New species of *Hoplopleura* (Anoplura: Hoplopleuridae), parasites of *Ochotona* (Lagomorpha: Ochotonidae)

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Mammals of the genus *Ochotona* Link are parasitized by lice *Hoplopleura ochotonae* Ferris. This species was found on *Ochotona alpina* Pall., *O. daurica* Pall., *O. roylei* Ogilby and *O. hyperborea* Pall. Two new species are described: *Hoplopleura bilobata* Sosnina & Dubinina, sp. n. from *Ochotona (Conotoa) macrotis* Günther (Kirghizia and Tajikistan) and *Hoplopleura uralensis* Sosnina, sp. n. from *Ochotona (Pika) hyperborea uralensis* Flerov, a subspecies isolated in the Polar Ural by Pleistocene glaciation from the main distribution range of the species east of the Yenisei. In addition to females and males, eggs and larvae of all stages are described for *H. bilobata*, and larvae of two stages for *H. uralensis*.

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The louse *Hoplopleura ochotonae* Ferris, described from *Ochotona cansa* Lyon (=*O. pusilla* Pall.) from China (type), *O. daurica* Pall. from Mongolia, and *O. roylei* Ogilby from Baltistan (Ferris, 1922), is known as parasite of pikas (*Ochotona*). In the former Soviet Union, this louse was for the first time recorded by Dubinin (1948) as *Ferrisiella ochotonae* (Ferris, 1922) from *O. alpina* and *O. daurica* in Chita Province. Later it was discovered on *O. daurica* in southwestern Transbaikal (Zarubina, 1963a, 1963b, with description of male); on *O. roylei* in Kazakhstan (Bezukladnikova, 1967); on *O. hyperborea* Pall. in the West Sayan (Zarubina & Shtilmark, 1969).

Specimens of *Hoplopleura emarginata* Ferris were recorded from *O. hyperborea* (Zarubina, 1963a; Zarubina & Shtilmark, 1969; Yakuba & al., 1970; Volkov & al., 1978), a species widely spread in the Asian part of Russia, east of the Yenisei. Identification of the species not substantiated by morphological characterization casts some doubt. *H. emarginata* was described by Ferris (1922) from Chinese chipmunk *Sciurotamias davidianus* Milne-Edwards, a representative of the family Sciuridae (Rodentia). The records from *Ochotona* could have been accidental.

Examination of 6 specimens of *Ochotona rutila* Severtz. in Kazakhstan (Bezukladnikova, 1962) and 82 specimens of this species in Tajikistan (Sosnina & Davydov, 1973) revealed no lice.

The louse *H. ochotonae* was identified from *O. roylei macrotis* Günther (=*O. macrotis*) from Tajikistan (Sosnina & Davydov, 1973) and Kirghizia (Sosnina & al., 1988) and also from *O. hyperborea uralensis* Flerov in the Polar Ural (Sosnina & Novozhilova, 1986). This subspecies of the northern pika inhabits an area widely separated from ranges of other pikas. It was discovered by Flerov (1927) in an area isolated by Pleistocene glaciation that covered the territory between the Urals and Yenisei.

Re-examination of pika lice from Tajikistan, Kirghizia and Polar Urals showed that *O. macrotis* and *O. hyperborea uralensis* are actually parasitized by two new species described below.

Hoplopleura bilobata Sosnina & Dubinina, sp. n. (Figs 1-10)

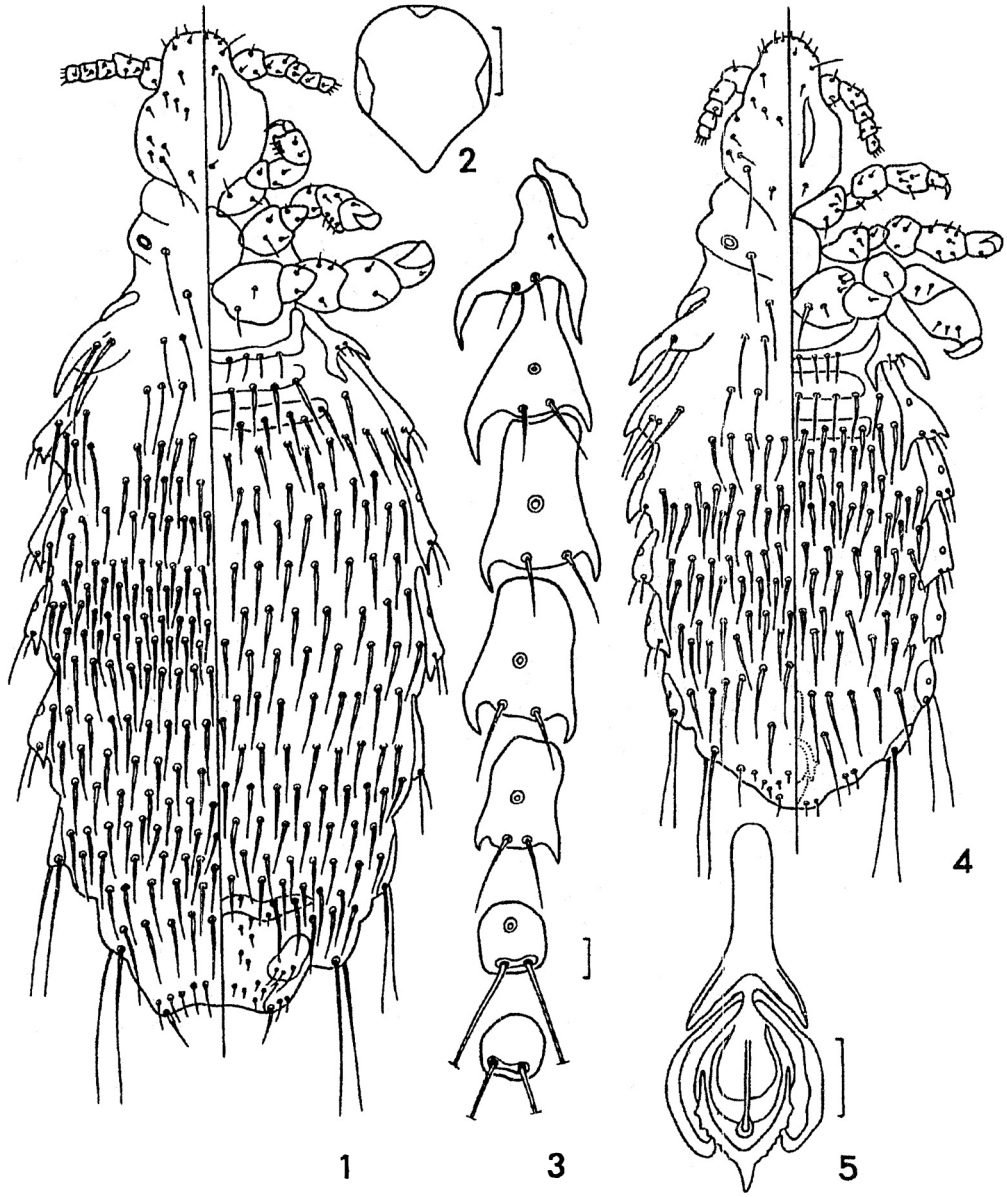
Holotype. ♀ (slide Ana-T-1), **Kirghizia**, *Issyk-Kul' Prov.*, locality Chon-Kyzyl-Su, altitude 2800 m, 14.VII.1975, from *Ochotona (Conotoa) macrotis* Günther (H.V. Dubinina).

Paratypes. **Kirghizia**, *Issyk-Kul' Prov.*, Terskei Ala-Too Range: 2 ♀ from 2 (of 8) pikas, locality Turgen, altitude 2200-2500 m, July 1973; 9 ♀, 15 ♂, 66 larvae, many eggs from 2 (of 6) pikas, locality Chon Kyzyl-Su, altitude 2800 m, July 1974 (H.V. Dubinina). **Tajikistan**, *Badakhshan*: 4 ♀, 2 ♂ and 2 larvae from 4 (of 57) pikas, Sakhdarinsky Range, altitude 3500-4000 m, August 1971 (G.S. Davydova). All specimens collected from *O. (C.) macrotis*. Holotype and paratypes in Zoological Institute, St.Petersburg.

Description. Female (Fig. 1). Body length 0.90-1.37 mm. Head 0.21-0.23 × 0.12-0.15 mm, rounded anteriorly, with notable postantennal angles in front and moderately convex lateral margins. A pair of narrow sclerotized plates present on ventral side near the median line. Sternal plate of thorax (Fig. 2) 0.08-0.10 × 0.07-0.08 mm, rounded in front and on sides, sharpened posteriorly. Hind legs notably thicker than fore and middle legs. Abdomen oval, without tergal plates. Sternal plates relatively weakly sclerotized: sternite II with one pair of sternal plates contacting pleural plates; sternite III with two pairs of sternal plates, the anterior one lacking enlarged paired setae characteristic of this genus. Rows of setae on tergites II and III divided into a medial and a lateral group. Usually 18 transverse rows of setae present dorsally and 16-17 rows ventrally. Dorsal rows on most segments with 12-20, ventral rows with 10-16 setae. Pleural plates (Fig. 3): 1st pair usually small, situated dorsally; 2nd pair narrow in anterior part, divided in posterior part into two lobes of equal length, widely set apart, narrow, strongly bent, sharpened; 3rd pair narrowed anteriorly, with posterior angles forming curved sharpened teeth, ventral tooth longer than the dorsal one; 4th-6th pairs of almost equal width in anterior and posterior parts. Curved teeth in pleural plates of 4th and 5th pairs of approximately equal length; in 6th pair, teeth small, ventral tooth sometimes smoothed or even imperceptible; 7th and 8th pairs of pleural plates rounded, with long paired setae. Pleural plates of 2nd-6th pairs

Table. Measurements of *Hoplopleura bilobata* sp. n. and *H. uralensis* sp. n., mm

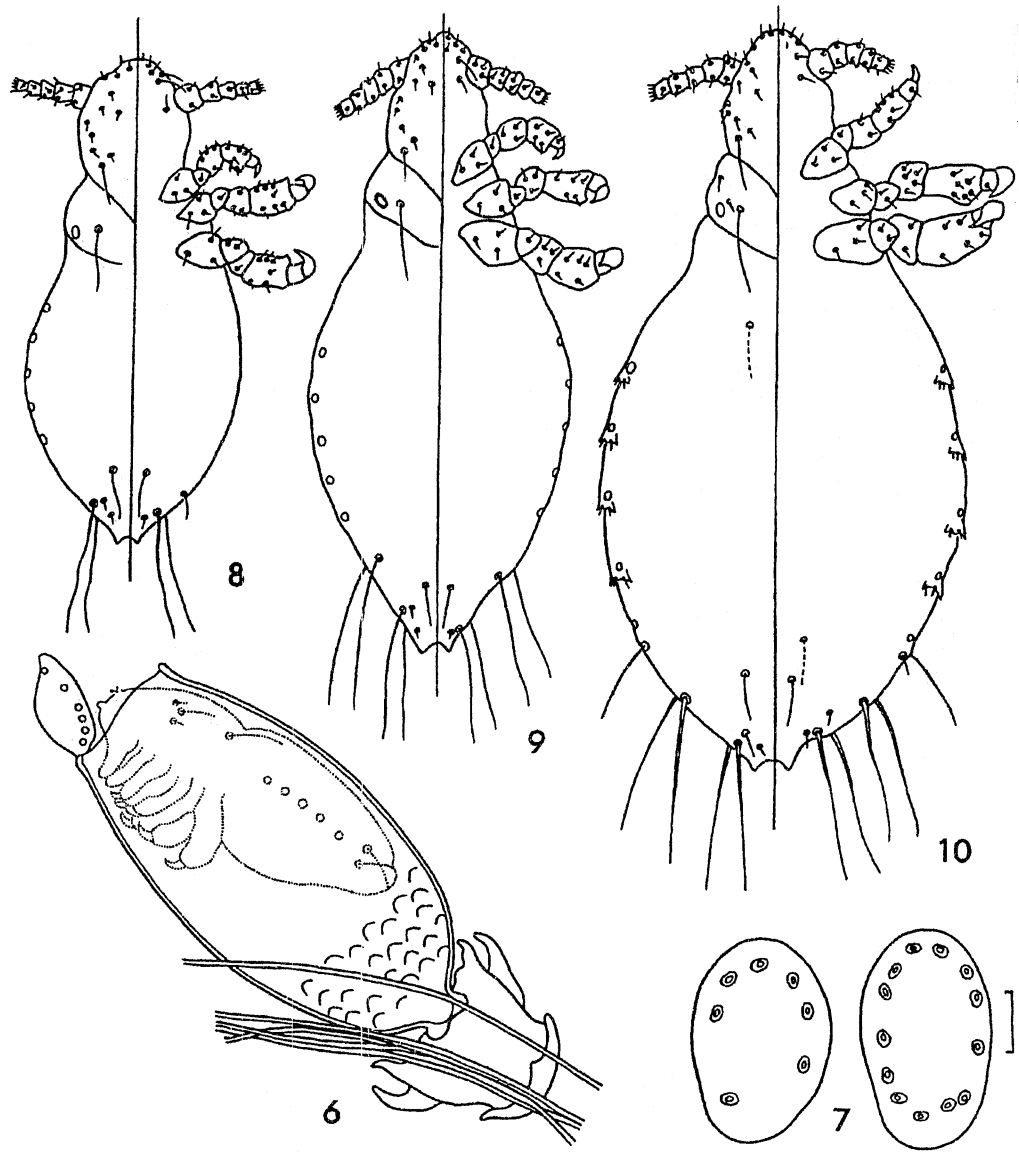
Developmental stages	Characters	*H. bilobata* sp. n.	*H. uralensis* sp. n.
Adults:			
Females	Body length	0.90-1.37	1.20-1.44
	Head:		
	length	0.21-0.23	0.24-0.26
	width	0.12-0.15	0.14-0.16
	Sternal plate of thorax:		
	length	0.08-0.10	0.11-0.12
	width	0.07-0.08	0.09-0.10
Males	Body length	0.76-1.08	1.05-1.25
	Head:		
	length	0.21-0.22	0.24-0.25
	width	0.12-0.15	0.14-0.16
	Sternal plate of thorax:		
	length	0.09-0.10	0.11-0.12
	width	0.07-0.08	0.08-0.09
	Length of copulatory organ	0.15-0.16	0.16-0.18
	Length of paramere	0.06	0.08
Larvae:			
1st stage	Body length	0.47-0.63	0.66-0.73
	Head:		
	length	0.18-0.19	0.20-0.21
	width	0.11-0.14	0.13-0.14
2nd stage	Body length	0.52-0.75	0.78-0.81
	Head:		
	length	0.19-0.21	0.21-0.22
	width	0.11-0.14	0.15-0.16



Figs 1-5. *Hoplopleura bilobata* Sosnina & Dubinina, sp. n. **1-5**, female: **1**, dorsal and ventral view; **2**, sternal plate of thorax; **3**, pleural plates of abdomen; **4-5**, male: **4**, dorsal and ventral view; **5**, copulatory organ. Scale: 0.05 mm.

with posterior marginal setae equal in length to the plate. Genital plate transverse, bent.

Male (Fig. 4). Body length 0.76-1.08 mm. Structure of head, thorax and legs as in female. Head 0.21-0.22 × 0.12-0.15 mm. Sternal plate of thorax 0.09-0.10 × 0.07-0.08 mm. Abdomen oval, without tergal plates. Sternal plates: one on sternite II and two on sternite III, all weakly noticeable. Usually 12 transverse dorsal and ventral rows of setae present. Most segments with 10-15 setae in rows. Pleural plates similar to those of female. Copulatory organ (Fig. 5) 0.15-0.16 mm long, basal plate constituting about half of its length; parameres wide, slightly curved, 0.06 mm long; branches of pseudopenis set widely apart, with small teeth on outer margin.



Figs 6-10. *Hoplopleura bilobata* Sosnina & Dubinina, sp. n. **6**, egg; **7**, operculum of egg; **8-10**, larvae: **8**, 1st stage; **9** 2nd stage; **10**, 3rd stage. Scale: 0.05 mm.

According to our observations, eggs of lice on *O. (C.) macrotis* are mostly dispersed on the head. Their batches were found at the base of the ear, about 300 eggs in one batch. Larvae were located mostly on the back and on the shoulder blades.

Egg (Figs 6, 7) 0.60-0.63 × 0.28-029 mm, with a weakly convex operculum about 56-61 μm high. Located on its periphery are 7-13 (usually 10) micropiles of oval shape, 8 × 11 μm. Glue mass attaches the egg to a bunch of host's hair. The mass has a peculiar form with four pronounced horn-like projections in some cases somewhat smoothed out. Squamous-like structure can be observed on the surface of the basal part of the egg. Some eggs contained developed larvae.

1st stage larva (Fig. 8). Length 0.47-0.63 mm. Head 0.18-0.19 × 0.11-0.14 mm. Abdomen without rudiments of pleural plates. Side

with 5 stigmae corresponding to pleural plates of segments III-VII in adult lice. On the sides of posterior end of abdomen (corresponding to segment IX) dorsally and ventrally there are long setae common in larvae, but absent in adults. Near these long setae on the posterior end of abdomen there are two small setae located one behind the other on the dorsal side and one small seta on the ventral side. On the medial line of abdomen (corresponding to segment VIII) there are two pairs of well-developed setae: one on the dorsal side and one on the ventral side.

2nd stage larva (Fig. 9). Length 0.52-0.75 mm. Head 0.19 × 0.11-0.14 mm. Unlike larvae of the 1st stage, sides of abdomen in front of paired long setae belonging to segment IX with long paired setae belonging to segment VIII.

3rd stage larva (Fig. 10). Length 0.72-0.87 mm. Head 0.20-0.22 × 0.11-0.14 mm. Abdomen without notable segmentation, but on sides, behind stigmae 1st-4th (corresponding to segments III-VI), there are distinct rudiments of pleural plates. There is a pair of short setae on posterior margins of pleural plates. On the sides of the body behind 5th stigma (corresponding to segment VII) there are setae approximately half as long as setae belonging to segment VIII. On the medial line of abdomen, in addition to dorsal and ventral setae belonging to segment VIII, some setae corresponding to other segments may appear. Such isolated setae are shown in the figure by dashed line. The larvae containing a forming female had a length of 0.87 mm.

Comparison. Hoplopleura bilobata sp. n. is similar to *H. ochotonae* Ferris. The former differs in the shape of the sternal plate of thorax, structure of pleural plates of abdomen, especially in the form of the 2nd and 3rd pleural plates. Our description differs from the description of male (Zarubina, 1963b) mainly in the more developed chaetotaxy of abdomen and details of the structure of the copulatory organ.

Hoplopleura uralensis Sosnina, sp. n.
(Figs 11-17)

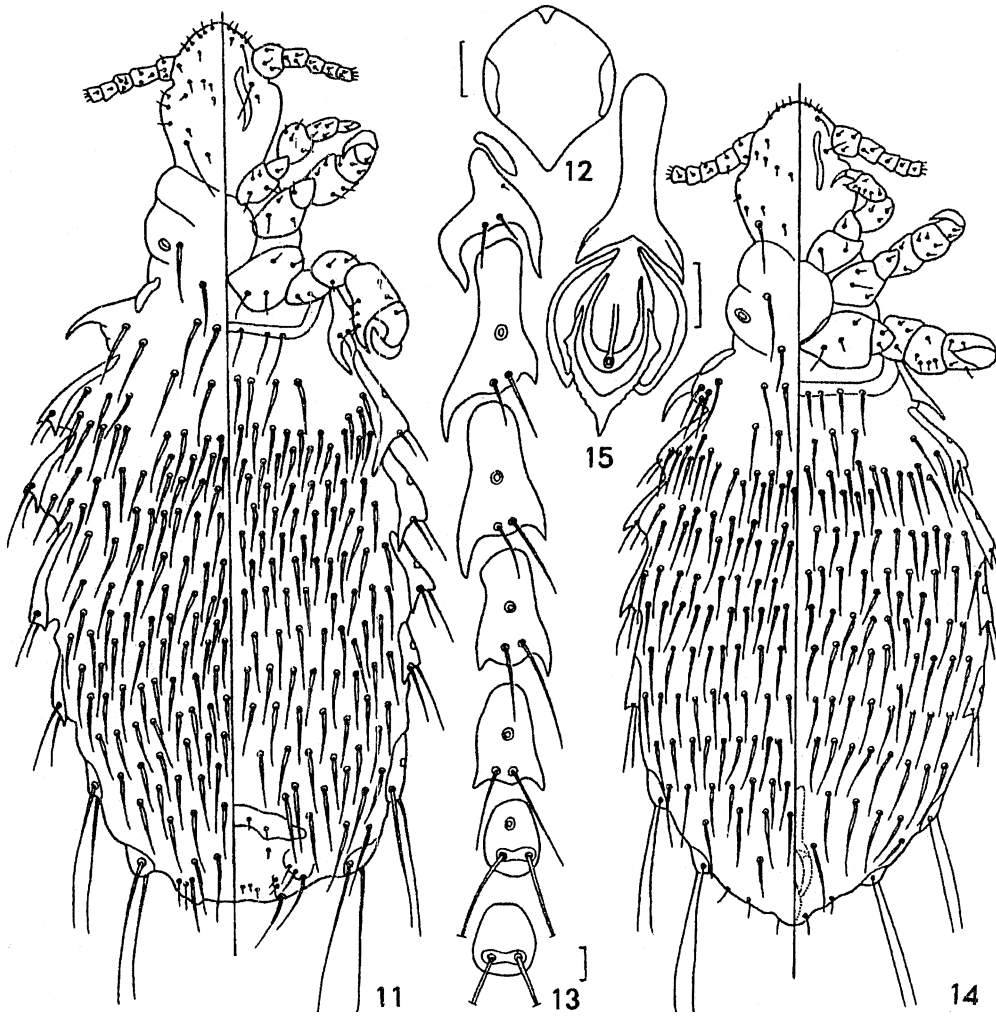
Holotype. ♀ (Ana-T-3), **Russia**, western slopes of the Polar Urals, basin of the Bolshaya Synya River, 5.VIII.1968, from *Ochotona (Pika) hyperborea uralensis* Flerov (E.N. Novozhilova).

Paratypes. Same locality, host and collector as in holotype: 2 ♀, 8 ♂, 3 larvae from 2 (of 8) pikas, July-August 1968; 14 ♀, 7 ♂, 22 larvae from 2 (of 3) pikas, July 1971. Holotype and paratypes in Zoological Institute, St.Petersburg.

Description. Female (Fig. 11). Body length 1.20-1.44 mm. Head 0.24-0.26 × 0.14-0.16 mm, rounded anteriorly, with notable postantennal angles and moderately convex lateral margins, slightly narrowing backwards. Ventral side close to median line with a pair of narrow sclerotized plates. Sternal plate of thorax (Fig. 12) rounded anteriorly and on sides, sharpened towards posterior end, 0.11-0.12 × 0.09-0.10 mm. Hind legs thicker than fore and middle legs. Abdomen oval, without tergal plates. Sternal plate of segment II conspicuous, connecting with pleural plates. Dorsal side usually with 17-18, ventral side with 15-16 transverse rows of setae. Dorsal rows on most segments with 15-20, ventral rows with 15-16 setae. Pleural plates (Fig. 13): 1st pair usually small, 2nd pair narrow in anterior part, divided in posterior part into widely set apart, abruptly bent sharpened lobes of similar length; 3rd and 4th pairs with short dorsal posterior marginal tooth and long curved ventral one on posterior margin; 5th and 6th with short teeth of similar size; 7th and 8th rounded, with a pair of long setae. Posterior marginal setae of 2nd plate subequal in length, relatively short; in subsequent plates setae longer, especially on dorsum; in 5th and 6th plates setae as long as the plate. Genital plate transverse, bent.

Male (Fig. 14). Body 1.05-1.25 × 0.24-0.25 mm. Structure of head, thorax and legs as in female. Head 0.24-0.25 × 0.14-0.16 mm. Sternal plate of thorax 0.11-0.12 × 0.08-0.09 mm. Abdomen oval, without tergal plates. Sternal plate of sternite II conspicuous, contacting pleural plates. Dorsal side with 14-15, ventral side with 12-13 transverse rows of setae; 17-20 setae in each row. Copulatory organ (Fig. 15) 0.16-0.18 mm long; basal plate comprising about half of its length; parameres wide, slightly curved, 0.08 mm long; branches of pseudopenis widely set apart, with small teeth on external margin.

1st stage larva (Fig. 16). Body length 0.66-0.73 mm. Head 0.20-0.21 × 0.13-0.14 mm. Abdomen without rudiments of pleural plates. Sides with 5 stigmae corresponding to segments III-VII, and a pair of long setae common in larvae on the posterior end of body, corresponding to segment IX. Close to them, two small setae are located one behind the other on dorsal side and one seta on ventral side. Dorsal side of abdomen usually



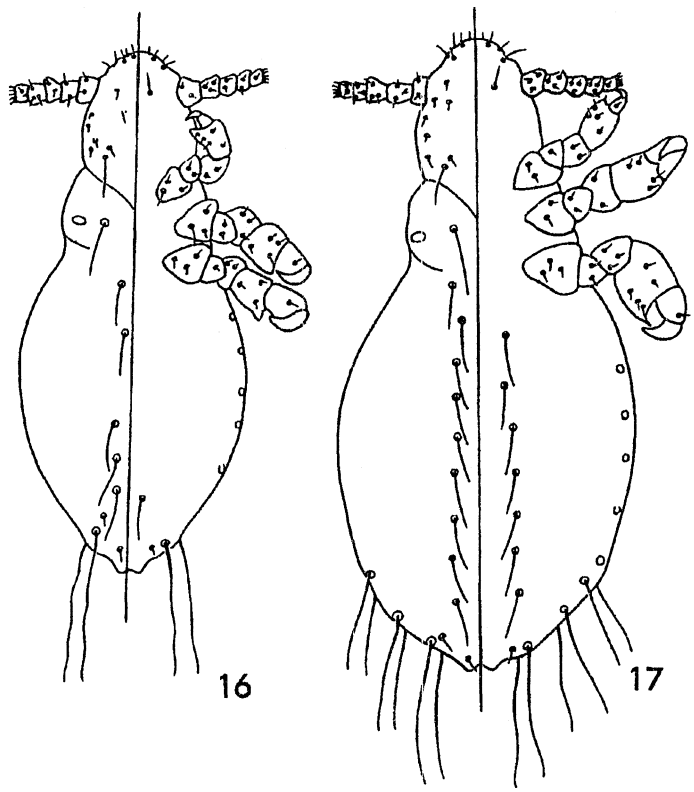
Figs 11-15. *Hoplopleura uralensis* Sosnina, sp. n. **11-13**, female: **11**, dorsal and ventral view; **12**, sternal plate of thorax; **13**, pleural plates of abdomen; **14-15**, male: **14**, dorsal and ventral view; **15**, copulatory organ. Scale: 0.05 mm.

with 5 pairs of fairly long setae along the median line; their arrangement and number (3-6) on left and right side slightly varying. Ventral side with one pair of such setae on the median line close to the posterior end, corresponding to segment VIII.

2nd stage larva (Fig. 17). Body length 0.78-0.81 mm. Head 0.21-0.22 × 0.15-0.16 mm. Unlike larva of the 1st stage, sides of posterior end of abdomen, in addition to long paired setae belonging to segment IX, with paired setae belonging to segments VII-VIII. Dorsal side of abdomen with 9 pairs and ventral side with 7 pairs of setae arranged one behind the other along the median line.

Chaetotaxy of abdomen of the 2nd stage larva was examined in a larva of the 1st stage preparing for molt; setae of the next developmental stage were visible through the integument. Body length of this premolt individual 0.78 mm; head 0.22 × 0.16 mm.

Comparison. Hoplopleura uralensis sp. n. is similar to *H. ochotonae* and *H. bilobata*. It differs from them primarily in the shape of sternal plate of thorax and pleural plates of abdomen (2nd and 3rd plates in particular).



Figs 16-17. *Hoplopleura uralensis* Sosnina, sp. n., larvae. **16**, 1st stage; **17**, 2nd stage.

From *H. bilobata*, the new species differs in the structure of pleural plates of abdomen and in the length of setae on posterior margin of body; the most pronounced difference consists in the larger size of the body and its parts (Table). The larvae of *H. uralensis* differ also in the presence of setae along the median line of abdomen.

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