

The water mite *Frontipoda carpenteri* Halbert, 1911 from Karelia (Acariformes: Oxidae)

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Morphology of female, male and deutonymph of *Frontipoda carpenteri* are described. A key to adult mites of the genus *Frontipoda* from the fauna of Russia is included.

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The genus *Frontipoda* Koenike, 1891 comprises about 40 species (Viets, 1987). In the fauna of the former USSR (Sokolow, 1940), only one species of this genus, *F. musculus* (Müller, 1776), was long known. A new species *F. variabilis* Tuzovskij (Tuzovskij, 2002) from the Magadan Province has been described recently; it is found also in Northern Karelia (Tuzovskij & Shatrov, 2005). One more species (*F. carpenteri* Halbert, 1911) is reported from northern part of Ladoga Lake (Sokolow & Yankovskaya, 1962; Yankovskaya, 1965) on the basis of the data from the paper by Osolin (1931). Actually, Osolin (1931) collected the species from Lake Loimolanjärvi N of Ladoga. Lundblad (1968) considered this record as referring to Finland, but the lake is situated in Russian Karelia. *F. carpenteri* is reported from the following countries: Russia, Finland, Sweden, Ireland, Germany, Switzerland, France, Italy (Osolin, 1931; Viets, 1956, 1978; Schworbel, 1959; Lundblad, 1968).

F. carpenteri is found by me in material from lakes of Northern Karelia. In the present paper, the characteristic of the basic morphological features of adult mites and deutonymph of *F. carpenteri* and a key to the *Frontipoda* adult mites from the fauna of Russia are given.

Frontipoda carpenteri Halbert, 1911 (Figs 1-16)

Material examined (4 ♀, 5 ♂, 1 deutonymph). **Russia, Karelia**, Louhsky Distr., Chupa Bay, Kandalaksha Reserve: Krivo Lake, 1 ♂ 26.VIII.2001, 1 ♂ and 2 ♀ 7.VIII.2002, 2 ♂ and 2 ♀ 4.VIII.2003; Rudnichnoe Lake, 1 ♂ and 1 deutonymph 7.VIII.2002 (leg. A.B. Shatrov).

Female. (Nomenclature of idiosomal setae and lyriform organs follows Tuzovskij, 1987). Colour brown or black-green. Body high and laterally compressed (Fig. 1). Coxae of legs extreme-

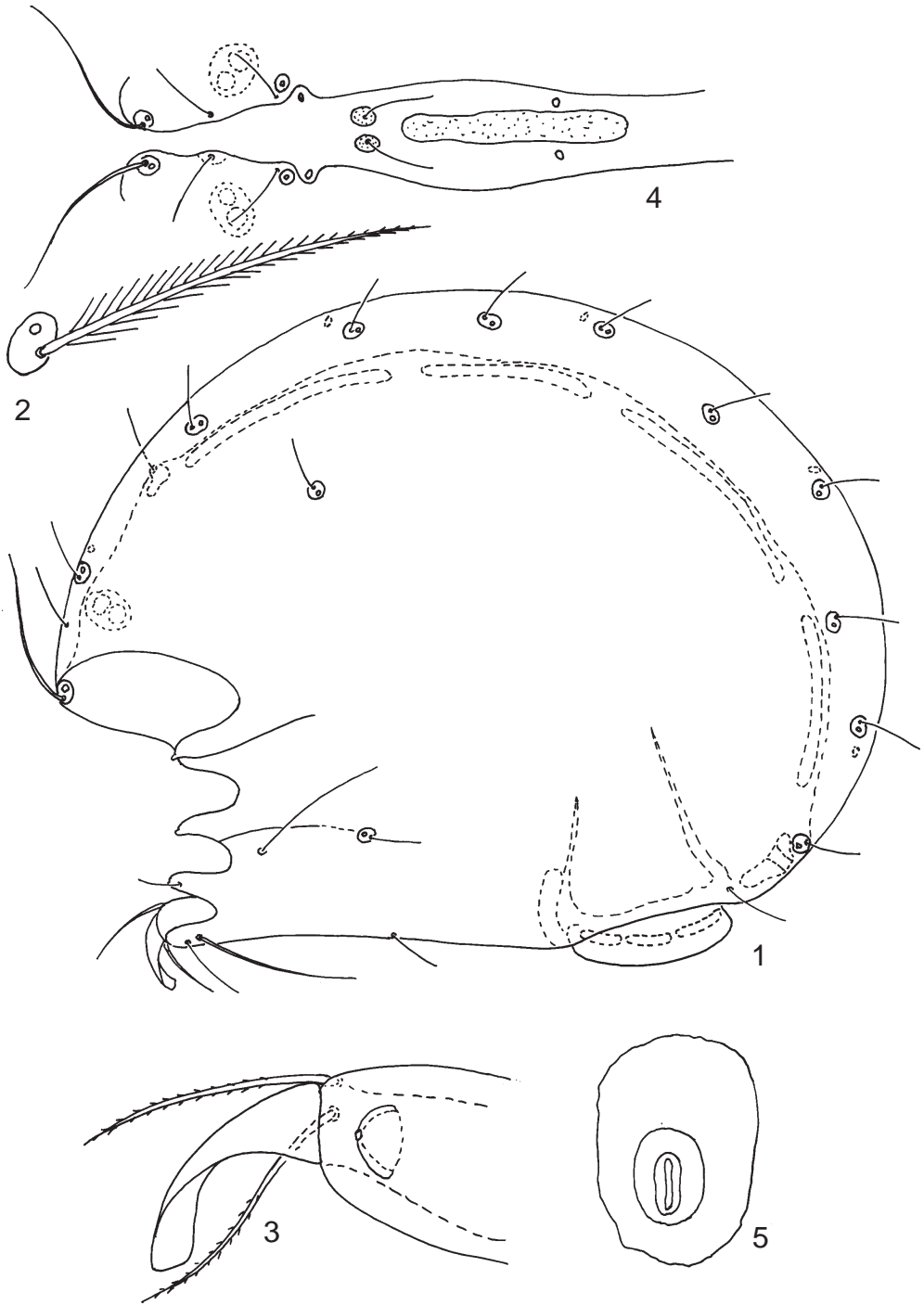
ly large, fused in one shield and covering entire surface of body, except narrow dorsal strip. Most of idiosomal setae situated along lateral edges of coxal shield; setae *Oe* and *Se* slightly removed from these edges; bases of setae *Hv* close to ventral edge of shield. Setae *Fch* (Fig. 2) thick and plumose, other idiosomal setae thin and smooth. Trichobothria *Fp*, *Oi* and setae *Pi* without accompanying glandularia, other idiosomal setae with glandularia. Anterior end of coxa I with wide hyaline projection with flat apex, and with two plumose setae almost equal in length (Fig. 3).

Soft interscutal membrane usually with 5 unpaired narrow plates and 5 pairs of lyriform organs. Setae *Oi* located on minute sclerites (Fig. 4). Some dorsal plates sometimes divided into parts. Excretory pore on separate plate (Fig. 5).

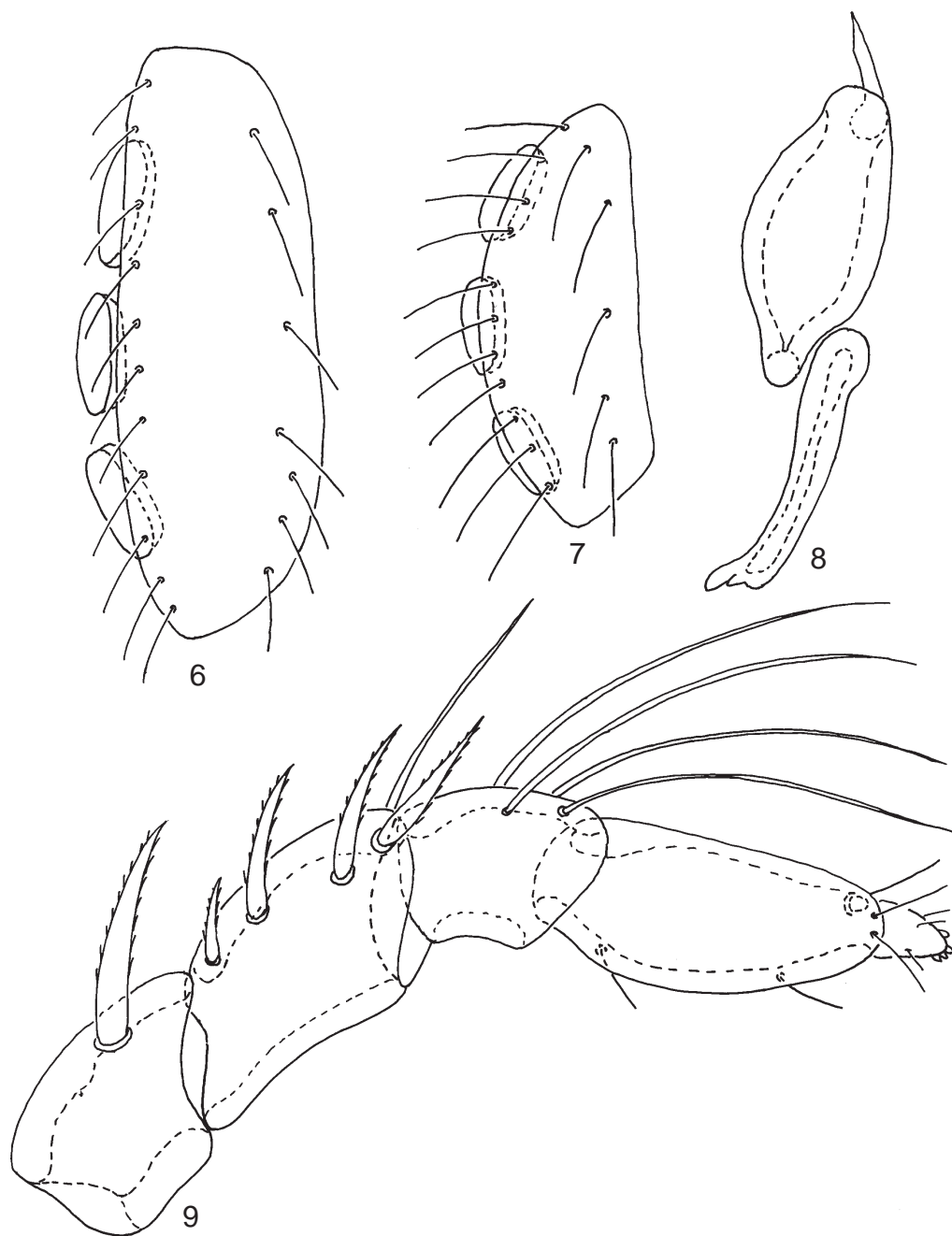
External genital organ situated in posterior part of ventral body surface. Genital flaps (Fig. 6) elongate, ratio length/width = 2.6-3.0. Anterior and median acetabula usually a little longer than posterior acetabula, but sometimes all acetabula equal in size; their total length is much less than length of flaps. Each genital flap with 11-12 medial and 6-7 lateral thin setae.

Chelicera with relatively large basal segment, its dorsal and ventral edges convex; cheliceral stylet small, with pointed apex (Fig. 8).

Dorsal edge of pedipalpal trochanter twice as long as ventral edge and bearing large seta (Fig. 9). Ventral edge of pedipalpal femur weakly concave, its dorsal edge with 5 setae: a thin long and 4 thick, the proximal of these shorter than 3 others. Pedipalpal genu with 4 long setae. Dorsal edge of pedipalpal tibia straight; ventral edge convex. Distal part of tibia with short thick lateral spine and three thin setae; ventral setae widely spaced and dividing this segment in proportion 1-2-1. Tarsus of pedipalp with short thick terminal spines.



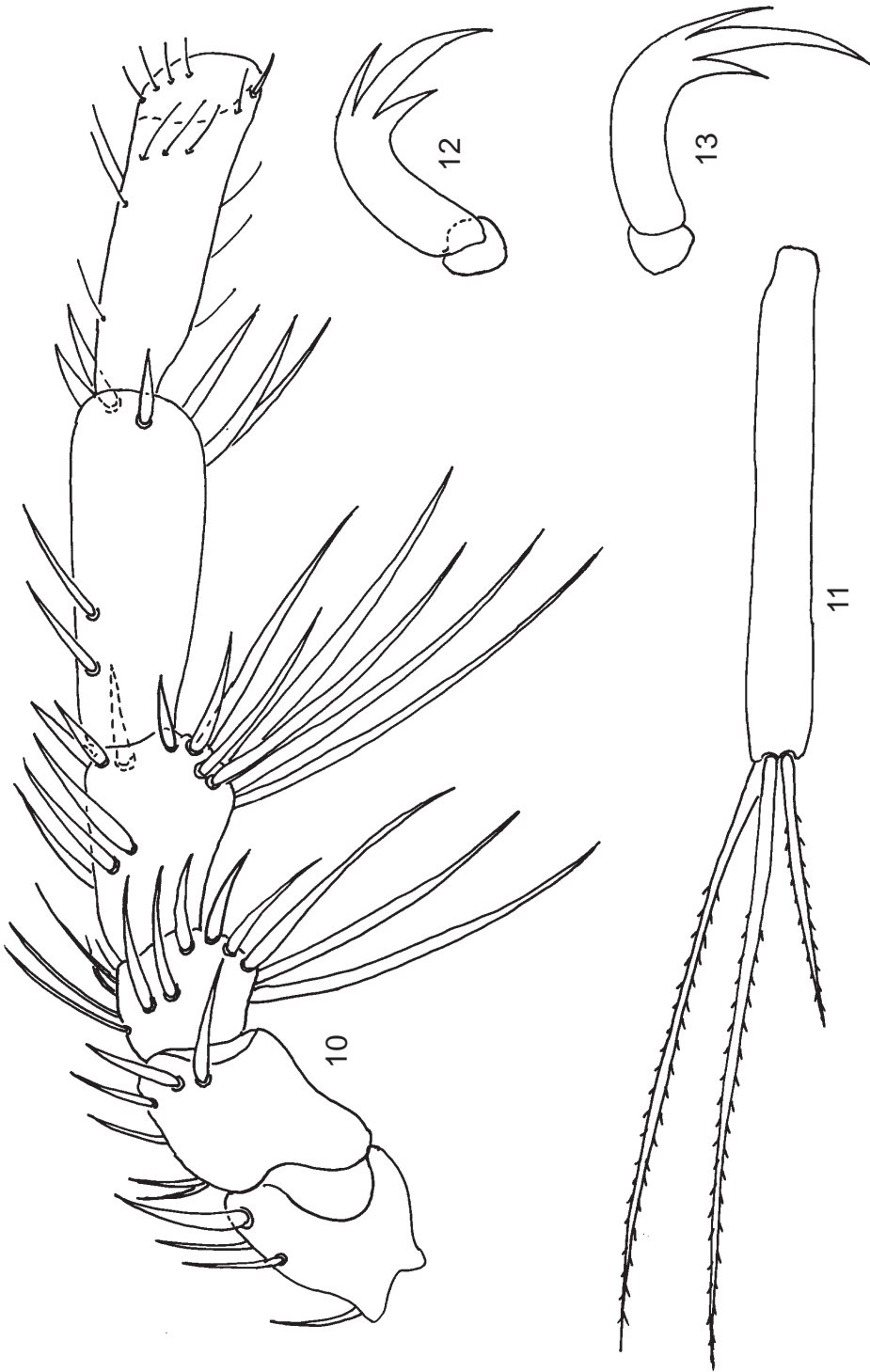
Figs 1-5. *Frontipoda carpenteri*, female: 1, idiosoma, lateral view; 2, seta *Fch*; 3, anterior part of coxa of leg I; 4, anterior part of idiosoma, dorsal view; 5, anal plate, ventral view.



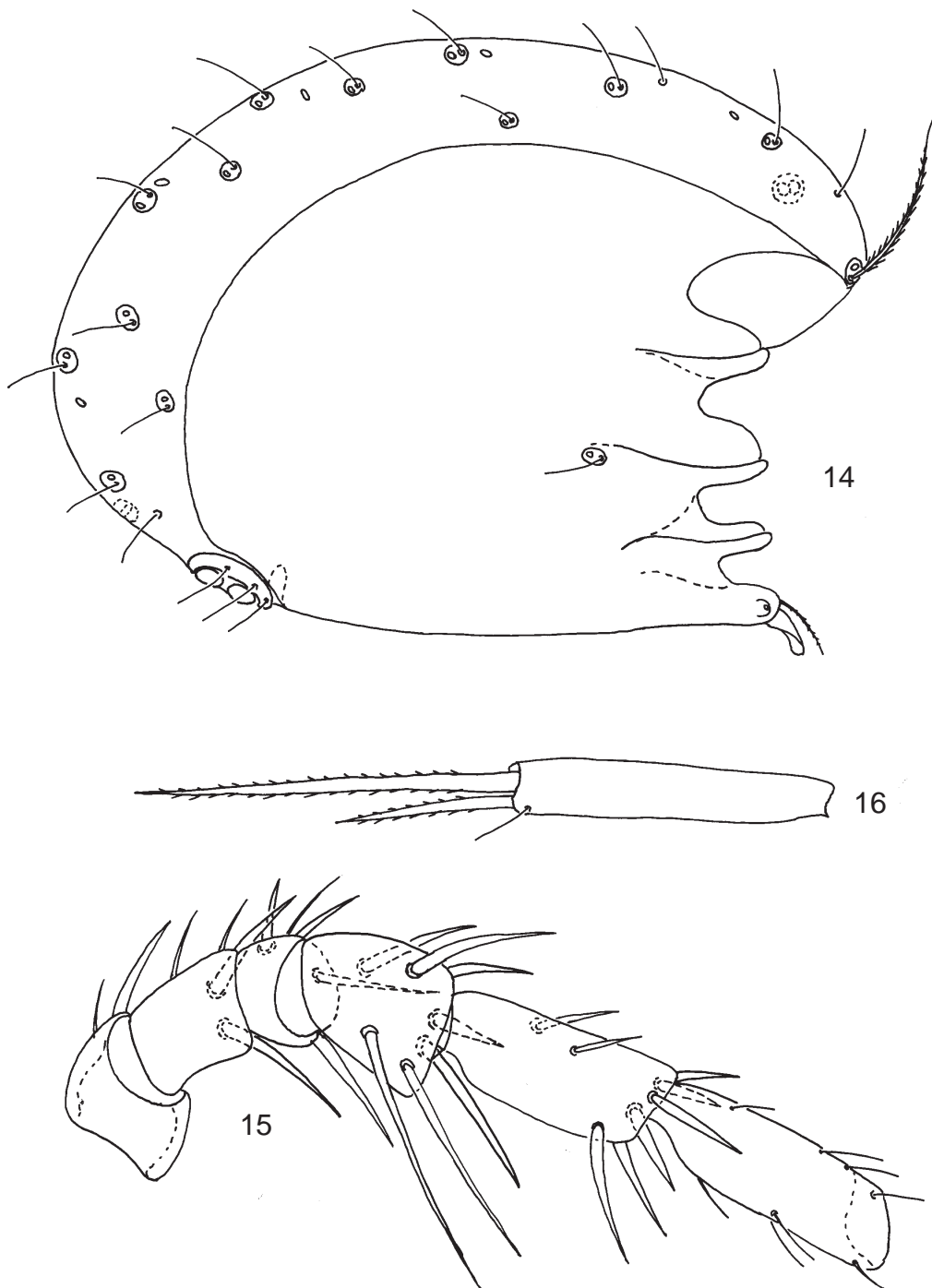
Figs 6-9. *Frontipoda carpenteri* (6, 8-9, female; 7 male): 6-7, genital flap; 8, chelicera; 9, pedipalp.

Anterior legs without swimming setae (Fig. 10). Telo femur and genu of leg I with very long thick ventrodistal setae. Tibia of leg II with 11-12, of leg III with 11-17, of leg IV with 11-13 long swimming setae. Ambulacra of legs I-III each with long

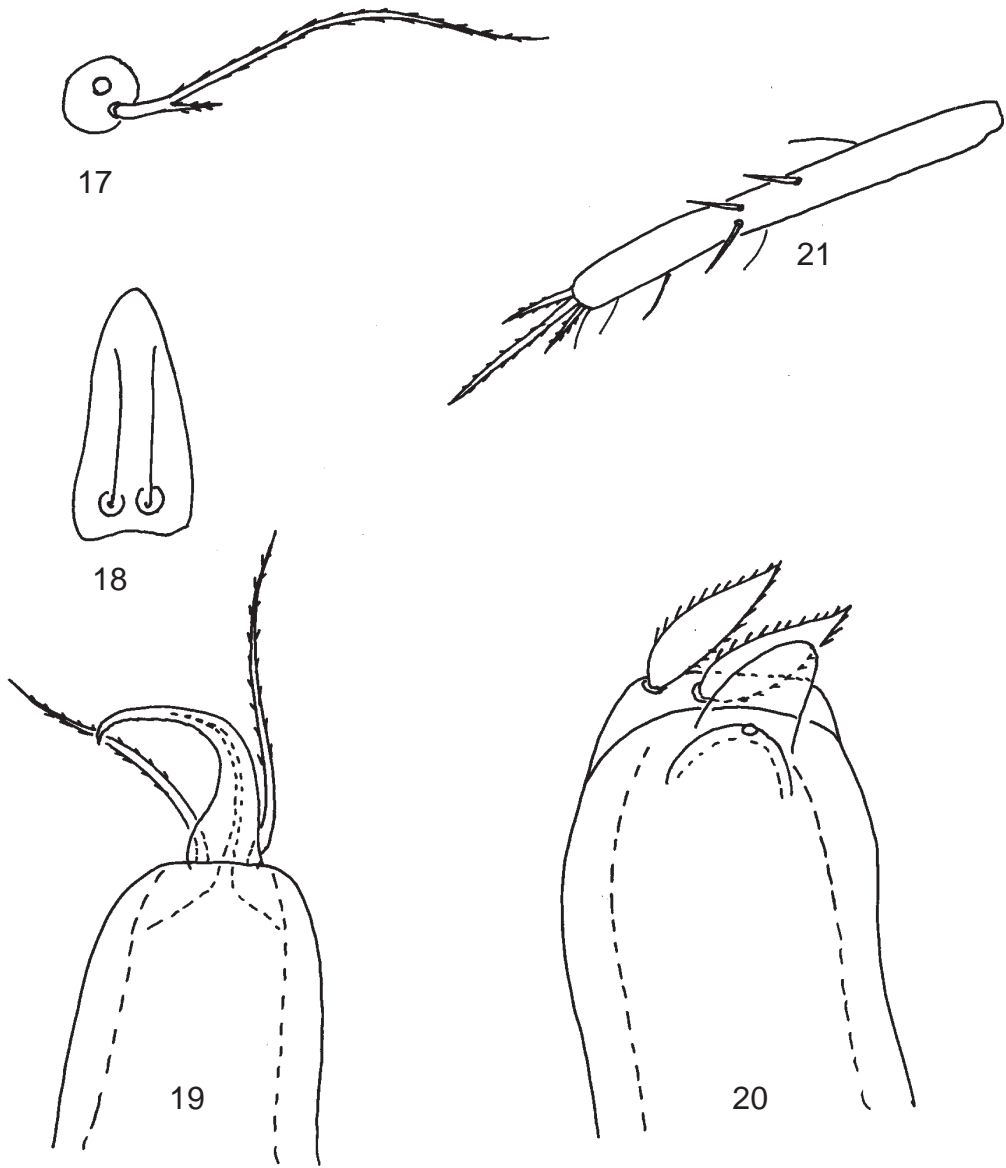
central denticle and 2 small denticles, dorsal and ventral; ambulacra of leg I (Fig. 12) smaller than those of leg II and III (Fig. 13). Tarsus of leg IV with 2 long and 1 short plumose seta in distal part (Fig. 11); both large setae usually equal in length.



Figs 10-13. *Frontipoda carpenteri*, female. **10**, leg I; **11**, tarsus of leg IV; **12**, claw of leg I; **13**, claw of leg IV.



Figs 14-16. *Frontipoda carpenteri*, deutonymph: **14**, idiosoma, lateral view; **15**, leg I; **16**, tarsus of leg IV.



Figs 17-21. 17-19. *Frontipoda variabilis*, female: 17, seta *Fch*; 18, plate with setae *Oi*; 19, anterior part of coxa I. 20-21. *Frontipoda musculus*, female: 20, anterior part of coxa I; 21, tarsus of leg IV.

Measurements, μm . Length of body 900-925, height of body 710-775; length of setae *Fch* 115-130; length of genital flaps 185-200, their width 62-75; length of genital acetabula (ac. 1-3): 50-62, 50-62, 37-50; length of basal segment of chelicera 84-90, length of cheliceral stylet 40-48; length of pedipalpal segments (P 1-5): 30-35, 35-40, 30, 45-48, 12; length of leg segments: I – 42-55, 42-48,

36-42, 60-72, 95-110, 100-110; II – 55-65, 55-78, 60-78, 115-125, 145-165, 108-140; III – 65-72, 60, 84-90, 130-150, 180-200, 150-175; IV – 70-80, 65-72, 90-105, 135-145, 145-180, 135-145.

Male. Similar to female, differing in the smaller size, short and wide genital flaps (Fig. 7). Each flap with 11-12 medial and 5-6 lateral relatively long setae.

Measurements, μm . Length of body 725-850, height of body 585-700; length of setae *Fch* 115-130; length of genital flaps 150-165, their width 55-62; length of genital acetabula (ac. 1-3): 36-42, 36-42, 30-36; length of basal segment of chelicera 80-85, length of cheliceral stylet 40-45; length of pedipalpal segments (P 1-5): 30-35, 30-35, 24, 42-46, 12; length of leg segments: I – 42-48, 36-42, 30-36, 55-60, 85-95, 90-96; II – 48-55, 48-55, 55-65, 95-110, 125-155, 120-130; III – 60-65, 60-65, 80-90, 135-145, 155-185, 145-170; IV – 70-80, 50-60, 78-85, 120-126, 155-165, 120-135.

Deutonymph. Coxae of legs large, fused from each side into two groups and occupying more than half of surface of body (Fig. 14). Most of idiosomal setae and all lyriform organs situated on soft integument and setae *Hv* and *Pe* on coxae of legs. Setae *Fch* long, plumose; other setae thin and smooth. Anterior ends of coxa I with hyaline projection with flat top and single setae. External genital organ consisting of two very narrow plates and two pairs of acetabula of equal size. Each genital plate with three thin setae. Excretory pore on very small plate.

Pedipalp similar to that of adult mite, but with smaller number of setae. Pedipalp trochanter without setae. Femur with three setae: relatively short thick proximal, short thick and long thin distal setae. Pedipalpal genu with two long dorsodistal setae. Bases of ventral setae dividing pedipalpal tibia in proportion 1-2-1.

Trochanter, basifemur, telofemur and tibia of leg I with thick distal setae of moderate length and only genu with long ventrodistal setae (Fig. 15).

Tarsus of leg IV (Fig. 16) with one short and one long thick terminal seta.

Measurements, μm . Length of body 380, height 290; length of seta *Fch* 80; length of genital acetabula (ac. 1-2) 18, 18; length of anal plate 18; length of pedipalpal segments: 24, 24, 18, 30, 12; length of leg segments: I-30, 35, 24, 33, 60, 63; II – 33, 35, 35, 60, 78, 78; III – 36, 42, 42, 78, 135, 108; IV – 42, 36, 48, 66, 90, 75.

Comparison. Data on the morphology of *F. carpenteri* are given in papers by Halbert (1911), Soar & Williamson (1927), Viets (1956), and Lundblad (1962). All adult mites from Karelia are characterized by relatively small anal plate, without posterior projection (Fig. 6), but in specimens from Germany the anal plate quite often with long posterior projection (Viets, 1956). Tarsus of leg IV in the Karelian specimens with one short and two long subequal setae, but in Swedish specimens all thick distal setae on tarsus of leg IV are of different lengths (Lundblad, 1962).

Key to adult mites of the genus *Frontipoda* from Russia

- 1(4). External genital organ situated in posterior part of ventral surface; anterior part of coxa I with distinctly developed hyaline projection and two rather long whip-like setae; tarsus of leg IV with 2 long and 1 short thick terminal setae.
- 2(3). Setae *Fch* with short ramus (Fig. 17); bases of setae *Oi* located on common plate (Fig. 18); coxa I (Fig. 19): hyaline projection knee-shaped with pointed apex **F. variabilis**
- 3(2). Setae *Fch* without ramus (Fig. 2); bases of setae *Oi* located on separate small plates (Fig. 4); coxa I (Fig. 3): hyaline projection wide, straight or slightly bent, with flat apex **F. carpenteri**
- 4(1). External genital organ situated in center of ventral surface; anterior part of coxa I with very short hyaline projection and two leaf-like setae (Fig. 20); tarsus of leg IV with 1 relatively long and 2 short thick terminal setae (Fig. 21) **F. musculus**

Acknowledgements

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