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WATER MITES OF THE GENUS *HYDROCHOREUTES* KOCH, 1835 (ACARI: HYDRACHNIDIA, PIONIDAE) IN RUSSIA

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[Тузовский П.В. Водяные клещи рода *Hydrochoreutes* Koch, 1837 (Acari: Hydrachnidia: Pionidae) России]
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Key words: *Hydrachnidia, Pionidae, Hydrochoreutes, water mites, morphology, identification keys, male, female, Russia*

Ключевые слова: *Hydrachnidia, Pionidae, Hydrochoreutes, водяные клещи, морфология, определительные ключи, самец, самка, Россия*

Summary: The study presents a detailed taxonomic review of water mites of the genus *Hydrochoreutes* Koch, 1837 (Pionidae) found in the fauna of Russia during the long-term survey period of 1970-2008. The review includes illustrations and (re)descriptions of males and females of 8 species: *Hydrochoreutes krameri* Piersig, 1895, *H. ungulatus* (Koch, 1836), *H. virens* Tuzovskij, 1977, *H. magadanicus* Tuzovskij, 1990, *H. wolgaensis* Tuzovskij, 2001, *H. cooki* Tuzovskij, 2003, *H. orientalis* Tuzovskij, 2003, and *H. similis* Tuzovskij, 2003. Diagnostic keys to the adult males and females of all species are supplied.

Резюме: Дан детальный таксономический обзор водяных клещей рода *Hydrochoreutes* Koch, 1837 (Pionidae), найденных в России в течение длительного периода (1970-2008 гг.). Обзор включает иллюстрированное (пере)описание самцов и самок 8 видов, найденных в России: *Hydrochoreutes krameri* Piersig, 1895, *H. ungulatus* (Koch, 1836), *H. virens* Tuzovskij, 1977, *H. magadanicus* Tuzovskij, 1990, *H. wolgaensis* Tuzovskij, 2001, *H. cooki* Tuzovskij, 2003, *H. orientalis* Tuzovskij, 2003 и *H. similis* Tuzovskij, 2003. Предложены определительные ключи для самцов и самок.

INTRODUCTION

Water mites of the genus *Hydrochoreutes* are associated with fresh-water biotopes. Like other members of the Hydrachnidia, the life cycle of water mites typically includes egg, three active stages (six-legged larva, eight-legged sexually undifferentiated deutonymph, and eight-legged sexually differentiated adult), and three inactive resting stages (prelarva, protonymph and tritonymph). The resting stages are strongly reduced and represented only by integument; they do not have organs except for provisional ones. Larvae differ greatly from other active stages in ecology and morphology. Larvae of the genus *Hydrochoreutes* are known to parasitize the abdominal region of imagos of Chironomidae from the subfamilies Orthocladiinae and Chironominae [Smith and Oliver 1976, 1986]. Deutonymphs and adults are free–living predators that feed on various small invertebrates. Adults and deutonymphs are well adapted for subaquatic life, but most larvae have adaptations for aerial existence.

The world fauna of water mites of the genus *Hydrogchoreutes* Koch, 1837 currently includes 13 species. Five species of this genus, *H. intermedius* Cook, 1956*, H. minor* Cook, 1970*, H. michiganensis* Cook, 1970*, H. microporus* Cook, 1970 and *H. schizopetiolatu*s Cook, 1970 are known from northern America [Cook 1956, 1970]. Two species of *Hydrochoreutes* have been known from Europe and Russia since the 19th century, namely *H. ungulatus* (Koch, 1836) and *H. krameri* Piersig, 1895. Six other species, *H. virens* Tuzovskij, 1977, *H. magadanicus* Tuzovskij, 1990, *H. wolgaensis* Tuzovskij, 2001, *H. cooki* Tuzovskij, 2003, *H. orientalis* Tuzovskij, 2003 and *H. similis* Tuzovskij, 2003 [Tuzovskij, 1977, 1990, 2001, 2003; respectively], have hitherto been reported from Russia.

Morphology of *Hydrogchoreutes* larvae has been described for the following taxa: *H. krameri* Piersig [Piersig 1895, 1897–1900; Tuzovskij, 2005], *H. ungulatus* (Koch) [Piersig 1895, 1897–1900], *H. minor* Cook [Prasad and Cook ,1972]; *H. microporus* Cook [Prasad and Cook 1972; Smith, 1976]; *H. michiganensis* Cook [Smith, 1976], *H. wolgaensis* Tuzovskij [Tuzovskij, 2001], *H. cooki* Tuzovskij [Tuzovskij, 2003], H. *orientalis* Tuzovskij [Tuzovskij, 2003] and *H. similis* Tuzovskij [Tuzovskij, 2003]. The key to larvae of *Hydrochoreutes* species inhabited Russia is given in [Tuzovskij, 2005] .

Information on the morphology of deutonymphs has been published for a few species: *H. krameri* Piersig [Piersig 1895, 1897–1900; Tuzovskij, 1990], *H. ungulatus* (Koch) [Piersig 1895, 1897–1900]; *H. magadanicus* (Tuzovskij, 1990) and *H. wolgaensis* [Tuzovskij, 2001].

The identification of adult mites of the genus *Hydrochoreutes*, especially for females, is very difficult.

The aim of the paper is to study the morphology of adults of the genus *Hydrochoreutes* collected in Russia and to give an identification keys for the males and females.

MATERIAL AND METHODS

Most materials used in the present study were collected by the author in the European and Asian parts of Russia within 1970–2008. Besides, the collections of water mites deposited in the Institute for Biology of Inland Waters of Russian Academy of Science (Borok, Yaroslavl Province) were investigated. Some important comparative materials were loaned from the private collection of Dr. Henk van der Hammen (The Netherlands) and Dr. Andrew Przhiboro (Russia). Specimens collected by P. Tuzovskij were not fixed in Koenike liquid, but slides were made from the fresh material. Most specimens were not dissected, thus preserving the natural shape of body. For several females and males the gnathosoma was mounted in a position that allowed investigating pedipalps in lateral view. Specimens collected by H. van der Hammen and A. Przhiboro were dissected. All mite specimens were mounted in Hoyer's medium.

Some idiosomal ventral setae are named according to Tuzovskij [1987]: *Hv* – humerales ventralia, *Pe* – praeanales externae. Furthermore, the following abbreviations are used: P–1–5, pedipalp segments (trochanter, femur, genu, tibia and tarsus); I–Leg–1–6, first leg, segments 1–6 (trochanter, basifemur, telofemur, genu, tibia and tarsus) i.e. III–Leg–4 = genu of third leg; L, length; W, width; n = number of specimens measured. The length of appendage segments was measured along their dorsal side, all measurements are given in μm.

Specimen depositories and reference to accession numbers are given using the following abbreviation: IBIW - the Institute of Biology for Inland Waters of the Russian Academies of Science (Borok, Yaroslavl Province, Russia).

SYSTEMATIC PART

Family Pionidae

Genus *Hydrochoreutes* Koch, 1837

Type: *Spio ungulata* Koch, 1837. Designated by Wolcott [1905].

Diagnosis. Adults. Idiosoma soft; posterior apodemes of first coxal group short, suture line between third and fourth coxal plates oriented at right angles to the long axis of the idiosoma; medial margin of fourth coxae well developed, coxal groups of males separated or variously fused with one another such that the posterior groups are fused medially or all groups are fused medially to form a single coxal shield; coxal groups of females separated; coxal plates IV of males separate from the acetabular plates; posterior margin of coxa IV oblique, posterolaterally directed, forming an acute or right angle with the lateral margin; openings for insertion of fourth legs with large ventral condyles; three pairs of genital acetabula present, these on narrow separate acetabular plates in females and fused to each other in males; males with a three-parted petiole located immediately posterior to the acetabular plates. Gnathosoma bearing anchoral processes; palpal segments long and slender, P–4 with several or numerous heavy setae. Legs very long and their segments comparatively very slender, III–leg–4 of male showing a very characteristic sexual dimorphism.

Nymph. See Piersig [1897–1900], Tuzovskij [1990, 2001].

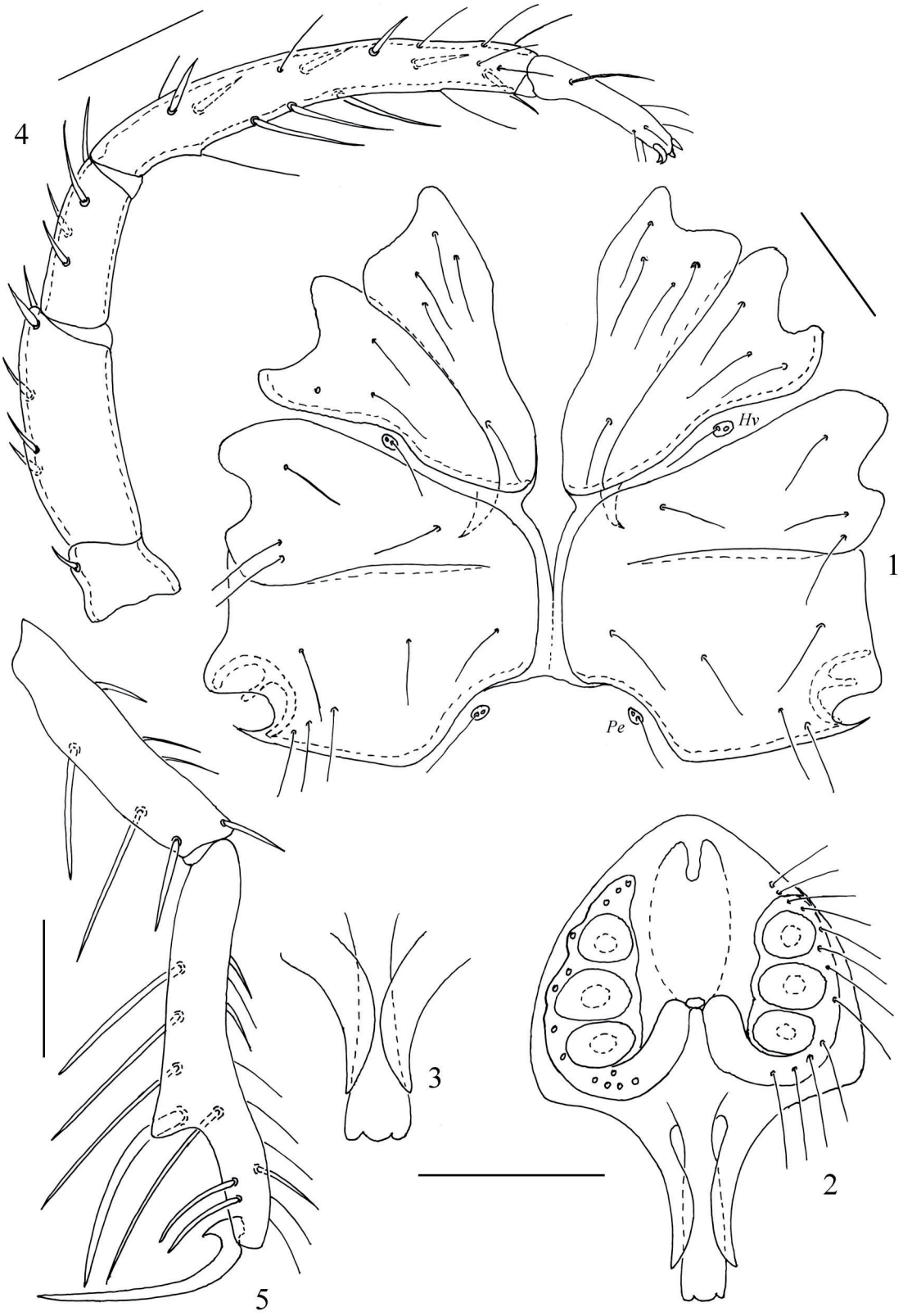
Larva. See Prasad and Cook [1972], Wainstein [1980], Smith [1974], Tuzovskij [2001, 2003, 2005].

Hydrochoreutes ungulatus (Koch, 1836)

(Figs. 1–12)

Material examined. Three females, Russia, Karelia, Krivoe Lake, 21 August 1996, leg. A. Przhiboro; five males and four females, the Netherlands, leg. Henk van der Hammen.

Male. Posteromedial margins of coxal plates I and II fused with anteromedial margins of coxal plates III for about 1/3 of their width. Medial margins of coxal plates IV fused in posterior half (Fig. 1). Apodemes of anterior coxal groups moderate in size. Suture lines between coxal plates III and IV incomplete medially. Medial margins of coxal plates III only half as long as those of coxal plates IV. Posterolateral margins of coxal plates IV oriented slightly obliquely against suture lines between coxal plates III and IV. Genital acetabula grouped close together on acetabular plates bearing 17–25 pairs of slender setae (Fig. 2). Central piece of petiole extending beyond the posterior ends of lateral pieces; trifurcate distally with middle tooth relatively wide and rounded and lateral teeth narrow and slightly rounded (Figs. 2–3). Pedipalps (Fig. 4) with P–2 relatively large and with ventral margin straight or slightly concave; P–4 bearing 8–9 thick setae and several slender setae, and with anterior ventral slender seta on a tiny tubercle and posterior ventral slender seta removed from distal end of segment; P–5 with ventral margin straight, bearing proximal solenidion, 4 thick and 5 thin setae in distal third of segment. Leg III with genu with well developed projections ventrally and distally, each bearing a long, thick blade-like seta which are subequal in length (Fig. 5), and with 2 curved distolateral setae of about equal length and thickness which are half as long as blade-like setae, and 4 long, thick ventral setae of which 3 are located near midlength of seg-



Figs. 1–5. *Hydrochoreutes ungulatus* (Koch, 1836), male: 1 – coxal shield, ventral view; 2 – external genital organ and petiole; 3 – petiole, ventral view; 4 – pedipalp, lateral view; 5 – telofemur and genu of leg III. Scale bars: 100 μm.

Рис. 1–5. *Hydrochoreutes ungulatus* (Koch, 1836), самец: 1 – коксальный щит, вентральная сторона; 2 – наружный генитальный орган и петиолус; 3 – петиолус, вентральная сторона; 4 – педипальпа, боковая сторона; 5 – телофемур и колено ноги III. Шкалы: 100 μm.

ment and other is located near ventral blade-like seta. Long, slender swimming setae distributed as follows: 4–5 on III–Leg–5, 3–4 on IV–Leg–4 and 5–6 on IV–Leg–5.

Measurements (n=5). L of idiosoma 490–540; L of cheliceral segments: base 120–140, claw 25–30; dorsal L of pedipalp segments (P–1–5): 35–50, 130–145, 95–105, 250–270, 80–90; lengths of legs segments: I–Leg–1–6: 80–90, 160–195, 200–220, 300–320, 340–350, 390–400; II–Leg–1–6: 90–100, 185–195, 200–210, 300–320, 350–365, 425–450; III–Leg–1–6: 115–120, 185–215, 195–210, 310–325, 385–405, 440–455; IV–Leg–1–6: 120–130, 160–180, 235–245, 360–385, 415–430, 425–450.

Female. Apodemes of anterior coxal group moderate in size (Fig. 6). Medial margins of coxal plates IV 2.5–3.0 times as long as medial margins of coxal plates III. Posteromedial angles of coxal plates IV acutely angled forming well developed genital bay. Acetabular plates (Fig. 7–8) slightly curved, strongly tapered anteriorly and with small protrusion posteriorly, bearing 15–25 slender setae evenly distributed on plates and with genital acetabula arranged in an arc, all acetabula more or less subequal in size and usually separated by short interspace. Pregenital sclerite small and transverse, postgenital sclerite large and elongate. Excretory pore partially surrounded by anterior and posterior curved sclerites, anterior and posterior sclerites small and subequal in size (Fig. 9–10) or posterior sclerite slightly larger than anterior one (Fig. 11). Pedipalps (Fig. 12) similar to those of males but longer; P–4 bearing 15–18 thick setae and several slender setae. Long, slender swimming setae distributed as follows: 3–4 on III–Leg–4 and, 4–5 on III–Leg–5 and IV–Leg–4 and 6–7 on IV–Leg–5.

Measurements, n=7. L of idiosoma 815–1750; L of acetabular plates 170–250, W of acetabular plates 45–75; L of cheliceral segments: base 180–240, claw 65–90; dorsal L of pedipalp segments (P–1–5): 65–90, 245–290, 195–250, 530–635, 145–205; L of leg segments: I–Leg–1–6: 130–150, 285–300, 405–540, 570–725, 570–725, 430–625; II–Leg–1–6: 140–165, 300–320, 400–525, 585–740, 585–725, 470–575; III–Leg–1–6: 145–190, 285–385, 360–475, 530–650, 595–725, 465–700; IV–Leg–1–6: 185–250, 275–310, 415–525, 595–715, 610–750, 455–575.

Deutonymph. See Piersig [1895, 1897-1900].

Larva. See Piersig [1895, 1897-1900].

Habitat. Aquatic vegetation in lakes, ponds, rivers and streams.

Distribution. Europe, Asia, North Africa (Algeria) [Viets, 1936, 1956; Sokolow, 1940; Lundblad, 1968; K.O. Viets, 1978, 1987].

Remark. Marshall [1937] reported this species from USA, however I have seen no specimens from North America which can be assigned to the species and the illustrations in the cited Marshall's paper are definitely not those of *H. ungulatus* (Cook, 1970).

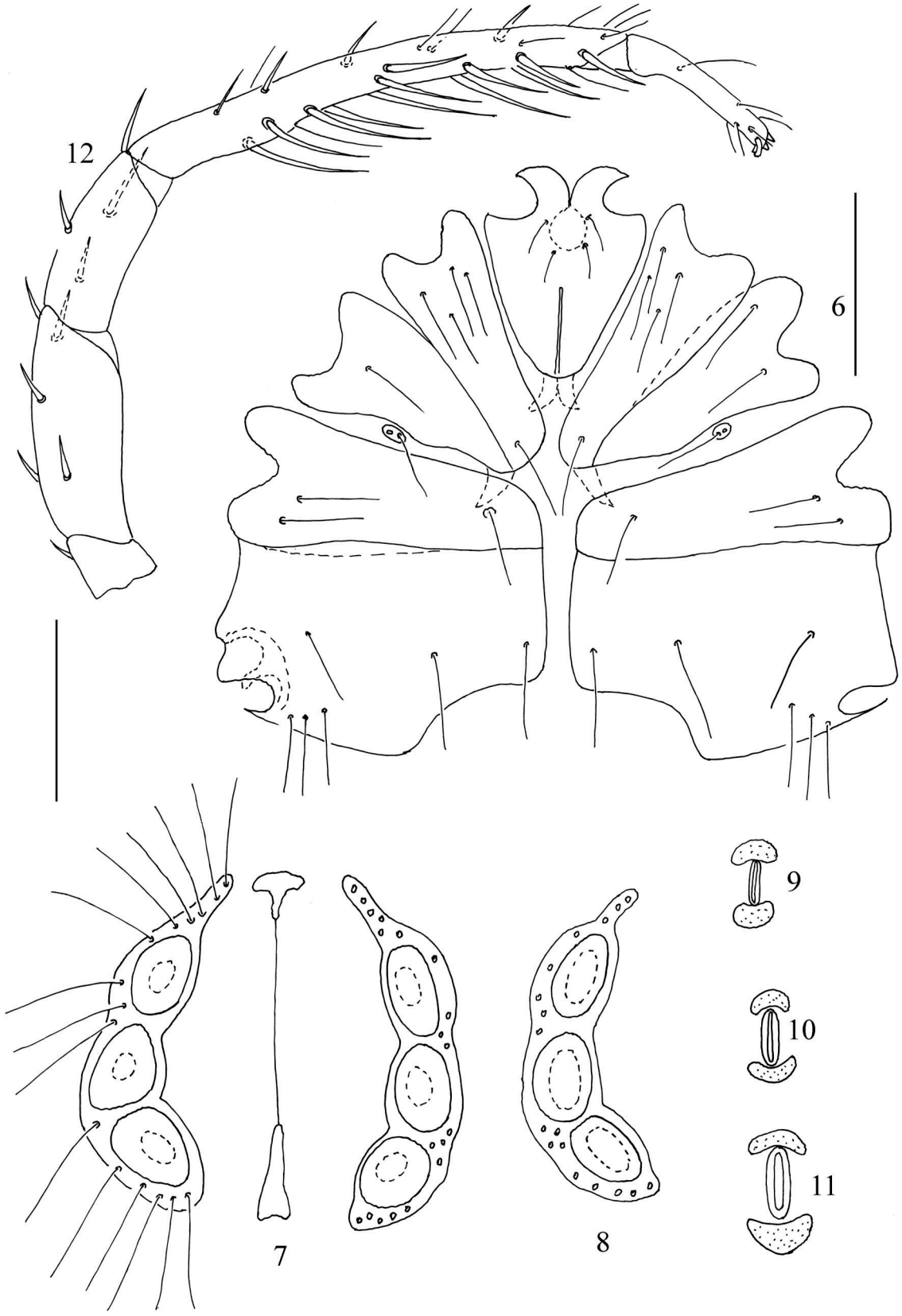
Hydrochoreutes krameri Piersig, 1895
(Figs. 13–22)

Material examined. Four males and five females: Russia, Samara Province, National Natural Park "Samara Luka", small lake near village Koltsovo, May 1992; three males and three females: Yaroslavl Province, Nekouz District, litoral zone with macrophytes of Rybinsk reservoir near settlement Borok, May–June 1977, leg. P.V. Tuzovskij.

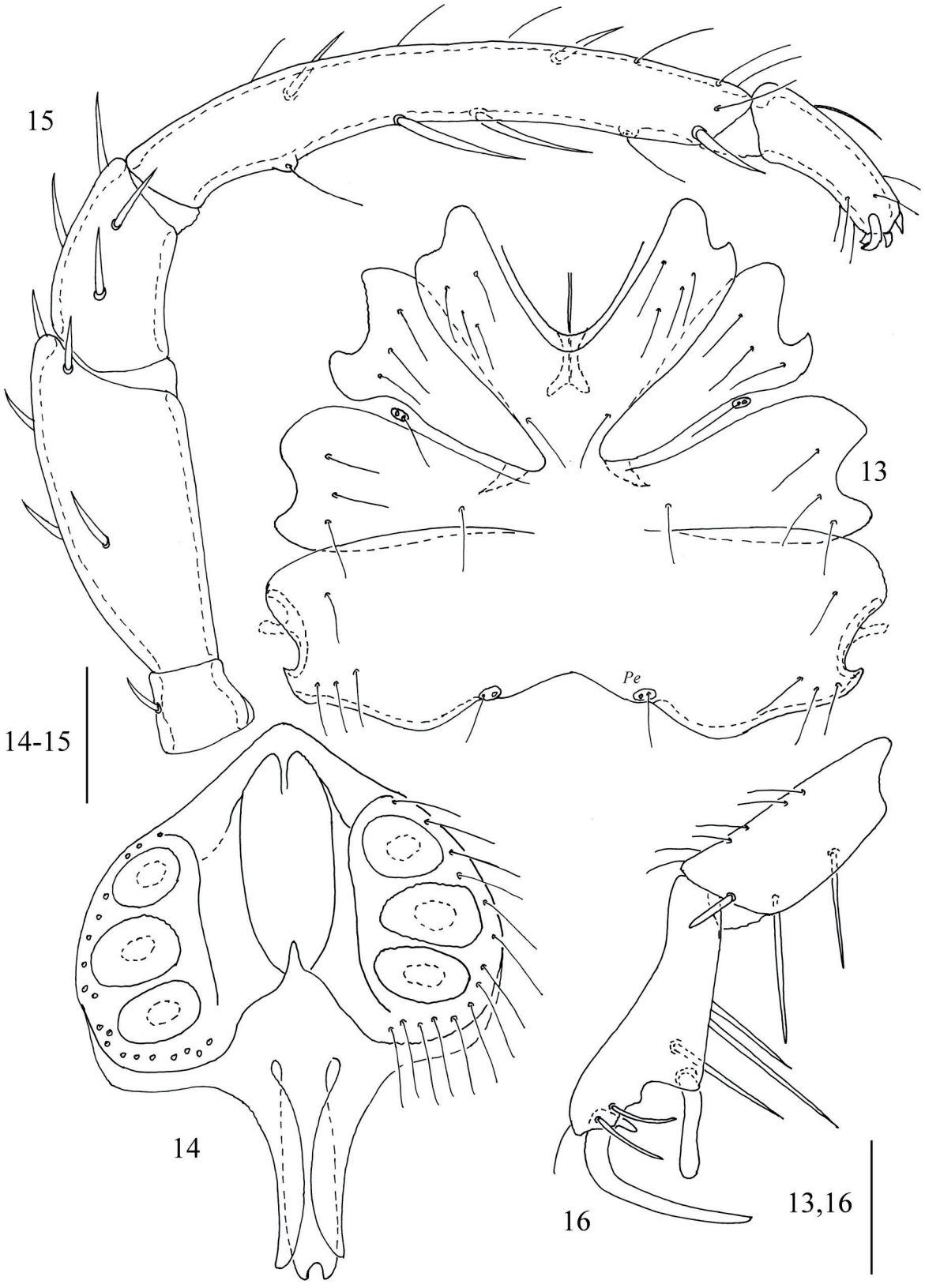
Male. All coxal plates fused together medially and coxal plates II and III slightly separated laterally (Fig. 13). Capitular bay rounded posteriorly. Apodemes of anterior coxal groups short and slender. Suture lines between coxal plates III and IV transverse and obliterated medially. Genital bay wide and shallow. Setae *Pe* placed on coxal plates IV posteriorly. Genital field (Fig. 14) with genital acetabula arranged in an arc and relatively large; middle and posterior acetabula larger than anterior one; acetabular plates each bearing 14–20 slender setae. Central piece of petiole slightly longer than lateral pieces and bifurcate distally with small distomedial incision. Pedipalps (Fig. 15) with P–2 with ventral margin straight; P–4 bearing 4–7 thick setae, with ventral setae borne on small tubercles and with posterior slender seta well spaced from distal end of segment; P–5 bearing 4 short thick setae distally and 5 slender setae, and a solenidion proximally. Leg III with telofemur (Fig. 16) bearing 3 thick setae, including 1 short distolateral seta, 2 long unequal ventral setae and several short, thin dorsal setae; III–Leg–4 with well developed projections ventrally and distally, each bearing a large, thick seta, dorsal setae pointed and considerably longer than ventral one, the latter slightly S–shaped and with rounded tip. Long, slender swimming setae distributed as follows: 4–5 on III–Leg–5 and IV–Leg–5, and 3–4 on IV–Leg–4.

Measurements (n=10). L of idiosoma 455–490; L of coxal plates 350; L of cheliceral segments: base 90–155, claw 35–60; dorsal length of pedipalp segments: P–1–5: 30–40, 120–155, 70–120, 205–270, 65–100; L of leg segments: I–Leg–1–6: 70–80, 140–205, 165–245, 230–340, 270–375, 360–440; II–Leg–1–6: 70–100, 145–205, 165–235, 245–335, 280–390, 400–490; III–Leg–1–6: 85–115, 150–230, 150–335, 240–295, 305–405, 400–480; IV–Leg–1–6: 95–140, 135–195, 190–285, 280–390, 335–450, 390–465.

Female. Apodemes of anterior coxal groups short and slender. Medial edges of coxal plates IV about 2.5 times longer than those of coxal plates III (Fig. 17). Posteromedial angles of coxal plates IV acutely

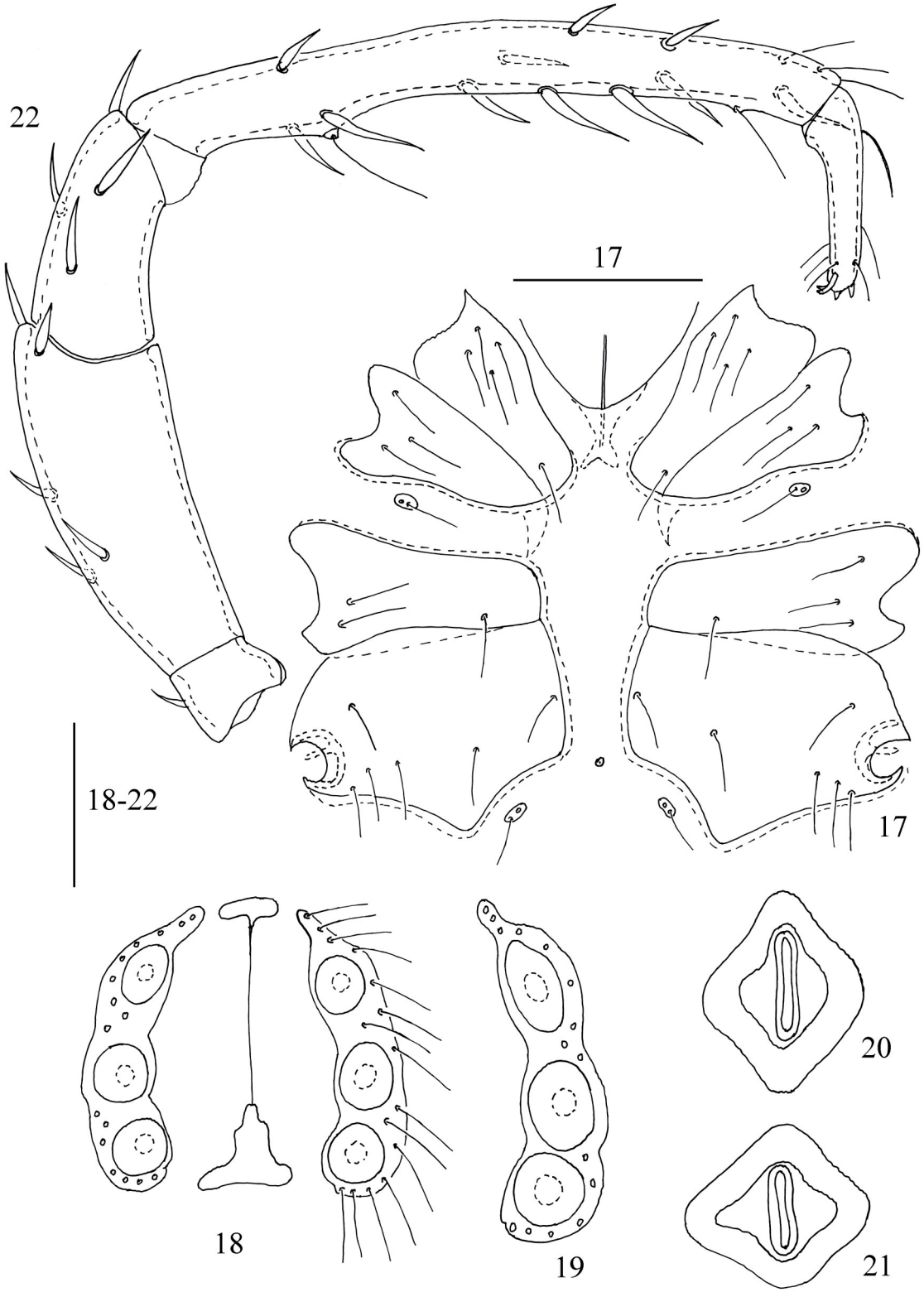


Figs. 6–12. *Hydrochoreutes ungulatus* (Koch, 1836), female: 6 – coxal plates, ventral view; 7 – external genital organ; 8 – genital plate; 9–11 – excretory pore; 12 – pedipalp, lateral view. Scale bars: 6 = 200 μm, 7–12 = 100 μm.
Рис. 6–12. *Hydrochoreutes ungulatus* (Koch, 1836), самка: 6 – коксальные пластинки, вентральная сторона; 7 – наружный генитальный орган; 8 – генитальная пластинка; 9–11 – экскреторная пора; 12 – педипальпа, боковая сторона. Шкалы: 6 = 200 μm, 7–12 = 100 μm.



Figs. 13–16. *Hydrochoreutes krameri* Piersig, 1895, male: 13 – coxal shield, ventral view; 14 – external genital organ and petiole; 15 – pedipalp, lateral view; 16 – telofemur and genu of leg III. Scale bars: 13, 16 = 100 μm; 14, 15 = 50 μm.

Рис. 13–16. *Hydrochoreutes krameri* Piersig, 1895, самец: 13 – коксальный щит, вентральная сторона; 14 – наружный генитальный орган и петиолус; 15 – педипальпа, боковая сторона; 16 – телофемур и колено ноги III. Шкалы: 13, 16 = 100 μm; 14, 15 = 50 μm.



Figs. 17–22. *Hydrochoreutes krameri* Piersig, 1895, female: 17 – coxal plates, ventral view; 18 – external genital organ; 19 – genital plate; 20–21 – excretory pore; 22 – pedipalp, lateral view. Scale bars: 100 μm.
Рис. 17–22. *Hydrochoreutes krameri* Piersig, 1895, самка: 17 – коксальные плаинки, вентральная сторона; 18 – наружный генитальный орган; 19 – генитальная пластинка; 20–21 – экскреторная пора; 22 – педипальпа, боковая сторона. Шкалы: 100 μm.

angled forming well developed genital bay. Acetabular plates tapered anteriorly and rounded posteriorly (Figs. 18–19), bearing 12–17 slender setae with clusters of 4–5 anteriorly and posteriorly and the rest located near the middle acetabula. All acetabula usually circular and subequal in size but sometimes anterior acetabula elongate. Excretory pore elongate and surrounded by more or less rhombic ring (Figs. 20–21). Pedipalps (Fig. 22) with ventral margin of P–2 straight or weakly convex; P–4 bearing 10–12 thick setae, with anterior ventral slender seta well removed from proximal end of segment and posterior ventral slender seta located near to distal end of segment; P–5 with 1 proximal solenidion, 4 thick and 5 thin distal setae. Long, slender swimming setae distributed as follows: 3 on III–Leg–4, 3–4 on III–Leg–5 and IV–Leg–4, and 5–6 on IV–Leg–5.

Measurements, n=5. L of idiosoma 895–1150; L of acetabular plate 145–185, W of acetabular plate 40–50; L of cheliceral segments: base 155–180, claw 50–65; dorsal L of pedipalp segments P–I–5: 55–75, 195–275, 125–230, 350–545, 105–205; L of legs segments: I–Leg–1–6: 95–140,220–365, 290–280, 440–695, 430–695, 310–505; II–Leg–1–6: 105–140, 235–360, 300–-490, 440–675, 440–685, 335–540; III–Leg–1–6: 145–165, 225–365, 285–450, 405–630, 440–630, 340–540; IV–Leg–1–6: 145–230, 200–350, 300–515, 425–675, 430–710, 310–540.

Deuthonymph. See Piersig [1897–1900], Tuzovskij [1990].

Larva. See Piersig 1897–1900, Tuzovskij 2005. The larva described as *H. krameri* by Wainstein [1976, 1980] does not refer to this species [Tuzovskij 2005].

Habitat. Aquatic vegetation in lakes, ponds, rivers and streams.

Distribution. Europe, Asia, North Africa (Algeria) [Viets, 1936, 1956; Sokolow, 1940; Lundblad, 1968; Cook, 1970; K.O. Viets, 1978, 1987].

Remarks. The combination of the following characters separates male *H. krameri* from all other species males of the genus *Hydrochoreutes*: the central piece of the petiole indented posteromedially (Fig. 14), the ventrodistal blade-like seta much shorter than dorsodistal blade-like seta (Fig. 16), setae *Pe* placed on the coxal shield posteriorly (Fig. 13).

Hydrochoreutes wolgaensis Tuzovskij, 2001
Figs. 23–36

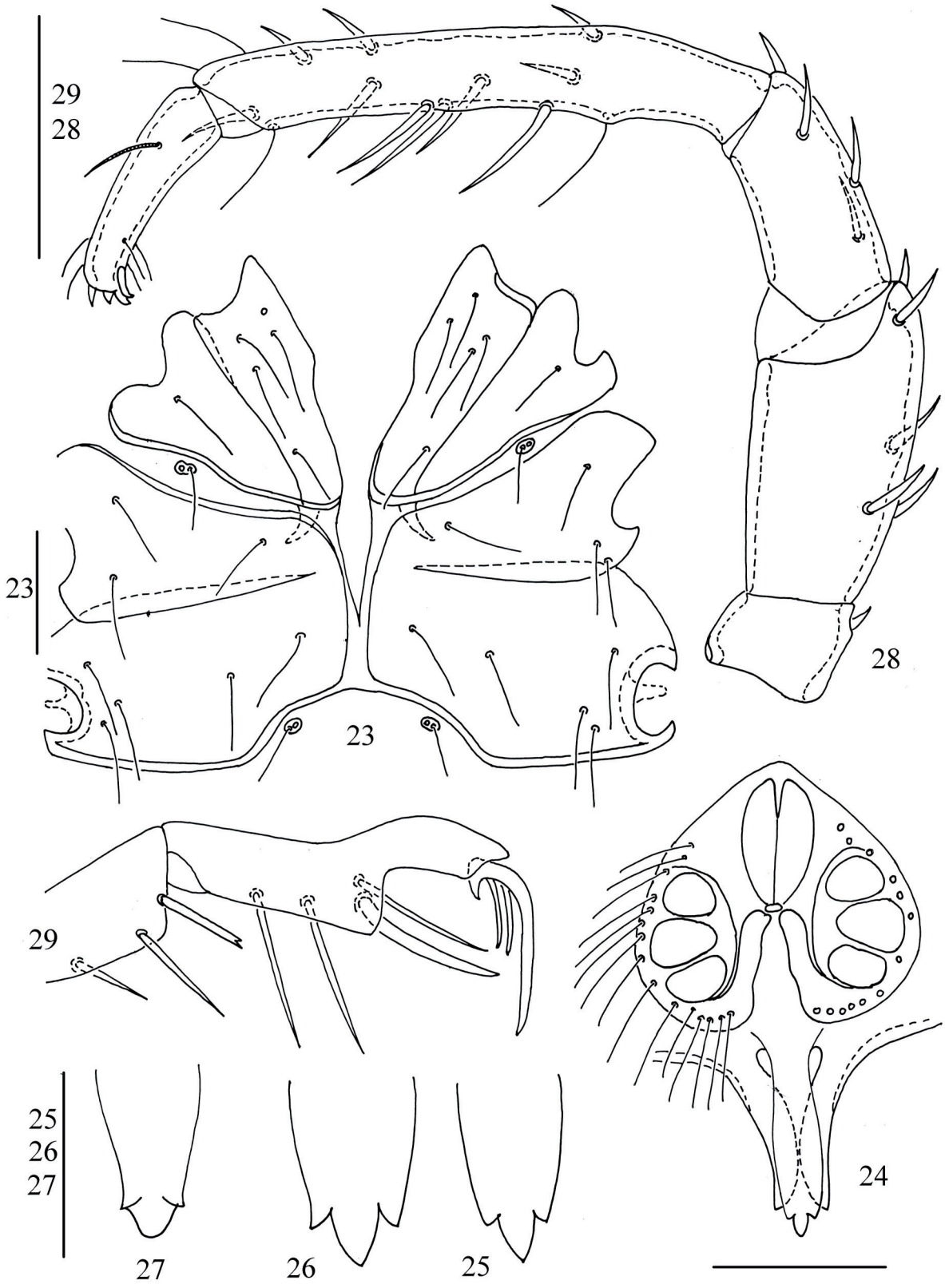
Material examined. Holotype male (IBIW 3675), Russia, Yaroslavl Province, Nekouz District, pond near village Pogorelka, 25 May 1977, leg. P.V. Tuzovskij. Paratypes: 1 male and 2 females, same data and locality as holotype; 7 males and 10 females, Yaroslavl Province, Nekouz District, litoral zone of Rybinsk reservoir near settlement Borok, 7 May 1975; 2 males and 2 females, mouth of stream Sunozhka near settlement Borok, 3 June 1994.

Additional material: 6 females, Russia, Samara Province, National Natural Park “Samara Luka”, village Koltsovo, small lake, 30 May 1993, leg. P.V. Tuzovskij.

Male. Posteromedial margins of coxal plates I and II fused with anteromedial margins of coxal plates III for about 1/3 of their width. Medial margins of coxal plates IV fused in posterior half (Fig. 23). Apodemes of anterior coxal groups moderate in size. Suture lines between coxal plates III and IV incomplete medially. Medial margins of coxal plates III approximately half as long as those of coxal plates IV. Posterolateral margins of coxal plates IV oriented slightly obliquely against suture lines between coxal plates III and IV. Genital acetabula grouped close together on acetabular plates bearing 12–17 pairs of slender setae (Fig. 24). Central piece of petiole slightly extending beyond the posterior ends of lateral pieces; trifurcate distally with middle tooth relatively wide and more or less pointed, and lateral teeth narrow and slightly pointed (Figs. 25–27). Pedipalps (Fig. 28) with P–2 relatively large, and with ventral margin straight or slightly convex; P–4 bearing 8–11 thick setae and several slender setae, and with anterior ventral slender seta on a tiny tubercle and posterior ventral slender seta almost at distal end of segment; P–5 with ventral margin straight, bearing proximal solenidion, 4 thick and 5 thin setae in distal third of segment. Leg III with genu with well developed projections ventrally and distally, each bearing a long, thick blade-like pointed seta which are subequal in length (Fig. 29), and with 2 curved distolateral setae of about equal length and thickness which are half as long as blade-like setae, and 3 long, thick ventral setae of which 2 are located near midlength of segment and other is located near ventral blade-like seta. Long, slender swimming setae distributed as follows: 5–6 on III–Leg–5 and IV–Leg–5, 4–5 on IV–Leg–4.

Measurements, n=10. L of idiosoma 530–650; L of cheliceral segments: base 115–130, claw 35–40; dorsal L of pedipalp segments (P–1–5): 32–40, 135–145, 95–115, 235–270, 80–90; lengths of legs segments: I–Leg–1–6: 80–90, 170–205, 180–250, 260–340, 290–375, 270–415; II–Leg–1–6: 80–100, 170–210, 205–235, 290–340, 335–375, 360–480; III–Leg–1–6: 100–120, 180–220, 205–235, 275–300, 360–400, 430–480; IV–Leg–1–6: 105–120, 165–195, 235–275, 325–385, 375–390, 405–450.

Female. Apodemes of anterior coxal group moderate in size (Fig. 30). Medial margins of coxal plates IV 2.5–3.0 times as long as medial margins of coxal plates III. Posteromedial angles of coxal plates IV



Figs. 23–29. *Hydrochoreutes wolgaensis* Tuzovskij, 2001, male: 23 – coxal shield, ventral view; 24 – external genital organ and petiole; 25–27 – distal portion of central piece of petiole, ventral view; 28 – pedipalp, lateral view; 29 – telofemur and genu of leg III. Scale bars: 23–24, 28–29 = 100 μm; 25–27 = 50 μm.

Рис. 23–29. *Hydrochoreutes wolgaensis* Tuzovskij, 2001, самец: 23 – коксальный щит, вентральная сторона; 24 – наружный генитальный орган и петиолус; 25–27 – дистальная часть центрального отростка петиолуса, вентральная сторона; 28 – педипальпа, боковая сторона; 29 – телофемур и колено ноги III. Шкалы: 23–24, 28–29 = 100 μm; 25–27 = 50 μm.

acutely angled forming well developed genital bay. Acetabular plates (Figs. 31–33) slightly curved, strongly tapered anteriorly and with small protrusion posteriorly, bearing 17–24 slender setae evenly distributed on plates and with genital acetabula arranged in an arc, all acetabula more or less subequal in size and usually separated by short interspace. Pregenital sclerite small and transverse, postgenital sclerite relatively large and elongate. Excretory pore surrounded by narrow ring (Figs. 34–35). Pedipalps (Fig. 36) similar to those of males but longer, P–4 bearing 13–16 thick setae and several slender setae. Long, slender swimming setae distributed as follows: 3–4 on III–Leg–4, 5–7 on III–Leg–5 and IV–Leg–4, and 7–8 on IV–Leg–5.

Measurements, n=10. L of idiosoma 815–1350; L of acetabular plates 185–210, W of acetabular plates 65–75; L of cheliceral segments: base 210–230, claw 80–90; dorsal L of pedipalp segments (P–1–5): 65–80, 225–270, 195–230, 470–540, 185–195; L of leg segments: I–Leg–1–6: 115–145, 310–375, 405–495, 610–735, 595–710, 445–530; II–Leg–1–6: 135–155, 300–360, 425–490, 610–710, 610–725, 470–545; III–Leg–1–6: 160–170, 340–360, 375–455, 610–660, 670–710, 530–560; IV–Leg–1–6: 185–230, 325–350, 450–490, 660–700, 700–735, 510–540.

Deutonymph. See Tuzovskij [2001].

Larva. See Tuzovskij [2001].

Habitat. Aquatic vegetation in lakes, ponds and rivers.

Distribution. Europe, Russia: Samara Province and Yaroslavl Province.

Remarks. Adults of *Hydrochoreutes wolgaensis* are similar to those of *H. ungulatus* but differ in that males have the short central piece of the petiole (Fig. 24) with three unequal distal teeth (central tooth longer than both lateral teeth, Figs. 25–27), and the excretory pore of female surrounded by the sclerotized ring (Figs. 34–35). In contrast, the central piece of the petiole in males *H. ungulatus* considerably longer than both lateral pieces, with distal teeth equal in length (Figs. 2–3), and the excretory pore of the female have only anterior and posterior small anal sclerites (Figs. 9–11).

Hydrochoreutes cooki Tuzovskij, 2003
(Figs. 37–49)

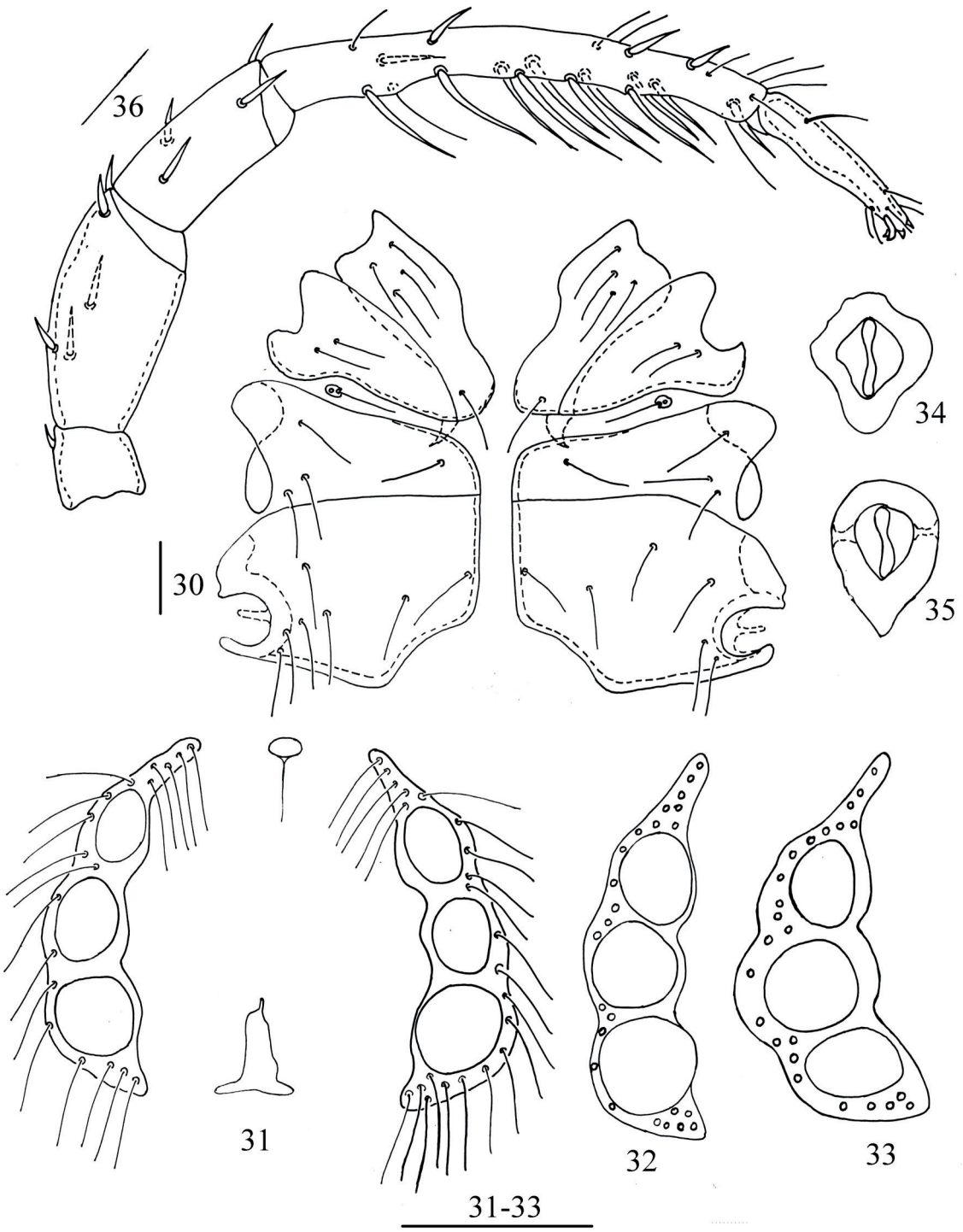
Material examined. Holotype male (IBIW 4649), Russia, Kamchatka Province, Ust'–Kamchatka District, Dyakonovskoe Lake on the left bank of the Kamchatka River 40 km. up–stream from its mouth, 26 July 1983, leg. P.V.Tuzovskij. Paratypes (slides): one male, 13 July 1983 and three females, 26 July 1983 from same locality as holotype.

Additional specimen examined: one male, Yaroslavl Province (European Russia), Breitovo District, Sit' River near village of Sit'-Pokrovskoe, 29 July 1976, leg. P.V. Tuzovskij.

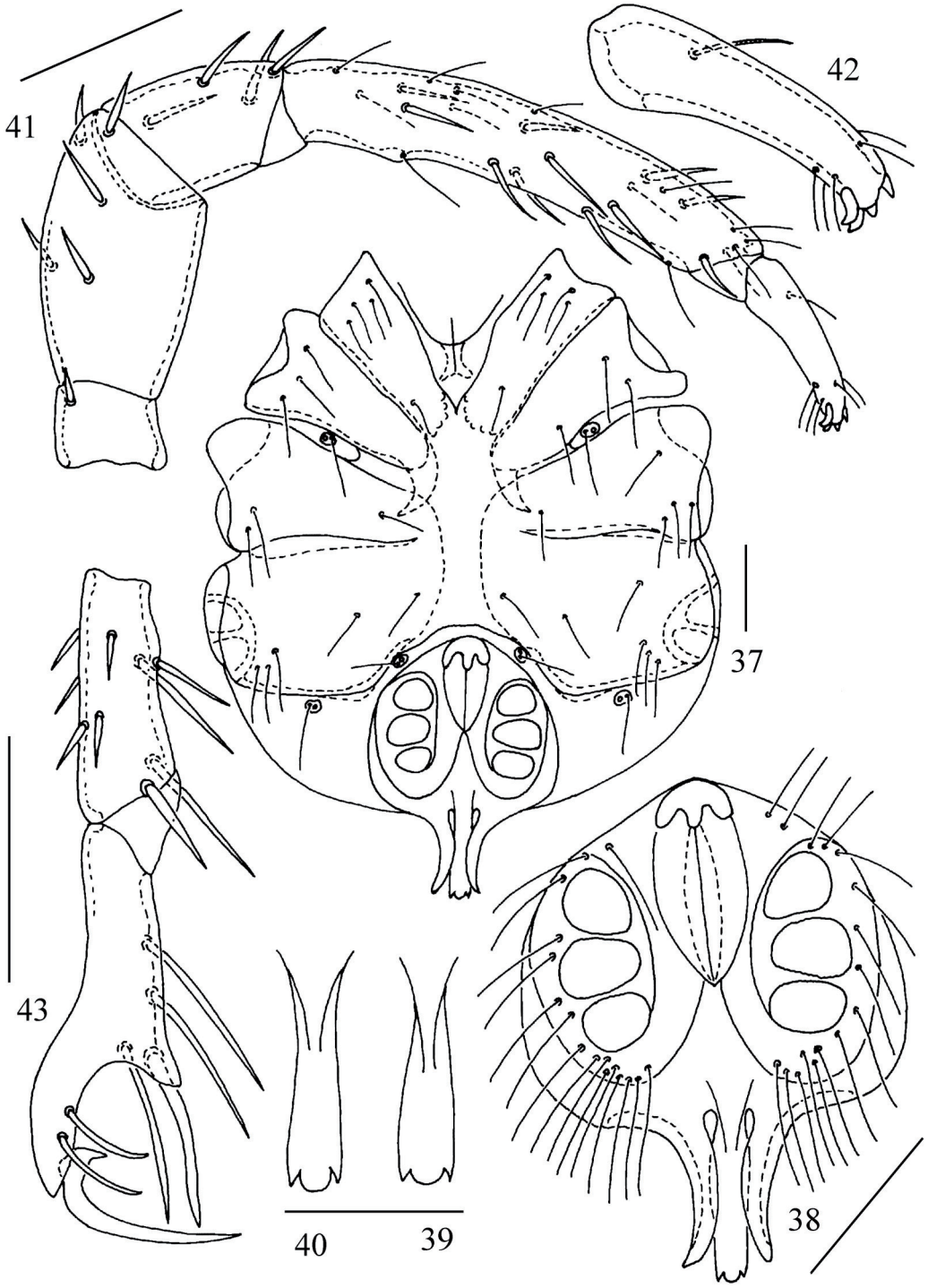
Male. All coxae fused together medially, and plates II and III slightly separated laterally (Fig. 37). Capitular bay acutely angled posteriorly. Medial edges of coxae I, III and IV indistinct. Apodemes of anterior coxal groups long. Suture line between coxae III and IV distinct laterally and obliterated medially. Posteromedial angles of coxae IV weakly developed and acutely rounded. Genital bay wide and shallow. Genital field (Fig. 38) with genital acetabula subequal in size and linearly arranged on acetabular plates bearing 16–17 pairs of setae. Central piece of petiole only slightly longer than lateral piece and trifurcate distally with middle tooth rounded and lateral teeth acutely pointed (Figs. 39–40). Pedipalps (Fig. 41) with femur with ventral margin straight or weakly convex; P–4 bearing 9–11 thick setae and several slender setae, with ventral margin slightly concave and with most posterior and ventral slender setae located almost at distal end of segment; P–5 bearing several simple setae (thick and thin) in distal third, and a solenidion in proximal third of segment (Fig. 42). Leg III with telofemur (Fig. 43) bearing 3–4 long, thick setae ventrally and 4–5 short, thick setae dorsally and with most distolateral seta approximately half as long as most distomedial seta; III–Leg–4 with well developed projections ventrally and distally, each bearing a long, thick blade-like seta which are subequal in length, and with two curved distolateral setae of about equal length and thickness which are half as long as blade-like setae. Slender swimming setae distributed as follows: 1–3 relatively short setae on I–Leg–4, I–Leg–5, II–Leg–4 and II–Leg–5; 3–4 relatively long setae on IV–Leg–4, 4–5 relatively long setae on each of III–Leg–5 and IV–Leg–5.

Measurements, n=4. L of coxal plates 395–425; L of cheliceral segments: base 140, claw 50; dorsal L of pedipalp segments (P–1–5): 40–50, 140–150, 105–110, 260–305, 90–100; L of leg segments: I–Leg–1–6: 75–90, 170–180, 185–210, 285–310, 325–360, 360–405; II–Leg–I–6: 90–100, 170–190, 185–210, 285–320, 350–365, 365–440; III–Leg–1–6: 105–120, 180–205, 185–205, 290–295, 385–405, 405–465; IV–Leg–1–6: 115–145, 180–190, 235–260, 350–385, 400–450, 400–450.

Female. Similar to male, except as follows: apodemes of anterior coxal groups short (Fig. 44). Medial edges of coxal plates IV 3–3.5 times longer than medial edges of coxal plates III. Posteromedial angles of coxal plates IV weakly acutely angled. Gonopore shorter than acetabular plates and pregenital sclerite very small (Fig. 45). Acetabular plates strongly tapered anteriorly and rounded posteriorly,

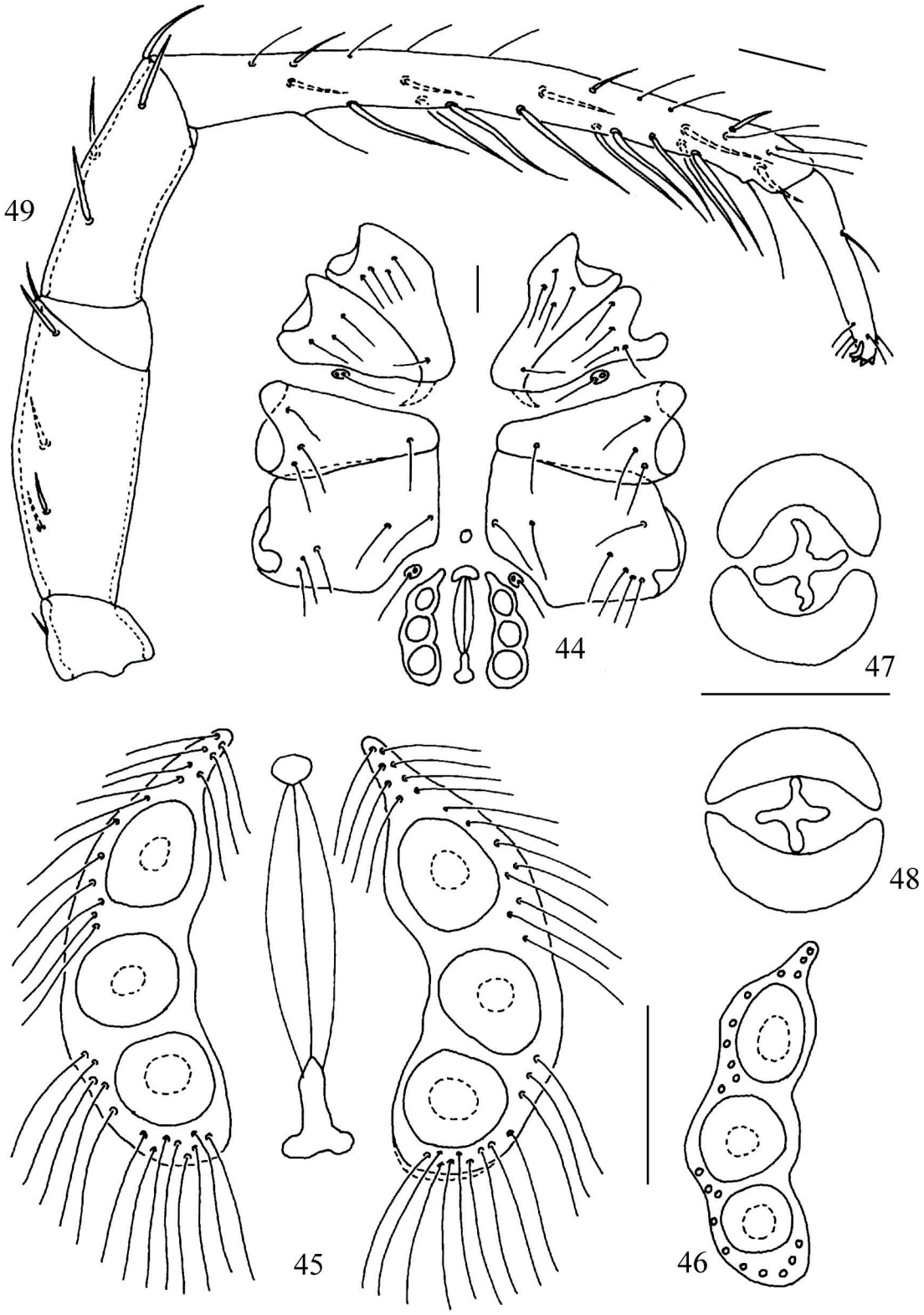


Figs. 30–36. *Hydrochoreutes wolgaensis* Tuzovskij, 2001, female: 30 – coxal shield, ventral view; 31 – external genital organ; 32–33 – genital plate; 34–35 – excretory pore; 36 – pedipalp, lateral view. Scale bars = 100 μm.
Рис. 30–36. *Hydrochoreutes wolgaensis* Tuzovskij, 2001, самка: 30 – коксальные пластинки, вентральная сторона; 31 – наружный генитальный орган; 32–33 – генитальная пластинка; 34–35 – экскреторная пора; 22 – педипальпа, боковая сторона. Шкалы: 100 μm.



Figs. 37–43. *Hydrochoreutes cooki* Tuzovskij, 2003, male: 37– coxal shield, ventral view; 38 – external genital organ and petiole; 39–40, central piece of petiole, ventral view; 41 – pedipalp, lateral view; 42 – pedipalpal tarsus; 43 – telofemur and genu of leg III. Scale bars: 100 μm.

Рис. 37–43. *Hydrochoreutes cooki* Tuzovskij, 2003, самец: 37 – коксальный щит, вентральная сторона; 38 – наружный генитальный орган и петиолус; 39–40 – центральный отросток петиолуса, вентральная сторона; 41 – педипальпа, боковая сторона; 42 – лапка педипальпы; 43 – телофемур и колено ноги III. Шкалы: 100 μm.



Figs. 44–49. *Hydrochoreutes cooki* Tuzovskij, 2003, female: 44 – coxal shield, ventral view; 45 – external genital organ; 46 – genital plate; 47–48 – excretory pore; 49 – pedipalp, lateral view. Scale bars = 100 μm.
Рис. 44–49. *Hydrochoreutes cooki* Tuzovskij, 2003, самка: 44 – коксальные пластинки, вентральная сторона; 45 – наружный генитальный орган; 46 – генитальная пластинка; 47–48 – экскреторная пора; 49 – педипальпа, боковая сторона. Шкалы: 100 μm.

bearing 19–28 slender setae clustered anteriorly and posteriorly and with genital acetabula arranged in an arc and about equidistant from one another. Acetabula subequal in size, with anterior pair slightly elongate and middle and posterior pair almost round (Fig. 46). Excretory pore cross–shaped and nearly surrounded by anterior and posterior crescentic sclerites (Figs. 47-48). Pedipalps (Fig. 49) similar to those of males, but very long and slender, with P–2 with ventral margin straight; P–4 bearing 14–17 thick setae and several slender setae. Long, slender swimming setae distributed as follows: 3–5 on III–Leg–4, 5–7 on III–Leg–5, 4–5 on IV–Leg–4, 6–8 on IV–Leg–5.

Measurements, n=3. L of idiosoma 1025–1305; L of acetabular plates 205-245, W of acetabular plates 55–75; L of cheliceral segments: base 230, claw 80; dorsal L of pedipalp segments (P–1–5): 75–90, 250–310, 210–270, 530–690, 160–205; L of leg segments: I–Leg–1–6: 120–145, 300–365, 385–465, 530–660, 520–660, 405–480; II–Leg–1–6: 130–140, 300–365, 365–455, 520–635, 540–670, 440–520; III–Leg–1–6: 140–145, 275–360, 335–410, 480–605, 545–695, 450–530; IV–Leg–1–6: 180–245, 295–350, 365–475, 545–670, 585–740, 425–545.

Deutonymph. Unknown.

Larva. See Tuzovskij [2003].

Habitat. Aquatic vegetation in lakes and slow flowing rivers.

Distribution. Asia: Russia **(**Kamchatka) and Europe: Russia (Yaroslavl Provinces).

Remarks. *H. cooki* is similar to *H. minor* (Cook, 1970), but males differ in the structure of the petiole and females differ in the shape of the acetabular plates. Males of *H. cooki* have the central and lateral pieces of the petiole subequal in length (Figs. 39–40) while those of *H. minor* have the central piece much longer than the lateral pieces. Females of *H. cooki* have the acetabular plates relatively wide and rounded posteriorly (Figs. 44–46) compared to those of *H. minor.*

Hydrochoreutes orientalis Tuzovskij, 2003

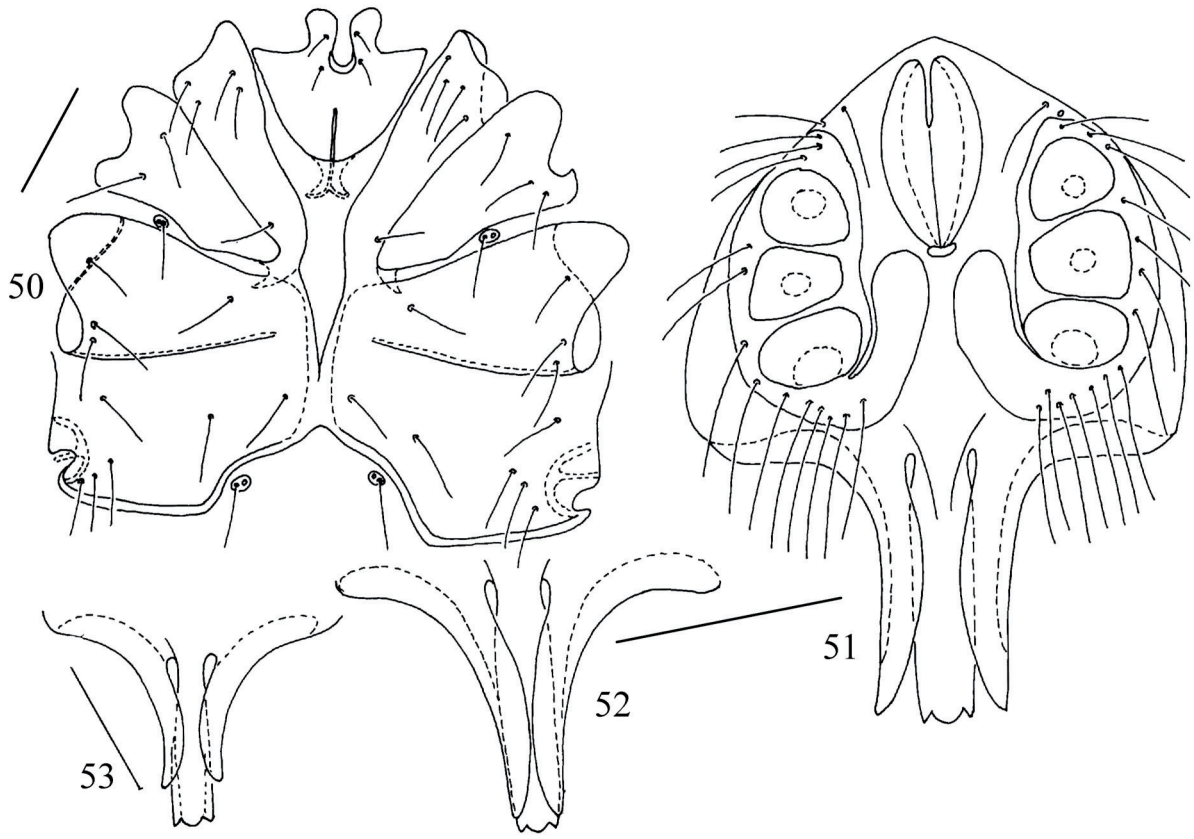
(Figs. 50–62)

Material examined. Holotype: male (IBIW 5086), Russia, Magadan Province, Yagodnoe District, small thermokarst lake two km north of Sibik-Tyellakh near Aborigen Mountain, 23 July 1987, leg. P.V. Tuzovskij. Paratypes: same locality as holotype: 6 females collected on 23 July 1987, 2 males and 3 females collected on 25 July 1987, leg. P.V. Tuzovskij.

Male. Posteromedial margins of coxal plates I and II fused with anteromedial margins of coxal plates III for about 1/3 of their width. Medial margins of coxal plates IV fused in posterior half (Fig. 50). Apodemes of anterior coxal groups short. Suture lines between coxal plates III and IV incomplete medially. Medial margins of coxal plates III only half as long as those of coxal plates IV. Posterolateral margins of coxal plates IV oriented slightly obliquely against suture lines between coxal plates III and IV. Genital acetabula grouped close together on acetabular plates bearing 12–15 pairs of slender setae (Fig. 51). Central piece of petiole subequal in length to lateral pieces (Fig. 51); trifurcate distally with middle tooth rounded and lateral teeth acutely pointed (Figs. 51–52). Pedipalps (Fig. 54) with P–2 relatively large and with ventral margin straight; P–4 bearing 6–8 thick setae and several slender setae, and with anterior ventral slender seta on a tiny tubercle and posterior ventral slender seta removed from distal end of segment; P–5 with ventral margin straight, bearing several setae in distal third of segment. Leg III with genu with well developed projections ventrally and distally, each bearing a long, thick blade-like seta which are subequal in length (Fig. 55), and with two curved distolateral setae of about equal length and thickness which are half as long as blade-like setae, and three long, thick ventral setae of which 2 are located near midlength of segment and other is located near ventral blade-like seta. Long, slender swimming setae distributed as follows: 2–3 on III–Leg–5, 3 on IV–Leg –4 and 5–6 on IV–Leg–5.

Measurements, n=3. L coxal plates 355–385; L of cheliceral segments: base 105–115, claw 48–55; dorsal L of pedipalp segments (P–1–5): 35–40, 140–180, 85–90, 210–220, 75–80; lengths of legs segments: I–Leg–1–6: 75–80, 160–170, 185–195, 250–260, 300–310, 375–400; II–Leg–1–6: 75–80, 165–180, 185–195, 270-280, 300-310, 440-450; III–Leg–1–6: 85–90, 165–175, 165–175, 225–235, 310–325, 430–450; IV–Leg–1–6: 95–105, 155–165, 220–230, 290–320, 365–375, 405–430.

Female. Apodemes of anterior coxal group moderate in size (Fig. 56). Medial margins of coxal plates IV twice as long as medial margins of coxal plates III. Posteromedial angles of coxal plates IV acutely angled forming well developed genital bay. Acetabular plates (Fig. 57–59) slightly curved, strongly tapered anteriorly and rounded posteriorly, bearing 15–23 slender setae evenly distributed on plates and with genital acetabula arranged in an arc with the posterior acetabula usually largest and anterior middle acetabula separated more widely from middle acetabula than posterior acetabula are. Pregenital sclerite small and transverse, postgenital sclerite large and elongate. Excretory pore partially surrounded by smaller anterior and larger posterior curved sclerites (Figs. 60–61). Pedipalps (Fig. 62) similar to those of males but longer; P–4 bearing 12–13 thick setae and several slender setae. Long, slender swimming setae distributed as follows: 3–4 on III–Leg–4 and IV–Leg–4, 4–5 on



Figs. 50–52. *Hydrochoreutes orientalis* Tuzovskij, 2003, male: 50 – coxal shield, ventral view; 51 – external genital organ and petiole; 52 – petiole, ventral view. Scale bars: 100 μm.
Рис. 50–52. *Hydrochoreutes orientalis* Tuzovskij, 2003, самец: 50 – коксальный щит, вентральная сторона; 51 – наружный генитальный орган и петиолус; 52 – петиолус, вентральная сторона. Шкалы: 100 μm.
Fig. 53. *Hydrochoreutes ungulatus* (Koch, 1836), male: petiole. Scale bar: 100 μm.
Рис. 53. *Hydrochoreutes ungulatus* (Koch, 1836), самец: петиолус. Шкала: 100 μm.

III–Leg–5 and 5–6 on IV–Leg–5.

Measurements, n=3. L of idiosoma 675–1150; L of acetabular plates 175–185, W of acetabular plates 40–65; L of cheliceral segments: base 155–170, claw 55–65; dorsal L of pedipalp segments: P–1–5: 48–55, 205–220, 155–170, 365–410, 115–145; L of leg segments: I–Leg–1–6: 90–100, 225–235, 285–310, 405–435, 425–480, 340–350; II–Leg–1–6: 95–105, 230-235, 285–310, 415–435, 440–480, 365–400; III–Leg–1–6: 105–110, 205–220, 260–270, 365-415, 430–456, 365-390; IV–Leg–1–6: 140–150, 220–230, 320–330, 440–445, 490–500, 380–390.

Deutonymph. Unknown.

Larva. See Tuzovskij [2003].

Habitat. Known only from a small thermokarstic lake.

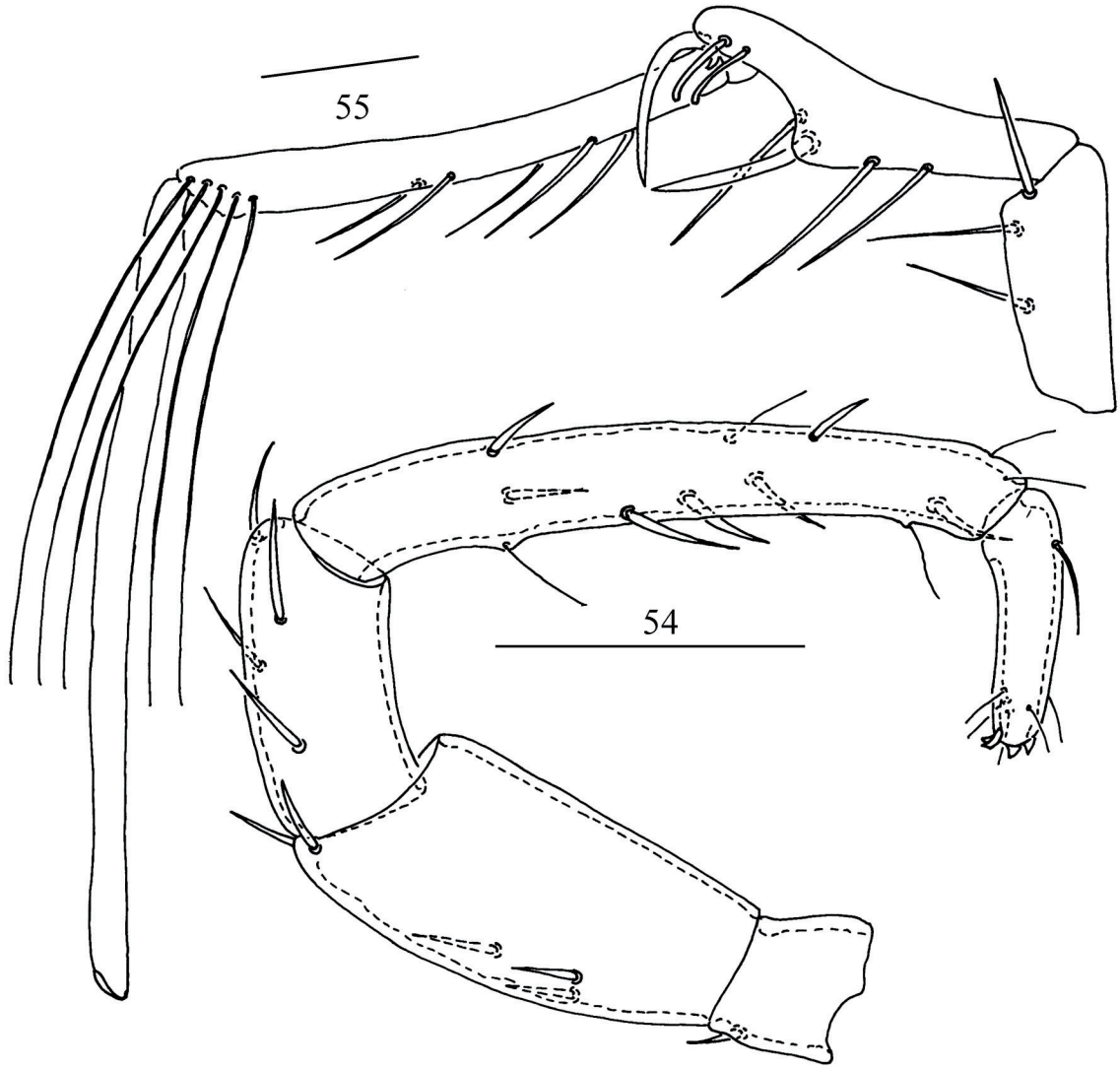
Distribution. Asia, Russia: Magadan Province.

Remarks. Adults of *H. orientalis* are similar to those of *H. ungulatus,* but differ in that the central piece of the petiole of males is shorter (compare Figures 52 and 53), the acetabular plates of females are less extended anteriorly (compare Figures 57–59 and 63). P–4 in *H. orientalis* bears 6–8 thick setae in males (Fig. 54) and 12–13 in females (Fig. 62); in contrast, P–4 in *H. ungulatus* bears 8–9 thick setae in males (Fig. 4) and 15–18 in females (Fig. 12).

Hydrochoreutes similis Tuzovskij, 2003
(Figs. 64–76)

Material examined. Holotype male (IBIW 2475): Russia, Magadan Province, Tenka District, a small thermokarstic lake near village Agrobasa, 21 June 1979, leg. P.V. Tuzovskij. Paratypes: 2 females, 21 June 1979 and 3 females 24 June 1979 from same locality as holotype, leg. P.V. Tuzovskij.

Male. All coxal plates fused together medially and coxal plates II and III slightly separated laterally (Fig. 64). Capitular bay rounded posteriorly. Apodemes of anterior coxal groups short and slender. Suture lines between coxal plates III and IV obliterated medially and nearly parallel to posterior edges of coxal plates IV. Genital bay wide and shallow. Genital field with genital acetabula arranged in an arc and relatively large, with middle one largest. Acetabular plates each bearing 10–12 slender setae. Central piece of petiole

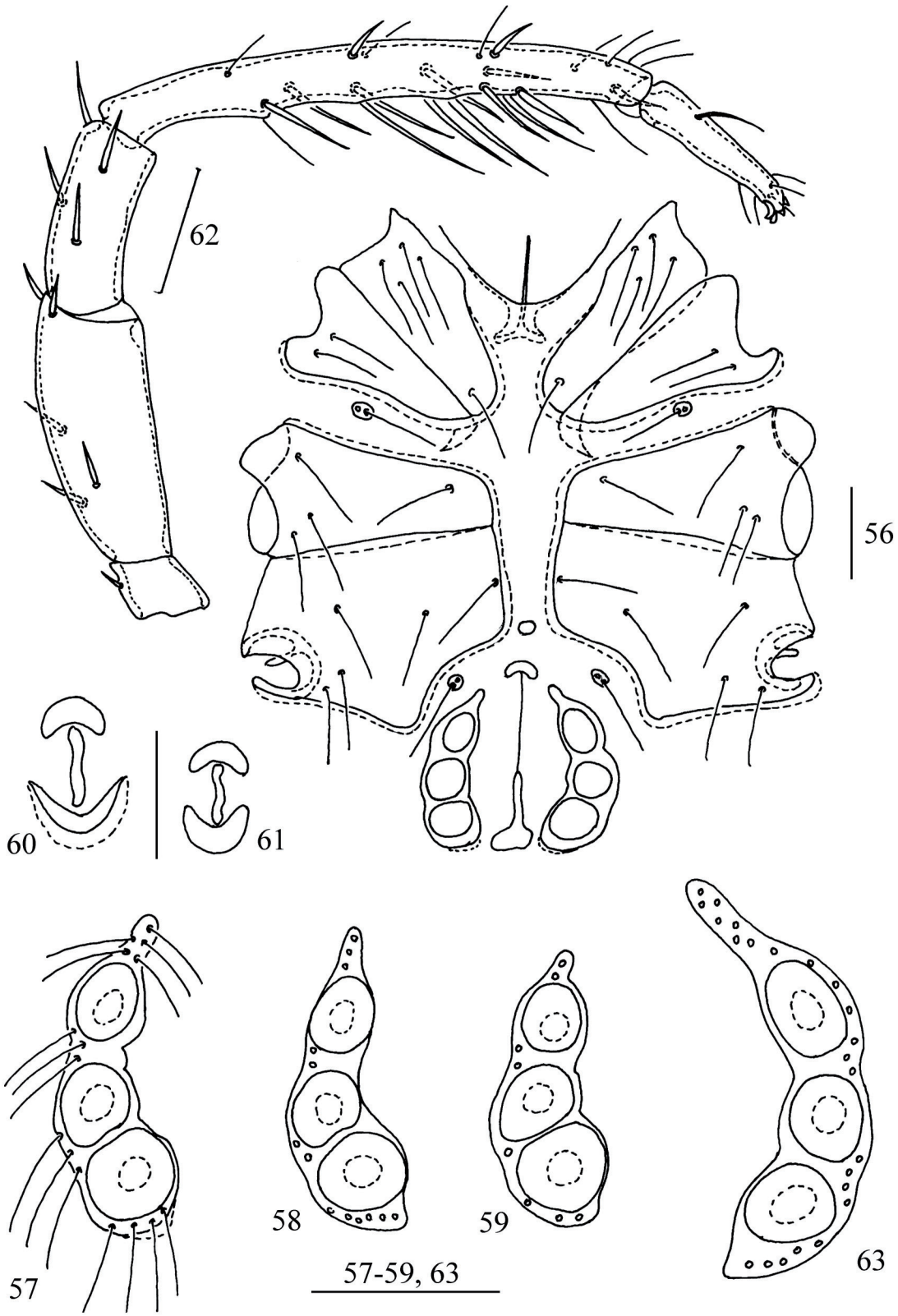


Figs. 54–55. *Hydrochoreutes orientalis* Tuzovskij, 2003, male: 54 – pedipalp, lateral view; 55 – telofemur, genu, tibia and tarsus of leg III. Scale bars = 100 μm.
Рис. 54–55. *Hydrochoreutes orientalis* Tuzovskij, 2003, самец: 54 – педипальпа, боковая сторона; 55 – телофемур, колено, голень и лапка ноги III. Шкалы: 100 μm.

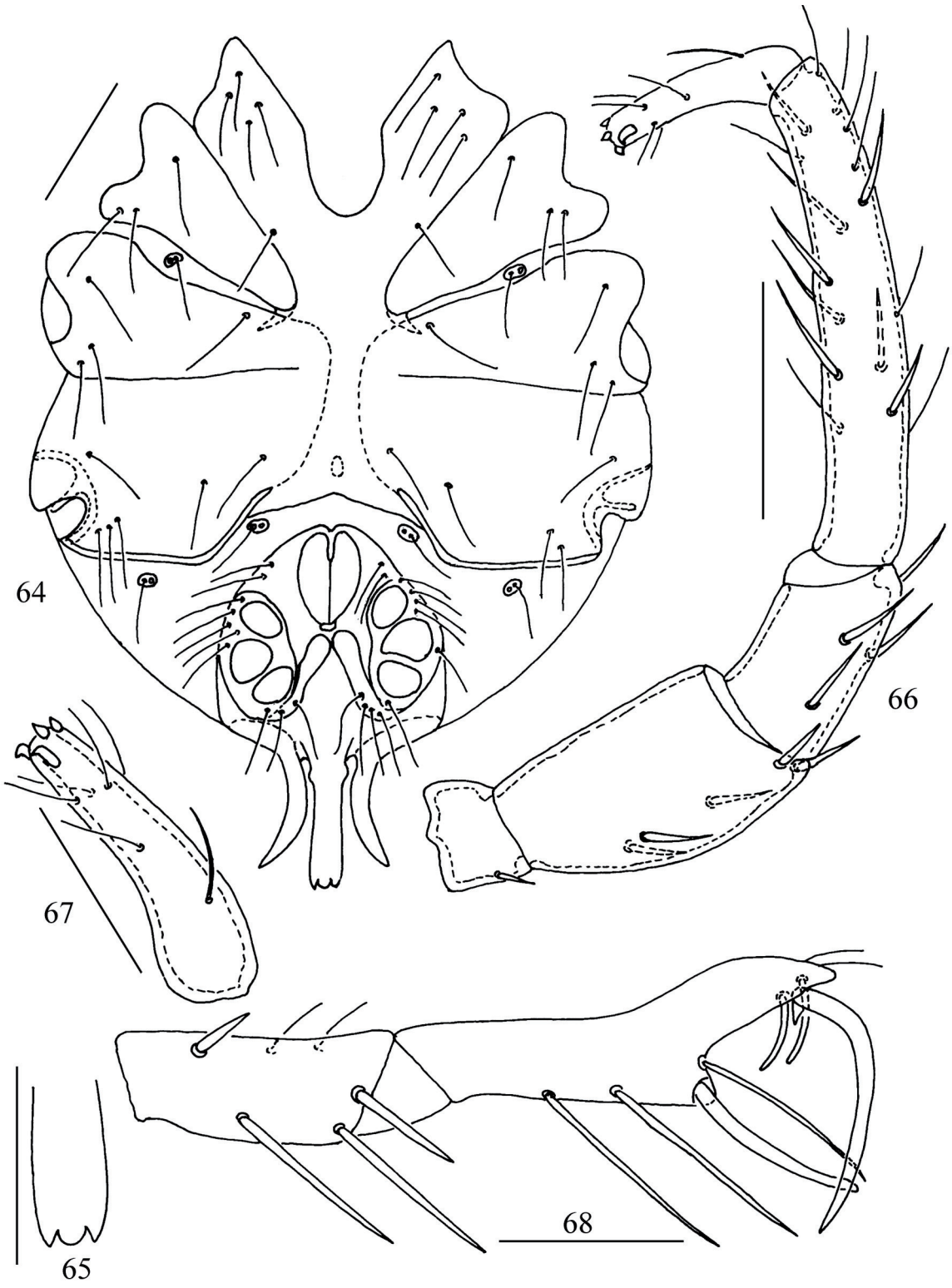
slightly longer than lateral pieces and trifurcate distally with middle tooth rounded and lateral teeth acutely pointed (Fig. 65). Pedipalps (Fig. 66) with P–2 with ventral margin weakly convex; P–4 bearing 6–8 thick setae, with ventral setae borne on small tubercles and with posterior slender seta located nearly at distal end of segment; P–5 bearing 4 short thick setae distally and 5 slender setae, 1 near the midlength of the segment, and a solenidion proximally (Fig. 67). Leg III with telofemur (Fig. 68) bearing 4 thick setae, including 1 short dorsal seta, 2 long ventral setae and 1 moderately long distolateral seta; genu with well developed projections ventrally and distally, each bearing a long, thick seta with the more distal one slightly longer. Long, slender swimming setae distributed as follows: 4 on III–Leg–5, 3–4 on IV–Leg–4 and IV–Leg–5.

Measurements, n=l. L of coxal plates 350; L of cheliceral segments: base 105, claw 40; dorsal length of pedipalp segments: P–I–5: 40, 110, 85, 200, 80; L of leg segments: I–Leg–1–6: 70, 145, 165, 230, 270, 360; II–Leg–1–6: 70, 145, 165, 245, 280, 400; III–Leg–1–6: 85, 150, 150, 240, 305, 400; IV–Leg–1–6: 95, 135, 190, 280, 335, 390.

Female. Apodemes of anterior coxal groups short and slender. Medial edges of coxal plates IV about 2.5 times longer than those of coxal plates III (Fig. 69). Posteromedial angles of coxal plates IV acutely angled forming well developed genital bay. Acetabular plates tapered anteriorly and rounded posteriorly (Figs. 70–72), bearing 11–17 slender setae with clusters of 3–5 anteriorly and posteriorly and the rest located near the middle acetabula. Posterior acetabula usually the largest. Excretory pore elongate and with anterior sclerite very small and posterior sclerite larger



Figs. 56–62. *Hydrochoreutes orientalis* Tuzovskij, 2003, female: 56 – coxal plates, ventral view, 57–59 – genital plate; 60–61 – excretory pore; 62 – pedipalp, lateral view. Scale bars = 100 μm;
Рис. 56–62. *Hydrochoreutes orientalis* Tuzovskij, 2003, самка: 56 – коксальные пластинки, вентральная сторона; 57–59 – генитальная пластинка; 60–61 – экскреторная пора; 62 – педипальпа, боковая сторона. Шкалы: 100 μm.
Figs. 63. *Hydrochoreutes ungulatus* (Koch, 1836), female: genital plate. Scale bar: 100 μm.
Рис. 63. *Hydrochoreutes ungulatus* (Koch, 1836), самка: генитальная пластинка. Шкала: 100 μm.



Figs. 64–68. *Hydrochoreutes similis* Tuzovskij, 2003, male: 64 – ventral view; 65 – central piece of petiole; 66 – pedipalp; 67 – tarsus of pedipalp; 68 – telofemur and genu of leg III. Scale bars: 65, 67 = 50 μm; 64, 66, 68 = 100 μm.

Рис. 64–68. *Hydrochoreutes similis* Tuzovskij, 2003, самец: 64 – вентральная сторона; 65 – центральный отросток петиолуса; 66 – педипальпа; 67 – лапка педипальпы; 68 – телофемур и колено ноги III. Шкалы: 65, 67 = 50 μm; 64, 66, 68 = 100 μm.

(Figs. 73–74). Pedipalps (Fig. 75) with ventral margin of P–2 straight or weakly convex; P–4 bearing 8–13 thick setae, with anterior ventral slender seta well removed from proximal end of segment and posterior ventral slender seta located nearly at distal end of segment; P–5 with 1 slender seta located relatively near midlength of segment (Fig. 76). Long, slender swimming setae distributed as follows: 3–4 on III–L–4, 3–5 on III–L–5, 4 on IV–Leg–4 and 5–6 on IV–Leg–5.

Measurements, n=5. L of idiosoma 625–880; L of acetabular plate 165–185, W of acetabular plate 50–60; L of cheliceral segments: base 155–180, claw 50–65; dorsal L of pedipalp segments P–I–5: 40–55, 195–220, 140–180, 350–400, 120–145; L of legs segments: I–Leg–1–6: 65–80, 210–235, 270–325, 375–450, 415–470, 335–365; II–Leg–1–6: 80–105, 225–245, 270–320, 385–450, 415–470, 360–385; III–Leg–1–6: 95–105, 205–235, 245–285, 350–410, 425–470, 365–390; IV–Leg–1–6: 120–145, 220–235, 295–335, 415–470, 455–515, 360–390.

Deutonymph. Unknown.

Larva. See Tuzovskij (2003).

Habitat. Known only from a thermokarstic lake.

Distribution. Asia, Russia: Magadan Province.

Remarks. Adults of *Hydrochoreutes similis* are similar to those of *H. cooki,* but differ in that males have the capitular bay more rounded posteriorly; relatively short apodemes associated with the anterior coxal groups (Fig. 64); comparatively short legs with proportionately longer tarsi. Females differ in the relatively slender gonopore, the elongate shape of the excretory pore with the anterior sclerite smaller than the posterior sclerite (Figs. 73–74), and in that the posterior genital acetabula are larger than the more anterior ones (Figs. 70–72).

Hydrochoreutes magadanicus Tuzovskij, 1990
(Figs. 77–80)

Material examined. Holotype: deutonymph (IBIW 2302), Russia, Magadan Province, Anadyr District, Majorskoe Lake, 29 June 1978, leg. P.V. Tuzovskij. Paratype: 1 male, same data and locality as holotype, leg. P.V. Tuzovskij.

Male, first description. Posteromedial margins of coxal plates I and II fused with anteromedial margins of coxal plates III for about 1/3 of their width. Medial margins of coxal plates IV fused in posterior half (Fig. 77). Apodemes of anterior coxal groups moderate in size. Suture lines between coxal plates III and IV incomplete medially. Medial margins of coxal plates III only half as long as those of coxal plates IV. Posterolateral margins of coxal plates IV oriented slightly obliquely against suture lines between coxal plates III and IV. Genital bay wide, setae *Pe* free. Genital acetabula grouped close together on acetabular plates bearing 13 pairs of slender setae (Fig. 78). Central piece of petiole slightly extending beyond the posterior ends of lateral pieces; trifurcate distally with middle tooth relatively wide and straight and lateral teeth acutely pointed. Pedipalps (Fig. 79) with P–2 relatively large and with ventral margin straight; P–4 bearing 6–7 thick setae and several slender setae, and with anterior ventral slender seta on a tiny tubercle and removed from distal end of segment and posterior ventral slender seta placed near distal end of segment; P–5 with ventral margin straight, bearing proximal solenidion, 4 thick and 5 thin setae in distal third of segment. Leg III with genu with slightly developed projections ventrally and distally, dorsal blade-like seta considerably longer than ventral blade-like seta (Fig. 80), and with 2 curved distolateral setae of about equal length and thickness which approximately 2.5 time shorter than dorsal blade-like seta, and 4 long, thick ventral setae of which 3 are located proximally to midlength of segment and other is located near ventral blade-like seta. Long, slender swimming setae distributed as follows: 5 on III–Leg–5, 3 on IV–Leg –4 and 5–6 on IV–Leg–5.

Measurements, n=1. L of idiosoma 570; L of acetabular plates 170–250, W of acetabular plates 45–75; L of cheliceral segments: base 180–240, claw 65–90; dorsal L of pedipalp segments (P–1–5): 45, 165, 115, 280, 95; L of leg segments: I–Leg–1–6: 85, 205, 240, 335, 380, 430; II–Leg–1–6: 90, 195, 230, 335, 385, 465; III–Leg–1–6: 105, 190, 200, 240, 375, 465; IV–Leg–1–6: 120, 165, 115, 280, 95.

Female. Unknown.

Deutonymph. See Tuzovskij (1990).

Larva. Unknown.

Habitat. Aquatic vegetation in small lake.

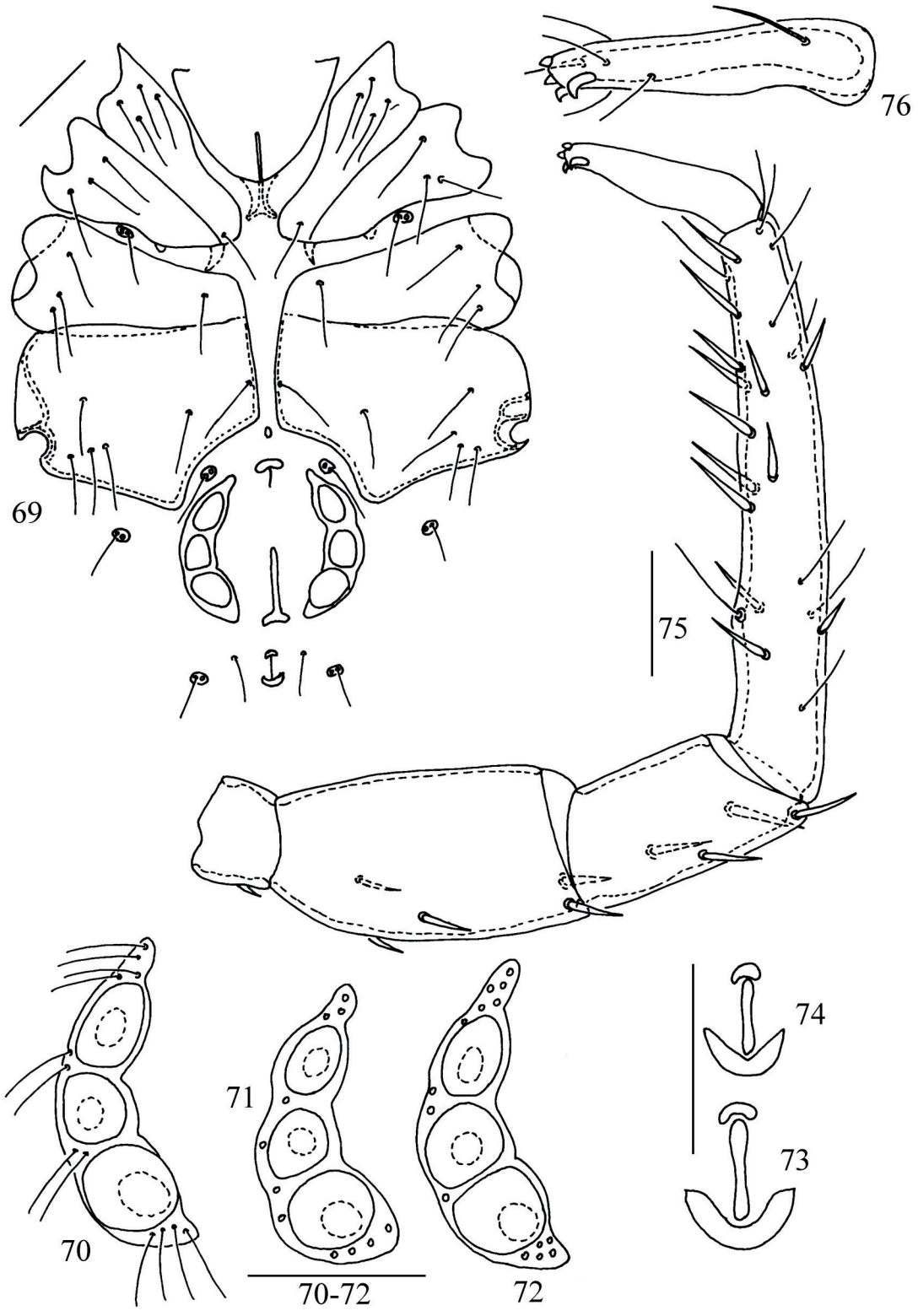
Distribution. Asia, Russia: Magadan Province.

Remarks. The present species is similar to *H. ungulatus,* but the central piece of the petiole in male *H. ungulatus* is considerably longer than both lateral pieces, with equal in length distal teeth (Figs. 2–3), and P–4 bears 8-9 thick setae (Fig. 4). In contrast, the central piece of the petiole in male *Hydrochoreutes magadanicus* is short (Fig. 78) with three unequal distal teeth (central tooth longer than both lateral teeth), P–4 bears 6-7 thick setae (Fig. 79).

Hydrochoreutes virens Tuzovskij, 1977
(Figs. 81–84)

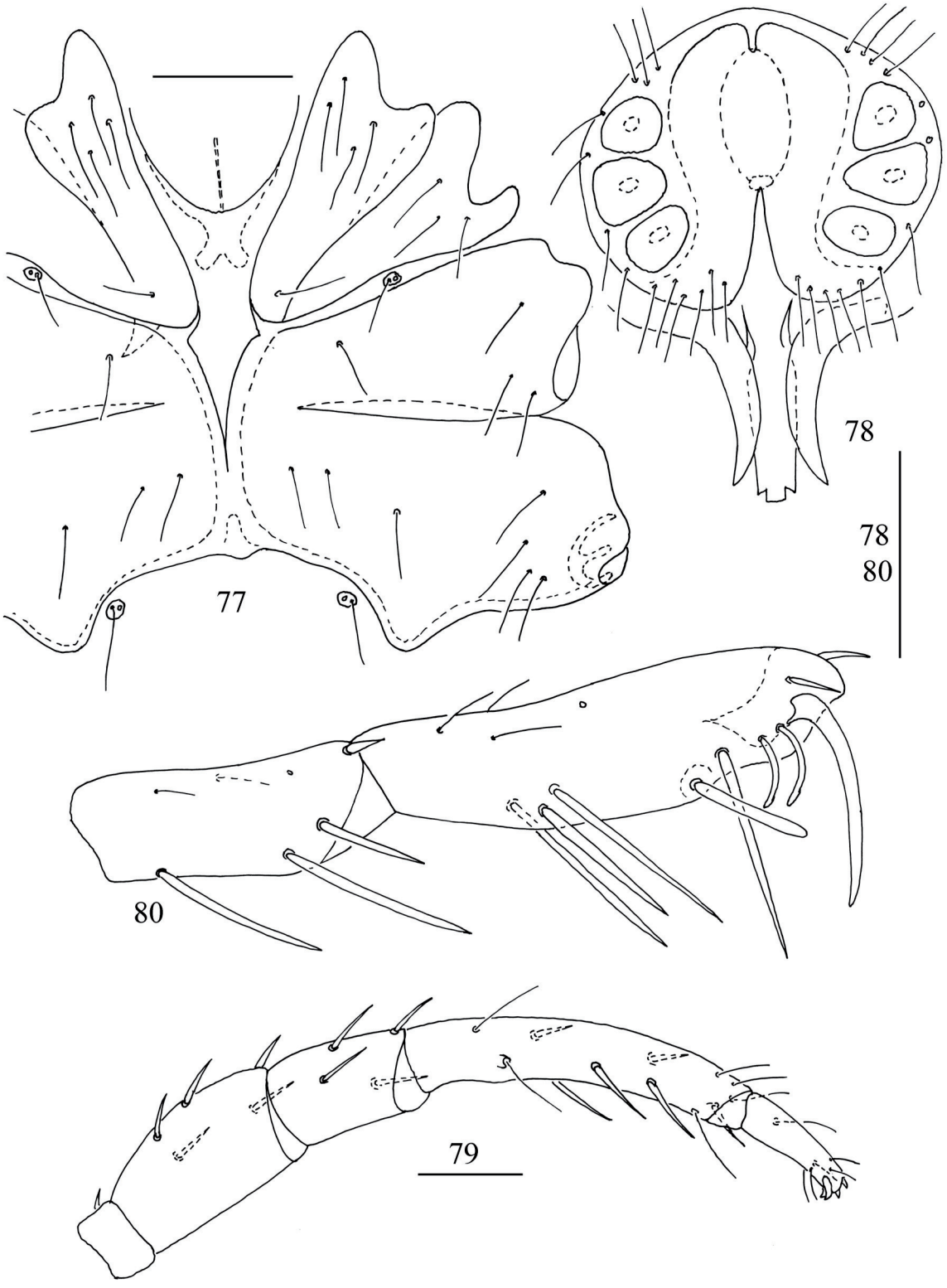
Material examined. Holotype male (IBIW 850): Europe, Russia, Yaroslavl Province, Nekouz District, pond with macrophytes near settlement Borok, 4 June 1975, leg. P.V. Tuzovskij.

Male. Coxal plates in four groups (Fig. 81). Medial edges of coxal plates I, III and IV close to each other. Apodemes of anterior coxal groups short. Su-



Figs. 69–76. *Hydrochoreutes similis* Tuzovskij, 2003, female: 69 – ventral view; 70–72 – genital plate; 73–74 – excretory pore; 75 – pedipalp; 76 – tarsus of pedipalp. Scale bars: 69–72, 75 = 100 μm; 73–74 = 50 μm.

Рис. 69–76. *Hydrochoreutes similis* Tuzovskij, 2003, самка: 69 – вентральная сторона; 70–72 – генитальная пластинка; 73–74 – экскреторная пора; 75 – педипальпа; 76 – лапка педипальпы. Шкалы: 69–72, 75 = 100 μm; 73–74 = 50 μm.



Figs. 77–80. *Hydrochoreutes magadanicus* Tuzovskij, 1990, male: 77 – coxal shield, ventral view; 78 – external genital organ and petiole; 79 – pedipalp, lateral view; 80 – genu of leg III. Scale bars: 100 μm.
Рис. 77–80. *Hydrochoreutes magadanicus* Tuzovskij, 1990, самец: 77 – коксальный щит, вентральная сторона; 78 – наружный генитальный орган и петиолус; 79 – педипальпа, боковая сторона; 80 – колено ноги III. Шкалы: 100 μm.

ture line between coxae III and IV distinct laterally and obliterated medially. Medial edges of coxal plates IV about 3.0 times longer than those of coxal plates III. Posteromedial angles of coxal plates IV obtuse and relatively weakly developed, setae *Pe* free. Genital bay wide and shallow. Genital acetabula grouped close together on acetabular plates bearing 17–18 pairs of slender setae, anterior two pairs of acetabula larger than posterior pair of acetabula (Fig. 82). Central piece of petiole straight, longer than lateral pieces, all pieces without teeth and rounded distally.

Pedipalps (Fig. 83) with femur with ventral margin straight or weakly concave; P–4 bearing 9 thick setae and several slender setae, with ventral margin nearly straight and with most posterior and ventral slender seta almost at distal end of segment; P–5 bearing proximal solenidion, 5 thin and 4 thick unequal spines in distal third.

III–Leg–4 (Fig. 84) bearing 1 large sword-like seta, 2 distal swimming setae, 4 relatively long, thick setae ventrally and several short, thin setae dorsally. Slender swimming setae distributed as follows: 6 on II–Leg–5; 5–6 on III–Leg–4, 4–7 on III–Leg–5 and 6 on IV–Leg–5.

Measurements**,** n=1. L of idiosoma 695; L of cheliceral segments: base 125, claw 40; dorsal L of pedipalp segments (P–1–5): 40, 130, 100, 235, 85; L of leg segments: I–Leg–1–6: 80, 170, 200, 290, 330, 370; II–Leg–1–6: 80, 175, 200, 300, 335, 410; III–Leg–1–6: 95, 185, 205, 255, 350, 405; IV–Leg–1–6: 110, 165, 235, 325, 375, 390.

Female. Unknown.

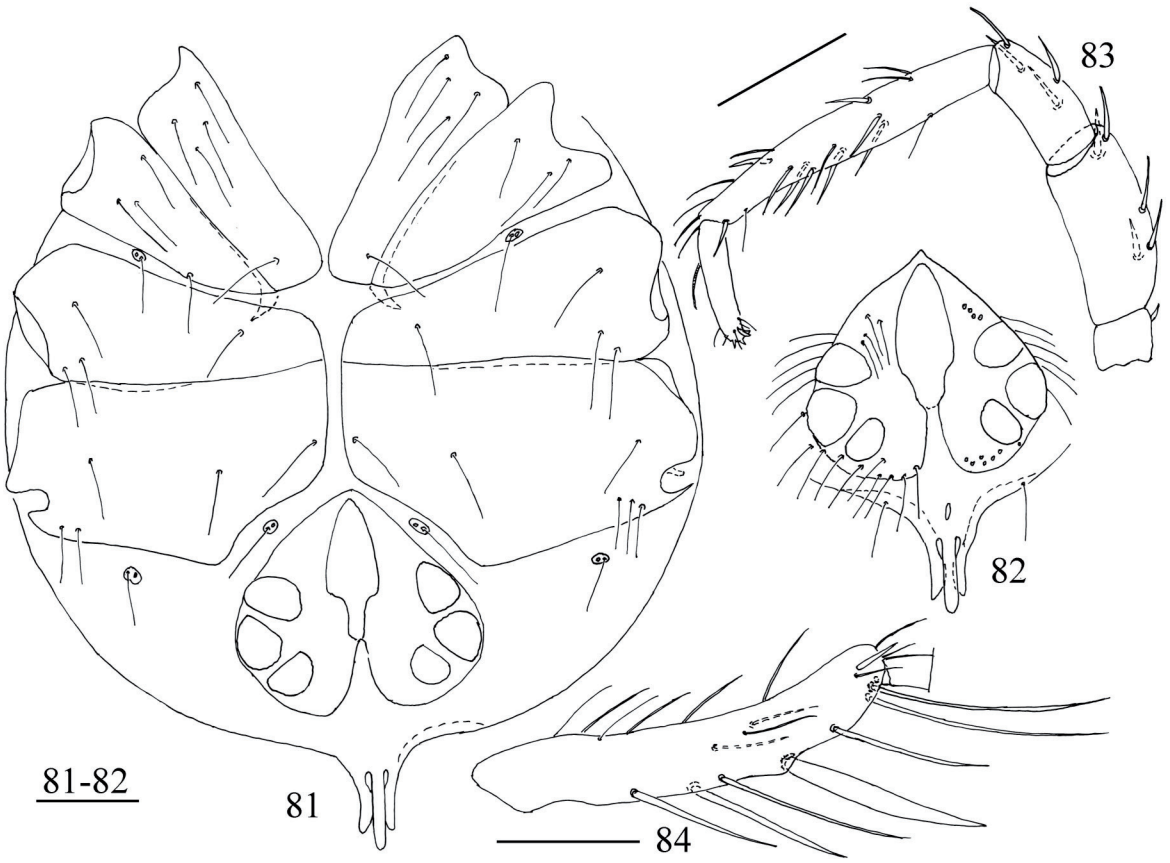
Deutonymph. Unknown.

Larva. Unknown.

Habitat. Pond with macrophytes.

Distribution. Europe, Russia: Yaroslavl Province.

Remarks. The male of the present species is similar to North American species *H. microporus* Cook, 1970 in which also lacking fusion of the coxal groups. The central piece of the petiole in *H. microporus* large, much longer than both lateral pieces, with straight distal end; III–Leg–4 with distodorsal and distoventral curved blade-like setae [Cook, 1970]. In contrast, the central piece of the petiole in *H. virens* moderately in size, slightly longer than the lateral both lateral pieces, with rounded distal end; III–Leg–4 with single distoventral sword-like seta.



Figs. 81–84. *Hydrochoreutes virens* Tuzovskij, 1990, male: 81 – ventral view; 82 – external genital organ and petiole; 83 – pedipalp, lateral view; 84 – genu of leg III. Scale bars: 100 μm.

Рис. 81–84. *Hydrochoreutes virens* Tuzovskij, 1990, самец: 81 – вентральная сторона; 82 – наружный генитальный орган и петиолус; 83 – педипальпа, боковая сторона; 84 – колено ноги III. Шкалы: 100 μm.

Key to adults of the Russian species of the genus *Hydrochoreutes*

Males

1 (14) Coxal groups variously fused to each other, IV–Leg–4 with dorsodistal and ventrodistal blade-like setae

2 (7) All coxal groups are fused together medially to form a single coxal shield

3 (4) Central piece of petiole indented distally (Fig. 14) …..… *H. krameri* Piersig, 1896

4 (3) Central pieces of petiole not indented distally

5 (6) IV–Leg–3 with two ventral setae near middle of segment (Fig. 43), P–4 with 11 thick setae (Fig. 41) ..... *H. cooki* Tuzovskij, 2003

6 (5) IV–Leg–3 with one ventral setae near middle of segment (Fig. 68), P–4 with 9 thick setae (Fig. 66) ..... *H. similis* Tuzovskij, 2003

7 (2) Medial margins of coxal plates I–III separated and coxal plates IV are fused together in posterior half

8 (9) Central piece of petiole considerably longer than lateral pieces (Figs. 2–3) .... *H. ungulatus* (Koch, 1836)

9 (8) Central piece and lateral pieces of petiole equal or nearly equal in length

10 (11) IV–Leg–4 with long dorsal and short ventral blade–like setae (Fig. 80) .... *H. magadanicus* Tuzovskij, 1977

11 (10) IV–Leg–4 with subequal dorsal and ventral blade–like setae

12 (13) Central piece of petiole with equal in length medial tooth and lateral teeth (Fig. 51–52), P–4 with 6–8 thick setae (Fig. 54) .... *H. orientalis* Tuzovskij, 2003

13 (12) Central pieces of petiole with long medial tooth and short lateral teeth (Figs. 24–27), P–4 with 8–11 thick setae (Fig. 28) .... *H. wolgaensis* Tuzovskij, 2001

14 (1) All coxal groups are separated (Fig. 81), IV–Leg–4 with single ventrodistal sword–like setae only (Fig. 84) ..... *H. virens* Tuzovski, 1977

Females

1 (4) Excretory pore surrounded by sclerotized ring

2 (3) Genital plates rounded posteriorly and with 12–17 slender setae each (Figs. 18–19), P–4 with 10–12 thick setae (Fig. 22) ..... *H. krameri* Piersig, 1896

3 (2) Genital plates with posterior ledge and with 17–24 slender setae each (Figs. 31–33), P–4 with 13–16 thick setae (Fig. 36) .... *H. wolgaensis* Tuzovskij, 2001

4 (1) Excretory pore has only anterior and posterior anal sclerites

5 (8) Genital plates rounded posteriorly

6 (7) P–4 with 14–17 thick setae (Fig. 49), anterior and posterior anal sclerites relatively large and subequal in sizes (Figs. 47–48) ..... *H. cooki* Tuzovskij, 2003

7 (6) P–4 with 12–13 thick setae (Fig. 62), posterior anal sclerite larger than anterior sclerite (Figs. 60–61) ..... *H. orientalis* Tuzovskij, 2003

8 (5) Genital plates has a posterior angular ledge

9 (10) P–4 with 15–18 thick setae (Fig. 12), anterior and posterior anal sclerites small and subequal in size (Figs. 9–11) ..... *H. ungulatus* (Koch, 1836)

10 (9) P–4 with 8–13 thick setae (Fig. 75), anterior anal sclerite considerably lesser than posterior sclerite (Figs. 73–74) .... *H. similis* Tuzovskij, 2003

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REFERENCES

Cook D.R., 1956. Preliminary studies of the Tiphysinae of the United States (Acarina: Pionidae) // Annals of the Entomological Society of America, 49. P. 264-272.

Cook D.R., 1970. North American species of the genus *Hydrochoreutes* (Acarina: Pionidae) // The Michigan Entomologist, 3(4). P. 108-117.

Cook D.R., 1974. Water mite genera and subgenera // Memoirs of the American Entomological Institute, 21. P. 1- 860.

Lundblad O., 1968. Die Hydracarinen Schwedens. III // Arkiv för Zoologi, (2) 21 (1). S. 1-633.

Marshall R., 1937. Preliminary list of the Hydracarina of Wisconsin. Part V // Transactions of the Wisconsin Academy of Sciences, 30. P. 225-251.

Piersig G.R., 1897–1900. Deutschlands Hydrachniden // Zoologica. Stuttgart, 19 (22). P. 1-601.

Prasad V., Cook D.R., 1972. The taxonomy of water mite larvae // Memoirs of the American Entomological Institute, 18. P. 1-326.

Smith I.M., 1976. A study of the systematic of the water mite family Pionidae (Prostigmata: Parasitengona) // Memoirs of the Entomological Society of Canada, 98. P. 1–249.

Smith I.M., Oliver D.R., 1976. The parasitic associations of larval water mites with imaginal aquatic insects, especially Chironomidae // The Canadian Entomologist, 108. P. 1427-1442.

Smith I.M., Oliver D.R., 1986. Review of parasitic associations of larval water mites Acari: Parasitengona: Hydrachnida) with insect hosts // The Canadian Entomologist, 118. P. 407-472.

Soar C.D., Williamson W., 1929. The British Hydracarina. III. Ray Society, London. 115 p. P. 8 +184

+ 40.
Sokolow I.I., 1940. Hydracarina – vodyanye kleshchi. Chast' I. Hydrachnellae. Fauna SSSR (novaya seriya No 20. Paukoobraznye, 5 (2) [Hydracarina – the aquatic mites. Part I. Hydrachnellae. Fauna of the USSR. (nouv. ser., no 20), Arachnides, 5(2)]. Publisher: Nauka, Moscow–Leningrad. P. 1-511 (in Russian).
Tuzovskij P.V., 1977. A new species of water mite from genus *Hydrochoreutes* (Pionidae, Acariformes) // Biology of Inland Waters. Informazionnyi Bulletin, 34. P. 39-44 (in Russian).
Tuzovskij P.V., 1987. Morfologiya i postembrionalnoye razvitiye vodyanykh kleshchej [Morphology and Postembryonic Development in Water Mites]. Nauka, Moscow. 172 p. (in Russian).
Tuzovskij P.V., 1990. Opredelitel' deytonimf vodyanykh kleschej [Key to water mites deutonymphs]. Nauka Publ., Moscow. 238 p. (in Russian).
Viets K., 1936. Wassermilben oder Hydracarina (Hydrachnellae und Halacaridae). In: F. Dahl, ed. // Tierwelt Deutschlands. Jena: G. Fischer. P. 31-32: 1-574.
Viets K., 1956. Die Milben des Süßwassers und des Meeres. Hydrachnellae et Halacaridae (Acari). Zweiter und dritter Teil: Katalog und Nomenklator. Jena: G. Fischer. S. 1-870.
Viets K.O., 1978. Hydracarina // Limnofauna Europaea / Illies J. (Ed.). Stuttgart: G. Fischer. S. 154-181.
Viets K.O., 1987. Die Milben des Süsswassers (Hydrachnellae und Halacaridae [part], Acari. 2: Katalog // Sonderbände des Naturwissenschaftlichen Vereins in Hamburg, 8. S. 1-1012.
Wainstein B.A., 1976. Larvae and classification of the subfamily Pioninae (Hygrobatidae, Acariformes) // Biologiya i sistematika presnovodnykh bespozvonochnykh [Biology and systematics of aquatic invertebrates]. Yaroslavl. P. 29-69 (in Russian).
Wainstein B.A., 1980. Opredelitel' lichinok vodyanykh kleshchej [Key to water mite larvae]. Publisher: Nauka, Leningrad. 238 p. (in Russian).
Wolcott R.H., 1905. A review of the of water mites // Transactions of the American Microscopical Society, 26. P. 161-243.