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## Description of *Birabenella*, a New Genus of Goblin Spiders from Argentina and Chile (Araneae: Oonopidae)

CRISTIAN J. GRISMADO<sup>1</sup>

### ABSTRACT

A new genus, *Birabenella*, is erected for three new soft-bodied oonopid species from Coquimbo Region, Chile (*B. homonota*, the type species, *B. elqui*, and *B. pizarroi*) and one from Catamarca Province, Argentina: *B. argentina* (Birabén, 1955), here transferred from *Oonopinus* Simon. The new genus is supported and diagnosed by the tarsal claws with one row of teeth, and by the stout and flattened setae on the dorsum of the abdomen. The thickened anterior wall of the posterior receptacle in female genitalia, and the ventral digitiform projection on the bulb of the male palp are also probable synapomorphies.

### INTRODUCTION

The Oonopidae, or goblin spiders, are small to very small haplogyne, ecribellate, six-eyed spiders whose greatest diversity occurs in tropical regions (Jocqué and Dippenaar-Schoeman, 2006). The family comprises around 543 described species in 74 genera (Platnick, 2010), although there is evidence that these numbers represent only a small fraction of the actual oonopid diversity (Fannes and Jocqué, 2008). Simon (1890) established the family and classified the genera according to their degree of body sclerotization into two informal subgroups, “loricati,” with abdominal scuta, and “molles,” lacking scuta (Simon, 1890, 1893). The monophyly

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of these groups is, however, doubtful (Fannes and Jocqué, 2008), although there is now evidence supporting the monophyly of the whole family as currently delimited (Burger and Michalik, 2010). Among the molles, there are many nominal species from diverse parts of the World (see Platnick, 2010, for a list) that are currently assigned to the genus *Oonopinus* Simon (1893). This genus was erected for the Mediterranean *Oonops angustatus* Simon, 1882, and for the subsequently described species *Oonopinus aurantiacus* Simon, 1893, from Venezuela. Simon (1893) separated *Oonopinus* from *Oonops* Templeton by the longer and lower carapace and by the shorter and more robust legs that lack spines (in contrast to the highly spinose legs of *Oonops*; see the key in Simon, 1893: 293).

After that, 11 additional species were assigned to *Oonopinus* without strong justification. One of these, *Oonopinus argentinus* Birabén, 1955, was described from one male collected in Catamarca Province, northwestern Argentina. However, Birabén's (1955) illustrations and descriptions show several features that suggest that the species is misplaced in the genus *Oonopinus*. The reticulated cuticle, the smaller eyes, the higher clypeus, and the very different palpal conformation (Birabén, 1955, figs. 1–4) differ clearly from the type species (*Oonopinus angustatus*), which has a smooth tegument, very low clypeus, and a palp with a thin "stylus" (terminal part of the embolus).

A close examination of the type of *O. argentinus* shows, in addition, that the tarsal claws bear a single row of teeth, a condition very uncommon in oonopids (Forster and Platnick, 1985: 218). Those authors considered the bipectinate claws as the primitive condition in the superfamily Dysderoidea (where Oonopidae are placed). If this interpretation is correct, the few known unipectinate-clawed oonopids are reversions and, therefore, the state should be considered derived.

The general appearance of *O. argentinus* is unusual for oonopids, especially its small eyes in a compact group (figs. 18, 26, 39, 45), so much so that Brignoli (1978: 20) proposed that it should probably be included in the Ochyroceratidae, a group from which it can be easily distinguished by the advanced position of the tracheal spiracles.

In a recent field trip to Coquimbo Region (north-central Chile) I collected a few specimens belonging to three species that are morphologically similar to *Oonopinus argentinus*. Fortunately, one of these is represented by both sexes, enabling a better understanding of this small group of spiders. The male palpal morphology of the new species resembles that of *O. argentinus*, including the small digitiform projection on the ventral side of the bulb (figs. 33, 49). In addition, the females of the three Chilean species share the same conformation of the internal genitalia, differing, however, in other characters (for example, the texture of the prosomal cuticle and the presence or absence of leg macrosetae). These features suggest that this small assemblage of species comprise a monophyletic group restricted to north-central Chile and northwestern Argentina, which I propose as a new genus in this contribution.

Specimens are deposited in the following collections: Museo de La Plata (MLP, Luis A. Pereira), Museo Argentino de Ciencias Naturales "Bernardino Rivadavia," Buenos Aires (MACN, Cristina L. Scioscia), and Museo de Historia Natural, Santiago (MHNS, Mario Elgueta). 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



FIGURES 1–2. Habitats of *Birabenella* species in Coquimbo, Chile. **1**, Cuesta Porotitos, the type locality of *B. homonota*, n. sp., and *B. elqui*, n. sp. **2**, disturbed grassland Near Quebrada del Quereo, Los Vilos, type locality of *B. pizarroi*, n. sp.

with a Leica DFC 290 digital camera mounted on a Leica M165 C stereoscopic microscope, and the focal planes were composed with Helicon Focus 4.62.2. Scanning electron micrographs were taken under high vacuum with a FEI XL30 TMP after critical point drying and gold-palladium coating. The format of descriptions follows mostly Platnick and Dupérré (2009). All measurements are expressed in millimeters. We report GPS coordinates of the localities when available; otherwise, we provide approximate coordinates (denoted with “ca.”) calculated with Google Earth (<http://earth.google.com>) from label data.

## TAXONOMY

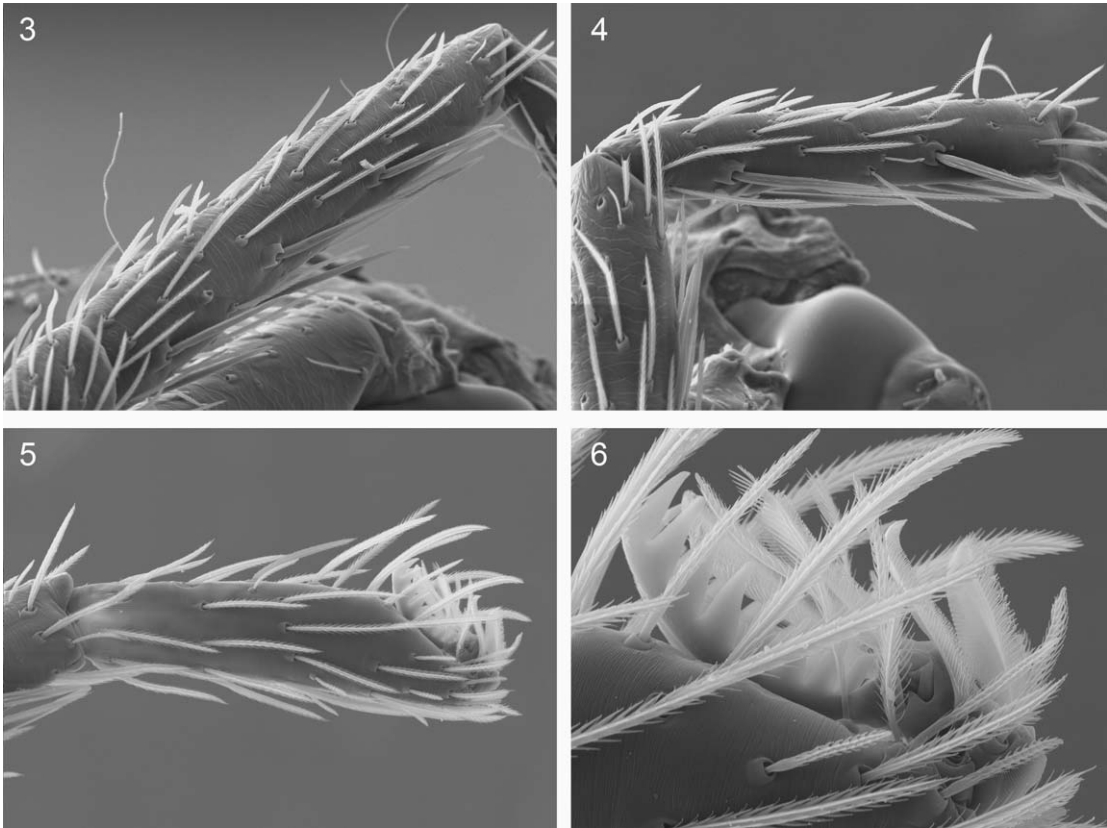
### *Birabenella*, new genus

TYPE SPECIES: *Birabenella homonota*, n. sp.

ETYMOLOGY: The generic name is in honor of the late Argentine arachnologist Max Birabén (1893–1977), who was the first to describe a species assigned here to this genus (*O. argentinus*), in recognition of his valuable contributions to the knowledge of the oonopids from Argentina. Gender feminine.

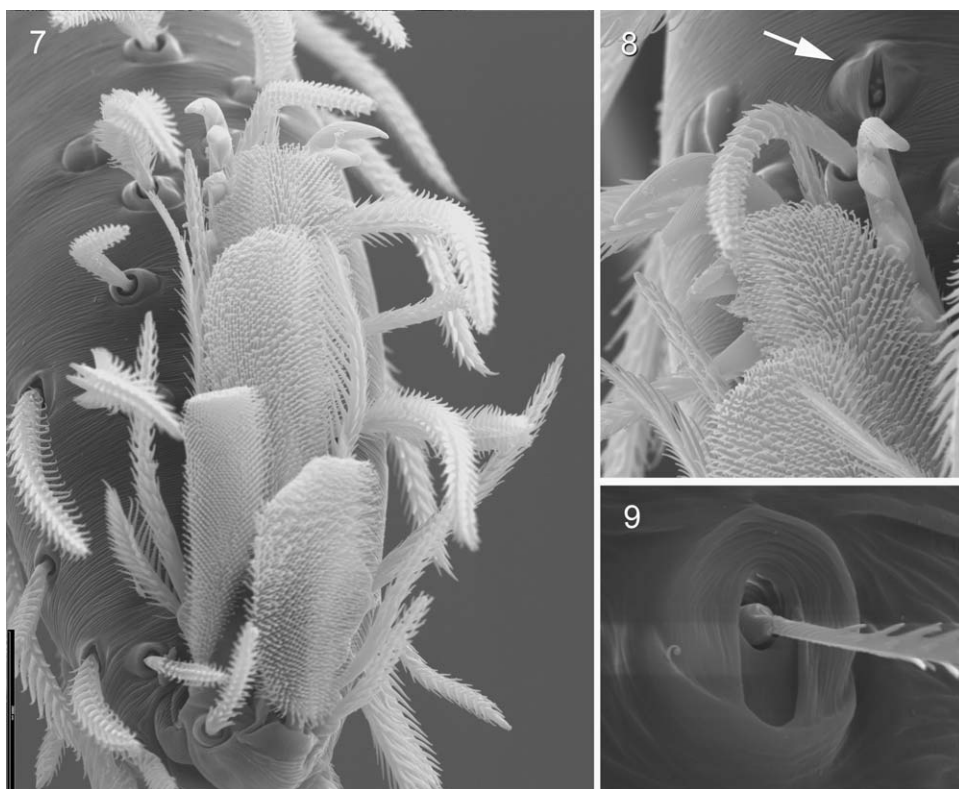
DIAGNOSIS: The putative synapomorphies proposed for *Birabenella*, new genus, are the unipectinate tarsal claws (figs. 6, 7–8, 10–11) and the stout and flattened setae on the dorsum of the abdomen (figs. 18, 26, 39, 54, 63). Other probable synapomorphies are the conspicuous ventral digitiform projection on the male palpal bulb (figs. 33, 49) and the strongly thickened anterior wall of the posterior diverticle in the female genitalia (figs. 35, 59, 68).

DESCRIPTION: *Male* (males of *B. elqui* and *B. pizarroi* are unknown): CEPHALOTHORAX: Carapace without any pattern, broadly oval in dorsal view, pars cephalica almost flat in lateral view, anteriorly narrowed to between 0.5 and 0.75 times its maximum width, with rounded posterolateral corners, posterolateral edge without pits, posterior margin not bulging below posterior rim, anterolateral corners without extension or projections, posterolateral surface without spikes, surface of pars cephalica strongly reticulate, sides also strongly reticulate, thorax without depressions, fovea absent, without radiating rows of pits; lateral margin straight,



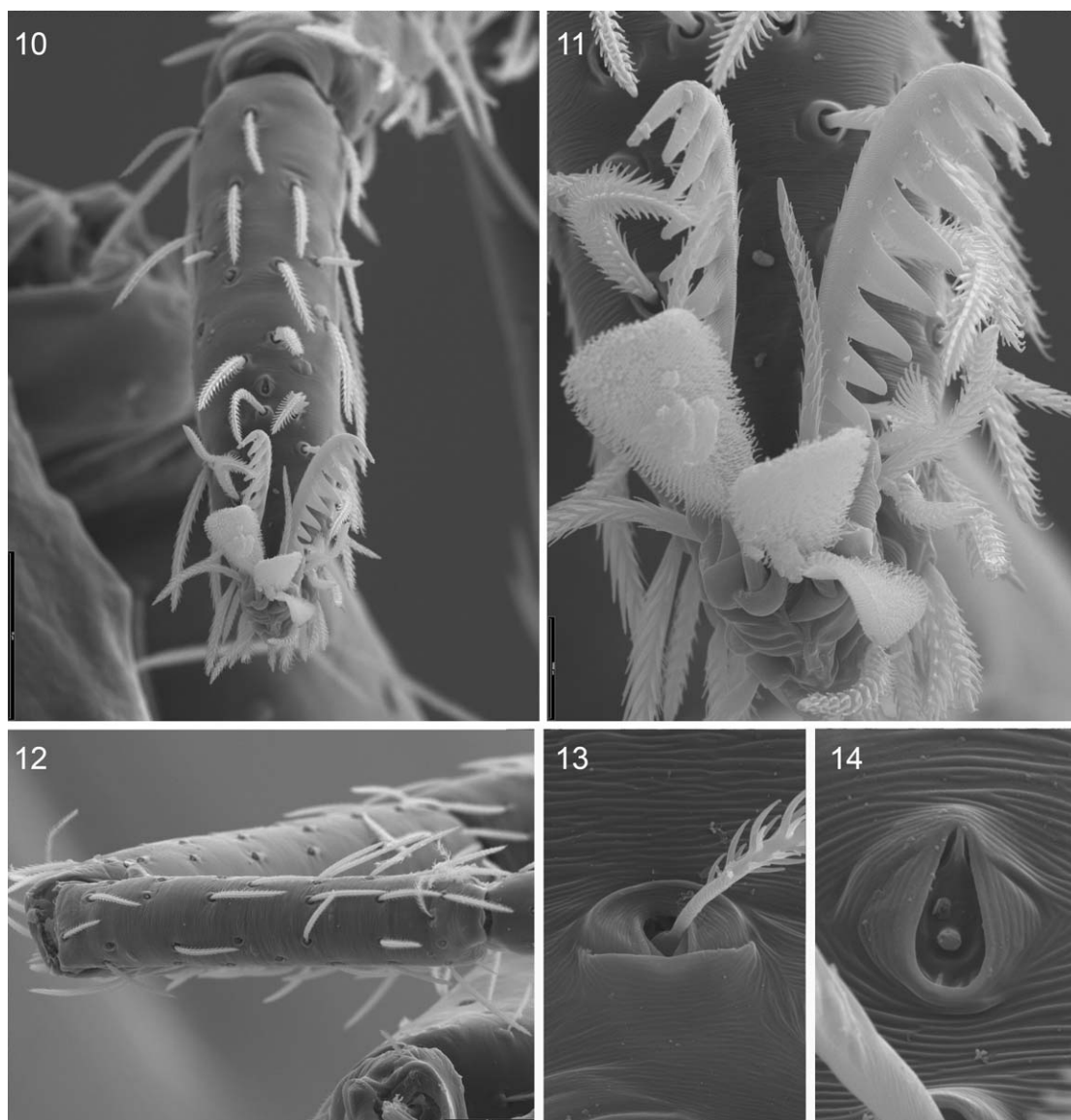
FIGURES 3–6. *Birabenella homonota*, n. sp., female paratype (PBI\_OON 14990), morphology of left leg I. 3, tibia, prolateral; 4, metatarsus, prolateral; 5, tarsus, prolateral; 6, tarsal claws, prolateral.

rebordered, without denticles; plumose setae near posterior margin of pars thoracica absent; nonmarginal pars thoracica setae needlelike; marginal setae needlelike. Clypeus margin unmodified, curved downwards in front view, vertical in lateral view, high, ALE separated from edge of carapace by their radius or more, median projection absent; setae present. Chilum absent. Eyes: six, well developed, all subequal, all eyes circular; posterior eye row recurved from above, straight from front; ALE separated by more than their diameter, ALE-PLE separated by ALE radius to ALE diameter, PME separated by less than their radius, PLE-PME separated by PME radius to PME diameter. Sternum as long as wide, uniform, not fused to carapace, median concavity absent, surface finely reticulate, without pits, microsculpture covering entire surface, sickle-shaped structures absent, anterior margin unmodified, posterior margin extending posteriorly beyond anterior edges of coxae IV as single extension, anterior corner unmodified, lateral margin without infracoxal grooves, distance between coxae approximately equal, extensions of precoxal triangles absent; setae sparse, dark, needlelike, evenly scattered, originating from surface, without hair tufts. Mouthparts: chelicerae straight, anterior face with the base slightly swollen; without teeth on both promargin and retromargin; without toothlike projections, directed medially, shape normal, without prominent basal process, tip unmodified; setae



FIGURES 7–9. *Birabenella homonota*, n. sp., female paratype (PBI\_OON 14990), left leg I. 7, claws and claw tufts, apical; 8, same, detail (arrow: tarsal organ); 9, tibial trichobothria, dorsal.

needlelike, evenly scattered; paturon inner margin with scattered setae, distal region unmodified, posterior surface unmodified, promargin unmodified, inner margin unmodified, laminate groove absent. Labium subpentagonal, elongate, not fused to sternum, anterior margin indented at middle, same as sternum in sclerotization. Endites strongly convergent, anterior tip with one strong, spinelike projection (as in fig. 47), distally not excavated, serrula present in single row, posteromedian part unmodified, same as sternum in sclerotization. ABDOMEN: ovoid, without long posterior extension, rounded posteriorly; dorsum soft portions white, without color pattern (a small, weakly sclerotized dorsal scutum is present in *B. homonota*). Book lung covers large, round, without setae, anterolateral edge unmodified. Posterior spiracles connected by groove. Pedicel tube short, unmodified, scuto-pedicel region unmodified, scutum absent, but abdomen not extending anterior of pedicel, plumose hairs absent, matted setae on anterior ventral abdomen in pedicel area absent, cuticular outgrowths near pedicel absent. Epigastric scutum absent. Postepigastric scutum absent. Spinneret scutum absent. Supraanal scutum absent. Dorsum setae present, stout and flattened. Epigastric area setae uniform, needlelike. Postepigastric area setae present, needlelike. Dense patch of setae anterior to spinnerets absent. Colulus absent. LEGS: without color pattern; femur IV not thickened, same size as femora I–III, tibia I unmodified, tibia IV specialized hairs on ventral apex absent, tibia IV ventral scopula



FIGURES 10–14. *Birabenella pizarroi*, n. sp., female holotype (PBI\_OON 14992), morphology of left leg I. **10**, tarsus, apicodorsal; **11**, tarsal claws and claw tufts, apical; **12**, metatarsus, dorsal; **13**, metatarsal trichothoria, dorsal; **14**, tarsal organ, dorsal.

absent, metatarsi I and II mesoapical comb absent, metatarsi III and IV weak ventral scopula absent. Tarsi I to IV without inferior claw. Superior claws unipectinate. Leg spines present only in *B. homonota*. GENITALIA: Epigastric region with sperm pore not visible with light microscope; furrow without  $\Omega$ -shaped insertions, without setae. Palp normal size, not strongly sclerotized, right and left palps symmetrical, proximal segments pale orange; embolus light, prolateral excavation absent; 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 trichobothria not examined; cymbium pale orange, ovoid in dorsal view, not fused with bulb, not extending beyond distal tip of bulb, plumose and stout setae absent, without distal patch of setae; bulb pale orange, 1 to 1.5 times as long as cymbium, stout, tapering apically, with a large, oval opening from which the embolus and accessory membranes arise. The seminal duct is visible with clarification (figs. 33, 49).

*Female* (females of *B. argentina* are unknown): As in males except as noted. CEPHALOTHORAX: Carapace surface of elevated portion of pars cephalica reticulate or smooth, sides strongly (*B. homonota*) to finely reticulate (*B. elqui* and *B. pizarroi*). Clypeus setae dark, needle-like. Sternum surface reticulate (*B. homonota*) or smooth (*B. elqui* and *B. pizarroi*). Labium with 1 or 2 setae on anterior margin, subdistal portion with unmodified setae. Endites antero-medial tip unmodified. Female palp claws absent; spines absent; tarsus unmodified, patella without prolateral row of ridges. LEGS: patella plus tibia I near as long as carapace. Tarsal proclaws and retroclaws inner face striate (at least in *B. homonota* and *B. pizarroi*). Tarsal organ with two or three sensilla visible (at least in legs I in *B. homonota* and *B. pizarroi*). GENITALIA: anterior diverticle duct shaped, with thin lumen, associated with a transverse sclerite (visible through cuticle, with at least two pairs of muscles attached). Anterior to the transverse sclerite there is an anterior process with a transversely widened structure. Posterior receptaculum with the anterior wall strongly sclerotized, with internal ducts variable shape and length (see below, under species descriptions).

### *Birabenella homonota*, new species

Figures 1, 3–9, 15–35, 69

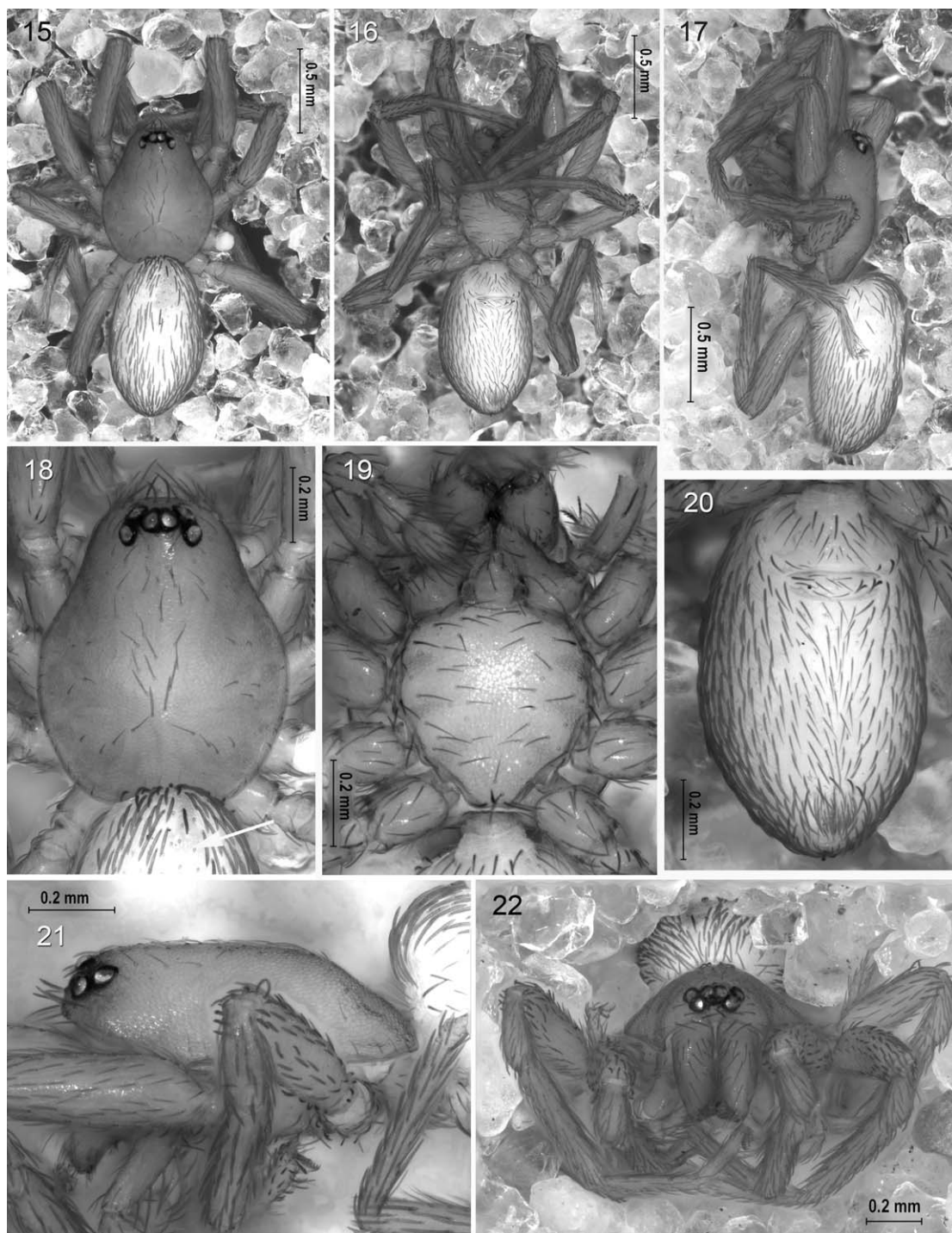
TYPE MATERIAL: Male holotype from Chile: Coquimbo Region: Elqui Province: Cuesta Porotitos; 29°47'40.1"S; 71°17'31.8"W (WGS84); alt. 106 m (GPS); 16.VIII.2009; coll. C. Gris-mado, A. Ojanguren, J. Pizarro and F. Alfaro. Coastal shrubby steppe, under stones. Deposited in MHNS (PBI\_OON 14989). Same data: two female paratypes (MACN-Ar 22098, 22097, PBI\_OON 14991, 14990 respectively).

OTHER MATERIAL EXAMINED: None.

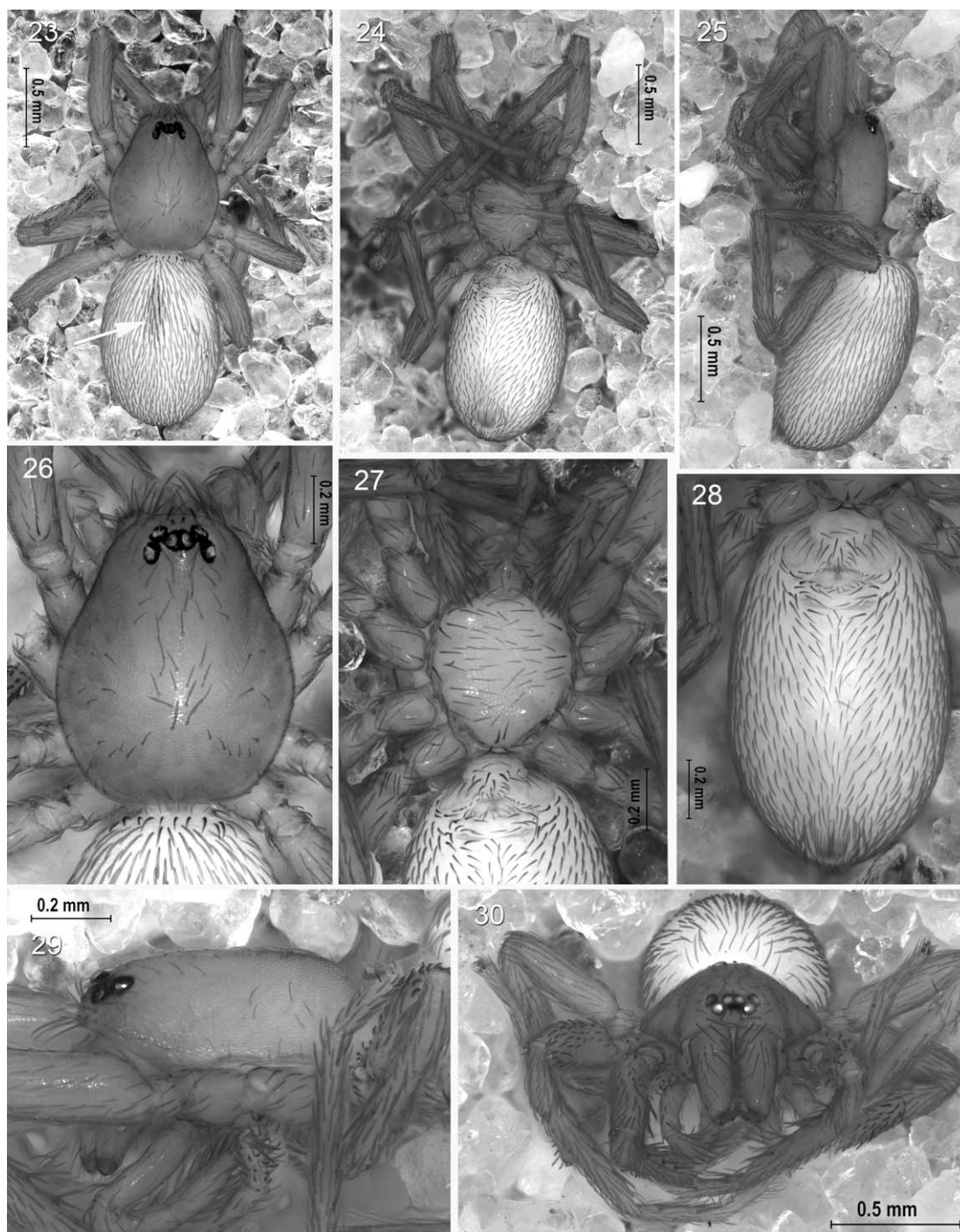
ETYMOLOGY: The specific epithet refers to the gekkonid genus *Homonota* Gray, very common lizards at the site where these spiders were collected. The reticulate carapace of these oonopids resembles the scaly skin of these lizards.

DIAGNOSIS: *B. homonota* is the only known species with ventral spines on tibiae and metatarsi I–II (figs. 3–4). Males resemble those of *B. argentina* in general palpal conformation, but differ in the dorsally bulging bulb, the shape of the apical membranous elements that accompany the embolus and the obtuse ventral protrusion on the palpal tibia (figs. 31–33). Females differ from other species in having a highly coiled tube of the posterior receptaculum (fig. 35) and a strongly reticulate surface of the carapace and sternum.

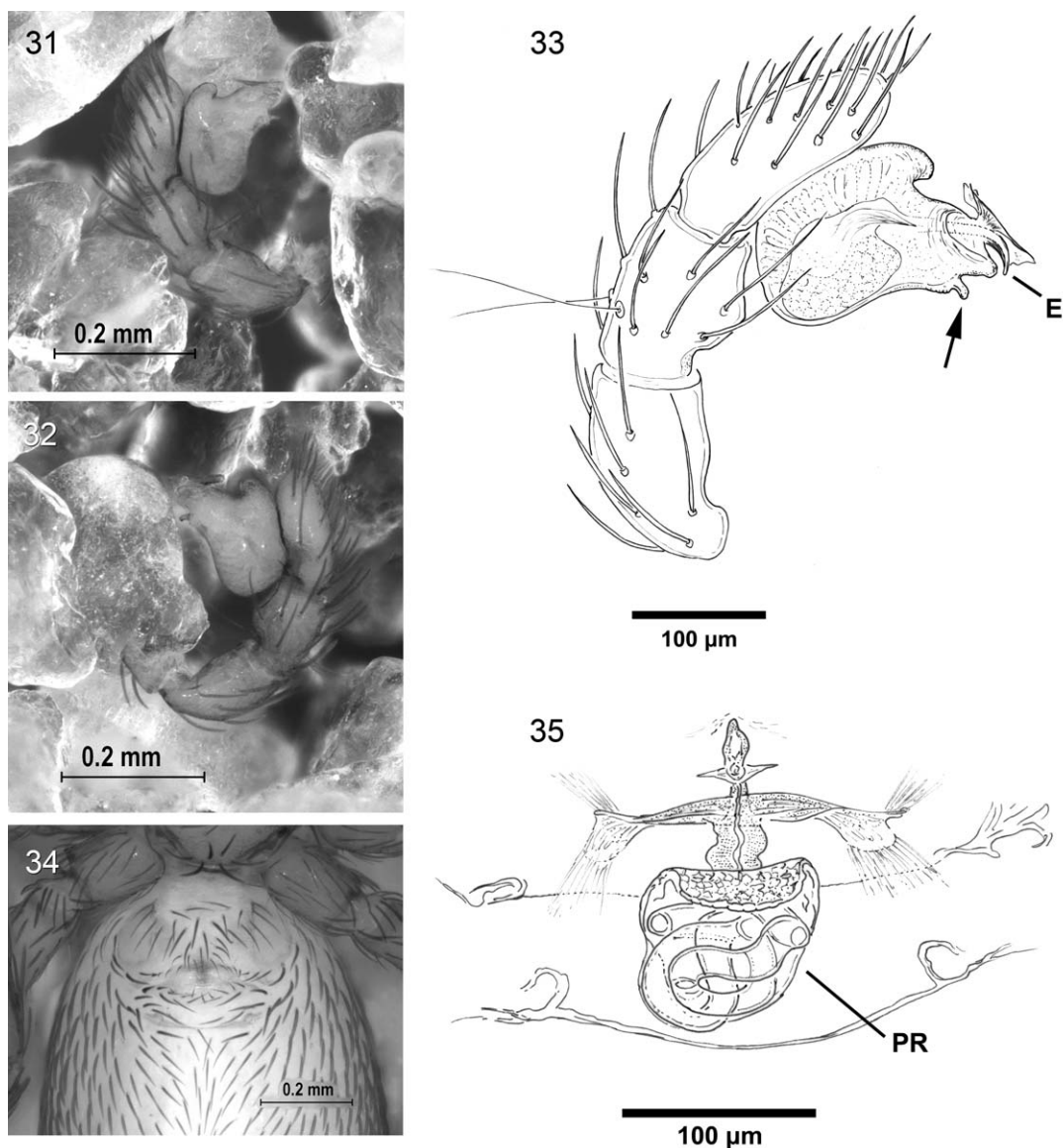
DESCRIPTION: *Male* (holotype): Total length 1.74. CEPHALOTHORAX: Carapace orange; surface of elevated portion of pars cephalica strongly reticulate, sides strongly reticulate, non-marginal pars cephalica setae dark, needlelike, scattered; nonmarginal pars thoracica setae



FIGURES 15–22. *Birabenella homonota*, n. sp., male holotype (PBI\_OON 14989). 15–17, 22, habitus; 18–19, 21, cephalothorax; 20, abdomen. 15, 18, dorsal; 16, 19–20, ventral; 22, anterior; 17, 21, lateral. Arrow: dorsal scutum.



FIGURES 23–30. *Birabenella homonota*, n. sp., female paratype (PBI\_OON 14991). 23–25, 30, habitus; 26–27, 29, cephalothorax; 28, abdomen. 23, 26, dorsal; 24, 27–28, ventral; 30, anterior; 25, 29, lateral. Arrow: dorsal scutum.



FIGURES 31–35. *Birabenella homonota*, n. sp., genital morphology. 31–33, male holotype (PBI\_OON 14989), left palp. 31, 33, prolateral; 32, retrolateral (E = embolus; arrow: ventral digitiform projection of the bulb). 34–35, female paratypes (PBI\_OON 14991 and 14990, respectively); 34, epigastric area, ventral; 35, internal genitalia, cleared, dorsal view (PR = posterior receptaculum).

dark; marginal setae dark. Clypeus setae dark, needlelike. Sternum orange, with radial furrows between coxae I–II, II–III, III–IV, surface finely reticulate, microsculpture covering entire surface, lateral margins with rounded extensions between coxae. Mouthparts: setae dark. Chelicerae, endites, and labium orange; labium with 1 or 2 setae on anterior margin, subdistal portion with one medial setae. Endites converging anteriorly, tip with one strong, spinelike projection.

ABDOMEN: Dorsal scutum weakly sclerotized, pale orange, narrow, with irregular margins, reaching to around the middle of the dorsum, without color pattern, covering less than  $\frac{1}{2}$  of abdomen, between  $\frac{1}{4}$  and  $\frac{1}{2}$  abdomen width, not fused to epigastric scutum, surface smooth. Setae: dorsal stout and flattened; epigastric and postepigastric needlelike, all dark. LEGS: pale orange; patella plus tibia I nearly as long as carapace. Leg spination (only surfaces bearing spines listed, all spines longer than segment width): leg I: femur: p0-0-1, pv0-0-1; tibia: v2-2-2-0; metatarsus: v2-2, leg II: tibia: v2-2-2-0; metatarsus: v2-2. Tarsi I to IV superior claws unipennate. Trichobothria not examined. GENITALIA: Palpal bulb with rounded dorsal bulge, distally with distinct, small, digitiform ventral apophysis, embolus accompanied by a large retrolateral membranous element, both arising from broad opening of bulb; tibia with ventral obtuse median projection.

*Female* (paratype, MACN-Ar 22098, PBI\_OON 14991): Total length 2.04. As male except where noted. CEPHALOTHORAX: Carapace slightly broader anteriorly compared with the male. Clypeus high, ALE separated from edge of carapace by their radius or more. Eyes all subequal; ALE-PLE separated by ALE radius to ALE diameter. Mouthparts: Endites convergent anteriorly, anterior tip without the spinelike projection of males. Female palp spines absent. ABDOMEN: dorsum soft portions white. Dorsal scutum less than  $\frac{1}{4}$  abdomen width, narrow, with irregular margins, shorter than that of male. LEGS: cuticular sculpture reticulate, at least on tibiae and metatarsi (figs. 3–4), fingerprint in tarsi (figs. 5–6). Leg spination (only surfaces bearing spines listed, all spines longer than segment width): leg I: femur: p0-0-1, pv0-0-1; tibia: v2-2-2-0; metatarsus: v2-2, leg II: tibia: v2-2-2-0; metatarsus: v2-2. Trichobothria (only metatarsal and tibial examined with SEM): base longitudinally narrowed, internal texture of the aperture not grate-like, hood covered by low, closely spaced ridges, hood and distal plates not well differentiated. Tarsal organ with 3 sensilla visible, capsulate, opening intermediate between oval and longitudinal slit. GENITALIA (figs. 34–35): anterior process and its transverse widened structure relatively small; posterior receptaculum with anterior wall strongly sclerotized, apparently dorsally folded, with long, irregularly convoluted internal duct.

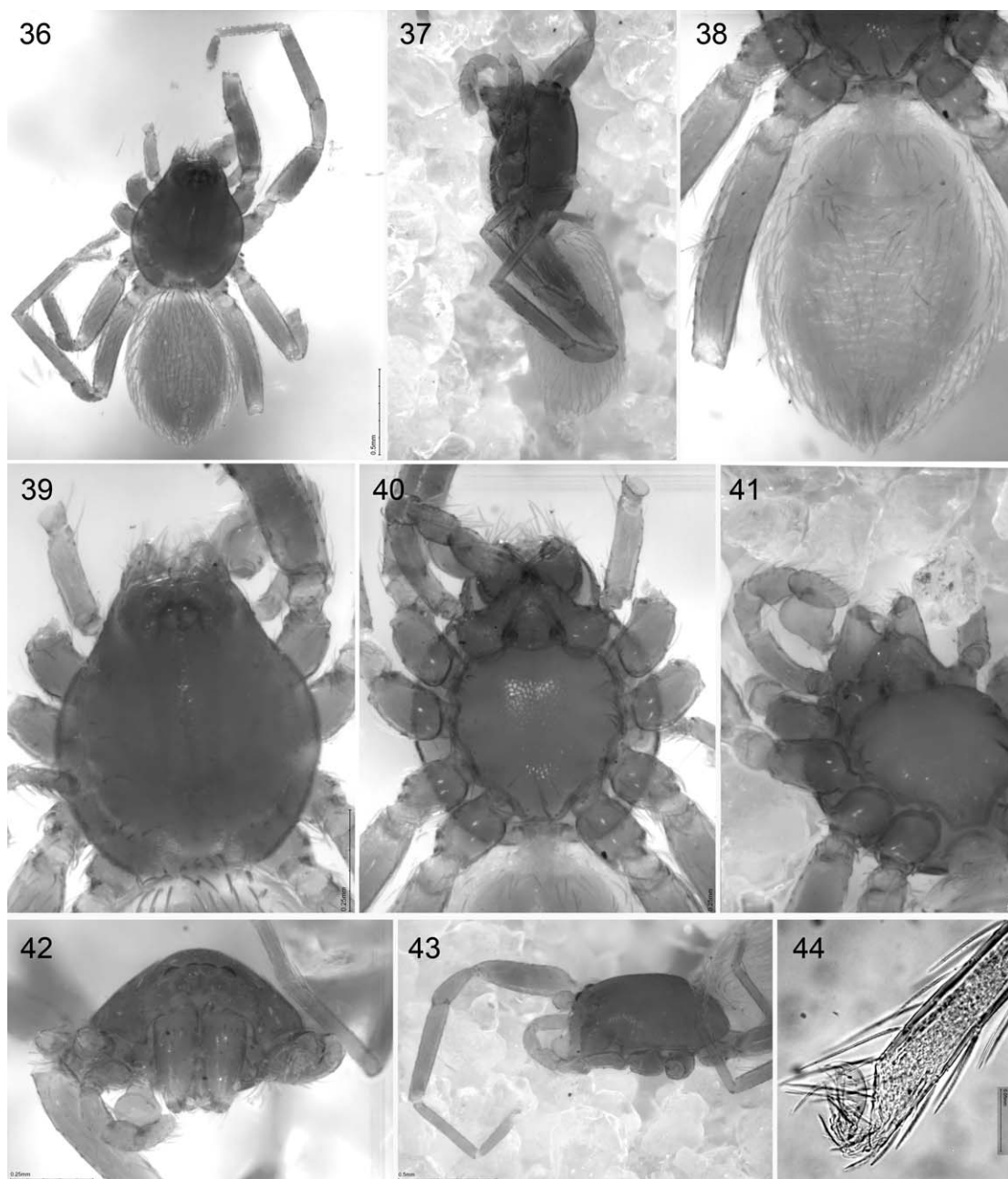
NATURAL HISTORY: The three known specimens were collected under stones in Cuesta Porotitos (fig. 1), in a typical habitat of the shrubland steppe subregion of central Chile. The plant formations of the type locality correspond to the “coastal shrubby steppe,” as described in Gajardo (1993).

*Birabenella argentina* (Birabén, 1955), new combination

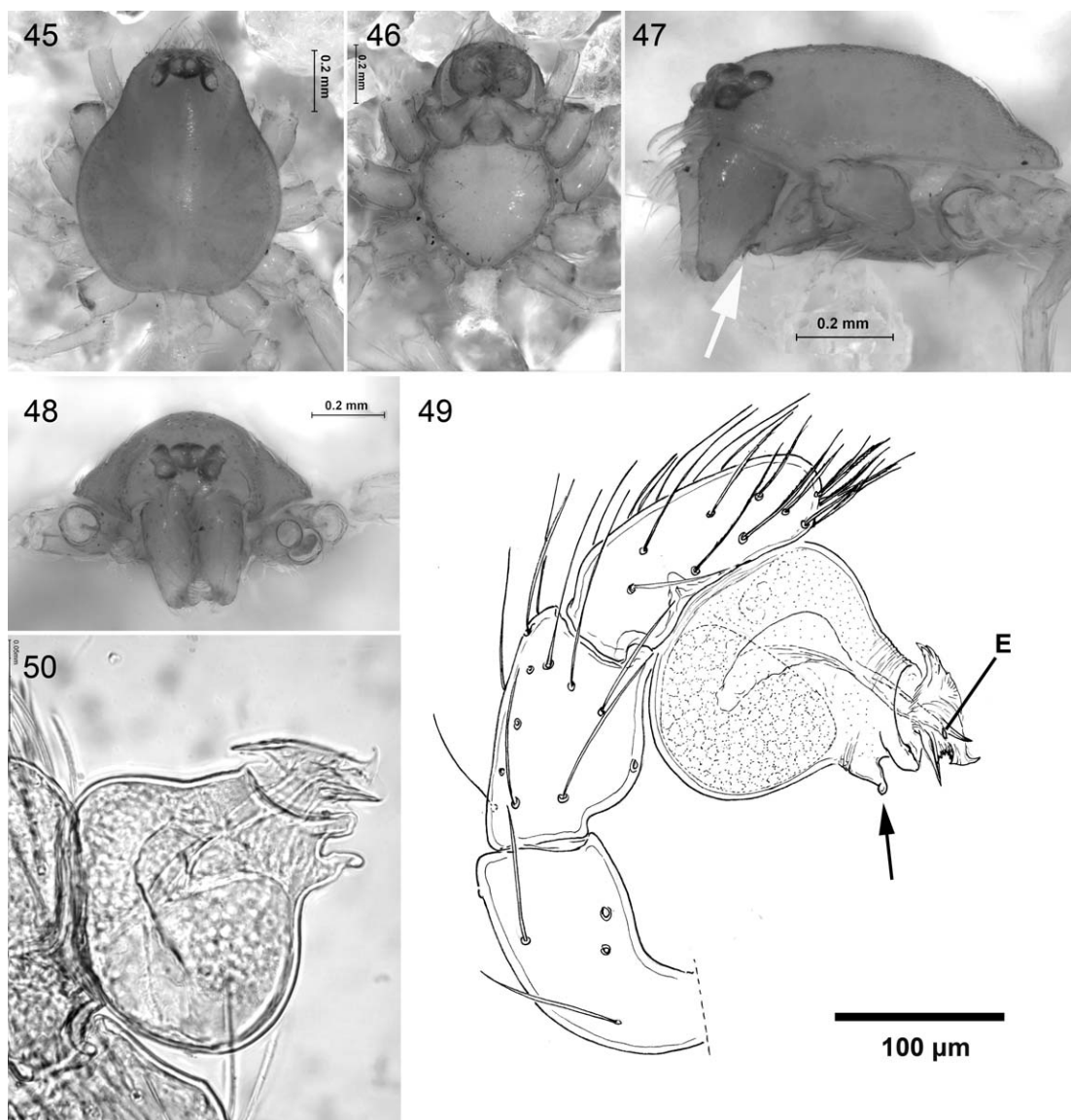
Figures 36–50, 69

*Oonopinus argentinus* Birabén, 1955: 73, figs. 1–4; male holotype from Argentina: Catamarca Province: Mutquín (road from Andalgalá to Pomán) ca. 28°18'S, 66°8'W, in MLP 280 (PBI\_OON 14757): examined. Brignoli 1978: 20.

REMARKS: The vial with the type specimen is labeled as “*Oonopinus rupicola*, Birabén/Holotypus.” Ramírez determined as *O. argentinus* probable male holotype (note in vial); see also Pereira et al. (1999). Although the specimen does not have the number assigned by Birabén



FIGURES 36–44. *Birabenella argentina* (Birabén); 36–43, male holotype (PBI\_OON 14757); 44, male (PBI\_OON 14758). 36–37, habitus; 38, abdomen; 39–43, cephalothorax; 44, right tarsus IV. 36, 39, dorsal; 37, 43, lateral; 38, 40, ventral; 41, posteroventral; 42, anterior; 44, prolateral.



FIGURES 45–50. *Birabenella argentina* (Birabén), male (PBI\_OON 14758). 45–48, cephalothorax; 49–50, left palp, prolateral. 45, dorsal; 46, ventral; 47, lateral; 48, anterior; black arrow: ventral digitiform projection of the bulb, white arrow: spinelike projection on the endites; E = embolus.

in his private collection, I assume that this specimen is the holotype because all the data of the label match with those of the publication (especially the locality and date), and it seems to be the specimen illustrated.

OTHER MATERIAL EXAMINED: Argentina: Catamarca: Hualfin; M. Birabén col., no date, 1 male (MLP 14599, PBI\_OON 14758) ca. 27°13'S, 66°49'W.

DIAGNOSIS: The male is very similar to that of *B. homonota*, but clearly differs in the lack of leg spines, the dorsal bulge on the palpal bulb, and the small dorsal scutum on the abdomen

(figs. 36, 49–50). The palpal tibia is unmodified and the membranous elements in the apical bulb are different (figs. 49–50).

**DESCRIPTION:** *Male* (holotype, in poor condition): Total length 1.71. **CEPHALOTHORAX:** Carapace orange-brown; nonmarginal pars cephalica setae absent (probably lost); nonmarginal pars thoracica setae light (probably by the condition of preservation). Clypeus setae light, stout. Eyes mostly as in *B. homonota*; all subequal, circular. Sternum without radial furrows between coxae I–II, II–III, III–IV, lateral margins unmodified. Mouthparts: setae light. Labium subpentagonal, elongated; without setae. Endites converging anteriorly, tip with one strong, spinelike projection (fig. 47). **ABDOMEN:** dorsal scutum absent. Dorsum setae light. Epigastric and postepigastric area setae light. **LEGS:** orange; patella plus tibia I near as long as carapace. Leg spines absent. Tarsi I to IV superior claws unipectinate. Trichobothria not examined. **GENITALIA:** Palpal embolus difficult to see, surrounded by several membranous elements, all arising from a broad opening of the bulb, which has a distinct, small, digitiform ventral apophysis.

**VARIABILITY:** The original description mentioned that the eyes are on a dark pigmented area. In the holotype seems to be faded, but in the other known male the dark area is still visible (fig. 45).

*Female:* Unknown.

**NATURAL HISTORY:** The original description (Birabén, 1955: 74) mentioned only that the holotype was found under a stone.

***Birabenella pizarroi*, new species**

Figures 2, 10–14, 51–59, 69

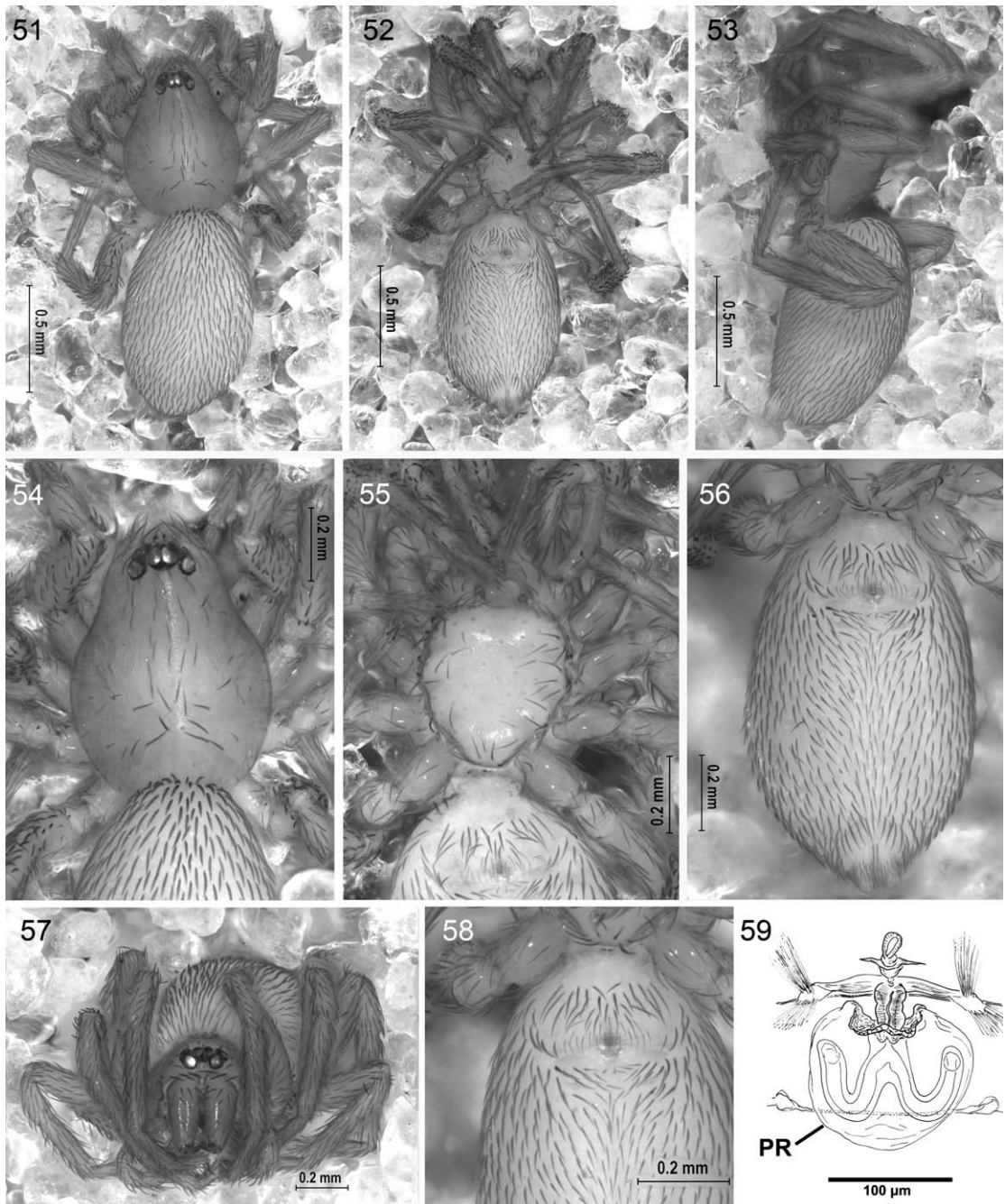
**TYPE MATERIAL:** Female holotype from Chile: Coquimbo Region: Choapa Province: Los Vilos, near Quebrada de Quereo; 31°55′35.4″S; 71°30′51.1″W (WGS84); alt. 19 m (GPS); 19.VIII.2009; coll. C. Grismado, A. Ojanguren, J. Pizarro and F. Alfaro. Under stones. Deposited in MHNS (PBI\_OON 14992).

**OTHER MATERIAL EXAMINED:** None.

**ETYMOLOGY:** The specific epithet is a patronym in honor of Jaime Pizarro-Araya (Universidad de La Serena), co-collector of the Chilean specimens described in this contribution, and in recognition of his hospitality and help during my Chilean fieldwork.

**DIAGNOSIS:** This species resembles *B. elqui* in having a smooth to finely reticulate carapace, smooth sternum and spineless legs, but differs in the W-shaped internal duct of the posterior receptaculum, and by the less sinuous anterior part of the internal female genitalia (fig. 59).

**DESCRIPTION:** *Female* (holotype): Total length 1.64. **CEPHALOTHORAX:** Carapace orange, surface of elevated portion of pars cephalica smooth, sides finely reticulate. Clypeus high, ALE separated from edge of carapace by their radius or more. Eyes: three diads on black pigment, ALE largest; ALE–PLE separated by less than ALE radius. Sternum orange, without radial furrows between coxae I–II, II–III, III–IV, surface smooth, microsculpture absent, lateral margins unmodified. Mouthparts: chelicerae anterior face with basal swelling. Labium anterior margin not indented at middle, subpentagonal. Endites orange, strongly convergent. Palpal spines absent, with enlarged setae on tarsus. **ABDOMEN:** dorsum soft portions pale orange. Dorsal



FIGURES 51–59. *Birabenella pizarroi*, n. sp., female holotype (PBI\_OON 14992). 51–53, 57, habitus; 54–55, cephalothorax; 56, abdomen; 58, epigastric area; 59, internal genitalia, cleared. 51, 54, 59, dorsal; 52, 55–56, 58, ventral; 53, lateral; 57, anterior. PR= posterior receptaculum.

scutum absent. LEGS: orange. Leg spines absent. Tarsi I to IV superior claws unipectinate. Trichobothria (only tibial and metatarsal examined with SEM): base rounded, internal texture of the aperture not gratelike, hood covered by low, closely spaced ridges, hood and distal plates well differentiated. Tarsal organ with 3 sensilla visible on leg I (one of them shallow), capsulate, opening intermediate between oval and a long slit. GENITALIA: shape: anterior diverticle thickened, the posterior receptaculum with anterior wall strongly sclerotized and anteriorly concave, and with an internal W-shaped duct (fig. 59).

*Male:* Unknown.

NATURAL HISTORY: The only known specimen was collected under a stone in disturbed coastal grasslands near Quebrada de Quereo, Los Vilos (fig. 2). The type locality belongs to the shrubland steppe subregion, with the main plant formations of the region corresponding to the “arborescent shrubby steppe,” as described in Gajardo (1993).

*Birabenella elqui*, new species

Figures 1, 60–69

TYPE MATERIAL: Female holotype from Chile: Coquimbo Region: Elqui Province: Cuesta Porotitos; 29°47'40.1"S; 71°17'31.8"W (WGS84); alt. 106 m (GPS); 16.VIII.2009; coll. C. Gris-mado, A. Ojanguren, J. Pizarro, and F. Alfaro. Coastal shrubby steppe, under stones. Deposited in MHNS (PBI\_OON 14993).

OTHER MATERIAL EXAMINED: None.

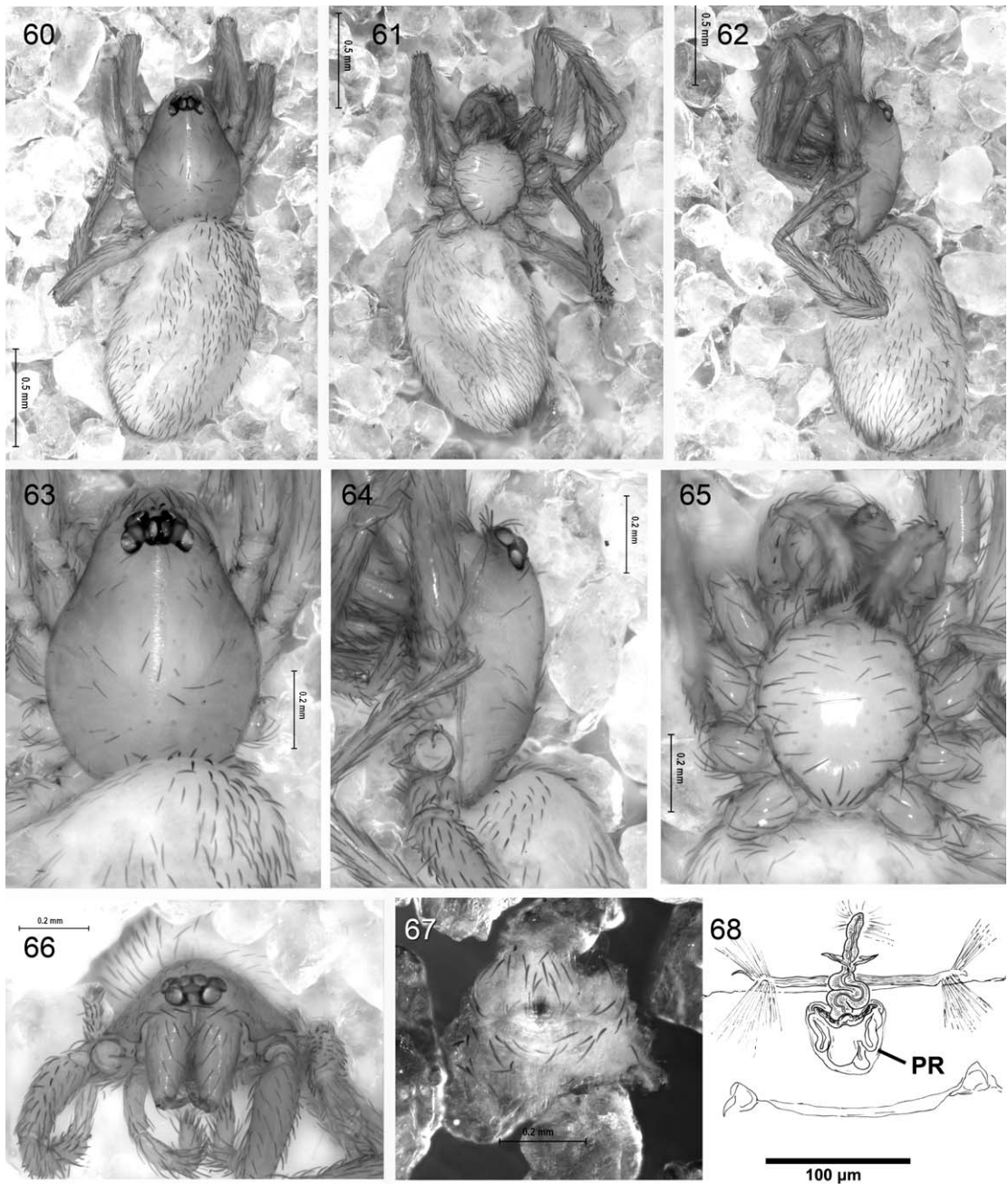
ETYMOLOGY: The specific epithet is a noun in apposition derived from the province where this species was collected.

DIAGNOSIS: This species resembles *B. pizarroi* in lacking spines on the legs and in the texture of the cuticle of the cephalothorax (finely reticulate only at the sides of the carapace, the remaining areas smooth), but can be distinguished by the internal female genitalia with a small and irregularly shaped posterior receptaculum and longer and more sinuous anterior elements (fig. 68).

DESCRIPTION: *Female* (holotype): Total length 1.80. CEPHALOTHORAX: Carapace pale orange, surface of elevated portion of pars cephalica smooth, sides finely reticulate. Clypeus low, ALE separated from edge of carapace by less than their radius. Eyes: ALE largest; ALE-PLE separated by less than ALE radius. Sternum without radial furrows between coxae I–II, II–III, III–IV, surface smooth, microsculpture absent, lateral margins unmodified. Mouthparts: chelicerae anterior face unmodified, with a basal swelling. Labium subpentagonal. Female palp spines absent, with enlarged setae on tarsus. ABDOMEN: dorsum with soft portions pale light orange. Dorsal scutum absent. LEGS: pale orange. Leg spines absent. Tarsi I to IV superior claws unipectinate, but not examined in detail. Trichobothria not examined. GENITALIA: Shape similar to that of *B. pizarroi*, but with the anterior elements longer and more sinuous, and with the posterior receptaculum reduced, irregular (fig. 68).

*Male:* Unknown.

NATURAL HISTORY: As in the sympatric *B. homonota*.



FIGURES 60–68. *Birabenella elqui*, n. sp., female holotype (PBI\_OON 14993). 60–62, habitus; 63–66, cephalothorax; 67, epigastric area (dissected); 68, internal genitalia, cleared. 60, 63, 68, dorsal; 61, 65, 67, ventral; 62, 64, lateral; 66, anterior. PR = posterior receptaculum.

## DISCUSSION

Although the material available is still scarce, it seems clear that *B. homonota* and *B. argentina* are congeneric, especially considering the prosomal cuticular texture and palpal conformation, which are very different from any other oonopid genera. However, the inclusion of *B. pizarroi* and *B. elqui* in the same genus is supported by more tenuous evidence. The latter two species are smaller, have a slightly reticulate to smooth prosomal integument, lower clypeus, larger anterior lateral eyes, and slightly elongated carapace. The characters shared by all the species are the unipectinate tarsal claws and the stout and flattened dorsal setae on the dorsum of the abdomen. Furthermore, all known females share the general morphology of the internal genitalia. The discovery of the female of *B. argentina* and the males of *B. elqui* and *B. pizarroi* could help to confirm whether the latter two species should be assigned to a different genus, but for the moment I consider it preferable to keep all species provisionally together.

The diversity among *Birabenella* species shows that some characters—usually considered important for separating genera in oonopids—must be more comprehensively studied, especially features such as the cuticular sculpture, the presence or absence of spines on the legs or abdominal scuta. Concerning this last character, it's interesting to note that—at least in a still undescribed genus of South American molles—some species are known whose males have a narrow dorsal abdominal scutum (Grismado and Ramírez, in prep.). The genitalic conformation of the females, especially the anterior elements together, resemble the complex known in other oonopids, such as the loricati species "*Opopaea*" *fosuma* Burger, 2002, and *Silhouettella loricatula* (Roewer, 1942), described in Burger et al. (2003) and Burger et al. (2006), and probably have some type of locking mechanism in relation to the uterus externus (not visible in the microscopic preparations).

Other remarkable characters found in *Birabenella* could add information that would be useful in a future discussion of the evolution of the family. One of these is the unipectinate tarsal claws (known so far only in the genera *Unicorn* [Platnick and Brescovit, 1995], *Anophthalmoonops* Benoit [Forster and Platnick, 1985: 218], and perhaps *Xiombarg* Brignoli [C. Rheims and A. Brescovit, unpublished data]). Another additional peculiar feature is the presence of visible seminal ducts in the palpal bulb. It is usually accepted that the presence of seminal ducts inside the bulbs is a plesiomorphic condition for the family, which suggests the basal position of the taxa that have these structures, e.g., *Orchestina*, *Ferchestina*, *Unicorn*, and *Xiombarg* (Platnick and Dupérré, in press). However, the ducts that I found in *Birabenella* species are not so strongly sclerotized as in *Orchestina* and relatives, and resemble to those of *Spinestis* Saaristo and Marusik and other Eurasian genera (Saaristo and Marusik, 2009: figs. 24–27), and also in many still undescribed taxa of soft-bodied oonopids from South America (personal obs.). In all these taxa, a more or less large sinus is connected with the embolus through a more or less weakly sclerotized duct, visible only with clarification of the bulbs. Indeed, more detailed studies are needed about the evolution of these characters within the family and on issues relevant to the higher-level classification of the family before proposing stronger hypotheses on the relationships among the genera.

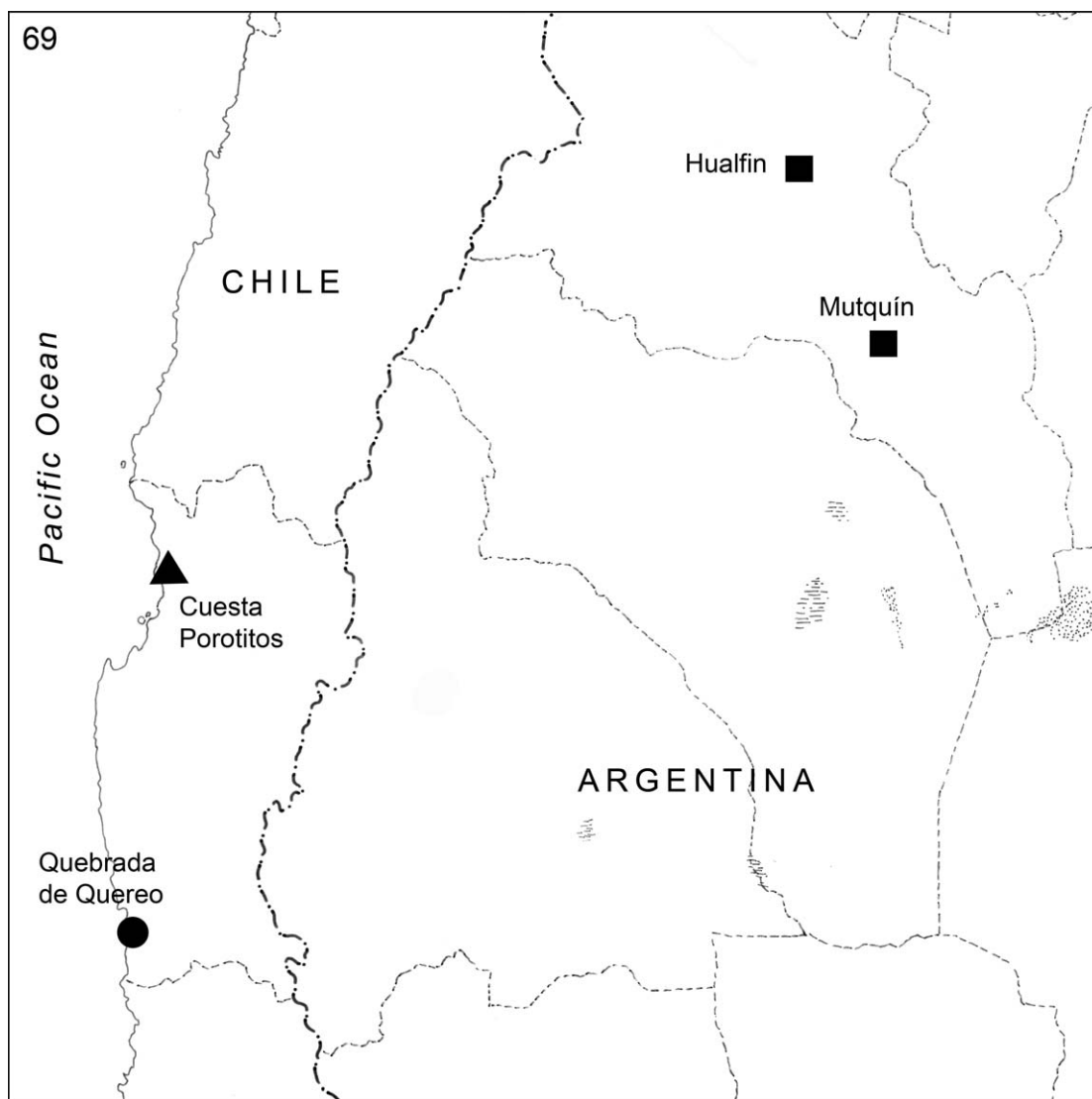


FIGURE 69. North-central Chile and northwestern Argentina, showing the geographic distribution of *Birabenella* species: *B. argentina* (squares); *B. homonota* and *B. elqui* (triangle) and *B. pizarroi* (circle).

Regarding biogeographic aspects, it is interesting to note that this new genus is distributed on both sides of the central Andes. Other epigeic arthropod genera are present in xeric environments on both sides of the Andean range at the same latitudes, including Bolivia and Peru, for example, Pimeliine tenebrionid beetles (Flores, 1998: 235) and some scorpions of the genus *Brachistosternus* Pocock, within which are known some species of the Chilean transitional coastal desert phylogenetically very close to some species from Argentinian plains (Ojanguren-Affilastro and Ramírez, 2009). Among spiders, the genera *Unicorn* (Oonopidae; Platnick and

Brescovit, 1995), *Anisaedus* Simon (Palpimanidae; Platnick 1975, Platnick et al., 1999), *Echemoides* Mello-Leitão, and *Apodrassodes* Vellard (Gnaphosidae; Platnick, 1983, Platnick and Shadab, 1979, 1983) also contain species on both sides of the high mountains.

But is not evident a clear pattern for explain the distribution of all these organisms, since in some animal groups, the taxa inhabiting north-central Chile appear to be basal, while in other groups, taxa seem to be clearly derived (see, for example, the case of the scorpions in Augusto et al., 2006: 414).

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