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A New Goblin Spider Genus of the *Zyngoonops* Group from Costa Rica, With Notes on *Coxapopha* (Araneae, Oonopidae)

NORMAN I. PLATNICK,¹ LILY BERNIKER,¹ AND CARLOS VÍQUEZ²

ABSTRACT

A new genus, *Hexapopha*, is described for a group of species from Costa Rica that resemble those of *Coxapopha* Platnick in having an elevated carapace and heavily sclerotized, highly modified male endites but differ in retaining six eyes, lacking leg spines, and having no female genitalic scape. *Xestaspis reimoseri* Fage is transferred to *Hexapopha* as the type species, its female is described for the first time, and three new species (*H. hone*, *H. jimenez*, and *H. osa*) are described. *Dysderina caeca* Birabén, from Argentina, is transferred to *Coxapopha*.

INTRODUCTION

Revisionary work on New World oonopids began with the studies of Chickering (1968, plus nine additional papers published between 1968 and 1973). Prior to that, only a relatively small number of isolated species descriptions appeared, scattered in various faunistic studies. As is often the case with faunistic approaches, the results were sometimes less than satisfactory. Two species, in particular, stand out as decidedly enigmatic. In both cases, a new species was described on the basis of a single specimen, and was misplaced in a large genus to which it clearly does not belong. In both cases, the holotypes have subsequently been lost, exacerbating doubts about their status.

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One such case is *Dysderina caeca* Birabén (1954), which was based on a female taken in Salta, Argentina. Birabén acknowledged that his female differed from all members of *Dysderina* Simon (1891) in having only two eyes, but argued that the presence of spines on the anterior legs left no doubt about the generic allocation. At that time, *Dysderina* was simply a catch-all group containing hard-bodied, spinose species from far-flung localities around the globe. Since then, *Dysderina* itself has been redefined and shown to be a member of an exclusively Neotropical, highly speciose complex of genera (Abraham et al., 2012; Platnick and Berniker, 2014; Platnick, Berniker, and Bonaldo, 2013a, 2013b; Platnick, Berniker, and Viquez, 2014; Platnick and Dupérré, 2011a, 2011b, 2011c, 2012; Platnick et al., 2013).

The holotype female of *Dysderina caeca* should have been deposited in the Museo de La Plata, Argentina, along with the remainder of the Birabén collection, but is not in that collection (Luis Pereira, in litt.). Luckily, Birabén supplied illustrations that provide several clues. In addition to the eye pattern (only two eyes, widely separated), Birabén supplied a ventral view of the abdomen and even a lateral view of the epigastric region. These figures show an extensive posterior genitalic system including a small, median external scape at its posterior end. Such genitalia are typical of the genus *Coxapopha* Platnick (2000); although the Panamanian type species of that genus is known only from males, additional species have been described from Brazil and Peru (Ott and Brescovit, 2004). The female genitalia of a Peruvian species have been documented in detail by Fannes (2013a: figs. 86–88), and they are an excellent match to Birabén's figures. *Dysderina caeca* is therefore here transferred to *Coxapopha caeca* (Birabén), new combination.

The second case is a male from Costa Rica that was described as *Xestaspis reimoseri* by Fage (1938). Here again, the placement of the species initially seems bizarre, as *Xestaspis* Simon (1884) is an Old World group with no representatives in America, and there are no special similarities between the Costa Rican species and the Old World type species. Fage's placement was based instead on similarities to the species *Xestaspis sertata* Simon (1907) from Bioko; the most striking feature of the Costa Rican male is its enormously elaborate, heavily sclerotized endites, which occur also in the Bioko species. Today, those types of endite modifications are considered synapomorphic for the group of genera including *Zyngoonops* Benoit (1977), *Coxapopha*, *Antoonops* Fannes and Jocqué (2008), *Kijabe* Berland (1914), and *Triaeris* Simon (1891), as detailed by Fannes (2013a) and Platnick et al. (2012).

Fage's male was reportedly taken in an odd habitat: a nest of the termite *Nasutitermes corniger* (Motschulsky). Fage obtained the specimen from Eduard Reimoser of the Natural History Museum of Vienna, where the type was subsequently deposited. Surprisingly, Fage's original description provides no locality data for the specimen, which was deposited as "Inv. No. 214" in the Vienna collection. Unfortunately, the type has been lost; a note written in 2002 by Jürgen Gruber, then the curator of the collection, indicated that the animal was missing from its vial. Fortunately, a copy of the registration entry for the specimen, kindly provided by Christoph Hörweg, the current curator, provides the missing locality information. The specimen was collected at Hamburg Farm by Nevermann. The registry information is also confirmed by an entry for Fage's species published by Reimoser (1939: 381).

Hamburg Farm was the property of the German entomologist Ferdinand Nevermann; it was situated on the banks of the Río Reventazón near Cairo in Limón, Costa Rica. After Nevermann's death, the farm was purchased by a banana company, and its name is retained by the village of Hamburg, situated at approximately 10.246618°N, 83.464285°W. Although we have seen no other males from Hamburg Farm, the Field Museum of Natural History collection includes one female that was taken there by Nevermann in 1937. That female appears to be conspecific with modern specimens found at the Estación Biológica La Selva in Heredia, so we are here able to redescribe the male and newly describe its female. This species and three close relatives, newly described below, belong to a new genus described below as *Hexapopha*.

Specimens of *Hexapopha*, like those of *Coxapopha*, are extremely rare in collections; despite substantial collecting efforts in Costa Rica, we have been able to find only 22 specimens of the genus among the large Costa Rican oonopid collections that are currently available. This may be due in part to unusual habitat preferences; most of the available specimens seem to have been taken above ground level, either in tree holes, the root debris of epiphytic plants, or by canopy fogging. We thus suspect that Fage's type specimen was associated with an arboreal termite nest, and the termite species Nevermann indicated does build large, arboreal nests. Whether the spiders actually occur inside arboreal termite nests, as well as near them, remains an open question.

In a detailed cladistic analysis, Fannes (2013a) identified several putative synapomorphies uniting *Zyngoonops*, *Antoonops*, and *Coxapopha* that are also shared by *Hexapopha*: extended lateral corners on the elevated male pars cephalica (fig. 5), a single row of five long setae on the posterior surface of the cheliceral paturon (fig. 8), a pair of pleural flaps at the anterolateral corners of the male sternum (fig. 6), a greatly widened male labium (fig. 15), and the highly modified male endites (fig. 9). In addition, there may be another synapomorphy uniting these taxa; in males, the abdomen is carried at an oblique angle, with the posterior end much lower than the anterior end (figs. 2, 50, 77, 112); the same character occurs in *Zyngoonops* (see Fannes, 2013a: figs. 37A, 45A), *Antoonops* (see Fannes and Jocqué, 2008: fig. 7C; Fannes, 2013b: fig. 4A), and apparently also in *Coxapopha* (see Fannes, 2013a: fig. 106A). Although no lateral habitus photographs or drawings have been published for *Coxapopha* males, unpublished images by Cristina Rheims and Ricardo Ott suggest they also share this character (unfortunately, most of the few known males of the genus were destroyed in a fire at the Instituto Butantan).

The members of *Hexapopha* can easily be distinguished from those of *Coxapopha* by the presence of six rather than two eyes, the absence of a laminar projection on the palpal conductor, the absence of an external scape on the posterior portion of the female genitalia, the absence of ventral apophyses on the male abdomen, and the absence of leg spines. They differ from the members of *Antoonops* in lacking an abdominal constriction and an external copulatory orifice in females, and from those of *Zyngoonops* in lacking an external scape in females and in having a palpal conductor in males.

The closest relatives of *Hexapopha* may be none of the above genera, but rather some or all of a highly speciose complex of taxa found from Venezuela south to Argentina. These mem-

bers of the *Zyngoonops* group have six eyes, and are abundantly represented in Brazilian collections. No males of this complex appear to have been described, but two species known only from females are probably members; these species were misplaced in *Gamasomorpha* Karsch (1881): *Gamasomorpha brasiliiana* Bristowe (1938) and *Gamasomorpha m-scripta* Birabén (1954), both of which are currently being redescribed by Ricardo Ott and colleagues (in prep.). Judging by the published illustrations of the female genitalia, it is unlikely that either of those two species are members of *Hexapopha* or that they are congeneric with each other. We suspect that there may be several six-eyed South American genera of the *Zyngoonops* group, but detailed studies of both sexes of many of these undescribed species will be needed before the number of genera involved, and whether any of those species actually belong to *Hexapopha*, can convincingly be determined.

Our methods follow those of Platnick and Dupérré (2009); only differences from the males (beyond the obvious lack of male endite modifications) are mentioned in the descriptions of females. Scans were taken from uncoated right male palps, and the images were flipped for consistency. All measurements are in mm; high-resolution versions of the presented images as well as many additional images (of specimens from localities different from those imaged here), a sortable version of the geocoded locality data, and a distribution map for each species (with dots linked to the specimen data) will be available on the goblin spider Planetary Biodiversity Inventory (PBI) project's website (<http://research.amnh.org/oonopidae>). Users should note that the relatively small published images are merely avatars for the actual image files on the website, which can each be enlarged several times before pixelating.

COLLECTIONS EXAMINED

AMNH	American Museum of Natural History, New York, NY
FMNH	Field Museum of Natural History, Chicago, IL
INBIO	Instituto Nacional de Biodiversidad, Santo Domingo, Costa Rica
MCZ	Museum of Comparative Zoology, Harvard University, Cambridge, MA

Hexapopha, new genus

TYPE SPECIES: *Xestaspis reimoseri* Fage (1938).

ETYMOLOGY: The generic name refers to the presence of six eyes and the similarities to *Coxapopha*, and is feminine in gender.

DIAGNOSIS: These spiders are easily recognized as members of the *Zyngoonops* group of genera by the heavily sclerotized endites of males (figs. 49, 79, 114). The combined presence of six eyes, a palpal conductor in males, and a female epigastric region without an external orifice or scape distinguishes these species from those of the other described genera of the group. Additional differences from *Zyngoonops*, *Antoonops*, and *Coxapopha* are discussed in the Introduction.

DESCRIPTION: Total length of males 1.4–1.7, of females 1.7–1.9. Carapace orange-brown, with *Coxapopha*-like pattern (fig. 47), sternum pale orange, without pattern, chelicerae, female mouthparts pale orange, male labium, endites dark red-brown, dorsal, ventral scuta pale orange, without pattern, abdomen soft portions white, legs yellow, without pattern. **Cephalothorax:** Carapace broadly oval in dorsal view (fig. 3), pars cephalica of males domed in lateral view (fig. 4), of females less domed but still strongly elevated in lateral view (cf. figs. 112, 116), anteriorly narrowed to between 0.5 and 0.75 times its maximum width, anterolateral corners with strongly sclerotized, triangular extension in males (fig. 5), pars thoracica with angular posterolateral corners, without depressions or radiating rows of pits, posterolateral edge without pits, posterior margin not bulging below posterior rim, posterolateral surface without spikes, surface of elevated portion of pars cephalica smooth, sides granulate, fovea present, lateral margin straight, rebordered, without denticles; plumose setae near posterior margin of pars thoracica absent; marginal, nonmarginal pars cephalica, pars thoracica setae dark, needlelike, scattered. Clypeus vertical in lateral view, high, ALE separated from edge of carapace by their radius or more; margin strongly rebordered, straight in front view; median projection absent; setae dark, needlelike. Chilum absent. Eyes six, well developed, ALE largest, oval, PME squared, PLE oval; posterior eye row recurved from above, procurved from front; ALE of males separated by their radius to diameter, females sometimes with ALE closer, ALE-PLE separated by less than ALE radius, PME touching throughout most of their length, PLE-PME separated by less than PME radius. Sternum wider than long, fused to carapace, median concavity absent, with radial furrows between coxae I–II, II–III, III–IV, furrows with rows of small pits, radial furrow opposite coxae III absent, surface finely punctate, covered with small round pits, microsculpture everywhere but front, sickle-shaped structures absent, anterior margin with continuous transverse groove, posterior margin not extending posteriorly of coxae IV, anterior corner with strongly sclerotized pleural flap in male (fig. 6), lateral margin with infracoxal grooves bearing anterior, posterior openings, distance between coxae approximately equal, extensions of precoxal triangles absent, lateral margins with rounded extensions between coxae, without posterior hump; setae sparse, dark, needlelike, evenly scattered, originating from small pits, hair tufts absent. Chelicerae straight, anterior face unmodified; without teeth on promargin or retromargin; fangs without toothlike projections, directed medially, shape normal, without prominent basal process, tip unmodified; setae dark, needlelike, evenly scattered; paturon inner margin with pairs of enlarged setae, distal region abruptly narrowed (fig. 7), posterior surface unmodified, with row of five long setae (fig. 8); promargin with row of flattened setae, inner margin unmodified, laminate groove absent. Labium of males rectangular, fused to sternum, anterior margin anteriorly projecting at middle (fig. 15), much more heavily sclerotized than sternum, of females with anterior margin indented at middle; with six or more setae on anterior margin, subdistal portion with unmodified setae; labrum with complex setae (fig. 45). Endites of males much more heavily sclerotized than sternum, distally excavated, serrula absent, anteromedian tip with backwards folded ridge (figs. 9–14), posteromedian part unmodified; endites of females apparently with serrula. Female palp without claws or spines; patella without prolateral row of ridges, tarsus unmodified. **Abdomen:** Ovoid, without long posterior extension, rounded posteriorly, inter-

scutal membrane without rows of small sclerotized platelets; in males, set at oblique angle to cephalothorax (figs. 1, 2). Book lung covers large, ovoid, without setae, anterolateral edge unmodified. Posterior spiracles not connected by groove (fig. 25). Pedicel tube medium, ribbed, scutopedicel region unmodified, scutum extending far dorsal of pedicel, plumose hairs, matted setae on anterior ventral abdomen in pedicel area, cuticular outgrowths near pedicel all absent. Dorsal scutum strongly sclerotized, in males covering full length of abdomen, no soft tissue visible from above, in females sometimes smaller, not fused to epigastric scutum, middle surface smooth, sides smooth, anterior half without projecting denticles. Epigastric scutum strongly sclerotized, surrounding pedicel, not protruding, small lateral sclerites absent, in females without lateral joints. Postepigastric scutum strongly sclerotized, almost semicircular, in males extending nearly full length of abdomen, in females sometimes shorter, fused to epigastric scutum in males but not in females, anterior margin unmodified, with short posteriorly directed lateral apodemes. Spinneret scutum present as incomplete ring. Supraanal scutum absent. Abdominal setae dark, needlelike, epigastric area setae not basally thickened. Spinneret scutum with fringe of long setae. Dense patch of setae anterior to spinnerets absent. Interscutal membrane with setae. Colulus present. Six spinnerets, anterior laterals bisegmented, basal segment without oblique membranous strip (fig. 26), posterior medians unisegmented, posterior laterals bisegmented (fig. 27), spigots scanned only in male of *H. reimoseri*, anterior laterals with one major ampullate gland spigot and two piriform gland spigots (fig. 28), posterior medians with two spigots (fig. 29), posterior laterals with three spigots (fig. 30). **Legs:** Femur IV not thickened, same size as femora I–III, patella plus tibia I shorter than carapace, tibia I unmodified, tibia IV specialized hairs on ventral apex, ventral scopula both absent, metatarsi I, II mesoapical comb absent, metatarsi III, IV weak ventral scopula absent. Leg spines absent. Tarsi without inferior claw, claws scanned only in males of *H. reimoseri*, outer margins of superior claws with about four large teeth, inner margins with distally situated row of tiny, closely appressed teeth, longest teeth situated at tip (figs. 31–38). Tarsal organs scanned only in males of *H. reimoseri*, with three receptors on legs I, II, two receptors on legs III, IV, palp (figs. 39–43). Trichobothrial base with tiny opening (fig. 44). **Genitalia:** Male epigastric region with sperm pore small, oval, situated at level of anterior spiracles, rebordered (fig. 25); furrow without Ω -shaped insertions, without setae. Palp normal size (fig. 16), not strongly sclerotized, right and left palps mirror images, proximal segments yellow; trochanter normal size, unmodified; femur normal size, two or more times as long as trochanter, without posteriorly rounded lateral dilation, attaching to patella basally; patella shorter than femur, not enlarged, without prolateral row of ridges, setae unmodified; tibia with three trichobothria (fig. 20); cymbium yellow, ovoid in dorsal view (fig. 19), fused with bulb but with clearly defined seam, extending beyond distal tip of bulb (fig. 18), plumose setae, stout setae, distal patch of setae all absent, bulb yellow, shorter than cymbium, stout, elongated (fig. 17); embolus dark, prolateral excavation absent, accompanied by conductor (figs. 21–24). Female genitalia with T-shaped anterior genitalic process, elaborate posterior portion lacking external scape or orifice (figs. 59, 60).

DISTRIBUTION: Known only from Costa Rica.

Key to Species

1. Males (those of *jimenez* unknown) 2
 - Females 4
2. Projection at tip of endites narrow (fig. 64) *hone*
 - Projection at tip of endites wide (figs. 10, 98) 3
3. Projection at tip of endites small (fig. 10) *reimoseri*
 - Projection at tip of endites large (fig. 98) *osa*
4. Posterior genitalic plate narrow (figs. 59, 85) 5
 - Posterior genitalic plate wide (figs. 94, 120) 6
5. Arms of anterior genitalic process straight, large (fig. 60) *reimoseri*
 - Arms of anterior genitalic process curved, small (fig. 86) *hone*
6. Arms of anterior genitalic process procurved (fig. 95) *jimenez*
 - Arms of anterior genitalic process straight (fig. 121) *osa*

Hexapopha reimoseri (Fage), **new combination**

Figures 1–60

Xestaspis reimoseri Fage, 1938: 371, figs. 1A–D (male holotype from Hamburg Farm, Limón, Costa Rica, should be in the Natural History Museum of Vienna, lost).

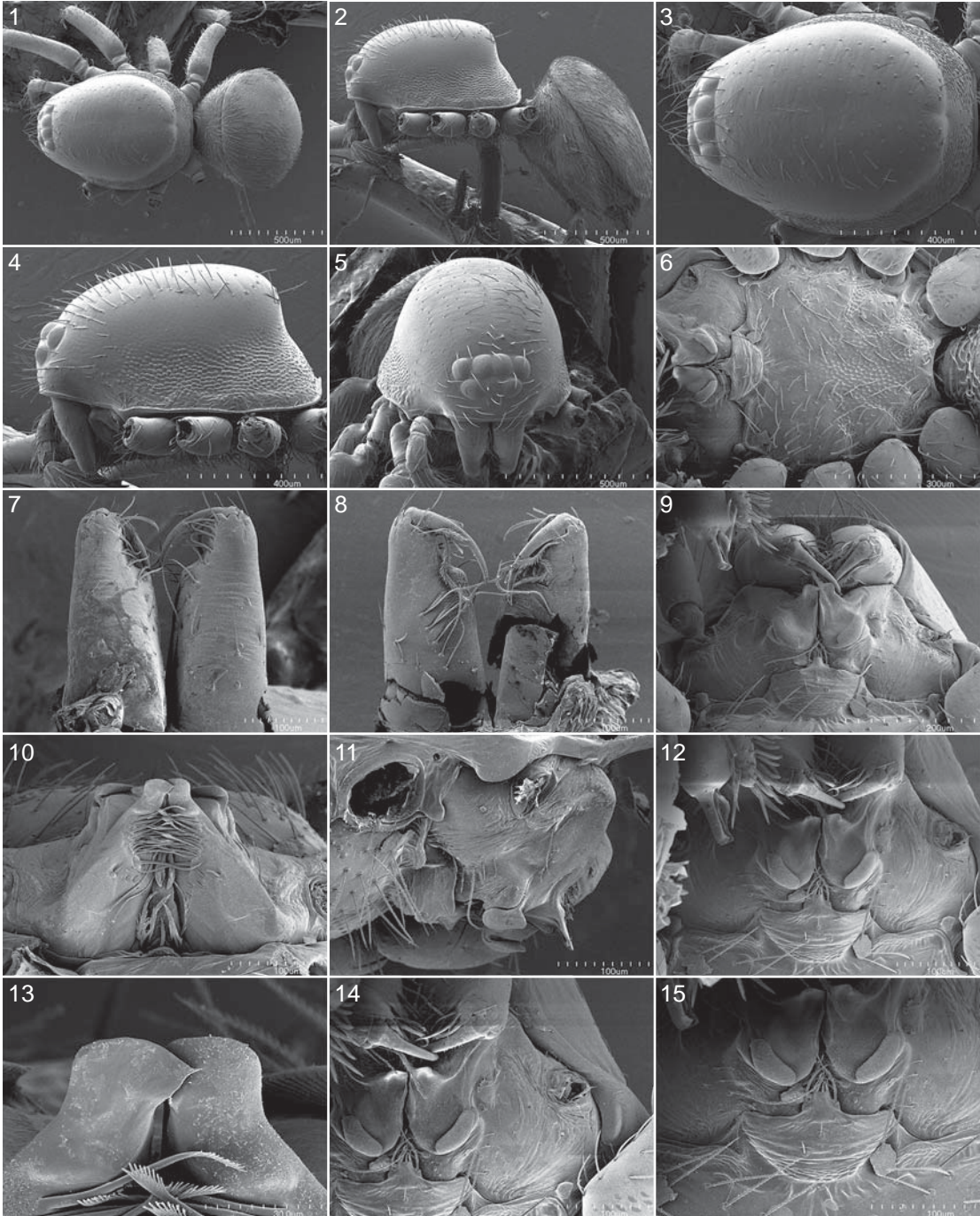
DIAGNOSIS: Males can be recognized by the small squared projection on the squared tip of the endites (fig. 9), females by the relatively long and narrow posterior genitalic plate (fig. 59) and the large, straight arms of the anterior genitalic process (fig. 60).

MALE (PBI_OON 49619, figs. 1–53): Total length 1.54. Labium with squared, narrow tip situated on slightly wider base; endites with squared tip followed posteriorly by obliquely set elevated projections. Conductor with gradually narrowed tip.

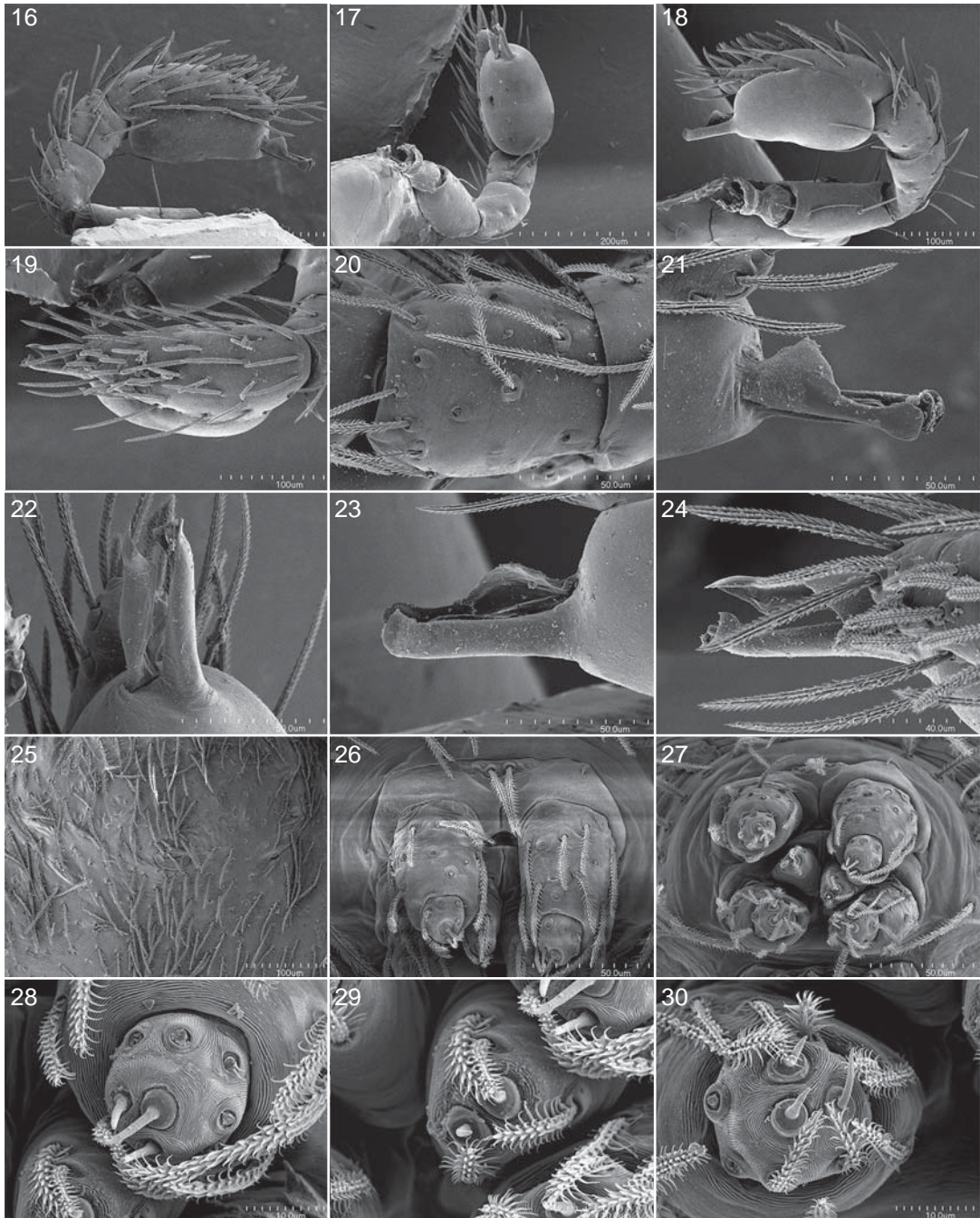
FEMALE (PBI_OON 10125, figs. 54–60): Total length 1.83. ALE separated by their radius to diameter. Dorsal scutum covering more than 3/4 of abdomen length, more than 1/2 to most of abdomen width. Postepigastric scutum covering about 3/4 of abdomen length. Anterior genitalic process with long, straight arms; posterior genitalic plate relatively long, narrow.

MATERIAL EXAMINED: COSTA RICA: **Heredia:** Estación Biológica La Selva, 10°26'N, 83°59'W, Mar. 5, 1973, Berlese, tree hole above floor in coarse wood chips with large ants (J. Wagner, J. Kethley, FMNH 33527, PBI_OON 10034), 1 ♀, Mar. 7, 1973, Berlese, concentrated epiphytic root fibers (J. Wagner, J. Kethley, FMNH PBI_OON 10542), 1 ♂; Estación Biológica La Selva, 10°26'N, 84°01'W, Jan. 14, 1993, fogging *Virola koschnyi*, elev. 50–150 m (INBIO PBI_OON 49618), 1 ♂, May 1993, same (INBIO PBI_OON 49619), 1 ♂; Estación Biológica La Selva, Camino Experimental Sur, 830 m marker, Mar. 1, 2002 (ALAS project, AMNH PBI_OON 36994), 1 ♂. **Limón:** Hamburg Farm, Reventazón, Feb. 19, 1937 (F. Nevermann, FMNH 33617, PBI_OON 10125), 1 ♀.

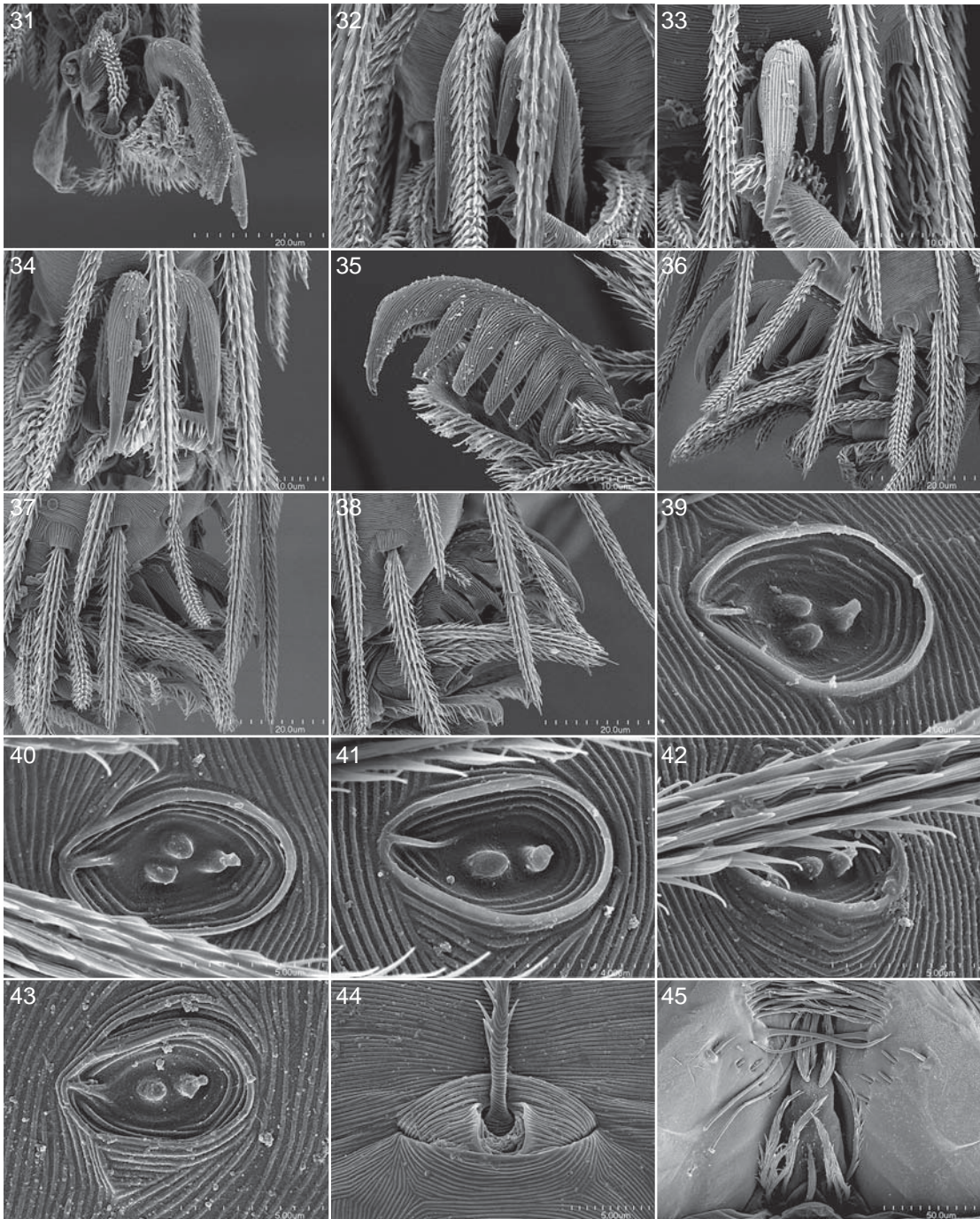
DISTRIBUTION: Known only from two localities in Heredia and Limón, Costa Rica.



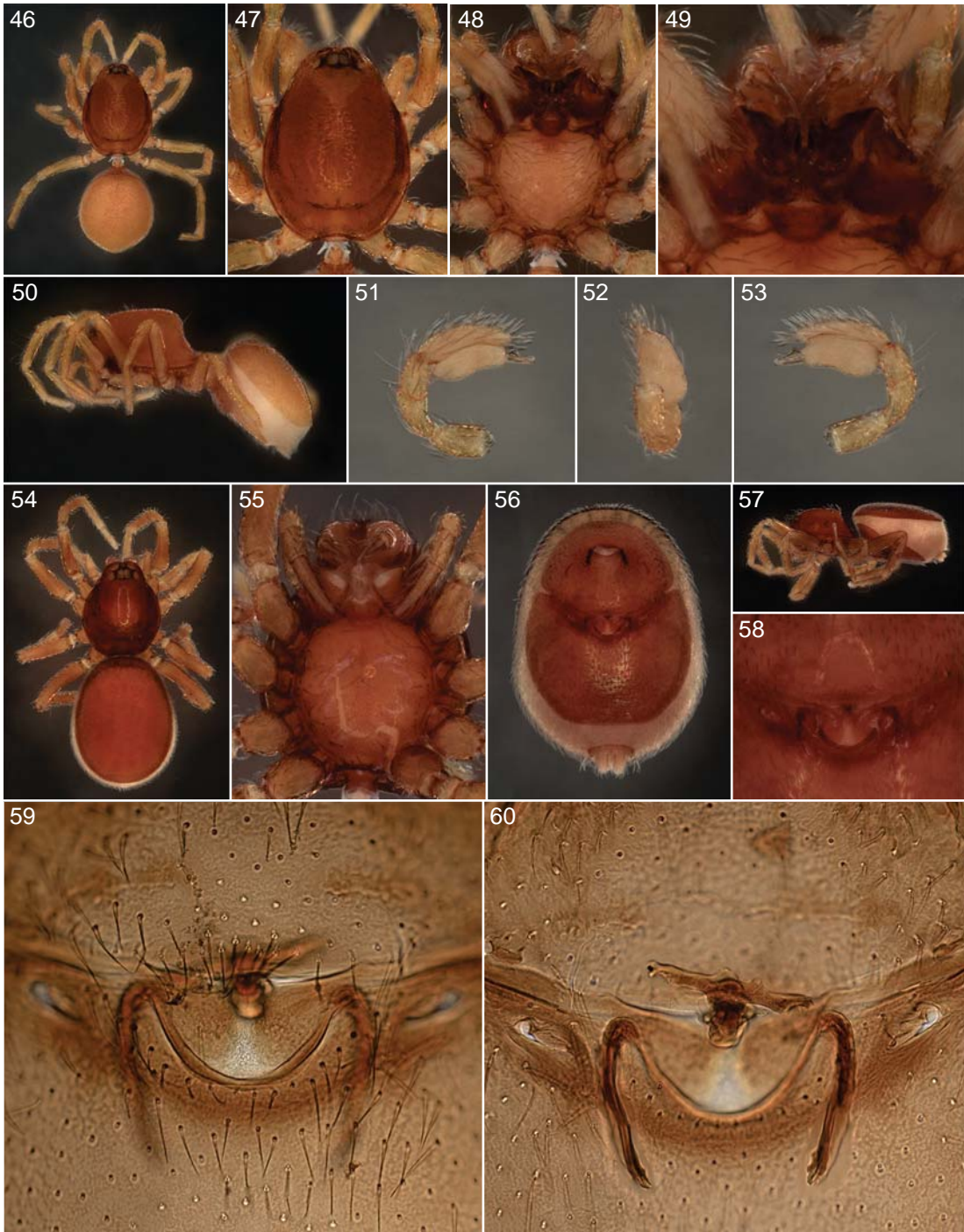
FIGURES 1–15. *Hexapopha reimoseri* (Fage), male. 1. Habitus, dorsal view. 2. Same, lateral view. 3. Carapace, dorsal view. 4. Same, lateral view. 5. Same, anterior view. 6. Sternum, ventral view. 7. Chelicerae, anterior view. 8. Same, posterior view. 9. Mouthparts, ventral view. 10. Endites, dorsal view. 11. Same, lateral view. 12. Same, anterior view. 13. Tip of endites, dorsal view. 14. Same, ventral view. 15. Labium, ventral view.



FIGURES 16–30. *Hexapopha reimoseri* (Fage), male. 16. Left palp, prolateral view. 17. Same, ventral view. 18. Same, retrolateral view. 19. Same, dorsal view. 20. Palpal tibia, dorsal view. 21. Left embolus, prolateral view. 22. Same, ventral view. 23. Same, retrolateral view. 24. Same, dorsal view. 25. Epigastric region, ventral view. 26. Spinnerets, ventral view. 27. Same, distal view. 28. Anterior lateral spinneret, same. 29. Posterior median spinneret, same. 30. Posterior lateral spinneret, same.



FIGURES 31–45. *Hexapopha reimoseri* (Fage), male. 31. Claws of leg I, distal view. 32. Same, leg II. 33. Same, leg III. 34. Same, leg IV. 35. Claws of leg I, lateral view. 36. Same, leg II. 37. Same, leg III. 38. Same, leg IV. 39. Tarsal organ of leg I, dorsal view. 40. Same, leg II. 41. Same, leg III. 42. Same, leg IV. 43. Same, palp. 44. Trichobothrial base, metatarsus II, dorsal view. 45. Labrum, dorsal view.



FIGURES 46–60. *Hexapopha reimoseri* (Fage), male (46–53) and female (54–60). 46, 54. Habitus, dorsal view. 47. Carapace, dorsal view. 48, 55. Sternum, ventral view. 49. Endites, ventral view. 50, 57. Habitus, lateral view. 51. Left palp, prolateral view. 52. Same, ventral view. 53. Same, retrolateral view. 56. Abdomen, ventral view. 58, 59. Genitalia, ventral view. 60. Same, dorsal view.

Hexapopha hone, new species

Figures 61–86

TYPES: Male holotype and female allotype taken by beating vegetation in an abandoned cacao field on the farm of Alberto Moore at Hone Creek, Limón, Costa Rica (Jan. 8, 2004; C. Viquez), deposited in INBIO (547, PBI_OON 29669).

ETYMOLOGY: The specific name is a noun in apposition taken from the type locality.

DIAGNOSIS: Males can be recognized by the narrow, beak-shaped tip of the endites (fig. 64), females by the relatively long and narrow posterior genitalic plate (fig. 85) and the small, recurved arms of the anterior genitalic process (fig. 86).

MALE (PBI_OON 29669, figs. 61–79): Total length 1.41. Tip of labium tiny, distally blunt triangle; endites with small, beak-shaped tips, tiny, sharp anterolateral projections, tip followed posteriorly by obliquely set elevated projections. Conductor with abruptly narrowed tip.

FEMALE (PBI_OON 29669, figs. 80–86): Total length 1.74. ALE separated by less than their radius. Dorsal scutum covering full length of abdomen, no soft tissue visible from above. Post-epigastric scutum covering nearly full length of abdomen. Anterior genitalic process with small, recurved arms; posterior genitalic plate relatively long, narrow.

OTHER MATERIAL EXAMINED: None.

DISTRIBUTION: Known only from Limón, Costa Rica.

Hexapopha jimenez, new species

Figures 87–95

TYPE: Female holotype taken at an elevation of 130 m at a site 13 km SSW of Puerto Jiménez, Puntarenas, Costa Rica (Mar. 10, 2008; J. Longino), deposited in MCZ (88153, PBI_OON 38102).

ETYMOLOGY: The specific name is a noun in apposition taken from the type locality.

DIAGNOSIS: Females can be recognized by the very short, wide posterior genitalic plate (fig. 94) and the procurved arms of the anterior genitalic process (fig. 95).

MALE: Unknown.

FEMALE (PBI_OON 38102, figs. 87–95): Total length 1.74. ALE separated by their radius to diameter. Dorsal scutum covering more than 3/4 of abdomen length, more than 1/2 to most of abdomen width. Postepigastric scutum covering about 3/4 of abdomen length. Anterior genitalic process with short, procurved arms; posterior genitalic plate very short, wide.

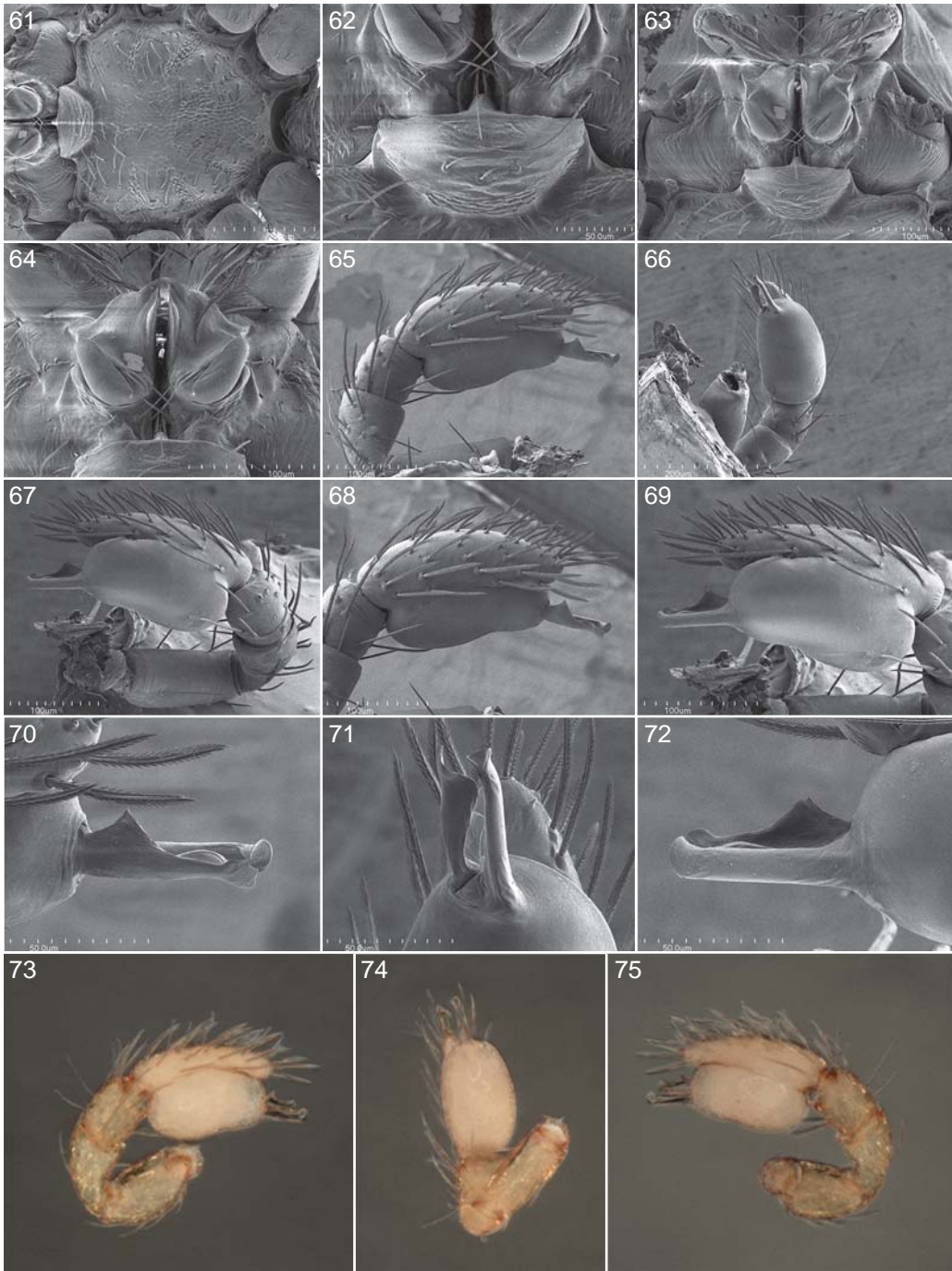
OTHER MATERIAL EXAMINED: One female taken in humus at an unspecified locality in Costa Rica, on Apr. 27, 2001, by B. Pezzek, in INBIO (PBI_OON 49620).

DISTRIBUTION: Known only from Puntarenas, Costa Rica.

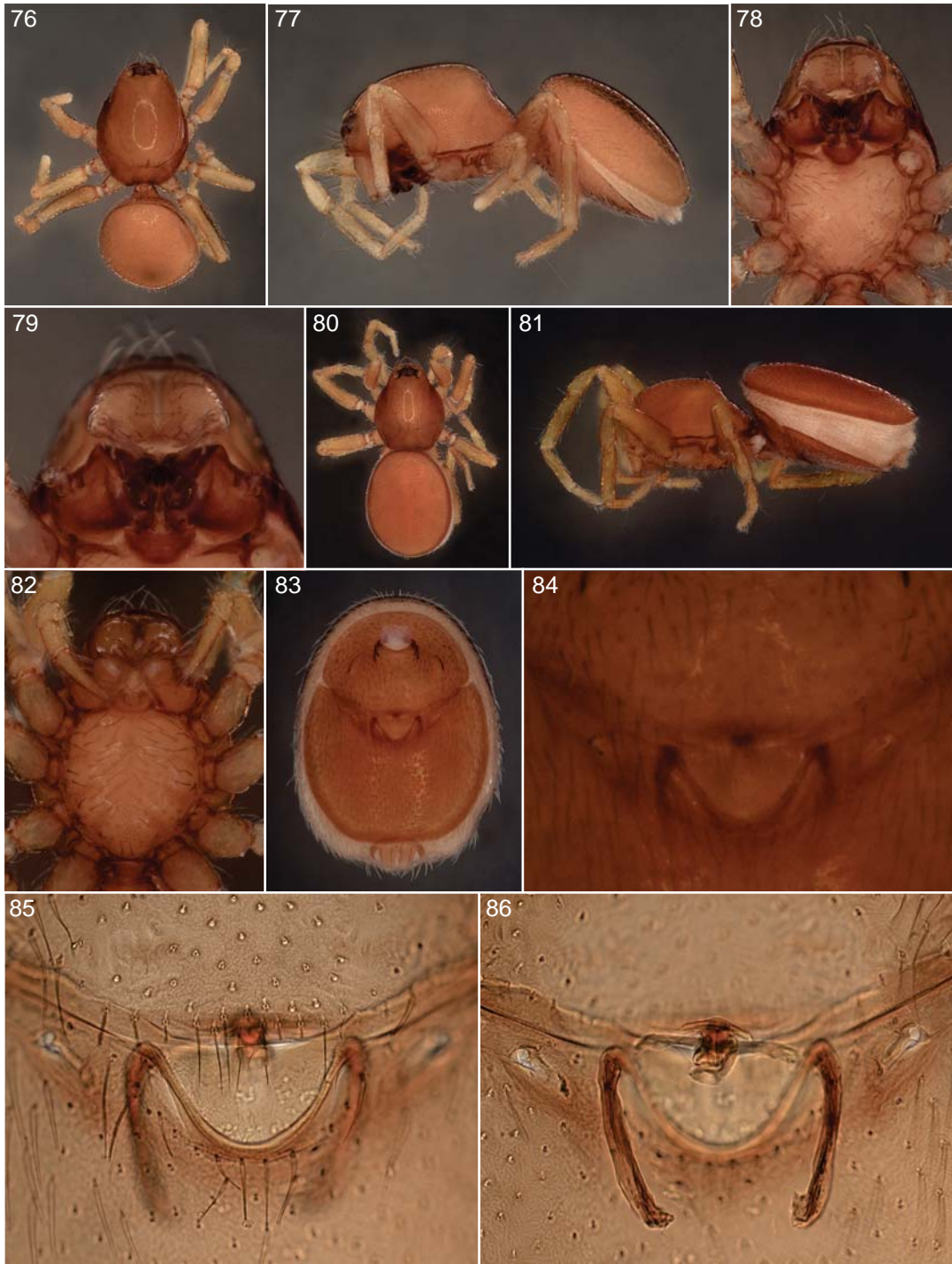
Hexapopha osa, new species

Figures 96–121

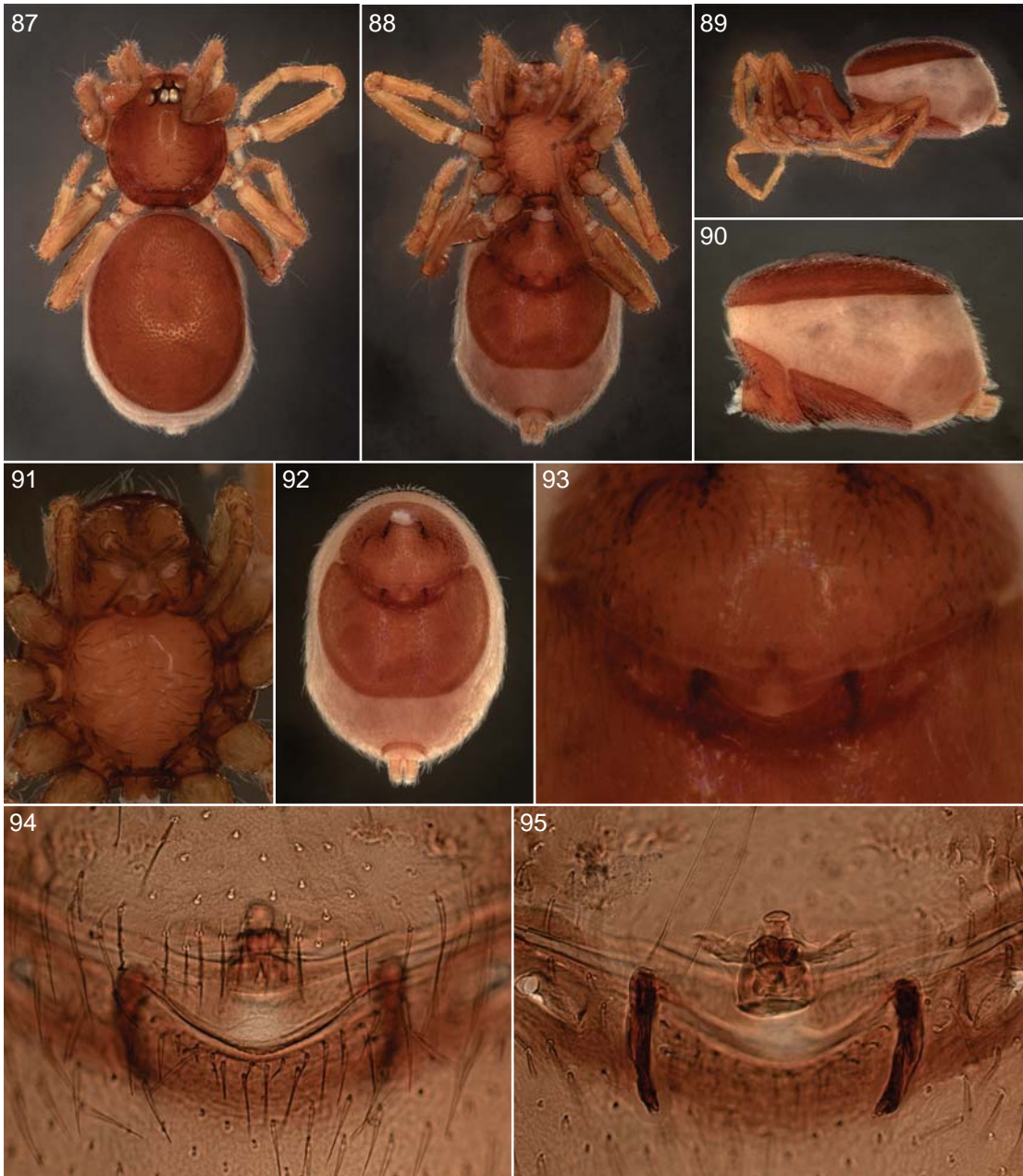
TYPES: Male holotype and female allotype from Berlese sample taken under the bark of a stage II log leaning at a 45° angle in a stream bed situated in a tropical wet forest at an elevation of 50 m at the Tropical Science Center, 5 km W of Rincón de Osa, Península de Osa, 8°42'N,



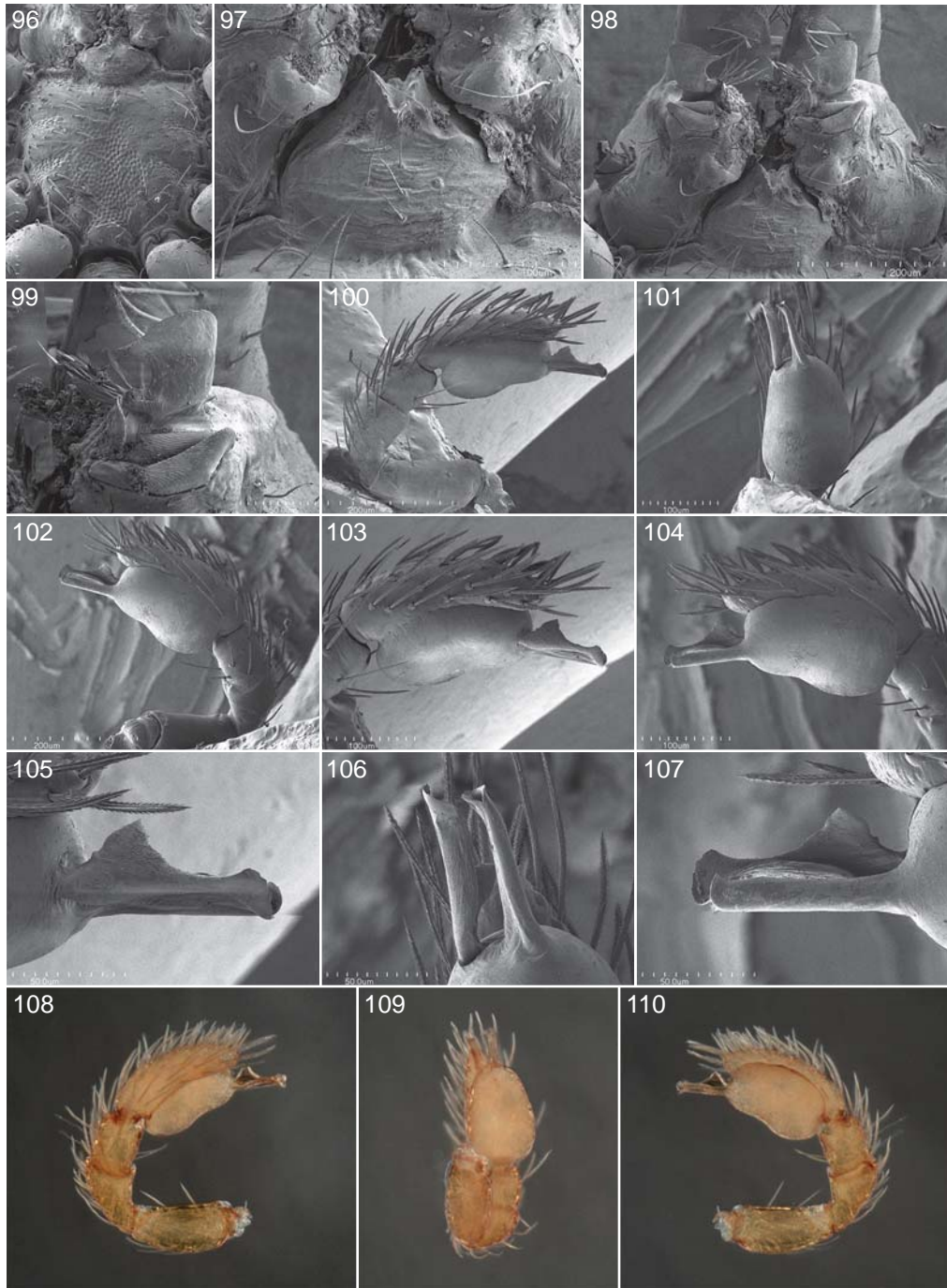
FIGURES 61–75. *Hexapopha hone*, new species, male. **61.** Sternum, ventral view. **62.** Labium, same. **63.** Endites, same. **64.** Tip of endites, same. **65, 73.** Left palp, prolateral view. **66, 74.** Same, ventral view. **67, 75.** Same, retrolateral view. **68.** Left palpal bulb, prolateral view. **69.** Same, retrolateral view. **70.** Left embolus, prolateral view. **71.** Same, ventral view. **72.** Same, retrolateral view.



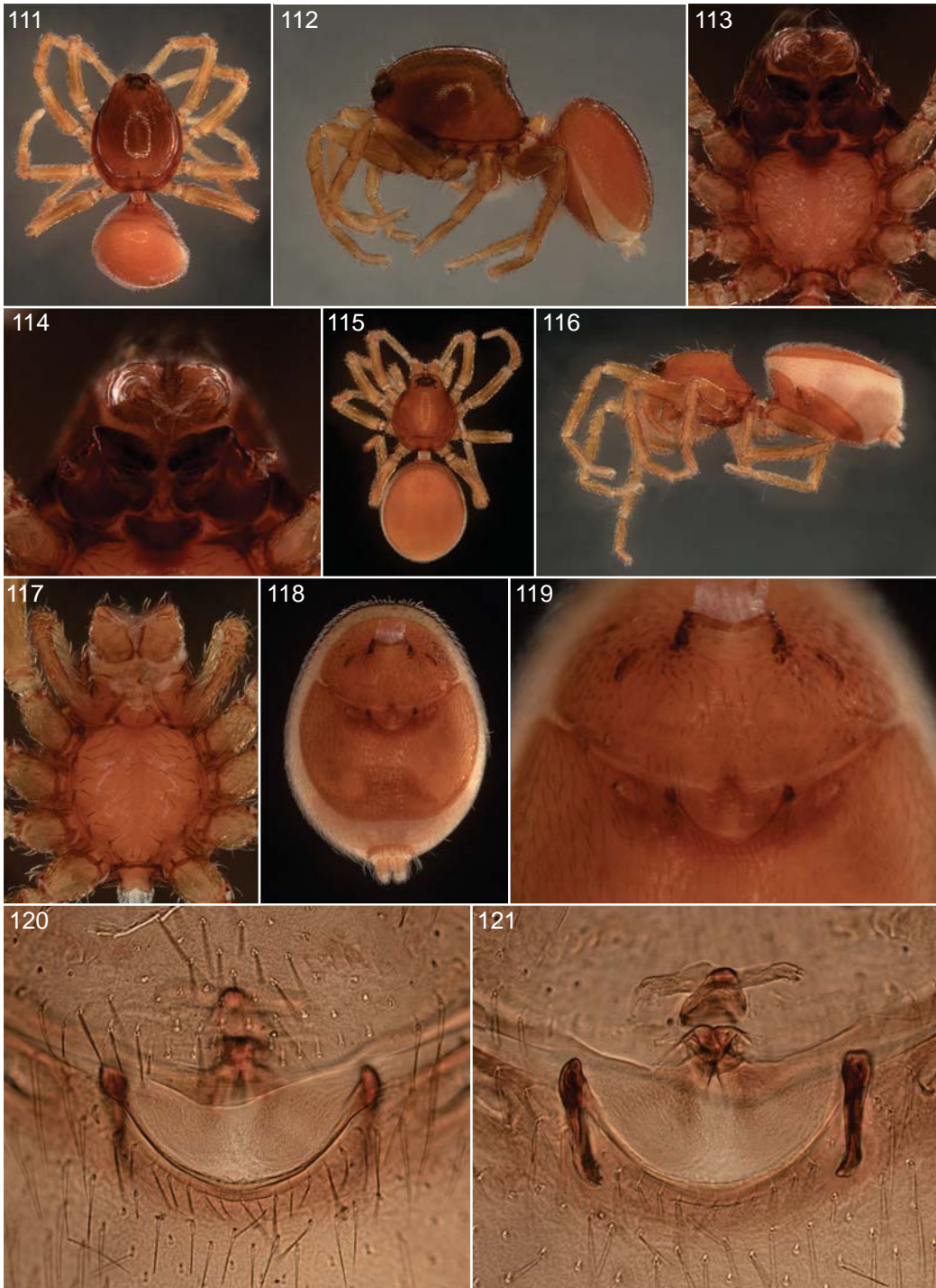
FIGURES 76–86. *Hexapopha hone*, new species, male (76–79) and female (80–86). 76, 80. Habitus, dorsal view. 77, 81. Same, lateral view. 78, 82. Sternum, ventral view. 79. Endites, same. 83. Abdomen, same. 84, 85. Genitalia, same. 86. Same, dorsal view.



FIGURES 87–95. *Hexapopha jimenez*, new species, female. **87.** Habitus, dorsal view. **88.** Same, ventral view. **89.** Same, lateral view. **90.** Abdomen, lateral view. **91.** Sternum, ventral view. **92.** Abdomen, ventral view. **93.** Genitalia, ventral view. **94.** Same, dorsal view.



FIGURES 96–110. *Hexapopha osa*, new species, male. **96.** Sternum, ventral view. **97.** Labium, same. **98.** Endites, same. **99.** Tip of endites, same. **100, 108.** Left palp, prolateral view. **101, 109.** Same, ventral view. **102, 110.** Same, retrolateral view. **103.** Left palpal bulb, prolateral view. **104.** Same, retrolateral view. **105.** Left embolus, prolateral view. **106.** Same, ventral view. **107.** Same, retrolateral view.



FIGURES 111–121. *Hexapopha osa*, new species, male (111–114) and female (115–121). **111, 115.** Habitus, dorsal view. **112, 116.** Same, lateral view. **113, 117.** Sternum, ventral view. **114.** Endites, same. **118.** Abdomen, same. **119, 120.** Genitalia, same. **121.** Same, dorsal view.

83°32'W, Puntarenas, Costa Rica (Mar. 25, 1973; J. Wagner, J. Kethley), deposited in FMNH (PBI_OON 10540).

ETYMOLOGY: The specific name is a noun in apposition taken from the type locality.

DIAGNOSIS: Males can easily be recognized by the hypertrophied tip of the endites (fig. 99), females by the wide, relatively long posterior genitalic plate (fig. 120).

MALE (PBI_OON 10540, figs. 96–114): Total length 1.69. Labium with tiny tip situated in V-shaped depression; endites with hypertrophied tip bearing anteromedian projection, followed posteriorly by transversely set elevated projections. Conductor only slightly narrowed at base.

FEMALE (PBI_OON 10540, figs. 115–121): Total length 1.87. ALE separated by less than their radius. Dorsal scutum covering full length of abdomen, no soft tissue visible from above. Postepigastric scutum covering about 3/4 of abdomen length. Arms of anterior genitalic process long, straight; posterior genitalic plate wide, relatively long.

OTHER MATERIAL EXAMINED: COSTA RICA: **Puntarenas:** Rancho Quemado, Península de Osa, Mar. 1992 (F. Quesada, INBIO 45746, PBI_OON 36992), 1 ♀, Nov. 1992 (F. Quesada, INBIO 45745, PBI_OON 36995), 1 ♀; Sirena, Península de Osa, humus, May 18–30, 2001 (A. Azofeifa, INBIO PBI_OON 36993), 2 ♂; Tropical Science Center, 5 km W Rincón de Osa, Osa Peninsula, 8°42'N, 83°32'W, Mar. 24, 1973, Berlese, log, bark, and root mat from high ridge, elev. 500 m (J. Wagner, J. Kethley, FMNH PBI_OON 10628), 1 ♀, same date, Berlese, floor litter from pockets halfway up ridge, elev. 50 m (J. Wagner, J. Kethley, FMNH PBI_OON 10616), 1 ♂, Mar. 25, 1973, Berlese, log litter, tropical wet forest, elev. 50 m (J. Wagner, J. Kethley, FMNH PBI_OON 10611), 1 ♂, same date, Berlese, under bark of stage II log leaning at 45° in stream bed, tropical wet forest, elev. 50 m (J. Wagner, J. Kethley, AMNH PBI_OON 51522), 2 ♂, 1 ♀.

DISTRIBUTION: Known only from the Osa Peninsula, Puntarenas, Costa Rica.

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REFERENCES

- Abraham, N., et al. 2012. A revision of the Neotropical goblin spider genus *Neoxyphinus* Birabén 1953 (Araneae, Oonopidae). *American Museum Novitates* 3743: 1–75.
- Benoit, P.L.G. 1977. Oonopidae anophthalmes africains nouveaux avec une clé des genres (Araneae). *Revue de Zoologie Africaine* 91: 243–249.
- Berland, L. 1914. Araneae (1re partie). *In* Voyage de Ch. Alluaud et R. Jeannel en Afrique orientale (1911–1912): resultants scientifiques: 3: 37–94. Paris: Schultz.

- Birabén, M. 1954. Nuevas Gamasomorphinae de la Argentina (Araneae, Oonopidae). *Notas del Museo de La Plata* 17: 181–212.
- Bristowe, W.S. 1938. Some new termitophilous spiders from Brazil. *Annals and Magazine of Natural History (series 11)* 2: 67–73.
- Chickering, A.M. 1968. The genus *Dysderina* (Araneae, Oonopidae) in Central America and the West Indies. *Breviora* 296: 1–37.
- Fage, L. 1938. Quelques arachnides provenant de fourmilières ou de termitières du Costa Rica. *Bulletin du Muséum National d'Histoire Naturelle Paris (2)* 10: 369–376.
- Fannes, W. 2013a. The goblin spider genus *Zyngoonops* (Araneae, Oonopidae), with notes on related taxa. *Bulletin of the American Museum of Natural History* 379: 1–117.
- Fannes, W. 2013b. Two new species of the spider genus *Antoonops* (Araneae: Oonopidae), with a key to the known species. *Zootaxa* 3709: 524–542.
- Fannes, W., and R. Jocqué. 2008. Ultrastructure of *Antoonops*, a new, ant-mimicking genus of Afro-tropical Oonopidae (Araneae) with complex internal genitalia. *American Museum Novitates* 3614: 1–30.
- Karsch, F. 1881. Diagnoses arachnoidarum japoniae. *Berliner Entomologische Zeitschrift* 25: 35–40.
- Ott, R., and A.D. Brescovit. 2004. Three new species of the haplogyne spider genus *Coxapopha* Platnick from the Amazon region (Araneae, Oonopidae). *Revista Ibérica de Aracnología* 9: 127–135.
- Platnick, N.I. 2000. On *Coxapopha*, a new genus of the spider family Oonopidae from Panama (Araneae, Haplogynae). *Memorie della Società Entomologica Italiana* 78: 403–410.
- Platnick, N.I., and L. Berniker. 2014. The goblin spider genus *Costarina* (Araneae, Oonopidae), part 3. *American Museum Novitates* 3819 1–67.
- Platnick, N.I., L. Berniker, and A.B. Bonaldo. 2013a. The South American goblin spider genera *Dysderina* and *Tridysderina* (Araneae, Oonopidae). *American Museum Novitates* 3772: 1–52.
- Platnick, N.I., L. Berniker, and A.B. Bonaldo. 2013b. The South American goblin spiders of the new genera *Pseudodysderina* and *Tinadysderina* (Araneae, Oonopidae). *American Museum Novitates* 3787: 1–43.
- Platnick, N.I., L. Berniker, and C. Viquez. 2014. The goblin spider genus *Costarina* (Araneae, Oonopidae), part 2: the Costa Rican fauna. *American Museum Novitates* 3794: 1–75.
- Platnick, N.I., and N. Dupérré. 2009. The goblin spider genera *Opopaea* and *Epectris* (Araneae, Oonopidae) in the New World. *American Museum Novitates* 3649: 1–43.
- Platnick, N.I., and N. Dupérré. 2011a. The Andean goblin spiders of the new genus *Scaphidysderina* (Araneae, Oonopidae), with notes on *Dysderina*. *American Museum Novitates* 3712: 1–51.
- Platnick, N.I., and N. Dupérré. 2011b. The goblin spider genus *Simoonops* (Araneae, Oonopidae). *American Museum Novitates* 3724: 1–30.
- Platnick, N.I., and N. Dupérré. 2011c. The Andean goblin spiders of the new genera *Paradysderina* and *Semidysderina* (Araneae, Oonopidae). *Bulletin of the American Museum of Natural History* 364: 1–121.
- Platnick, N.I., and N. Dupérré. 2012. The goblin spider genus *Costarina* (Araneae, Oonopidae), part 1. *American Museum Novitates* 3730: 1–64.
- Platnick, N.I., N. Dupérré, L. Berniker, and A.B. Bonaldo. 2013. The goblin spider genera *Prodysderina*, *Aschnaonops*, and *Bidysderina* (Araneae, Oonopidae). *Bulletin of the American Museum of Natural History* 373: 1–102.
- Platnick, N.I., N. Dupérré, D. Ubick, and W. Fannes. 2012. Got males?: The enigmatic goblin spider genus *Triaeris* (Araneae, Oonopidae). *American Museum Novitates* 3756: 1–36.

- Reimoser, E. 1939. Wissenschaftliche Ergebnisse der österreichischen biologischen Expedition nach Costa Rica. Die Spinnenfauna. *Annalen des Naturhistorischen Museums in Wien* 50: 328–386.
- Simon, E. 1884. Arachnides nouveaux d'Algérie. *Bulletin de la Société Zoologique de France* 9: 321–327.
- Simon, E. 1891. On the spiders of the island of St. Vincent. Part 1. *Proceedings of the Zoological Society of London* 1891: 549–575.
- Simon, E. 1907. Arachnides recueillis par L. Fea sur la côte occidentale d'Afrique. Ire partie. *Annali del Museo Civico di Storia Naturale de Genova* (3) 3: 218–323.

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