

Resurrection of the genus *Formosaurella* Hirschmann (Uropodina: Discourellidae) with descriptions of a new species and a new subgenus

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Abstract

The genus *Formosaurella* Hirschmann, 1979 is resurrected with a new diagnosis and notes to the known two species. A new species of *Formosaurella*, *F. tertia* **sp. nov.**, is discovered and described from Peru. The new species differs from the previously described ones in the shape of dorsal and ventral setae and the sculptural pattern of the sternal shield of the male and genital shield of the female. A new subgenus (*Falcatana* **subgen. nov.**) is erected to accommodate *Formosaurella (Falcatana) falcata* Hirschmann, 1972 **comb. nov.** The new subgenus differs from the nominate subgenus in the shape of marginal setae, the shape of setae on posterior part of dorsal idiosoma, and the absence of a pygidial shield.

Key words: Taxonomy, new taxa, Peru

Introduction

Within the last few years numerous species of Uropodina have been discovered and described from Peru (Kontschán & Friedrich 2017, 2018; Błoszyk *et al.* 2019), based on the collection of the SNSB-Zoologische Staatssammlung, Munich (ZSM). During the study of the collected mites, a small and unusual uropodine species was investigated, which belongs to the almost forgotten discourellid genus *Formosaurella* Hirschman, 1979.

Formosaurella Hirschman, 1979 was erected by Hirschmann (1979: 59) for the members of the *Discourella formosa*-species group, but moved only the type species *Discourella formosa* Hirschmann, 1972 into the new genus. Later this genus wasn't mentioned by Hirschmann again and the species were discussed only as the members of the *Discourella formosa*-group (see Wiśniewski & Hirschmann 1993). Currently, only Halliday (2015) acknowledges the genus in his catalog of genera of Uropodina. Based on several characters (e.g., shape of genital shield, shape of dorsal and ventral setae) we consider *Formosaurella* a well-defined and valid genus that is easy to separate from the other similar discourellid genera. We assign three species that are likely endemic to the Neotropical region to *Formosaurella*, one of which is new (described below), and erect a new subgenus to encompass one of the three species.

Material and methods

Males and females of the new *Formosaurella* species were found in Peru. Specimens were cleared in lactic acid for a week and were then placed in on half-covered well slides and examined using a Leica 1000 microscope with a drawing tube. All specimens are stored in ethanol and deposited in the

Museo de Historia Natural, Universidad Nacional Mayor de San Marcos, Lima, Peru (MUSM) and SNSB-Zoologische Staatssammlung, Munich (ZSM). Abbreviations: *h* = hypostomal seta, *st* = sternal seta, *ad* = adanal seta, *lf* = lyriform fissure, *p* = pore. All measurements and the scales in the figures are given in micrometres (μm).

Taxonomy

Family Discourellidae Baker & Wharton, 1952

Genus *Formosaurella* Hirschmann, 1979

Formosaurella Hirschmann, 1979: 59.

Formosaurella.—Halliday 2015: 114.

Type species: *Discourella formosa* Hirschmann, 1972 by original designation.

Diagnosis

Idiosoma pentagonal, its posterior margin rounded. Dorsal shield with elevated central area and a strongly sclerotized postdorsal area. Dorsal and ventral setae leaf-like, with margins of setae smooth or serrate. Inner margin of marginal shield undulated. Genital shield of female short and wide (length/width ration ≈ 1) and linguliform, without anterior process. Male sternal shield with reticulate sculptural pattern. Leg pedofossae present. Peritreme hook-like or U-shaped, poststigmatal part absent. Genital shield of male without eugenital setae. Fixed digit of chelicera longer than movable digit in both sexes. Leg I without claws.

Notes. The morphology of the currently known species suggests two different lineages within this genus, so we propose to split *Formosaurella* into two subgenera (the differences between the subgenera are presented in Table 1).

TABLE 1. Distinguishing characteristics for the subgenera *Formosaurella* and *Falcatana*.

	<i>Formosaurella</i>	<i>Falcatana</i>
Idiosoma	narrow (length \gg width)	wide (length = width)
Setae on margins	placed on surface	placed on protuberances
Shape of marginal setae	leaf-like	T-shaped
Setae on lateral parts of dorsal shield	leaf-like with smooth margins	rod-like with serrate margins
Peritreme	hook-shaped	U-shaped

Subgenus *Formosaurella* Hirschmann, 1979

Type species: *Discourella formosa* Hirschmann, 1972.

Diagnosis

Idiosoma narrow and pentagonal, dorsal and marginal setae leaf-like with smooth margins. All sternal setae of female and male smooth. Pygidial shield present and trapezoidal or quadrangular. Peritreme hook-like.

Remark

Currently two species belong to this subgenus, the type species *Formosaurella* (*Formosaurella*) *formosa* (Hirschmann 1972) and the new, herein described *Formosaurella* (*Formosaurella*) *tertia* **sp. nov.**

***Formosaurella (Formosaurella) tertia* sp. nov.**

(Figures 1–10)

Diagnosis

Dorsal shield with numerous leaf-like setae. Pygidial shield trapezoidal and bearing one pair of leaf-like setae. Four pairs of very wide and apically serrate ventral setae. Surface of female genital shield and sternal shield of male covered by reticulate sculptural pattern.

Material examined

Holotype. Female. Peru, Departamento Huánuco, Rio Yuyapichis, ACP Panguana, 9° 37' S, 74° 56' W, 230–260m, in the primary evergreen lowland rainforest by sieving leaf litter and upper soil layer with subsequent Winkler extraction, 23 April to 09 May 2016, leg. S. Friedrich (in MUSM). *Paratypes*. Three females and one male, collection data as for holotype (male paratype is deposited in the MUSM, three female paratypes are deposited in the ZSM).

Description

Female (n=4)

Idiosoma yellowish, 385–410 long and 230–250 wide (n=4), pentagonal, with a rounded posterior margin.

Dorsal idiosoma (Figure 1). Dorsal (ca 285–290 long and ca 175–180 wide) and marginal shields fused anteriorly. A small anterior vertex presents with three pairs of wide, long (ca 18–20) and apically serrate setae. Dorsal shield with 23 pairs of setae. All dorsal setae ca 16–25 long, leaf-like with smooth margins. Dorsal shield covered by oval pits (ca 3–6 long × 4–7 wide), central area elevated from neighboring regions. A strongly sclerotized area present close to posterior margin of dorsal shield. Pygidial shield trapezoidal, anterior margin ca 143–146, posterior margin ca 60–63, length of pygidial shield ca 60–63. Surface of pygidial shield covered by some oval pits and bearing one pair of leaf-like setae. Marginal shields reaching to posterior margin of dorsal shield, marginal shields inner margins undulate, covered by oval pits and bearing 30–32 short (ca 14–16) leaf-like setae. One pair of triangular postmarginal shields situated between marginal and pygidial shields bearing two large (ca 16–24 long) and eight short (ca 14–16) leaf-like setae and covered by oval pits.

Ventral idiosoma (Figure 2). Base of tritosternum narrow, with one pilose central and two smooth marginal branches (Figure 3). Surface of sternal shield with irregular pits between the anterior margin of sternal shield and setae *st3*. Some reticulate sculptural pattern also present posterior to *st3*. Sternal setae (*st1–st3*) minute (ca 3–4), smooth and needle-like, *st4–st5* longer (ca 6–7). Setae *st1* and *st2* situated at level of central area of coxae II, *st3* at level of central area of coxae III, *st4* and *st5* at level of central area of coxae IV. Genital shield situated between coxae IV, linguliform, wider (ca 82–86) than long (ca 70–75). Surface with reticulate sculptural pattern, apical process absent. Ventral shield with numerous pairs of setae: ten pairs of leaf-like setae (ca 24–29); four pairs of wide (ca 30–32), short (ca 16–18) and apically serrate setae; one pair of very short (ca 6–7) and needle-like setae. Oval pits visible posterior to genital shield. Three pairs of ventral lyriform fissures situated close to anterior margin of sternal shield, at level of pedofossae IV and close to apical margin of anal opening. One pair of pores placed close to *st2*. Stigmata situated lateral to coxae II; prestigmatal part of peritremes hook-shaped, poststigmatal part absent. Anal opening small, adanal and postanal setae leaf like (ca 18–21). Leg grooves with smooth surface. Two large and rounded (ca 48–50 × 47–52) depressions with smooth surface situated lateral to anal opening.

Gnathosoma (Figure 3). Corniculi horn-like, internal malae smooth and longer than corniculi. Hypostomal setae *h1* long (ca 27–30), smooth and needle-like; *h2* and *h4* shorter (ca 12–14) with one pair of marginal spines; *h3* long (ca 22–24), smooth and needle-like. All setae on palp smooth

and needle-like (Figure 4). Epistome apically pilose. Chelicerae with one tooth on central part of fixed digit, fixed digit longer than movable digit and bearing two hole-like sensory organs subapically, movable digit without tooth. Internal sclerotized node absent (Figure 5).

Legs (Figures 6–9). Length of legs I 170–178, legs II 173–175, legs III 187–192, and legs IV 180–185. Legs I without tarsal claws. Leg setae mostly smooth and needle-like, those on ventral part pilose. Contrary to Uropodina leg chaetotaxy-types in Evans (1972), the specimens we examined have two ventral setae on femora III and IV rather than one.

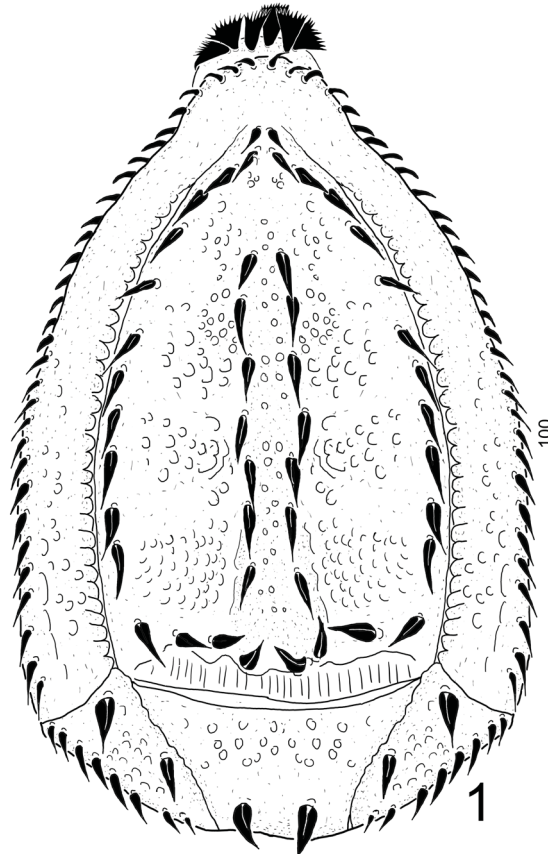


FIGURE 1. *Formosaurella (Formosaurella) tertia* sp. nov., female holotype, dorsal idiosoma.

Male (n=1).

Idiosoma. 430 long and 240 wide.

Dorsal idiosoma. As in female.

Ventral idiosoma. Intercoxal area, with sternal setae and genital shield, as in Figure 10. Surface of sternal shield between *st1* and *st2* with irregular pits and between *st2* and *st4* with reticulate sculptural pattern. Sternal setae needle-like and short (ca 6–7). Setae *st1* situated at level of central area of coxae II, *st2* at level of posterior margins of coxae II, *st3* at level of posterior margin of coxae III, *st4* at level of central area of coxae IV, *st5* at level of posterior margin of genital opening. One pair of lyriform fissures situated close to anterior margin of sternal shield, one pair close to *st2* and one pair between *st4* and *st5*. Genital shield rounded, situated between coxae IV (Figure 10). Other characters as in female.

Gnathosoma and legs. As in female.

Nymphs and larvae. Unknown.

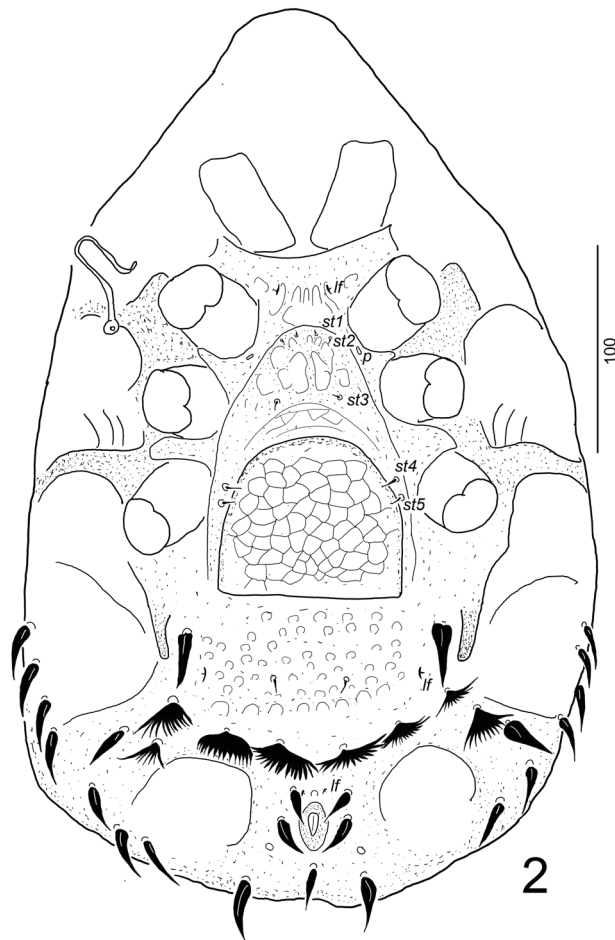
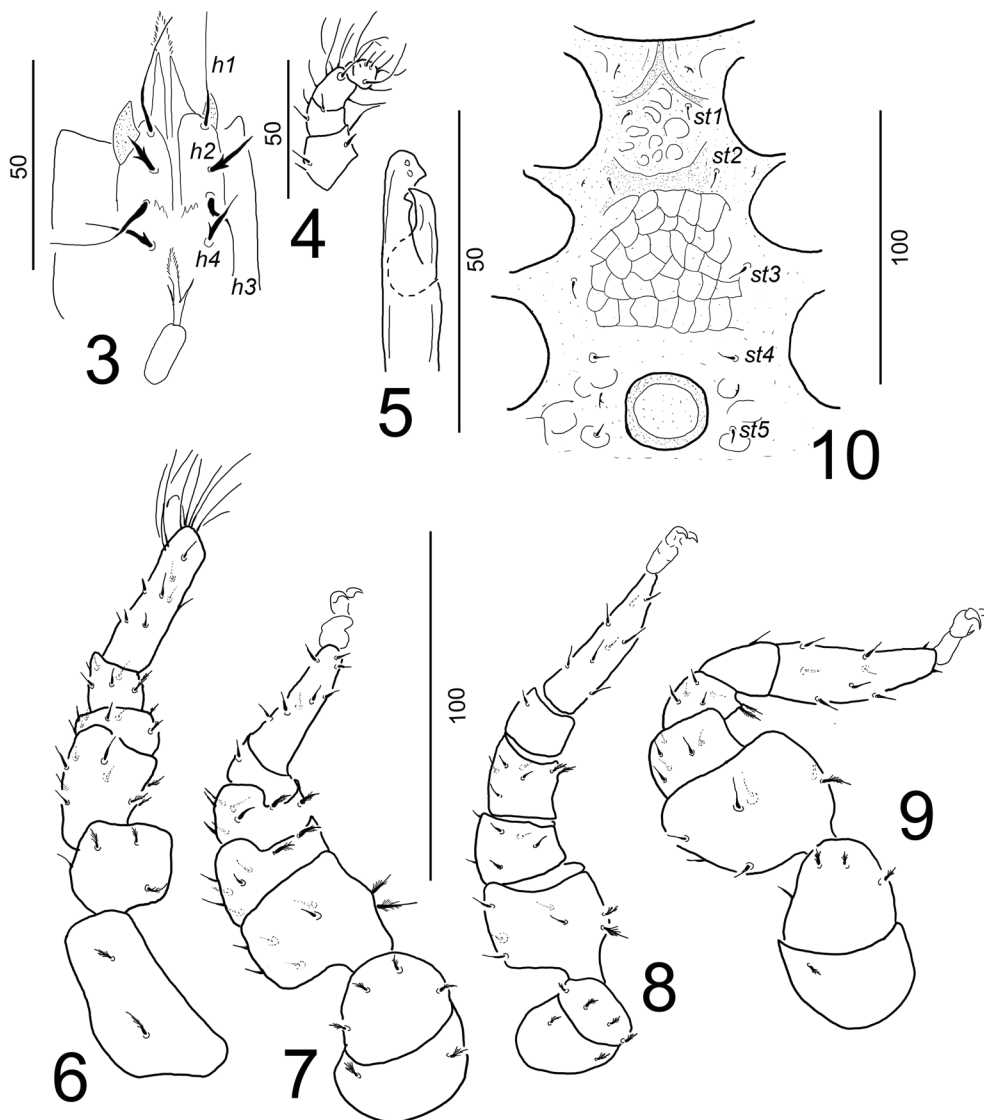


FIGURE 2. *Formosaurella (Formosaurella) tertia* sp. nov., female holotype, ventral idiosoma.

TABLE 2. Distinguishing characteristics for the known *Formosaurella* species.

	<i>F. (Fo.) formosa</i>	<i>F. (Fo.) tertia</i> sp. nov.	<i>F. (Fa.) falcata</i>
Idiosoma	narrow	narrow	wide
Setae on margins	placed on surface	placed on surface	place on protuberances
Shape of marginal setae	leaf-like	leaf-like	T-shaped
Setae on central part of dorsal shield	with smooth margins	with smooth margins	with serrate margins
Setae on lateral parts of dorsal shield	leaf-like with smooth margins	leaf-like with smooth margins	rod-like with serrate margins
Setae on lateral part of dorsal shield	as long as other dorsal setae	longer than other dorsal setae	longer than other dorsal setae
Pygidial shield	trapezoidal	narrow quadrangular	narrow quadrangular
Peritreme	hook-shaped	hook-shaped	U-shaped
Surface of female genital shield	smooth	with reticulate sculptural pattern	with some spines
Surface of male sternal shield	with rectangular pits	with irregular pits and reticulate sculptural pattern	with oval pits
Shape of ventral setae situated anterior to anal opening	longer than wide, marginally pilose	wider than long, apically serrate	rod-like and pilose
Margins of adanal setae	pilose	smooth	pilose



FIGURES 3–10. *Formosaurella (Formosaurella) tertia* sp. nov., 3–9. Female holotype. 3. Tritosternum and ventral view of subcapitulum; 4. Palp, femur-tarsus; 5. Lateral view of chelicera; 6–9. Legs I–IV, respectively, ventral view. 10. Male, intercoxal area.

Etymology

This is the third species of this genus that has been found; therefore, the name of the new species refers to its chronological placement (*tertia* = third in Latin).

Remarks

The distinguishing differences between the named *Formosaurella* species are presented in Table 2.

Subgenus *Falcatana* subgen. nov.

Type species: *Discourella falcata* Hirschmann 1972 (= *Formosaurella (Falcatana) falcata* (Hirschmann 1972) **comb. nov.**)

Diagnosis

Idiosoma wide and pentagonal, marginal setae T-shaped and situated on protuberances. Setae on central area of dorsal shield leaf-like with serrate margins; other setae on dorsal shield long, narrow and serrate. Pygidial shield very narrow. Ventral setae narrow and serrate. All setae on male sternal shield pilose, and the last sternal setae of female also pilose. Peritreme U-shaped.

Etymology

The name of the new subgenus refers to the name of its type species.

Remark

The new subgenus is monotypic, only with the type species of the subgenus, which occurs in Brazil.

Discussion

The three currently known *Formosaurella* species occur only in two countries of South America, Peru and Brazil; therefore we expect that *Formosaurella* is an endemic Neotropical genus, similar to previously resurrected discourellid genera *Longicarinaturella* Hirschmann, 1979 and *Clivosurella* Hirschmann, 1979 (Kontschán 2010). Unfortunately, the whole family Discourellidae is very poorly defined; however, the other neglected genera from this family need to be revised before a clear definition of this family can be made.

Acknowledgements

We cordially thank Dr. Juliane Diller and Erich Diller for kindly inviting one of us (Stefan Friedrich) to Panguana; Franz Wachtel (Grünwald, Germany) and David Hauth (Fürstenfeldbruck, Germany) for expertise and assistance in the field; Dr. Gerardo Lamas Müller and Dra. Diana Silva Dávila (both Museo de Historia Natural, Universidad Nacional Mayor de San Marcos, Lima, Peru) for cooperation; and the Servicio Nacional Forestal y de Fauna Silvestre (SERFOR) for issuing a collecting permit (# 007-2014-SERFOR-DGGSPFFS) and export permit (# 003052-SERFOR). This project was supported by Prof. Dr. Roland Melzer (Bavarian State Collection of Zoology). We are very grateful for Dr. Heather Proctor for her linguistic corrections and notes to the manuscript.

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Submitted: 25 May 2020; accepted by Shahrooz Kazemi: 23 Jun. 2020; published: 24 Aug. 2020