SPIXIANA	44	2	243–256	München, December 2021	ISSN 0341-8391

A new species of *Tartarothyas* K. Viets, 1934 from Colombia, the first record of the genus in the Neotropics

(Acari, Hydrachnidia, Hydryphantidae)

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Goldschmidt, T., Pimiento-Ortega, M. G. & Herrera-Martínez, Y. 2021. A new species of *Tartarothyas* K. Viets, 1934 from Colombia, the first record of the genus in the Neotropics (Acari, Hydrachnidia, Hydryphantidae). Spixiana 44 (2): 243–256.

A new species of the genus *Tartarothyas* is described from Colombia. *T. xiua* sp. nov. is the first record of this rare genus from the Neotropical region. The specimens were collected in 2010 and 2012 in the riparian zone of high Andean lakes.

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Introduction

Since the description of the genus *Tartarothyas* K. Viets, 1934 from a spring in SE-Europe (*T. micrommata* K. Viets, 1934), several rare findings were published from the Western Palaearctic (K. Viets 1934, Husiatinschi 1937, Motaş & Tanasachi 1962, Bader 1989, Schwoerbel 1991, Gerecke 1996, Gerecke & Martin 2006). Currently two rather similar species are recognized in the European fauna *T. micrommata* K. Viets, 1934 and *T. romanica* Husiatinschi, 1937 (Gerecke 1996, Di Sabatino et al. 2010). Four species are known from Australia *T. boultoni* Harvey, 1987, *T. curtipalpis* Smit, 2021, *T. beedelup* Smit, 2021 and *T. setosa* Smit, 2021 (Harvey 1987, Smit 2021), and two from North America *T. occidentalis* Smith & Cook, 1999 (known from NW-USA and SW-Canada) and *T. martini* Smith & Cook, 1999 (Smith & Cook 1999) (from Eastern Canada and Eastern-central USA).

The genus is mainly crenobiont – at least by far most findings from Europe and North America refer to springs, especially helocrenes (Europe – "preferably in helocrenes" (Di Sabatino et al. 2010), North America – helocrene springs, springs and small streams (Smith & Cook 1999)). As a remarkable exception, three of the Australian species are described from brooks and rivers (Harvey 1987, Smit 2021), however at least the sample sites of *T. boultoni* could rather be classified as shallow intermittent, cobble-bed streams, possibly with some ground water influence (Boulton & Lake 1990, Mark Harvey, Andrew Boulton pers. comm.).

The finding of *T. xiua* sp. nov. is the first neotropical record of the genus. Furthermore, these are the first records of *Tartarothyas* from lakes, though the sample sites are probably influenced by riparian springs.

Tropical high mountain lakes are small, oligotrophic ecosystems with low conductivity and high transparency, generally of glacial origin. Studies related to watermites in these ecosystems are very rare – more than 100 years ago, in the first study on

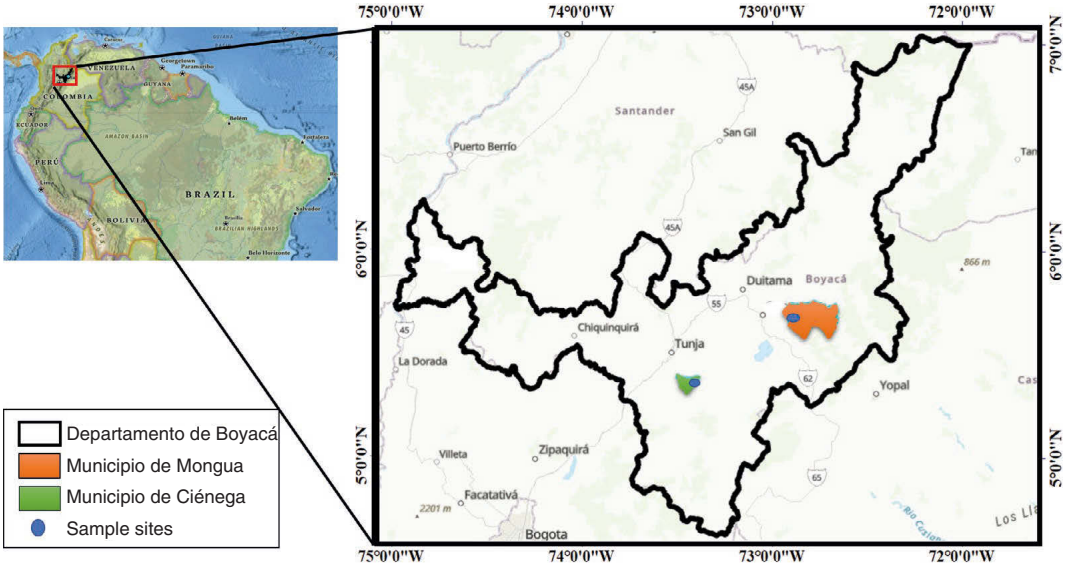

Fig. 1. Map of the sample sites in the Departamento de Boyacá, Cordillera Oriental, Colombia.

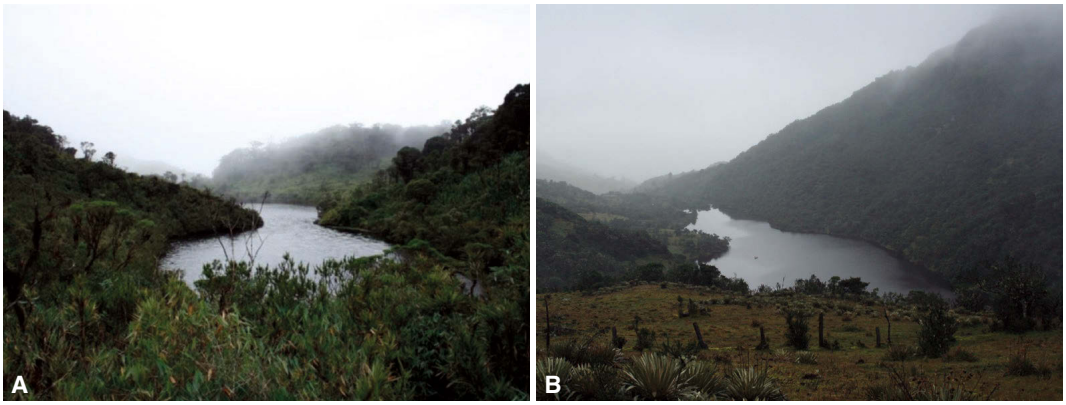

Fig. 2. Photos of the sample sites. **A.** Laguna Pensilvania, August 2011; **B.** Laguna Negra de Mongua, August 2012.

water mites from Colombia, Walter (1912) described three new species from high Andean lakes. In 1953 Lundblad published the so far most comprehensive study on water mites from Colombia, listing 75 species, most of them new to science; within the 27 sample sites, just one is a high Andean lake (Lundblad 1953). Since then only one study dealt with water mites from this region – in 2010, Pešić et al. described a new species of the family Hydryphantidae (*Wandesia* (*Partnuniella*) *lehmanni*) from a lake in the Colombian Andes (Pešić et al. 2010).

Material and methods

The mites were collected in two high Andean lakes in the mountain massifs of the eastern mountain range of Colombia (Fig. 1): in 2010 in the Laguna Pensilvania in the paramo Bijagual (Fig. 2A), and in 2012 in the Laguna Negra de Mongua in the paramo Siscinsí-Ocetá (Fig. 2B). Samples were taken about one meter from the shore, with the use of a 25×25 cm metal sediment sampler, which was partially introduced into the sediments. All sediment and plant material were removed, fixed with 96 % alcohol and stored in plastic bags for subsequent analysis. In the laboratory, the samples were

Fig. 3. *T. xiua* sp. nov., female, paratype B 376.2: **A.** idiosoma dorsal; **B.** idiosoma ventral. Scale bar: 500 µm.

washed through a 250 µm mesh sieve, and sorted under a Nikon SMZ 475T stereomicroscope.

The field work was conducted in the framework of the doctoral dissertation of Yimy Herrera-Martínez about the impact of the introduction of trout (*Oncorhynchus mykiss*) in high Andean aquatic systems (Research Group XIUÂ, Pedagogical and Technological University of Colombia-UPTC).

The water mites for the type series were dissected and slide mounted in glycerine jelly. One unmounted female and two deutonymphs were stored in Koenike's solution (10 parts glycerine, 6 parts water, 3 parts acetic acid).

All measurements are given in µm, with measurements of the paratypes given in parentheses after the holotype as minimum-maximum (for the deutonymph measurements are as well given as minimum-maximum, without parentheses). Measurements of the idiosoma, coxae (Cx), genital field and chelicera are given as maximum length (L)/width (W); measurements of leg and palp segments as well as the basal chelicera segment are given as dorsal length (L)/maximum height (H). For Cx-I/II and Cx-III/IV, W (width) is referring to one side, tW (total width) is referring to both sides. The idiosoma L/W, distance of lateral eyes, total L of Cx-field and width of anterior and posterior coxal groups were measured in the unmounted specimens, as measurements (e.g. of coxae) may vary in mounted specimens due to distortions and the eyes are easily lost in preparation. All other measurements were made in the mounted specimens. The length of the genital field was measured as distance between pre- and postgenital sklerite (including sklerites), and could therefore not be measured in deutonymphs. In the length measurement of Cx-I/II, the subcutan secondary postero-medial projections (Figs 5B, 6B) were not included. In all legs, a long caudal protrusion of the second leg segment is reaching deep (about further 50 % of dorsal length) into the first segment, this protrusion is not included in the measurement of the second segment (Fig. 8).

Coxae and legs are named from anterior to posterior (Cx-I to Cx-IV, I-leg to IV-leg), leg and palp segments are numbered from proximal to distal (I- to IV-leg-1 to -6: Trochanter, basifemur, telofemur, genu, tibia, tarsus; P-1 to P-5: Trochanter, femur, genu, tibia, tarsus). Acetabula are named Ac-1 to Ac-3 from anterior to posterior.

Further abbreviations used: Cxgl-2, -4 – coxoglandularia 2 and 4; Dgl-3 – dorsoglandulare 3; Po – postoculare; tL – total length (given for Cx-field, legs, palps); Vgl-1 – ventroglandulare 1. The terminology of the glandularia and setae is following Gerecke et al. 2016 and Smit 2020, a different terminology of the ventral glandularia has been used by Harvey (1987) – vg1 = Cxgl-2, vg2 = Cxgl-4, vg3 = Vgl-1.

Microphotos were taken at the Bavarian State Collection of Zoology, Munich, Germany, section Arthropoda varia with a Leica DM 5000B microscope, ProgRes®CapturePro 2.8 – Jenoptik/Optical Systems (camera and software) as well as a Nikon V1 camera combined with a Leica Z16 Apo and a 2.0 fold objective, in both cases images were stacked with HeliconFocus 5.3 software. The photo for Fig. 7A has been taken with an Olympus TG-4 camera and a Leica MZ16 stereoscope. For the line drawings a Leitz, Laborlux D light microscope with drawing mirror was used.

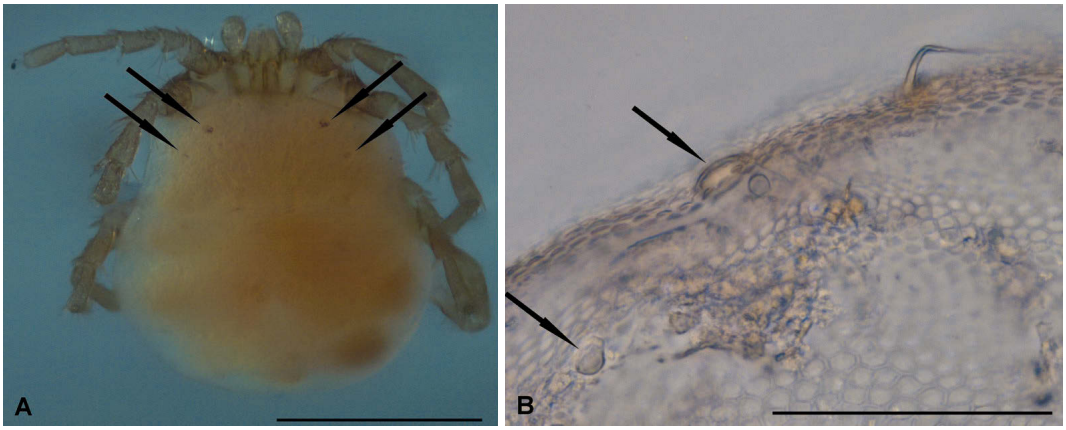

Fig. 4. *T. xiua* sp. nov., female: **A.** lateral eyes (arrows), paratype B 376.2; **B.** detail idiosoma antero-dorsal, eye lenses (arrows, pigment lost in preparation), holotype B 376.3. Scale bars: 500 µm (A); 100 µm (B).

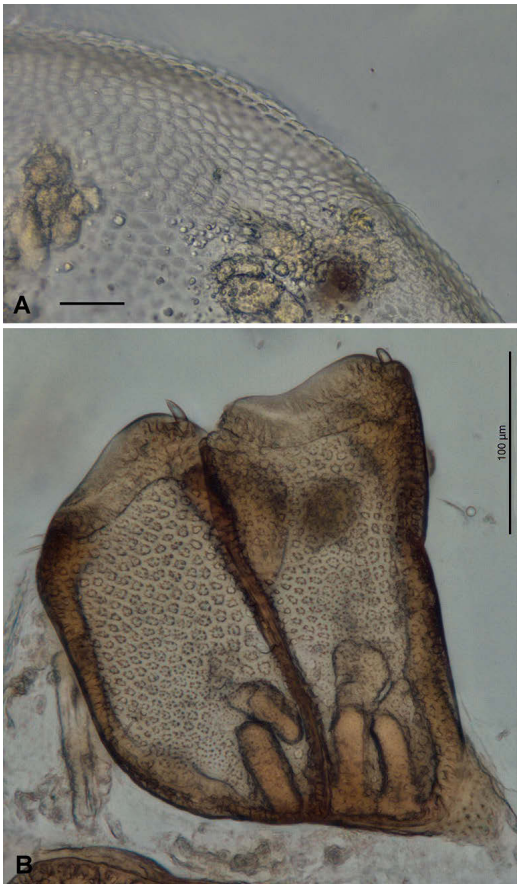

Fig. 5. *T. xiua* sp. nov., female: **A.** detail idiosoma antero-dorsal, paratype B 654; **B.** Cx-I/II, holotype B 376.3. Scale bars: 20 µm (A), 100 µm (B).

Results

Family Hydryphantidae Piersig, 1896
Subfamily Tartarothyadinae K. Viets, 1934
Genus *Tartarothyas* K. Viets, 1934

Tartarothyas xiua sp. nov. Goldschmidt, Pimiento-Ortega & Herrera-Martínez

Material examined. Holotype female, slide mounted in glycerine jelly, preparation no. B 376.3, Laguna Negra de Mongua, Municipio de Mongua, Departamento de Boyacá, 3520 m a.s.l., 5°42'42''N, 72°47'20''W, leg. Yimy Herrera-Martínez & Mabel Pimiento-Ortega, July 31, 2012; – paratypes three mounted females (B 376.1, B 376.4, B 654), two mounted deutonymphs (B 376.6, B 376.8), one unmounted female (B 376.2), two unmounted deutonymphs (B 376.5, B 376.7), same collection data as holotype; one mounted female (B 593), Laguna Pensilvania, Municipio de Ciénega, Departamento de Boyacá, 3115 m asl, 5°23'01''N, 73°14'54''W, leg. Yimy Herrera-Martínez & Mabel Pimiento-Ortega, August 24, 2010.

Distribution. So far only known from two lakes in the central part of the Cordillera Oriental, the eastern branch of the Colombian Andes.

Derivatio nominis: *xiua* (Muisca) – lake (engl.); the name – originally written "*xiuâ*" – refers to the fact that this is the first species of the genus found in lakes, at the same time it was chosen to honour the Muisca, the people living in the area in prehispanic times. "XIUÂ" is as well the name of the research group studying these high Andean lakes and collected the new species.

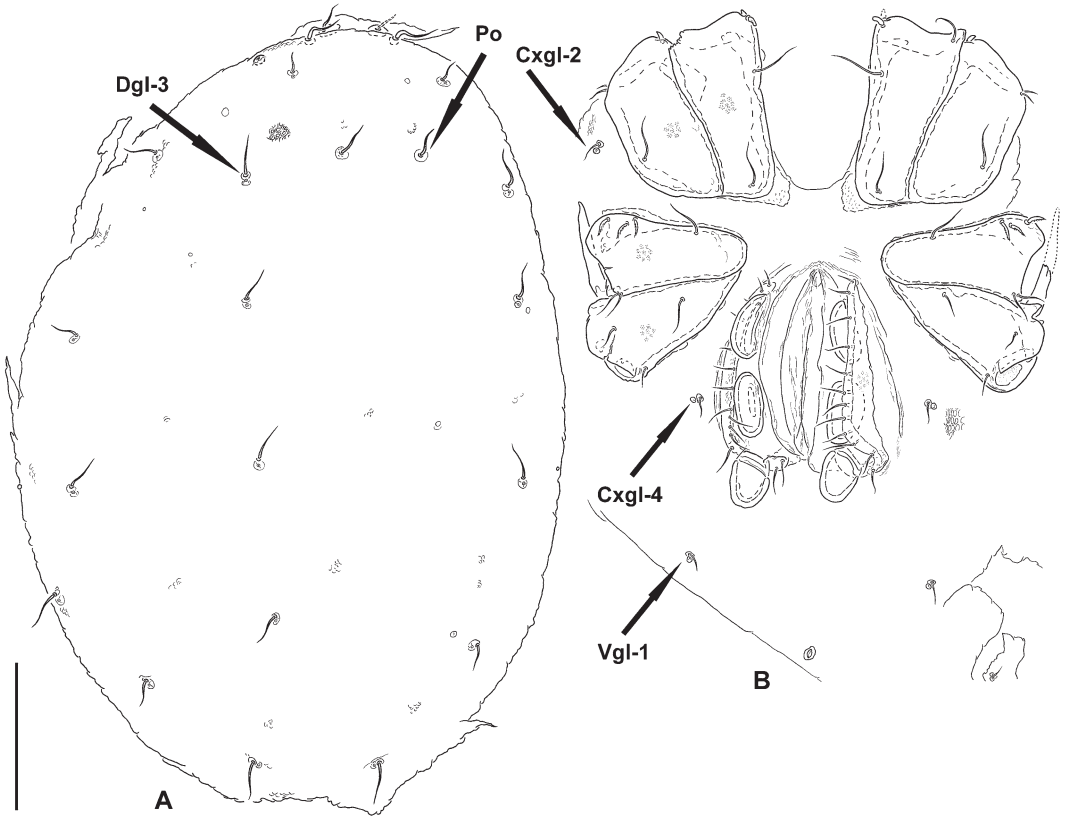

Fig. 6. *T. xiua* sp. nov., female, holotype B 376.3: **A.** idiosoma dorsal; **B.** idiosoma ventral. Scale bar: 200 µm.

Diagnosis. Character states of the genus as given by Smit (2020). – Idiosoma rectangular-oval, anterior and posterior Cx rectangular to each other, lateral eyes very small, not in capsules, integument papillate, without plates or platelets, legs with strong setation, without swimming hairs, legs, palps, chelicera stout; characteristics of the new species: Ac elongated-oval, interspace rather small, Ac-3 apically pointed, cheliceral claw very strong, P-4 bearing two peg like seta, one medio-centrally and one latero-distally.

Description

Male – unknown

Female (n = 5 mounted, 1 unmounted)

Colour yellowish to pale orange (might be faded by the fixation), idiosoma oval to sub-rectangular, anterior margin convex, with clear "shoulders", broadened in posterior half, L/W 1080 (1044–1344)/816 (768–1056) (Fig. 3A, B).

Lateral eyes separated in two pairs of pigment dots near anterior margin of dorsum (not in capsules) (Fig. 4A arrows), with very small, hardly visible eye lenses (Fig. 4B arrows), diameter anterior eye lenses 24 (19–24), distance anterior/posterior eyes 254 (268–301)/390 (357–404); no dorsal platelets, but small muscle attachment sites visible in some specimens (Fig. 6A); postoculare clearly anterior to the Dgl-3 (Fig. 6A arrows); integument covered by very flat papillae (Figs 4B, 5A); sclerotized body parts (mainly coxae) with large polygonal honeycombed structures formed by very fine pores (Figs 5B, 6B).

Cx-I/II trapezoid, laterally narrowed, posterior margin straight (Fig. 5B), rectangular to longitudinal axis of idiosoma, Cx-III/IV triangular; anterior and posterior coxal groups laying nearly rectangular to each other (Figs 3B, 6B); Cx-field tL 516 (516–582), Cx-I/II L 263 (263–282), tW 576 (480–612), W 226 (212–230), Cx-III/IV L 235 (235–273), tW 636 (558–708), W 226 (212–273); Cx-I antero-medially rounded, bearing two short, broad, flattened setae, antero-laterally pointed, bearing a single long seta,

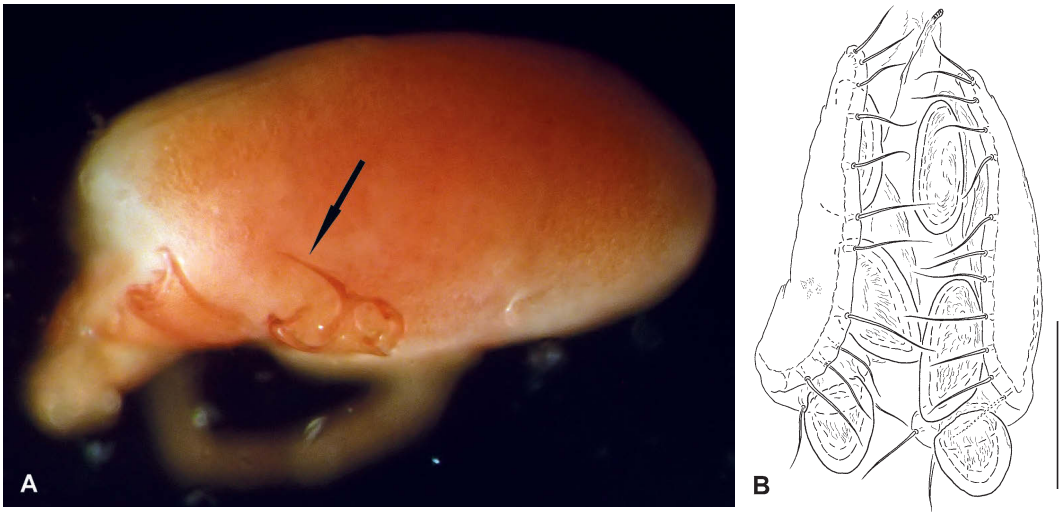

Fig. 7. *T. xiua* sp. nov., female: **A.** idiosoma lateral (appendages dissected), arrow pointing at dorso-lateral extension of Cx-IV, holotype B 376.3; **B.** genital field, paratype B 654. Scale bar: 100 µm (B).

medial margin +/- straight, centrally bearing single long seta, postero-medially rounded with porose, medial extension (Figs 5B, 6B), single long seta centrally at posterior margin; Cx-II antero-medially with one short, broad, flattened seta, antero-laterally rounded, bearing two small setae, one slender seta near rounded postero-lateral margin; medial margin of Cx-III/IV only formed by rounded medial margin of Cx-III, Cx-III bearing one slender seta centrally, three broad, pinnate setae antero-laterally and two slender setae postero-laterally, Cx-IV triangular, medially sharp pointed, bearing one slender seta medio-centrally, two laterally and postero-laterally (Figs 3B, 6B), dorso-laterally bearing a long projection pointing towards anterior (Figs 6B, 7A); Cxgl-2 laterally to Cx-I, Cxgl-4 laterally to genital field, beside Ac-2, Vgl-1 far anterior to excretory pore (Fig. 6B).

Fig. 8. *T. xiua* sp. nov., female, paratype B 593, III-leg-2-6 (arrow pointing at protrusion of second segment). Scale bar: 100 µm.

Genital field anteriorly laying between Cx-IV, posteriorly extending far beyond Cx-field, L/W 256 (251–282)/212 (242–254) (Fig. 6B); genital flaps anterior narrowed, posterior widened, scoop-shaped bend under Ac-3 (Fig. 7B), anteriorly extending beyond Ac-1, posteriorly ending at sockets of Ac-3, medial margins straight to slightly double bend (exact shape difficult to see, due to different opening angles), L 270 (242–296), medially with 14 (14–23) pairs of small setae; Ac-1, -2 elongated oval to lenticular pointed, with very flat sockets, Ac-3 apically pointed, on short stalks, interspace between Ac smaller than Ac diameter, Ac-1 to Ac-2 19 (14–35), Ac-2 to Ac-3 28 (24–40); L Ac-1 94 (87–103), Ac-2 89 (92–113), Ac-3 61 (54–82); socket/stalk L Ac-1 7 (7–14), Ac-2 (9–16), Ac-3 24 (18–28) (Figs 3B, 6B, 7B).

Two oviger specimens, one (holotype B 376.3) bearing two large eggs (diameter 240 x 288), one (paratype B 376.2, Fig. 3A, B) bearing two large eggs (diameter 192 x 288), and two smaller eggs (diameter 144 x 144).

Legs strong, compact, all with large setae especially at distal margins of segments 2–5 (Fig. 8), nevertheless with clear differences in setation (Fig. 9A–E), proximal segments stouter than distal ones in all legs, posterior legs longer than anterior ones, tL I-leg 656 (637–729), II-leg 705 (663–806), III-leg 698 (698–811), IV-leg 1058 (1041–1180), L of leg segments 1–6: I-leg 80 (78–85), 80 (73–85), 85 (80–

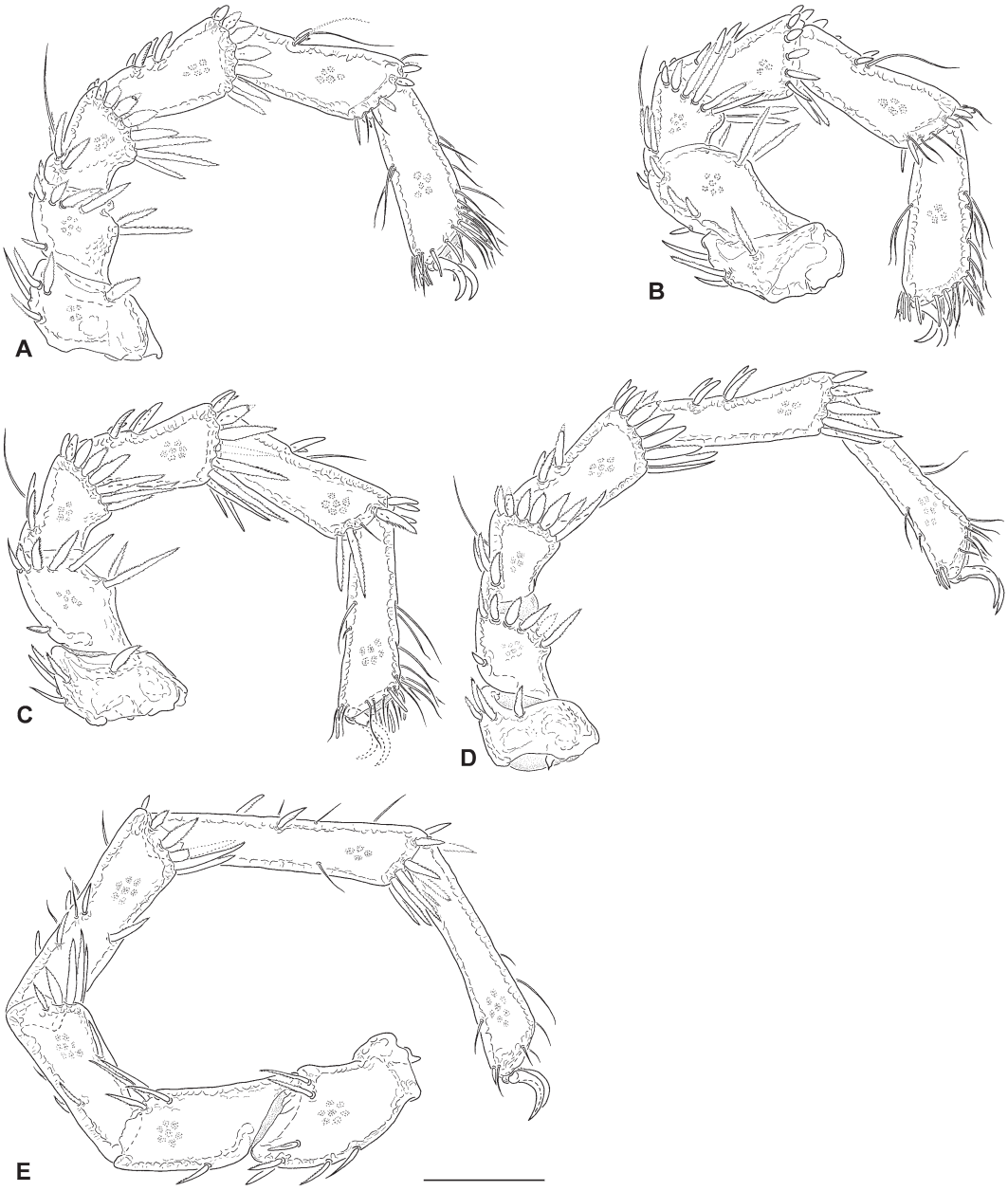

Fig. 9. *T. xiua* sp. nov., female, paratype B 376.4: **A.** I-leg anterior view; **B.** I-leg posterior view; **C.** II-leg anterior view; **D.** III-leg anterior view; **E.** IV-leg anterior view. Scale bar: 100 µm.

101), 118 (108–134), 143 (141–157), 150 (157–167), II-leg 89 (73–94), 87 (85–99), 89 (87–108), 125 (113–143), 153 (136–179), 162 (148–190), III-leg 66 (68–80), 75 (71–82), 85 (80–99), 132 (122–155), 172 (169–202), 169 (165–195), IV-leg 153 (153–172), 115 (113–129), 150 (141–172), 195 (195–219), 235 (226–268), 209 (204–221); claws large, slender, curved, simple without clawlets (Figs 8, 9A–E).

Gnathosoma stout, ventral margin straight; in ventral view basally trapezoid, rostrum short, broad blunt cone-shaped, L 266 (251–282), W 174 (165–174), H 122 (120–136), rostrum L 82 (75–80), mouth opening

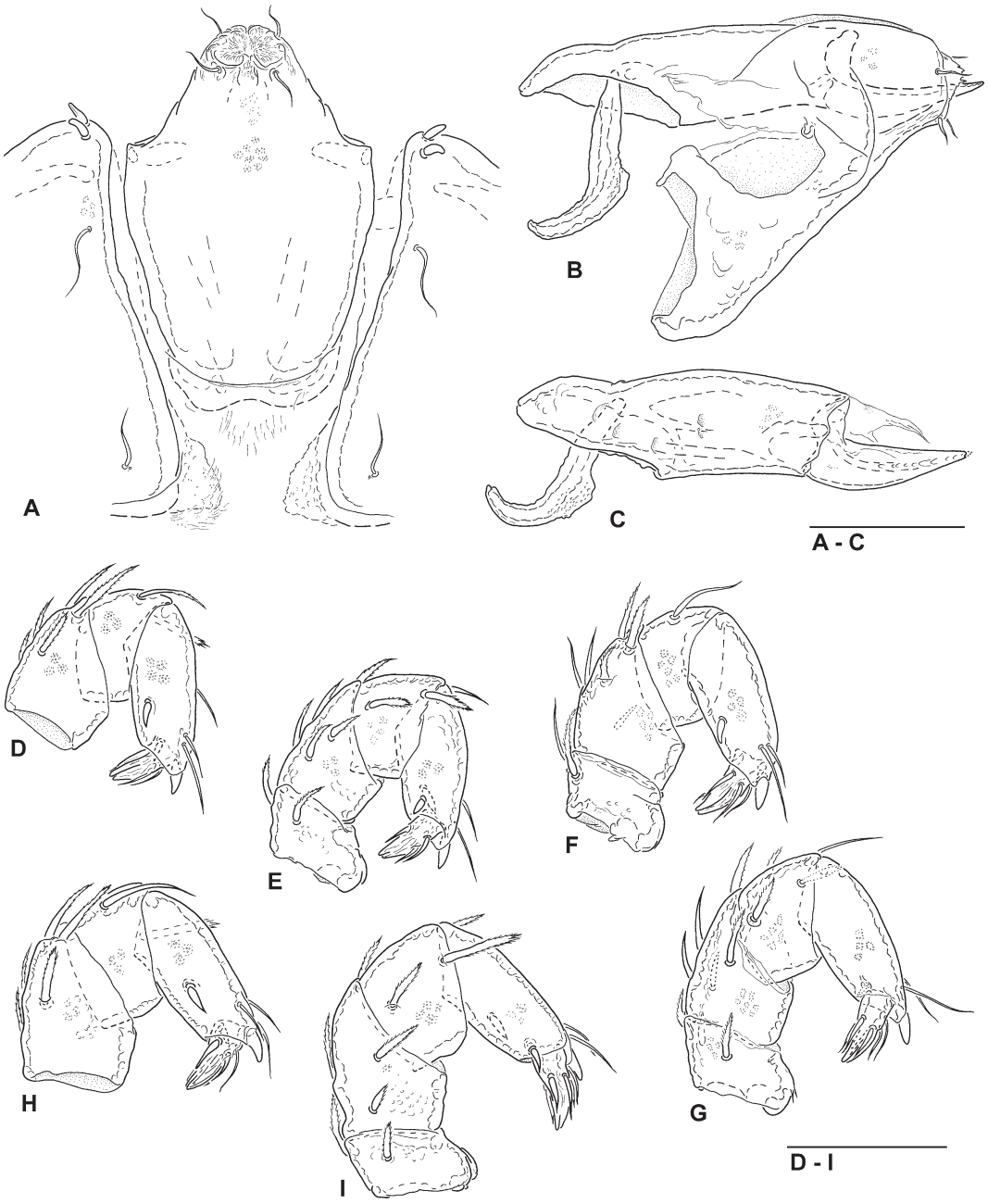

Fig. 10. *T. xiua* sp. nov., female, paratype B 654 (A), holotype B 376.3 (B, C, D, E), paratypes B 376.4 (F, G), B 593 (H, I): **A.** gnathosoma ventral view; **B.** gnathosoma (with right chelicera) lateral view; **C.** left chelicera medial view; **D.** left palp medial view; **E.** right palp lateral view; **F.** left palp medial view; **G.** right palp lateral view; **H.** left palp medial view; **I.** right palp lateral view. Scale bars: 100 µm.

Fig. 11. *T. xiua* sp. nov., deutonymph, paratype B 376.6: **A.** idiosoma dorsal; **B.** idiosoma ventral. Scale bar: 500 µm.

surrounded by two pairs of setae (Fig. 10A, B); chelicera stout (tL 306 (244–315), tL/H 4.3 (3.5–4.3)), claw stout (basal segment/claw 2.0 (1.8–2.0)), very thick (Fig. 10B, C); palp compact, P-1 to -3 bearing large, pinnate setae, mainly in dorsal half of segments (P-1 2–3, P-2 5–6, P-3 2–3), P-4 is bearing two large peg like setae, one laterally sub-distal (Fig. 10E, G, I), one medially more central (slightly variable in position in the distal half to distal third) (Fig. 10D, F, H), furthermore P-4 medio-dorsally is bearing two slender subdistal setae (inserted close to each other), in two specimens one palp is bearing a third slender dorsal seta (Fig. 10D, H), the dorso-distal projection of P-4 is completely fused, however with a clearly visible suture (Fig. 10D–G); L/H P-1 45 (42-47)/61 (56–71), P-2 87 (82–101)/61 (63–75), P-3 56 (52–63)/66 (63-75), P-4 118 (113–132)/42 (45–47), P-5 45 (45–54)/19 (19–21), tL 350 (343–392), relative L P-1 0.13 (0.11–0.14), P-2 0.25 (0.24–0.26), P-3 0.16 (0.15–0.16), P-4 0.34 (0.33–0.35), P-5 0.13 (0.13–0.14), L ratio P-2/P-4 0.74 (0.69–0.77), P-3/P-4 0.48 (0.44–0.50), ratio L/H P-1 0.7 (0.6–0.89), P-2 1.4 (1.2–1.4), P-3 0.9 (0.8–0.9), P-4 2.8 (2.5–2.8), P-5 2.4 (2.1–2.8).

Deutonymph (n = 2 mounted, 2 unmounted)

Colour pale reddish (might be faded by the fixation), shape of idiosoma rectangular-oval as in females, just smaller L/W 528–708/420–552 (Fig. 11A, B); diameter anterior eye lenses 15, distance anterior/posterior eyes 179–197/282; postoculare even further anterior to the Dgl-3 as in females (Fig. 12A); as in females, integument covered by very flat papillae, coxae bearing large polygonal pore-like structures; coxal field similar to females, however posterior coxal groups further distant from anterior groups (Figs 11B, 12B) and setation of coxae slightly reduced (Fig. 12B); Cx-field tL 312–324, Cx-I/II L 157–167, tW 330–353, W 118-136, Cx-III/IV L 127–134, tW 364–415, W 132–136. Genital field anteriorly laying between Cx-IV, posteriorly extending beyond Cx-field, W 127–129, genital flaps anterior pointed, posterior bend inwards, L 78–80, medially with 3–4 pairs of small setae, two pairs of irregular oval Ac, L Ac-1 40–45, Ac-2 33–54, Ac-2 socket L 9–14, interspace Ac-1 to Ac-2 19 (Fig. 12B).

Legs very similar to females, strong, even more compact, just with a reduced setation (Fig. 13A–D), tL I-leg 390–395, II-leg 360–404, III-leg 390–397, IV-leg 522–557, L of leg segments 1–6: I-leg 47, 45–52, 47, 68, 85, 96–99, II-leg 47, 52–54, 49–52, 54–68, 89, 99–

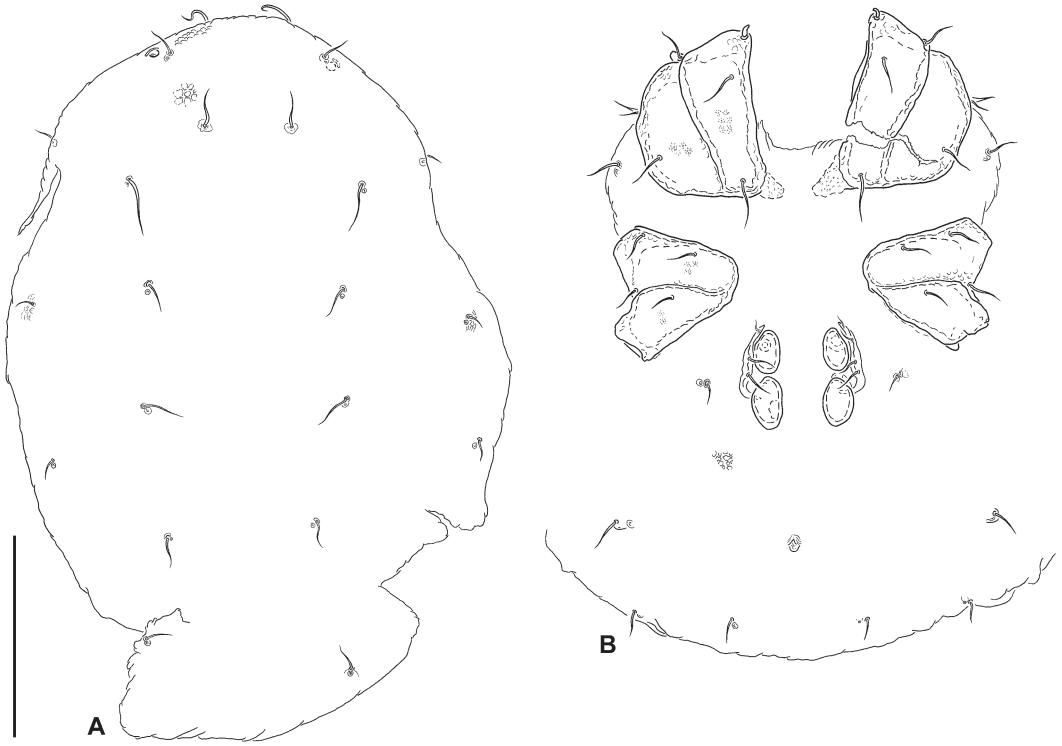

Fig. 12. *T. xiua* sp. nov., deutonymph: **A.** idiosoma dorsal, paratype B 376.8; **B.** idiosoma ventral, paratype B 376.6. Scale bar: 200 µm.

106, III-leg 42, 45–47, 40–47, 68, 92, 101–103, IV-leg 52–80, 61–66, 73, 99–101, 118–122, 115–120.

Gnathosoma as in females L 153–172, W 106–122, H 94, rostrum slightly more pointed L 49 (Fig. 14A, B). Chelicera stout tL 197–202, tL/H 3.9–4.0, claw stout, very thick (basal segment/claw 1.9–2.1) (Fig. 14C, D). Palp more compact than in females, setation slightly reduced (Fig. 14E, F), L/H P-1 26/47, P-2 54–56/45–47, P-3 35/42–45, P-4 73/33, P-5 33–35/16, tL 195–226, relative L P-1 0.11, P-2 0.25–0.28, P-3 0.16–0.18, P-4 0.32–0.37, P-5 0.16–0.17, L ratio P-2/P-4 0.74–0.77, P-3/P-4 0.48, L/H ratio P-1 0.6, P-2 1.2, P-3 0.8, P-4 2.2, P-5 2.0–2.1.

Differential diagnosis. All so far described species of *Tartarothyas* are very similar – *T. xiua* sp. nov. seems closest to *T. occidentalis*, described from North America (Smith & Cook 1999), especially in the shape and position of the acetabula (Ac-1 and Ac-2 elongated-oval, Ac-3 slightly elongated, pointed, all acetabula relatively close to each other) – in all other species the Ac-3 are globular (*T. romanica* and *micrommata* from Europe, *boultoni* from Australia and *martini* the second North American species) or elongated-oval as Ac-1 and Ac-2 (*T. setosa*, *T. curtipalpis* and *T. beedelup*). Furthermore in *T. boultoni* and *T. micrommata* the acetabula are smaller, more rounded and further distant from each other (in the other six species, as well as in *T. xiua* sp. nov., the acetabula are larger and closer to each other).

In *T. xiua* sp. nov. P-4 is bearing a large peg like seta medio-centrally in the distal half to third, and a second large peg like seta latero-distally – *T. occidentalis* is very similarily bearing two peg like setae ventro-distally at P-4 (according to the illustrations one medial, one lateral), just slightly more distally, though P-4 is more slender in *T. occidentalis* than in *T. xiua* sp. nov.; in both *T. romanica* and *T. boultoni* P-4 is medially bearing just one single, large, sub-distal seta (Husiatinschi 1937, Harvey 1987, Di Sabatino et al. 2010), in *T. martini* no large seta is found at P-4, just one slender, setiform seta ventro-distally (Smith & Cook 1999); *T. micrommata* as well is bearing just a single small medial seta ventro-distally at P-4 (Viets 1934).

Additionally, *T. xiua* sp. nov. is differing from all so far described species in a more compact, especially basally thicker cheliceral claw.

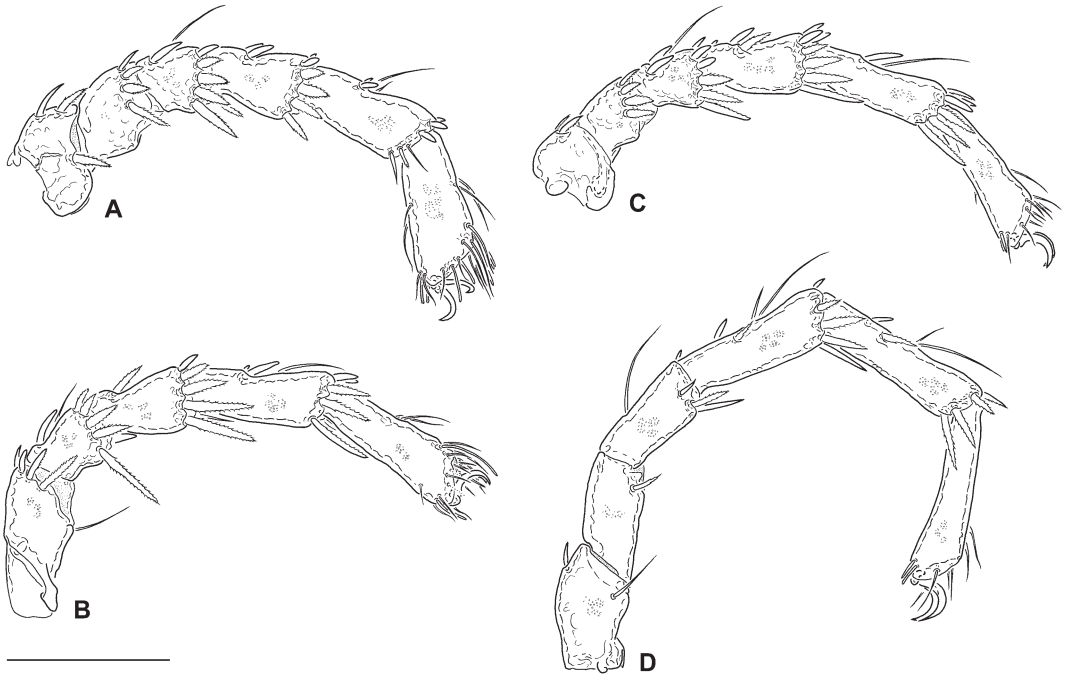

Fig. 13. *T. xiua* sp. nov., deutonymph, paratype B 376.6: **A.** I-leg anterior view; **B.** II-leg anterior view; **C.** III-leg anterior view. **D.** IV-leg anterior view. Scale bar: 100 µm.

At the antero-medial margin of Cx-I *T. xiua* sp. nov. is bearing two very characteristic short, broad, flat setae – similar setae (as well one or two), even though not mentioned in the descriptions, are visible in the illustrations of *T. micrommata*, *T. romanica* and *T. boultoni* (Viets 1934, Husiatinschi 1937, Harvey 1987); in the same position (extending further to posterior, as well illustrated but not mentioned in the description) the only so far known New World species *T. martini* and *T. occidentalis* are bearing five to six respective short, broad setae.

In the description of *T. boultoni* from Australia the position of the Dgl-3 (at the same level as the postocularia) is given as the main difference towards the European species (Dgl-3 well posterior to the postocularia) (Harvey 1987). However whereas in the description of *T. micrommata* Dgl-3 are indeed well posterior to the postocularia (Viets 1934), in *T. romanica* Dgl-3 and the postocularia are at the same level (Husiatinschi 1937). But the later species clearly differs from *T. boultoni* in size and position of the acetabula (see above). In *T. xiua* sp. nov. the position of the Dgl-3 is posterior to the postocular setae – as in the European *T. micrommata* and as well in both North American species *T. occidentalis* and *T. martini* (Ian Smith pers. comm.).

T. xiua sp. nov. is differing from the females of the most similar *T. occidentalis* in a clearly shorter coxal field and shorter legs (*T. occidentalis* in brackets): tL Cx-field 516–576 (618–720); leg-I 637–729 (838–1038), leg-II 663–806 (902–1086), leg-III 698–811 (856–1084), leg-IV 1041–1180 (1344–1612). Whereas the second North American species *T. martini* is smaller in these characters: tL Cx-field 450–510; leg-I 626–709, leg-II 641–738, leg-III 670–730, leg-IV 931–1034.

T. xiua sp. nov. (Id L 1044–1344) is larger than *T. micrommata* (585–800) and *T. boultoni*: (830–1010), *T. romanica* has about the same size (1260), for *T. occidentalis* and *T. martini* no data on the total Id length are given.

Due to the poor condition of the material, no information on dorsal glandularia, or details on the setation of palps and coxae are given for the three recently described species from Australia (Smit 2021). However, *T. setosa* is separated from all other known species by a group of long setae at the ventral margin of segment six in the first and second leg, *T. curtipalpis* is characterized by a very stocky palp, especially a short P-4, *T. beedelup* differs from all other species of the genus in a rather short I-leg-6, relatively small Cx-IV and large acetabula touching each other. A key to the Australian species is given by Smit (2021).

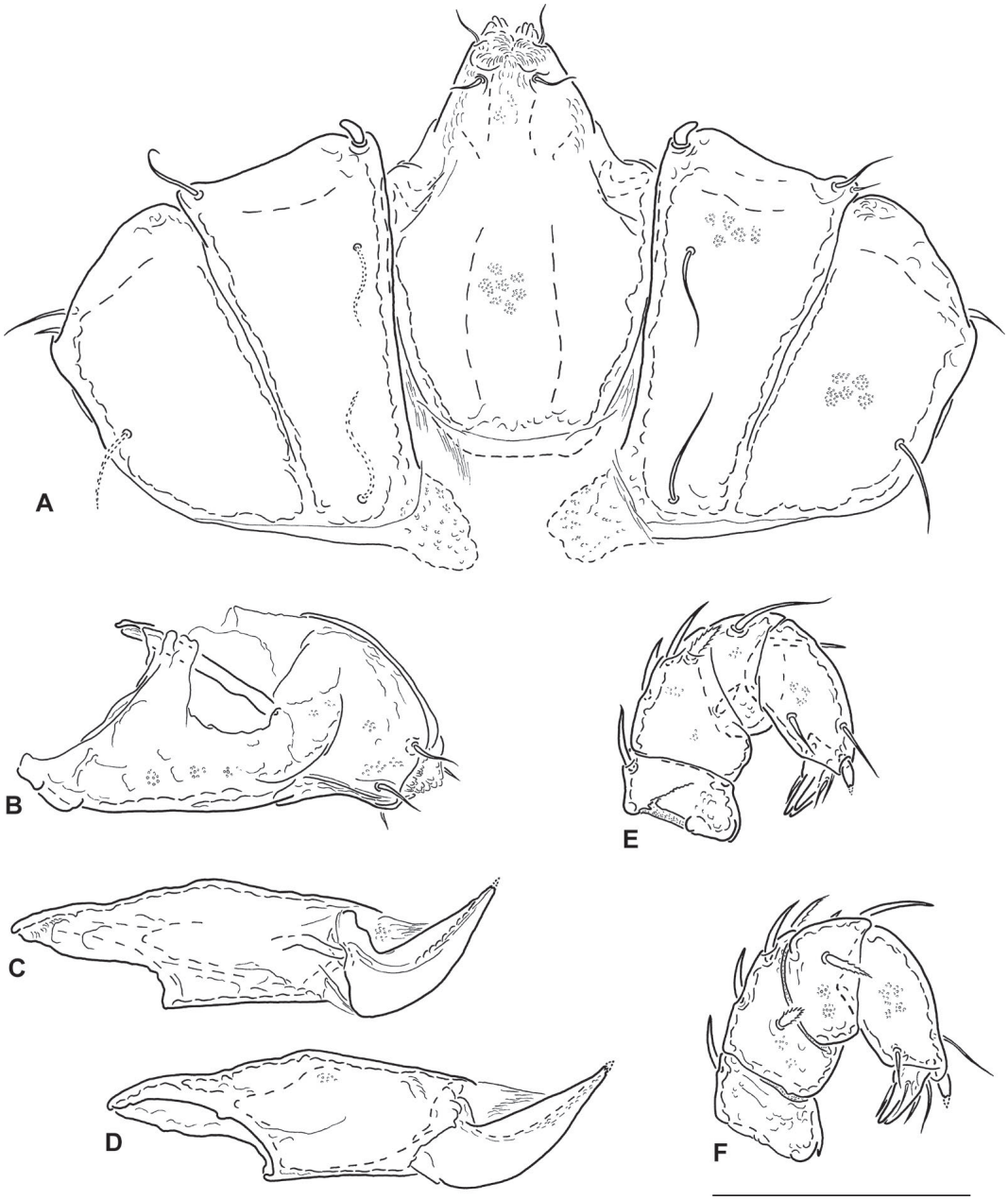

Fig. 14. *T. xiua* sp. nov., deutonymph, paratypes B 376.8 (A, C, D), B 376.6 (B, E, F): **A.** gnathosoma, anterior coxae ventral view; **B.** gnathosoma lateral view; **C.** left chelicera medial view; **D.** right chelicera lateral view; **E.** left palp medial view; **F.** right palp lateral view. Scale bar: 100 μm.

Discussion

It is very remarkable, that the few, rare, very far dispersed hitherto described species of *Tartarothyas* – currently nine species are known from four different continents – show an outstanding morphological similarity. Furthermore the morphological differences used for species separation in Europe resulted to be rather variable in larger populations, leading to the synonymisation of three (*T. fonticola* (Motaş & Tanasachi, 1957), *raetica* Bader, 1989 and *suecica* Bader, 1989) out of the temporarily described five European species (Gerecke 1996, Di Sabatino et al. 2010). Apart from size differences, the species mainly differ in the palpal setation. However the so far present descriptions are often rather incomplete and the illustrations – given the fact, that some setae are difficult to see not very reliable. Further differences refer to size and shape of the acetabula and cheliceral claws. The published measurements of the length of the genital field are rather difficult to compare, as in the so far existing species descriptions it is not specified which distance has been used. Therefore an overall revision of the variability of the morphological characters including all so far known species would be eligible. In addition molecular data would be very useful in order to clarify the phylogenetic relationships within this interesting genus.

Currently 1491 species of water mites (Hydrachnidia) have been recorded in the Neotropical region (Goldschmidt & Ramirez 2020), so far – just – 93 species are known from Colombia, mainly described by Lundblad (1953). For the Departamento de Boyacá, this is only the second record of a water mite species (Pešić et al. 2010). Taken into account the overall high biodiversity and the geomorphological heterogeneity of Colombia, this number is clearly underestimating the probable diversity of this group in the country. As water mites significantly contribute to the diversity of freshwater systems and provide excellent tools for the assessment of water quality and habitat integrity (Goldschmidt & Ramirez 2020), further studies on the distribution, taxonomy and ecology of this group in the Andean freshwater systems of the region are urgently needed.

Acknowledgements

We are grateful to Roland Melzer, Head of the Section Arthropoda varia and Bernhard Ruthensteiner, Head of the Section Evertebrata varia, Bavarian State Collection of Zoology, Munich, Germany for the possibility to use photomicroscopes and stacking facilities. We wish to thank Mark Harvey (Welshpool, Australia) and Andrew Boulton (Armidale, Australia) for providing information on the sample sites of *T. boultoni* from Australia, as well as Ian Smith (Ottawa, Canada) for checking the types of the North American species for us and making available additional information on their characters. The samples were taken as part of Yimy Herrera-Martínez's doctoral thesis, financed with funds from the Colombian Petroleum Company (ECOPETROL) and the Pedagogical and Technological University of Colombia (UPTC). Last but not least it is our pleasure to thank Vladimir Pešić (Podgorica, Montenegro) and Karl-Heinz Schmidt (Oderwitz, Germany) for improving the manuscript with their very careful reviews.

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