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THREE NEW WATER MITE SPECIES OF THE GENUS *FELTRIA* (ACARI, HYDRACHNIDIA, FELTRIIDAE) FROM ASIAN RUSSIA

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ABSTRACT: This paper provides an illustrated description of three water mite species of the genus *Feltria* from streams in Asian Russia: *(Feltria) altaiensis* sp. n.*, Feltria (Feltria) jeltulakensis* sp. n. and *Feltria (Feltria) rubrella* sp. n.

KEY WORDS: Acarina, *Raphignathoidea*, systematics, morphology, SEM.

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INTRODUCTION

At present, about 20 water mite species of the genus *Feltria* are known in Russia (Tuzovsky and Semenchenko 2009). In this paper, three new water mite species of the genus *Feltria* Koenike, 1892 are described. In addition, this paper provides further description of other species of this genus, based on material collected by Vitaly Stolbov in the streams of the State Nature Reserve "Tigireksky" in the Altai Krai and by K. Semenchenko and D. Sidorov in the Amur Oblast. The material was sampled with a common hand net with 250 μm mesh size and fixed in 75% ethanol. All specimens were dissected and slides mounted in Hoyer's medium.

MATERIALS AND METHODS

Idiosomal setae are named according to Tuzovsky (1987): *Fch*—frontales chelicerarum, *Fp*—frontales pedipalporum, *Vi*—verticales internae, *Ve*—verticales externae, *Oi*—occipitales internae, *Oe*—occipitales externae, *Hi*—humerales internae, *He*—humerales externae, *Hv*—humerales ventralia, *Sci*—scapulares internae, *Sce*—scapulares externae, *Li*—lumbales internae, *Le*—lumbales externae, *Si*—sacrales internae, *Se*—sacrales externae, *Ci*—caudales internae, *Pi*—praeanales internae, *Pe*—praeanales externae. Setae *Fp* and *Oi* are trichobothria and not associated with glandularia. Setae *Pi* are simple and are also not associated with glandularia.

Furthermore, the following abbreviations are used: P-1–5, pedipalp segments (trochanter, femur, genu, tibia and tarsus); I-Leg-1–5, first leg, segments 1–5 (trochanter, femur, genu, tibia and tarsus) i. e., III– Leg–3—genu of third leg; H—height; L—length; n—number of specimens measured; W—width. All measurements are given in micrometers (μm); lengths of appendage segments are given as dorsal lengths. The type material is deposited in the collection of the Papanin Institute for Biology of Inland Waters.

This paper presents the morphology and provides the description of new species belonging to the genus *Feltria* collected in Russia.

SYSTEMATICS

Family **Feltriidae K. Viets, 1926**
Genus ***Feltria* Koenike, 1882**

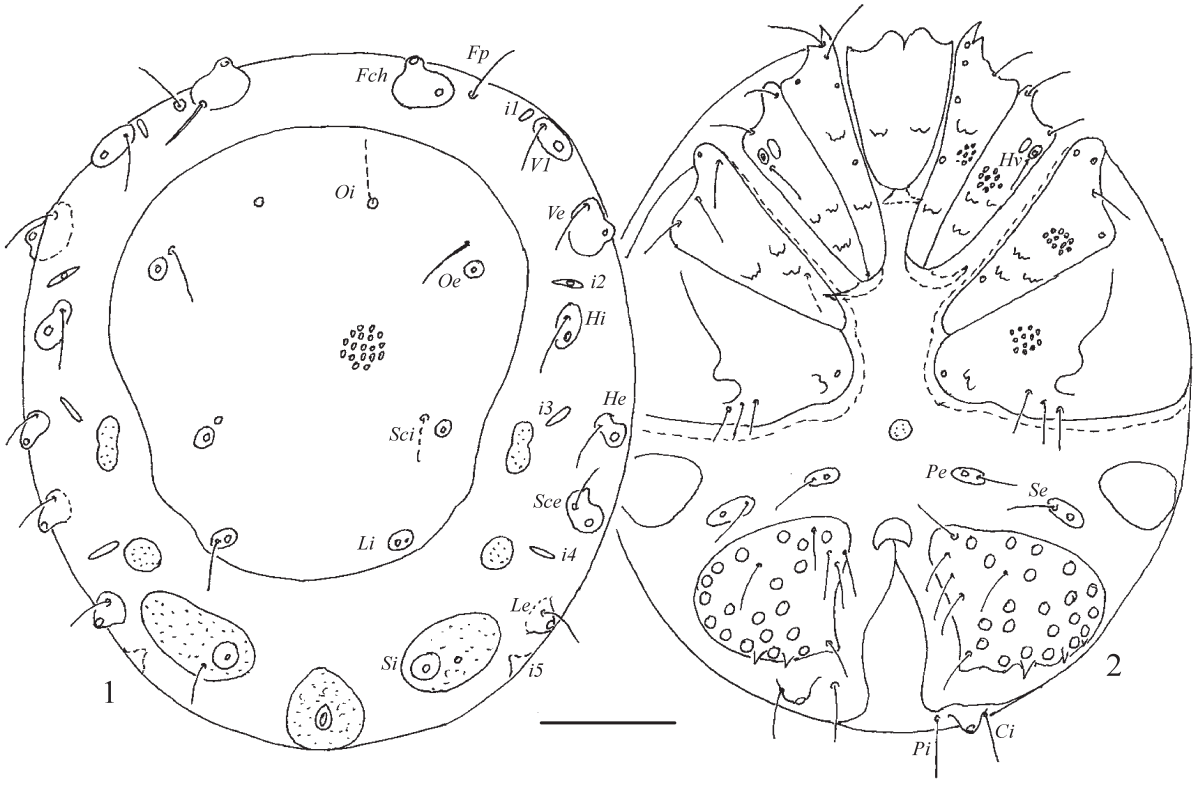
Feltria (Feltria) altaiensis sp.n.

Figs. 1–5

Type material. Holotype: female slide 9487, Asia, Altai Krai, Krasnoshchekovsky District, State Nature Reserve "Tigireksky", Inya River, 51°11′00.6″N 83°03′55.3″E, depth 40–50 cm, substrates: stones, mosses, 17.08.2007, leg. V. Stolbov.

Diagnosis. Female: Frontal area with all glandularia and setae on separate platelets. Dorsum with large shield bearing four pairs of setae and four pairs unequal lateral plates. Coxal plates in four groups. Genital field with 19–21 pairs of acetabula. P-2 with convex ventral margin, P-4 slenter and longer than P-2. Excretory pore in posterodorsal position.

Description. *Female*. Idiosoma flat and wide (L/W ratio 1.17), frontal setae (*Fch, Fp, Vi, Ve*) located on separate platelets (Fig. 1). Dorsum with large shield and three pairs small unequal of lateral platelets and one pair relatively large posterior



Figs. 1–2. *Feltria altaiensis* sp.n., female: 1—dorsal view; 2—ventral view. Scale bar=100 μm.

plates. Dorsal shield broad (L/W ratio 1.17), with widely rounded anterior and posterior margins, bearing four pairs of setae: *Oi, Oe, Sci* and *Li.* Setae *Hi, He, Sce* and *Le* located on soft integument along lateral portions of dorsum. Posterior pair of plates bearing seta and glandularium *Si,* and anterior pair plates bearing seta and glandularium *Ve* on each side. Excretory pore opens on large posterodorsal plate. All slit organs lying free on soft integument along lateral portions of dorsum.

Leg coxae incorporated into four groups (Fig. 2). Posterior apodemes of anterior coxal groups short, curved and directed laterally. Coxal plate IV with convex medial margin which much longer than medial margin coxal plate III. Acetabular plates with 19–21 genital acetabula and six thin setae (five medial and one near center of plate) on each side. Acetabular plate with distinctly developed posteromedial corners. Pregenital sclerite small, located between posteromedial corners of posterior extensions of fourth coxae and platelets, bearing setae *Pe*. Anterior genital sclerite slightly wider than long. Setae *Pe* and *Se* with associated glandularia lying free on soft integument between posterior margins of fourth coxae and genital area. Ventrolateral plates relatively large triangular and lying free between posterolateral extensions of fourth coxae and acetabular plates. Capitulum with short anchoral process.

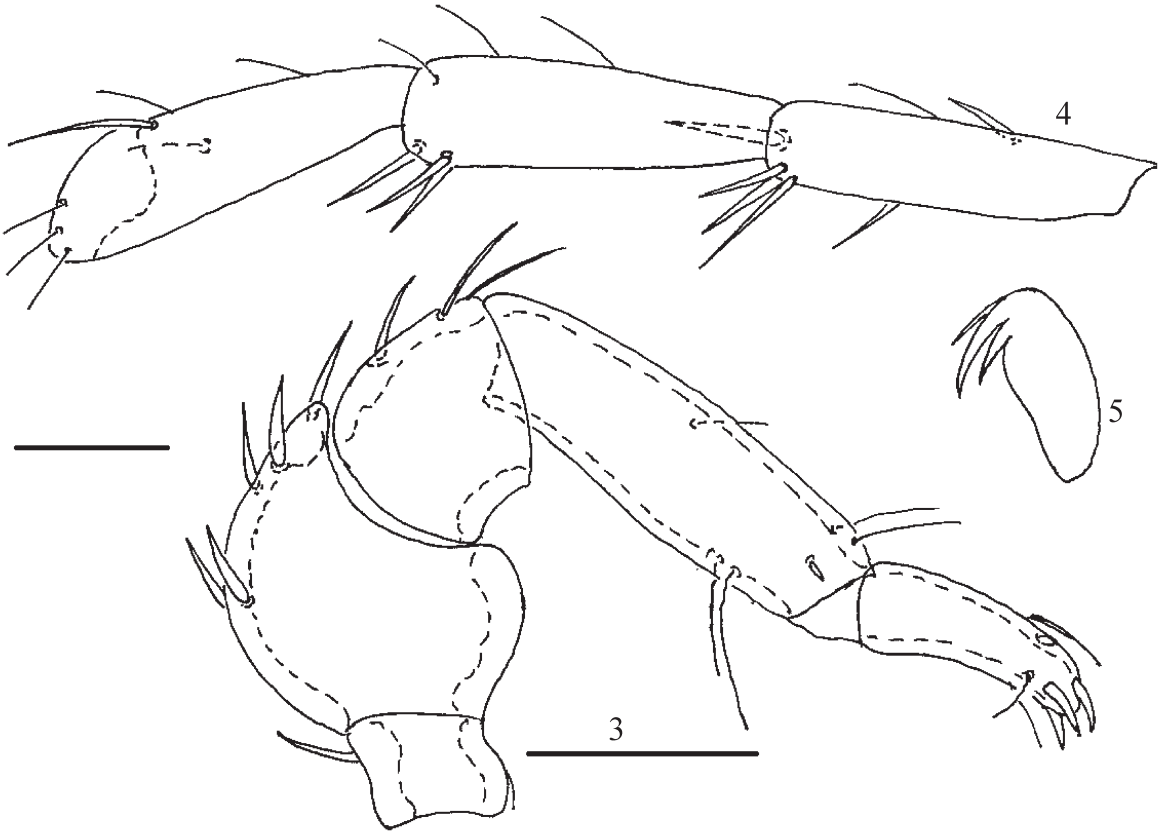
Pedipalp (Fig. 3) slender: P-1 short, with single dorsodistal seta; P-2 expanded (L/H ratio 1.15), with convex ventral margin, two proximal and three thick dorsodistal setae; P-3 short (L/H ratio 1.0), with one short, thick proximal seta and two comparatively long, thin setae; P-4 slender (L/H ratio 3.0) distinctly longer than P-2, with two unequal ventral setae and three thin dorsal ones; P-5 longer than P-3, with three pointed distal spines.

First four segments of all legs with mainly thick setae, terminal segments (especially tarsi) with several thin setae (Fig. 4). Leg claws with three pointed denticles: large median, internal clawlet a little thicker and longer than external one (Fig. 5).

Measurements (n=1). Idiosoma L 480, W 410; dorsal shield L 310, W 265; capitulum L 115; cheliceral segments: base L 115, chela L 33; pedipalp segments (P-1-5) L/H: 18/26, 62/54, 36/36, 90/30, 45/18; leg segments L: I-Leg-1-6: 42, 45, 42, 60, 65, 65; II-Leg-1-6: 42, 42, 42, 48, 65, 72; III-Leg-1-6: 54, 42, 48, 80, 90, 75; IV-Leg-1-6: 75, 55, 65, 95, 105, 102.

Male. Unknown.

Differential diagnosis. The female of the new species is similar to the female of *F. montana* Tu-



Figs. 3–5. *Feltria altaiensis* sp.n., female: 3—pedipalp; 4—III-Leg-4–6, 5—leg claw. Scale bar=50 μm.

zovskij, 1990 in the structure of the dorsal shield and posterodorsal plates, as well as in the shape of the genital field and pedipalps. The two species differ in the setation of the frontal part of the dorsum and the shape of posterior coxal groups. Namely, in female *F. montana,* setae *Fch, Fp, Vi* and the first pair of slit organs are located on total plates (Fig. 18), seta *Vi* is placed on large elongate plate on each side, and the medial margin of coxal plates IV is straight (Fig. 19). In contrast, in female *F. altaiensis* sp.n., setae *Fch, Fp, Vi* and the first pair of slit organs are located on separate platelets (Fig. 1), seta *Vi* placed on comparatively small oval plate on each side, and the medial margin of coxal plates IV is convex (Fig. 2).

Etymology. The species is named after the region (Altai) where it was collected.

Habitat. Running waters.

Distribution. Asia, Russia: Altai Krai.

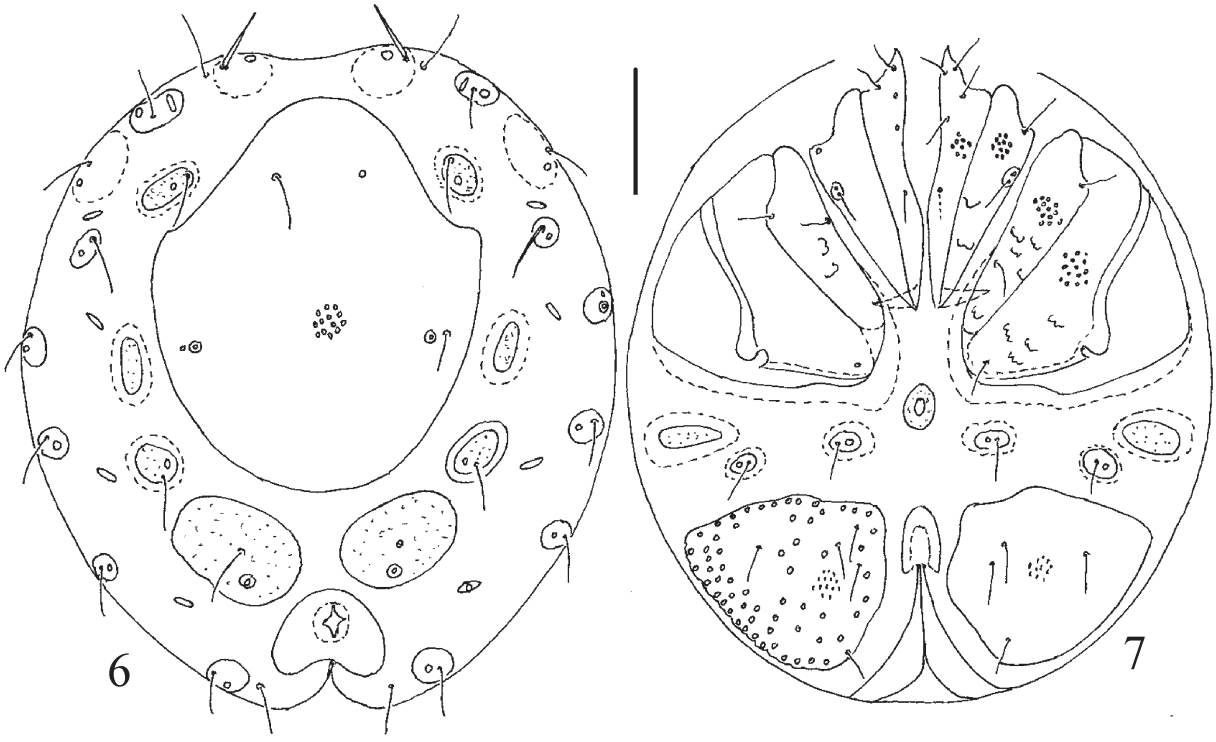
Feltria (Feltria) jeltulakensis **sp.n.**

(Figs. 6–12)

Type material. Holotype: female slide 9565, Asia, Russia, Amur Oblast, Tyndinsky District, Jeltulak Stream, depth 40–50 cm, substrates: stones, mosses, 24.07.2006, leg. K. Semenchenko and D. Sidorov.

Diagnosis. *Female*: frontal area with all glandularia and setae on separate platelets. Dorsum with large shield bearing two pairs of setae, three pairs of small lateral platelets and one pair of posterodorsal plates. Coxal plates in four groups. Genital field with 61–68 small subequal acetabula. P-2 with slightly convex ventral margin, P-3 with single thick dorsoproximal seta and two unequal (thick and thin) dorsodistal setae; P-4 short, thick, with slightly convex ventral margin. Excretory pore large in posterodorsal position.

Description. *Female.* Idiosoma flat and almost circular (L/W ratio 1.10), with slightly concave anterior margin, frontal setae (*Fch, Fp, Vi, Ve*) located on separate sclerites (Fig. 6). Dorsum with relatively small shield and three pairs small subequal lateral platelets and one pair comparatively large posterodorsal plates. Dorsal shield broad (L/W ratio 1.13), narrowed anteriorly, occupy about half of the dorsal idiosoma surface and bearing setae *Oi* and *Sci.* Setae *Fch* and *Ve* located on rather large sclerites. First pair of slit organs fused with glandularia *Vi*, other slit organs lying free on soft integument along lateral portions of dorsum.



Figs. 6–7. *Feltria jeltulakensis* sp.n., female: 6—dorsal view; 7—ventral view. Scale bar=100 μm.

Setae *Oe* located on first pair of anterolateral plates, *Li* on third pair of lateral plates and *Si* on postdorsal plates. Setae *Pi* and *Ci* distinctly separated. Excretory pore plate very large in posterodorsal position.

Leg coxae incorporated into four groups and occupy about half of the idiosoma ventral surface (Fig. 7). Anterior coxal groups with short posterior apodemes, seta and glandularium *Hv* situated laterally on posterior margin of coxal plate II on each side. Coxal plates III and IV with nearly subequal in length medial margins, posteromedial angles coxal plates IV rounded, secondary sclerotization well developed. Genital plate transverse (L/W ratio 0.84) with convex medial margin, anterior margin slightly undulating, 61–68 small subequal acetabula, three to four medial fine setae and one lateral seta on each side, pregenital sclerite elongate. Lateral plates, setae *Pe* and *Se* lying free on soft integument between posterior margins of fourth coxae and genital area. Excretory pore plate large in posterodorsal position.

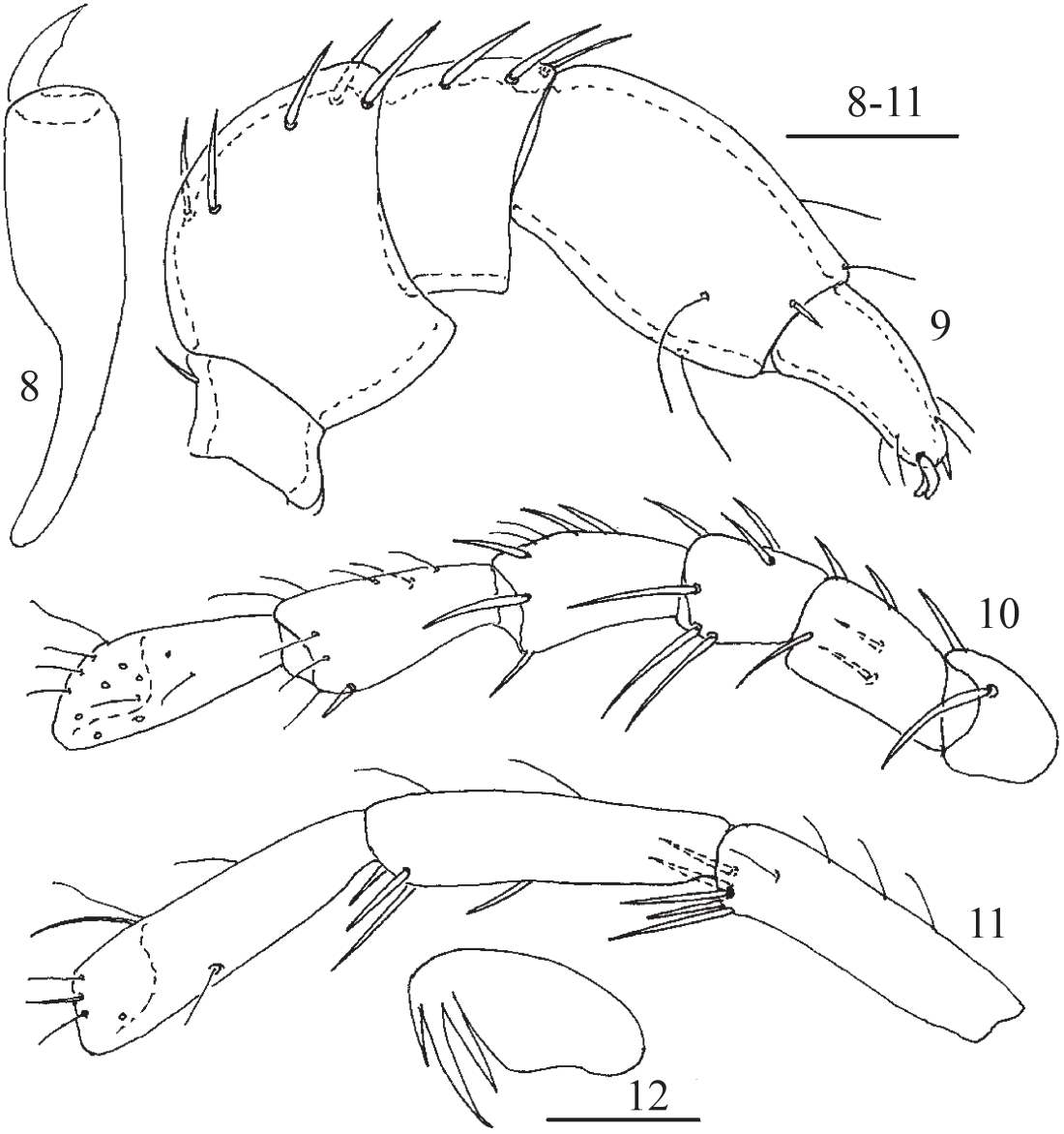
Chelicera basal segment (Fig. 8) distally thickened, chela short, crescent-shaped. Pedipalp short stout (Fig. 9): P-1 short, with single dorsodistal seta; P-2 expanded (L/H ratio 1.0), with straight or slightly convex ventral margin, two proximal and three thick subequal dorsodistal setae; P-3 short (L/H ratio 0.75), with single thick dorsoproximal seta and two unequal (thick and thin) dorsodistal setae; P-4 short, thick (L/H ratio 1.7) with slightly convex ventral margin, a little longer than P-2 (P-4/P-2 ratio 1.1), with two unequal distoventral setae, two thin dorsal ones, mediodistal seta short; P-5 a little longer than P-3, with three distal spines.

First four segments of all legs with mainly thick setae, terminal segments (especially tarsi) with several thin setae (Fig. 10), III-Leg-6 without ventrolateral projection (Fig. 11). Leg claws with three clawlets: median clawlet largest, internal clawlet thicker and longer than external one (Fig. 12).

Measurements (n=1). Idiosoma L 485, W 435; dorsal shield L 295, W 260; posterodorsal plates L 102, W 78; capitulum L 90; cheliceral segments: base L 78, chela L 30; pedipalp segments (P-1-5) L/H: 24/30, 66/66, 36/48, 72/42, 42/24; leg segments L: I-Leg-1-6: 42, 48, 42, 57, 70, 72; II-Leg-1-6: 48, 51, 42, 60, 72, 85; III-Leg-1-6: 48, 51, 54, 80, 95, 100; IV-Leg-1-6: 78, 57, 65, 99, 108, 108.

Male. Unknown.

Differential diagnosis. The new species is similar to *Feltria amurensis* Tuzovskij and Semenchenko, 2009 (=*F. orientalis*, Tuzovsky and Semenchenko 2010) from which it is distinguishable by the structure of the dorsum and venter.



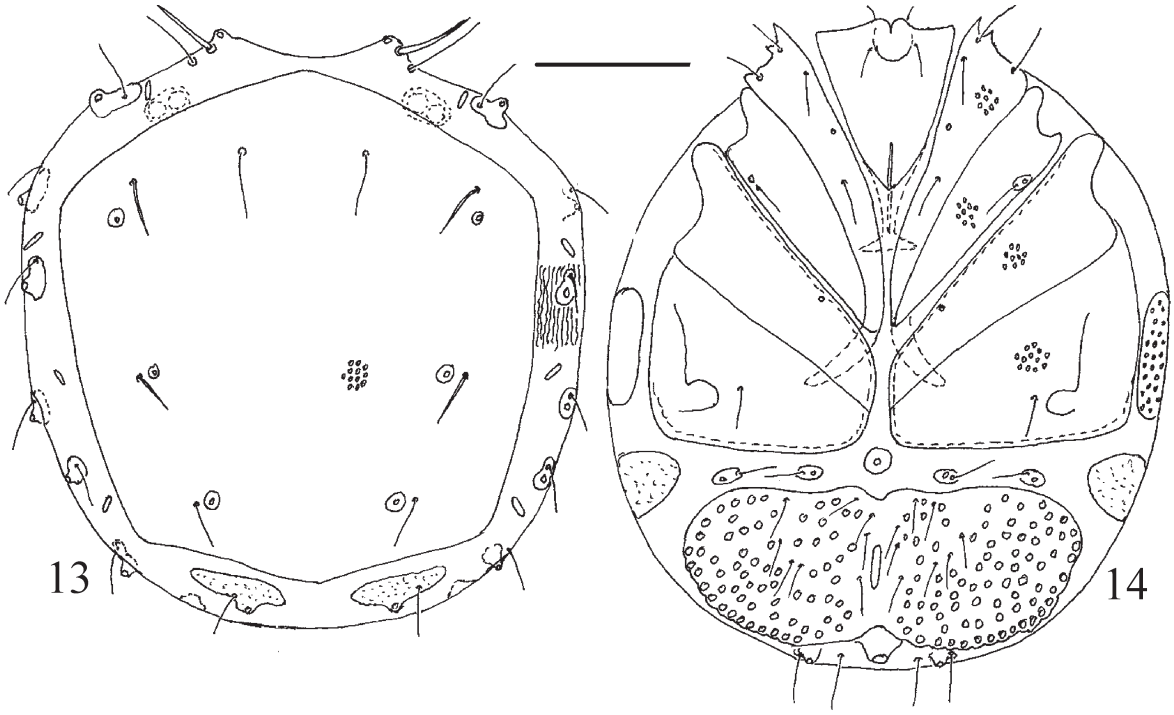
Figs. 8–12. *Feltria jeltulakensis* sp.n., female: 8—chelicera; 9—pedipalp; 10—I-Leg-1–6; 11—III-Leg-4–6, 12—leg claw. Scale bars: 8–11=50 μm, 12=20 μm.

However, the following clear differences can be found in the morphology of females (character states of female of *F. amurensis* are given in parenthesis after Tuzovsky and Semenchenko 2009): idiosoma large and almost circular, Fig. 6, L/W 485/438 (relatively small and distinctly elongate, L/W 343–396/270–363, Figs. 22–23); dorsal shield broad, L/W ratio 1.13, narrowed anteriorly, not cross-shaped (elongated, L/W 1.3, cross-shaped with lateral protrusion on each side); genital plate large, L/W 125/150, with 61–68 acetabula (comparative small, L/W 85–95/92–130, with 30–50 acetabula); P-2 ventral margin nearly straight, Fig. 9 (convex, Fig. 24); P-3 with single proximal thick seta and two unequal dorsodistal setae (two dorsoprximal short, thick setae and two long, thin dorsodistal ones); all leg claws with pointed clawlets, Fig. 12 (internal clawlet with rounded tip, Fig. 25).

Feltria (Feltriella) rubrella sp.n.

(Figs. 13–17)

Type material. Holotype: female slide 9486, Asia, Altai Krai, Krasnoshchekovsky District, State Nature Reserve "Tigireksky", Bolshoi Tigirek River, 51°08′54.8″N 83°01′32.2″E, depth 40–50 cm, substrates: stones, mosses, 21.08.2007, leg. V. Stolbov.



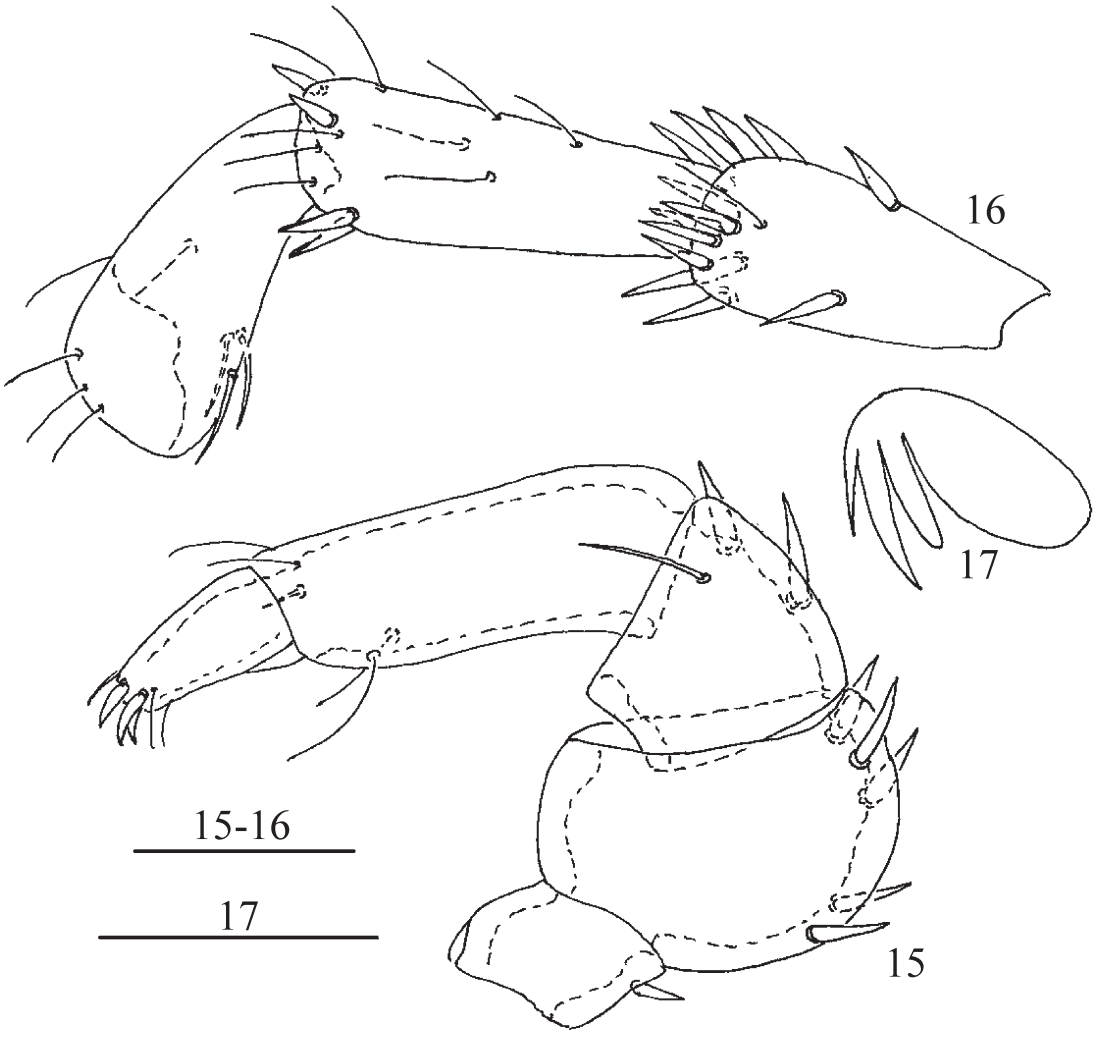
Figs. 13–14. *Feltria rubrella* sp.n., male: 13—dorsal view; 14—ventral view. Scale bar=100 μm.

Diagnosis. *Male*: frontal area with all glandularia and setae on separate platelets. Dorsum almost circular, with large shield bearing four pairs of setae and one pair narrow postdorsal plates. Coxal plates in four groups. Capitulum with moderately long anchoral process, P-2 with convex ventral margin. Genital field with 61–65 pairs of acetabula. Excretory pore in posteroventral position and fused with genital field posterior margin. III-Leg-6 without ventrolateral projection.

Description. *Male*. Idiosoma flat and almost circular (L/W ratio 1.06) with concave ventral margin, frontal setae (*Fch, Fp, Vi, Ve*) located on separate sclerites (Fig. 13). Dorsum with large shield and one pair narrow posterior plates. Dorsal shield broad (L/W ratio 1.04), occupies almost all of the idiosoma dorsal surface and bears four pairs of setae: *Oi, Oe, Sci* and *Li.* Setae *Hi, He, Sce* and *Le* located on soft integument along dorsolateral portions of dorsum. Posterodorsal pair of plates narrow transverse (L/W ratio 0.4), bearing seta and glandularium *Si* on each side. All slit organs lying free on soft integument along lateral portions of dorsum.

Leg coxae incorporated into four groups, close to each other, and occupy more than half of the ventral idiosoma surface (Fig. 14). Anterior coxal groups with well-developed posterior apodemes, seta and glandularium *Hv* situated laterally on posterior margin of coxal plate II on each side. Coxal plates III and IV with straight and subequal in length medial margins. Genital plate transverse, anterior margin slightly undulating, anteromedial and posteromedial margins weakly indented, gonopore small and narrow in the center of the plate, with 61–65 acetabula and seven thin setae on each side. Pregenital sclerite small. Ventral surface with two pairs of unequal lateral plates: anterior pair elongate, narrow, situated laterally to coxal plates IV; posterior pair rather larger, broad and located between posterior coxal plates and genital field. Setae *Pe* and *Se* with associated glandularia lying free on soft integument between posterior margins of fourth coxae and genital area. Capitulum with moderately long anchoral process. Excretory pore in posteroventral position and fused with genital plate posterior margin.

Shape and chaetotaxy of pedipalp as in Fig. 15: P-1 short, with single dorsodistal seta; P-2 strong expanded (L/H ratio 1.09), with slightly convex ventral margin, two proximal and three thick subequal dorsodistal setae; P-3 short (L/H ratio 0.82), with concave ventral margin, two short, thick dorsal setae and single thin seta; P-4 comparatively thin slender (L/H ratio 2.72), slightly tapering distinctly, longer than P-2 (P-2/P-4 ratio 0.8), with two unequal distoventral setae, two thin



Figs. 15–17. *Feltria rubrella* sp.n., male: 15—pedipalp; 16—III-Leg-4–6, 17—leg claw. Scale bars: 15–16=50 μm, 17=25 μm..

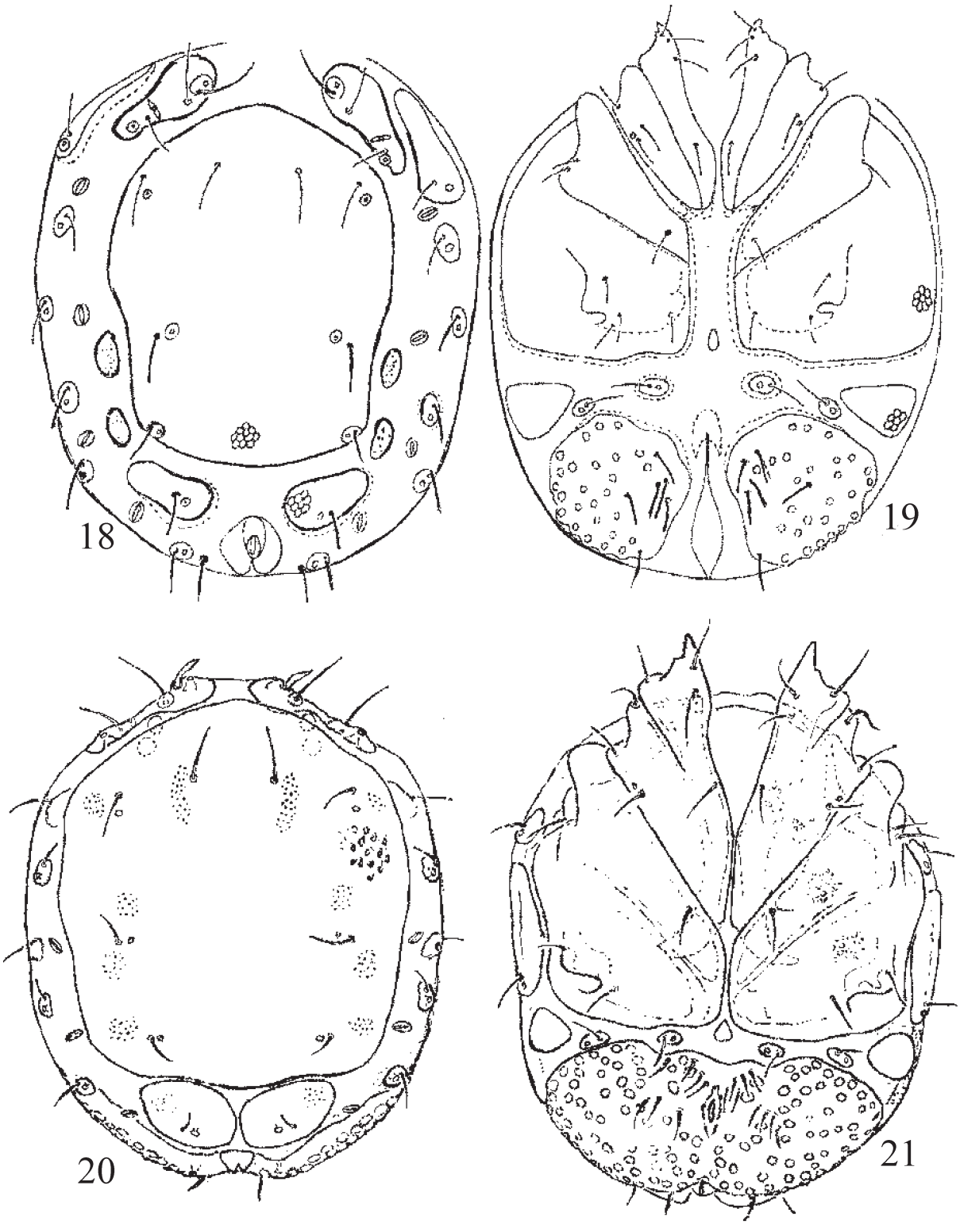
dorsal ones, mediodistal seta thin and short; P-5 and P-3 subequal in length, with three pointed distal spines.

III-Leg-6 without ventrolateral projection (Fig. 16). First four segments of all legs with mainly thick setae, terminal segments (especially tarsi) with several thin setae. Leg claws with three clawlets: median clawlet largest, internal clawlet thicker and longer than external one (Fig. 17).

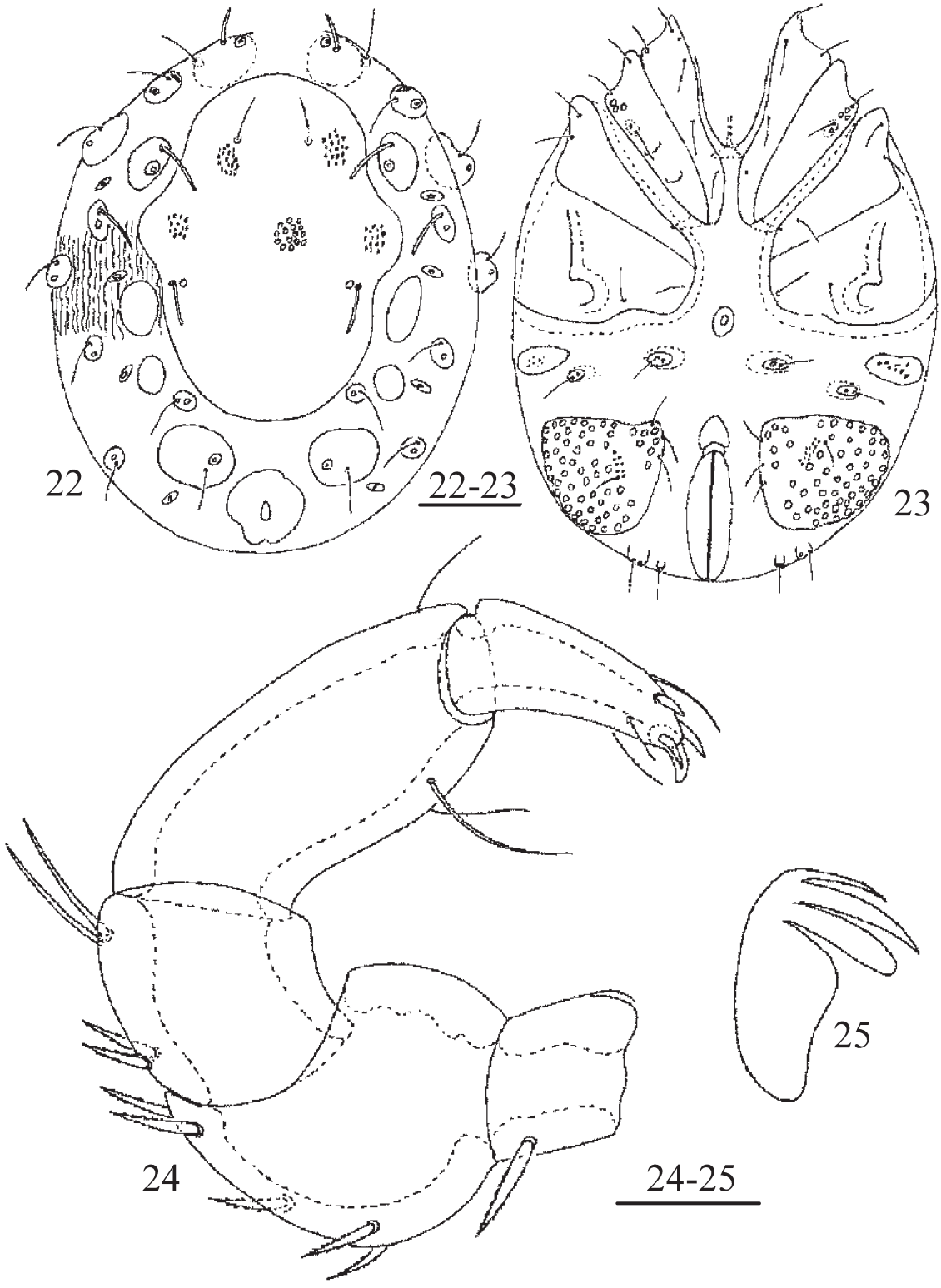
Measurements (n=1). Idiosoma L 415, idiosoma dorsal surface L 370, W 410; distance between setae *Fch–Fch* L 120; dorsal shield L 318, W 305; capitulum L 150; cheliceral segments: base L 90, chela L 30; pedipalp segments (P-1–5) L/H: 24/30, 72/66, 42/51, 90/33, 40/20; leg segments L: I-Leg-1–6: 42, 48, 48, 72, 72, 75; II-Leg-1–6: 42, 48, 48, 70,84, 80; III-Leg-1–6: 48, 42, 54, 80,108, 85; IV-Leg-1–6: 75, 55, 65, 95, 108, 95.

Female. Unknown.

Differential diagnosis. The new species is closely related to *Feltria rubra* Piersig, 1898, from which it is distinguishable by the structure of the dorsum and venter. The males of *F. rubra* are characterized by the following features: idiosoma and dorsal shield (Fig. 20) distinctly longer than wide, L/W ratio 1.31–1.43 and 1.10–1.28, respectively (Gerecke 2012, Pesic and Panesar 2008); posterodorsal plates oval and wide (L/W ratio 0.62–0.80 in Chukotka specimens); anterior ventrolateral plate (Fig. 21) bearing seta and associated with glandularium on each side (Gerecke 2012). In contrast, the idiosoma and the dorsal shield of *F. rubrella* sp. n. (Fig. 13) are slightly longer than wide, L/W ratio 1.06 and 1.04, respectively; posterodorsal plates narrow (L/W ratio 0.4); anterior lateroventral plate without seta and associated with glandularium on each side (Fig. 14).



Figs. 18–21. *Feltria* spp.: 18–19—*F. montana,* female: 18—dorsal view, 19—ventral view; 20–21—*F. rubra*, male: 20—dorsal view; 21—ventral view; 18–19—after Tuzovsky (1988); 20–21—after Gerecke (2012).



Figs. 22–25. *Feltria amurensis*: 22—dorsal view; 23—ventral view; 24—pedipalp; 25—leg claw; 22–25—after Tuzovsky and Semenchenko (2009). Scale bars: 22–23=100 μm, 24–25=25 μm.

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