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MYGALOMORPH SPIDERS FROM PERU (ARANEAE, PYCNOTHELIDAE, RHYTIDICOLIDAE): DESCRIPTION OF TWO NEW SPECIES AND FIRST PERUVIAN RECORD OF THE FAMILY RHYTIDICOLIDAE

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Mygalomorph spiders from Peru (Araneae, Pycnothelidae, Rhytidicolidae): description of two new species and first Peruvian record of the family Rhytidicolidae. Beratz, M. J., Ferretti, N. E., Chaparro, J. C. & West, R. C. — Two previously unknown mygalomorph spider species belonging to two families are described from the south-central Andean region of Peru. Within the family Pycnothelidae, *Acanthogonatus goloboffi* sp. n. is described, diagnosed and illustrated based on a female from Ccochirhuay, Cusco. The female of this species differs from most known *Acanthogonatus* by the shape of the spermathecae, which possess two single receptacles lacking additional projections or chambers. It further differs from congeners sharing a single receptacle

by having non-spiraled ducts with a well-defined constriction and outwardly directed spherical receptacles. This represents the second record of the genus *Acanthogonatus* in Peru. Within the family Rhytidicolidae, *Fufius agualaniensis* sp. n. is described, diagnosed and illustrated based on a female from Agualani, Puno. The female of this species is distinguished from congeners by the following combination of characters: a straight fovea; a sternum as wide as long; a labiosternal junction with a well-developed septum; a preening comb on metatarsus IV consisting of seven large spines in a single row; and spermathecae with a wide, inwardly curved stalk giving rise to three sinuous branches ending in digitiform or domed structures. This constitutes the first formal record of the family Rhytidicolidae from Peru.

Key words: Mygalomorphae, Andes, new taxa, Cusco, Puno.

Introduction

Pycnothelidae (re-established by Opatova et al., 2019) includes 15 genera and 140 described species to date (World Spider Catalog 2025). Spiders of this family are recognized by the following combination of characters: (1) a small to large, pale yellowish, soft and well-developed intercheliceral tumescence covered with few to many setae, (2) cymbium lacking dorsal spines, (3) patella III with 1–1–1 prolateral spines, (4) bipectinate tarsal claws, (5) male tarsi flexible in one or more legs, (6) tarsal organ located on apical central region, (7) tarsal scopula present and (8) absence of claw tufts, with the exception of *Acanthogonatus incursus* (Chamberlin, 1916) (Goloboff, 1995; Montes de Oca et al., 2022). Neotropical pycnothelids are represented by small to medium-sized spiders that can be found living in loose silken tubes, in the leaf litter, under trunks or stones, in burrows closed with debris, or simply open, or protected by a trapdoor (Indicatti et al., 2015; Ghirotto et al., 2021). The most diverse Neotropical pycnothelid genus is *Acanthogonatus* Karsch, 1880, comprising 30 described species, with *A. incursus* as the only known species from Peru (World Spider Catalog, 2025). *Acanthogonatus incursus* was originally described by Chamberlin (1916) under the genus *Brachythele* Ausserer, 1871 due to the presence of claw tufts, based on a female collected in Huadquina, Peru. Later, this species was transferred from *Brachythele* to *Bolostromus* Ausserer, 1875 by Raven (1985). Then, this species was assigned to *Acanthogonatus* based on the presence of claw tufts (together with the absence of all the characters of Theraphosoidina: no clavate trichobothria, tarsal trichobothria in a single zigzag row, and no basal group of retrobasal trichobothria on the anterior metatarsi) (World Spider Catalog, 2025). Moreover, additional female specimens of the species were later examined from Tarma and Huanuco in central western Peru and thus confirming the presence of the genus at about 3000 metres above sea level (Goloboff, 1995).

Rhytidicolidae was recently revalidated and elevated to family level by Montes de Oca et al., (2022) and currently includes the genera *Fufius* Simon, 1888 and *Rhytidicolus* Simon, 1889. The genus *Fufius* was formerly included by Simon (1888, 1891) in Ctenizinae and, then, it was transferred to Diplurinae (Simon 1892 a, b). Later, after a long and complicated taxonomic history, including synonymies and transferences (see Goloboff 1993, 1995; Raven 1985; World Spider Catalog 2025), molecular phylogenetic analyses confirmed the placement of *Fufius* within Rhytidicolidae (Montes de Oca et al., 2022).

The genus *Fufius* currently comprises 13 described species, distributed from Guatemala (*F. atramentarius* Simon, 1888 — type species) to central and southern

South America: *F. lanicius* (Simon, 1892) from Bolivia; *F. albovittatus* (Simon, 1891), *F. auricomus* (Simon, 1891), *F. candango* Ortega, Nagahama, Motta & Bertani, 2013, *F. funebris* Vellard, 1924, *F. jalapensis* Ortega, Nagahama, Motta & Bertani, 2013, *F. lucasae* Guadanucci & Indicatti, 2004, *F. minusculus* Ortega, Nagahama, Motta & Bertani, 2013 and *F. striatipes* (Drolshagen & Bäckstam, 2009) all known from Brazil; *F. annulipes* (Mello-Leitão, 1941) from Colombia; *F. ecuadorensis* (Simon, 1892) from Ecuador; and *F. antillensis* (F.O. Pickard-Cambridge, 1898) from Trinidad. These spiders are characterized by a unique leg colouration pattern, often with one to two stripes on each segment except tarsi, along with (1) a subquadrate maxilla, (2) a labium almost as long as wide or longer, (3) a short diagonal fang with (4) associated short fang groove (Raven, 1985, Bertani et al., 2012, Ortega et al., 2013). Although Montes de Oca et al., (2022) recovered as the sister group of the *Fufius* clade a divergent lineage comprising an unknown species from Peru and this was included in the distribution of the family Rhytidicolidae, there have been no formal records of Rhytidicolidae in Peru to date (World Spider Catalog, 2025).

With the goal to expand the knowledge of these genera and families in Peru, we present the description of two new species, one belonging to the genus *Acanthogonatus* (Pycnothelidae) and a second one belonging to *Fufius* (Rhytidicolidae), thus providing the first formal record of Rhytidicolidae from the country.

During 2023 field surveys in the south-central Andean region of Peru, we collected mygalomorph spiders of the families Pycnothelidae Chamberlin, 1917 and Rhytidicolidae Simon, 1903. Examination of this material, deposited at the Museo de Biodiversidad del Perú (MUBI), confirmed that the specimens represent undescribed species, which we described here.

Currently, there are about 101 reported species of mygalomorph spiders for Peru, in 34 genera and 8 families, of which the vast majority belong to the Theraphosidae (ca. 80 species) (World Spider Catalog, 2025, Arachnotrac, 2025), which includes the famous tarantulas. Although recent studies have described multiple new mygalomorph species from Peru, most belong to Theraphosidae (e. g. Ferretti et al., 2018, Kaderka et al., 2023), leaving other families like Pycnothelidae and Rhytidicolidae poorly documented.

Material and Methods

The specimens examined in this study are deposited in the Museo de Biodiversidad del Perú, Cusco (MUBI; curator J. A. Ochoa). Total body length (excluding chelicerae and spinnerets) was measured dorsally. Carapace length was measured from the clypeus margin to the posterior margin. Palp and leg segments were measured between the joints in dorsal view: femur, patella, tibia, metatarsus, and tarsus. All measurements are given in millimetres (mm). The female spermathecae were dissected and cleaned using the Subtilisin-based protease enzyme ©Naclens, and then stored in small vials containing 70% ethanol. Leg segments were measured with a digital caliper (precision: 0.01 mm). Photographs were obtained using a Leica S APO stereomicroscope equipped with an MShot digital camera, and image stacks were processed with Helicon Focus software. Morphological terminology follows the standards established for Rhytidicolidae, using *Fufius* as a reference (Guadanucci &

Indicatti, 2004, Bertani et al., 2012, Ortega et al., 2013) and for *Acanthogonatus* Goloboff (1995) and Signorotto et al. (2023). The distribution map for species was made using the online tool SimpleMappr (https://www.simplemappr.net).

Abbreviations: ALE = anterior lateral eyes; AME = anterior median eyes; d = dorsal; ITC = inferior tarsal claw; me = metatarsus; p = prolateral; pa = patella; PLE = posterior lateral eyes; PLS = posterior lateral spinnerets; PME = posterior median eyes; PMS = posterior median spinnerets; r = retrolateral; STC = superior tarsal claw, ta = tarsus; ti = tibia; v = ventral.

Results

Family Pycnothelidae Chamberlin, 1917
Subfamily Diplothelopsinae Schiapelli & Gerschman, 1967
Genus *Acanthogonatus* Karsch, 1880

Acanthogonatus Karsch, 1880. Originally placed in Barychelidae, later transferred to Nemesiidae (Raven, 1985 a) and subsequently to Pycnothelidae (Opatova et al., 2020). Several genera historically associated with it, including *Tryssothele* and *Chubutia*, have been treated as junior synonyms (Gerschman & Schiapelli, 1970; Raven, 1985 a).

Type species. *Acanthogonatus francki* Karsch, 1880, by original designation.

Diagnosis. See Goloboff, 1995: 73.

***Acanthogonatus goloboffi* sp. n.** (Figs 1–3)

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Type material. Holotype ♀: **Peru**: Cusco Department: Ccochirhuay (13°54'6.59" S, 71°50'25.63" W [-13.9018, -71.8405]), 09.10.2023 (N. Ferretti, J. C. Chaparro, R. C. West leg.) (MUBI: 195).

Diagnosis. Female of *Acanthogonatus goloboffi* **sp. n.** resemble that of *A. campanae* (Legendre & Calderón, 1984), *A. francki* Karsch, 1880, *A. hualpen* Goloboff, 1995, *A. huaquen* Goloboff, 1995, *A. nahuelbuta* Goloboff, 1995, *A. peniasco* Goloboff, 1995, *A. recinto* Goloboff, 1995 and *A. vilches* Goloboff, 1995 in having spermathecae with two single receptacles lacking additional projections or chambers (Fig. 2, *h*). It differs from *A. huaquen* and *A. recinto* by having non-spiraled ducts; and from *A. campanae*, *A. francki*, *A. hualpen, A. nahuelbuta, A. peniasco*, and *A. vilches* by having long ducts with a well-defined constriction and outward-directed spherical receptacles. The new species further differs from the only other Peruvian congener, *A. incursus*, by its spermathecae morphology and the absence of labial cuspules and claw tufts (Figs 2, *f*, 3, *b–c*).

Description of holotype female. Colour in life: carapace brown with dark striae and margins, abdomen light brown (Fig. 1, *b*). Colour in ethanol: carapace retains colouration (Fig. 2, *a–c*), abdomen dark brown dorsally with light brown spots (Fig. 2, *b*), ventrally light brown (Fig. 2, *c*). Total length 12.22. Carapace 4.38 long, 3.35 wide. Abdomen 7.84 long, 0.84 wide. Fovea slightly procurved, 0.75 long (Fig. 2, *a*). Chelicerae with 7 large teeth on inner margin and 18 weak denticles. Eye tubercle 0.56 long, 0.85 wide, slightly elevated. Anterior eye row procurved, posteri-

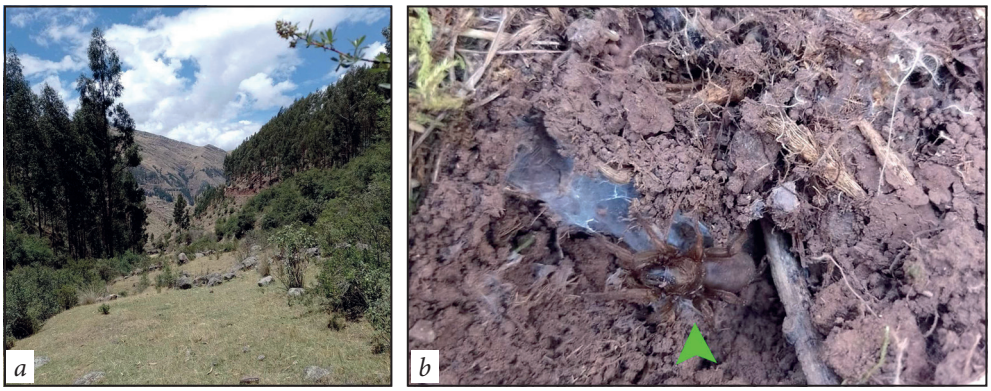

Fig. 1. *Acanthogonatus goloboffi* sp. n.: *a* — habitat at type locality; *b* — female holotype (green arrow) found under a stone

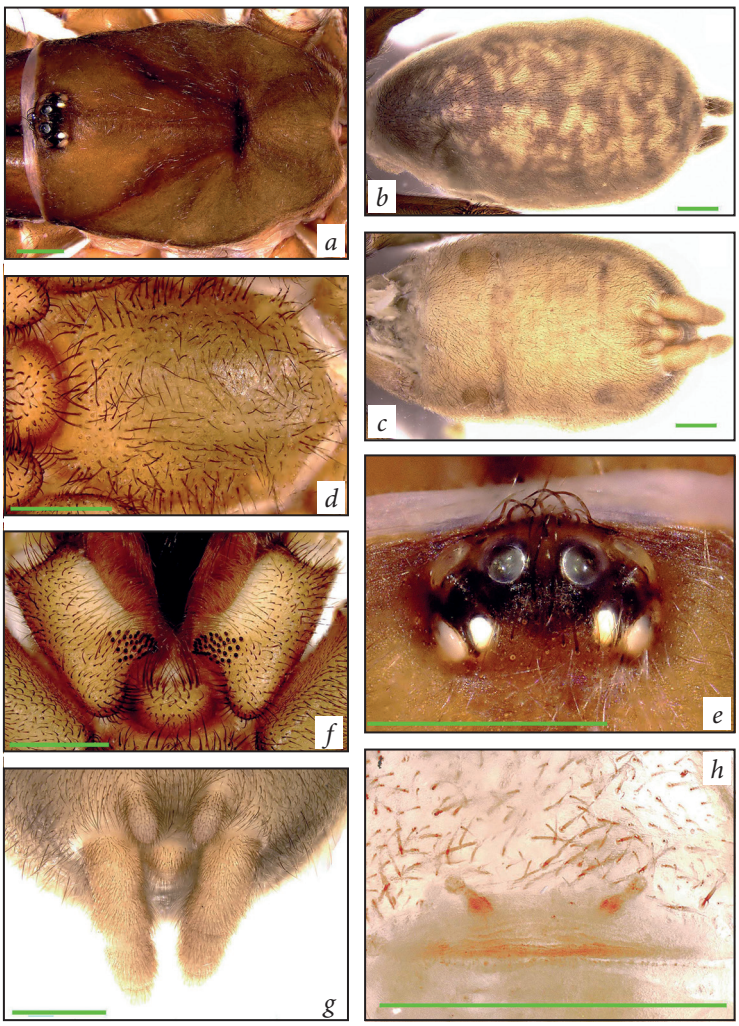

Fig. 2. *Acanthogonatus goloboffi* sp. n., female holotype: *a* — carapace, dorsal view; *b*— abdomen, dorsal view; *c* — abdomen, ventral view; *d* — sternum, ventral view; *e* — eyes, dorsal view; *f* — labium and maxillae, ventral view; *g* — spinnerets, ventral view; *h* — spermathecae, dorsal view. Here and in other drawings scale bars 1 mm

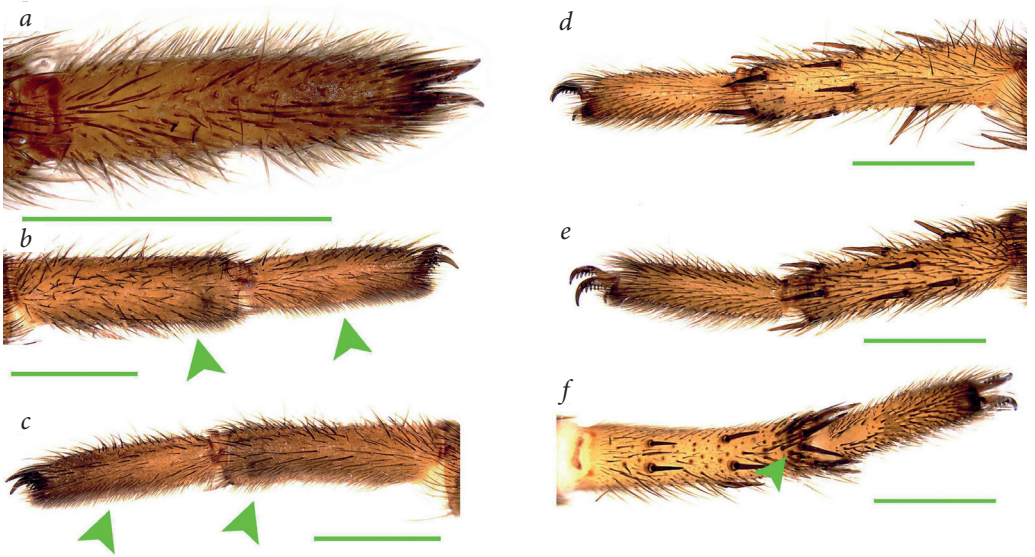

Fig. 3. *Acanthogonatus goloboffi* sp. n., female holotype: *a* — tarsus I, dorsal view; *b* — metatarsus and tarsus I, prolateral view (green arrows indicate the scapulae); *c* — metatarsus and tarsus I, retrolateral view (green arrows indicate the scapulae); *d* — metatarsus and tarsus IV, prolateral view; *e* — metatarsus and tarsus IV, retrolateral view (green arrow indicates the preening-comb); *f* — metatarsus and tarsus IV, ventral view

or row recurved (Fig. 2E). Clypeus absent. eye sizes and interdistances: AME 0.13, ALE 0.20, PME 0.11, PLE 0.16, AME-AME 0.14, AME-ALE 0.08, PME-PME 0.37, PME-PLE 0.04, ALE-PLE 0.11. Labium 0.48 long, 0.84 wide, without cuspules (Fig. 2, *f*). Maxillae (left/right) with 42 cuspules on the internal basal angle (Fig. 2, *f*). Sternum oval (Fig. 2, *d*), 2.41 long, 2.09 wide. Sternal sigillae: anterior slightly smaller than medium and close to margin, posterior the largest and distant from margin.

Legs and palp measurements. Palp: femur 2.06/ patella 1.17/ tibia 1.16/ tarsus 1.18/ total 5.57; legs: measurements: I: femur 2.80/ patella 1.92/ tibia 1.84/ metatarsus 1.63/ tarsus 1.25/ total 9.44; II:2.34/1.52/1.50/1.44/1.23/8.03; III:2.06/1.43/1.00/1.60/1.21/7.30; IV:2.61/1.78/2.06/2.25/1.14/9.84.

Spination. Tarsi of palps and legs I–IV, 0. Palp: femur: v1ap; tibia: v1-4-2ap, p0-1-0. I: femur: p1ap; patella: 0; tibia: 0; metatarsus: v2-1-2ap. II: femur: p1ap; patella: 0; tibia: 0; metatarsus: 1-2-4ap. III: femur: 0; patella: p1-1-1; tibia: v2ap, p1-1-0, r0-1-0, d0-1-0; metatarsus: v2-2-12ap, p1-1-0, d2-2-2. IV: femur: 0; patella 0; tibia: v2ap; metatarsus: v2-2-12ap, p0-2-1, d1-2-1. Scopulae on tarsi from legs I–IV complete and not divided by setae (Figs 3, *b–c*). Scopulae from metatarsi I and II complete and not divided by setae, metatarsi III 3/4 scopulated and IV without scopula. Tarsi I–IV without claw tufts (Figs 3, *d–e*). Metatarsal preening combs: present on ventral legs III and IV, consisting of three to four stout spines irregularly arranged (Figs 3, *d–f*)**.** ITC present on legs I–IV (Fig. 3). STC with double rows of teeth, I: 5 5 3 4; II: 5 5 4 5; III: 5 4 5 4; IV: 5 4 5 4. Four spinnerets (Fig. 2, *g*): PMS 0.51 long; PLS: basal segment 1.00 long, median 0.52 long, apical 0.55 long, domed. Spermathecae with two long single outward-directed receptacles, with well-developed constrictions near the spherical apical chambers (Fig. 2, *h*).

Distribution and natural history. Known only from the type locality (Fig. 7). The holotype was found under a small stone on a riverine hillside (Fig. 1, *a*), inhabiting a debris-covered silk tube (Fig. 1, *b*).

Etymology. The specific epithet is a patronym honoring Pablo A. Goloboff, in recognition of his outstanding contribution to the knowledge of Neotropical mygalomorphs and pycnothelids, especially within the genus *Acanthogonatus*.

Family Rhytidicolidae Simon, 1903
Genus *Fufius* Simon, 1888

Fufius Simon, 1888: 212. Transferred from Dipluridae to Cyrtaucheniidae (Raven, 1985) and later to Rhytidicolidae (Montes de Oca et al., 2022). Several genera previously proposed as distinct have been treated as its junior synonyms (Simon, 1903; Raven, 1985; Bertani et al., 2012).

Type species. By original designation, *Fufius atramentarius* Simon, 1888.

Diagnosis. See Raven (1985): 134–135.

***Fufius agualaniensis* sp. n.** (Figs 4–6)

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Type material. Holotype ♀: **Peru**: Puno Department: Agualani, after Limbani, close to Sandia (14°07'34.55" S, 69°41'17.65" W [-14.1263, -69.6882]), 13.10.2023 (N. Ferretti, J. C. Chaparro, R. C. West leg.) (MUBI: 221).

Diagnosis. *Fufius agualaniensis* **sp. n.** differs from congeners by the following combination of characters: (1) a straight fovea (Fig. 5, *a*), (2) a sternum as wide as long, with (3) a labiosternal junction with a well-developed septum (Fig. 5, *f*), and (4) a preening comb on the metatarsus IV consisting of 7 large spines in a single row (Figs 6, *a*, *c*). Additionally, females of *F. agualaniensis* sp. n. differ from the other known species by the shape of the spermathecae, having a wide and inward curved stalk, giving rise to three sinuous branches ending in digitiform or domed structures (Fig. 5, *h*).

Description of holotype female. Colour in life: carapace and chelicerae black with short golden hairs, abdomen black with a dorsal band of golden hairs, legs black with distinct orange longitudinal stripes on the femora, patella, tibia and metatarsi, spinnerets orange (Fig. 4). Colour in ethanol: carapace and chelicerae brown with short golden hairs (Fig. 5, *a*), abdomen black (Figs 5, *b–d*), legs black with distinct orange longitudinal stripes, labium, sternum and maxillae light brown (Figs 5, *e–f*), spinnerets light brown (Fig. 5, *c*). Total length: 11.36. Carapace 4.79 long, 3.94 wide. Abdomen 6.57 long, 4.63 wide. Fovea T-shaped (Fig. 5, *a*), 0.77 wide. Chelicerae: prolateral margin with 9 teeth, retrolateral margin with 28 denticles. Eye tubercle: 0.43 length, 1.13 width. Anterior and posterior eye row recurved (Fig. 5, *a*, *g*). Clypeus 0.08. Eye sizes and inter-distances: AME 0.17, ALE0.26, PME 0.09, PLE 0.19, AME–AME 0.15, AME–ALE 0.08, PME–PME 0.47, PME–PLE 0.05, ALE–PLE 0.07, PLE-PLE 0.71. Labium: 0.74 long, 1.01 wide, with 7 cuspules and a labiosternal junction with a well-developed septum (Figs 5, *e–f*). Maxillae: 52 cuspules spread over ventral inner heel (Fig. 5, *e*). Sternum: 2.75 long, 4.63 wide with 4 pairs of sigillae, all rounded, first pair recessed, second, third and fourth pairs are located at 0.18, 0.26, and 0.26, respectively from the margin.

Legs and palp measurements. Palp: femur 2.20, patella 1.18, tibia 1.25, tarsus 1.25, total 5.99. Legs (femur, patella, tibia, metatarsus, tarsus, total): I: 2.99, 1.82, 2.14, 1.96, 1.48, 10.39. II: 2.72, 1.73, 1.60, 1.78, 1.11, 8.94. III: 2.24, 1.48, 1.20, 1.72, 1.23, 7.87.

Fig. 4. Fufius agualaniensis sp. n., female holotype, habitus

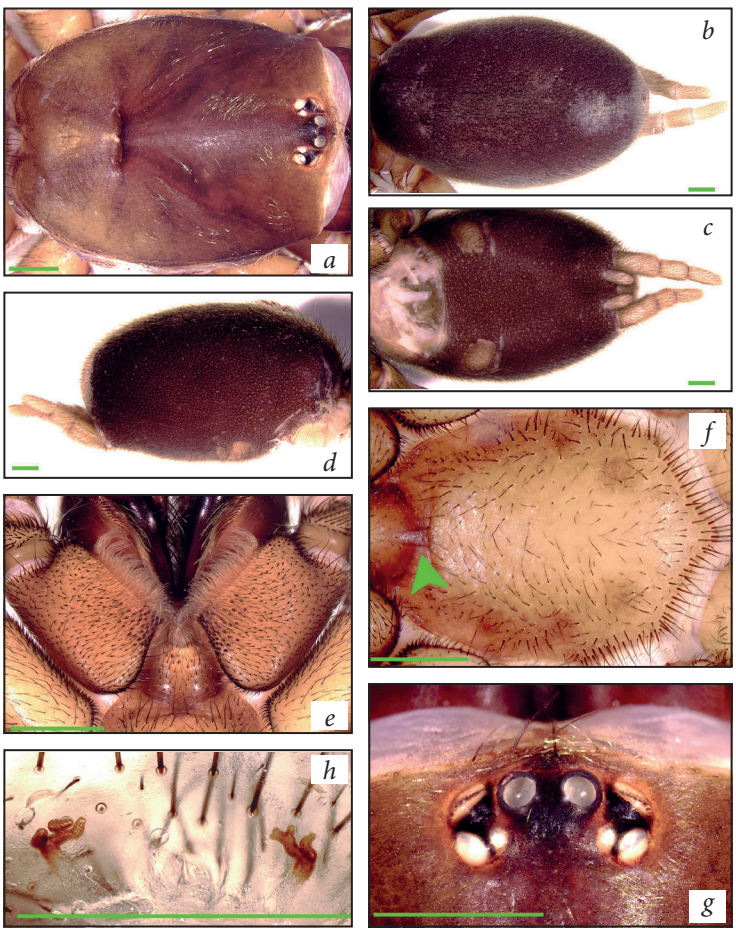

Fig. 5. *Fufius agualaniensis* sp. n., female holotype: *a* — carapace, dorsal view; *b* — abdomen, dorsal view; *c* — abdomen, ventral view; *d* — abdomen, lateral view; *e* — labium and maxillae, ventral view; *f* — sternum, ventral view (green arrow indicates the labiosternal join); *g* — eyes, dorsal view; *h*— spermathecae, dorsal view

IV: 3.00, 1.66, 2.38, 2.22, 1.21, 10.47.

Spination. Palp: femur, patella 0, tibia v2-2-3ap, p0-1-0, tarsus v2-0-0; leg I: femur, patella 0, tibia v2-2-2ap, p0-1-0, metatarsus v1-2-2; leg II: femur, patella 0, tibia v1-1-2ap, p0-1-0, metatarsus v2-2-2ap; leg III: femur, patella 0, tibia v2-1-1, p1-1-0, metatarsus v2-2-3ap, p0-1-1, r1-0-1, d0-1-1; leg IV: femur, patella 0, tibia v2-3-2ap, metatarsus v2-2-3ap, p0-0-7ap, r0-1-1. Scopula: tarsi I–IV fully scopulated, divided by setae. Metatarsi I–IV 1/2 scopulate, divided by setae. Metatarsal preening-comb present on retrolateral tip

of metatarsus IV (Figs 6, *a, c*). ITC present (Fig. 6, *b*), STC with two rows of 4–7 teeth on both margins on all legs. Four spinnerets (Fig. 5, *c*): PMS, 0.77 long; PLS, 1.17 basal, 0.67 middle, 0.81 distal. Spermathecae with two receptacles; stalk wide and inwardly curved, giving origin to three sinuous branches ending digitiform or domed (Fig. 5, *h*).

Distribution and natural history. Known only from the type locality (Fig. 7). The female was found under the bark of a small tree with a dense silk tube and silk lines radiating from the tube.

Etymology. The specific epithet is a toponym referring to Agualani, a highland locality in the Limbani District (Sandia Province, Puno), southeastern Peru, the type locality of the species. The name underscores the unique biodiversity of this understudied and remote Andean region, advocating for its further exploration, research and conservation.

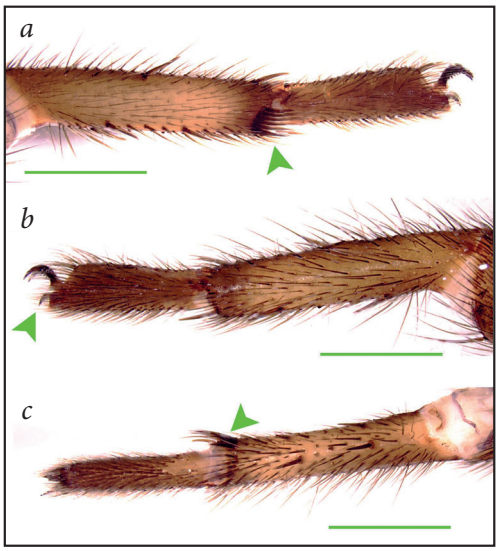

Fig. 6. *Fufius agualaniensis* sp. n., female holotype: *a* — metatarsus and tarsus of leg IV, prolateral view (green arrow indicates the preening comb); *b* — metatarsus and tarsus of leg IV, retrolateral view (green arrow indicates the ITC); *c* — metatarsus and tarsus of leg IV, ventral view (green arrow indicates the preening comb).

Discussion

The first of *Acanthogonatus* species described from Peru was *A. incursus*, originally described by Chamberlin (1916) in the genus *Brachythele* and later transferred to *Bolostromus* by Raven (1985). Goloboff (1995) challenged this placement due to: (1) the presence of a claw tufts (shared only with the nemesiid genus *Mexentypesa* Raven, 1987), and (2) its anomalous distribution (no other *Acanthogonatus* occur in the high Andes of Peru). Recent molecular phylogenetic studies have transferred *Acanthogonatus* to the family Pycnothelidae (Montes de Oca et al., 2022), whereas *Mexentypesa* remains within Nemesiidae. Montes de Oca et al. (2022) did not refer to *A. ncursus* when transferring *Acanthogonatus* to Pycnothelidae, thus the true position of this species can be only unveiled through comparative morphology. Indeed, *A. incursus* remains the only known pycnothelid with claw tufts. Other features that supported the inclusion of this taxon under *Acanthogonatus* are the inferior tarsal claw absent from legs I and II, the disposition pattern of spines of patella III and of metatarsus IV, tarsus IV scopulate, flexible tarsi, rastellum absent, narrow fovea, eyes in a tubercle and presence of pumpkin-shaped spigots (Goloboff, 1995). The discovery of a second *Acanthogonatus* species from Peru, located south of the known records of *A. incursus* (Fig. 7) confirms the presence of this genus in the country. Unfortunately, males remain unknown from both Peruvian taxa; therefore, further sampling and research directed at this interesting group of mygalomorphs is neces-

Fig. 7. Distribution map of the species treated in this work

sary. This second species shares common features among other *Acanthogonatus* species, such as the shape of the fovea, the spines and the absence of claw tufts. The only information about the natural history of *A. incursus* is that it lives presumably under rocks or logs due to an interpretation of the original label from some specimens collected by H. Levi in Tarma that says "on the ground" (Goloboff, 1995). From the present work, we can confirm that the second Peruvian *Acanthogonatus* species lives in dense silk tubes under stones like most other *Acanthogonatus* representatives.

The family Rhytidicolidae was recently erected by Montes de Oca et al., (2022) to include the genera *Fufius* and *Rhytidicolus*. Montes de Oca et al. (2022) identified a divergent Peruvian lineage sister to *Fufius*, represented by undescribed females and juveniles (Montes de Oca pers. observation), and rather than describe this group as a new family, they preferred a more conservative approach to attribute these to the family Rhytidicolidae. In this work, we formally cited the presence of this family in Peru with the description of a new species of *Fufius* collected in Agualani, Puno. This new species has some remarkable features that differ from the known species of this genus, such as the straight fovea, a wide sternum and a well-developed labiosternal junction appearing as a septum, and a very spinose preening comb on the metatarsus IV. While the general aspect of the spermathecae typically matches the genus, *F. agualaniensis* **sp. n.** exhibits a non-spiraled, wide and non-sclerotized stalk that gives rise to short branches that end bluntly and not as bulbs, which is common among the other species described in the genus (Guadanucci & Indicatti, 2004; Dupérré & Tapia, 2021; Ortega et al., 2013).

In conclusion, the discovery of the second species of Pycnothelidae and the first Rhytidicolidae underscores the critical need for accelerated taxonomic surveys and conservation prioritisation in Peru's montane ecosystems. Without urgent fieldwork, many undescribed species may face extinction unnoticed.

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