

Larval morphology of the water mite *Hydrochoreutes krameri* Piersig (Acariformes: Pionidae)

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Tuzovskij, P.V. 2005. Larval morphology of the water mite *Hydrochoreutes krameri* Piersig (Acariformes: Pionidae). *Zoosystematica Rossica*, **14**(1): 31-35.

The larva of the water mite *Hydrochoreutes krameri* is described, and a key to larvae of *Hydrochoreutes* from the fauna of Russia is given.

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Larvae of the genus *Hydrochoreutes* parasitize species of Chironomidae (Smith & Oliver, 1976, 1986; Oliver & Smith, 1980). The first data on morphology of *Hydrochoreutes* larvae are contained in Piersig's works (1895, 1896-1899), in which the anal plates of *H. unguulatus* (Koch, 1836) and *H. krameri* are described. The larva of *H. unguulatus* is characterized by the long posteromedial conic projection of the anal plate, while the larva of *H. krameri* has a short one. These features were used as the characteristics of larvae of *H. krameri* and *H. unguulatus* by Soar & Williamson (1927), Viets (1936) and Sparing (1959). Wainstein (1976, 1980) gave a more detailed description of *H. krameri* larva, but he apparently misidentified the species. In the present work, the larva of *H. krameri* is described in detail and a key to the *Hydrochoreutes* larvae from the fauna of Russia is given.

The following abbreviations are used: *c1* – coxal seta located posteromedially on coxa I, *c2* – coxal seta located posterolaterally on coxa I, *c3* – coxal seta located posterolaterally on coxa II, *c4* – coxal seta located anteriorly on coxa III; *tmas* – transverse muscle attachment scar.

Hydrochoreutes krameri Piersig, 1896 (Figs 1-16)

Material examined. 23 larvae, received from three females: 2 females and 12 larvae from Samara Prov., 1 female and 11 larvae from Yaroslavl Prov. (P.V. Tuzovskij). Each mature female was contained in a separate glass cylinder 10-15 mm in diameter and 10 mm in height. The duration of embryonal period was 7-12 days at room temperature.

Description. Larva (nomenclature of body setae and lyriform organs according to Tuzovskij, 1987). Body plates with scale-like porous sculpture. Dorsal shield weakly convex anteriorly and rounded posteriorly, with small anterolateral in-

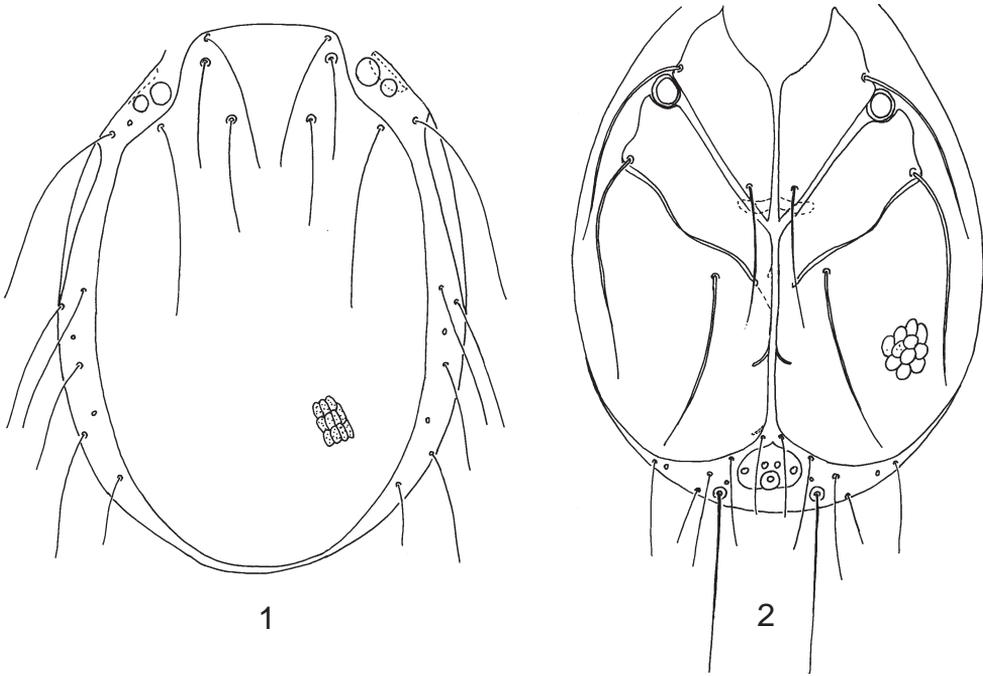
cisions containing eyes (Fig. 1). Anterior eyes slightly larger than posterior. Trichobothria *Fp* and *Oi* equal in length and shorter than setae *Fch*; setae *Vi* longer than *Fch*. Setae *Ve* the longest, setae *Le* the shortest on the interscutal membrane of dorsum. The first pair of lyriform organs (*i1*) near the eyes; *i2* behind humeral setae, *i3* between setae *Sci* and *Sce*.

Suture line between coxae II and III distinct (Fig. 2), but incomplete and not reaching their medial margins. Medial apodemes of coxa I and III rather well developed, but apodemes I larger than apodemes III. Medial coxal apodemes II very weakly developed, frequently completely absent. Posteromedial parts of coxae III usually without *tmas*, sometimes rudimentary *tmas* present on one coxa. Internal seta (*c1*) on coxa I shorter than external seta (*c2*). Setae *c1*, *c2* and *c3* subequal in size. Setae *Ci* (the longest in posterior part of body) located on small bases. Setae *Si* shorter than other ventral setae. Fourth pair of lyriform organs (*i4*) situated near setae *Le*, the fifth pair (*i5*) located in an interspace between the anal plate and bases of setae *Ci*.

Anal plate transverse, wider than long (Figs 3-6). Anal opening at a small projection in posterior part of anal plate. Posterior edge of this projection variable in shape, sometimes extended beyond posterior margin of anal plate. Anal setae form almost regular transverse row in centre of anal plate, or setae *Ai* located slightly in front of setae *Ae*. Setae *Ai* slightly shorter than setae *Ae*.

Capitulum (Fig. 7) with wide basal part; its ventral setae shorter than dorsal ones. Chelicerae with basal segments strongly expanded proximally, tapering distally (Fig. 8). Stylet of chelicera crescent, with sharp top and without distal teeth (Fig. 9).

Dorsodistal setae of femur and genu of pedipalps subequal in size (Fig. 10); lateral genu seta



Figs 1, 2. *Hydrochoreutes krameri*, larva, body: **1**, dorsal view; **2**, ventral view.

relatively long and thick; tibia with 3 thin setae of equal size and with large dorsodistal claw (Fig. 11). Pedipalpal tarsus bearing setae of various length, length of one of them nearly equal to thickness of lateral genu seta; proximal solenidion relatively short.

Chaetotaxy of leg segments, except eupathids, as in Figs 12-14. Solenidia on tibia of leg I located together at distal end of segment, those on tibia of legs II separated in distal half of segment. Tibiae of all legs bearing 2 long swimming setae increasing in length from leg I to leg III. Tarsus of leg I with short claws and empodium (Fig. 15); tarsi of legs II and III with relatively long claws and empodium (Fig. 16).

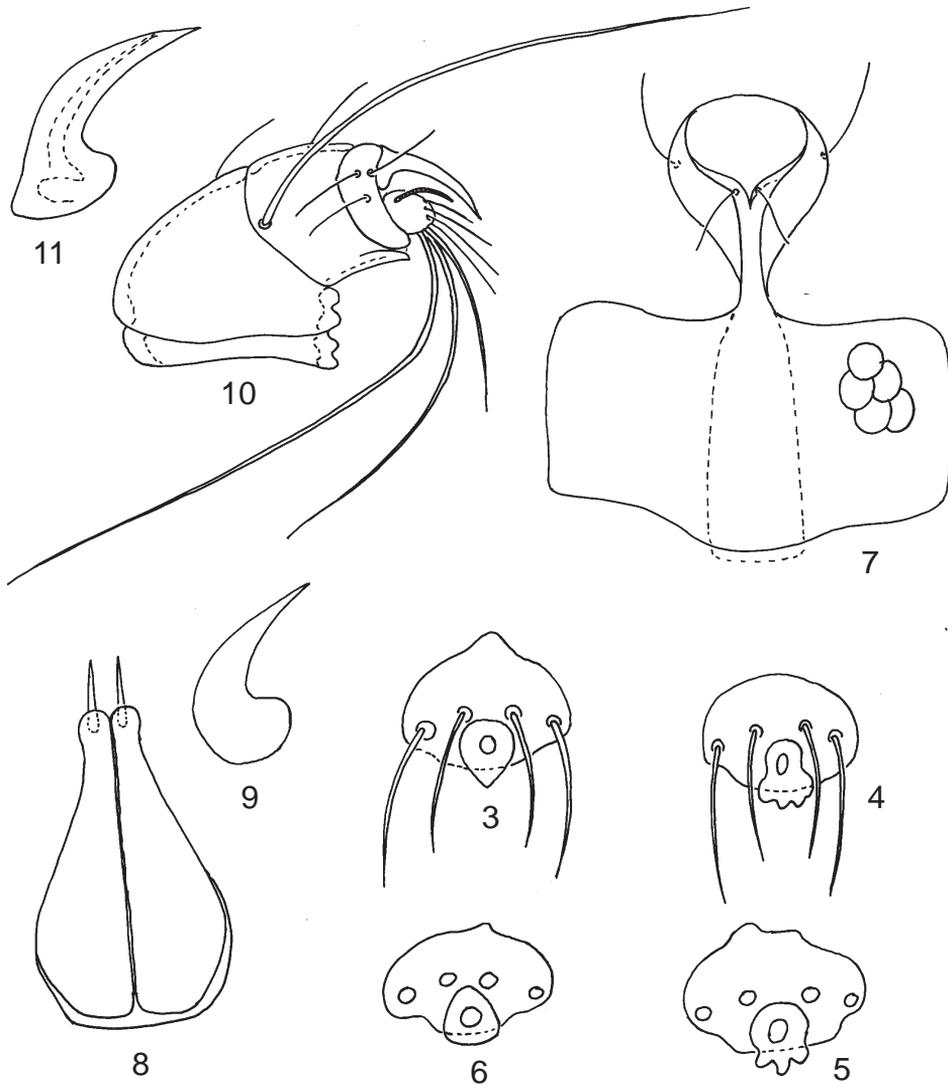
Measurements, μm . Length of dorsal plate 230-260, its width 145-175; length of anal plate (without posteromedial projection) 20-25, its width 30-35; length of medial edge of coxae I 64-70, that of coxae II+III 102-109; dorsal length of pedipalp segments (P1-P5): 5-7, 25-32, 20-24, 6-8, 5-6; dorsal length of leg segments 1-5: leg I – 32-40, 30-40, 30-35, 40-48, 56-65; leg II – 30-40, 35-40, 34-42, 50-55, 68-77; leg III – 38-42, 38-42, 32-40, 48-55, 70-80.

Comparison. Larva of *H. krameri*, according to Wainstein (1976), is characterized by the dorsal shield rather large (length 290 μm); all setae of dorsal shield equal in length; suture line be-

tween coxae II+III distinctly developed in about 1/3 of their lateral part; length and width of anal plate equal (30-32 μm). According to our data, larva of *H. krameri* has the dorsal shield smaller (length 230-260 μm); trichobothria shorter than tactile setae of dorsal shield; suture line between coxae II+III distinctly developed over almost all their width and absent only on their most medial edge; anal plate transverse (length 20-25 μm , width 30-35 μm).

Seven species of *Hydrochoreutes* are recorded from Russia: *H. unguatus*, *H. krameri*, *H. virens* (Tuzovskij, 1977), *H. wolgaensis* (Tuzovskij, 2001), *H. cooki*, *H. orientalis* Tuzovskij and *H. similis* (Tuzovskij, 2003). Only for *H. virens* the larva is unknown. Larvae of *H. cooki*, *H. orientalis* and *H. similis* are characterized by the transverse anal plate and short posteromedial projection. The shape and sizes of the anal plate of the larva described as *H. krameri* by Wainstein (1976) are similar to those in *H. wolgaensis* larva, but in the last species setae *Vi* are longer than other setae of dorsal shield, suture line between coxae II and III is distinctly developed over 4/5 of their width, and posteromedial parts of coxae III have transverse scars (tmas).

Hence, the larva described as *H. krameri* by Wainstein (1976) does not refer to this species.



Figs 3-11. *Hydrochoreutes krameri*, larva: 3-6, anal plate; 7, capitulum, ventral view; 8, chelicerae; 9, stylet of chelicera; 10, pedipalp, lateral view; 11, claw of pedipalpal tibia.

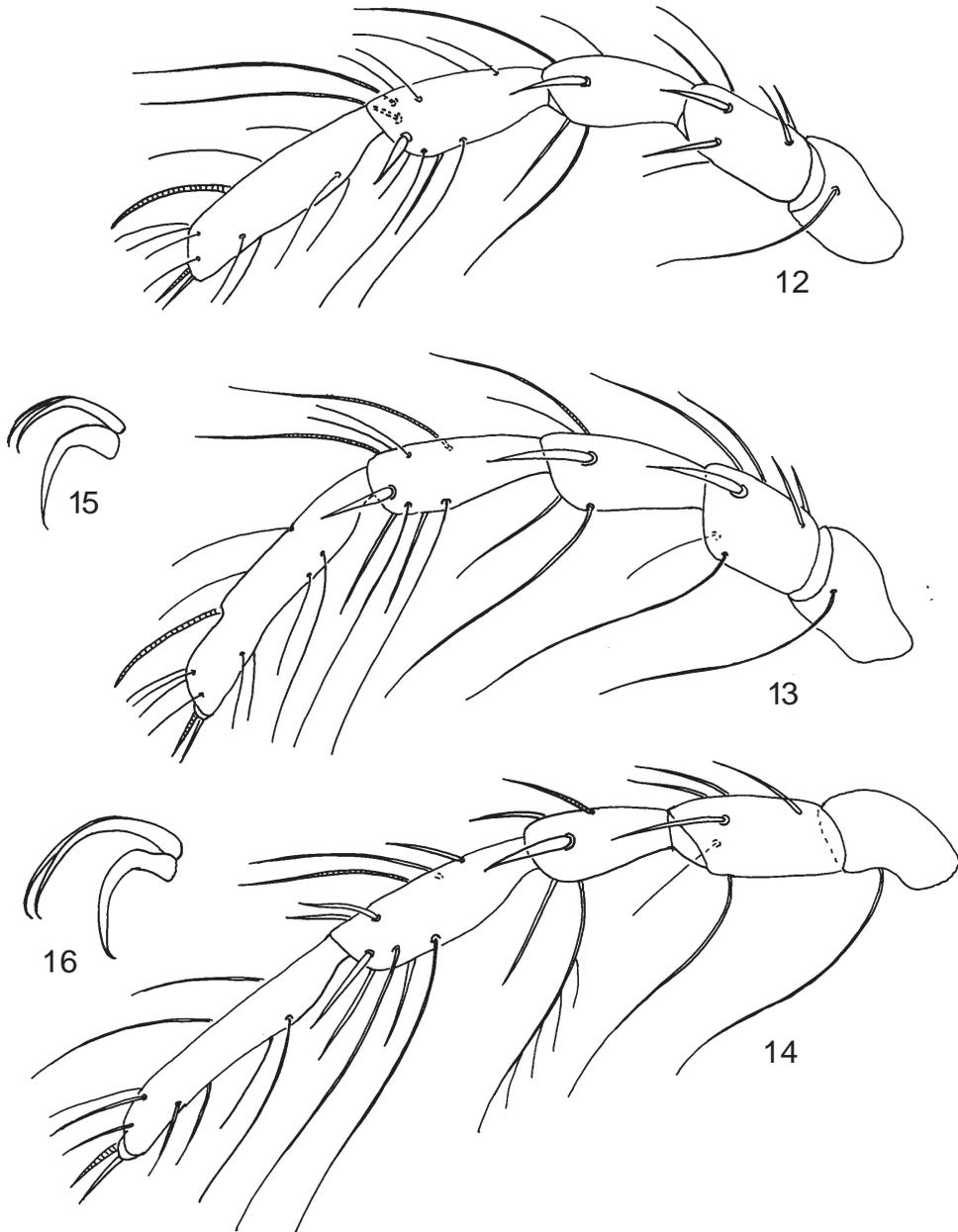
Key to *Hydrochoreutes* larvae

- 1(2) Anal plate with posteromedial projection elongate, extending markedly beyond posterior margin of plate **H. unguatus**
- 2(1) Anal plate with posteromedial projection short, extending weakly beyond posterior margin of plate.
- 3(10) Posteromedial part of coxa III with distinct tmas.
- 4(5) Suture line between coxae II and III complete **H. cooki**
- 5(4) Suture line between coxae II and III incomplete, reduced on medial edges of coxae.
- 6(7) Anal plate as long as wide **H. wolgaensis**
- 7(6) Anal plate wider than long.

- 8(9) Anal opening at the base of posteromedial projection of anal plate; setae *Ai* and *Ae* equal in length ... **H. orientalis**
- 9(8) Anal opening distant from the base of posteromedial projection of anal plate; setae *Ae* longer, than *Ai* ... **H. similis**
- 10(3) Posteromedial part of coxa III without tmas **H. krameri**

Acknowledgements

The work was supported by the Russian Foundation for Basic Research, project no. 03-04-49081.



Figs 12-16. *Hydrochoreutes krameri*, larva: 12, leg I; 13, leg II; 14, leg III; 15, claws of leg I; 16, claws of leg III.

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Received 15 March 2005