

An Update of the Goblin Spider Genus *Birabenella* Grismado, 2010 (Araneae: Oonopidae), with the Description of Three New Species

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ABSTRACT

The taxonomy of the poorly known South American goblin spider genus *Birabenella* Grismado (Araneae: Oonopidae) is updated in light of recently collected material. Three new species are described: *B. kamanchaca*, from northern Chile, *B. portai*, from northwestern Argentina, and *B. chincha*, from southern Peru, where the genus is reported for the first time. The diagnosis of the genus is updated; the presence of the ventral digitiform projection on the male copulatory bulb in the three newly described species supports this character as a putative synapomorphy for the genus. Additionally, all species in this genus possess unipectinate tarsal claws. Preliminary observations indicate that there is some degree of variability in tarsal organ morphology.

INTRODUCTION

The genus *Birabenella* was described by Grismado (2010) for small oonopids from semiarid areas in north-central Chile (three species) and northwestern Argentina (one species). *Birabenella* species have a mixture of conflicting characters that challenge their classification in any of the main groups of Oonopidae. Species of *Birabenella* have uniseriate tarsal claws, likening them to the subfamily Sulsulinae (Platnick et al., 2012), however, their male copulatory organ has an unsclerotized spermophore similar to that of Oonopinae. Although the general structure

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of their female genitalia resembles that of the oonopines *Silhouettella* Benoit and *Prethopalpus* Baehr et al., their soft body contradicts a placement within this group of heavily sclerotized oonopids (see Grismado et al., 2014, for “gamasomorphines”). The phylogenetic analysis of de Busschere et al. (2014), based on the nuclear ribosomal markers 28S and 18S, placed the *Birabenella* representatives outside the clade that contained the majority of the Oonopidae (de Busschere et al., 2014: 186) although the lack of data for the 28S marker in this genus did not allow for a more definite placement.

During recent field trips to northern regions of Chile and Argentina, two new species of *Birabenella* were collected. A third new species was collected in pitfall traps in southern Peru, and made available to us for study, by Alfredo Giraldo, from the Universidad Nacional Agraria La Molina, Lima. The materials that we examined included both sexes for all three species.

The males of *Birabenella homonota* Grismado, *B. argentina* (Birabén), and the three new species described below possess a curved, digitiform projection on the ventral part of the copulatory bulb, a character that was predicted as a probable synapomorphy for the genus (Grismado, 2010: 2). The female genitalia of the three new species exhibit a similar morphology to previously described species. All species of the genus *Birabenella* have unipectinate tarsal claws. Although the flattened setae on the dorsum of the abdomen were previously considered as a probable synapomorphy for the group (Grismado, 2010:3), the character is variable after the addition of new species.

Although the materials available for study are still scarce, we attempted to examine the morphology of the tarsal organ of the new available specimens. The tarsal organ morphology of oonopids was studied in detail by Platnick et al. (2012), leading to the description of serial dimorphism in most genera of the family: the tarsal organs of the legs I and II bear an additional receptor compared with those of the palp and legs III and IV; in addition, the proximal margin has a longitudinal ridge (Platnick et al., 2012: figs. 1–25, 86–105). However, in one of the subfamilies, the Sulsulinae, the tarsal organ lacks the proximal ridge and is capsulate (Platnick et al., 2012: figs. 111–120), making it impossible to observe the shape and precise number of the receptors using conventional scanning electron microscopes. The European species *Cortestina thaleri* Knoflach seems to have partially capsulate tarsal organs (Platnick et al., 2012: figs. 106–110), interpreted as an intermediate step to the completely capsulate condition of *Sulsula* Simon and relatives, and for this reason it was placed in the same subfamily. Interestingly, *Cortestina* Knoflach is the only sulsuline with bipectinate tarsal claws (Knoflach et al., 2009: figs. 34–37). For the genus *Birabenella*, only two images of the tarsal organ were previously published (Grismado, 2010: figs. 8, 14). The general morphology resembles that of typical oonopines, however, the number of receptors could not be determined.

Examination of the tarsal organ using SEM revealed some interesting morphological patterns within the genus. The proximal ridge is present in all the specimens examined (fig. 1), but it is relatively shallow on tarsal organs I and II. The receptors are very small and low, making them difficult to distinguish, and the pores are easily occluded by dirt or debris; as a result, it is hard to determine how many receptors are present on a given tarsal organ. The tarsal organ of the cymbium of *B. chincha* (fig. 1G) and that of leg III of *B. kamanchaca* (fig. 1F) are similar

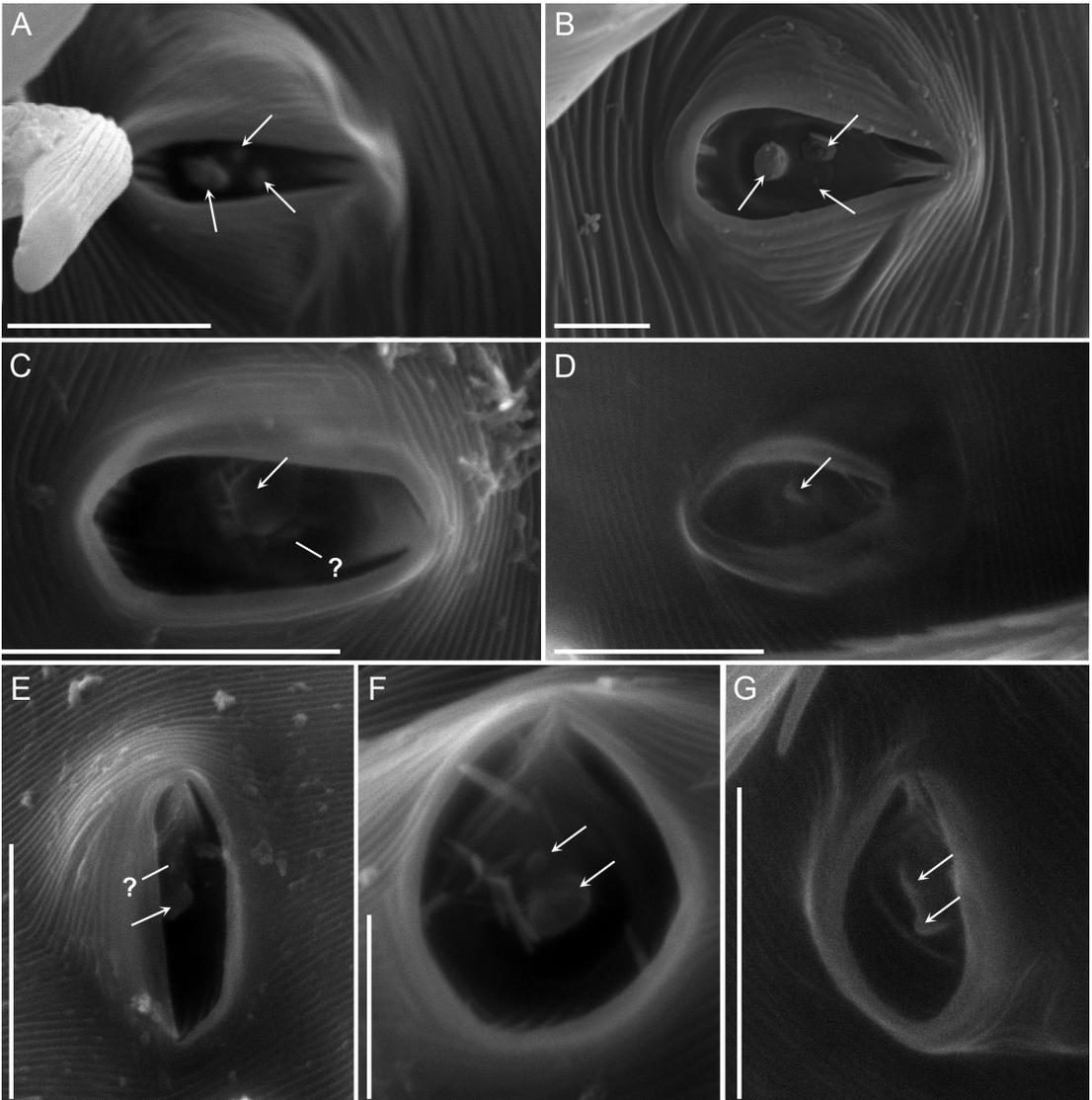


FIG. 1. *Birabenella* spp., morphology of tarsal organs. A–D, leg I, E, leg II, F, leg III, G, cymbium. A, *B. homonota* Grismado (female PBI_OON 14990), B, *B. pizarroi* Grismado (female holotype PBI_OON 14992), C, E, F, *B. kamanchaca*, n. sp. (female PBI_OON 42434), D, *B. chincha* n. sp. (female paratype PBI_OON 49999), G, *B. chincha* n. sp. (male paratype PBI_OON 49999). Arrows = receptors, ? = probable receptors. Scale bars: A, 0.5 mm; B, 0.2 mm; C–E, G, 5 mm; F, 2 mm.

to that of other oonopines (i.e., the well-defined proximal ridge and two receptors, one large and another smaller). However, on legs I and II of *B. kamanchaca*, and leg I of *B. chincha* there is a notable difference: apart from the less conspicuous ridge, only one relatively small receptor is visible (figs. 1C–E); additional tiny projections are visible in *B. kamanchaca*, but we do not interpret them as true receptors. In *B. chincha* there is no evidence of more than one receptor (fig. 1D). These findings are surprising because the morphology of the reanalyzed images of

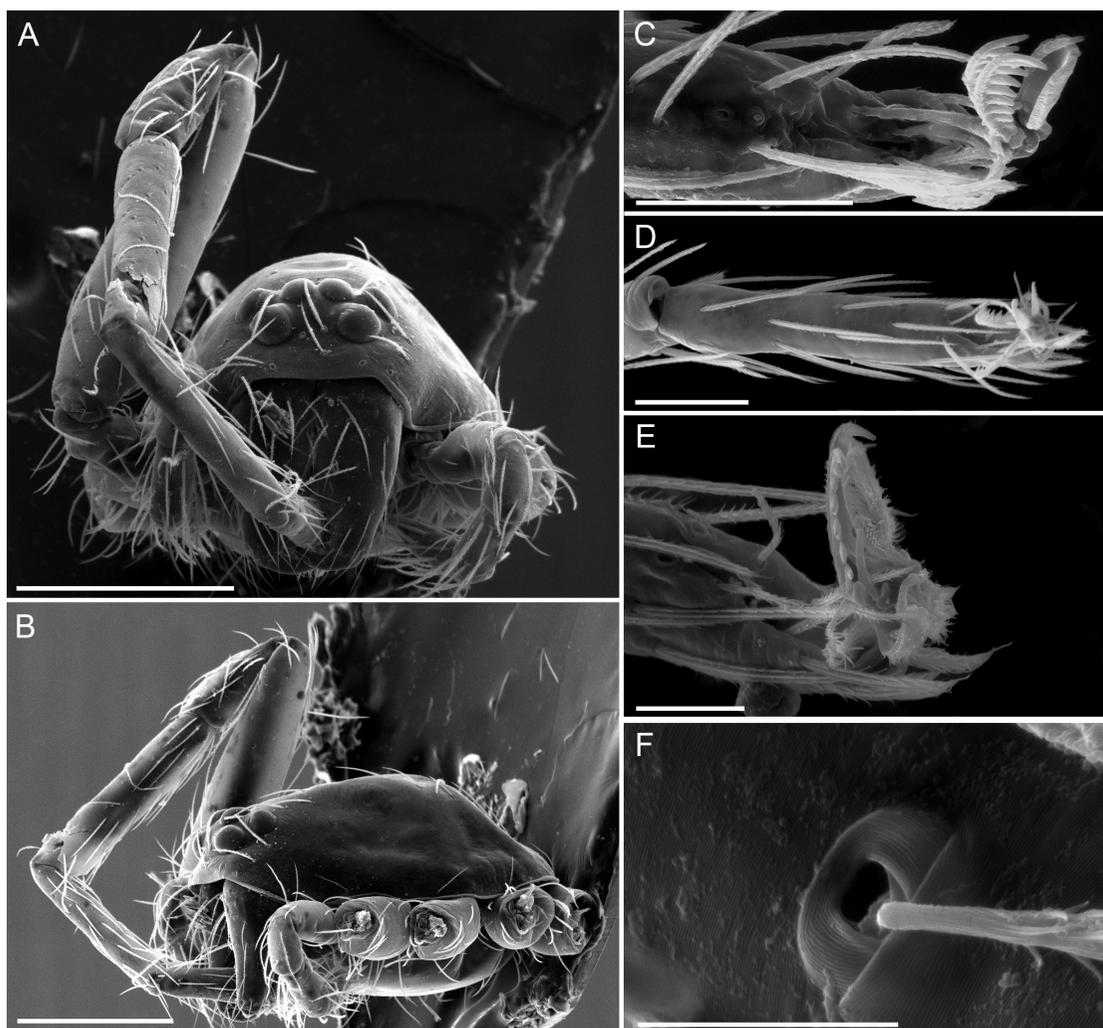


FIG. 2. *Birabenella kamanchaca*, n. sp., females. A, B, D (PBI_OON 42434), C, E, F (PBI_OON 42083); A–B, cephalothorax (A, anterior, B, lateral); C–F, legs (C, tarsus II, D, tarsus IV, E, tarsus IV, detail of claws; F, trichobothrium socket of metatarsus IV). Scale bars: A, B, 200 μ m; C, D, 50 μ m; E, 20 μ m; F, 10 μ m.

the tarsal organs I of *B. homonota* and *B. pizarroi* Grismado (figs. 1A–B) show not only a typical, conspicuous ridge, but also one large receptor and two transverse smaller ones—the typical oonopine arrangement. Unfortunately, we failed to find the tarsal organ IV of *B. kamanchaca* (fig. 2D). It seems that the genus *Birabenella* is another example of variability in the configuration of the tarsal organ pattern of receptors in oonopids, resembling patterns reported for the genus *Khamisia* Saaristo and Van Harten and their relatives (Platnick and Berniker, 2015).

Finally, concerning potential relationships, we note that *Birabenella* shares at least two important characters with *Guaraguaonops* Brescovit, Rheims, and Bonaldo (Brescovit et al., 2012) from sandy areas of the Cerrado biome in northeastern Brazil. First, the two species of *Guaraguaonops* possess a conical projection on the ventral side of the tegulum, in a posi-

tion similar to that in *Birabenella* (Brescovit et al., 2012; figs. 20–23, 40–41). Second, *Guaraguaoonops* has unipectinate tarsal claws (Brescovit et al., 2012; fig. 14). The internal female genitalia of *Guaraguaoonops* and *Birabenella* are also similar (Brescovit et al., 2012; figs. 42–43), however, the pattern is common to many oonopids. Unfortunately, there are no published images of the tarsal organs of *Guaraguaoonops*. If further evidence supports these two genera as sister groups, then their distribution would be of biogeographic interest as it is similar to the South American species of *Sicarius* Walckenaer (Magalhaes et al., 2013, 2017) in which some species are in northeastern Brazil, and others in the xerophytic areas of Argentina, Bolivia, Chile, and Peru.

Specimens are deposited in the following collections: Museo Argentino de Ciencias Naturales “Bernardino Rivadavia,” Buenos Aires (MACN-Ar, Cristina L. Scioscia and Martín J. Ramírez), Museo Nacional de Historia Natural, Santiago (MHNS, Mario Elgueta), and Museo de Entomología “Klaus Raven Büller” of the Universidad Nacional Agraria La Molina, Lima (MEKRB, Mariajosé Deza). The descriptions were generated automatically from the Species Descriptive Database of the oonopid Planetary Biodiversity Inventory (PBI) project (<http://research.amnh.org/oonopidae>). Female genitalia were observed in clove oil. Drawings were made with a camera lucida mounted on an Olympus BH-2 compound microscope. Photographs of the preserved specimens were taken with a Leica DFC 295 digital camera mounted on a Leica M205A stereoscopic microscope, and the focal planes were aligned with LAS software (V. 3.7). Scanning electron micrographs were taken under high vacuum with a FEI XL30 TMP after critical-point drying and gold-palladium coating. All measurements are in millimeters. Due to the scarcity of museum specimens, we avoided the use of irreversible techniques—such as scanning electron microscopy—in fully documenting the anatomy of the animals (it was possible only for some characters).

TAXONOMY

Birabenella Grismado, 2010

Birabenella Grismado, 2010: 3; type species *B. homonota* Grismado, 2010.

DIAGNOSIS: Soft-bodied oonopines with unipectinate tarsal claws in both sexes (figs. 2 C–E, 3F; Grismado 2010: figs. 6, 7–8, 10–11). Males with conspicuous ventral digitiform projection on the male palpal bulb (figs. 3A–E, 10 A, C, E; Grismado 2010: figs. 33, 49). Female genitalia with strongly thickened anterior or anterodorsal wall of the posterior receptacle (figs. 10 B, D, F; Grismado, 2010: figs. 35, 59, 68).

DESCRIPTION: See Grismado (2010). Additional data are provided below. Carapace and sternum texture reticulate to smooth; setae on the dorsum of the abdomen usually stout and flattened, but needlelike in the smaller species. Endites of males with apical, dark, spinelike setae. Legs: Tarsal claws unipectinate in all species, macrosetae present only in the type species (*B. homonota*); tarsal organs partially examined, showing variability in shape and probably also in number of receptors: on tarsal organ I of *B. homonota* and *B. pizarroi* the aperture is rela-

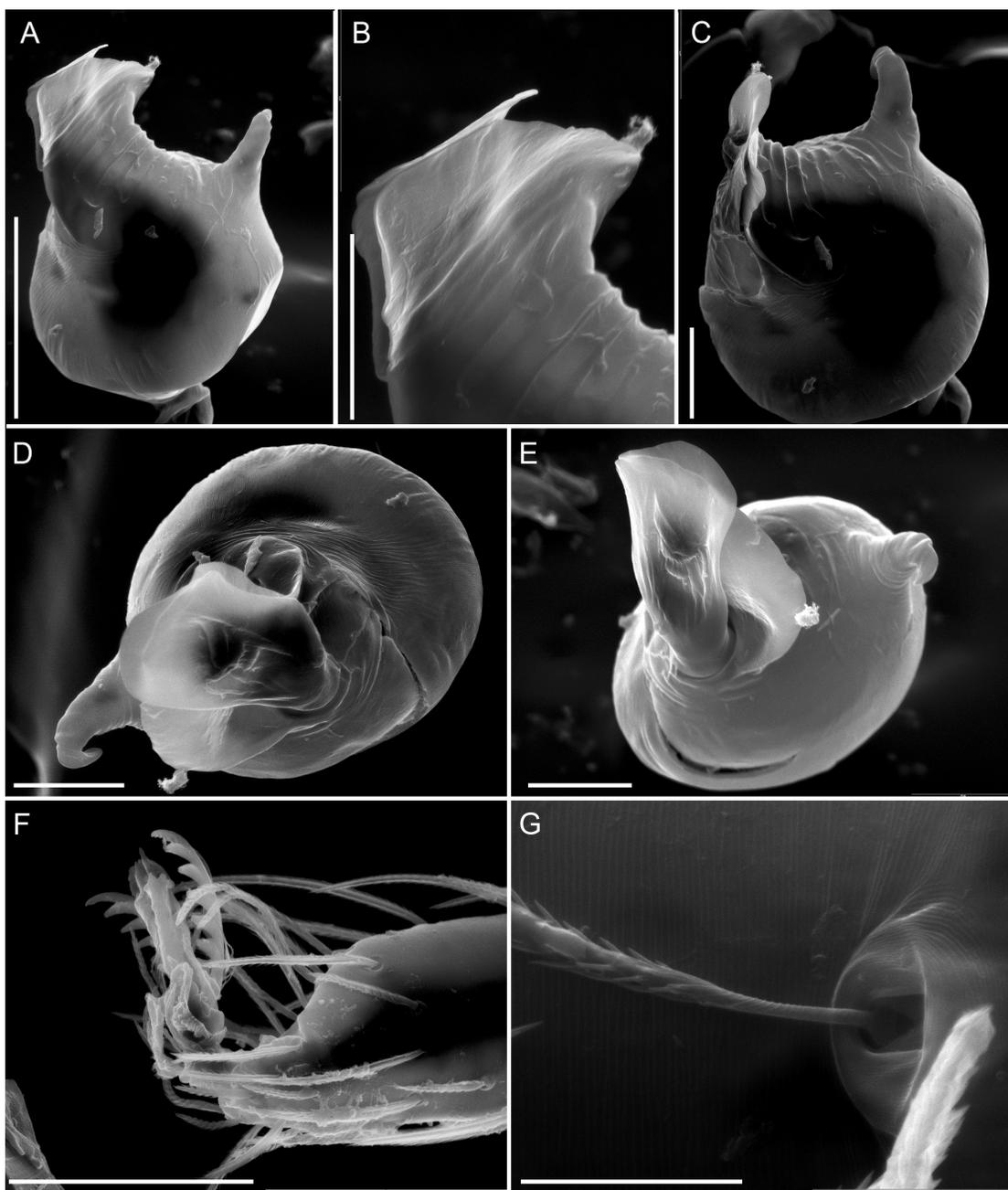


FIG. 3. *Birabenella chincha*, n. sp. A-E, male paratype, F-G, female paratype (both specimens PBI_OON 49999). A-E, left palp, copulatory bulb, A, prolateral view, B, same, detail of the distal part, C, dorsal prolateral, D, apical, E, apical ventral. F, leg I tarsal claws; G, trichobothrium socket of metatarsus I. Scale bars: A, E, 50 μ m; B-E, 20 μ m; G, 10 μ m.

tively narrow, all other features as in other oonopines (a ridge on proximal margin, three receptors, one large and two small, transversely arranged, see fig. 1A, B); in *B. kamanchaca* and *B. chincha*, aperture wider, proximal ridge less conspicuous; only one clearly visible receptor (apparently homologous to the large, unpaired receptor of *B. homonota* and *B. pizarroi*); in *B. chincha*, no trace of other sensilla (fig. 1D); in *B. kamanchaca*, data are inconclusive for interpreting presence of tiny projections (fig. 1C). Tarsal organ II of *B. kamanchaca* with similar pattern of receptors as that of leg I, but opening narrower (fig. 1E). Tarsal organ of male palp of *B. chincha* and third leg of *B. kamanchaca* similar to those of most oonopines (fig. 1G, F, respectively). Genitalia: Copulatory bulb of all known males with distinctive ventral, sometimes curved, digitiform projection (fig. 10A, C, E; Grismado, 2010: figs. 31–33, 49–50); sperm duct weakly sclerotized (as in Oonopinae), with longitudinal tendon running parallel to most of its length; terminal part of bulb with oval opening (like an alveolus) from where several flattened projections of variable shapes arise, surrounding the embolus opening (fig. 3A–E). Female internal genitalia: anterior element of variable shape, always with lumen, separated from posterior part of genitalia by apparently small, thin transverse bars, probably functioning as locking structures; posterior elements consist of copulatory duct of diverse shape (usually sinuous or coiled, with thick walls), a transverse set of sclerotized elements associated to muscle insertions, posterior receptacle with thickened anterior to anterodorsal wall, with apparently wrinkled or reticulated texture under light microscopy; internal tubes of diverse shape and course in the area of the posterior receptacle (fig. 10B, D, F).

DISTRIBUTION: From southern Peru (Ica department) to Coquimbo region in Chile and Jujuy and Catamarca Province in Argentina (although no records are yet known from Bolivia). In Chile all species were collected near the coast, in arid or semiarid habitats; in Argentina, the records also include xerophytic biomes.

Birabenella kamanchaca, new species

Figures 1C, E, F; 2; 4; 5; 10A, B; 11

TYPE MATERIAL: Male holotype from Chile: Región de Antofagasta (II); Antofagasta: 8.1 km NNW Paposo, 60 km (air) N. Taltal, desert scrub, 114 m, -24.93944°, -70.49250°, Oct. 27–29, 2011, M.J. Ramírez, A. Ojanguren, J. Pizarro et al., (MHNS PBI_OON 42098); paratypes: same data, 1 ♀ (MACN 37254 PBI_OON 42083), 1 ♂ (MACN 37256 PBI_OON 42432), 1 ♀ (MACN 37253 PBI_OON 42433).

ETYMOLOGY: The specific epithet is a noun in apposition referring to the natural phenomenon known as “Kamanchaca” or “Camanchaca,” the fog that comes from the Pacific Ocean providing humidity to the coastal desert environments of north-central Chile, especially evident in Paposo. The name was inspired by *Brachistosternus kamanchaca* Ojanguren-Affilastro et al., a scorpion species that inhabits the region (Ojanguren-Affilastro et al., 2007).

DIAGNOSIS: Males resemble those of *B. chincha* in the relatively simple (only two) flattened terminal projections of the bulb, but differ in their size and orientation (especially the forward-directed, pointed, retrolateral projection, fig. 10A); females are similar to those of *B. elqui*

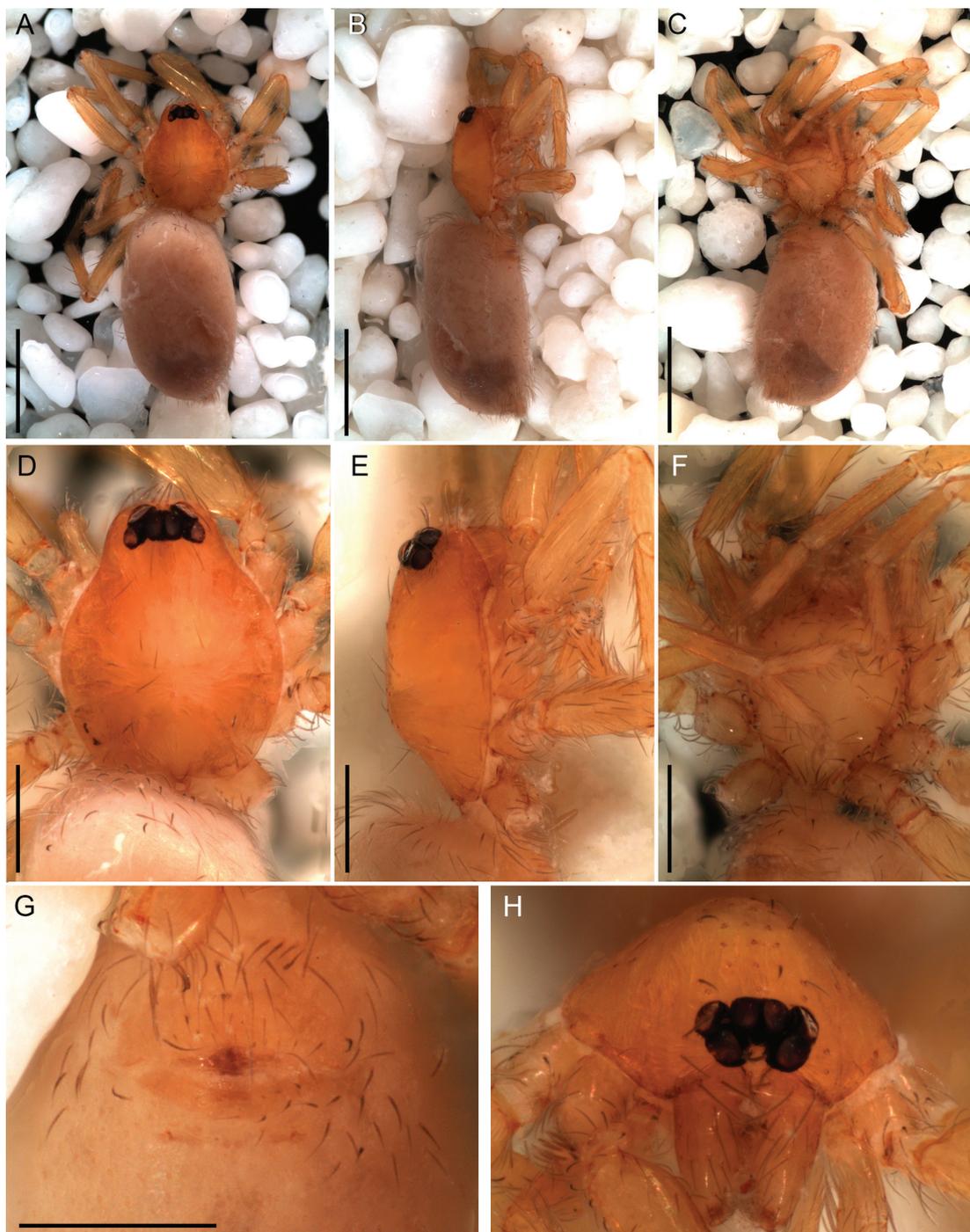


FIG. 4. *Birabenella kamanchaca*, n. sp., female paratype (PBI_OON 42083). A–C, habitus (A, dorsal; B, lateral; C, ventral); D–F, cephalothorax (D, dorsal, E, lateral, F, ventral); G, epigastric area, ventral; H, carapace, anterior view. Scale bars: A–C, 500 mm; D–G, 200 mm.

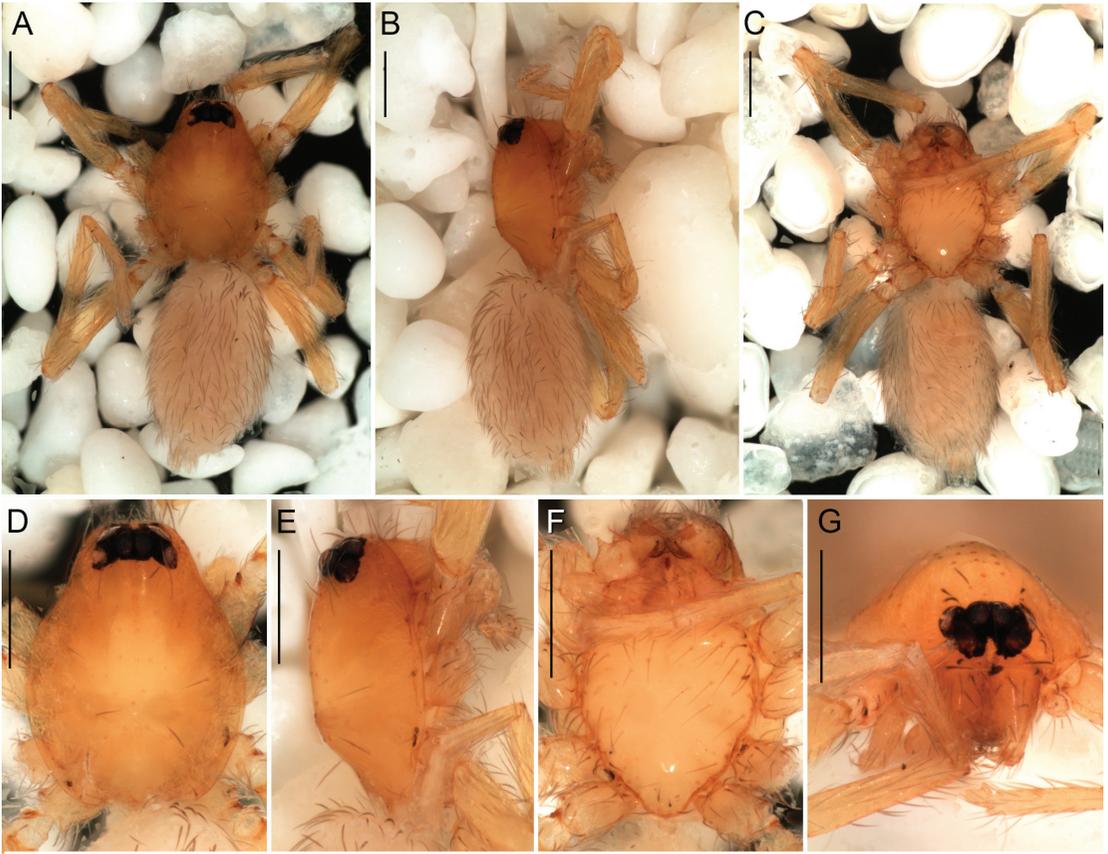


FIG. 5. *Birabenella kamanchaca*, n. sp., male holotype. A–C, habitus (A, dorsal; B, lateral; C, ventral); D–F, cephalothorax (D, dorsal; E, lateral; F, ventral); G, carapace, anterior view. Scale bars: 200 μ m.

Grismado in having copulatory duct convoluted before reaching the posterior receptacle, but differ by having a droplike anterior sclerite, and a more convoluted copulatory duct (fig. 10B).

MALE (PBI_OON 42098). **CEPHALOTHORAX**: Eyes on dark area, all subequal; posterior eye row recurved from above, straight from front; PLE-PME separated by less than PME radius. Sternum (fig. 5F) as long as wide, without radial furrows between coxae I–II, II–III, III–IV, surface smooth; setae light, evenly scattered. Mouthparts: Labium subpentagonal; with 3–5 setae on anterior margin. Endites with two darkened, curved setae at tip. **ABDOMEN**: Setae dark, needlelike. **LEGS**: Spines absent. Tarsi I to IV superior claws tooth not examined in detail. Trichobothria not examined. **GENITALIA** (fig. 10A): Palpal femur two or more times as long as trochanter; bulb, middle part of membranous fundus nearly spherical, ventral, from where arises weakly sclerotized seminal duct, gently curved to dorsal at its origin, it turns almost straight along almost all its length, running parallel to tendon; embolus opening presumably located between two flattened distal projections of bulb, one on prolateral side, slightly darkened, bent to ventral and prolateral, another forwardly directed, translucent, with acute tip. Curved, digitiform projection on ventral part of bulb located near distal part.

FEMALE (PBI_OON 42083). As in male except as noted. Palp spines absent. ABDOMEN: Dorsum soft portions slightly darker than in male. Tarsal organ I with inconspicuous proximal ridge and at least one visible sensilla; there is apparently one additional, small, very low projection, but probably not a true receptor (fig. 1C). Leg II with similar pattern of receptors, but opening narrower (fig. 1E). Leg III with oval tarsal organ, with proximal ridge and two sensilla, one large and another small (fig. 1F). GENITALIA (fig. 10B): Dorsal view: anterior sclerite small, drop shaped, apparently with lumen; two thin consecutive transverse sclerotized bars separate it from posterior part of genitalia, which has wide transverse sclerotized bar with lateral muscle insertions; copulatory opening apparently leading to thick-walled anterior copulatory duct, describing several tight turns before connecting with posterior receptacle. The latter has anterodorsal, thick walls, with reticulate surface, apparently with irregular lumen (not a definite tube).

OTHER MATERIAL EXAMINED: CHILE: Same data as the types, 1 ♀ (MACN 37255 PBI_OON 42434). **Region III (Atacama): Copiapó:** Quebrada El León, ca. Ruta 5, 10.5 km NNE Caldera, desert scrub, 50m, -26.97715°, -70.78150°, Oct. 25, 2011, M.J. Ramírez, A. Ojanguren, J. Pizarro et al., 1 ♀ (MHNS PBI_OON 42429); 1 ♀ (MACN 37257 PBI_OON 42430). **Huasco:** Carretera Costera, near Caleta de los Burros, 5.4 km NNE Carrizal Bajo, desert scrub, 50m, -28.03727°, -71.12570°, Oct. 25, 2011, M.J. Ramírez, A. Ojanguren, J. Pizarro et al., 1 ♀ (MACN 37258 PBI_OON 42084).

DISTRIBUTION: Coastal deserts in Antofagasta and Atacama regions, northern Chile.

NATURAL HISTORY: The specimens were collected under stones and in accumulated leaf litter between stones, and under shrubs.

Birabenella portai, new species

Figures 6; 7; 10C, D; 11

TYPE MATERIAL: Male holotype (MACN 37252 PBI_OON 50001), and female paratype (MACN 37251 PBI_OON 50000) from Argentina: Jujuy: Tilcara: Posta de Hornillos RN9 km 72, 4 km S of Maimará, litter under bushes and cacti, 2390 m, -23.65612°, -65.43365°, Dec. 28, 2016, coll. Andrés Porta.

ETYMOLOGY: The specific epithet is a patronymic in honor of Andrés Porta (MACN), the collector of this species, in recognition of his continuous efforts in searching for and collecting small arthropods.

DIAGNOSIS: The male of *B. portai* is easily recognized by its less globose copulatory bulb with more complicated set of paraembolic, thin terminal elements (fig. 10C); the female by its internal genitalia, with short copulatory duct with very thick walls, apparently fused with lateral apodemes, and by heavily sclerotized supporting structure that surrounds laterally and posteriorly the posterior receptacle, which has an internal ω -shaped tube (fig. 10D).

DESCRIPTION: MALE (PBI_OON 50001). CEPHALOTHORAX: All carapace setae dark, needlelike. Eyes: ALE largest; posterior eye row recurved from above, straight from front



FIG. 6. *Birabenella portai*, n. sp., female paratype. A–C, habitus (A, dorsal; B, lateral; C, ventral); D–F, cephalothorax (D, dorsal; E, lateral; F, ventral); G, epigastric area, ventral; H, carapace, anterior view. Scale bars: A, C, 200 mm; B, D–G, 500 mm.

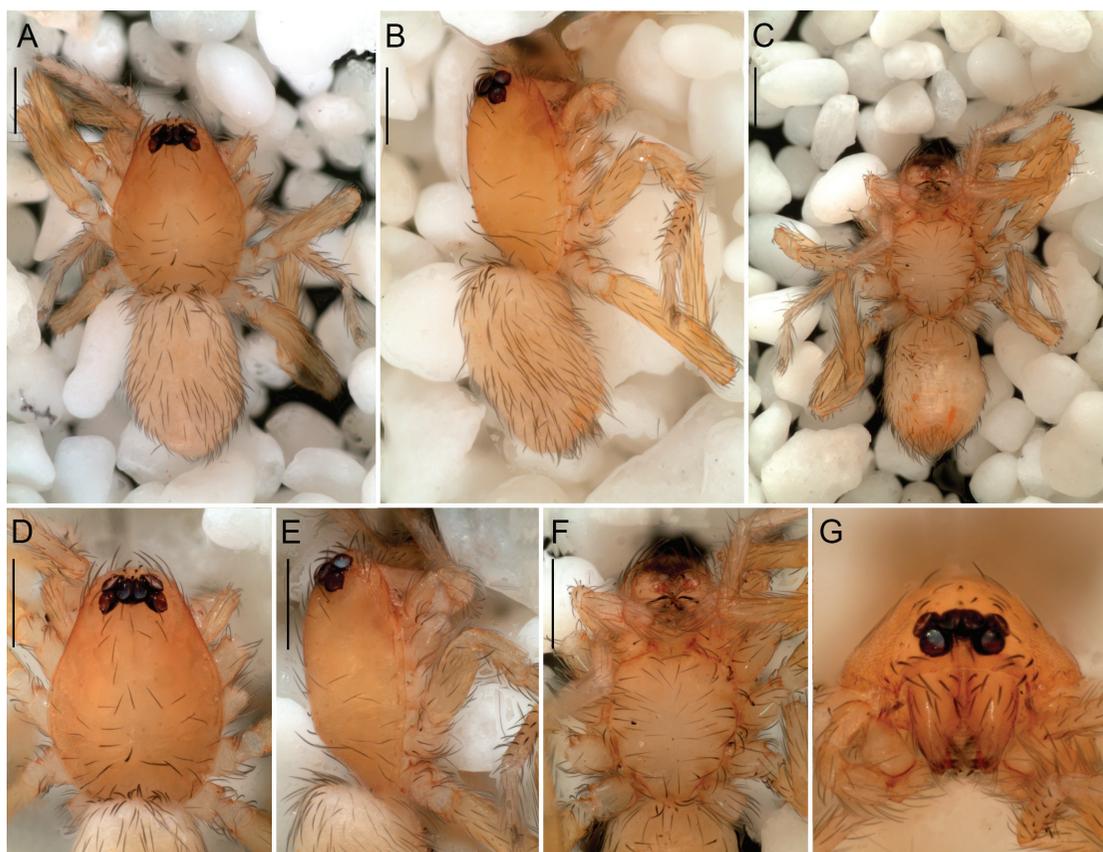


FIG. 7. *Birabenella portai*, n. sp., male holotype. A–C, habitus (A, dorsal; B, lateral; C, ventral); D–F, cephalothorax (D, dorsal; E, lateral; F, ventral); G, carapace, anterior view. Scale bars: 200 μ m.

(fig. 7D, G); PLE-PME separated by PME radius to PME diameter. Sternum longer than wide, without radial furrows between coxae I–II, II–III, III–IV, surface finely reticulate; setae dark, densest laterally. Mouthparts: Setae dark. Labium subpentagonal; with 1 or 2 setae on anterior margin, with unpaired, erect median setae near base. Endites with anteriorly directed, flattened, black setae. ABDOMEN: All setae dark, needlelike. LEGS: Spines absent. GENITALIA (fig. 10C): Palpal femur two or more times as long as trochanter; bulb more or less elongated piriform, membranous fundus nearly spherical, ventral, from where arises weakly sclerotized seminal duct; gently curved to dorsal at its origin, turning almost straight along almost all its length, running parallel to tendon; distal part of bulb with complex set of translucent, flattened projections (some with pointed tips, other with truncated tips, surrounding embolus opening). Ventral digitiform projection slightly curved to retrolateral side.

FEMALE (PBI_OON 50000). As in male except as noted. CEPHALOTHORAX: Female palp spines absent. GENITALIA (fig. 10D): Dorsal view: anterior sclerite small, drop shaped,

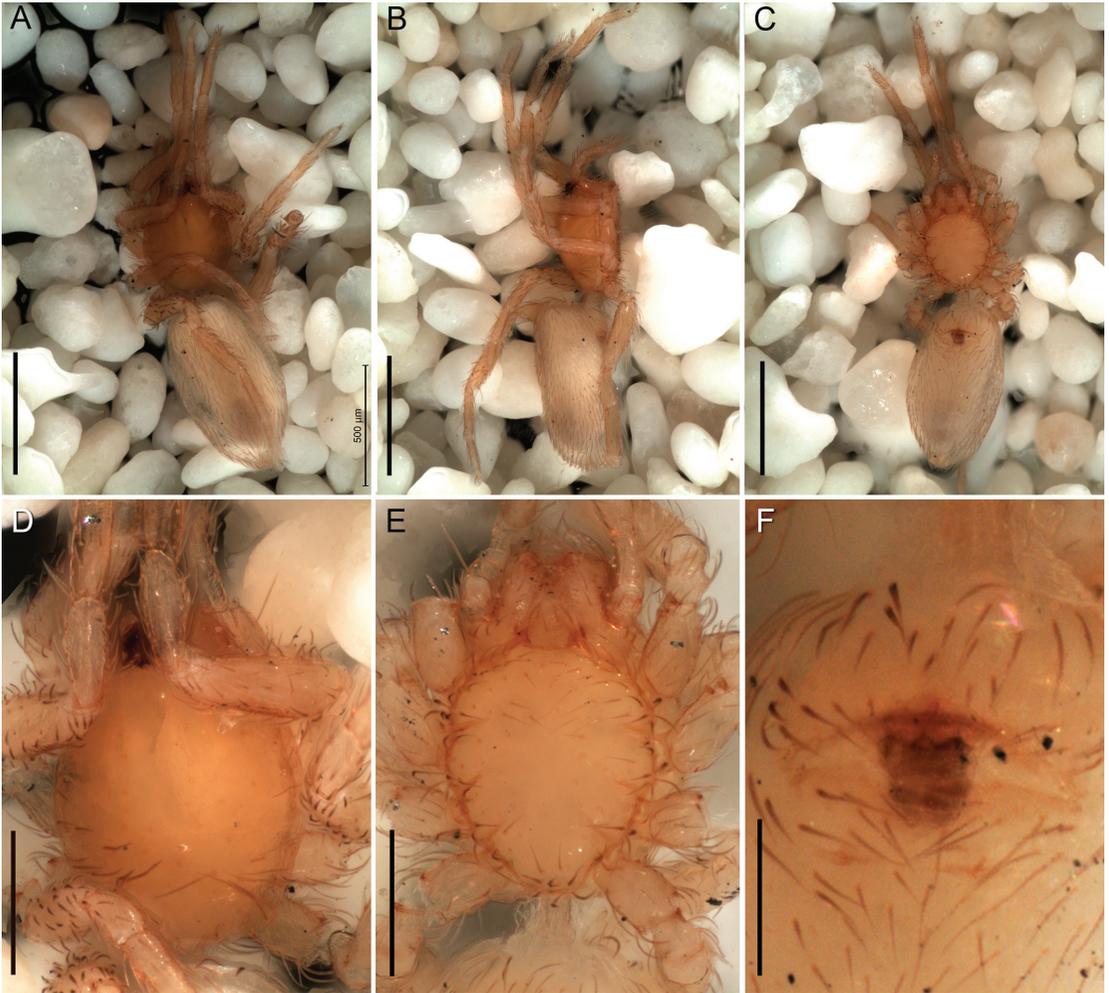


FIG. 8. *Birabenella chincha*, n. sp., female paratype (PBI_OON 49999). A-C, habitus (A, dorsal; B, lateral; C, ventral); D, E, cephalothorax (D, dorsal; E, ventral); F, epigastric area, ventral. Scale bars: A-C, 500 µm; D-F, 200 µm.

apparently with lumen; two thin consecutive transverse sclerotized bars separating it from posterior part of genitalia. Copulatory opening apparently leading to thick-walled anterior copulatory duct, apparently fused with paired lateral, transverse projections (apodemes) with muscular insertions at their tips; posterior receptacle, with thick anterior wall, with wrinkled surface and nearly ω-shaped internal tube. Posterior receptacle on the middle of heavily sclerotized structure with lateral extensions bearing muscle insertions.

OTHER MATERIAL EXAMINED: ARGENTINA: **Jujuy**: *Tilcara*: Purmamarca, Cerro de los Siete Colores -23.7438861°, -65.5052013°, 28 Dec 2016, A. Porta coll., one immature that probably belongs to this species (MACN-Ar).

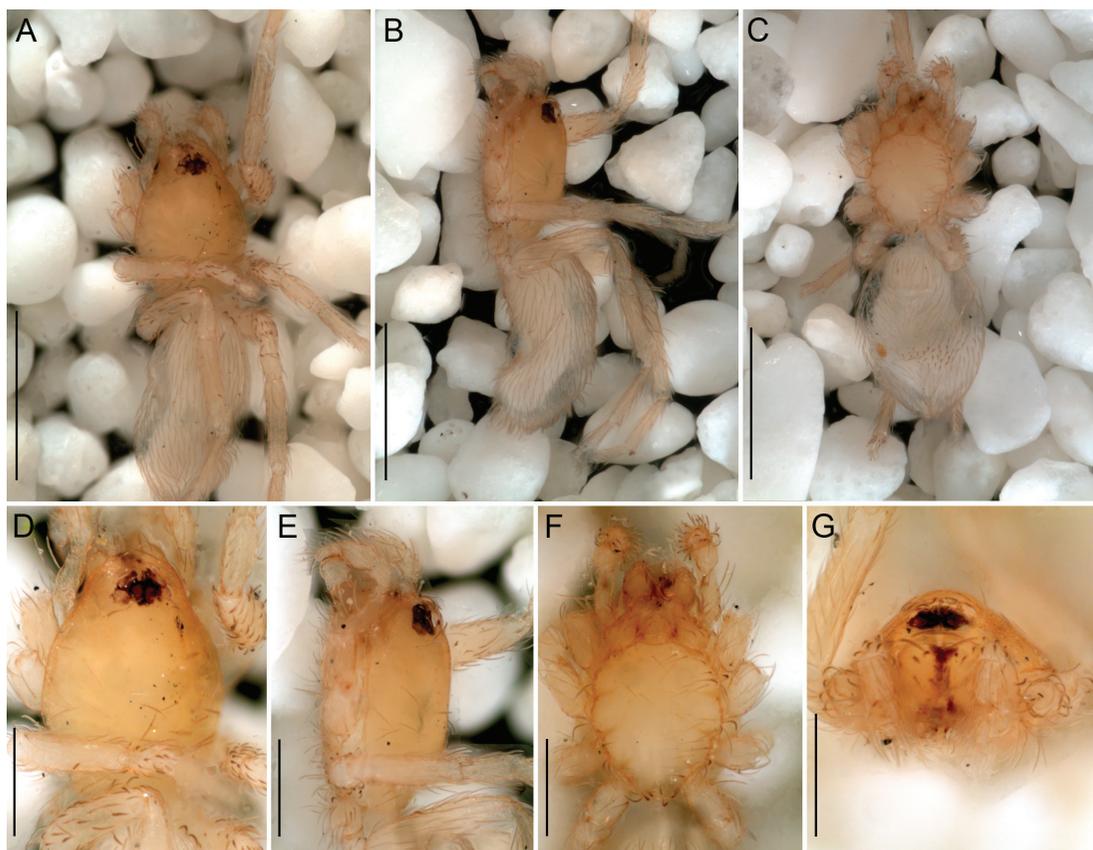


FIG. 9. *Birabenella chincha*, n. sp., male holotype. A–C, habitus (A, dorsal; B, lateral; C, ventral); D–F, cephalothorax (D, dorsal; E, lateral; F, ventral); G, carapace, anterior view. Scale bars: A–C, 500 mm; D–G, 200 mm.

Birabenella chincha, new species

Figures 1D, G; 3; 8; 9; 10E, F; 11

TYPE MATERIAL: Male holotype, two males and three female paratypes from Peru: Ica: Pisco, -13.70000° , -76.18333° , Sept. 01, 2011, Giraldo A. (MEKRB, PBI_OON 49999).

ETYMOLOGY: The specific epithet refers to Chincha people, whose ancient pre-Inca civilization flourished in the region of Peru where the holotype was found.

DIAGNOSIS: Both sexes are recognized by the conspicuous sternal furrows between coxae (figs. 8E, 9F), and by the nearly straight posterior eye row from above (fig. 9D); males are similar to *B. kamanchaca* by the relatively simple (only two) flattened terminal projections of bulb, but differ in their shape and orientation (figs. 3A–E, 10E); females are similar to those of *B. pizarroi* by the nearly oval anterior sclerite and straight copulatory duct, but differ by having a strongly recurved sclerotized bar, that appears as two curved, scimitar-shaped branches, and by the different path of the internal tube of the posterior receptacle (fig. 10F).

DESCRIPTION. MALE (PBI_OON 49999). CEPHALOTHORAX: Prosomal setae light. Eyes: ALE largest; posterior eye row straight from above, procurved from front; PLE-PME separated

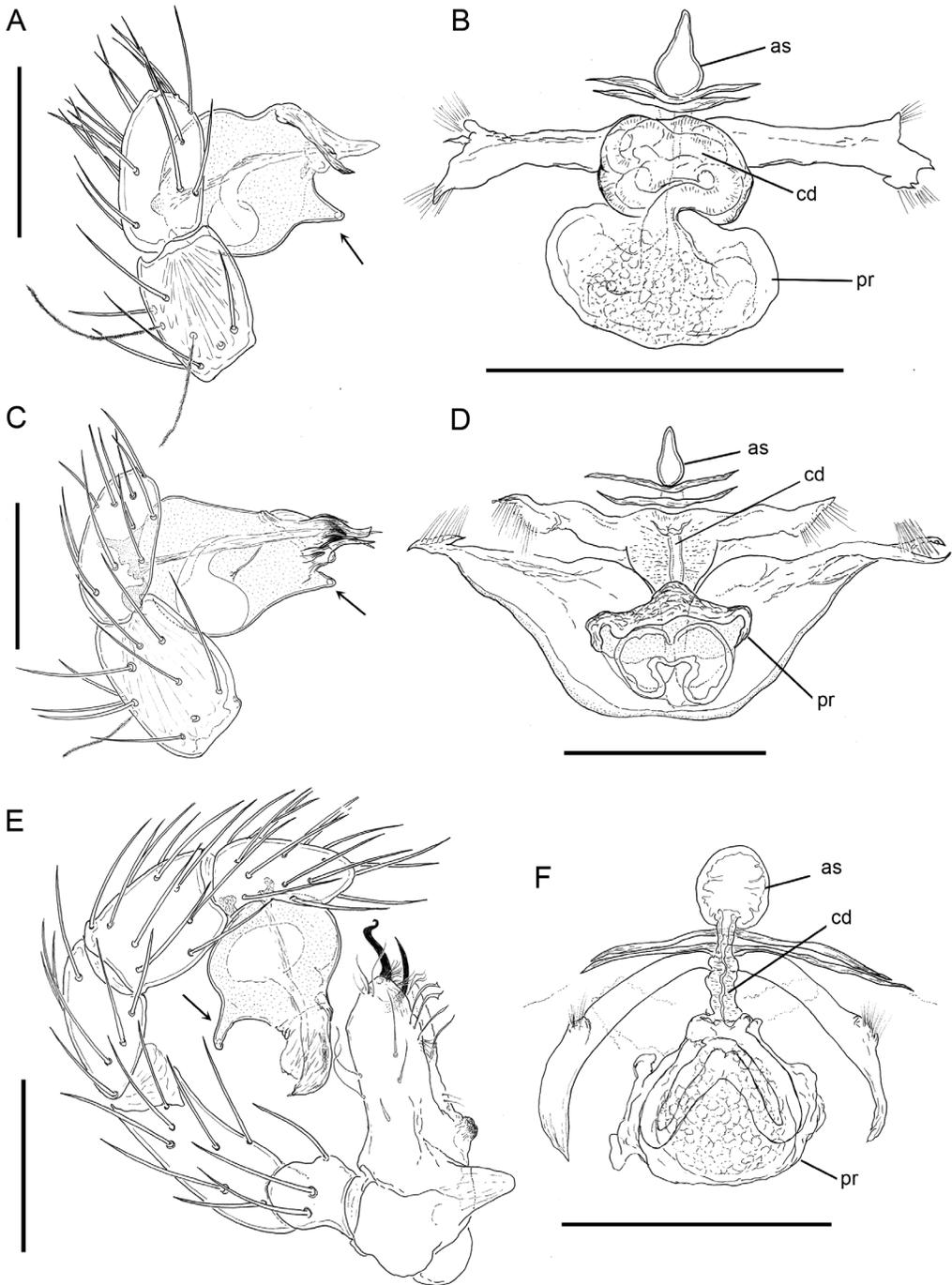


FIG. 10. *Birabenella* spp., genitalia. A–B, *B. kamanchaca*, n. sp. (male holotype and female paratype PBI_OON 42429); C–D, *B. portai*, n. sp. (male holotype and female paratype); E–F, *B. chincha*, n. sp. (male holotype and female paratype PBI_OON 49999). A, C, E, left palp, prolateral view; B, D, F, female vulva, cleared, dorsal view. Arrows = ventral tegular digitiform process. Abbreviations: **as** = anterior sclerite, **cd** = copulatory duct, **pr** = posterior receptacle. Scale bars: 100 μ m.



FIG. 11. Distribution of the species of *Birabenella*: black triangles indicate new species described in this paper; black circles indicate those previously described.

by less than PME radius. Sternum as long as wide, with radial furrows between coxae I–II, II–III, III–IV, surface smooth; setae light, evenly scattered. Mouthparts: labium subpentagonal; with 1 or 2 setae on anterior margin. Endites with lateral furrow that bisects them in two parts, dorsal and ventral; with two darkened, curved setae on tip, the larger one with twisted apex (fig. 10E). ABDOMEN: Dorsum and ventral setae light. LEGS: spines absent. GENITALIA: Tarsal organ of cymbium with proximal ridge and two receptors (apparently fused at their bases) one larger and other smaller (fig. 1G); femur one to two times as long as trochanter; membranous fundus oval, in center of the spherical base of bulb, from where arises weakly sclerotized seminal duct; gently curved along almost all its length, distal part with two flattened, compressed, distal projections of bulb that arise from an alveolus: one on prolateral side, bent to ventral, and another widened, ventrally directed, less sclerotized. Digitiform projection on ventral part of the bulb, near distal part, curved to retrolateral side (figs. 3A–E, 10E).

FEMALE (PBI_OON 49999). As in male except as noted. Palp spines absent. LEGS: Tarsi I superior claws examined by SEM, with six teeth each (fig. 3F). Tarsal organ of leg I with inconspicuous proximal ridge, apparently with only one receptor (fig. 1D). GENITALIA (fig. 10F): Dorsal view: anterior sclerite large, nearly spherical, apparently with lumen; two thin consecutive transverse sclerotized bars separate it from the posterior part of genitalia, that has strongly recurved sclerotized bar as two curved, scimitar-shaped branches (with muscle insertions on

middle of each branch); copulatory opening led apparently to thick-walled, sinuous copulatory duct. Posterior receptacle with anterodorsal thick wall, with reticulated surface and irregular shape, internal tube describing two loops and converging on anteromedian part.

OTHER MATERIAL EXAMINED: Same locality as the types, Apr. 01, 2011, Giraldo A., 1 ♀ (MEKRB PBI_OON 49998).

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