

## LARVAL MORPHOLOGY OF THE WATER MITE *LEBERTIA Densa* (ACARIFORMES, LEBERTIIDAE) AND REDESCRIPTION OF ADULTS

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ABSTRACT: The first illustrated description of the water mite larva *Lebertia densa* is given.

Key words: Lebertiidae, *Lebertia densa*, water mite, larva, morphology

### INTRODUCTION

The water mite *Lebertia densa* Koenike, 1912 is a morphologically polymorphic species (Viets 1987) widely distributed in Europe and Asia. As a result of strong morphological variation, seven species and one subspecies have been described which all were attributed to *L. densa* by Viets (1987). With the exception of the nominal subspecies, two other subspecies are considered to be valid: *L. (Mixolebertia) densa aberrans* Sokolow, 1934 and *L. (Mixolebertia) densa tenuis* Walter (Viets 1987). Larvae are unknown for all above species and subspecies. The purpose of this paper is to describe the larva of *L. densa* and give a brief redescription of the adults.

### MATERIAL AND METHODS

Adult mites are collected by the author in Kamchatka, Magadan and Yaroslavl Provinces, Russia. Larvae *Lebertia densa* were reared by the author from three females: 2 females and 10 larvae from Kamchatka Province, 1 female and 5 larvae from Yaroslavl' Province. Each mature female was placed in a separate glass cylinder 10–15 mm in diameter and 10 mm in height. The duration of the embryonic period was 12–17 days at the room temperature.

In the present work the nomenclature of the idiosomal setae and lyriform organs are given after Tuzovsky (1987) with the following modifications: s — solenidion, ac — acanthoid seta; P1–5, pedipalp segments (trochanter, femur, genu, tibia and tarsus); leg I: 1–6 — first leg, segment 1–6 (trochanter, basifemur, telofemur, genu, tibia and tarsus).

#### *Lebertia (Mixolebertia) densa densa* Koenike, 1902

Figs 1–4.

**Larva.** Dorsal shield in unengorged larva covers large part of dorsum (Fig. 1, a). Anterior margin of dorsal shield straight and wide, lateral margins undulate and converging in posterior part at sharp

angle. Dorsal shield bears 4 pairs of setae: 2 pairs of simple setae (Fch, Vi) and 2 pairs of trichobothria (Fp, Oi). Simple setae long and thick; anterior setae (Fch) shorter and thinner than posterior setae (Vi). Both pairs of trichobothria short and thin, equal in sizes and split at apex. Dorsal shield with porous and reticulated sculpture. Nine pairs of long setae (Oe, Hi, He, Sci, Sce, Li, Le, Si, Se) and 4 pairs of lyriform organs (i1–i4) situated on soft wrinkled membrane. Caudal setae slightly longer thinner than others dorsal setae, located on soft membrane. Lateral eyes convex, situated on small plate (Fig. 1, b).

Anterior coxae of legs separated from coxae II and III. Coxae II and III fused to each other, suture between them developed only in their lateral parts (Fig. 1, c). Setae on coxa III slightly longer than setae on coxae I and II, which approximately equal in length. Posterior edge of coxae III has 2 of subequal setae (Pi, Pe). Coxa I with convex anterior margin, coxa III with posteromedial obtuse extension. All leg coxae have porous reticulated pattern consisted of elongated cells.

Urstigma lateral to border between coxae I and II, covered by flaps (Fig. 2, a).

Anal plate (Fig. 2, b) usually with convex anterior margin; if anterolateral margins straight then they form blunt angle; posterior margin of convex. Both pairs of anal setae subequal, anal opening situated between setae Ae in posterior part of anal plate.

Capitulum (Fig. 2, c) elongated with wide long base and relatively narrow and short rostrum. Mouth cavity oval; anterior setae longer than posterior ones.

Chelicera with large basal segment, its dorsal margin convex, ventral margin concave (Fig. 2, d). Cheliceral stylet relatively small, crescent, with two small subapical teeth.

Pedipalpal trochanter (Fig. 2, e) glabrous; femur with single dorsal seta; genu with two unequal proximal setae. Pedipalpal tibia with dorsodistal

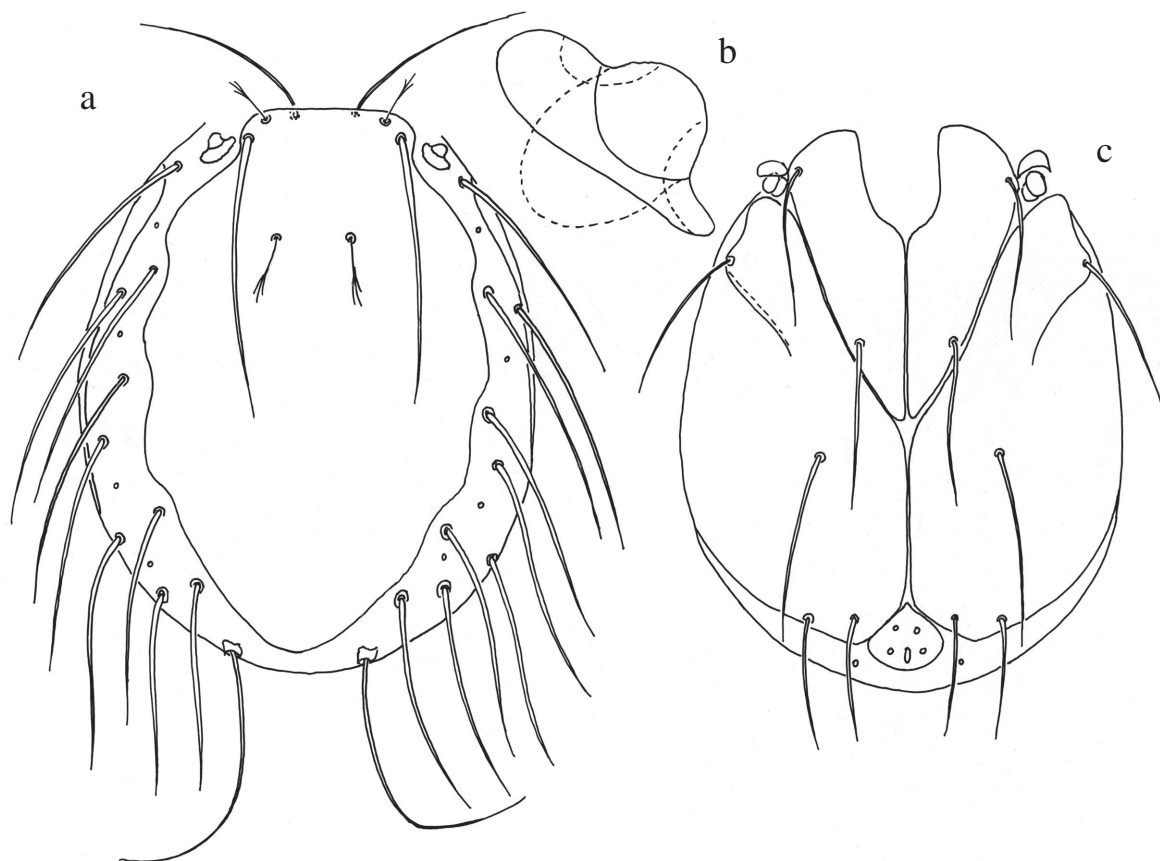


Fig.1. *Lebertia densa*, larva: a — dorsal view, b — eye plate, c — ventral view.

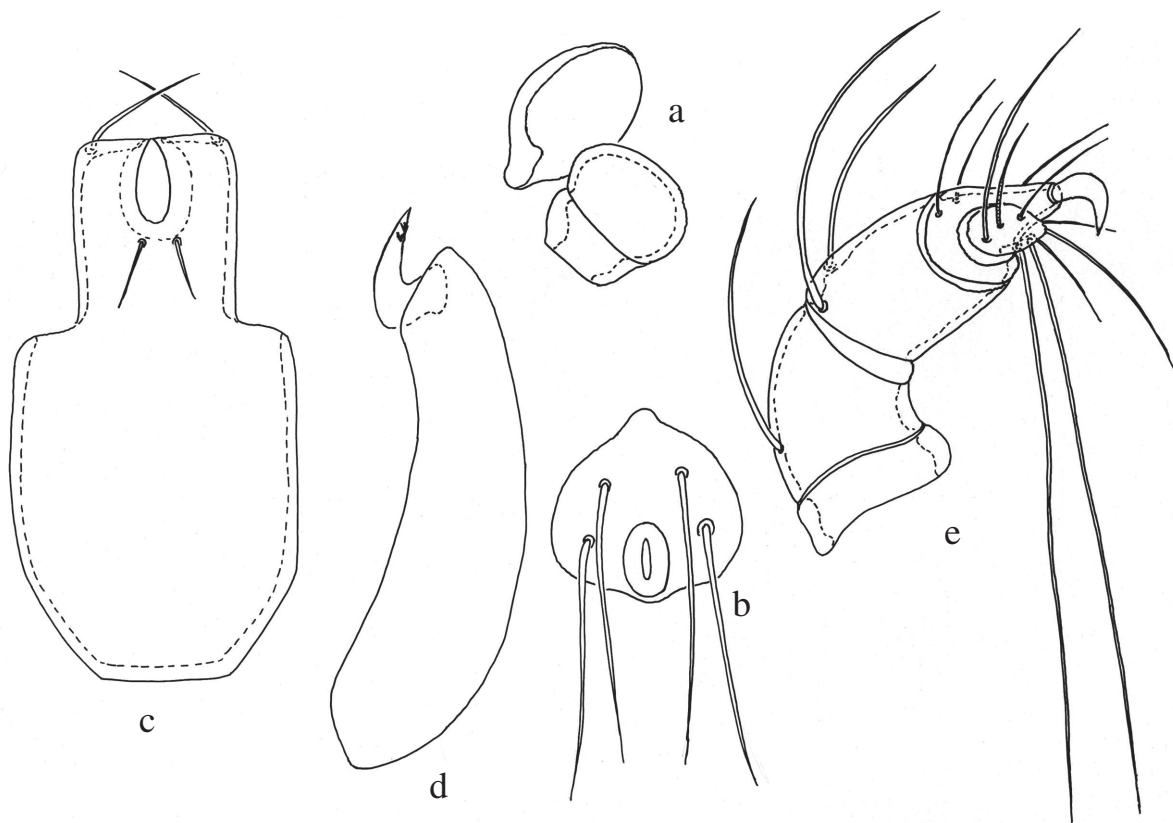


Fig. 2. *Lebertia densa*, larva: a — urstigma, lateral view; b — anal plate; c — capitulum, ventral view; d — chelicera, lateral view; e — pedipalp, lateral view.



Fig. 3. *Lebertia densa*, larva: a — leg I, b — leg II, ñ — leg III, d — acanthoid seta on tarsus I, e — claws of leg I, f — claws III.

projection, bearing thick claw; with two thin unequal proximal setae and one dorsodistal thin seta. Length of pedipalpal tibia is more than its height. Pedipalpal tarsus with two very long subequal setae; solenidion and all short setae longer than this segment. Total number of setae on legs I–III except for eupathidia, as follows (number of sensilla shown in parenthesis): leg I 1–5: 1, 7, 5 (s), 10 (2s), 15 (s, ac); leg II 1–5: 1, 7, 5 (s), 11 (2s), 15 (s, ac); leg III 1–5: 1, 6, 5 (s), 10 (s), 11.

Basifemur and telofemur of all legs (Fig. 3, a–c) fused to each other, with indistinct suture line. Trochanter I has short thick seta, trochanters II and III have long seta. Both tibial solenidia II subequal, located together in distal part of tibia. Bases of solenidia on tibia II widely separated, proximal solenidion situated close to middle of tibia II. Distal solenidion on genu III and proximal solenidion on tibia III equal in length. Acanthoid setae are present only on tarsus I and II. Acanthoid seta on tarsus I (Fig. 3, d) crescent, on tarsus II bent two-times.

Empodium on tarsus of all legs thick short, ambulacra long and thin. Empodium I (Fig. e) shorter than empodia II and III (Fig. 3, f). All claws in distal part have 2 additional teeth.

**Measurements** (in  $\mu\text{m}$ ). Length of dorsal shield 300–320, its width 180–190; length of medial margin of coxae I 95–112, length of medial margin of

coxae II+III 112–125; length of anal plate 32–38, its width 35–48; length of basal segment of chelicera 85–109, length of the cheliceral stylet 12–16; length of pedipalpal segments (P1–5): 13–16, 38–55, 32–38, 23–29, 12–16. Length of leg segments — leg I 1–5: 35–45, 50–60, 55–68, 73–87, 70–100; leg II 1–5: 45–58, 55–65, 60–70, 85–100, 95–120; leg III 1–5: 54–60, 64–70, 65–75, 90–100, 115–130.

**Female.** Setae Fch (Fig. 4, a) longer and thicker than others idiosomal setae. Coxal shield (Fig. 4, b) transverse, in mature females occupies about half of ventral surface. Suture line between coxa II 2.5–3.4 times shorter than medial part of coxa I. Posteromedial angles of coxa IV wide, rounded, anterior and posterior margins of these coxae parallel to each other. Genital flaps wide, with 15–19 medial and 2–3 lateral thin setae. Anterior and, especially, posterior genital sclerite well developed. Posterior acetabula shorter than two subequal anterior pairs of acetabula. Basis of ventral seta of pedipalpal femur (Fig. 4, c) situated at 1/4 of length of this segment from its distal end. Ventral tibial setae subdivide pedipalpal tibia into 3 equal parts, distal seta shorter and thicker than proximal one. Legs long and thin, without swimming setae. Trochanter of legs IV with 5–9 stout dorsal setae, tarsus of leg IV with 3–7 short thick setae. Ambulacra

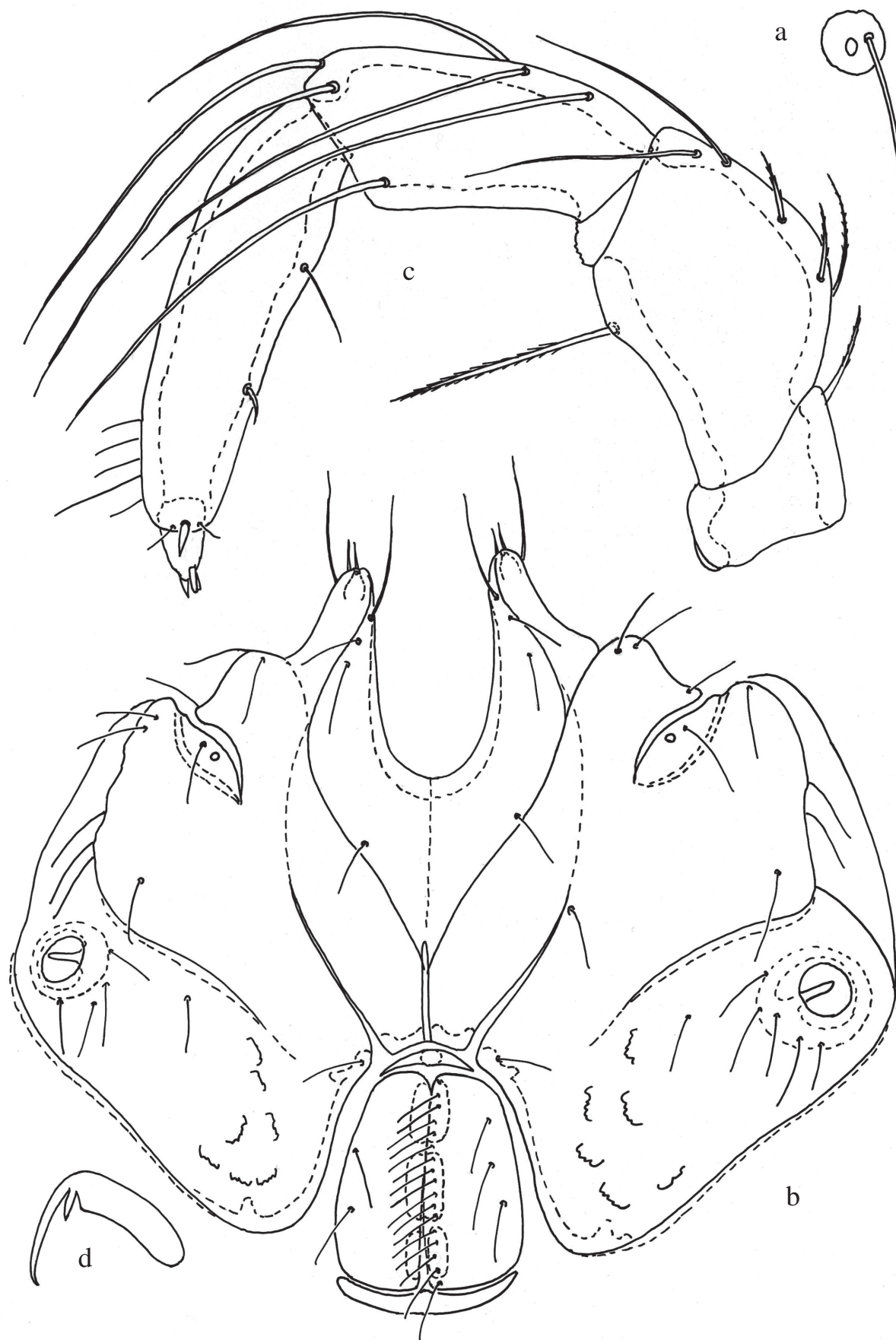


Fig. 4. *Lebertia densa*, female: a — setae Fch, b — coxal shield, c — pedipalp, lateral view, d — ambulacrum.



(Fig. 4, d) with weakly developed lamella, external clawlet 3–4 times is longer than internal one.

**Measurements.** Length of body 1100–1600; length of coxal shield 715–770, its width 800–900; length of medial part of coxae I 190–220, length of suture line between coxae II 60–95; length of genital flaps 200–260, their width 80–90; length of genital acetabula (ac. 1–3) 70–80, 60–70, 48–55; length of capitulum 210–230; length of basal segment of chelicera 235–280, length of cheliceral stylet 36–42; length of pedipalpal segments (P 1–5) 36–50, 100–125, 105–125, 145–165, 25–40. Length of leg segments: leg I 1–6 — 75–90, 100–165, 105–140, 160–190, 175–205, 175–190; leg II 1–6 — 85–100, 120–195, 135–165, 200–245, 250–310, 225–260; leg III 1–6 — 90–105, 150–235, 180–220, 265–315, 330–385, 285–320; leg IV 1–6 — 165–205, 205–280, 275–335, 345–410, 355–410, 315–360.

**Male** similar to female, from which differs by smaller sizes and number of genital setae. Genital flaps with 25–35 medial and 4–6 lateral setae.

**Measurements.** Length of body 1100–1470, length of coxal shield 625–735, its width 740–840; length of medial part of coxae I 180–220, length of suture line between coxae II 60–95; length of genital flaps 160–220, their width 65–75; length of genital acetabula (ac. 1–3) 54–66, 54–60, 42–48; length of capitulum 150–220; length of basal segment of chelicera 205–275, length of cheliceral stylet 35–45; length of pedipalpal segments (P 1–5) 30–40, 90–120, 95–130, 125–165, 25–40. Length of legs segments — leg I 1–6: 75–90, 90–145, 100–140, 135–195, 155–215, 150–180; leg II 1–6: 75–100, 100–180, 120–165, 180–270, 220–320, 190–255; leg III 1–6: 75–105, 115–220, 115–220, 175–335, 215–395, 200–330; leg IV 1–6: 135–215, 180–280, 240–345, 295–425, 305–425, 280–370.

**Material examined.** 7 females and 2 males from Azabach'e lake Ust'-Kamchatsk Distr., Kamchatka Province, 25.06.1983; 2 females and 3 males from the Anadyr river, Anadyr Distr., 20.08.1981, 2 females and 1 male from Jack London lake Yagodnoe Distr., 21.09.1984, 4 female and 4 males (20.08.1982) from the Pucheveem river (inflow of the Chaun river) Chaun Distr., Magadan Province; 11 females and 9 males (June-September 2004) from Rybinsk reservoir near settlement Borok Nekouz Distr., Yaroslavl Province.

## DISCUSSION

The larva of *L. densa* is similar to the larva of *L. dubiaeformis* and differs from it by the following characters (character states of *L. dubiaeformis* are in parenthesis from Wainstein, 1980): dorsal shield with straight anterior margin (convex); the pedipalpal tibia longer than wide (equal); the pedipalpal tarsus is extending the dorsodistal end of the tibia (not extending); the solenidion and all short tactile setae on the tarsus are longer than the segment (solenidion and one seta are shorter); the anterior margin of the anal plate rounded or the anteriolateral margins of the anal plate are forming a blunt angle (straight, converging at the right angle and forming a large extension).

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