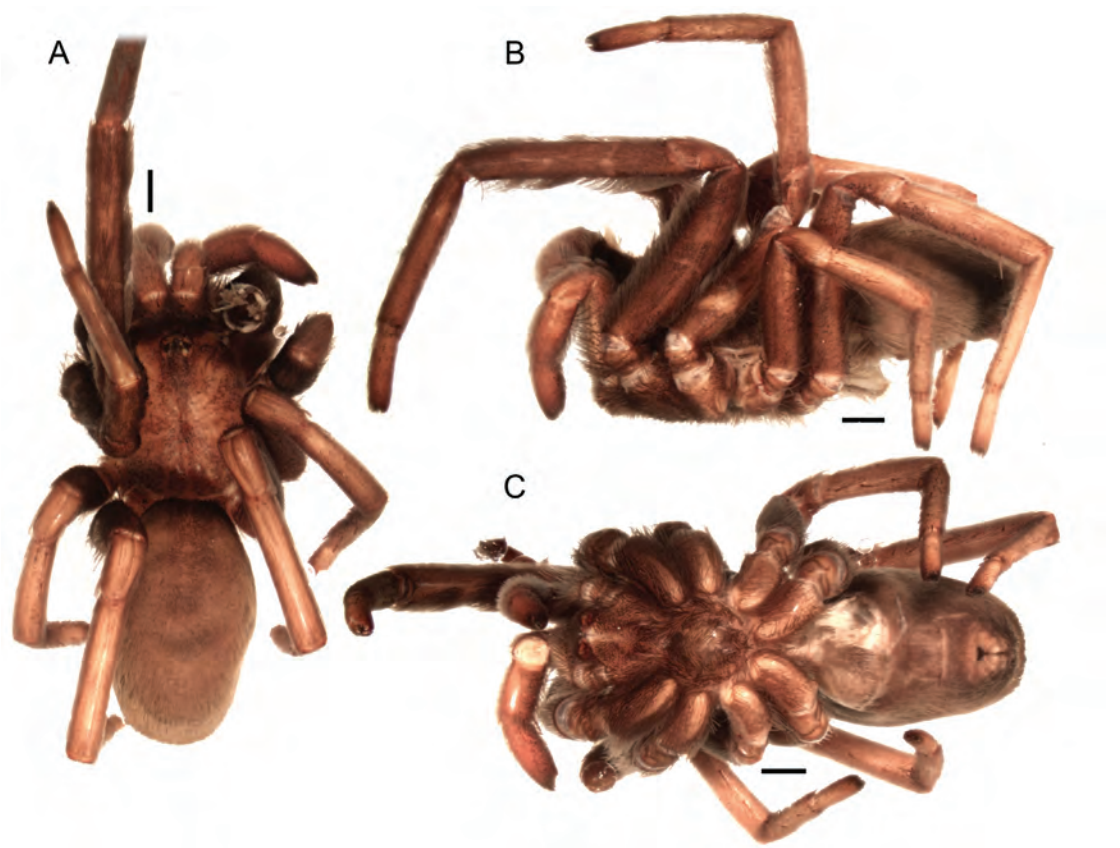

FIGURE 59. *Kukulcania brignolii* (Alayón, 1981), comb. nov., female from Mexico, Oaxaca, Monte Albán (AMNH IFM-1637), habitus. **A.** Dorsal. **B.** Lateral. **C.** Ventral. Scale bars = 1 mm.

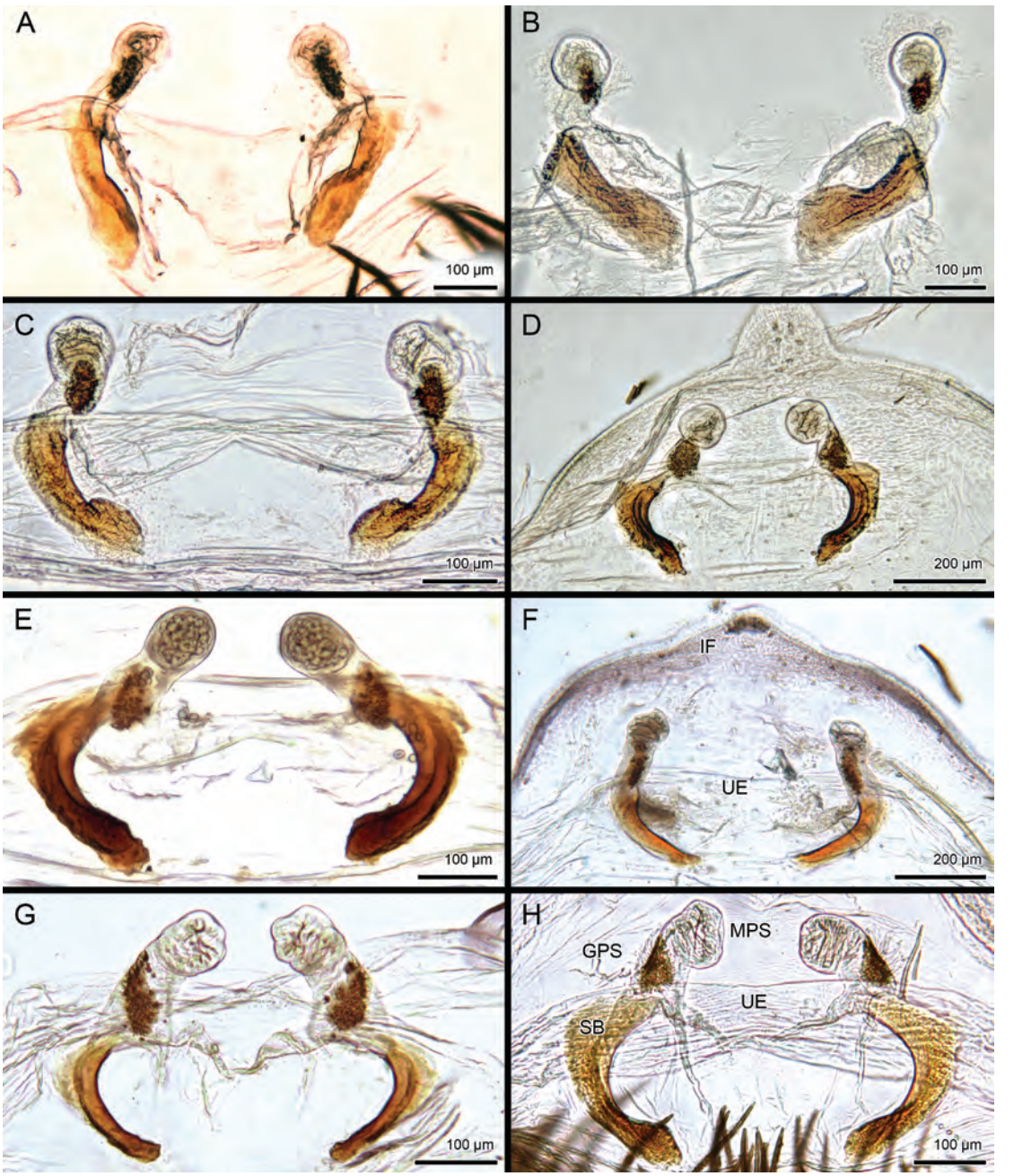

FIGURE 60. *Kukulcania brignolii* (Alayón, 1981), comb. nov., female spermathecae, ventral. **A.** Oaxaca, Monte Albán (AMNH IFM-1637). **B.** Puebla, Tehuacán (AMNH-1524). **C.** Puebla, Tehuacán (AMNH-1525). **D.** Oaxaca, carretera Ixtlán-Oaxaca (CNAN-Ar 6635). **E.** Puebla, 12 miles N Acatlán (AMNH IFM-1569). **F.** Oaxaca, 7.4 miles N of Telixtlahuaca (CAS 9057632). **G.** Puebla, 62 km west of of Orizaba (AMNH IFM-1573). **H.** Sierra Mixteca(?) (MfN). Abbreviations: **GPS,** glandular portion of spermathecae apex; **IF,** interpulmonary fold; **MPS,** membranous portion of spermathecae apex; **SB,** sclerotized bars; **UE,** uterus externus.

3.36–3.71 (3.54), femur I length 7.21–7.46 (7.34), tibia I length 6.98–7.29 (7.14), femur/carapace ratio 2.01–2.15 (2.08). Females (N = 5): total length 10.29–12.77 (12.14), carapace length 4.55–5.6 (5.08), femur I length 5.05–6.34 (5.85), tibia I length 4.9–6.08 (5.6), femur/carapace ratio 1.11–1.26 (1.15). The shape of the female genitalia is variable, especially the shape of the sclerotized bars (fig. 60), and some specimens are somewhat intermediate with the morphology found in *K. mexicana*, sp. nov., although these have been collected in areas with males or females with typical morphology (fig. 60H).

Natural history: Label data indicate this species has been collected under stones, on rocky slopes and in pine-oak forests.

Distribution: Mexico, in Estado de México, Oaxaca, Puebla and Veracruz (fig. 4B).

Additional material examined: **Mexico. Estado de México:** *Pyramids of San Juán Teotihuacán* [N19.69227°, W98.8435°], Bentzien, 15.ix.1977, 3♀ 3 imm. (UCB). **Oaxaca:** no further data [N17.0438°, W96.76811°], R. Greenfield, v–vi.1938, 2♀ (USNM); [N17.05942°, W96.72162°, 1534m], C. and P. Vaurie, 17.vii.1955, 1♀ (AMNH); [N17.05942°, W96.72162°], 6.ii.1939, 1♀ 1 imm. (AMNH); R.V. Chamberlin, 6.ii.1939, 2♀ (AMNH); *10 miles E Oaxaca* [N17.00505°, W96.54714°], J. Reddell and J. Fish, 15.viii.1967, 3♀ 4 imm. (AMNH); *10 miles S Tomellín* [N17.62498°, W96.91975°], J. Reddell, J. Fish and T. Evans, 14.viii.1967, 1♀ 2 imm. (AMNH); *28 km S Nochixtlán* [N17.2261°, W96.87526°], S.A. Stockwell, 11.viii.1988, 1♀ 1 imm. (AMNH); *3.7 km N El Moral,* under stones (N17.50223°, W96.93485°, 2050m), L. Prendini, O. Francke, E. Gonzaléz and J. Ponce, 23.vii.2002, 5♀ (AMNH); *5 miles NE Mitla,* near "El Crucero" ruins [N16.9379°, W96.28138°, 2073–2195m], M.R. Bogert, G. Sluder and N. Bucknall, 27.viii.1963, 1♀ 1 imm. (AMNH); *5.8 miles N Teotitlán,* off Mex-131 [N17.03016°, W96.52073°], L.R. Erickson and M.E. Soleglad, 31.vii.1973, 2♀ (AMNH); *7.4 miles N of Telixtlahuaca* [N17.34993°, W96.89013°, 1800m], V.F. Lee, 16.xi.1987, 1♀ (CAS 9057632); *8 km NE El Punto* [N17.30739°, W96.55186°, 2134m], S.A. Stockwell, 16.viii.1988, 1♀ (AMNH); *9 km N de San Lorenzo Mixtepec* (N16.17521°, W96.1983°, 1925m), O. Francke et al., 23.vi.2006, 1♀ (CNAN-Ar 8181); *Disto. De Ejutla,* 1.5 km W San Andres Zabache, on rocky slope [N16.59905°, W96.85799°, 1539m], C.M. Bogert, 15.viii.1970, 1♀ (AMNH); *El Catrín* (N17.21°, W96.57°), J. and W. Ivie, 3.ix.1964, 2♀ 3 imm. (AMNH); *Etla,* 2 miles N of El Moral, in pine-oak forest [N17.47762°, W96.93724°], C.M. Bogert, 10.ix.1966, 1♀ (AMNH); *Guelatao* [N17.31763°, W96.49114°], M.R. Bogert, viii.1962, 1♀ (AMNH); *Km 171 carretera Ixtlán-Oaxaca* (N17.29725°, W96.54295°, 2006m), H. Montaña, 16.iii.2008, 1♀ (CNAN-Ar 6635); *Monte Albán* [N17.0438°, W96.76811°], 11.xii.1948, 2♀ 1 imm. (AMNH); E.S. Ross, 11.xii.1948, 1♀ (AMNH IFM-1637); *NE slope of Cerro San Felipe* [N17.09253°, W96.74474°, 2499–2743m], M.R. Bogert, 6.viii.1961, 1♀ (AMNH); *Nochixtlán* (N17.27°, W97.14°), J. and W. Ivie, 4.ix.1963, 2♀ (AMNH); *Oaxaca* [N17.05942°, W96.72162°], 1♂ (AMNH); B. Malkin, 13–20.ix.1947, 1♀ (AMNH); *Sierra Mixteca* [N17.0438°, W96.76811°], C.A. Purpus, 1♀ 3 imm. (ZMB IFM-0826). **Puebla:** *12 miles N Acatlán* [N18.38001°, W98.05422°], L.I. and A.M. Davis, 3.vii.1947, 1♀ 1 imm. (AMNH IFM-1569); *5 miles N Tehuacán* (N19.35°, W97.24°), J. and W. Ivie, 3.viii.1966, 2♀ 2 imm. (AMNH); *62 km W Orizaba,* under rocks [N18.72052°, W97.68412°], G. Dingerkus et al., 11.viii.1975, 2♀ (AMNH IFM-1573); *7 miles NE Tehuacán,* ground, dry rocky slope [N19.35°, W97.24°], W. Peck, 7.iv.1967, 1♀ (CAS 9060623); *Cacaloapán,* 0.5 mile west on highway 50 [N18.57893°, W97.58413°], R.M. Schick and D. Schroeder, 25.vii.1965, 1♀ (AMNH); *Tehuacán* [N18.46586°, W97.40005°], D.M. Bogert and H.E. Vokes, 8.xi.1939, missing spermathecae, 1♀ 1 imm. (AMNH IFM-1525); H. Wagner, 17–24.x.1944, 10♀ 1 imm. (AMNH IFM-1406); [N18.46651°, W97.40038°], W.J. Gertsch and V. Roth, 24.vii.1956, 1♂ 1♀ 2 imm. (AMNH); *Tlacotepec* [N18.68163°, W97.64832°], V. Roth and W. Gertsch, 24.vii.1956, 7♀ 8 imm. (AMNH); *toll road 21 km N Tehuacán,* under rocks (N18.64475°, W97.45636°, 2249m), W.G. Villegas, O. Francke and R. Paredes, 31.xi.2004, 2♀ (AMNH). **Veracruz:** *15.5 miles W Orizaba,* off Mex-150 [N18.71566°, W97.30777°], L.R. Erickson and M.E. Soleglad, 30.vii.1973, 1♀ (AMNH); *2 miles NE Acultzingo,* J.A. Beatty, 4.vii.1963, 1♀ 5 imm. (AMNH); *Veracruz* [N19.17377°, W96.13422°], O'Rourke, iii.1968, 2♀ (AMNH). **Uncertain locality:** label illegible, C.A. Purpus, 1♀ (ZMB).

Kukulcania mexicana, sp. nov.

Figures 4C, 8N, 31C, 61–64

Type material: holotype: **Querétaro:** *Piñal de Amoles,* Campamento El Jabalí, 4 km E Bucarelli (N21.03381°, W99.5906°, 1646m), 14.xi.2009, 1♂ (CNAN-Ar DNA-0047). Paratypes: **Mexico. Distrito Federal:** no further data [N19.43261°, W99.13321°], 1♂ (AMNH); *Ciudad de México,* M. Forman, 1♀ (CAS 9060647). **Guanajuato:** *10 miles E Guanajuato* [N21.09547°, W101.13056°], C.E. Griswold & R.R. Jackson, 15.ix.1976, 1♀ (UCB). **Hidalgo:** *1 mile E Zimapán* [N20.7386°, W99.38118°], J.A. Beatty, 24.vi.1963, 1♀ 1 imm. (AMNH); *2 miles SW Jacala* (N20.59°, W99.13°), J. and W. Ivie, 18.viii.1964, 1♂ 1♀ 5 imm. (AMNH IFM-1651, IFM-1640); *3 km N Huautla* (N20.71818°, W98.837°, 1625m), O. Francke et al., 28.iv.2006, 1♀ (CNAN-Ar 8185); *4 miles N of Tizayuca* [N19.88271°, W98.94487°], E.S. Ross, 20.xi.1946, 1♀ (CAS 9057576); *Cardonal,* 2 km N Pinalito (N20.67133°, W99.1043°, 2301m), 16.x.2009, 1♀ (CNAN-Ar DNA-0043); *El Tablón* 7 miles SE Zimapan (N20.4°, W99.2°), J. and W. Ivie, 19.viii.1964, 1♂ 1♀ 2 imm. (AMNH IFM-1642).

Remarks: W.J. Gertsch identified this species under the manuscript name "*Filistata azteca*."

Etymology: The name is an adjective in reference to Mexico, the only country where this species can be found.

Diagnosis: Males are similar to those of *K. brignolii* and *K. santosi* in having incrassate, strong setae in the prolateral border of the cymbium. They differ in having a long embolus with two coils (short, uncoiled in *K. brignolii*) and by the simple apex of the incrassate setae in the cymbium (fig. 62) (spatulate in *K. santosi*). They also have much longer macrosetae in the ventral faces of femur I (fig. 61C). Females are similar to *K. brignolii* in having long, curved sclerotized bars that do not taper posteriorly, and spermathecae that project anteriorly to the margin of the uterus externus. *K. mexicana* might be distinguished by the larger glandular portion of the spermathecae apex which is placed ectally to the membranous portion (smaller, ventrally placed glandular portion in *K. brignolii*), and by the usually more bent sclerotized bars (fig. 64).

Description: Male holotype from Piñal de Amoles, Querétaro, Mexico (CNAN-DNA-Ara 0047). Coloration yellowish cream. Carapace very lightly stippled with light brown. Sternum yellowish light brown, with white markings. Abdomen dorsum grayish yellow. Clypeus short. Sternum oval, with two pairs of sigillae. Total length 7.39. Carapace length 3.37, width 2.84, clypeus length 0.19. Eye diameters and interdistances: AME 0.157; PME 0.208; ALE 0.24; PLE 0.23; AME–AME 0.053; PME–PME 0.207. Sternum length 1.56, width 1.57. Palp: femur length 4.14, height 0.5; tibia length 3.75, height 0.587. Leg I: femur (fe) 6.76; patella (pa) 1.58; tibia (ti) missing from tibia. II: fe 5.56; pa 1.41; missing from tibia. III: fe 5.07; pa 1.31; ti 4.34; mt 5.37; ta 3.23. IV: fe 6.55; pa 1.5; ti 6.3; mt 7.92; ta 4.26. Abdomen: length 4.03, width 1.72. Palp macrosetae long, in several rows along femur ventral face. Leg macrosetae (counts from tibia, metatarsus and tarsus I and II from specimen AMNH IFM-1651): fe I 6d, p11, 16v, 9r, all very long; ti I d3, 7p, 11v, 1r; mt I 3d, 64p, 16v, 1r; ta I 13v; fe II 5d, 6p, 12v, 7r; ti II 1d, 2p, 8v; mt II 3d, 9p, 12v, 2r; ta II 9v; fe III 6d, 3p, 12v, 2r; ti III 3d, 4p, 4v, 3r; mt III 4d, 5p, 10v, 4r; ta III 11v; fe IV 9d, 2p, 20v, 1r; ti IV 4d, 3p, 6v, 3r; mt IV 4d, 5p, 14v, 2r; ta IV 12v. Palp: cymbium long, with strong, incrassate setae on both prolateral and retrolateral faces; bulb short; sperm duct with at least three coils; embolus long, with two coils, thick at apex. State of the specimen: good, left palp dissected, both legs I missing from tibia, right leg II set apart for DNA extraction, right legs III and IV disarticulated from tibia.

Female paratype from Cardonal, Hidalgo, Mexico (CNAN-DNA-Ara 0043). Coloration very dark, reddish brown. Carapace brown, stippled on median area and lateral borders with dark brown. Sternum and first femora and tibiae hirsute, with long setae. Leg coxae and femora with longitudinal brown stripes. Anterior margin of the carapace unmodified.

FIGURE 61. *Kukulcania mexicana*, males, habitus. **A–D.** Holotype from Mexico, Querétaro, Piñal de Amoles (CNAN-Ar DNA0047). **A.** Dorsal**. B.** Ventral. **C.** Left femur I, retrolateral. **D.** Lateral. **E.** Male from Coahuila, San Pedro (AMNH IFM-1552), subanterior. **F.** Paratype from Hidalgo, 2 miles southwest of Jacala (AMNH IFM-1651), left legs I–II, prolateral. Scale bars = 1 mm.

FIGURE 62. *Kukulcania mexicana*, left male palps. **A–D.** Holotype from Mexico, Querétaro, Piñal de Amoles (CNAN-Ar DNA0047). **A–B.** Prolateral. **C.** Dorsal. **D.** Retrolateral. **E.** Paratype from Hidalgo, 2 miles SW Jacala (AMNH IFM-1651), prolateral. **F.** Male from Oaxaca, 8 miles N Miahuatlán (AMNH IFM-1591), prolateral. **G–H.** Male from Coahuila, San Pedro (AMNH IFM-1552). **G.** Prolateral. **H.** Retrolateral. Scale bars = 0.2 mm except for A, 1 mm.

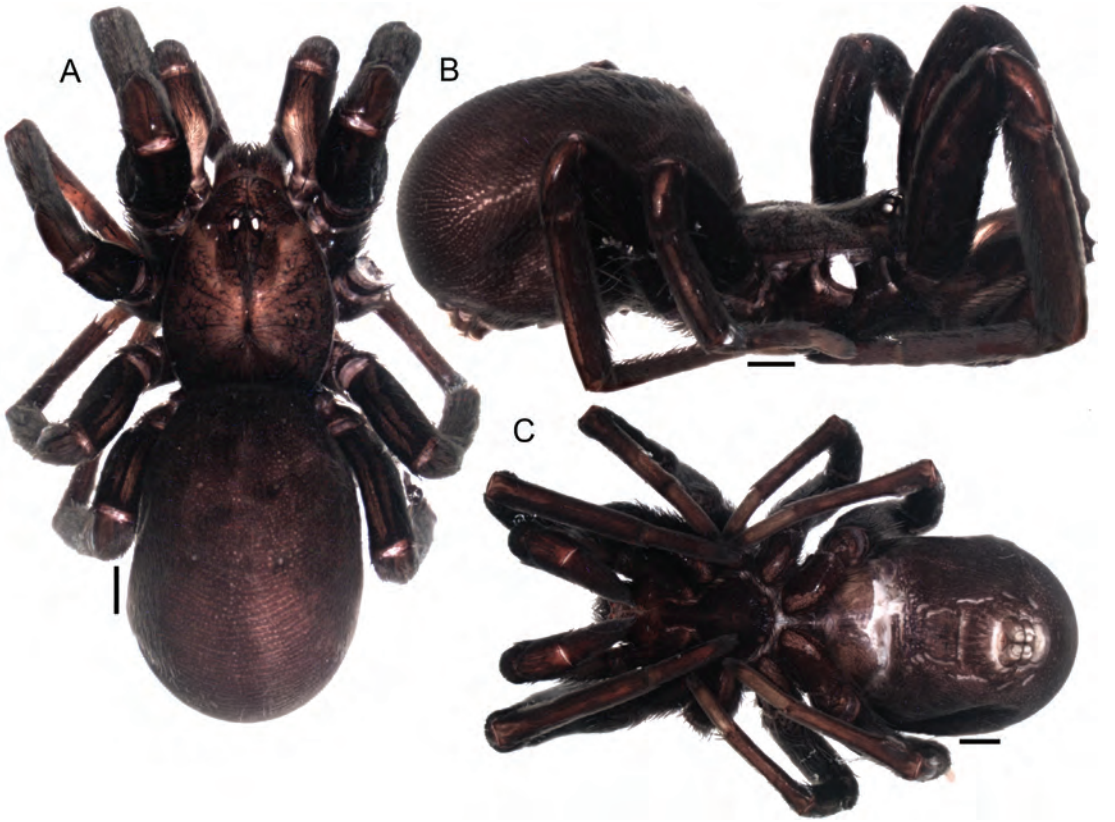

FIGURE 63. *Kukulcania mexicana*, female paratype from Mexico, Hidalgo, Cardonal (CNAN-Ar DNA0043), habitus. **A.** Dorsal. **B.** Lateral. **C.** Ventral. Scale bars = 1 mm.

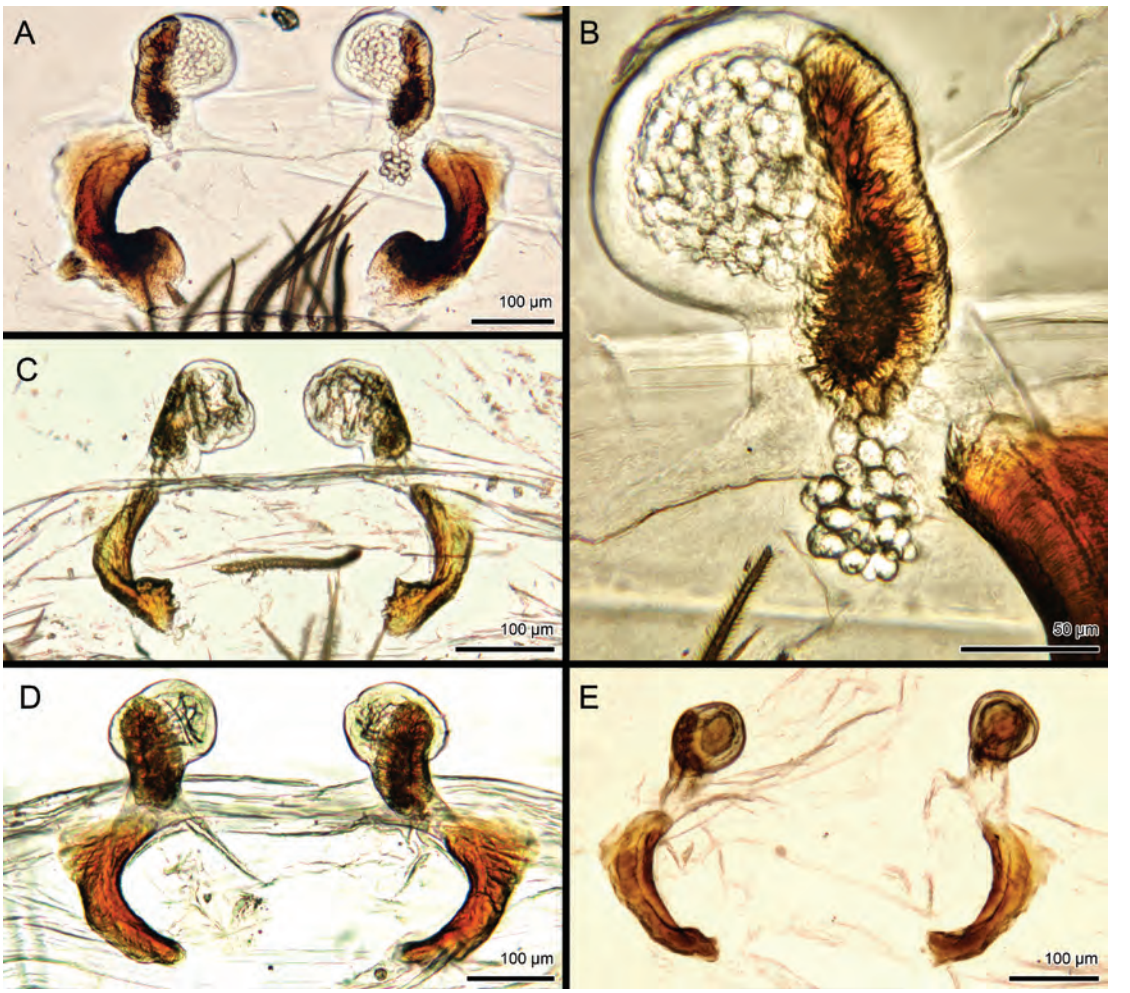

FIGURE 64. *Kukulcania mexicana*, female spermathecae, ventral. **A–B.** Paratype from Mexico, Hidalgo, Cardonal (CNAN-Ar DNA0043). **C.** Paratype from Hidalgo, El Tablón (AMNH IFM-1642). **D.** Hidalgo, 2 miles NE Tizayuca (AMNH IFM-1572). **E.** Paratype from Hidalgo, 2 miles SW Jacala (AMNH IFM-1640).

Sternum oval, with two pairs of sigillae. Total length 11.39. Carapace length 4.79, width 3.59, clypeus length 0.74. Eye diameters and interdistances: AME 0.138; PME 0.233; ALE 0.338; PLE 0.263; AME–AME 0.095; PME–PME 0.271. Sternum length 1.94, width 2.07. Palp: femur length 2.62, height 1.06; tibia length 1.57, height 0.89. Leg I: femur (fe) 5; patella (pa) 1.77; tibia (ti) 4.55; metatarsus (mt) 4.05; tarsus (ta) 2.21. II: fe 3.97; pa 1.59; ti 3.26; mt 3.18; ta 1.72. III: fe 3.34; pa 1.52; ti 2.72; mt 2.59; ta 1.46. IV: fe 4.48; pa 1.58; ti 3.82; mt 3.55; ta 1.66. Abdomen: length 7.1, width 4.74. Palp macrosetae on ventral surface of tibia and tarsus. Leg macrosetae present on ventral surfaces of tibiae, metatarsi, and tarsi; femora with one dorsal macroseta on basal third. Interpulmonary fold large, rounded, covering the spermathecae dorsally. Sclerotized lateral bars present, strong, curved, posteriorly blunt; membranous portion of the spermathecae apex subrounded; glandular portion positioned ectally to the membranous part. State of the specimen: good, genitalia dissected, right leg II set apart for DNA extraction.

Intra specific var iatio n: Males (N = 4): total length 6.78–7.39 (7.07), carapace length 2.99–3.37 (3.16), femur I length 5.72–7.02 (6.59), tibia I length 5.31–7.62 (6.55), femur/carapace ratio 1.84–2.35 (2.09). Females (N = 5): total length 7.4–14.06 (10.22), carapace length 3.41–6.16 (4.38), femur I length 3.67–5.98 (4.44), tibia I length 3.52–5.2 (4.12), femur/carapace ratio 0.96–1.13 (1.02). Most males have incrassate setae on both sides of the cymbium, while the male from Coahuila has them only on the prolateral side (fig. 62G–H); it also has fewer macrosetae on the legs than males in other populations and has both emboli broken; therefore we cannot dismiss the possibility that it could belong to another species. The shape of the female genitalia is variable, especially the sclerotized bars (fig. 64).

Natural his t or y: Unknown; specimens in collections have no natural history data associated with their labels.

Distr ibutio n: Central Mexico, with a doubtful record from Coahuila (see comment on intraspecific variation above) (fig. 4C).

Additio nal mater ial examined: **Mexic o**. **Coahuila:** *San Pedro* [N25.75721°, W102.98386°], W.J. Gertsch, 20.viii.1947, 1♂ 1 imm. (AMNH IFM-1552). **Distrito Federal:** [N19.43261°, W99.13321°], D.L. Frizzell and H. Exline-Frizzell, ix.1943, 1♀ (MCZ 69198); R.H. Crandall, 28. xii.1940, 1♀ 1 imm. (AMNH); *Cuicuilco* [N19.37659°, W99.15098°], B. Malkin, 12. viii.1955, 1♀ (AMNH); *San Angel* [N19.34652°, W99.19129°], C.J. Goodnight, 13.viii.1946, missing spermathecae, 1♂ 1♀ 1 imm. (AMNH); *San Jerónimo* [N19.25067°, W99.09098°], J.C. and D.L. Pallister, 1.vii.1946, 1♀ (AMNH). **Guanajuato:** *0.5 miles S of San Luis Potosí border,* off highway 57 [N21.57421°, W100.75341°], W.D. Sissom, 24.viii.1984, 1♀ (AMNH); *36 km N San Luis de La Paz* (N21.56944°, W100.75194°, 1870m), L. Prendini, O. Francke, E. Gonzaléz and J. Soriano, 27.vii.2002, 1♀ (AMNH). **Hidalgo:** *11.7 miles S Metzquititlán,* off Mex-105 [N20.43028°, W98.68444°], L.K. Erickson and M.E. Soleglad, 5.viii.1973, 1♀ (AMNH); *18 miles E Huichapán* [N20.43332°, W99.41546°], W.D. Sissom, C. Myers and L. Born, 25.viii.1984, 1♀ (AMNH); *2 miles NE Tizayuca* (N19.58°, W98.51°), W.J. Gertsch and W. Ivie, 22.iv.1963, 1♀ (AMNH IFM-1572); *5 miles N Zimapan* [N20.80322°, W99.38503°], E.S. Ross, 21.xi.1946, 2♀ 1 imm. (AMNH IFM-1643); *5 miles S Zimapan* [N20.6665°, W99.38063°], V. Roth and W. Gertsch, 20.vii.1956, with two egg sacs, 5♀ 6 imm. (AMNH IFM-1405); *5 miles SW Jacala* [N20.57°, W99.14°], W.J. Gertsch and W. Ivie, 21.iv.1963, 1♀ (AMNH); *Jacala* (N21.01°, W99.12°), 20.iv.1963, 2♀ 1 imm. (AMNH); *Taxquillo* (*Tzindejeh),* Río Tula (N20.33°, W99.19°), J. and W. Ivie, 20.viii.1964, 1♀ (AMNH); *Tlalpam* [N19.29154°, W99.1719°], H. Wagner, 20.vii.1947, 1♀ 3 imm. (AMNH). **Oaxaca:** *8 miles N Miahuatlán* [N16.40419°, W96.66479°], C.M. Bogert, 5. ix.1962, 1♂ (AMNH IFM-1591). **Querétaro:** *Querétaro* [N20.58879°, W100.38989°], S.A. Minton, 1♀ (AMNH). **Tlaxcala:** *8 miles W Capulalpán* [N19.56362°, W98.68331°], S.C. Williams and C.L. Mullinex, 30.x.1973, 7♀ 2 imm. (CAS 9060657); *La Venta* [N19.56315°, W98.68402°], 11.ii.1939, caught in the middle of an imaginal molt, 1♀ 2 imm. (AMNH).

Kukulcania santosi, sp. nov.

Figures 1F–I, 4A, 5E, 6C, 8C, 27D, 28D, 29D, 31D, 65–68

Kukulcania brevipes: Lehtinen, 1967: 242 (misidentified); Brescovit and Santos, 2013: 302, figs. 1A–C, 2A–C, 3A, 4A–B, 5, 6, 7, 8A–C (misidentified).

Filistata brevipes: Alegre et al., 1977: 64 (misidentified).

Kukulcania hibernalis: Taucare-Ríos, 2010: 84, figs. 1–2 (misidentified).

Type material: Holotype: **Mexico. Chiapas:** *Tuxtla Gutiérrez* [N16.7516°, W93.10299°], C. and P. Vaurie, 7.vii.1955, 1♂ (AMNH IFM-1678). Paratypes: **El Salvador. La Tecla:** [N13.67578°, W89.28947°], N.L.H. Krauss, x.1959, 1♀ (AMNH). **San Salvador:** [N13.69294°, W89.21819°], 1♀ (AMNH), [N13.69294°, W89.21819°] v.1966, 1♀ (MCZ 41325); J.B. Boursot, i–iii.1954, 1♀ (AMNH IFM-1679). **Mexico. Chiapas:** *Tuxtla Gutiérrez* [N16.7516°, W93.10299°], R.B. and J.M. Salander, 19.vi.1955, 1♀ (AMNH). **Oaxaca:** *12 miles W Tehuantepec* (N16.2°, W95.2°), W.J. Gertsch and W. Ivie, 29.iv.1963, 3♀ 8 imm. (AMNH); *Juan García* (N16.31°, W95.47°), J. and W. Ivie, 1.ix.1964, 1♂ 3♀ (AMNH IFM-1646); *Salina Cruz* [N16.18428°, W95.20876°], H. Wagner, 27.viii.1947, 2♀ 2 imm. (AMNH IFM-1528). **Nicaragua. León:** [N12.43155°, W86.87222°], B. Garcete, xi.1989, 1♀ (MCZ 41331). **Peru. Arequipa:** *Camaná*, km 842 [S16.62355, W72.71047], 28.ii.2004, L. Tejada, 1♀ (MACN-Ar 35013); *Caravelí*, Acarí [S15.43845, W74.61808], vi.2003, R; Gutiérrez R., 1♂ (MACN-Ar 35011); *La Cano* [S16.531645, W71.91511, 1350m], 27.i.2004, L. Tejada, 2♀ (MACN-Ar 35012). **La Libertad:** *near Trujillo,* Hacienda Cartavio [S8.10905°, W79.02153°], W. Weyrauch, vi–vii.1939, 2♂ 1♀ (AMNH IFM-1403). **Lima:** *Cañete,* Lunahuana (S12.97691°, W76.16278°m, 423m), A.D. Brescovit et al., 18.vi.2012, 2♂ 3♀ (UFMG 13224), 8♂ 20♀ (IBSP 163498, 163501, 163503–163504); Chilca (S12.5266°, W76.70336°, 135m), A.D. Brescovit et al., 18.vi.2012, 3♂ 3♀ (UFMG 13223), 6♂ 18♀ (IBSP 163512–163513); *Canta,* Santa Rosa de Quives (S11.66667°, W76.8°), J. Coddington, 18.vi.1988, 3♂ 7♀ (USNM), 14.VII.1985, D. Silva D., 1♂ (MUSM); 19.V.1985, D. Silva D., 1♂ (MUSM); 19.V.1984, S. Cárdenas, 1♀ (MUSM); *Huaral*, Reserva Nacional de Lachay (S11.35669°, W77.3285°, 230m), 15.vi.2012, A.D. Brescovit et al., 3♀ 1 imm. (UFMG 13225), 9♀ (IBSP 163505); *Quebrada Verde* [S12.21667°, W76.86667°], W. Weyrauch, viii.1948, 1♀ 2 imm. (CAS 9057612).

Remarks: This species has been described by Brescovit and Santos (2013) under the name *Kukulcania brevipes* (Keyserling, 1883). As it turns out, this was a mistaken identification—Keyserling's description is clearly that of a prithine spider, and thus *Filistata brevipes* belongs in one of the South American prithine genera (see *Pikelinia brevipes* below). This means that the species described by Brescovit and Santos (2013) is actually an unnamed *Kukulcania*, which is treated here. W.J. Gertsch recognized this species under the manuscript name "*Filistata tropica*," although he also misidentified several *K. hibernalis* from Central and South America under this name. He applied the name "*Filistatoides brevipes* (Keyserling)" (a combination never formally proposed) to a Peruvian *Pikelinia* Mello-Leitão, indicating he was aware that Keyserling's name applied to a prithine spider. The record of *K. hibernalis* from northern Chile (Taucare-Ríos, 2010) is actually this species; we did not examine the original specimen, but his photos showing a spider with stout legs and deep, reddish-brown coloration indicate it is a *K. santosi* female rather than a *K. hibernalis*.

Etymology: The name is patronym in honour of our friend and colleague Adalberto J. Santos, in recognition of his contributions to the study of Neotropical arachnids and to the scientific development of the first author.

Diagnosis: Males are easily distinguished from all *Kukulcania* species by the presence of thick setae with spatulate apices on the prolat-

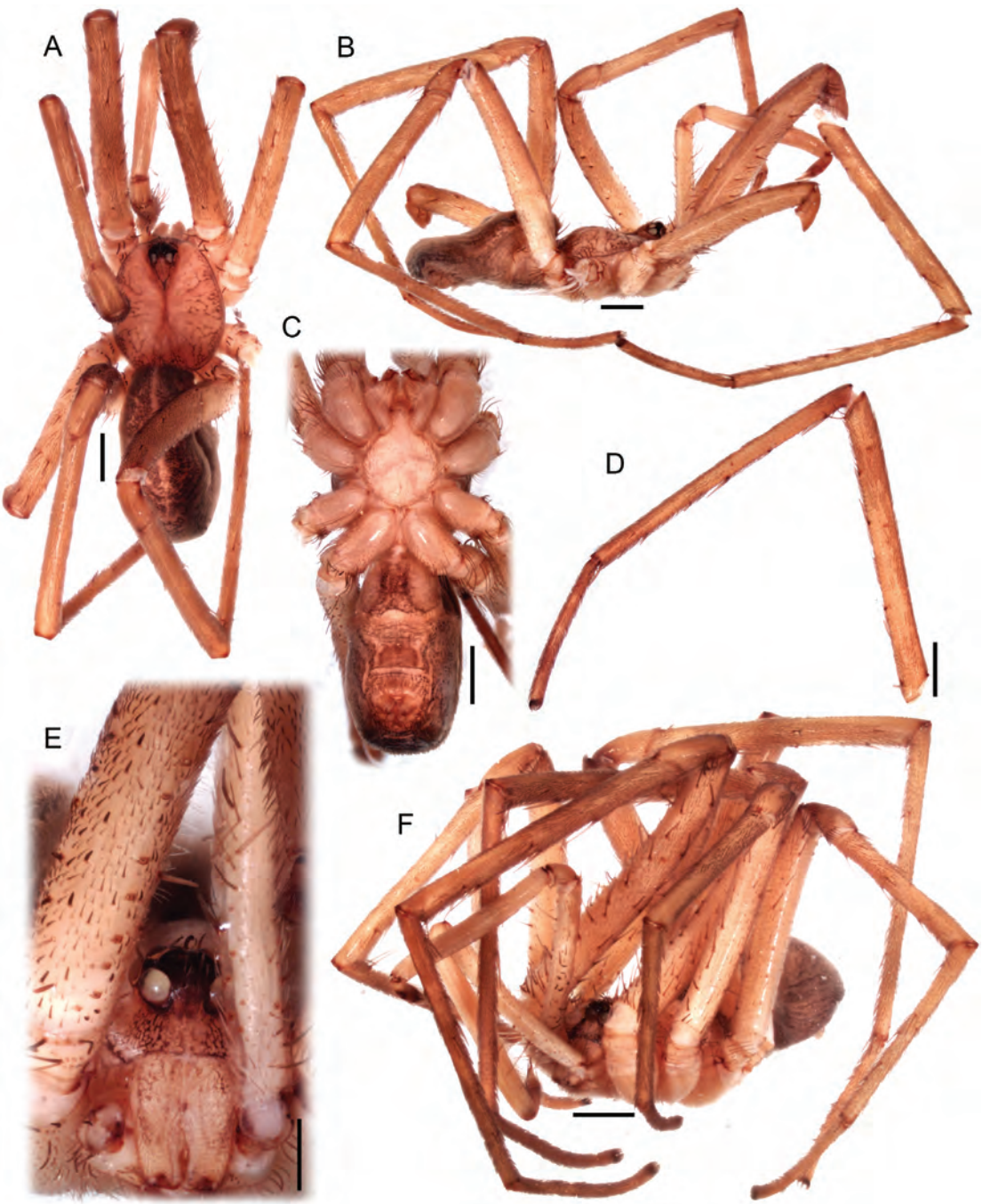

FIGURE 65. *Kukulcania santosi*, male habitus. **A–E.** Holotype from Mexico, Chiapas, Tuxtla Gutiérrez (AMNH IFM-1678). **A.** Dorsal. **B.** Lateral. **C.** Ventral. **D.** Right leg I, prolateral. **E.** Clypeus, subanterior. **F.** Male from Peru, Lima (AMNH IFM-1680). Scale bars = 1 mm except for E, 0.5 mm.

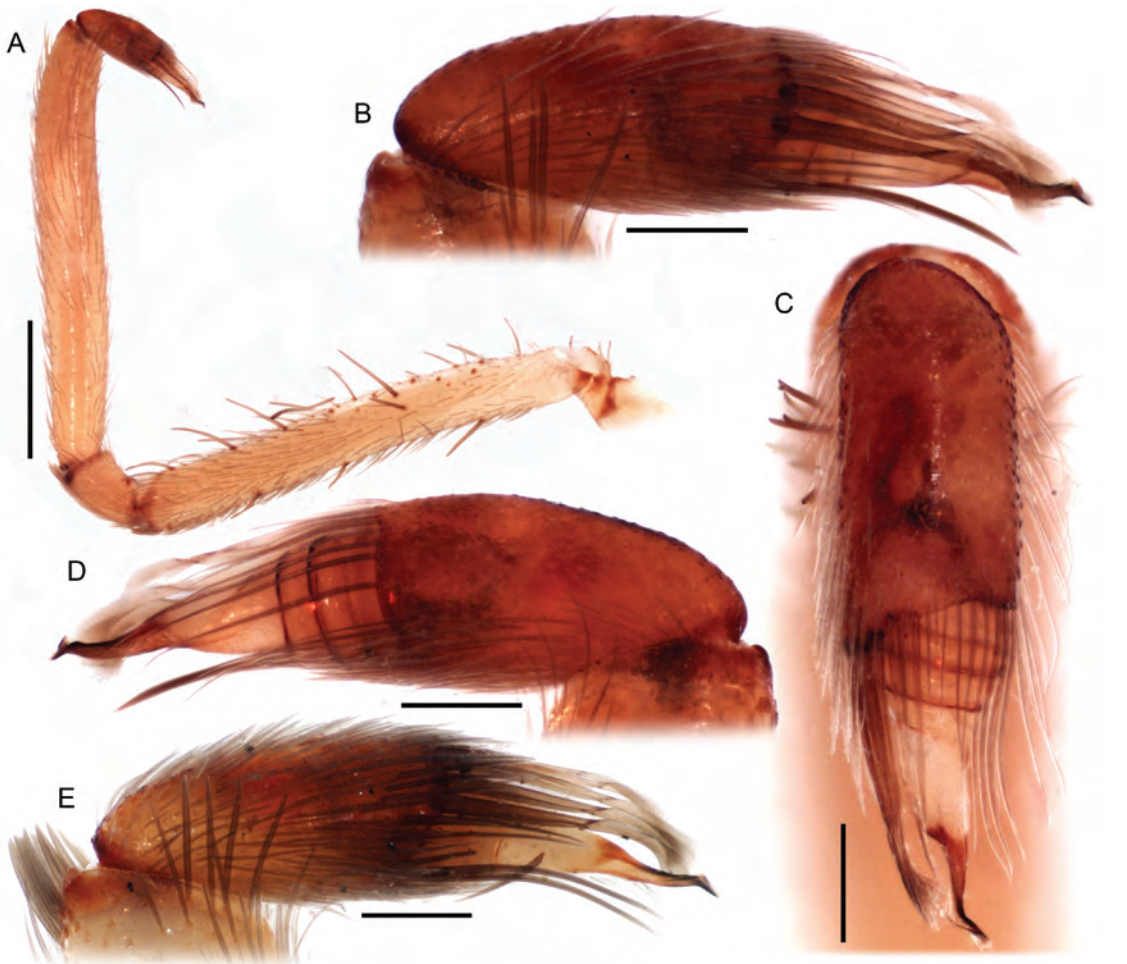

FIGURE 66. *Kukulcania santosi*, left male palps. **A–D.** Holotype from Mexico, Chiapas, Tuxtla Gutiérrez (AMNH IFM-1678). **A–B.** Prolateral. **C.** Dorsal. **D.** Retrolateral. **E.** Paratype from Peru, Lima, Cañete (UFMG 13224). Scale bars = 0.2 mm except for A, 1 mm.

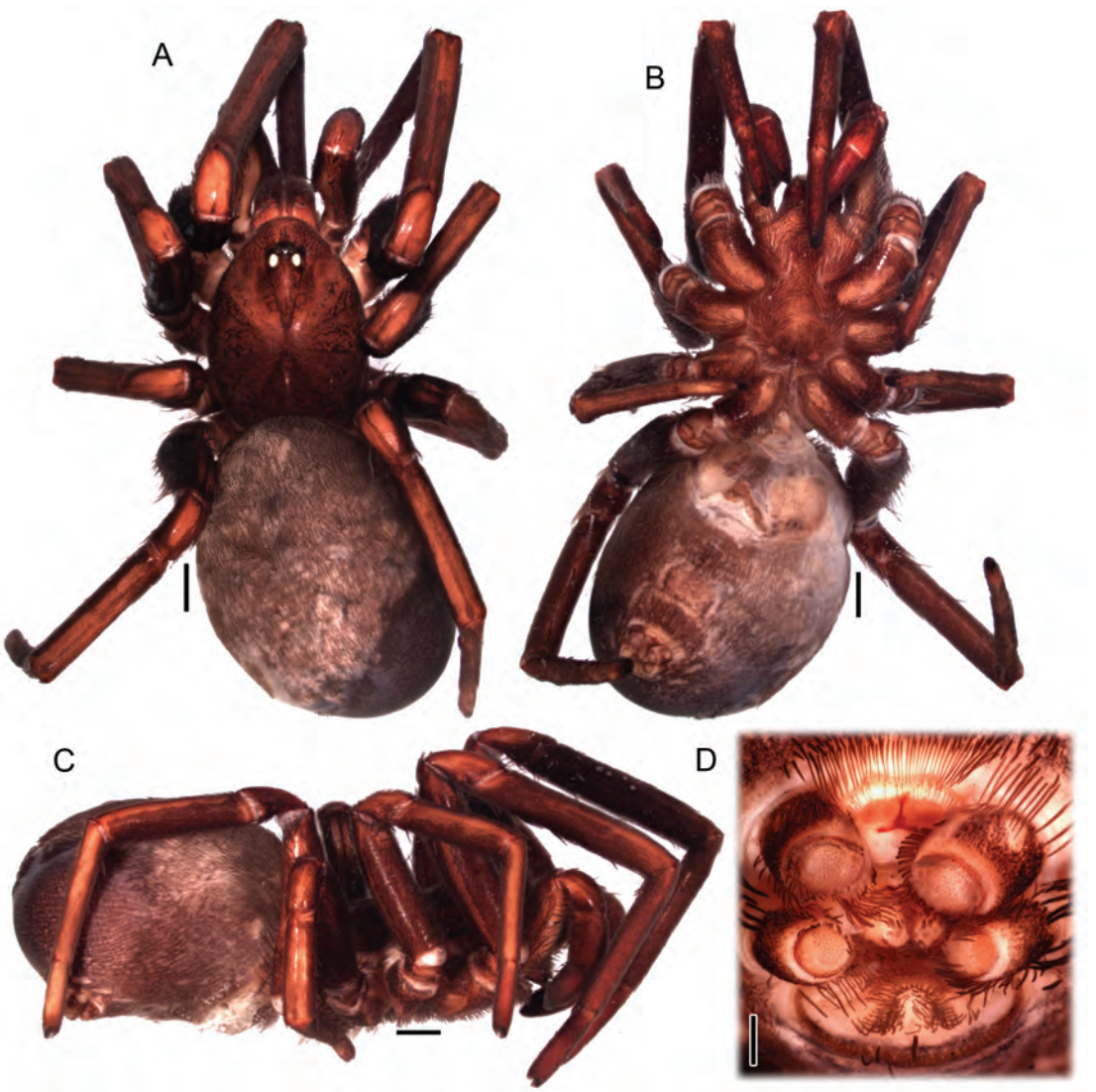

FIGURE 67. *Kukulcania santosi*, female paratype from El Salvador, San Salvador (AMNH IFM-1679), habitus. **A.** Dorsal. **B.** Ventral. **C.** Lateral. **D.** Spinnerets, ventral. Scale bars = 1 mm except for D, 0.2 mm.

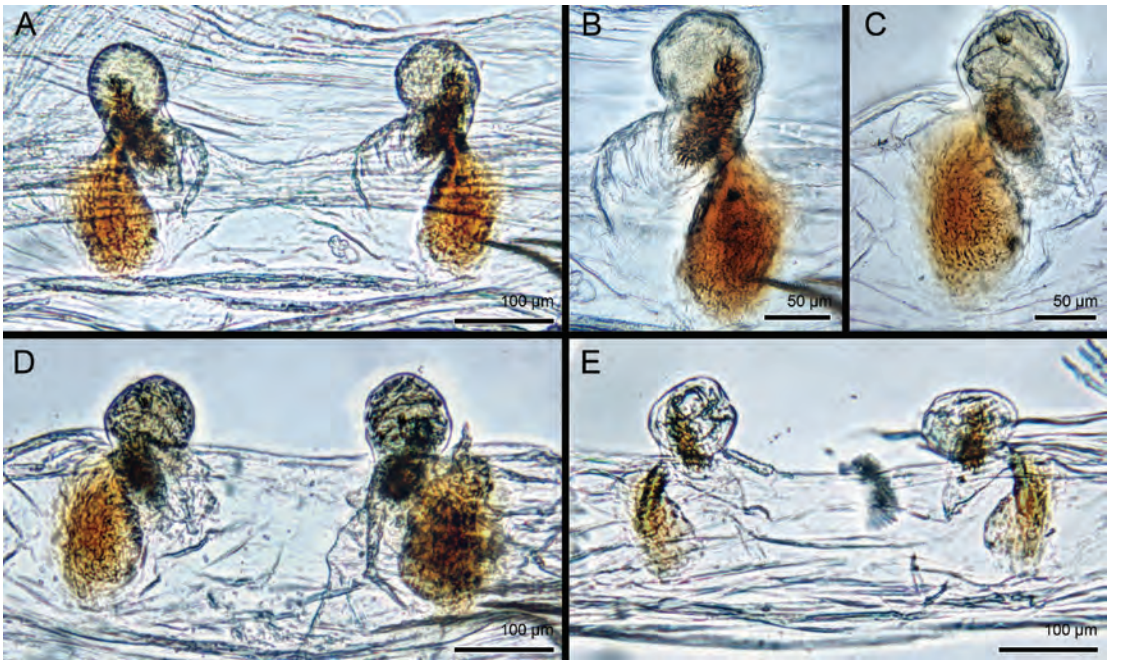

FIGURE 68. *Kukulcania santosi*, female spermathecae, ventral. **A–B.** Paratype from Mexico, Oaxaca, Salina Cruz (AMNH IFM-1528). **C–D.** Paratype from Peru, La Libertad, near Trujillo (AMNH IFM-1530). **E.** Female from Costa Rica, Cartago, Villa Mills (AMNH IFM-1529).

eral border of the cymbium (fig. 66). Females are easily distinguished from all *Kukulcania* species by the short, straight, subquadrate sclerotized bars (fig. 68).

Descr iptio n: Male holotype from Tuxtla Gutiérrez, Chiapas, Mexico (AMNH IFM-1678). Coloration light orange. Carapace finely stippled with brown. Labium endites, sternum, and coxae yellowish cream. Abdomen dorsum grayish brown, light yellow cardiac area. Clypeus short. Sternum oval, with two pairs of barely visible sigillae. Total length 6.39. Carapace length 2.83, width 2.43, clypeus length 0.223. Eye diameters and interdistances: AME 0.171; PME 0.193; ALE 0.23; PLE 0.219; AME–AME 0.045; PME–PME 0.21. Sternum length 1.35, width 1.34. Palp: femur length 3.42, height 0.44; tibia length 3.28, height 0.46. Leg I: femur (fe) 5.36; patella (pa) 1.37; tibia (ti) 5.46; metatarsus (mt) 5.91; tarsus (ta) 2.87. II: fe 4.28; pa 1.14; ti 3.66; mt 4.35; ta 2.27. III: fe 3.87; pa 1.03; ti 3.06; mt 3.78; ta 2.11. IV: fe 4.98; pa 1.22; ti 4.43; mt 5.2; ta 2.48. Abdomen: length 3.69, width 2.01. Palp macrosetae long, in several rows along femur ventral and dorsal faces. Leg macrosetae: fe I 10d, 5p, 13v, 12r, all short; ti I 2p, 8v; mt I 2p, 13v, 1r; ta I 9v; fe II 10d, 1p, 12v, 4r; ti II 1d, 2p, 7v; mt II 5p, 8v, 2r; ta II 8v; fe III 6d, 4p, 10v, 1r; ti III 1d, 2p, 4v, 2r; mt III 1d, 4p, 9v, 4r; ta III 11v; fe IV 11d, 10v, 2r; ti IV 6v, 2r; mt IV 4p, 10v, 3r; ta IV 16v. Palp: cymbium about as long as bulb, with anterior border bearing a ring of setae that end close to the embolus, and a protruding prolateral edge bearing strong, thick setae with spatulate apices; bulb short, subtriangular; sperm duct with three tightly packed coils; embolus short, slightly curved, with a conspicuous keel. State of the specimen: regular, both palps dissected, right leg II and left legs I and III missing from tibia, right leg I disarticulated from tibia, right leg III disarticulated from trochanter.

Female paratype from San Salvador, El Salvador (AMNH IFM-1679). Coloration reddish brown. Carapace finely stippled with dark brown. Sternum and legs not particularly hirsute. Legs with light-brown longitudinal stripes on coxae, femora, and tibiae. Abdomen dorsum grayish brown. Anterior margin of the carapace unmodified. Sternum oval, with two pairs of sigillae. Total length 11.12. Carapace length 4.6, width 3.49, clypeus length 0.6. Eye diameters and interdistances: AME 0.22; PME 0.285; ALE 0.324; PLE 0.3; AME–AME 0.09; PME–PME 0.3. Sternum length 1.92, width 2.07. Palp: femur length 2.39, height 1.02; tibia length 1.4, height 0.81. Leg I: femur (fe) 4.84; patella (pa) 1.71; tibia (ti) 4.51; metatarsus (mt) 4.05; tarsus (ta) 2.12. II: fe 3.74; pa 1.44; ti 3.01; mt 2.84; ta 1.58. III: fe 3.23; pa 1.31; ti 2.51; mt 2.41; ta 1.42. IV: fe 4.39; pa 1.51; ti 3.68; mt 3.3; ta 1.53. Abdomen: length 6.9, width 5.03. Palp macrosetae on ventral surface of tibia and tarsus. Leg macrosetae present on ventral surfaces of tibiae, metatarsi, and tarsi; all femora 2–4 dorsal macrosetae, metatarsus III with one dorsal macroseta. Calamistrum with three rows with 7–9 setae each. Interpulmonary fold large, rounded, covering the spermathecae dorsally. Sclerotized bars present, short and subquadrate; membranous portion of the spermathecae subrounded, positioned anteriorly to the sclerotized bars; glandular portion of the spermathecae apex positioned ventrally to the membranous portion in a small patch. State of the specimen: good, genitalia dissected.

Intra specific var iatio n: Males (N = 5): total length 6.39–8.66 (7.06), carapace length 2.66–3.67 (3.02), femur I length 4.97–7.62 (5.88), tibia I length 5.46–7.58 (6.27), femur/carapace ratio 1.87–2.08 (1.95). Females (N = 5): total length 9.01–12.84 (10.6), carapace length 3.39–5.24 (4.3), femur I length 3.58–5.45 (4.43), tibia I length 3.31–4.99 (4.07), femur/carapace ratio 1–1.06 (1.03). The shape of the female genitalia is only slightly variable (fig. 68).

Natural his t or y: Label data indicate that specimens have been taken in synanthropic settings such as walls and around villages and houses. Others have been collected in lush cloud forest (in Costa Rica) or dry, rocky, disturbed roadsides (in Peru). Brescovit and Santos (2013) reported that specimens collected by them were always associated with human dwellings, walls,

or piles of debris. They also observed females guarding egg sacs (fig. 1G) or accompanied by immatures in their webs (fig. 1H), suggesting maternal care for the offspring. Alegre et al. (1977) studied the venom of this species. Rabbits and rats inoculated with extremely high doses (pooled venoms from 8–10 glands) presented symptoms such as rapid muscular contractions, increased salivation, urination, and rapid respiration, with eventual death of some animals. However, they concluded this species is not potentially dangerous to humans.

Distribution: Southern Mexico, in Chiapas and Oaxaca states; eastern Central America, from El Salvador to Nicaragua and Costa Rica; Peru and northern Chile (fig. 4A). The South American populations are probably introduced.

Additional material examined: **Costa Rica. Cartago:** *Villa Mills,* lush cloud forest [N9.56451°, W83.70792°], Riechert, 12.vii.1970, 1♀ 1 imm. (AMNH IFM-1529). **Mexico. Chiapas:** *5.5 miles E Tuxtla Gutiérrez* [N16.7516°, W93.10299°], R.B. and J.M. Salander, 22.vi.1955, 1♀ 2 imm. (AMNH); *Tonala* [N16.0844°, W93.76151°], 2♀ 1 imm. (AMNH), 1♀ (AMNH); A. Petrunkevitch, viii.1909, female genitalia mounted on a slide, 1♀ (AMNH). **Nicaragua. Chinandega:** *El Viejo,* Santo Thomas, Villa Argentina, in walls in house (N12.75°, W87.396°, 38m), C. Víquez and J. Mata, 26.xi.2007, 1♀ (AMNH). **León:** *La Paz Centro,* El Papalonal, around village and houses (N12.4822°, W86.4775°, 67m), 3.xii.2007, 2♀ (AMNH). **Peru. Ancash:** *Huárez,* behind Ica Museum [S9.52612°, W77.52878°], A. Moreton, 16.i.1973, 2♀ (MCZ 40560). **Libertad:** *Laredo* [S8.08199°, W78.96276°], A.F. Archer, 7.xi.1966, 1♀ (AMNH); *Trujillo* [S8.10905°, W79.02153°], 1967, 1♂ (AMNH), La Floresta [S8.10905°, W79.02153°], 1965, 3♀ (AMNH). **Lima:** [S12.04637°, W77.04279°], P. Aguilar, iii.1965, 1♂ (AMNH IFM-1680); W. Weyrauch, 5♀ 9 imm. (AMNH); i.1939, 1 imm. (AMNH); *500m S of Bartolome,* road leading out of Lima, dry, rocky, disturbed roadside, J. Palmer, 26.iii.1988, 1♀ (MCZ 40787); *8 km E Chosica* [S12.00175°, W76.85485°], I.G. Rozen, 3.vii.1995, 1♀ (AMNH); *Canta,* Santa Rosa de Quives (S11.66667°, W76.8°), J. Coddington, 18.vi.1988, subadult♀ 3 imm. (USNM); *Magdalena Vieja,* Ascona Farm [S12.07876°, W77.06554°], 16.v.1920, 1♀ (AMNH); *San Antonio,* Mala [S12.65749°, W76.6297°], 8.ii.1965, 5♀ 4 imm. (MCZ 40903). **Loreto:** *Iquitos* [S3.74381°, W73.25169°], xi.1962, 1♀ (AMNH). **Paita:** [S5.09385°, W81.09622°], W. Weyrauch, 14.xii.1953, 1♀ 5 imm. (CAS 9057596). **Piura:** *Negritos* [S4.65064°, W81.30418°], H. Exline-Frizzell, 1941, 1♂ (AMNH); 12.vi.1939, 6♀ (AMNH IFM-1404).

The *Kukulcania tractans* Species Group

Diagnosis: Males lack a ring of long setae around the entire border of the cymbium, and have the embolus keel reduced or absent (figs. 70, 80); females lack sclerotized bars alongside the spermathecae (figs. 72, 82).

Kukulcania tractans (O. Pickard-Cambridge, 1896)

Figures 2G–I, 4A, 5A, 6F, 9A, 15, 23, 27E, 28E, 29E, 31E, 69–72

Filistata tractans O. Pickard-Cambridge, 1896: 183, plate 23, fig. 4. F.O. Pickard-Cambridge, 1899: 47, plate 3, fig. 9; Gertsch, 1979: 90, fig. 3A, C. Male holotype from Mexico, Guerrero (NHM), examined by photos.

Filistata capillosa O. Pickard-Cambridge, 1899: 289, plate 32, fig. 1. First synonymized by F.O. Pickard-Cambridge, 1899. Female syntype from Mexico, Guerrero (OUNHM), examined by photos.

Kukulcania tractans: Lehtinen, 1967: 242.

Type material (examined through photographs): Holotype of *F. tractans*: **Mexico**: **Guerrero**: *Amula*, H. H. Smith, 1♂, labeled "♂ –Type –Amula –H.H.S. –1029", deposited in the NHM (figs. 69A–C, 70E). Syntype of *F. capillosa*: **Mexico**: **Guerrero**: *Amula*, ♀, labeled "*Filistata capillosa* Cb., Amula, 206," deposited in OUMNH (fig. 71C, E).

Remarks: We have not been able to examine the type material of this species in person, and relied on pictures and notes kindly taken by Stuart Longhorn during his visits to the collections in the

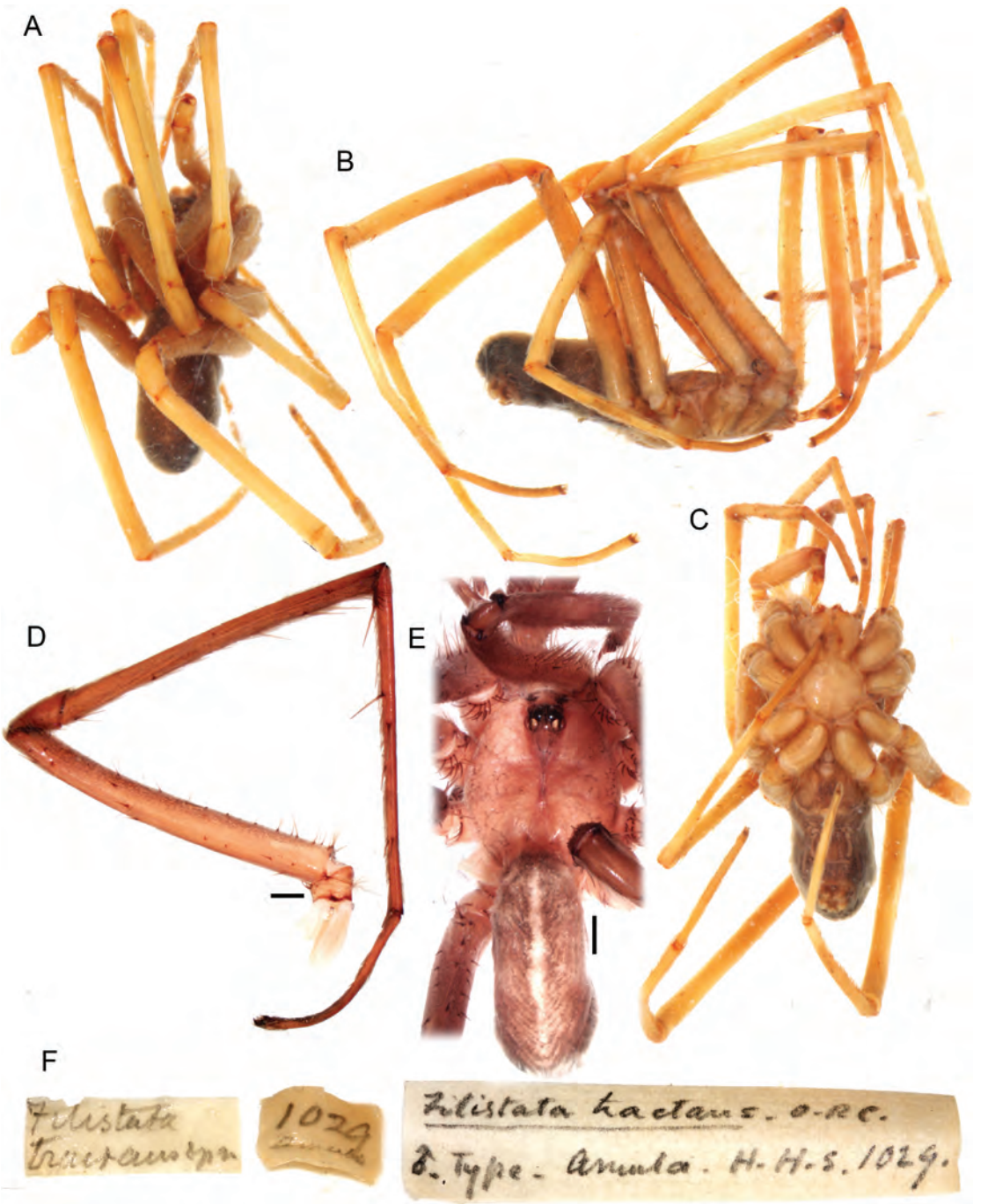

FIGURE 69. *Kukulcania tractans* (O. Pickard-Cambridge, 1896), male habitus. **A–C.** Male holotype from Mexico, Guerrero, Amula (BMNH). **A.** Dorsal. **B.** Lateral. **C.** Ventral. **D–E.** Male from Guerrero, Taxco (AMNH IFM-1662). **D.** Left leg I, prolateral. **E.** Habitus, dorsal. **F.** Labels associated to the holotype. Scale bars = 1 mm. Photographs A–C, F by S. Longhorn, not to scale.

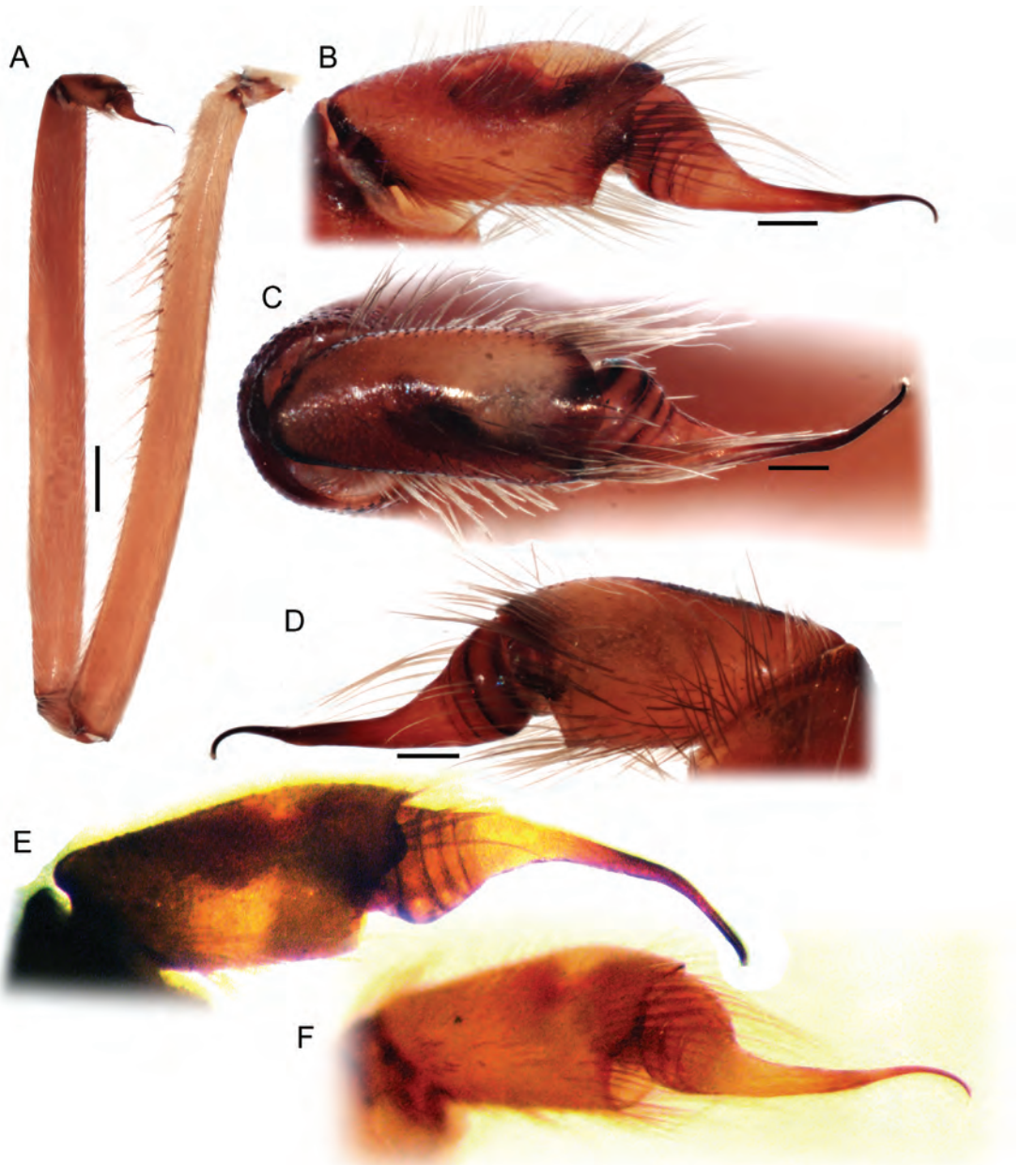

FIGURE 70. *Kukulcania tractans* (O. Pickard-Cambridge, 1896), left male palps. **A–D.** Male from Guerrero, Taxco (AMNH IFM-1662). **A–B.** Prolateral. **C.** Dorsal. **D.** Retrolateral. **E.** Holotype from Mexico, Guerrero, Amula (BMNH)**.** The cymbium is shown in prolateral view, but the bulb is artificially rotated in relation to it and is in ventral view. F. Male from Guerrero, Amula (OUMNH), prolateral. Scale bars = 0.2 mm except A, 1 mm. Photographs E–F by S. Longhorn, not to scale.

FIGURE 71. *Kukulcania tractans* (O. Pickard-Cambridge, 1896), female habitus. **A–B, D.** Female paratype from Guerrero, Amula (BMNH). **A.** Dorsal. **B.** Lateral. **C.** Syntype of *Filistata capillosa* O. Pickard-Cambridge, 1899, lateral (OUMNH 206).**D.** Ventral. **E.** Labels associated to the syntype of *F. capillosa*. **F.** Female from Guerrero, 28 miles south of Iguala (AMNH IFM-1661), legs, lateral. Scale bar = 1 mm. Photographs A–E by S. Longhorn, not to scale.

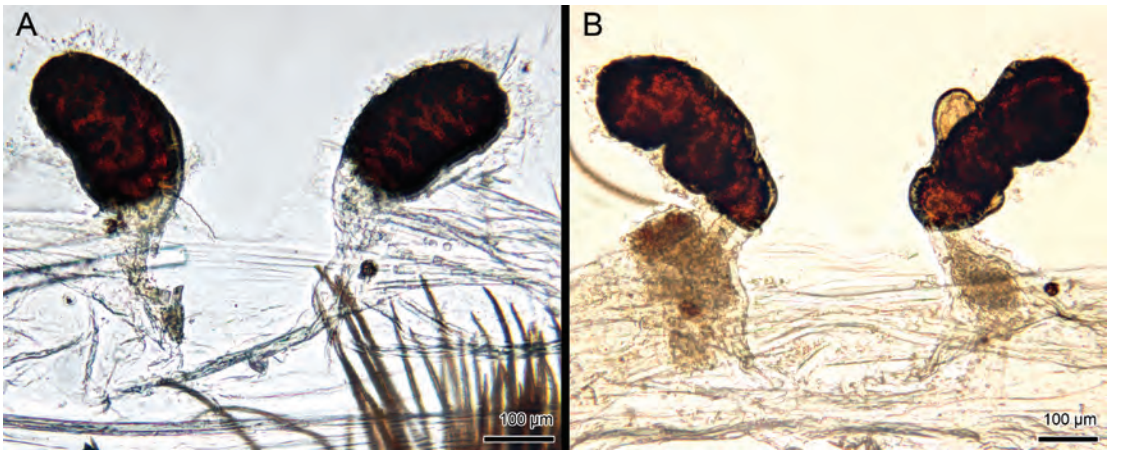

FIGURE 72. *Kukulcania tractans* (O. Pickard-Cambridge, 1896), female spermathecae, ventral. **A.** Mexico, Guerrero, Taxco (AMNH IFM-1508). **B.** Mexico, Guerrero, Iguala (AMNH IFM-1558).

NHM and in OUMNH. Octavius Pickard-Cambridge (1896) described this species based on a male from Guerrero, Amula. A few years later, he described a female identified by him as *F. tractans* based on material from Orizaba and also described *F. capillosa* (O. Pickard-Cambridge, 1899) from Amula and Omilteme [sic, probably Omitelmi]. The same year, his nephew and fellow arachnologist F.O. Pickard-Cambridge (1899) correctly synonymized both names and cited the species from several localities in Guerrero. He also mentions that the female from Orizaba described by O. Pickard-Cambridge is not conspecific with *F. tractans*. We have examined this female specimen only through photographs and were not able to dissect it, but the lack of a dense fringe of setae on the first pair of legs makes it clear that it is another species of *Kukulcania*, maybe *K. hibernalis*. A male in the NHM collection labeled "♂ –Type – Amula –H.H.S. –1029" seems to be the holotype of *F. tractans*. There are other male and female specimens in the NHM and OUMNH collections, but these seem to be specimens later identified by F.O. Pickard-Cambridge; one female is labeled a "deuterotype." The type material of *F. capillosa* is more difficult to trace. O.P. Cambridge (1899) examined females from Amula and Omitelme, but the specimens from the latter locality could not be found. There is a female labeled as "*Filistata capillosa* Cb., Amula" in the OUMNH, and we interpret this as part of the type series of this species. According to S. Longhorn, there might be other syntypes from Amula deposited in the NHM collection. We have not examined the genitalia of this syntype, but its somatic morphology with a dense fringe of setae in the legs makes it clear that it is conspecific with *K. tractans*.

Diagnosis: This large species can be recognized by the very long palps (the palpal femur can reach 10 mm in length) and by the long, gently sinuous shape of the bulb (fig. 70). Females share a very dense fringe of setae in the first two pairs of legs with *K. utahana* and *K. hurca* (fig. 71F), but can be easily differentiated by the lack of sclerotized bars in the genitalia. The female genitalia is more similar to that of *K. tequila* in having a short membranous stalk and a large, sclerotized glandular portion of the spermathecae, lacking the membranous portion of the spermathecae. *K. tractans* can be distinguished by the shorter membranous stalk and by the stouter, ventrally straight (instead of curved) glandular portion of the spermathecae (figs. 31E, 72).

Description: Male from Taxco, Guerrero, Mexico (AMNH IFM-1662). Coloration light orange. Carapace finely stippled with brown and dark markings on clypeus. Labium endites, sternum and coxae yellowish cream. Abdomen dorsum

cream, stippled with brown, with a light-yellow cardiac area. Clypeus short. Sternum oval, with two pairs of sigillae. Total length 10.03. Carapace length 5, width 4.03, clypeus length 0.45. Eye diameters and interdistances: AME 0.34; PME 0.3; ALE 0.322; PLE 0.339; AME–AME 0.084; PME–PME 0.397. Sternum length 2.25, width 2.16. Palp: femur length 10.22, height 0.87; tibia length 9.65, height 0.93. Leg I: femur (fe) 10.8; patella (pa) 2.4; tibia (ti) 10.22; metatarsus (mt) 10.82; tarsus (ta) 5.2. II: fe 9.23; pa 2.02; ti 8.14; mt 9.21; ta 4.56. III: fe 7.96; pa 1.8; ti 6.62; mt 8.2; ta 3.62. IV: fe 10.53; pa 2.03; ti 9.8; mt 11.54; ta 5.11. Abdomen: length 6.03, width 2.72. Palp macrosetae long and numerous, in several rows along femur ventral face. Leg macrosetae: fe I 12d, 2p, 23v, 14r; ti I 2p, 7v, 1r; mt I 2p, 10v, 3r; ta I 7v; fe II 12d, 3p, 15v, 17r; ti II 2p, 6v, 2r; mt II 3p, 12v, 3r; ta II 7v; fe III 11d, 5p, 12v, 3r; ti III 2d, 3p, 6v, 3r; mt III 4p, 11v, 3r; ta III 4v; fe IV 11d, 2p, 7v, 1r; ti IV 1p, 6v, 2r; mt IV 5p, 12v, 2r; ta IV 6v. Palp: cymbium shorter than bulb, cylindrical, with a protruding edge on the prolateral face bearing strong setae; bulb long, piriform, sinuous; sperm duct with four tightly packed coils; embolus S-shaped, slightly bent retrolaterally; tibia very slightly incrassate. State of the specimen: good, left palp and left leg I dissected, left leg IV missing from tibia.

Female from 38 miles S of Iguala, Guerrero, Mexico (AMNH IFM-1661). Coloration light reddishbrown, stippled with dark brown. Labium endites and sternum orange brown. Sternum, femora, and tibia I and II very hirsute, with a fringe of long setae. Abdomen dorsum grayish brown. Anterior margin of the carapace unmodified. Sternum oval, with two pairs of sigillae. Total length 17.61. Carapace length 6.54, width 4.75, clypeus length 0.815. Eye diameters and interdistances: AME 0.287; PME 0.315; ALE 0.43; PLE 0.37; AME–AME 0.087; PME–PME 0.43. Sternum length 3.01, width 2.66. Palp: femur length 3.83, height 1.29; tibia length 2.19, height 1.18. Leg I: femur (fe) 8; patella (pa) 2.85; tibia (ti) 7.1; metatarsus (mt) 6.54; tarsus (ta) 3.43. II: fe 6.49; pa 2.2; ti 5.18; mt 5.02; ta 2.6. III: fe 4.88; pa 1.94; ti 3.94; mt 4.13; ta 2.25. IV: fe 6.54; pa 2.24; ti 5.75; mt 5.48; ta 2.5. Abdomen: length 11.51, width 8.55. Palp macrosetae on ventral surface of tibia and tarsus. Leg macrosetae present on ventral surfaces of tibiae, metatarsi and tarsi; all femora with 2–4 dorsal macrosetae, metatarsus III with one dorsal macroseta. Calamistrum with three rows with 11–15 setae each. Interpulmonary fold large, rounded, covering the spermathecae dorsally. Spermathecae with a single, sclerotized receptacle with a membranous base, sclerotized lateral bars absent. State of the specimen: good, genitalia dissected, right palp missing from tibia.

Intraspecific variation: Males ($N = 5$): total length 8.61–10.06 (9.51), carapace length 3.76–5 (4.39), femur I length 8.07–10.8 (9.22), tibia I length 8.05–10.22 (8.9), femur/carapace ratio 2.03–2.16 (2.1). Females ($N = 5$): total length 10.59–17.98 (14.81), carapace length 3.9–9.33 (6.63), femur I length 4.58–10.99 (7.8), tibia I length 4.35–9.51 (6.92), femur/carapace ratio 1.06–1.29 (1.18). The morphology of the genitalia is surprisingly invariant, although the bulb sometimes rotates inside the cymbium (fig. 70).

Natural history: Specimens in collections have no natural history data associated with their labels. Females seen by S. Longhorn in Guerrero in the field make their webs in tree trunks and stone walls in dry forests (fig. 2G). Females guard their egg sacs by sitting on them in the entrance of their webs (fig. 2H).

Distribution: Central Mexico, in the states of Guerrero, Estado de México, Morelos, Puebla, and Tlaxcala (fig. 4A).

Additional material examined: **Mexico. Baja California Sur:** *La Purísima,* 1♂ (CAS 9060642) (probably mislabeled, not included in distribution map). **Estado de México:** *Tenancingo* [N18.96134°, W99.59107°, 2050m], H. Wagner, 7.x.1946, 7♀ 8 imm. (AMNH). **Guerrero:** *11 miles W Chilpancingo* [N17.57043°, W99.66793°], W.J. Gertsch and V. Roth, 30.vii.1956, 1♀ (AMNH); *38 miles S Iguala* [N17.79936°, W99.61363°], V. Roth and W. Gertsch, 29.vii.1956, 1♀ 1 imm. (AMNH IFM-1661); *5 miles N Taxco* [N18.62373°, W99.60875°], L. Irby Davis, 2.vii.1944, 1♂ 1 imm. (AMNH IFM-1408); *5 miles NE Taxco* [N18.33°, W99.36°], W.J. Gertsch and W. Ivie, 4.v.1963, 1♂ 5

imm. (AMNH); *7 miles S Chilpancingo* [N17.44816°, W99.51801°], W.J. Gertsch and V. Roth, 29.vii.1956, 4♀ (AMNH), 4♀ (AMNH), 4♀ (AMNH IFM-1416); *Chilpancingo* [N17.55154°, W99.50063°], P. Klass, viii.1978, 1♀ (MCZ 39916); Amojileca (N17.56817°, W99.569°, 1484m), O. Francke et al., 20.vi.2007, 1♀ (CNAN-Ar 8179); *Cocula* [N18.23785°, W99.66058°], C. Bolívar and D. Peiaez, 6.ii.1943, 1♀ (AMNH); *Iguala* [N18.34485°, W99.53973°], J.C. Pallister, 2.vi.1946, 2♀ (AMNH IFM-1558); *Taxco* (N18.33°, W99.36°), W.J. Gertsch and W. Ivie, 3.v.1963, 1♂ (AMNH IFM-1662); [N18.55655°, W99.60512°], L. Isaacs, x.1945, 2♀ (AMNH IFM-1508); W.J. Gertsch and V. Roth, 28.vii.1956, 1♂ 2♀ 2 imm. (AMNH); [N18.5566°, W99.60513°], E.I. Schlinger, 29.iv.1953, 1♀ (AMNH); L. Isaacs, 1946, collected in fall, 2♂ 2 imm. (AMNH IFM-1649); V. Roth and W. Gertsch, 29.vii.1956, 1♂ 2♀ 1 imm. (AMNH); W.J. Gertsch and V. Roth, 28.vii.1956, 2♀ 1 imm. (AMNH). **Morelos:** *11 km S Amayuca* [N18.72244°, W98.79494°, 1158m], E.S. Ross, 23.viii.1976, 1♀ (CAS 9060655); *Cuernavaca* [N18.56°, W99.14°], viii.1957, 1♂ 1♀ (AMNH); [N18.92421°, W99.22157°], H. Field, ix.1941, both pedipalps missing, 1♂ (FMNH 2857653); [N18.92423°, W99.22142°], 1♀ (AMNH); N.L.H. Krauss, ix.1955, 1♀ (AMNH); x.1944, 1♀ (AMNH); W.J. Gertsch and V. Roth, 31.vii.1956, 1♀ 4 imm. (AMNH); *Largo de Tegues* (*Tequesquitengo?)* [N18.61138°, W99.25932°, 920m], H. Wagner, vi–vii.1944, 1♀ (AMNH); *N of Cuernavaca* (N18.56°, W99.14°), W.J. Gertsch and W. Ivie, 6.v.1963, 1♂ 1♀ 5 imm. (AMNH), 4♀ 1 imm. (AMNH); *Puente de Ixtla* [N18.61373°, W99.32023°], Bolívar, Bonet and Osorio, 1.viii.1943, 1♀ (AMNH); *Tepoztlán* [N18.98487°, W99.09303°], Bolívar, Osorio and Velo, 10.v.1962, 1♀ (AMNH). **Puebla:** *Acatlán* [N18.20319°, W98.04981°], H. Wagner, 24–27. ix.1946, 2♀ 1 imm. (AMNH). **Tlaxcala:** *Tlaxcala* [N19.31392°, W98.24044°], V. Roth and W.J. Gertsch, 26.vii.1956, 1♂ (AMNH); [N19.31811°, W98.2375°], V. Roth and W. Gertsch, 26.vii.1956, 3♀ 10 imm. (AMNH).

Kukulcania tequila, sp. nov.

Figures 4B, 9B, 27F, 28F, 29F, 31F–G, 73–76

Type material: Holotype: **Mexico. Jalisco:** *3 miles W of Ocotlán on Rt. 35* [N20.34175°, W102.76523°], F.A. Coyle, 28.v.1982, 1♂, in the same vial as 1 imm. (MCZ 39921). Paratypes: Mexico. **Jalisco:** *3 miles W of Ocotlán on Rt. 35* [N20.34175°, W102.76523°], F.A. Coyle, 28.v.1982, 1♀ 2 imm. (MCZ 39920); *7 miles NW Tequila* [N20.91283°, W103.86832°], P.H. Arnaud, E.S. Ross and D.C. Rentz, 17.viii.1960, 1♀ (CAS 9060656); *8 km E Tequila* [N20.82118°, W103.71831°, 1219m], E.S. Ross, 5.xi.1976, 1♀ (CAS 9060640); *Ajijic, mtn. slope just behind town* [N20.29955°, W103.26344°], F.A. Coyle, 19.v.1982, 3♀ 1 imm. (MCZ 39032); *Chapala* [N20.30516°, W103.1846°], W.J. Gertsch, 1♂ (AMNH IFM-1549); *La Floresta,* Lago de Chapala, E.I. Schlinger, 4–5.ix.1977, 1♀ (UCB); *near Tequila* [N20.88195°, W103.8325°], V. Roth and W.J. Gertsch, 11. viii.1956, 4♀ 10 imm. (AMNH). **Michoacán:** *5 miles E Cojumatlán* [N20.1159°, W102.85436°], W.J. Gertsch, 2.viii.1954, 1♂ 3♀ 3 imm. (AMNH); *6 km NW Sahuayo,* near S shore Lago Chapala [N20.09193°, W102.80417°, 1707m], E.S. Ross, 4.xi.1976, 1♀ (CAS 9060638); *Apatzingán,* in houses [N19.08373°, W102.35367°], M. Cárdenas and M. Correa, 20.iv.1943, 1♂ (AMNH); *Tepaltepec,* Las Cañas, Balsas depression [N18.54578°, W101.97977°], R. Seib, 2.ix.1977, 1♀ (CAS 9060622). **Nayarit:** *15.6 miles W Compostela* [N21.1926°, W105.10437°], S.C. Williams, K.B. Blair and C.L. Mullinex, 19.x.1973, 1♀ (CAS 9060653); *25 miles SE Tepic* [N21.2239°, W105.00338°], 23.xi.1948, 2♀ (CAS 9060630); *3 km SE Ixtán del Río* [N21.03627°, W104.37192°, 1280m], E.S. Ross, 20.viii.1976, 3♀ (CAS 9060626); *Tepic* [N21.50417°, W104.89459°], xi.1894, 2♀ (MCZ 40226). **Sinaloa:** *50 miles N Culiacán* [N25.52693°, W107.4121°], V. Roth and W. Gertsch, 6. viii.1956, 1♂ 2♀ 1 imm. (AMNH IFM-1650, IFM-1666); *6 miles S Culiacán* [N24.6439°, W107.44357°], W.J. Gertsch, 22.vii.1954, 3♀ (AMNH); *6.1 miles E of Villa Union on Rt. 40* [N23.16761°, W106.11538°], F.A. Coyle, 23.v.1982, 1♀ (MCZ 39034).

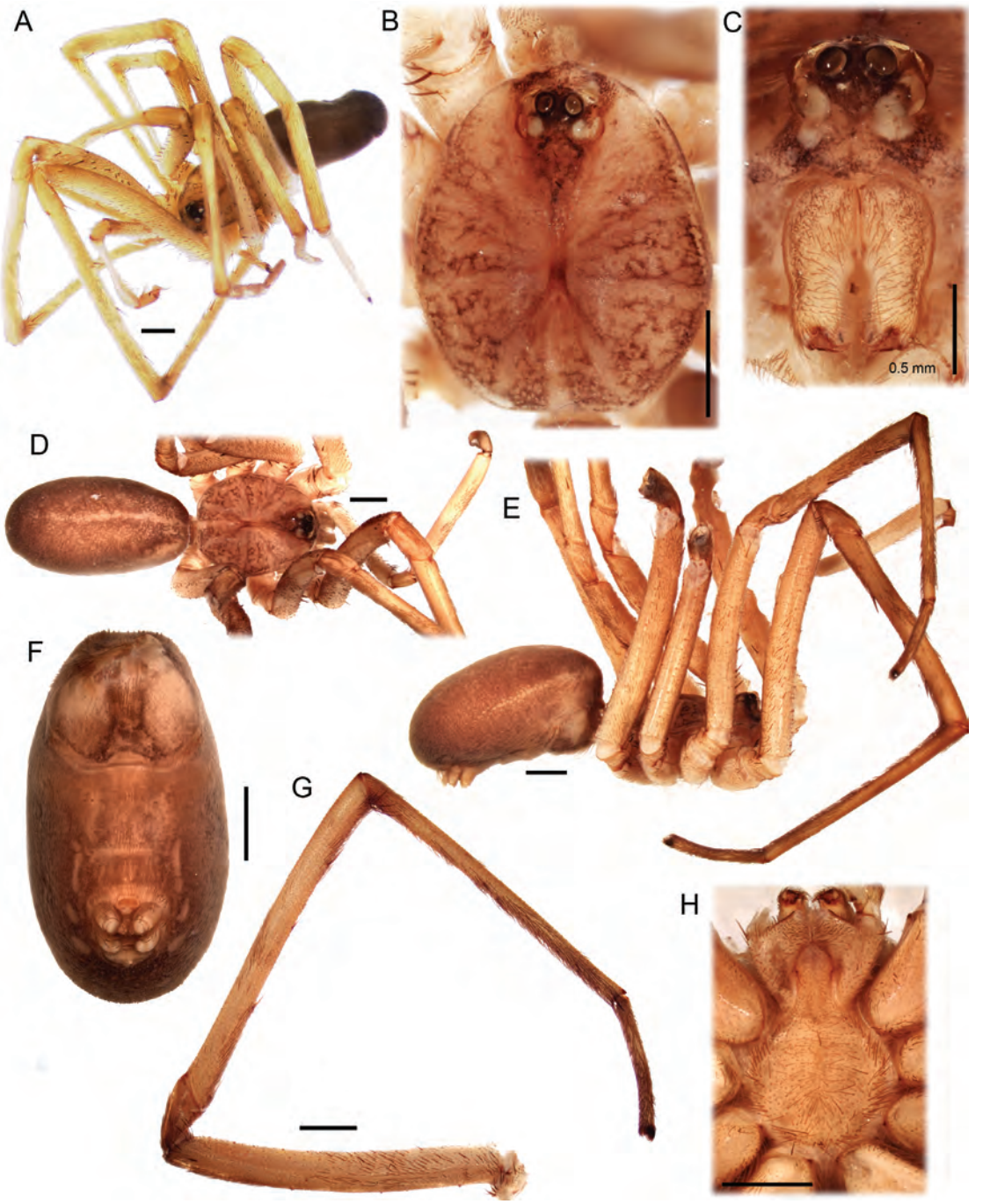

FIGURE 73. *Kukulcania tequila*, males. **A.** Holotype from Mexico, Jalisco, W of Ocotlán (MCZ 39921) habitus, subanterior. **B–H.** Paratype from Mexico, Jalisco, Lake Chapala (AMNH IFM-1549). **B.** Carapace, dorsal. **C.** Eye region, anterior. **D.** Habitus, dorsal. **E.** Same, lateral. **F.** Abdomen, ventral. **G.** Left leg I, prolateral. **H.** Sternum, ventral. Scale bars = 1 mm except where noted.

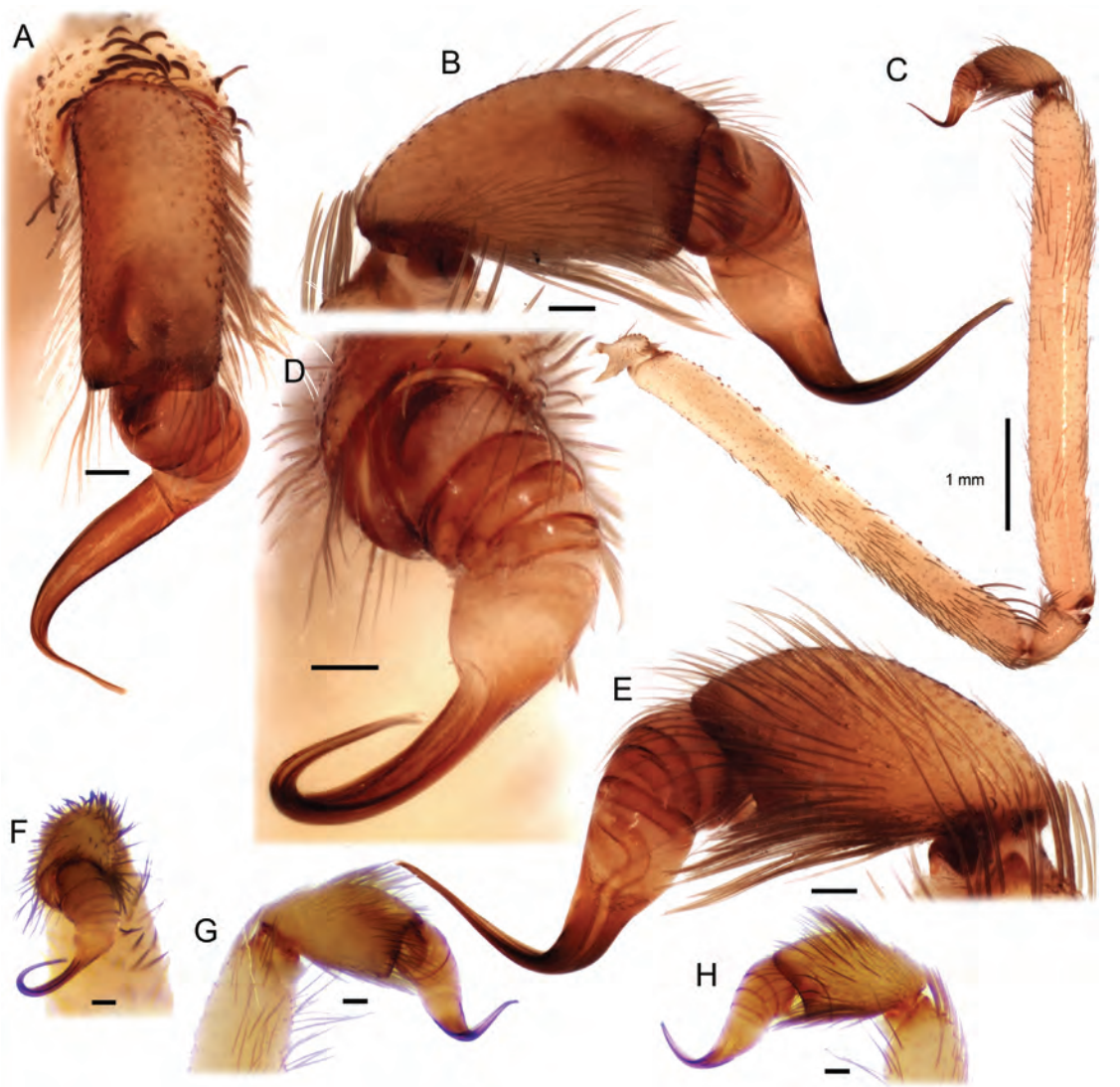

FIGURE 74. *Kukulcania tequila*, male genitalia. **A–E.** Male paratype from Mexico, Jalisco, Lake Chapala (AMNH IFM-1549), right palp. mirrored. **A.** Bulb, dorsal. **B.** Prolateral. **C.** Complete palp, retrolateral. **D.** Anterior. **E.** Bulb, retrolateral. **F–H.** Male holotype from Mexico, Jalisco, W of Ocotlán (MCZ 39921), left bulb. **F.** Anterior. **G.** Prolateral. **H.** Retrolateral. Scale bars = 0.1 mm except where noted.

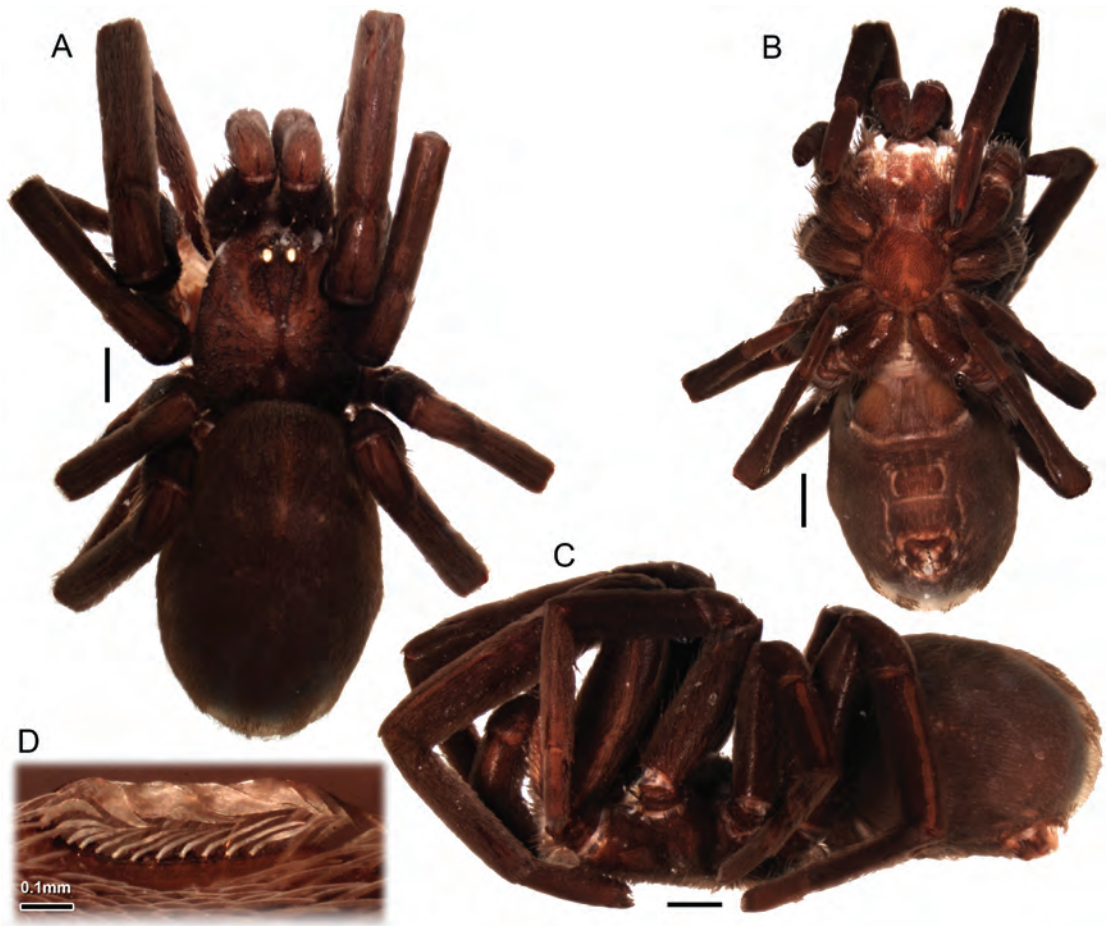

FIGURE 75. *Kukulcania tequila*, female paratype from 50 miles N of Culiacán, Sinaloa, Mexico (AMNH IFM-1650). **A.** Habitus, dorsal. **B.** Ventral. **C.** Lateral. **D.** Left calamistrum, dorsal. Scale bars = 1 mm except where noted.

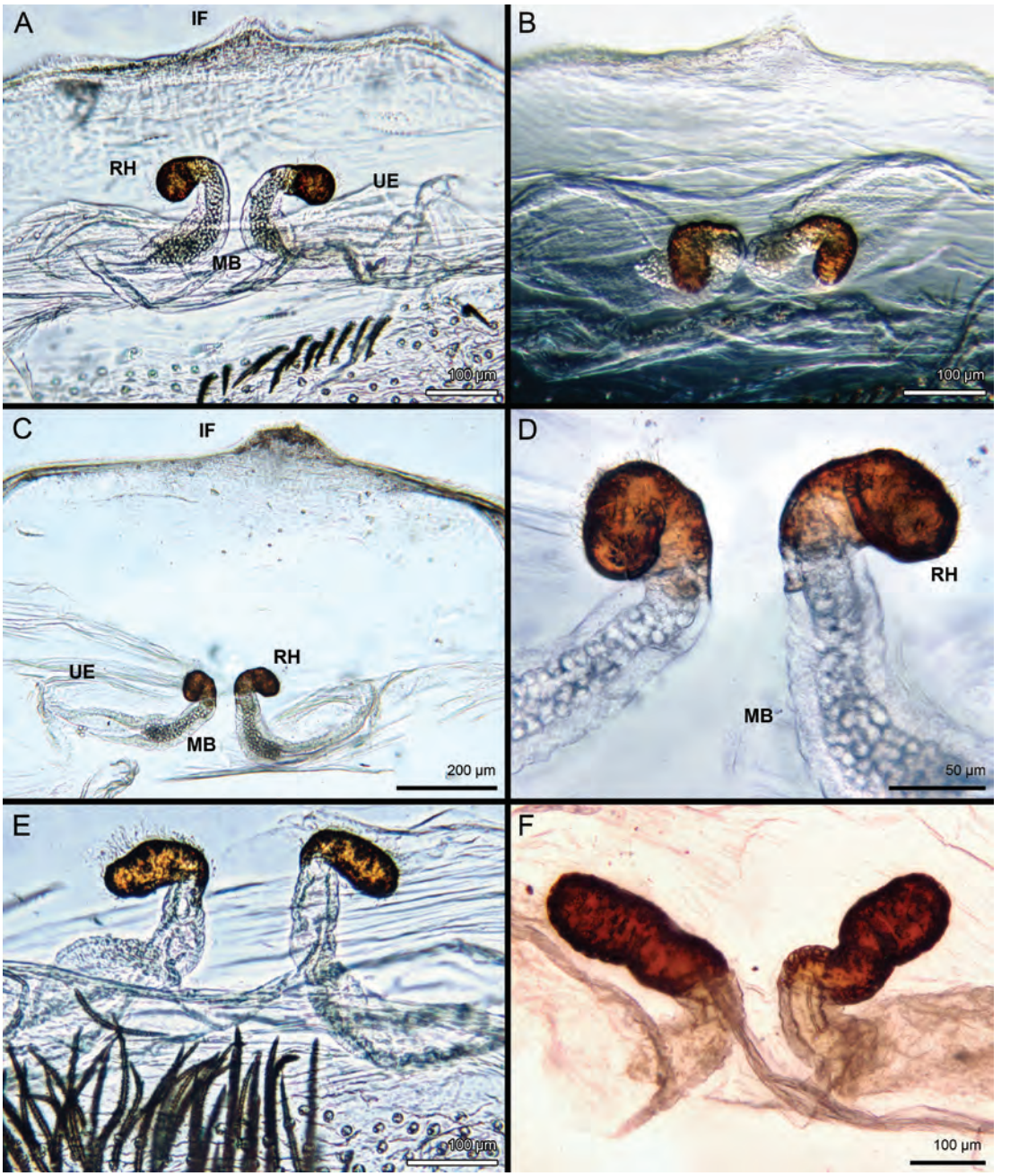

FIGURE 76. *Kukulcania tequila*, female spermathecae, ventral view except for B, anterior. **A–B.** Mexico, Nayarit, La Mesa de Nayarit (AMNH IFM-1513). Notice ventrally curved spermathecae heads in B. **C–D.** Mexico, Jalisco, Volcán de Tequila (CAS 9057638) **E.** Mexico, Nayarit, Ixtlán del Río (AMNH IFM-1542). **F.** Mexico, Sinaloa, 5 miles southwest of Culiacán (AMNH IFM-1542). Abbreviations: **IF,** interpulmonary fold; **MB,** membranous base; **RH,** receptacle head; **UE,** uterus externus.

Etymology: Tequila is one of the localities where the species is known to occur. The name is to be treated as a noun in apposition.

Description: Gertsch recognized this species under the manuscript name "*Filistata hespera*."

Diagnosis: Males are easily distinguished from all *Kukulcania* by the distinct twisted shape of the palpal bulb, more easily seen in apical view (fig. 74D, F). Females are similar to *K. tractans* in having spermathecae with a short membranous stalk and a large, sclerotized glandular portion of the spermathecae, lacking a membranous portion of the spermathecae. *K. tequila* can be distinguished by the longer membranous stalk and by the more slender and ventrally curved glandular receptacle portion of the spermathecae (figs. 31F–G, 76). The legs and sternum of *K. tequila* are also less hirsute than those of *K. tractans*, lacking the characteristic dense fringe of the latter species.

Description: Male paratype from Lake Chapala, Ajijic, Jalisco (AMNH IFM-1549). Coloration brownish yellow. Carapace finely stippled with light brown. Abdomen dorsum light brown; venter with light markings alongside spinnerets. Clypeus short. Sternum oval, with two pairs of sigillae. Total length 7.78. Carapace length 3.39, width 2.8, clypeus length 0.26. Eye diameters and interdistances: AME 0.2; PME 0.21; ALE 0.25; PLE 0.25; AME–AME 0.09; PME–PME 0.28. Sternum length 1.6, width 1.47. Palp: femur length 4.38, height 0.46; tibia length 4.6, height 0.52. Leg I: femur (fe) 6.32; patella (pa) 1.36; tibia (ti) 6.62; metatarsus (mt) 6.41; tarsus (ta) 2.62. II: fe 5.04; pa 1.26; ti 4.62; mt 5.01; ta 1.94. III: fe 4.53; pa 1.12; ti 3.77; mt 4.69; ta 1.95. IV: fe 5.96; pa 1.48; ti 5.52; mt 6.53; ta 2.7. Abdomen: length 5.04, width 2.72. Palp macrosetae long, in several rows along femur ventral face. Leg macrosetae: fe I 18d, 10v, 14r, all very short; ti I 1p, 8v; mt I 2p, 10v, 1r; ta I 4v; fe II 12d, 7v; ti II 2p, 7v; mt II 3p, 14v, 3r; ta II 7v; fe III 7d, 14v; ti III 1d, 2p, 3v, 2r; mt III 2d, 3p, 9v, 2r; ta III 4v; fe IV 9d, 12v; ti IV 1p, 3v; mt IV 3p, 14v, 2r. Palp: cymbium long, bearing a brush of strong setae on the retrolateral face; bulb oddly shaped, twisted, and curved retrolaterally; sperm duct with four coils, distally sinuous; embolus long, curved but uncoiled.

Female paratype from 50 miles north of Culiacán, Sinaloa, Mexico (AMNH IFM-1650). Coloration very dark, reddish brown. Carapace with median area and borders more densely stippled with brown. Sternum and legs not particularly hirsute. Leg coxae and femora with longitudinal, brown stripes. Abdomen dorsum grayish brown. Anterior margin of the carapace unmodified. Sternum oval, with two pairs of sigillae. Total length 9.9. Carapace length 4.33, width 3.18, clypeus length 0.68. Eye diameters and interdistances: AME 0.22; PME 0.234; ALE 0.301; PLE 0.284; AME–AME 0.014; PME–PME 0.287. Sternum length 1.94, width 1.76. Palp: femur length 2.16, height 0.87; tibia length 1.2, height 0.82. Leg I: femur (fe) 4.7; patella (pa) 1.5; tibia (ti) 4.2; metatarsus (mt) 3.8; tarsus (ta) 1.9. II: fe 3.5; pa 1.4; ti 2.8; mt 2.7; ta 1.4. III: fe 2.9; pa 1.3; ti 2.2; mt 2.4; ta 1.5. IV: fe 4; pa 1.4; ti 3.3; mt 3.1; ta 1.6. Abdomen: length 6.27, width 4.23. Palp macrosetae on ventral surface of tibia and tarsus. Leg macrosetae present on ventral surfaces of tibiae, metatarsi and tarsi; fourth femora with two dorsal macrosetae. Calamistrum with three rows of 9–11 setae each. Interpulmonary fold large, rounded, covering the spermathecae dorsally. Spermathecae with a single pair of receptacles, each with a membranous stalk and a sclerotized apex gently curved ventrally, sclerotized lateral bars absent. State of the specimen: good.

Intraspecific variation: Females ($N = 7$): total length 8.03–13.04 (10.18), carapace length 2.76–5.76 (4.06), femur I length 2.99–5.87 (4.28), tibia I length 3.01–5.33 (4.1), femur/carapace ratio 0.96–1.13 (1.06). The shape of the palpal bulb is slightly variable (fig. 74). Spermathecae vary in the length of the membranous stalks and the sclerotized receptacle apices (fig. 76). Some specimens have the receptacle apices only slightly curved ventrally (fig. 76E–F).

Natural history: A male specimen has been collected in a house.

Distribution: Western coastal states of Mexico, from Sinaloa to Guerrero (fig. 4B).

Additio nal mater ial examined: **Mexico. Colima:** *10 miles N Colima* [N19.34514°, W103.58016°], W.J. Gertsch, 7.vii.1954, 1♀ (AMNH); *7 miles S Colima* [N19.10288°, W103.77457°], W.J. Gertsch and R. Hastings, 28. viii.1965, 1♀ (AMNH); *8 miles SW Colima* (N19.1°, W103.45°), W.J. Gertsch and W. Ivie, 10.v.1963, 1♀ 1 imm. (AMNH). **Jalisco:** *1.5 mile N Tuxcueca,* south shore of Lake Chapala [N20.06667°, W103.36667°], W.J. Gertsch and J. Woods, 29.vii.1964, 4♀ 3 imm. (AMNH); *10 miles N Ciudad Guzmán* [N19.83489°, W103.50178°], W.J. Gertsch and R.H. Hastings, 28.viii.1965, 3♀ 4 imm. (AMNH); *2 miles N La Quemada* [N20.97202°, W104.04962°], W.J. Gertsch, 28. vii.1954, 2♀ 4 imm. (AMNH); *20 miles N La Quemada* [N21.04154°, W104.24158°], 2♀ 4 imm. (AMNH); *25 miles E Guadalajara* [N20.71721°, W102.94644°], J.A. Beatty, 16.vii.1963, 1♀ (AMNH); *3.5 miles S Zocoalco* [N20.22505°, W103.56972°], C.M. Bogert, 18.viii.1959, 5♀ (AMNH); *5 miles SE Jocotepec,* Lago de Chapala [N20.23454°, W103.42216°], Griswold and Jackson, 18.ix.1976, 2♀ (UCB); *5–8 miles E Magdalena* [N20.91283°, W103.86832°], W.J. Gertsch and J. Woods, 31.vii.1964, 8♀ 8 imm. (AMNH); *5–8 miles W Magdalena,* 1♂ 9♀ 4 imm. (AMNH); *Ajijic* [N20.29955°, W103.26344°], W.J. Gertsch, 28.vii.1954, 1♀ 2 imm. (AMNH); *Estancia de Biología "Chamela",* 8 km S Chamela [N19.42096°, W105.00405°], E.S. Ross and R.E. Stecker, 31. xii.1988, 1♀ (CAS 9060654); *La Venta,* W.J. Gertsch and J. Woods, 28.vii.1964, 9♀ 7 imm. (AMNH), 1♀ (AMNH); *Plan de Barrancas* [N21.04297°, W104.21055°], V. Roth and W. Gertsch, 4.viii.1956, 4♀ (AMNH); *Volcán de Tequila,* 2.5 mi. S of Tequila, on road to microwave tower [N20.78833°, W103.84139°, 1400m], V.F. Lee, 4.xi.1987, 1♀ (CAS 9057638); 3.5 mi. S of Tequila [N20.78833°, W103.84139°, 1430m], missing spermathecae, 1♀ (CAS 9057608); *W side of Lake Sayula* [N20.05905°, W103.54242°], W.J. Gertsch and J. Woods, 30.vii.1964, 10♀ 8 imm. (AMNH), 11♀ 3 imm. (AMNH); W.J. Gertsch and V. Roth, 3.viii.1956, 4♀ 7 imm. (AMNH). **Nayarit:** *15 miles N Tepic* [N21.70074°, W105.05174°], W.J. Gertsch, 25.vii.1954, 2♀ 2 imm. (AMNH); *Acaponeta* [N22.49595°, W105.36289°], C.M. Bogert and H.E. Volkes, 20.xi.1939, 2♀ 1 imm. (AMNH); *Ixtlan del Río* [N21.90611°, W104.33278°], B. Malkin, 22.ix.1953, 1♀ (AMNH IFM-1542); *Jesús María* [N22.25584°, W104.51721°], 1–15.vii.1955, 1♀ (AMNH); *La Mesa de Nayarit* [N21.90611°, W104.33278°], 16–21.vii.1955, 1♀ 1 imm. (AMNH IFM-1513). **Sinaloa:** *2 miles N Piaxtla* [N23.76973°, W106.71648°], W.J. Gertsch and J. Woods, 2.viii.1964, 1♀ 1 imm. (AMNH); *2 miles S Elota* (N23.55°, W106.48°), J. and W. Ivie, 11. ix.1966, 1♀ (AMNH); *32 miles E Villa Unión* [N23.32542°, W105.98716°], W.J. Gertsch and R. Hastings, 26.viii.1965, 1♀ (AMNH); *40 miles S Culiacán* [N24.27277°, W107.07231°], W.J. Gertsch, 22.vii.1954, 1♀ (AMNH); *5 miles SW Culiacán* [N24.6439°, W107.44357°], C.M. Bogert and H.E. Volkes, 26.xi.1939, 1♀ (AMNH IFM-1639); *Piaxtla river* (N23.5°, W106.4°), W.J. Gertsch and W. Ivie, 16.v.1963, caught in the middle of an imaginal molt, 1♀ 2 imm. (AMNH).

Kukulcania chingona, sp. nov.

Figures 4C, 9C, 77–78

Type mater ial: Hol ot ype: **Mexic o. Michoacán:** *6 miles S of Arteaga* [N18.35625°, W102.29199°, 790m], V.F. Lee, 9.xi.1987, 1♀ (CAS 9057614). Para t ypes: **Guerrero:** *23 miles S Chilpancigo* [N17.20936°, W99.50272°], V. Roth and W. Gertsch, 31.vii.1956, 1♀ (AMNH IFM-1541); *3 km SE Tuxpán* [N18.34917°, W99.47861°, 1768m], E.S. Ross, 3.xi.1976, 2♀ (CAS 9060649). **Michoacán:** *Tuxpán* [N19.56839°, W100.46382°, 1829m], S.C. Williams, 19.vi.1969, 1♀ (CAS 9060636).

Et ymol o gy: The Mexican slang terms *chingón* (masculine) and *chingona* (feminine) have a variety of meanings, including to denote something of high quality, and is here applied as an adjective.

Dia gnos is: The male is unknown. Females can be distinguished from other species lacking sclerotized bars by the unsclerotized spermathecae with glandular pores grouped into several small patches (instead of a single, large patch) (fig. 78).

Descr iptio n: Female holotype from 6 miles S of Arteaga, Michoacán Mexico (CAS 9057614). Coloration brown. Carapace light orange-brown, densely stippled with brown. Labium endites and sternum light orange. Ster-

FIGURE 77. *Kukulcania chingona*, female holotype from Mexico, Michoacán, 6 miles S Arteaga (CAS 9057614), habitus. **A.** Dorsal. **B.** Ventral. **C.** Legs, lateral. **D.** Left calamistrum, dorsal. **E.** Carapace, dorsal. **F.** Lateral. Scale bars = 1 mm except for F, 0.2 mm.

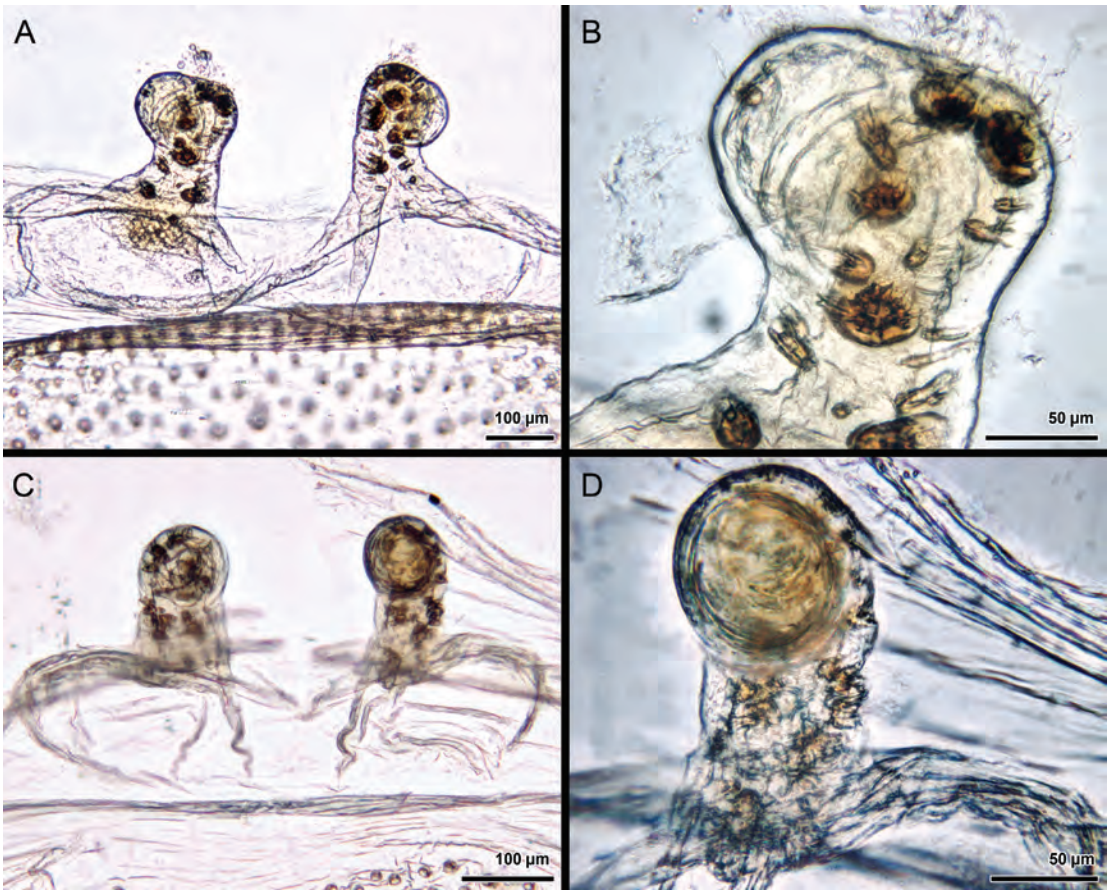

FIGURE 78. *Kukulcania chingona*, female spermathecae, ventral. **A–B.** Holotype from Mexico, Michoacán, 6 miles south of Arteaga (CAS 9057614). **C–D.** Paratype from Guerrero, 23 miles south of Chilpancigo (AMNH IFM-1541).

num not particularly hirsute. Legs brown, with yellowish-brown longitudinal stripes on coxae, femora, and tibiae; femora and tibia I and II hirsute, with long setae. Abdomen dorsum brown. Anterior margin of the carapace unmodified. Sternum oval, with two pairs of sigillae. Total length 12.77. Carapace length 5.31, width 3.94, clypeus length 0.73. Eye diameters and interdistances: AME 0.295; PME 0.32; ALE 0.293; PLE 0.328; AME–AME 0.07; PME–PME 0.391. Sternum length 2.4, width 2.23. Palp: femur length 2.97, height 1.08; tibia length 1.8, height 0.88. Leg I: femur (fe) 5.84; patella (pa) 2.05; tibia (ti) 5.32; metatarsus (mt) 4.71; tarsus (ta) 2.6. II: fe 4.68; pa 1.72; ti 4.01; mt 3.67; ta 2.03. III: fe 3.76; pa 1.52; ti 3; mt 3.19; ta 1.77. IV: fe 5.05; pa 1.65; ti 4.23; mt 3.93; ta 2.12. Abdomen: length 7.84, width 5.54. Palp macrosetae on ventral surface of tibia and tarsus. Leg macrosetae present on ventral surfaces of tibiae, metatarsi, and tarsi; all femora and metatarsi III with 2–4 dorsal macrosetae. Calamistrum with three rows with 9–12 setae each. Interpulmonary fold large, rounded, covering the spermathecae dorsally. Sclerotized lateral bars absent; spermathecae unsclerotized, with sparse patches of glandular pores in its base and an unsclerotized rounded apex lacking glands. State of the specimen: good, genitalia dissected, right leg IV disarticulated from tibia, left leg III missing from tibia.

Male unknown.

Intra specific var iatio n: Females (N = 2): total length 8.41–12.77 (10.59), carapace length 3.63–5.31 (4.47), femur I length 4.16–5.84 (5), tibia I length 3.75–5.32 (4.54), femur/carapace ratio 1.1–1.15 (1.13). The genitalia do not vary noticeably (fig. 78).

Natural his t ory: Unkown; the few specimens in collections do not have natural history data associated with them.

Distr ibutio n: Western Mexico, in Guerrero and Michoacán states. The record from Nayarit is based on a subadult female and thus should be taken with caution (fig. 4C).

Additio nal mater ial examined: **Mexic o. Nayarit:** *5 miles NE San Blas* (N21.34°, W105.12°), W.J. Gertsch and W. Ivie, 14.v.1963, subadult♀ (AMNH IFM-1636).

Kukulcania geophila (Chamberlin and Ivie, 1935)

Figures 2E, 4B, 5B, 6E, 9D–E, 12, 16, 17, 24–25, 27G, 28G, 29G, 31H, 79–82

Filistata geophila Chamberlin and Ivie, 1935: 6, plate 4, f. 22–23. Male and female types from California (AMNH), examined.

Filistata geophila wawona Chamberlin and Ivie, 1942: 4. NEW SYNONYMY. Female holotype from California (AMNH), examined.

Kukulcania geophila: Lehtinen, 1967: 242.

Kukulcania sp.: Ubick, 2005: 81, fig. 28.3; Ubick, 2017: 117, fig. 30.3.

Examined t ype mater ial: Hol ot ypes: **USA: California:** *San Mateo Co.*: Palo Alto, Menlo Park [N37.45276°, W122.18164°], J.C. Chamberlin, 1920,♂, in the same vial as the allotype♀ (AMNH); *Mariposa Co.*: Yosemite Park, Wawona camp [N37.53689°, W119.65701°], 17.ix.1941,♀ holotype of *F. g. wawona* (AMNH IFM-1225). Para t ypes: **California**: *Inyo Co.*: Mount Whitney (Nast base) [N36.58825°, W118.22946°], W. Ivie, 8.viii.1931, 1♀ (AMNH); *San Luis Obispo Co.*: 10 miles S San Luis Obispo [N35.17588°, W120.61716°], 19.vii.1934, 1♀ 2 imm. (AMNH); *Santa Barbara Co.*: Santa Cruz Island [N34.02321°, W119.76577°], R.V. Chamberlin, iv.1913, 2♀ (AMNH IFM-1539); *Santa Clara Co.*: Palo Alto [N37.44188°, W122.14302°], J.C. Chamberlin, 17.xii.1920, 2♀ (AMNH IFM-1536); *Los Angeles Co.*: Santa Monica [N34.01945°, W118.49119°], W. Ivie, 19.xii.1933, 3 imm. (AMNH).

Remar ks: The holotype of *Filistata geophila wawona* does not differ in morphology from females of the nominotypical subspecies and we see no reason to retain this name as valid.

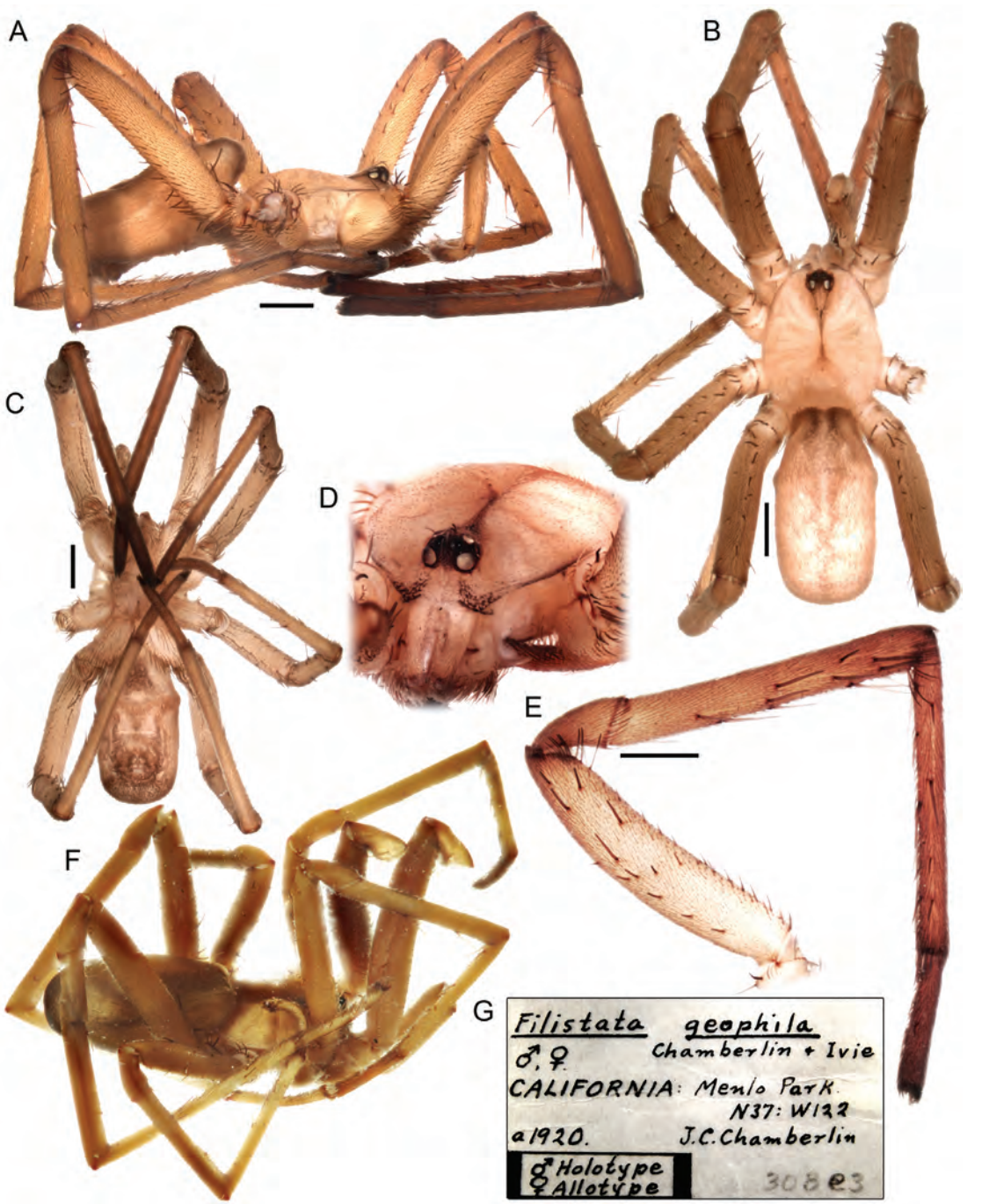

FIGURE 79. *Kukulcania geophila* (Chamberlin and Ivie, 1935), male habitus. **A–E.** California, Stanislaus (CAS 9057841). **A.** Lateral. **B.** Dorsal. **C.** Ventral. **D.** Clypeus, sublateral. **E.** Left leg I, prolateral. **F.** Male holotype, sublateral, not to scale. **G.** Label associated to the holotype. Scale bars = 1 mm.

FIGURE 80. *Kukulcania geophila* (Chamberlin and Ivie, 1935), male palps. **A–D, E.** California, Stanislaus Co. (CAS 9057841). **A–B.** Prolateral. Arrow to strong prolateral setae. **C.** Dorsal. **E.** Retrolateral. **D, F, G.** Male holotype from California, Palo Alto, Menlo Park (AMNH), not to scale. **E–F.** Prolateral. **G.** Retrolateral. Scale bars = 0.2 mm.

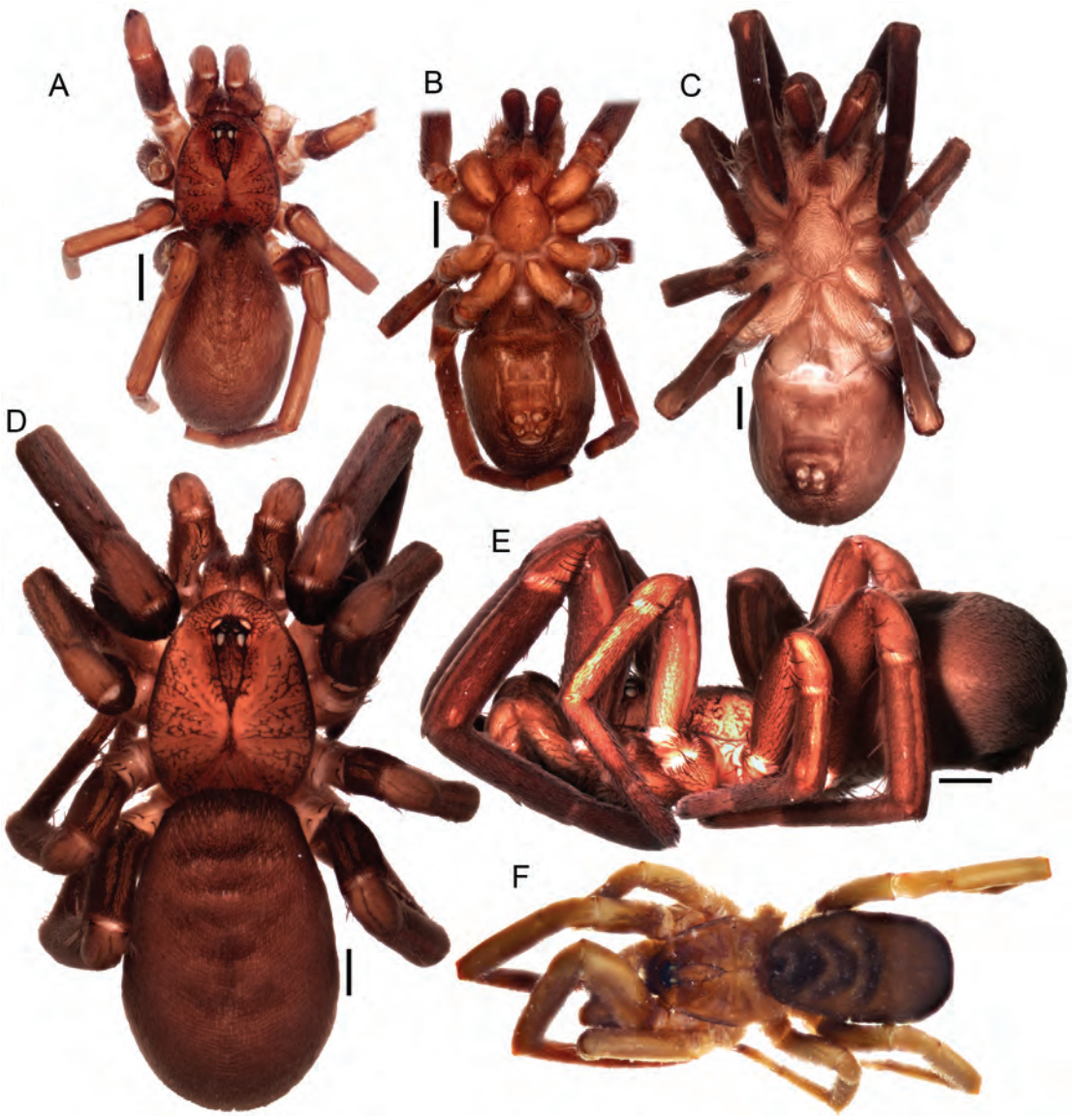

FIGURE 81. *Kukulcania geophila* (Chamberlin and Ivie, 1935), female habitus. **A–B.** Female holotype of *Filistata geophila wawona* Chamberlin and Ivie, 1942 (AMNH), from California, Yosemite Park. **A.** Dorsal. **B.** Ventral. **C–E.** Female from California, San Juaquin Co., Manteca (CAS 9057589). **C.** Ventral. **D.** Dorsal. **E.** Lateral. **F.** Female allotype from the type locality (AMNH), dorsal, not to scale. Scale bars = 1 mm.

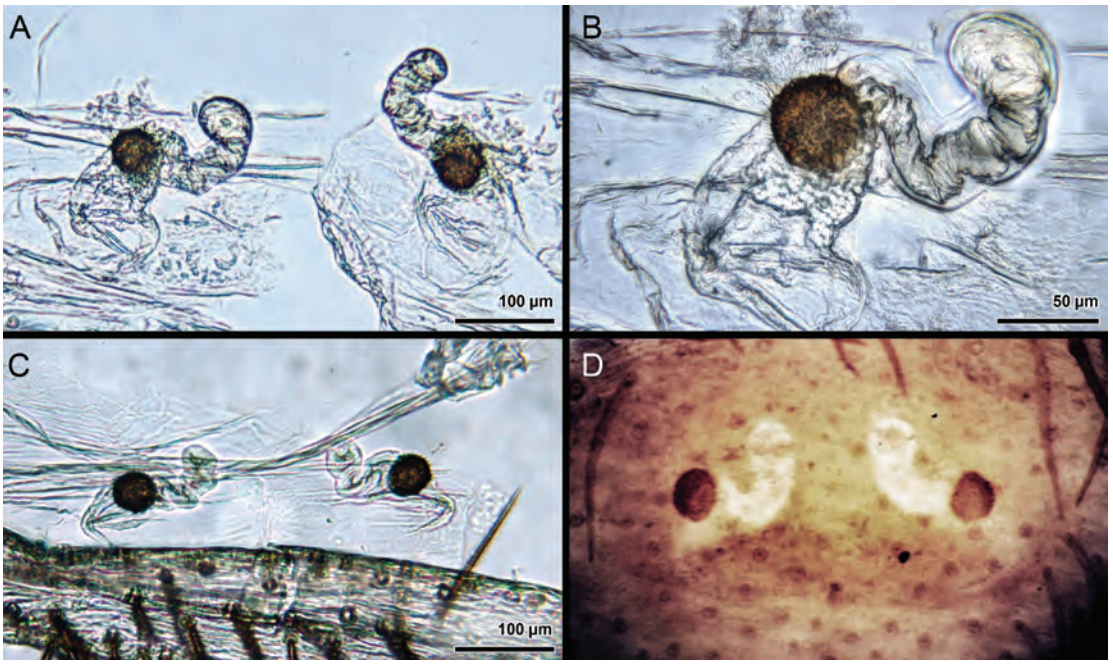

FIGURE 82. *Kukulcania geophila* (Chamberlin and Ivie, 1935), female spermathecae, ventral view except for D, dorsal. **A–B.** Female paratype from California, Palo Alto (AMNH IFM-1536). **C.** Female holotype of *Filistata geophila wawona* Chamberlin and Ivie, 1942 (AMNH), from California, Yosemite Park. **D.** Female allotype from the type locality (AMNH), dorsal, not to scale, preserved in a permanent slide mounted by W.J. Gertsch.

Diagnosis: Males are very similar to *K. benita*: the cymbium has two strong setae in the prolateral face, the bulb has a semicircular base and the embolus is thin and loosely has the shape of an S. Males of *K. geophila* can be distinguished by the shorter palpal tibia (fig. 80) (between 5.1× and 6.1× longer than higher in *K. geophila*, 8.1 in the single known male of *K. benita*). Females are similar to *K. benita* and some populations of *K. bajacali* in lacking sclerotized bars and having a small, semicircular glandular portion of the spermathecae apex sided by the membranous portion. They can be distinguished by the long, fingerlike membranous portion of the spermathecae apex with a proximal ~90° bend (fig. 82).

Description: Male from Stanislaus Co., California (CAS 9057841). Coloration yellowish cream. Carapace with dark brown, V-shaped median pattern. Abdomen dorsum grayish cream. Sternum oval, with two pairs of barely visible sigillae. Total length 6.59. Carapace length 3.04, width 2.32, clypeus length 0.27. Eye diameters and interdistances: AME 0.135; PME 0.177; ALE 0.205; PLE 0.183; AME–AME 0.056; PME–PME 0.18. Sternum length 1.46, width 1.27. Palp: femur length 2.31, height 0.36; tibia length 2, height 0.35. Leg I: femur (fe) 4.13; patella (pa) 1.34; tibia (ti) 4.09; metatarsus (mt) 4.12; tarsus (ta) 1.7. II: fe 3.49; pa 1.12; ti 3.03; mt 3.38; ta 1.4. III: fe 3.2; pa 1.01; ti 2.74; mt 3.3; ta 1.66. IV: fe 4.32; pa 1.2; ti 4.12; mt 4.56; ta 1.78. Abdomen: length 3.73, width 1.97. Palp macrosetae long, in several rows along femur ventral and dorsal faces. Leg macrosetae: fe I 6d, 11p, 27v, 2r, all very short; ti I 7p, 8v; mt I 6p, 12v, 1r; fe II 8d, 5p, 18v, 3r; ti II 3p, 7v; mt II 4p, 11v, 3r; fe III 6d, 5p, 11v, 5r; ti III 1d, 3p, 6v, 2r; mt III 1d, 4p, 10v, 3r; fe IV 8d, 3p, 14v, 2r; ti IV 1p, 7v, 2r; mt IV 3p, 9v, 1r; tarsal macrosetae present but indistinct. Palp: cymbium long, with prolateral edge slightly protruding and bearing two strong setae; bulb short, semi-

circular at base; sperm duct with three coils; embolus long, sinuous. State of the specimen: good, left palp and left leg I dissected, right legs II and III set apart for DNA extraction.

Female from San Joaquin Co., California (CAS 9057589). Coloration brown. Carapace light brown, lined and stippled with dark brown, with brown V-shaped pattern posteriorly to the eyes. Sternum and coxae yellowish brown. Legs brown, with orange longitudinal stripes on coxae, femora, and tibiae. Anterior margin of the carapace unmodified. Sternum oval, with two pairs of sigillae. Total length 7.64. Carapace length 3.15, width 2.46, clypeus length 0.37. Eye diameters and interdistances: AME 0.14; PME 0.198; ALE 0.23; PLE 0.22; AME–AME 0.07; PME–PME 0.18. Sternum length 1.5, width 1.41. Palp: femur length 1.63, height 0.66; tibia length 0.93, height 0.57. Leg I: femur (fe) 3.35; patella (pa) 1.28; tibia (ti) 2.98; metatarsus (mt) 2.84; tarsus (ta) 1.51. II: fe 2.54; pa 0.88; ti 1.98; mt 1.86; ta 1.13. III: fe 2.18; pa 0.97; ti 1.71; mt 1.68; ta 1.03. IV: fe 3.13; pa 1.2; ti 2.5; mt 2.38; ta 1.27. Abdomen: length 4.82, width 3.21. Palp macrosetae on ventral surface of tibia and tarsus. Leg macrosetae present on ventral surfaces of tibiae, metatarsi and tarsi; all femora and metatarsi III with 2–4 dorsal macrosetae. Calamistrum with three rows of setae with 8–9 setae each. Interpulmonary fold large, rounded, covering the spermathecae dorsally. Sclerotized lateral bars absent; membranous portion of the spermathecae apex long, finger shaped, with a 90° bend; glandular portion semicircular, sclerotized. State of the specimen: good, genitalia dissected.

Intraspecific variation: Males (N = 5): total length 5.76–7.6 (6.45), carapace length 2.55–3.04 (2.73), femur I length 3.7–4.3 (3.97), tibia I length 3.7–4.09 (3.86), femur/carapace ratio 1.36–1.52 (1.45). Females (N = 5): total length 7.05–12.21 (9.99), carapace length 2.89–5.35 (4.1), femur I length 3.12–5.6 (4.24), tibia I length 2.98–4.95 (3.95), femur/carapace ratio 1–1.08 (1.04). The shape of the bulb is slightly variable (fig. 80).

Natural history: Label data indicate specimens have been collected in broadleaf forest, citrus litter, chaparral ravines, grasslands, and pine/oak/manzanita/juniper forest, under loose *Eucalyptus* bark, rocks, granite, and serpentine, and in synanthropic settings (gardens, stores, around buildings). Cokendolpher and MacDonald (2008) reported egg sac–guarding by the female and cooperative prey capture and group feeding by spiderlings in this species.

Distribution: United States, California, with a few records in adjacent areas of Oregon and Arizona, and the Mexican state of Baja California (fig. 4B).

Additional material examined: **Mexico. Baja California:** *21.4 miles S Tijuana,* near Halfway house Marker K35 on Mex#1 R.B. 3 [N32.25293°, W116.95257°], P.R. Craig and D.L. Dailey, 20.xi.1962, 2♂ (CAS 9058495). **USA: Arizona:** *Pima Co.*: 38 miles S Ajo [N31.88498°, W112.8144°], S. and D. Mulaik, 4.i.1941, 1♀ (AMNH). **California:** *Alameda Co.*: Castro Valley [N37.6941°, W122.08635°], W.M. Pearce, 18.iii.1941, 2♀ (AMNH); *Amador Co.*: 3 miles S Jackson, canyon on highway [N38.3488°, W120.7741°], V. Roth, 7.vii.1958, missing spermathecae, 1♀ (AMNH); 7 miles E Pioneer, highway 88, sugar pine forest (N38.4999°, W120.5033°, 1250m), M. Hedin, 22.xi.2006, 1♂ (SDSU); Pardee Res. Ranger Sta., under rocks [N38.2873°, W120.87012°], D. Ubick, 24.i.1981, 1♀ (DU 81.01.24); *Butte Co.*: Oroville [N39.51378°, W121.55636°], R.O. Schuster, 12.i.1956, 1♀ (UCB); *Colusa Co.*: Williams [N39.15461°, W122.14942°], 30.viii.1955, 1♀ 1 imm. (AMNH); *Contra Costa Co.*: 4 miles S Antioch [N38.00492°, W121.80579°], R.F. Smith, 9.iv.1945, 1♀ (AMNH); 4 miles W Byron [N37.89466°, W121.71392°], 2.iv.1945, 1♀ 1 imm. (AMNH); Clayton [N37.94103°, W121.93579°], 16.iv.1939, 1♀ (AMNH); W.M. Pearce, 28.iv.1940, 1♀ (AMNH); 9.viii.1940, 1♀ (AMNH); Mount Diablo [N37.88159°, W121.91415°], W.J. and J.W. Gertsch, 21.vii.1953, 1♀ (AMNH); Mt. Diablo State Park, 0.5 mile W Jumper Cmpgnd., beneath rock [N37.88159°, W121.91415°, 823m], C.E. Griswold, 11.vi.1975, 1♀ (UCB); San Joaquin Valley [N37.98326°, W121.86774°], R. Schick, 16–31.vii.1955, 2♀ (AMNH); *El Dorado Co.*: 0.2 mile NE Anderson Ck., on Rattlesnake Bar Road, oak-pine [N38.77712°, W121.10272°], D. Ubick, 4.ii.1995, 1♀ (CAS

9060447); 1.5 mile S Latrobe [N38.55963°, W120.98383°], C.E. Griswold, 5.iv.1981, 1♂ (UCB); 5 miles N Pollock Pines [N38.76129°, W120.58659°], W.J. Gertsch and V. Roth, 6.vii.1958, with egg sac, missing genitalia, 1♀ (AMNH); Folsom Lake [N38.77712°, W121.10272°], C.E. Griswold, 4. iv.1981, 1♀ (UCB); *Fresno Co.*: Fresno [N36.74684°, W119.77259°], R.O. Schuster, 21.iii.1956, 2♀ (UCB); near Prather [N37.03745°, W119.51402°], 26.vi.1956, 1♀ (AMNH); Shaver Lake [N37.10411°, W119.31763°], W.J. Gertsch and V. Roth, 12.ix.1959, 1♀ (AMNH); *Los Angeles Co.*: Angeles National Forest, Vic. Henninger [N34.31582°, W118.00609°], M.E. Thompson, 13.iv.1968, 1♂ (AMNH); 21. xii.1967, 1♂ (AMNH); Eaton Canyon Park [N34.17698°, W118.09707°], 26.ii.1968, 1♂ (AMNH); Fish Canyon [N34.15208°, W117.92899°], E.I. Schlinger, 1.ii.1950, 1♂ (AMNH IFM-1647); [N34.16832°, W117.9263°], 28.v.1944, 1♀ (AMNH); San Dimas, Canyon near Claremont [N34.09668°, W117.71978°], V. Roth, 2.ix.1956, 1♀ (AMNH); San Gabriel Mountains, Angeles National Forest, Highway 3, 1.3 km W junction with Big Tujunga Canyon Road, forest/chaparral ravine (N34.2907°, W118.1706°, 1030m), M. Hedin, J. Satler, J. Starret and C. Richart, 15.ii.2009, 1♂ (SDSU); Big Tujunga Canyon [N34.2907°, W118.1706°], R. Schick, 15–22.i.1956, 1♀ 1 imm. (AMNH); Tanbark Flats, W.J. Gertsch, 20.vi.1952, 2♀ 1 imm. (AMNH); West Fork [N34.24161°, W117.87034°], M.E. Thompson, 1.iii.1968, 1♂ (AMNH); *Madera Co.*: Exper. Range [N37.09939°, W119.74015°], 29.ix.1972, 1♂ (CAS 9060444); Millerton Lake Campground, N side of lake, E of Madera (N37.0197°, W119.6693°, 150m), M. Hedin, 26.iii.2009, 1♂ (SDSU); Northfork [N37.22938°, W119.50938°], H. Dietrich, iii.1920, 4♀ (AMNH); *Marin Co.*: Novato, under serpentine [N38.10742°, W122.5697°], D. Ubick, 7.iii.1983, 1♂ (DU 82.03.07); Simmons Lane Open Space, D. Ubick and I. Budi, 21.vi.1991, 1♀ (CAS 9060479); San Anselmo, Phoenix Lake [N37.95329°, W122.57805°], R. Brady, 17.iv.1982, 1♀ (AMNH); San Francisco, Mount Tamalpais [N37.92354°, W122.59647°], J.H. Emerton, xi.1905, 1♀ (MCZ 145413); *Monterey Co.*: Arroyo Seco, Indians Road (N36.23°, W121.49167°, 343m), D. and S. Ubick, 25.i–11.vi.2003, 1♂ (DU 03.06.11); under rocks and litter (N36.22°, W121.49167°, 343m), 15.iv.2000, 1♂ (DU 00.04.15); S of Lakes, under granite and oak litter [N36.22°, W121.49167°, 900m], D. Ubick and J. Boutin, 13–15.v.1994, 1♀ (DU 94.05.13); Hastings Natural History Reserve [N36.36667°, W121.55°], J.M. Lindsale, 10.v.1941, 1♀ (CAS 9057623); Jolon [N35.9708°, W121.17603°], E. Ray, 28.ii.1944, 1♀ (FMNH 2857666); Salinas [N36.67774°, W121.6555°], 4. vii.1936, with egg sac, 1♀ (AMNH); *Nevada Co.*: Loma Rica Ranch [N39.21736°, W121.01404°, 2800m], D. Ubick, 12.viii.1995, 1♂ (DU 95.08.12); *Orange Co.*: Anahiem [N33.83529°, W117.9145°], R. Rideau, 18.ix.2001, 1♂ (CAS 9057579); [N33.83659°, W117.9143°], 9–18.ix.2001, 1♀ (CAS 9058498); *San Bernardino Co.*: Crystal Lake, San Gabriel Mountains (N34.2°, W117.5°), J. and W. Ivie, 29.ix.1965, 1♀ (AMNH); *San Francisco Co.*: Forest Hill, in garden [N37.74732°, W122.46512°], 28.v.1934, 2♂ 1 imm. (; Red Rock [N37.92953°, W122.4308°], W. Schmitt, 22.xii.1912, 1♀ 1 imm. (USNM); *San Joaquin Co.*: 18 miles W Patterson, N Fork del Puerto [N37.6157°, W121.33684°, 274–457m], C.E. Griswold, 14.vi.1980, 1♀ (UCB); Lodi, in old box at store [N38.13415°, W121.27222°], J. Leach, 8.viii.1977, 1♀ (MCZ 145414); Manteca, under rock [N37.79743°, W121.21605°], D. Ubick, 20.xi.1977, 1♂ (DU 77.11.20); San Juaquin, Manteca, V. Roth, 24.ii.1985, 1♀ (CAS 9057589); *San Mateo Co.*: Edgewood Park, under rock in field with oak [N37.46622°, W122.28255°], J. Starrett, 1.vi.2005, 1 imm. (SDSU G552), 1♀ (SDSU G551); *Santa Clara Co.*: Del Puerto Canyon road, Stanislaus/Santa Clara county line, oak/manzanita/juniper forest (N37.3928°, W121.44971°, 701m), M. Hedin, R. Keith, J. Starrett, S. Thomas and D. Leavitt, 30.iii.2007, 1♂ (SDSU); E San Jose, Highway 101 at Yerba Buena road, serpentine grassland [N37.33821°, W121.88633°], R. White, 13.iv.1992, 1♀ 2 imm. (CAS 9060412); eastside San Jose, M. Nichoff, spring/1980, 1♀ (CAS 9060385); Henry Coe State Park [N37.18678°, W121.54721°], D. Ubick, 17.iv.1980, 1♂ (DU 80.04.17); Palo Alto [N37.44188°, W122.14302°], J.C. Chamberlin, 27.xii.1920, 1♀ 2 imm. (AMNH); San Jose, Com. Hill, serpentine grassland [N37.33821°, W121.88633°], R. White, 11–27. iv.1992, 1♀ 3 imm. (CAS 9060455); San José, Silver Creek Hills, under loose *Eucalyptus* bark [N37.28965°, W121.78223°], J.G. Edwards, 9.x.1955, 1♀ (MCZ 145415); *Siskiyou Co.*: 3 miles NW Weed [N41.44955°, W122.44114°], W.J. Gertsch, 2.ix.1959, 1♂ 1♀ 1 imm. (AMNH); Soap Creek Ridge, 6.5 miles SW Yreka, pine/mixed forest (N41.6786°, W122.72335°, 1250m), M. Hedin, 20.iv.2006, 1♂ (SDSU); *Solano Co.*: Cordella road, 0.9 mile N of junction with Pittman road [N38.2261°,

W122.09795°], P.R. Craig and D.L. Craig, 9.ii.1964, 1♀ (CAS 9057641); Vallejo, Mare Island [N38.09548°, W122.27247°], 8.xii.2013, 1♀ (CAS 9058471); *Sonoma Co.*: [N38.29186°, W122.45804°], B. Malkin, 5.ii.1955, 4♀ 5 imm. (AMNH IFM-1391); *Stanislaus Co.*: Canyon Del Puerto [N37.4336°, W121.33617°], C.E. Griswold, 25.ii.1975, 2♀ (UCB); N fork del Puerto Creek, 12.iv.1975, 1♀ (UCB); Modesto, 3313 Coffee Rd. [N37.6391°, W120.99688°, m], L. Rose, 2009, 1♂ (CAS 9057841); *Tulare Co.*: 10 miles W Johnsondale [N35.92832°, W118.70327°], W.J. Gertsch and V. Roth, 15.ix.1959, 1♀ (AMNH); 40 miles NE Visalia, Ash Mountain Kaweah Power Station [N36.48692°, W118.83983°], D. J. Burdick, 28.v.1984, 3♂ (CAS 9060450); 4.vi.1983, 2♂ 1♀ (DU 83.06.04); 5 miles E Three Rivers, Kawea River [N36.34622°, W119.18703°], W.J. Gertsch, 17. vii.1952, 1♀ 1 imm. (AMNH); Ash Mountain, Kaweah Power Station, 40 miles NE Visalia [N36.48692°, W118.83983°], D. Burdick, 11.vi.1994, 1♂ (CAS 9057643); 30.v.1992, 1♂ (CAS 9057635); D.J. Burdick, 16.v.1992, 1♂ (CAS 9057583); Giant Forest to Marble Fork Cal, Kings R Trail [N36.56239°, W118.7515°], J.C. Bradley, 24.vii.1907, missing abdomen, 1♀ (AMNH); Lindcove, citrus litter [N36.35772°, W119.06363°], D. Caroll, 16–23.x.1978, 1♂ (USNM); 2–8.vii.1978, 1♂ (USNM); citrus, under board, 9.x.1978, 1♀ (USNM); Sequoia National Park, 3.5 km NE Visitor Center, broadleaf forest, in litter/rocks (N36.51°, W118.80667°, 615m), D. Ubick, 5.xi.2004, 1♂ (DU 04.11.05); Generals Highway (N36.55833°, W118.78833°, 1680m), 4. xi.2004, 1♂ (DU 04.11.04); Research center, around buildings at night (N36.48978°, W118.82906°), 28. iv.2004, 1♂ (DU 04.04.28); Soda Creek, near Nelson Camp [N36.44267°, W118.50099°], W.J. Gertsch and V. Roth, 14.ix.1959, 1♀ (AMNH); Three Rivers [N36.43884°, W118.90454°], W.J. Gertsch, Ivie and Schrammel, 29.iv.1960, 3♀ (AMNH); Mineking Roar, V. Roth and W. J. Gertsch, 4.vii.1956, 1♀ (AMNH); Venice Hills, grassland, under serpentine [N36.37356°, W119.18122°], D. Ubick, 28.iii.1991, 1♂ (DU 91.03.28); Wilsonia, Kings Canyon National Park [N36.7347°, W118.95599°], V. Roth and W.J. Gertsch, 13.ix.1959, 2♂ (AMNH); *Tuolumne Co.*: 5 miles N Priest [N37.8141°, W120.27269°], W.J. Gertsch and V. Roth, 8.vii.1958, 2♀ 3 imm. (AMNH); W of Yosemite, Tuolomne River (N37.91667°, W120.26667°), W. Ivie, 14.viii.1931, 1♀ (AMNH); *Ventura Co.*: Ventura [N34.27465°, W119.22903°], W.J. Gertsch, Ivie and Schrammel, 1.iv.1960, 1♀ 8 imm. (AMNH); Wheeler Springs [N34.50805°, W119.2915°], M.E. Thompson, 27. vii.1968, 1♂ (AMNH); *Yolo Co.*: Davis [N38.54491°, W121.74011°], W. Lange, 11.iv.1951, 1♀ 1 imm. (AMNH); *Yuba Co.*: Marysville [N39.14573°, W121.59136°], E. Ray, 21.xi.1943, subadult♀ (FMNH 2857665); 29.xi.1943, 1♀ (FMNH 2857663). **Oregon:** *Jackson Co.*: 10 mi. E, 6 mi. N Gold Hill on CR 234, EB-344-345 T35S/RIW/S17 [N42.51943°, W122.85543°, 396m], E. Benedict, 22.i.1972, 1♂ (MCZ 145416); Sam's Valley to Dead Indian Spring [N42.33208°, W122.44892°], J. Schuh, 17.v.1962, 1 imm. (AMNH). No data. 1♂ (AMNH); label illegible, with egg sac, 1♀ (CAS 9060633).

Kukulcania benita, sp. nov.

Figures 4B, 9F, 83–85

Type material: Holotype: **Mexico. Baja California:** *Islas San Benito*, Middle Island [N28.31048°, W115.56785°], S.C. Williams, 9. iv.1981, 1♀ (CAS 9060669). Paratypes: same data as the holotype, 1♀ (CAS 9060671), 1♂ (CAS 9060689); T. Cozana, 27.xii.1971, 1♀ (USNM IFM-1277); Benitos del Oeste [N28.3021°, W115.58734°], D.C. Lightfoot and V.F. Lee, 4.vii.1983, 1♀ 1 imm. (CAS 9060684).

Remarks: We initially thought this to be a variant of *K. geophila*. The male palpal morphology is nearly identical between the two species and differs only in proportions of the articles. The females, however, present a different genital morphology, with a much shorter membranous portion of the spermathecae. They are also larger and more lightly colored. Considering that this an insular population and the nearest record of *K. geophila* is more than 500 km to the north of the San Benito Islands, we believe it is safe to assume that both species represent independent evolutionary lineages.

Etymology: The name has been taken from the type locality and should be treated as an adjective.

Diagnosis: Males are very similar to *K. geophila*: the cymbium has two strong setae on the prolateral face, the bulb has a semicircular base and

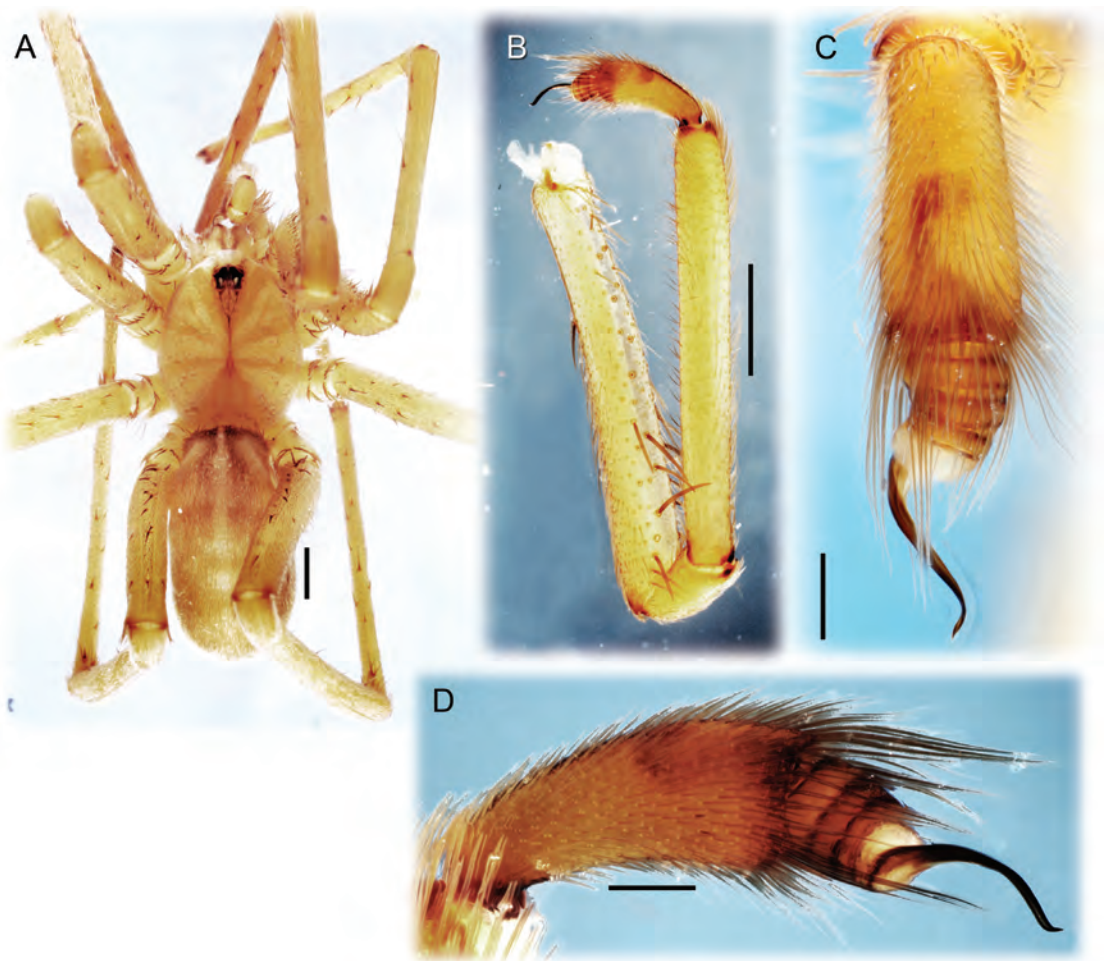

FIGURE 83. *Kukulcania benita*, male paratype from Mexico, Baja California, Islas San Benito (CAS 9060689). **A.** Habitus. **B.** Palp, retrolateral. **C.** Bulb, dorsal. **D.** Bulb, prolateral. Photos by D. Ubick. Scale bars = 1 mm (A–B), 0.2 mm (C–D).

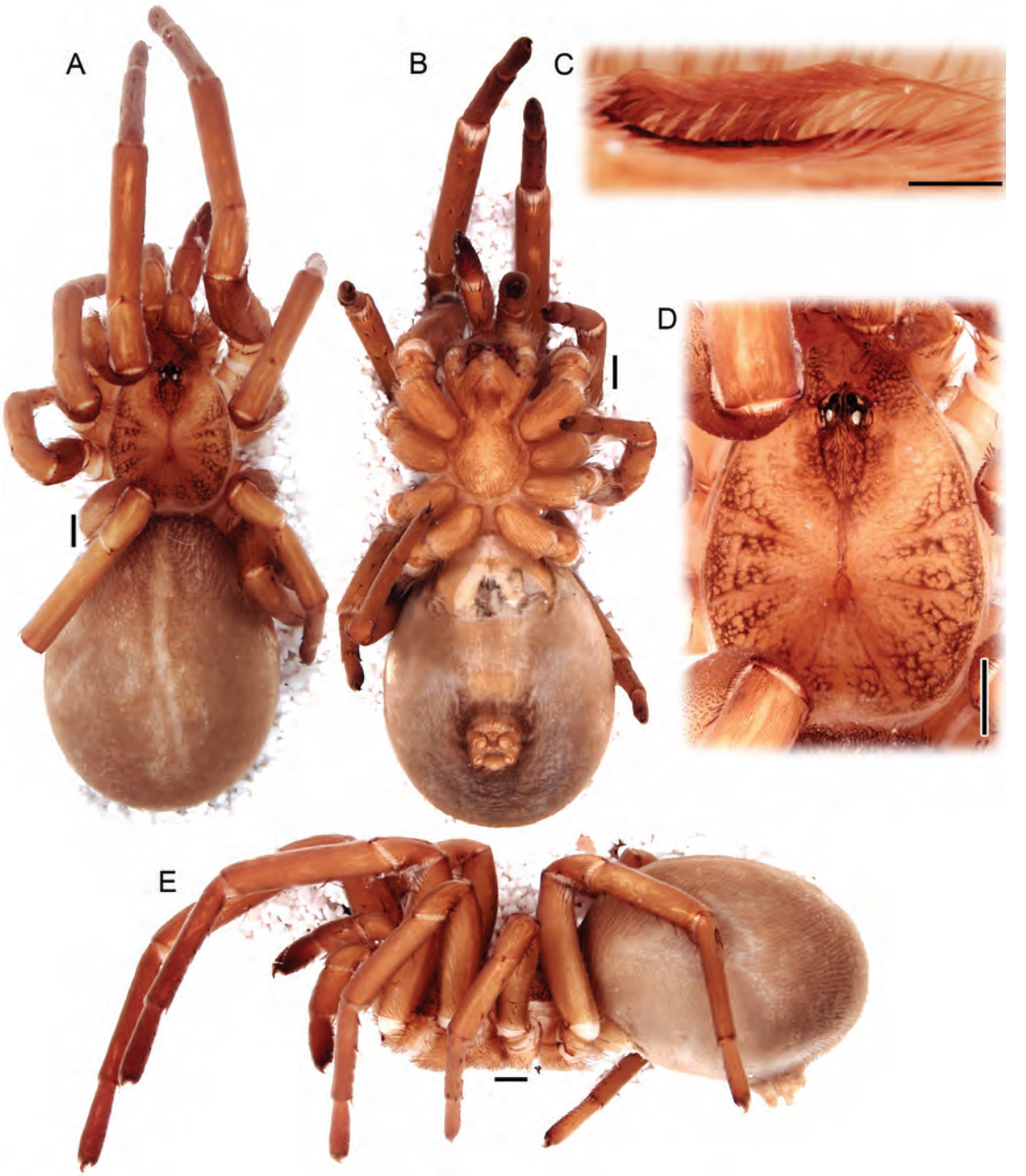

FIGURE 84. *Kukulcania benita*, female holotype from Mexico, Baja California, Islas San Benito (CAS 9060669), habitus. **A.** Dorsal. **B.** Ventral. **C.** Left calamistrum, dorsal. **D.** Carapace, dorsal. **E.** Habitus, lateral. Scale bars = 1 mm except for C, 0.2 mm.

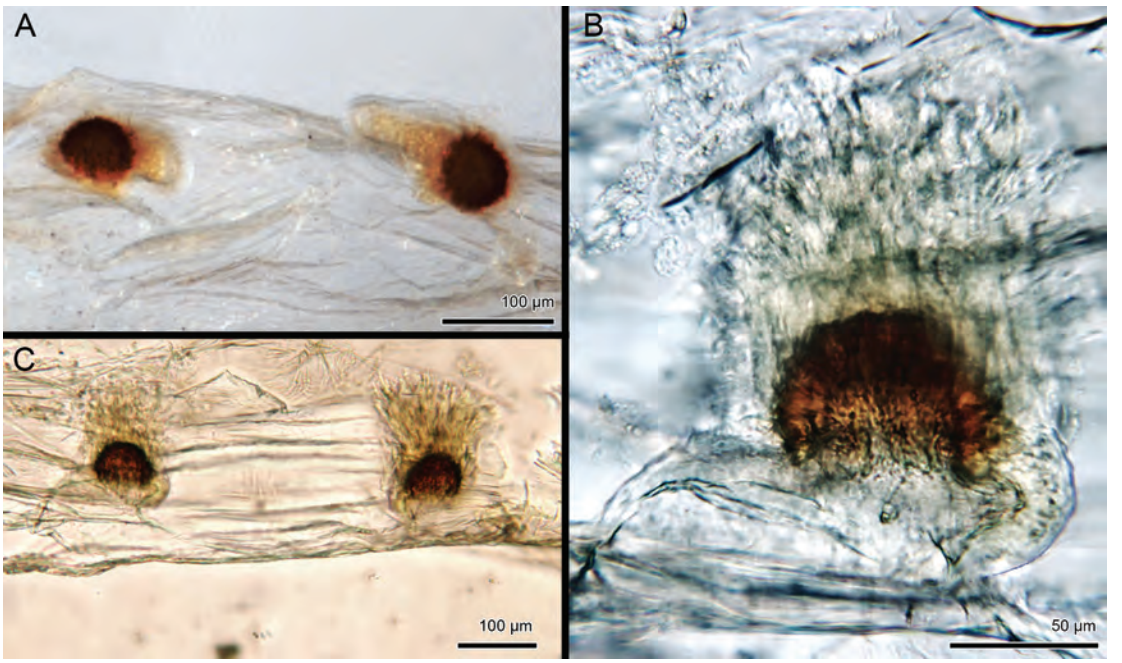

FIGURE 85. *Kukulcania benita*, female spermathecae, ventral. **A.** Holotype from Mexico, Baja California, Islas San Benito (CAS 9060669). **B–C.** Paratype from the same locality (USNM IFM-1277).

the embolus is thin and is loosely in the shape of an S. Males of *K. benita* can be distinguished by the longer palpal tibia (fig. 83) (8.1× longer than high in the single known male, between 5.1 and 6.1 in *K. geophila*). Females are similar to *K. geophila* and some populations of *K. bajacali* in lacking sclerotized bars and having at the apex of the spermathecae a small, semicircular glandular portion beside the membranous portion of the spermathecae. They can be distinguished from *K. geophila* by the shorter and stubbier (i.e., not finger-shaped) membranous portion of the spermathecae, and from *K. bajacali* by the shorter membranous base of the spermathecae (fig. 85) and by the lighter coloration (fig. 84).

Descr iptio n: Male paratype from Middle Island, San Benito Islands, Baja California, Mexico (CAS 9060689). Coloration orange yellow. Carapace with small V-shaped median pattern and lateral borders finely stippled with brown. Abdomen dorsum brownish yellow. Anterior margin of the carapace slightly shortened. Total length 8.03. Carapace length 3.55, width 2.78, clypeus length 0.33. Eye diameters and interdistances: AME 0.16; PME 0.17; ALE 0.2; PLE 0.19; AME–AME 0.07; PME–PME 0.2. Palp: femur length 3.37, height 0.43; tibia length 3.02, height 0.37. Abdomen: length 4.53, width 2.37. Leg macrosetae present on all femora, tibiae and metatarsi. Palp: cymbium long, with prolateral edge slightly protruding and bearing two strong setae; bulb short, semicircular at base; sperm duct with three coils; embolus long, sinuous.

Female paratype from San Benito Islands, Baja California, Mexico (USNM). Coloration yellow-brown. Carapace finely stippled with light brown. Sternum and legs not particularly hirsute. Legs with yellow longitudinal stripes on coxae, femora, and tibiae. Anterior margin of the carapace unmodified. Sternum oval, with two pairs of sigillae. Total length 11.79. Carapace length 5.11, width 4.16, clypeus length 0.88. Eye diameters and interdistances: AME 0.196; PME 0.31; ALE 0.32; PLE 0.316; AME–AME 0.092; PME–

PME 0.268. Sternum length 2.81, width 2.39. Palp: femur length 2.88, height 1.09; tibia length 1.79, height 1.01. Leg I: femur (fe) 6.14; patella (pa) 2.37; tibia (ti) 5.4; metatarsus (mt) 5.06; tarsus (ta) 2.67. II: fe 4.89; pa 1.82; missing from tibia. III: fe 3.89; pa 1.58; ti 3.23; mt 3.14; ta 1.77. IV: fe 5.42; pa 1.91; ti 4.65; mt 4.42; ta 2.05. Abdomen: length 7.42, width 4.94. Palp macrosetae on ventral surface of tibia and tarsus. Leg macrosetae present on ventral surfaces of tibiae, metatarsi, and tarsi; all femora and metatarsi III with 2–4 dorsal macrosetae. Calamistrum with three rows with 9–12 setae each. Interpulmonary fold large, rounded, covering the spermathecae dorsally. Sclerotized lateral bars absent; membranous portion of the spermathecae apex short, lobe shaped; glandular portion semicircular, sclerotized. State of the specimen: good, genitalia dissected, both legs II missing from tibia.

Natural history: Unknown.

Distribution: Known only from five adult individuals from the San Benito Islands, in Baja California, Mexico (fig. 4). The three islands together have an area of less than 6 km^2, making this the rarest and most geographically restricted species of the genus.

Kukulcania bajacali, sp. nov.

Figures 4B, 9G, 27H, 28H, 29H, 86–89

Type material: Holotype: **Mexico. Baja California Sur:** *Sierra de la Laguna,* Los Naranjos, under rocks [N23.56667°, W110°, 600m], A. Cota, 30.ix.1988, 1♀ (CAECIB 336). Paratypes: **Baja California:** *Cabo Pulmo,* Cerro Cuevoso [N23.43636°, W109.42963°], I. La Rivers, 26.iii.1947, 1♀ (UCB); *San José del Cabo* [N23.06366°, W109.70244°], Eisen and Vaslet, 6♀ 3 imm. (MCZ 145412); N. Banks, 1896, 1♀ (MCZ 145411). **Baja California Sur:** no further data, V. Roth, 5–8.ii.1966, 2♀ several imm. (AMNH); *12 miles NE Cabo San Lucas,* in a palm oasis [N22.98916°, W109.75131°], 7.ii.1966, 2♀ 1 imm. (AMNH); *44 km W La Paz,* at 0.2 km S km 44 on Highway 1 [N24.08966°, W110.69957°], D. Weissman, R. Love, V. Lee and C. Mullinex, 31.xii.1978, 1♀ (CAS 9060634); *8 miles SE La Paz* [N24.06244°, W110.18285°, 305m], E.L. Sleeper and F.J. Moore, 13.x.1968, 1♀ (CAS 9060627); *Cabo San Lucas* [N22.89053°, W109.91674°], T. Craig, 5.iii.1928, 1♀ (CAS 9060631); *Comitán* [N24.13151°, W110.42446°], M. Jiménez, 30.ix.1986, 1♀ (AMNH); *El Cien,* 1♀ (CAS 9060645), 1♀ (CAS 9060648); *La Paz* [N24.14264°, W110.31275°], V. Roth, 1–3.ii.1965, 2♂ 3♀ 2 imm. (AMNH), with egg sac, 1♂ 1♀ (AMNH IFM-1622), missing spermathecae, 2♂ 1♀ (AMNH); ii.1965, 2♂ 5♀ 1 imm. (AMNH); *S of El Cayuco "Fish Camp"* (N24.57787°, W111.67742°), R. Mercurio and M. Nashiguchi, 24.v.2004, 1♀ (AMNH IFM-0053); *Sierra de la Laguna,* Agua de La Palma, low woodland, hand collecting [N23.56667°, W110°, 150m], A. Cota, 11.xii.1986, 1♀ (CAECIB 342); *Sierra de las Cacachilas,* near Rancho Al Chivato [N24.10449°, W110.12541°, 487m], M.L. Jiménez and J. Maya, 5.xi.2013, 1♀ (CAECIB IFM-1540).

Etymology: The name has been taken from the first syllables of the name of the region where it occurs, the Baja California peninsula. To be treated as a noun in apposition.

Diagnosis: Males resemble *K. geophila* and *K. tractans* in having a simple bulb with an S-shaped embolus and inconspicuous keel. They can be distinguished by the shorter bulb, the lack of strong setae on the prolateral face of the bulb and the very conspicuous membranous area in the dorsum of the bulb (fig. 87). They can be further distinguished from all other *Kukulcania* by the unique texture of the bulb, resembling the cells of a beehive (fig. 27H), although this is very difficult to observe under light microscopy. Females are similar to *K. geophila* and *K. benita* in lacking sclerotized bars and having at the apex of the spermatheca a small, semicircular glandular portion beside the membranous portion. They can be distinguished from *K. geophila* by the shorter and stubbier (i.e., not finger-shaped) membranous portion of the spermathecae, and from *K. benita* by the longer membranous base

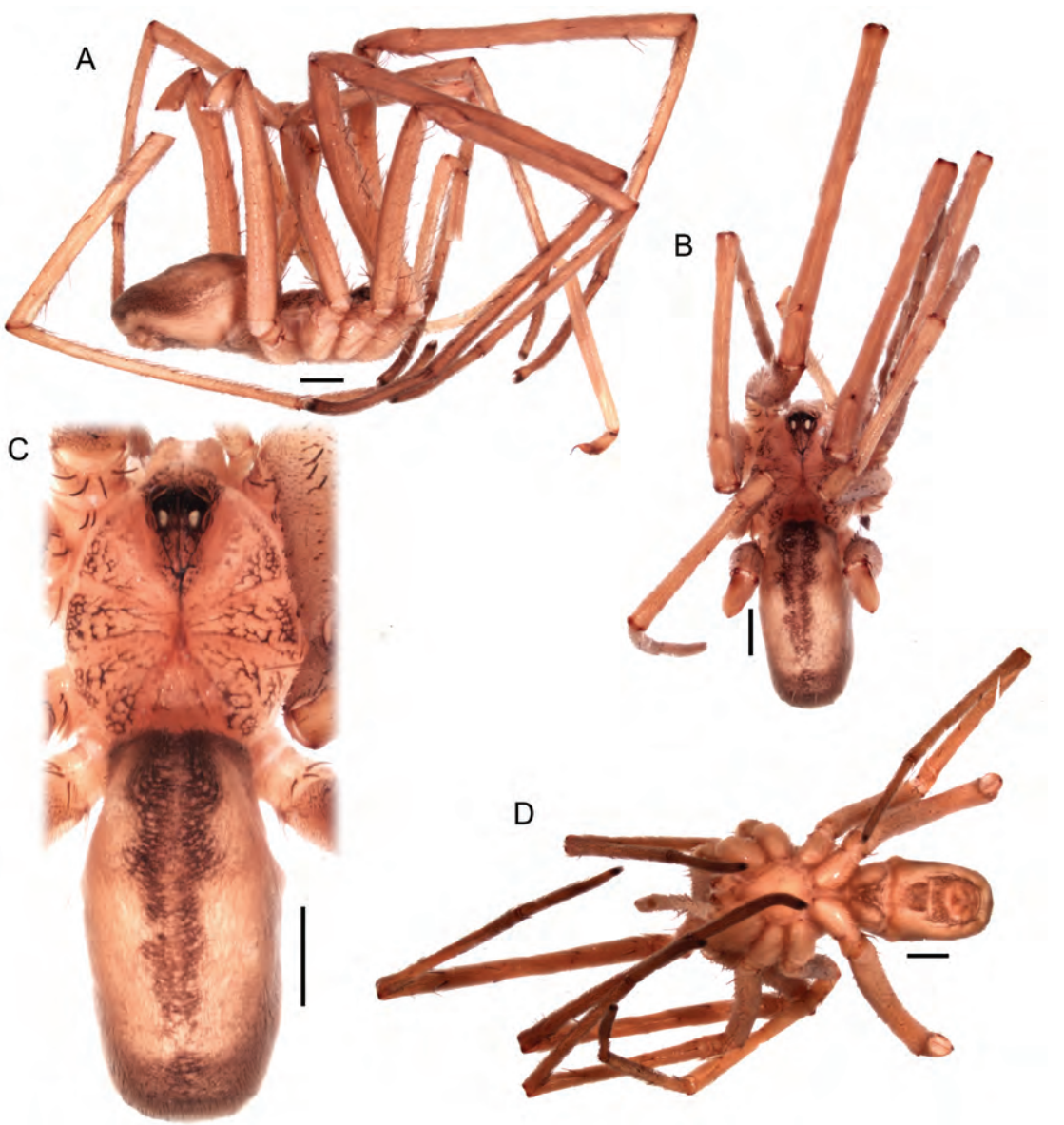

FIGURE 86. *Kukulcania bajacali*, male paratype from Mexico, Baja California Sur, La Paz (AMNH IFM-1622), habitus. **A.** Lateral. **B–C.** Dorsal. **D.** Ventral. Scale bars = 1 mm.

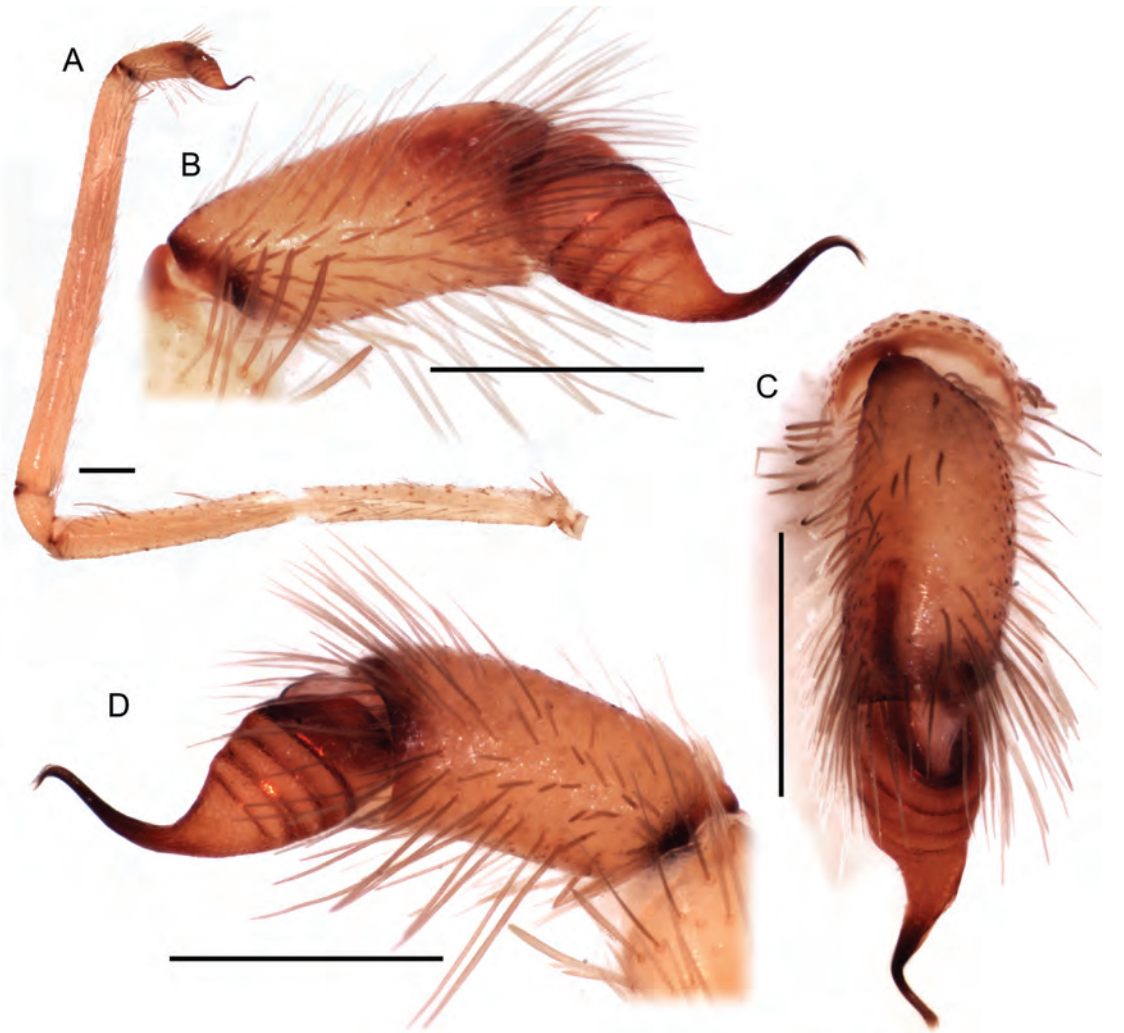

FIGURE 87. *Kukulcania bajacali*, male paratype from Mexico, Baja California Sur, La Paz (AMNH IFM-1622), left palp. **A–B.** Prolateral. **C.** Dorsal. **D.** Retrolateral. Scale bars = 0.5 mm.

FIGURE 88. *Kukulcania bajacali*, females, habitus. **A–D.** Female paratype from Mexico, Baja California Sur, Sierra de la Laguna (CAECIB 0342). **A.** Dorsal. **B.** Subanterior. **C.** Ventral. **D.** Lateral. **E.** Female holotype from Baja California Sur, Sierra de la Laguna (CAECIB 0336), lateral. Scale bars = 1 mm.

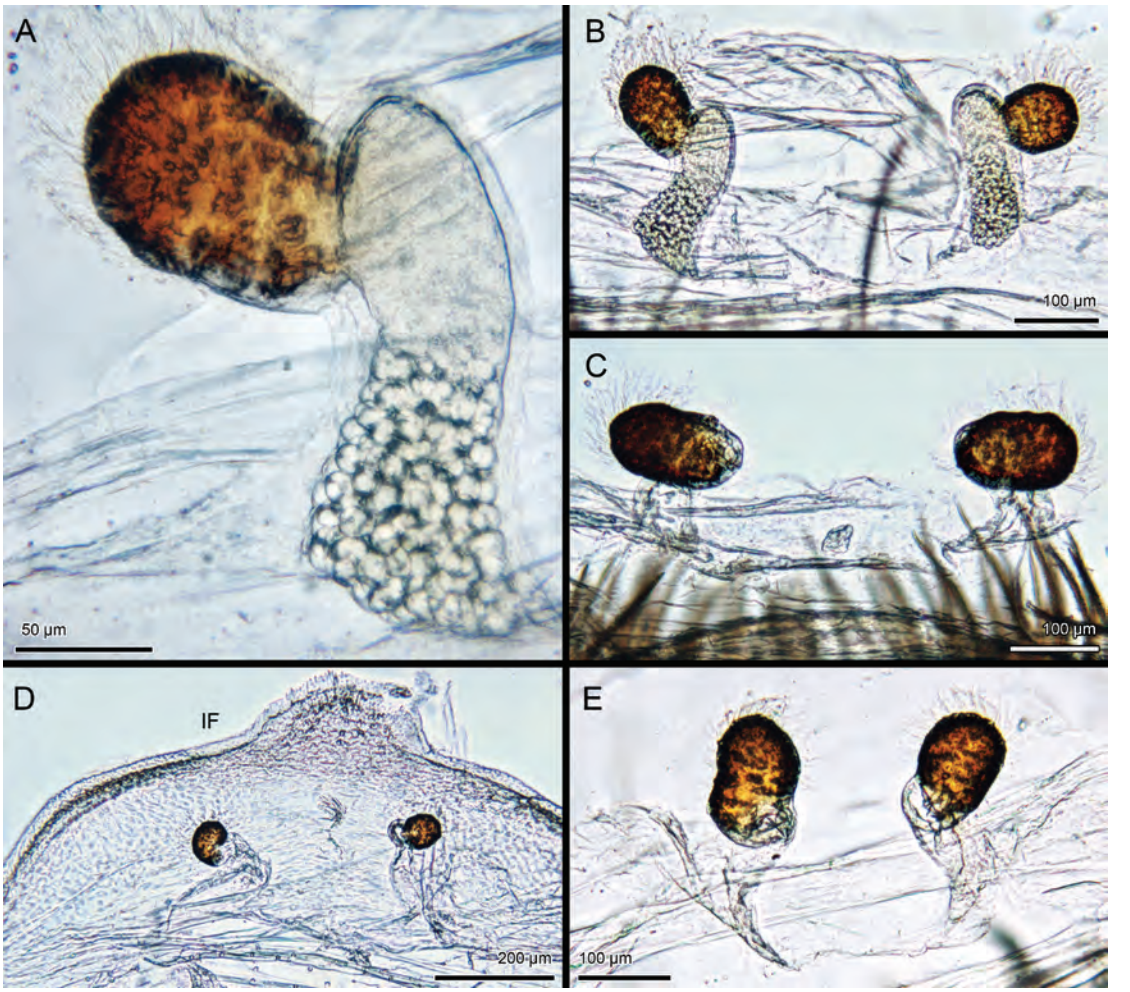

FIGURE 89. *Kukulcania bajacali*, female spermathecae, ventral. **A–B.** Holotype from Mexico, Baja California Sur, Sierra de la Laguna (CAECIB 0336). **C.** Paratype from Baja California Sur, Sierra de la Laguna (CAECIB 0342). **D.** Baja California Sur, Sierra de las Cacachillas (CAECIB). **E.** Baja California Sur, Boca de la Sierra (CAS 9057581). Abbreviation: **IF,** interpulmonary fold.

of the spermathecae (fig. 89) and by the darker coloration (fig. 88).

Descr iptio n: Male paratype from La Paz, Baja California Sur, Mexico (AMNH IFM-1622). Coloration yellowish cream. Carapace stippled with dark brown. Abdomen dorsum grayish cream, with brown cardiac area. Sternum oval, with two pairs of sigillae. Total length 6.68. Carapace length 2.94, width 2.47, clypeus length 0.31. Eye diameters and interdistances: AME 0.128; PME 0.195; ALE 0.254; PLE 0.234; AME–AME 0.09; PME–PME 0.224. Sternum length 1.45, width 1.42. Palp: femur length 4.36, height 0.34; tibia length 3.89, height 0.41. Leg I: femur (fe) 6.36; patella (pa) 1.36; tibia (ti) 6.33; metatarsus (mt) 6.54; tarsus (ta) 3.06. II: fe 4.94; pa 1.13; ti 4.5; mt 5.22; ta 2.22. III: fe 4.32; pa 1; ti 3.8; mt 4.99; ta 2.36. IV: fe 6; pa 1.32; ti 5.72; mt 7.1; ta 3.6. Abdomen: length 4.04, width 2.01. Palp macrosetae long, in several rows along femur ventral and dorsal faces. Leg macrosetae: fe I 2d, 10p, 20v, 3r; ti I 2p, 8v; mt I 1p, 15v, 1r; ta I 6v; fe II 7d, 4p, 14v; ti II 2p, 6v; mt II 3p, 10v, 2r; ta II 6v; fe III 6d, 12v, 1r; ti III 1d, 2p, 4v, 2r; mt III 3p, 9v, 4r; ta III 12v; fe IV 10d, 10v; ti IV 5v, 2r; mt IV 1p, 12v, 2r; ta IV 11v. Palp: cymbium about as long as bulb, with thick setae in the retrolateral face; bulb short, suboval; sperm duct with three tightly packed coils; embolus S-shaped, gently curved retrolaterally. State of the specimen: good, both palps dissected, right palp mounted for SEM, both legs IV disarticulated from tibia.

Female paratype from Sierra de La Laguna, Baja California Sur, Mexico (CARCIB 0342). Coloration brown. Carapace stippled on median area and lateral borders with dark brown. Sternum and first femora and tibiae hirsute, with short setae. Legs brown, with light brown longitudinal stripes on coxae, femora, and tibiae. Abdomen dorsum violaceous brown, with brown setae. Anterior margin of the carapace unmodified. Sternum oval, with two pairs of sigillae. Total length 12.17. Carapace length 4.94, width 4.11, clypeus length 0.564. Eye diameters and interdistances: AME 0.209; PME 0.244; ALE 0.34; PLE 0.294; AME–AME 0.077; PME–PME 0.301. Sternum length 2.19, width 2.3. Palp: femur length 2.58, height 0.98; tibia length 1.59, height 0.91. Leg I: femur (fe) 5.81; patella (pa) 1.95; tibia (ti) 5.51; metatarsus (mt) 4.71; tarsus (ta) 2.39. II: fe 4.47; pa 1.76; ti 3.56; mt 3.5; ta 1.87. III: fe 3.65; pa 1.57; ti 2.73; mt 3.02; ta 1.48. IV: fe 4.99; pa 1.61; ti 4.23; mt 4.01; ta 1.93. Abdomen: length 7.31, width 4.9. Palp macrosetae on ventral surface of tibia and tarsus. Leg macrosetae present on ventral surfaces of tibiae, metatarsi, and tarsi; femora with 2–4 dorsal macrosetae. Calamistrum with three rows with 9–11 setae each. Interpulmonary fold large, rounded, covering the spermathecae dorsally. Sclerotized lateral bars absent; membranous portion of the spermathecae apex digitiform, short; glandular portion oval, positioned laterally to membranous portion. State of the specimen: good, genitalia dissected, left leg I missing from tibia, abdomen lost most of the posterior setae.

Intra specific var iatio n: Males (N = 2): total length 4.3–6.68 (5.49), carapace length 2.07–2.94 (2.51), femur I length 5.48–6.36 (5.92), femur/carapace ratio 2.16–2.65 (2.41). Females (N = 5): total length 10.88–16.58 (12.55), carapace length 3.49–6.02 (4.87), femur I length 4.11–6.87 (5.65), tibia I length 3.64–5.92 (5.01), femur/carapace ratio 1.12–1.21 (1.17). The shape of the spermathecae is variable, especially in the size of the glandular portion and the shape of the membranous base (fig. 89).

Natural his t or y: Labels indicate specimens have been collected under rocks, under litter in sand dunes, in a palm oasis, and in low woodlands. A female has been collected in a house.

Distr ibutio n: Mexico, in Baja California Sur, with a few records in adjacent areas of southern Baja California (fig. 4B).

Additio nal ma ter ial examined: **Mexic o. Baja California Sur:** *1.5 mile NE Punta Palmilla* [N23.01058°, W109.71676°], S.C. Williams et al., 16.vii.1968, 1♀ (AMNH); *24 miles N Miraflores* [N23.69759°, W109.74241°], V. Roth, 10.ii.1966, 1♀ (CAS 9060683); *25 km E Cabo San Lucas* [N23.01487°, W109.72488°], C.E. Griswold and L.S. Vincent, 16.xii.1977, 1♀ (UCB); *5 miles W Mission San Luis Gonzaga* [N24.90802°, W111.29087°], V. Roth, 14.ii.1966,

2♀ (CAS 9060676); *6 miles E Cabo San Lucas,* night collecting [N22.89053°, W109.91674°, 107m], J.V. Olmstead, 14.i.1974, collected from burrow with young, 1♀ 2 imm. (AMNH); *8 km S Miraflores,* road to Las Casitas [N23.30636°, W109.76754°], C.E. Griswold and L.S, Vincent, 15.xii.1977, 2♀ (UCB); *8 miles S El Crucero* [N25.03953°, W111.65788°], V. Roth, 12.ii.1966, 1♀ (AMNH); *8 miles SE La Paz* [N24.06244°, W110.18285°, 305m], E.L. Sleeper and F.J. Moore, 13.x.1968, 1♀ (CAS 9060677); *Bahía de La Paz,* Isla Gaviota [N24.14264°, W110.31275°], B. Osorio y Tafall, 17.v.1944, 1♀ (AMNH); *Boca de la Sierra* [N23.38607°, W109.81647°], HWC, 12.viii.1964, 1♀ (CAS 9057581); *Cabo San Lucas,* under litter on sand dunes [N22.89053°, W109.91674°], P. Rude, 31. xii.1978, 2♀ (UCB); *Comitán* [N24.13151°, W110.42446°], M. Jiménez, 2.x.1986, 1♂ (AMNH); *La Paz* [N24.14264°, W110.31275°, 50m], E.L. Sleeper and F.J. Moore, 12.x.1968, 1♀ (AMNH); [N24.14264°, W110.31275°], V. Roth, 2–3.ii.1966, 1♀ (AMNH); *La Ribera* (N23.3°, W109.3°), 10.ii.1966, 1♀ (AMNH); *Rancho Centenario,* W of La Paz on road to Los Aripes [N24.14264°, W110.31275°], P.R. Craig and D.L. Craig, 10.ix.1963, 1♀ (CAS 9057634); *Santiago,* in house, H.W. Campbell, 15–18.viii.1964, 1♀ (CAS 9057585); *west side of Santiago* [N23.48194°, W109.71833°], 14.viii.1964, caught in the middle of an imaginal molt, 3♀ (CAS 9057600). **No data.** Marx Collection, label reads: "Arizona, Williams. Marx collection, careful of loc. data" –specimen certainly mislabeled, 1♀ (USNM).

Subfamily Prithinae Gray

Genus *Pikelinia* Mello-Leitão, 1946

Pikelinia Mello-Leitão, 1946: 42. Type species *Filistata tambilloi* Mello-Leitão, 1941, by original designation.

Pikelinia brevipes, comb. nov. (Keyserling, 1883)

Filistata brevipes Keyserling, 1883: 221. Female holotype from Peru, should be deposited in the University of Warsaw ("*In der Sammlung der Universität in Warschau*"), not located, probably lost.

Kukulcania brevipes: Lehtinen, 1967: 242 (incorrect transfer to *Kukulcania*).

Remar ks: Most early authors lumped filistatids in *Filistata* when describing new species, and Keyserling (1883) was no exception. He described this species based on females from Peru and provided a verbose description, but no illustrations. Mello-Leitão (1946) presented a small revision of Neotropical filistatids and correctly recognized that New World species do not belong in *Filistata*, transferring most prithine species to the New World genera *Filistatoides* F.O. Pickard-Cambridge, 1899, *Pikelinia* Mello-Leitão, 1946, or *Malalistata* Mello-Leitão, 1946 (= *Pikelinia*). However, he overlooked *Filistata brevipes*, and this species remained listed in this genus along with *F. hibernalis, F. tractans, F. arizonica, F. geophila, F. utahana*, and *F. hurca.* When Lehtinen (1967) erected *Kukulcania*, he transferred all American *Filistata* to his newly created genus, including *F. brevipes*, despite the fact that he could not locate or examine its type specimen. As this species continued to be listed in *Kukulcania*, Brescovit and Santos (2013) thought the material they had collected from Peru belonged to this species and proceeded to present a redescription of what they believed to be conspecific with the type of *Filistata brevipes*. This type material could not be located by Lehtinen (1967), Brescovit and Santos (2013), by C.J. Grismado (in litt.), or by one of us (I.L.F.M.). It is not in the collections of the Museum and Institute of Zoology of the Polish Academy of Sciences (Warsaw) (Brescovit and Santos, 2013), nor could be found in other collections where some of Keyserling's types are to be found (MCZ, NHM, OUNHM). At this point, the type material of *Filistata brevipes* should be regarded as lost. However, Keyserling's (1883) description presents two key characters that allow us to unambiguously identify his species as as a Prithinae: (1) yellow palps and legs, the latter with two brown rings in all articles except the tarsi ("*Palpen und Beine gelb, die ersteren an*

den Endgliedern dunkler, die letzteren an allen Gliedern, mit Aus-nahme der Tarsen, mit zwei, mehr oder weniger deutlichen, braunen Ringen versehen"), and (2) an inconspicuous calamistrum ("*ein Calamistrum ist an dem hinteren Beinpaar nicht zu bemerken*"). Yellow legs with brown rings are never present in *Kukulcania* (even in immature stages); this character is present in some *Filistata* (see Marusik and Zonstein, 2014) but is much more typical of Prithinae spiders (see Magalhaes, 2016, Magalhaes and Ramírez, 2017). The calamistrum in Filistatinae is on a crest, has broadened setae, and is generally very conspicuous (figs. 13F, 75D). Conversely, the calamistrum in Prithinae has unmodified setae and is not placed on a crest, and may be very difficult to distinguish among the other setae of the metatarsus (Magalhaes, 2016: fig. 26D). If *Filistata brevipes* was a filistatine, it is unlikely that Keyserling would have overlooked its calamistrum, since in 1879 he clearly recognized the peculiar morphology of this structure in *K. hibernalis* (sub *F. capitata*): "*Am Anfange an der Innenseite der Metatarsen des vierten Beinpaares befindet sich das Calamistrum, eine kurze kammförmige Erhöhung, die mit einer dichten Reihe nicht langer Stachelborsten besetzt ist.*" Thus, we can safely conclude that *Filistata brevipes* is a Prithinae, most likely in the genus *Pikelinia*. Its specific identity cannot be ascertained at this time: several species of *Pikelinia* occur in Peru (I.L.F. Magalhaes, unpublished data), and Keyserling's description could apply to many of these. Considering this and the impossibility of examining the type specimen, this species might eventually need to be regarded as a nomen dubium, although not until a revisionary study of South American prithine spiders is carried out. Reinforcing our point of view, W.J. Gertsch applied the name "*Filistatoides brevipes* (Keyserling)" (a combination never formally proposed) to a Peruvian *Pikelinia* Mello-Leitão, and identified the Peruvian *Kukulcania* as a new species under the manuscript name "*Filistata tropica*."

ACKNOWLEDGMENTS

We are indebted to the following persons and institutions for making specimens available for this study: G.A. Milledge (AM); L. Prendini, L. Sorkin, and N. Platnick (AMNH); M.L. Jiménez (CAECIB); S. Lagos and F. Campón (CAI); L. Esposito, D. Ubick, C.E. Griswold, and A. Carmichael (CAS); O.F. Francke and D. Barrales (CNAN-Ar); D. Ubick (DU); P.S. Motta (DZUB); P. Sierwald and J. Boone (FMNH); A.D. Brescovit and P.A. Goldoni (IBSP); E. Flórez (ICN-Ar); C. Víquez (INBIO); C.J. Grismado (MACN-Ar); L. Latella and R. Salmaso (MCVR); G. Giribet and L. Leibensperger (MCZ); A.B. Kury and C. Barros (MNRJ); D. Silva (MUSM); R. Pinto da Rocha (MZSP); J. Beccaloni (NHM); Z. Simmons (OUMNH); M. Hedin (SDSU); P. Jäger and Julia Altmann (SMF); A.J. Santos and V. Souza (UFMG); J. Coddington and D. DeRoche (USNM); and J. Dunlop and A. Friederichs (ZMB). L. Prendini, P. Colmenares and L. Sorkin (AMNH), L. Esposito, C.E. Griswold and D. Ubick (CAS), L. Leibensperger (MCZ), A.A. Nogueira (MZSP), and A.J. Santos and V. Souza (UFMG) are especially thanked for the warm reception in their respective institutions during visits by ILFM. A.J. Santos kindly shared a spreadsheet with published records of *K. hibernalis* and *K. santosi*. S. Crews, P.M. Favre, C.J. Grismado, M. Hedin, F.M. Labarque, S. Longhorn, A.J. Santos, D. Ubick, K.I. Ueda, and F. Vol are thanked for allowing reproduction of their photographs of live or fixed specimens and SEM images. C.J. Grismado and S. Longhorn are especially thanked for the great job in locating specimens, interpreting labels and localities, and photographing the type material of *Teratodes depressus* and *Filistata tractans* and *F. capillosa*, respectively. M. Reitmeyer helped in locating and scanning W. Gertsch's unpublished notes and drawings in the AMNH files. M. Hedin, W. Maddison, and especially A. Johnston and N. Franz, Arizona State University, helped with fieldwork of M.J.R. in Arizona. I.L.F.M. wishes to thank R. Pomarola, S. Absalon, and M. Polidoro for kindly housing him during his visit to Boston. An earlier version of the manuscript was improved by comments from C.E.

Griswold and an anonymous referee. Visits to the MCZ, CAS, and AMNH were generously supported by an Ernst Mayr Travel Grant in Animal Systematics (MCZ) and by a Theodore Roosevelt Memorial Grant (AMNH) to I.L.F.M. This study was financially supported by a CONICET doctoral fellowship (ILFM) and grants from CONICET (2012–0943) and FONCyT (2015–0283) (M.J.R.).

REFERENCES

Alayón G., G. 1972. La familia Filistatidae (Arachnida: Araneae) en Cuba. Ciencias (Biología) 4 (34): 1–19.

Alayón G., G. 1975. Situation nomenclatorial y designacion de lectotipo y paralectotipo para *Filistata isolinae* Alayón, 1972 (Arachnida: Araneae). Miscellanea Zoologica, 1: 2.

Alayón G., G. 1981. Nueva especie de *Filistata* Latreille, 1810 (Araneae: Filistatidae), de México. Poeyana 229: 1–3.

Alegre, A., G. Meneses, and F. Aguilar. 1977. Peligrosidad de diez arañas comunes en la costa central peruana. Revista Peruana de Entomología 20 (1): 63–66.

Álvarez-Padilla, F., and G. Hormiga. 2008. A protocol for digesting internal soft tissues and mounting spiders for scanning electron microscopy. Journal of Arachnology 35: 538–542.

Banks, N. 1909. Arachnida of Cuba. Estación Central Agronómica de Cuba, report 2: 150–174.

Barrantes, G., and M.J. Ramírez. 2013. Courtship, egg sac construction, and maternal care in *Kukulcania hibernalis*, with information on the courtship of *Misionella mendensis* (Araneae, Filistatidae). Arachnology 16 (2): 72–80.

Blackwall, J. 1867. Notes on spiders, with descriptions of several species supposed to be new to arachnologists. Annals and Magazine of Natural History 20 (3): 202–213.

Brescovit, A.D., and A.J. Santos. 2013. The spider genus *Kukulcania* in South America (Araneae: Filistatidae): a redescription of *K. brevipes* (Keyserling) and new records of *K. hibernalis* (Hentz). Zootaxa 3734 (3): 301–316.

Brescovit, A.D., A.S. Ruiz, and G. Alayón. 2016. The Filistatidae in the Caribbean region, with a description of the new genus *Antilloides*, revision of the genus *Filistatoides* F. O.P.-Cambridge and notes on *Kukulcania* Lehtinen (Arachnida, Araneae). Zootaxa 4136 (3): 401–432.

Chamberlin, R., and W. Ivie. 1935. Miscellaneous new American spiders. Bulletin of the University of Utah 26 (4): 1–79.

Chamberlin, R., and W. Ivie. 1942. A hundred new species of American spiders. Bulletin of the University of Utah 32 (13): 3–117.

Cokendolpher, J.C., and K. MacDonald. 2008. Egg guarding and spiderling group-feeding in crevice weaver spiders (Araneae: Filistatidae). Revista Ibérica de Aracnología 16: 67–70.

Craig, C.L., G.D. Bernard, and J.A. Coddington. 1994. Evolutionary shifts in the spectral properties of spider silks. Evolution 48: 287–296.

Crews, S.C. 2009. Assessment of rampant genitalic variation in the spider genus *Homalonychus* (Araneae, Homalonychidae). Invertebrate Biology 128 (2): 107–125.

Crews, S.C., and M. Hedin. 2006. Studies of morphological and molecular phylogenetic divergence in spiders (Araneae: *Homalonychus*) from the American southwest, including divergence along the Baja California Peninsula. Molecular Phylogenetics and Evolution 38 (2): 470–87.

Curtis, J.T., and J.E. Carrell. 1999. Social behaviour by captive juvenile *Kukulcania hibernalis* (Araneae: Filistatidae). Bulletin of the British Arachnological Society 11 (6): 241–246.

Deyrup, M., J.T. Cronin, and F.E. Kurczewski. 1988. *Allochares azureus*: an unusual wasp exploits unusual prey (Hymenoptera: Pompilidae; Arachnida: Filistatidae). Psyche 95: 265–281.

Eberhard, W.G. 1988. Combing and sticky silk attachment behaviour by cribellate spiders and its taxonomic implications. Bulletin of the British Arachnological Society 7: 247–251.

Eberhard, W., and F. Pereira. 1993. Ultrastructure of cribellate silk of nine species in eight families and possible taxonomic implications (Araneae: Amaurobiidae, Deinopidae, Desidae, Dictynidae, Filistatidae, Hypochilidae, Stiphidiidae, Tengellidae). Journal of Arachnology 21: 161–174.

Fernández, R., et al. 2018. Phylogenomics, diversification dynamics, and comparative transcriptomics across the spider tree of life. Current Biology 28: 1489–1497.

Gertsch, W.J. 1960. The *fulva* group of the spider genus *Steatoda* (Araneae, Theridiidae). American Museum Novitates 1982: 1–48.

Gray, M.R. 1995. Morphology and relationships within the spider family Filistatidae (Araneae: Araneomor-

phae). Records of the Western Australian Museum 52 (52): 79–89.

Griswold, C.E., M.J. Ramírez, J.A. Coddington, and N.I. Platnick. 2005. Atlas of phylogenetic data for entelegyne spiders (Araneae: Araneomorphae: Entelegynae) with comments on their phylogeny. Proceedings of the California Academy of Sciences 56 (2): 1–324.

Hamilton, C.A., B.E. Hendrixson, and J.E. Bond. 2016. Taxonomic revision of the tarantula genus *Aphonopelma* Pocock, 1901 (Araneae, Mygalomorphae, Theraphosidae) within the United States. ZooKeys 560: 1–340.

Hentz, N.M. 1842. Descriptions and figures of the Araneides of the United States. Boston Journal of Natural History 4: 54–57, 223–231.

Holmberg, E.L. 1876. Arácnidos argentinos. Anales de Agricultura de la República Argentina 4: 1–30.

Jiménez, M.L. 2004. Descripción de la hembra de *Leptoctenus sonoraensis* Peck (Araneae: Ctenidae) y nuevos registros de arañas para la península de Baja California, México. Revista Ibérica de Aracnología 10: 271–273.

Keyserling, E. 1879. Neue Spinnen aus Amerika. Verhandlungen der Kaiserlich-Königlichen Zoologisch-Botanischen Gesellschaft in Wien 29: 293–349.

Keyserling, E. 1883. Neue Spinnen aus Amerika. IV. Verhandlungen der Kaiserlich-Königlichen Zoologisch-Botanischen Gesellschaft in Wien 32: 195–226.

Koch, C.L. 1842. Die Arachniden: 1–36, 57–108. Nürnberg: C.H. Zeh'schen Buchhandlung.

Leavitt, D.H., J. Starrett, M.F. Westphal, and M. Hedin. 2015. Multilocus sequence data reveal dozens of putative cryptic species in a radiation of endemic Californian mygalomorph spiders (Araneae, Mygalomorphae, Nemesiidae). Molecular Phylogenetics and Evolution 91: 56–67

Lehtinen, P.T. 1967. Classification of the cribellate spiders and some allied families, with notes on the evolution of the suborder Araneomorpha. Annales Zoologici Fennici 4: 199–468.

Levi, H.W. 1957. The spider genera *Crustulina* and *Steatoda* in North America, Central America and the West Indies (Araneae, Theridiidae). Bulletin of the Museum of Comparative Zoology 117: 367–424.

Levi, H.W. 1971. Location of types of American (and some other) species of arachnids. Published by the author: 1–4.

Lopardo, L., and M.J. Ramírez. 2007. The combing of cribellar silk by the prithine *Misionella mendensis*, with notes on other filistatid spiders (Araneae: Filistatidae). American Museum Novitates 3563: 1–14.

Lucas, H. 1857. Arachnides. *In* R. de la Sagra, Historia física, política y natural de la Isla de Cuba, vol. 7: 69–84. Paris: A. Bertrand.

Magalhaes, I.L.F. 2016. On new or poorly known Australian Filistatidae spiders (Araneae: Araneomorphae), including a study on the fine morphology of *Wandella*. Journal of Natural History 50: 1815–1858.

Magalhaes, I.L.F. 2018. A new, relictual *Antilloides* from Mexican caves: first mainland record of the genus and revised placement of the fossil *Misionella didicostae* (Araneae: Filistatidae). Journal of Arachnology 46: 204–248.

Magalhaes, I.L.F., and M.J. Ramírez. 2017. Relationships and phylogenetic revision of *Filistatinella* spiders (Araneae:Filistatidae). Invertebrate Systematics 31 (6): 665–712.

Marusik, Y.M., and A. Zamani. 2015. The spider family Filistatidae (Araneae) in Iran. ZooKeys 516: 123–135.

Marusik, Y.M., and S.L. Zonstein. 2014. A synopsis of Middle East *Filistata* (Aranei: Filistatidae), with description of a new species from Azerbaijan. Arthropoda Selecta 23 (2): 199–205.

Marusik, Y.M., A. Zamani, and O. Mirshamsi. 2014. Three new species of mygalomorph and filistatid spiders from Iran (Araneae, Cyrtaucheniidae, Nemesiidae and Filistatidae). ZooKeys 463: 1–10.

Marusik, Y.M., S. Koponen, S.L. Zonstein. 2017. A revalidation and redescription of *Sahastata infuscata*, with notes on *S. nigra* (Araneae: Filistatidae). Arachnology 17: 309–311.

Mello-Leitão, C.F. de. 1943. Catálogo das aranhas do Rio Grande do Sul. Arquivos do Museu Nacional do Rio de Janeiro 37: 147–245.

Mello-Leitão, C.F. de 1946. Notas sobre os Filistatidae e Pholcidae. Anais da Academia Brasileira de Ciências 18: 39–83.

Petrunkevitch, A. 1911. A synonymic index-catalogue of spiders of North, Central and South America with all adjacent islands, Greenland, Bermuda, West Indies, Terra del Fuego, Galapagos, etc. Bulletin of the American Museum of Natural History 29: 1–809.

Pickard-Cambridge, F.O. 1899. Arachnida – Araneida and Opiliones. *In* Biologia Centrali-Americana, Zoology. 41–88. London: Godman & Salvin.

Pickard-Cambridge, O. 1896. Arachnida. Araneida. *In* Biologia Centrali-Americana, Zoology: 161–224. London: Godman & Salvin

Pickard-Cambridge, O. 1899. Arachnida. Araneida. *In* Biologia Centrali-Americana, Zoology: 289–304. London: Godman & Salvin.

Platnick, N.I., J.A. Coddington, R.R. Forster, and C.E. Griswold. 1991. Spinneret morphology and the phylogeny of haplogyne spiders (Araneae, Araneomorpha). American Museum Novitates 3016: 1–73.

Queiroz, K. de. 2007. Species concepts and species delimitation. Systematic Biology 56: 879–886.

Ramírez, M.J. 2014. The morphology and phylogeny of dionychan spiders (Araneae, Araneomorphae). Bulletin of the American Museum of Natural History 390: 1–374.

Ramírez, M.J., and C.J. Grismado. 1997. A review of spider family Filistatidae in Argentina (Arachnida, Araneae), with a cladistic reanalysis of filistatid genera. Entomologica Scandinavica 28 (3): 319–349.

Simon, E. 1893. Histoire naturelle das araignées, vol. 1: 257–488. Paris: Librairie Encyclopédique de Roret.

Swanson, B.O., T.A. Blackledge, A.P. Summers, and C.Y. Hayashi. 2006. Spider dragline silk: correlated and mosaic evolution in high-performance biological materials. Evolution 60: 2539–2551.

Taucare-Ríos, A.O. 2010. Primer registro de *Kukulcania hibernalis* (Hentz, 1842) (Araneae: Filistatidae) para Chile. Boletín de Biodiversidad de Chile 4: 83–86.

Ubick, D. 2005. Filistatidae. *In* D. Ubick, P. Paquin, P.E.Cushing, and V. Roth. Spiders of North America: an identification manual: 80–81. Keene: American Arachnological Society.

Ubick, D. 2017. Filistatidae. *In* D. Ubick, P. Paquin, P.E.Cushing, and V. Roth. Spiders of North America: an identification manual, 2nd ed.: 116–117. Keene: American Arachnological Society.

Wheeler, W.C., et al. 2017. The spider tree of life: phylogeny of Araneae based on target-gene analyses from an extensive taxon sampling. Cladistics 33 (6): 574–616.

WSC. 2018. World spider catalog, version 19.0. Natural History Museum Bern. Online resource (http://wsc.nmbe.ch), accessed February 14, 2018.

Zamani, A., and Y.M. Marusik. 2018. New species and records of Filistatidae (Arachnida: Aranei) from Iran. Arthropoda Selecta 27: 121–128.

Zonstein, S.L. 2009. Taxonomic notes on the genus *Microfilistata* (Araneae: Filistatidae), with a description of a new species from Turkmenistan. Journal of Arachnology 37 (3): 373–374.

Zonstein, S., and Y.M. Marusik. 2016. A revision of the spider genus *Zaitunia* (Araneae, Filistatidae). European Journal of Taxonomy 214: 1–97.

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On the cover: Kukulcania hurca (Chamberlin and Ivie), male from Anza-Borrego Desert State Park, California. Photo by Marshal Hedin.