Acarina 31(2): 275–282

DESCRIPTION OF TWO NEW WATER MITE SPECIES OF THE GENUS *ATRACTIDES* KOCH, 1837 (ACARI, HYDRACHNIDIA, HYGROBATIDAE) FROM RUSSIA

Petr V. Tuzovsky

Papanin Institute for Biology of Inland Waters of the Russian Academy of Sciences, Borok, Yaroslavskaya Oblast, Russia
e-mail: tuz@ibiw.yaroslavl.ru

ABSTRACT: This paper provides an illustrated description of two water mite species of the genus *Atractides—Atractides (Atractides) arzanensis* sp.n. and *Atractides (Atractides) teneroides* sp.n.—from the running waters of Russia.

KEY WORDS: Acari, water mite, Hygrobatidae, *Atractides*, morphology, male, female

DOI: 10.21684/0132-8077-2023-31-2-275-282

INTRODUCTION

In this paper, two new water mite species of the genus *Atractides* Koch, 1837 are described. Material was sampled by V. Stolbov in the streams of the Sverdlovskaya Oblast and by N. Yavorskaya, V. Kharitonov and V. Galagan in the Arzan Stream of the Khabarovskiy Kray, using a common hand net with a 250 μm mesh size. The specimens were sorted in the field and fixed in 75% ethanol, after which they were dissected and mounted on slides in Hoyer's medium.

Idiosomal setae are named according to Tuzovsky (1987), leg setae are named according to Gerecke (2003).

The following abbreviations are used: ac. 1–3—genital acetabula; a.s.l.—above sea level; D—diameter; L—length; mL—medial length; n—number of specimens measured; P–1–5—pedipalp segments (trochanter, femur, genu, tibia and tarsus); S-1—proximal sword seta on tibia of leg I; S-2—distal sword seta on tibia of leg I; W—width; I-Leg-1–6—first leg, segments 1–6 (trochanter, basifemur, telofemur, genu, tibia and tarsus), e.g., III-Leg–4—genu of third leg; I-Leg-6: HA—basal height, HB—height in the center, HC—distal height. All measurements are given in micrometers (μm); the length of appendage segments is given as dorsal length. Type material is deposited in the collection of the Papanin Institute for Biology of Inland Waters (Borok, Russia).

SYSTEMATICS

Family **Hygrobatidae Koch, 1842**

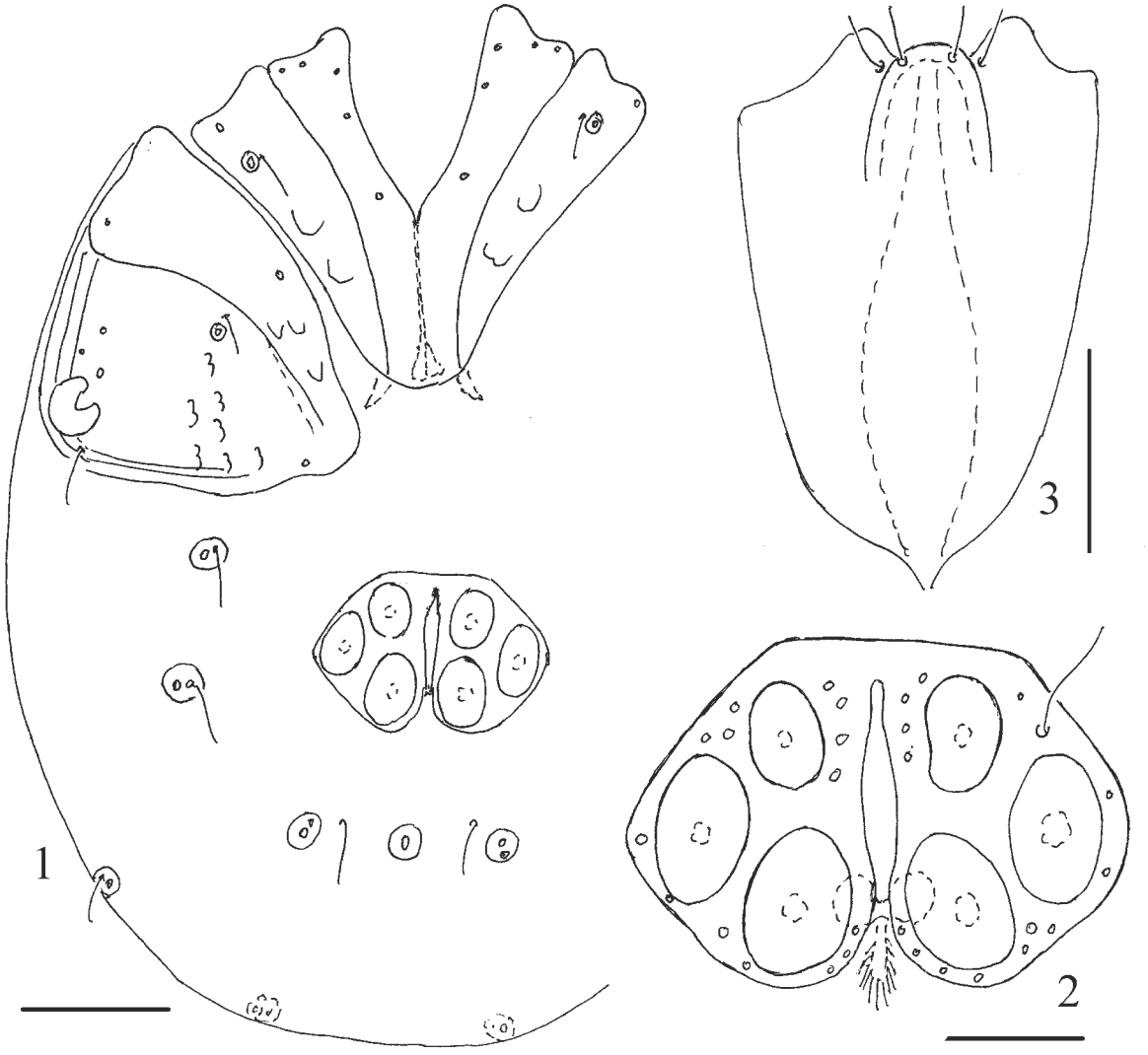
Genus ***Atractides* Koch, 1837**

***Atractides (Atractides) teneroides* sp.n.**
(Figs. 1–11)

Type material. Holotype: male, slide 9963, Russia, Sverdlovskaya Oblast, Kirovgradskiy Rayon, Visimskiy Zapovednik (Visimskiy State Natural Biosphere Reserve), 57°25′50.4″N 59°45′14.3″E, Medvezhka Stream, depth about 0.3 m, substrates: sand, stones, 16 July 2019, leg. V. Stolbov. Paratype: 1 female, same site and data as the holotype, leg. V. Stolbov.

Diagnosis. Integument finely striated recognizable in tangential view only; muscle attachment unsclerotized, coxal plates I+II ventral margin convex; apodemes of coxal plates I+II in an acute angle in relation to idiosoma midline; rostrum moderately developed, not extending beyond anterior margin; acetabula in an obtuse triangle; pedipalps with weak sexual dimorphism, P-1 thin, without seta, P-4 sword seta near level of distoventral seta; all legs without swimming setae; I-Leg-5: S-1–2 subequal in length with pointed tips; I-Leg-6 robust, weakly curved, distally thickened; excretory pore sclerotized; seta *Pi* not fused to *Ci*.

Male. Color in life unknown. Idiosoma elongate (L/W ratio 1.7), integument smooth, muscle insertions unsclerotized. Coxal plates I+II close to coxal plates III+IV at their touching edges, but not forming a coxal shield (Fig. 1). Mediocaudal margin of coxal plates I+II rather broad, slightly convex; apodemes short, directed posterolaterally. Median suture line between coxal plates I distinct, central sub–dermal projection small, not extending beyond posterior margin. Capitular bay V-shaped. Seta and glandularium *Hv* situated in posterolateral part of coxal plate II. Mediocaudal margin of coxal plates III+IV with an indentation, glandularium and seta *Pe* situated near anterior margin of coxal plate IV, posterior margin of coxal plate IV straight. Excretory pore sclerotized, setae *Pi* and *Ci* separated. Genital field sub-hexagonal, wider than long (L/W ratio 0.72), anterior margin straight,



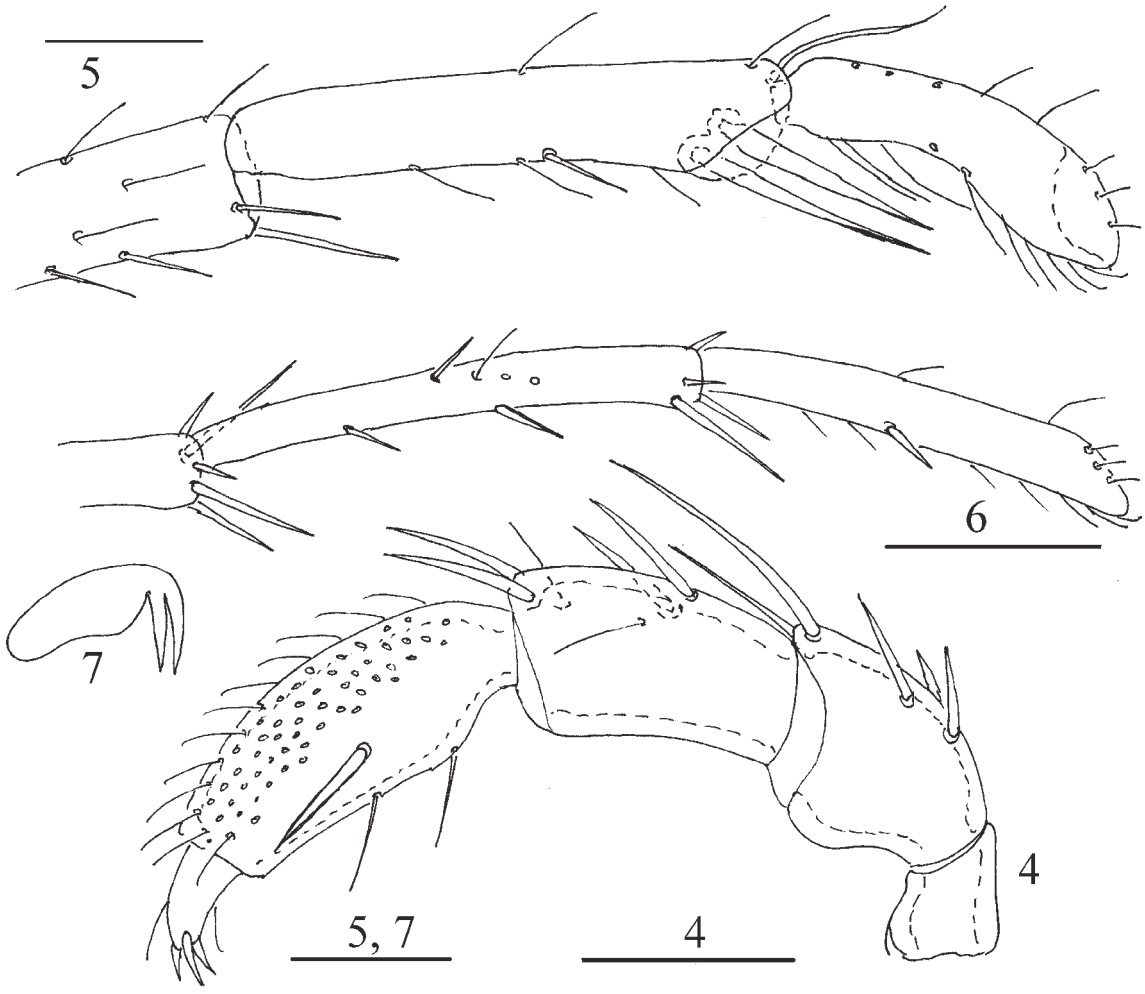
Figs. 1–3. *Atractides teneroides* sp. n., male: 1—ventral view; 2—genital plate; 3—capitulum, ventral view; Scale bars: 1—100 μm, 2–3—50 μm.

distal portions of plates not fused to each other, bearing14–15 fine setae on each side, acetabula in an obtuse triangle, ac-2–3 larger than ac-1 (Fig. 2).

Capitulum (Fig. 3) elongate, rostrum well developed but not reaching anterior edge of capitulum. Pedipalp (Fig. 4): P-1 short, without dorsodistal seta; P-2 short, longer than high (L/H ratio 1.42), ventral margin with distoventral protrusion, bearing three unequal proximal (one short and two relatively long ones) and two long unequal dorsodistal setae; P-3 slender, ventral margin slightly concave, with two dorsoproximal, two subequal dorsodistal thick setae and two to three fine ones; P-4 a little expanded near ventroproximal seta, sword seta rather long and located near level of distoventral seta, bases of ventral setae divide tibia into three sectors (1:1:2), dorsal setae numerous.

I-Leg-5: both sword setae (S-1-2) pointed and subequal in length, I-Leg-6 robust, weakly curved, a little thickened distally (Fig. 5). Posterior legs, in particular legs IV, very slender with a few setae on each segment (Fig. 6); leg claws with two pointed subequal denticles, lamella with slightly concave ventral margin (Fig. 7).

Measurements (n=1). Idiosoma L 910, W 540; coxal plates I–IV L 335, W 510, mL 125; genital plate L 112, W 155; genital acetabula (ac. 1–3) L/W: 36–42/30, 48/33, 48/36; glandularia D: 30–37; pedipalp total L 276, L/H, L/H ratio: P-1, 30/24, 1.25; P-2, 60/42, 1.42; P-3, 72/36, 2.0; P-4, 90/30, 3.0; P-5, 24/12, 2.0; leg segments, L: I–Leg-1-6: 50, 75, 100, 150, 160, 110; II–Leg-1–6: 50, 62, 87, 125, 125, 125; III-Leg-1–6: 50, 60, 87, 150, 170, 135; IV-Leg-1–6: 125, 100, 155, 200, 210, 185;



Figs. 4–7. *Atractides teneroides* sp.n., male: 4—pedipalp; 5—I-Leg-4–6; 6—IV-Leg-4–6; 7—leg claw. Scale bars: 4, 5, 7—50 μm, 6—100 μm.

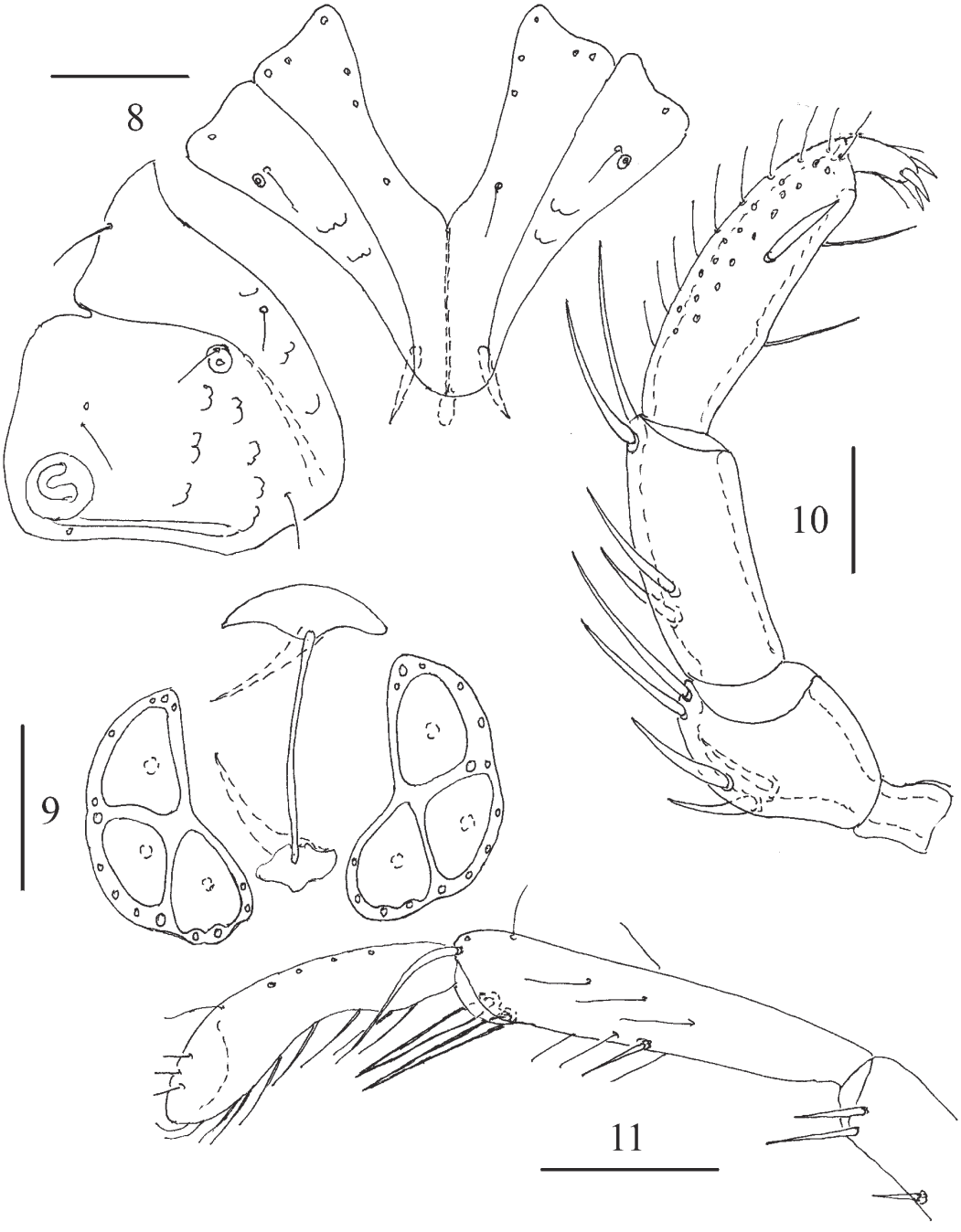
I-Leg-6: HA=27, HB=24, HC=30; I-Leg-6, distance between S-1 and S-2 4–6; S-1 L/W, L/W ratio 66/9, 7.33; S-2 L/W, L/W ratio 63/10.8, 5.83.

Female. Posteromedial margin of coxal plates I+II convex, apodemes of coxal plates I+II rather long, narrow in an acute angle in relation to idiosoma midline, central sub-dermal projection clearly extending beyond to posterior margin (Fig. 8). Genital plates relatively broad (L/W ratio 2.2), a little longer than gonopore, with 14–15 fine setae on each side, acetabula subequal in length (Fig. 9). Anterior genital sclerite considerably wider than posterior one.

Pedipalp (Fig. 10) slender: P-1 without seta; P-2 narrowed proximally and expanded distally (L/H ratio 1.38), with weakly convex ventral margin, bearing three unequal proximal (one short and two long ones), and two unequal dorsodistal setae; P-3 slender, ventral margin slightly concave with two dorsoproximal and two dorsodistal thick setae; P-4 longer than P-3, with almost straight ventral margin, sword seta located near to distoventral seta, bases of ventral setae divide tibia into three sectors (2:2:1), with a few short dorsal setae.

I-Leg-5 both sword setae (S-1–2) pointed and subequal in length, I-Leg-6 robust, weakly curved, distally thickened (Fig. 11).

Measurements (n=1). Idiosoma L 875, W 700; coxal plates I-IV L 385, W 625, mL 112; genital plate L 112, W 62; genital acetabula (ac. 1–3) L/W: 60/36, 60/36, 54/36; glandularia D: 30–45; pedipalp total L 369, L/H, L/H ratio: P-1, 42/36, 1.4; P-2, 75/54, 1.38; P-3, 102/42, 2.4; P-4, 120/30, 4.0; P-5, 30/18, 1.66; leg segments, L: I-Leg-1–6: 62, 85, 135, 212, 225, 150; II-Leg-1–6: 70, 85, 125, 175, 175, 160; III-Leg-1–6: 75, 85, 137, 200, 212, 200; IV-Leg-1–6: 145, 130, 225, 275, 280, 225; I-Leg-6: HA=31, HB=28, HC=37; I-Leg-6, dis-



Figs. 8–11. *Atractides teneroides* sp.n., female: 8—coxal plates; 9—genital field; 10—pedipalp, ventral view; 11—I-Leg-4–6. Scale bars: 8, 9, 11—100 μm, 10—50 μm.

tance between S-1 and S-2 9.6; S-1 L/W, L/W ratio 96/9.6, 10.0; S-2 L/W, L/W ratio 86/11.8, 7.7.

Differential diagnosis. The present species is closely related to *Atractides tener* Thor, 1899. The new species differs from *A. tener* in the following characters (character states of male *A. tener* are indicated in parenthesis, data from Gerecke 2003, Gerecke *et al.* 2016): *Both sexes:* I-Leg-5 both sword setae pointed, Figs. 5, 11 (vs. S-1 with rounded tip, Fig. 19); *Male:* the genital plate sub-hexagonal with straight anterior margin, distal portions of plates not fused to each other, bearing 14–15 fine setae on each side, Fig. 4 (vs. transverse-oval, distal portions of plates fused to each other, bearing 19–22 setae in European specimen, Fig. 20, and 24–27 setae on each side in Asian specimen, Fig. 21); I-Leg-5: S-1 and S-2 relatively short, 63–66 and 60—66, respectively (vs.

rather long, 78 and 76, respectively). *Female*: P-2 ventral margin convex (vs. straight), P-4 ventral margin sectors 2:2:1 (vs. 1:1:1), acetabula relatively large L 60, 60, 54 (vs. comparatively small L 42, 48, 45), apodemes of coxal plates I+II straight and almost parallel to the median line (vs. curved, forming 45°-90° angle with the medial line).

Etymology. The species is named *teneroides* because it has many characters in common with the species *Atractides tener.*

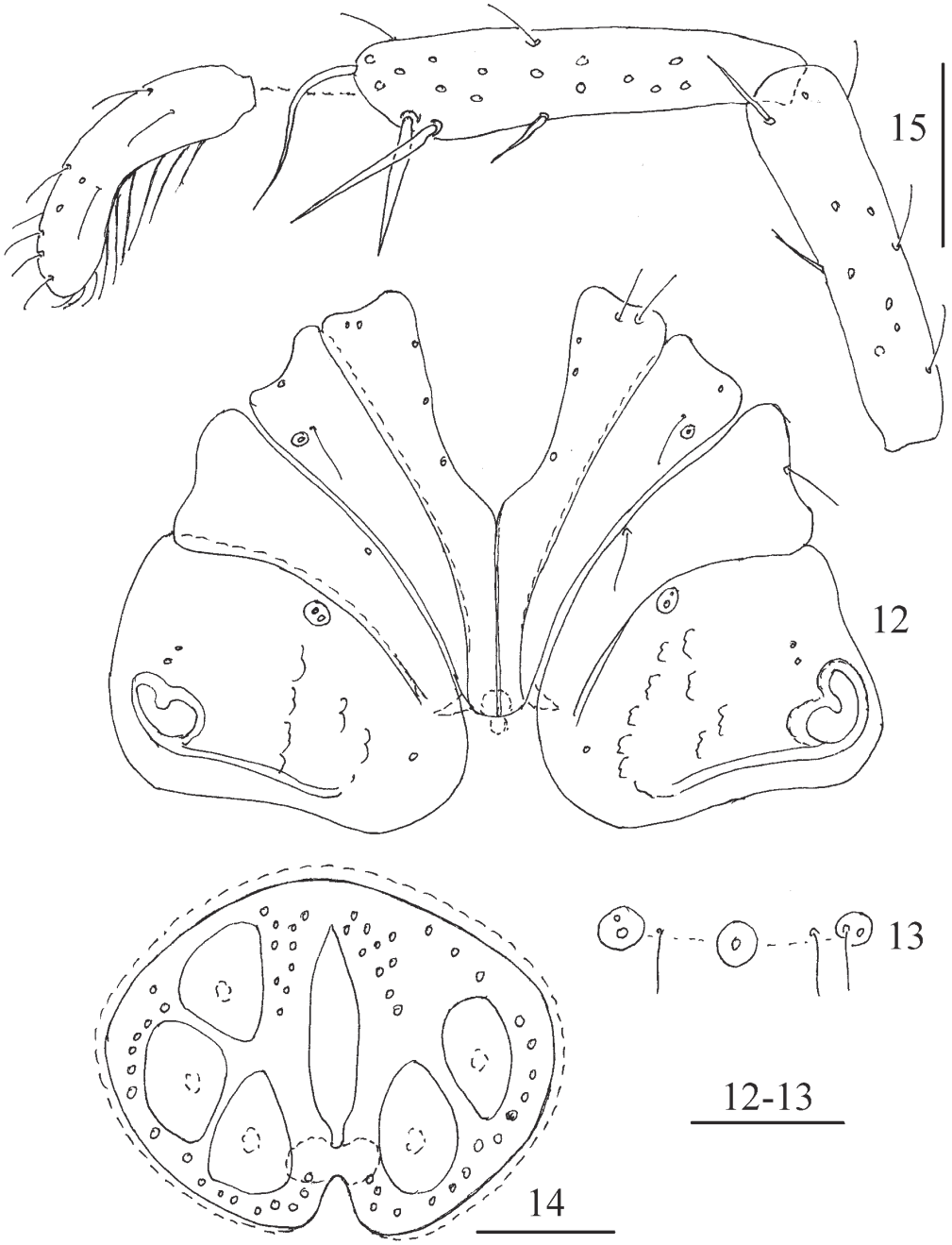
Habitat. Running waters.

Distribution. Russia, Sverdlovskaya Oblast.

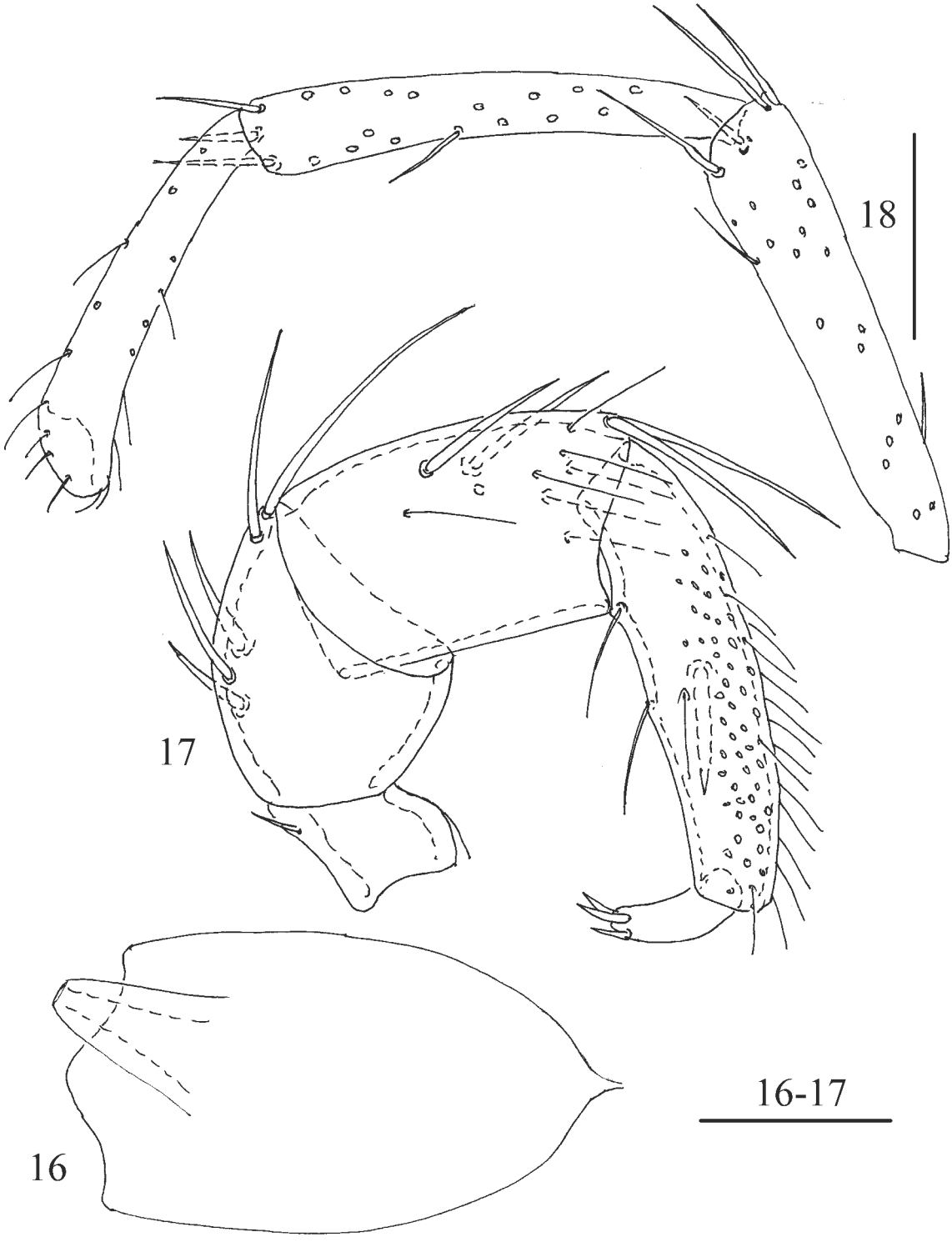
Atractides (Atractides) arzanensis sp. n.

(Figs. 12–18)

Type material. Holotype: male, slide 9553, Asia, Russia, Khabarovskiy Krai, the Amur River Basin, the Arzan Stream, 19 October 2006, leg. N. M. Yavorskaya, V. V. Kharitonov and V. A. Galagan.



Figs. 12–15. *Atractides arzanensis* sp. n., male: 12—coxal plates; 13—excretory pore, seta *Pi* and *Ci*; 14—genital plate; 15—I-Leg-4–6. Scale bars: 12–13, 15—100 μm, 14—50 μm.



Figs. 16–18. *Atractides arzanensis* sp.n., male: 16—capitulum, ventral view;17—pedipalp; 18—IV-Leg-4–6. Scale bars: 16–17—100 µm, 18—50 µm.

Diagnosis. Integument smooth; muscle attachment unsclerotized, coxal plates I+II close to coxal plate III+IV but not forming a coxal shield; capitulum: rostrum long and a little extending beyond anterior margin; genital field wider than long, all genital acetabula subequal in size; P-2 slightly convex, without ventrodistal projections or protrusion; with five thick unequal dorsal setae; P-4 sword seta near level of distoventral seta; ventral margin sectors 1:1:2; I-Leg-5: L/H ratio 4.25,

S-1–2 pointed, separation short, 10; I-Leg-6 short, thick, slightly curved; excretory pore sclerotized.

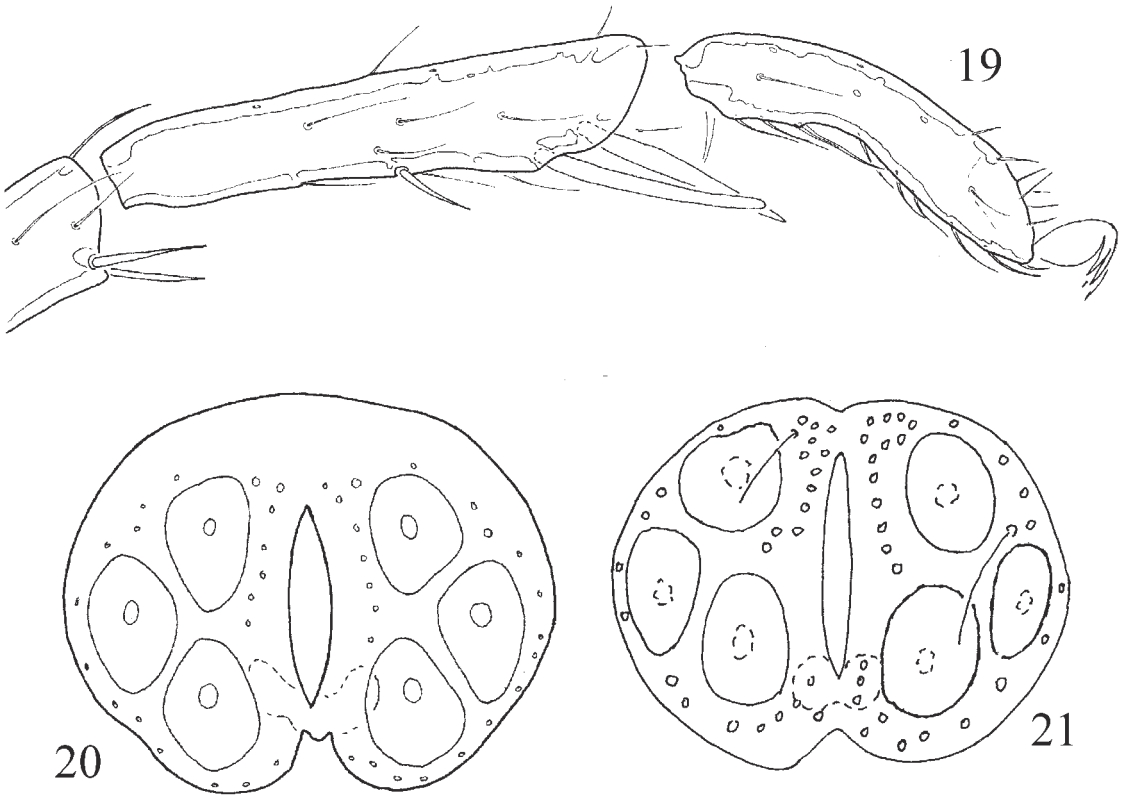
Description. *Male.* Color in life unknown. Idiosoma oval, integument smooth. Posteromedial margin of coxal plates I+II rounded, with two short apodemes directed laterally; median suture line between coxal plates I distinct; central sub–dermal projection small and a little extending beyond to posterior margin of coxal plates I+II (Fig. 12). Seta and glandularium *Hv* situated in posterolateral part of coxal plate II. Medial margin of coxal plates III+IV rounded, base and glandularium of seta *Pe* situated near middle of anterior margin of coxal plate IV, posterior margin of coxal plates IV slightly concave. Setae *Pi* and *Ci* separated, excretory pore sclerotized (Fig. 13). Genital field wider than long (L/W ratio 0.8), anterior margin convex, posterior margin indented, bearing 27 fine setae on each side, acetabula moderately developed in an obtuse triangle and subequal in size (Fig. 3).

Capitulum (Fig. 16) elongate, rostrum long, conic and a little extending beyond anterior edge of capitulum.

Pedipalp (Fig. 17): P-1 short, with a single dorsodistal seta; P-2 ventral margin slightly convex, with three short subequal proximal and two long unequal dorsal setae; both distal setae longer than proximal ones; P-3 longer than P-2, ventral margin straight, with two relatively short proximal and two long distal thick setae and several thin ones; P-4 slender a little thickened near ventroproximal seta, bases of ventral setae divide tibia into three sectors 1:1:2, sword seta near level of distoventral seta; dorsal setae numerous, located in central and distal parts of segment.

All legs without swimming setae. I-Leg-5 sword setae close together, with pointed tips, S-2 a little shorter and wider than S-1 (Fig. 15). I–Leg-6 much shorter than I-Leg-5 (L I-Leg-5/6 ratio 1.54), thick, slightly curved, proximally slightly thickened, from the center to claw furrow with almost parallel dorsal and ventral margins. Posterior legs, in particular legs IV, very slender with a few setae on each segment (Fig. 18).

Measurements (n=1). Idiosoma L 600; coxal plates I+IV L 365, W 510; coxal I mL 160; genital plate L 125, W155; genital acetabula L/W (ac. 1–3): 36/30, 42/30, 48/30; pedipalp total L 306; L/H, L/H ratio: P-1, 30/30, 1.0; P-2, 65/57, 1.15; P-3, 78/51, 1.5; P-4, 105/ 30, 3.5; P-5, 27/15, 1.8; P-4 sword



Figs. 19–21. *Atractides tener*: 19—I-Leg-4–6; 20–21—genital field; 19–20—from Gerecke 2003; 21—original.

seta L 35; lengths of leg segments I-Leg-1–6: 55, 90, 115, 180, 205, 130; II-Leg-1–6: 60, 70, 108, 130, 150, 145; III-Leg-1–6: 65, 787, 120, 170, 180, 160; IV-Leg-1–6: 140, 120, 180, 235, 245, 200; I-Leg-6: HA=36, HB=32, HC=34; I-Leg-5, seta S-1 L/W, L/W ratio 85/8, 10.6; S-2 L/W, L/W ratio 75/9, 8.33; distance between bases of setae S-1/2 9.

Female. Unknown.

Differential diagnosis. The present species is similar to *A. tener* and *A. teneroides* sp. n. The named species form *Atractides tener*—a group in which males are characterized by the following characters: excretory pore sclerotized; I-Leg-6 robust, weakly curved, more or less thickened distally; I-Leg-5 sword setae (S-1–2) nearly equal in length and a little modified. The difference between the named species is given in the key below.

Key to the species of the *Atractides tener*-group of Russia

Males

1. I-Leg-5 sword seta S-1 with rounded tip (Fig. 19) ..... *Atractides tener*
— I-Leg-5 both sword setae (S-1–2) with pointed tips 2
2. Rostrum relatively short, not reaching anterior margin of capitulum, Fig. 3, P-2 with ventrodistal protrusion (Fig. 4), genital plates not fused posteriorly, with 14–15 setae on each side (Fig. 2) ..... *Atractides teneroides* sp. n.
— Rostrum long and a little extending beyond anterior edge of capitulum (Fig. 16), P-2 with slightly convex ventral margin (Fig. 17), genital plates fused posteriorly, with 27 setae on each side (Fig. 14) ..... *Atractides arzanensis* sp. n.

Females

1. P-2 ventral margin convex, P-4 ventral margin sectors 2:2:1, acetabula relatively large L 60, 60, 54, apodemes of coxal plates I+II straight and almost parallel to the median line ..... *Atractides teneroides* sp. n.
— P-2 ventral margin straight, P-4 ventral margin sectors 1:1:1, acetabula relatively small L 42, 48, 45), apodemes of coxal plates curved, forming 45–90° angle with the medial line ..... *Atractides tener*

Etymology. The species is named after the Arzan Stream, in which it was collected.

Habitat. Running waters.

Distribution. Asian part of Russia, Khabarovskiy Krai.

ACKNOWLEDGEMENTS

This research was performed in the framework of state assignment № 0122-2014-0007 (Federal Agency of Scientific Organizations [FASO], Russia). The author expresses his sincere gratitude to V.A. Stolbov, N.M. Yavorskaya, V.V. Kharitonov and V.A. Galagan for collecting the material; to Dr. K. Semenchenko for the material supplied; and to the anonymous referees for reviewing the manuscript.

REFERENCES

Gerecke, R. 2003. Water mites of the genus Atractides Koch, 1837 (Acari: Parasitengona: Hygrobatidae) in the western Palaearctic region: A revision. *Zoological Journal of the Linnean Society,* 138(2–3), 141–378. https://doi.org/10.1046/j.1096-3642.06-0.00051.x

Gerecke, R., Gledhill, T., Pešić, V. and Smit, H. 2016. Chelicerata: Acari III. In: R. Gerecke (Ed.). *Süßwasserfauna von Mitteleuropa,* Bd. 7/2-3. Springer-Verlag Berlin, Heidelberg, pp. 1–429. https://dx.doi.org/10.1007/978-3-8274-2689-5

Tuzovsky, P.V. 1987. *Morfologiya i postembryonal'noe razvitie vodyanykh kleshchey* [Morphology and Postembryonic Development in Water Mites]. Nauka, Moscow, 172 pp. [In Russian]