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New and rare species of calanoid copepods from the central Arctic Basin (Crustacea, Copepoda)

E.L. Markhaseva & K.N. Kosobokova

Markhaseva, E.L. & Kosobokova, K.N. 1998. New and rare species of calanoid copepods from the central Arctic Basin (Crustacea, Copepoda). *Zoosystematica Rossica*, 7(1): 45-53.

Disco triangularis sp. n. (Discoidae) is described from females and *Onchocalanus cristogerens* sp. n. (Phaennidae) from a male, both species collected in the central Arctic Basin. *Scolecithricella laminata* (Farran, 1926) (Scolecithrichidae) is recorded for the first time from the central Arctic Basin. *Disco triangularis* sp. n. is clearly distinguished from the related discoids by its larger size, presence of 5 setae at P2 Enp2 and 5 setae at P3-P4 Enp3, by Md Gn with 2 teeth, and 2-segmented P5 in females. *Onchocalanus cristogerens* sp. n. is similar to *O. cristatus* (Wolfenden, 1904) and *O. subcristatus* (Wolfenden, 1906) in the presence of a crest, while in other representatives of the genus the crest is lacking. In P5 longer than urosome the species is similar to *O. hirtipes* Sars, 1905 and *O. magnus* (Wolfenden, 1906), differing from the remaining *Onchocalanus* males with P5 as long as urosome.

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Two new and one rare calanoid copepods were found in the deep-water zooplankton samples collected during R/V Polarstern cruise ARK XI/1 (June-September, 1995) in the central Arctic Basin. *Disco triangularis* sp. n. is the first representative of Discoidae recorded to the north of 60° N. *Onchocalanus cristogerens* sp. n. (Phaennidae) was probably recorded earlier in the Arctic under the name *Onchocalanus cristatus* (Wolfenden, 1904) (Harding, 1966; Dunbar & Harding, 1968). The rare species *Scolecithricella lamellata* (Farran, 1926) is recorded for the first time from the central Arctic Basin, and its Mx2 structure is redescribed to clarify the taxonomic position of the species within the family Scolecithrichidae.

The following abbreviations are used in the descriptions: A1, antennule; A2, antenna; Enp, endopod; Exp, exopod; Gn, gnathobase; Gns, genital somite; Md, mandible; Mdp, mandibular palp; Mx1, maxillule; Mx1 Li1, praecoxal arthrite (= first internal lobe); Mx1 Li2, coxal endite (= second internal lobe); Li3-4 basal endites (= third and fourth internal lobes); Mx1 Le 1

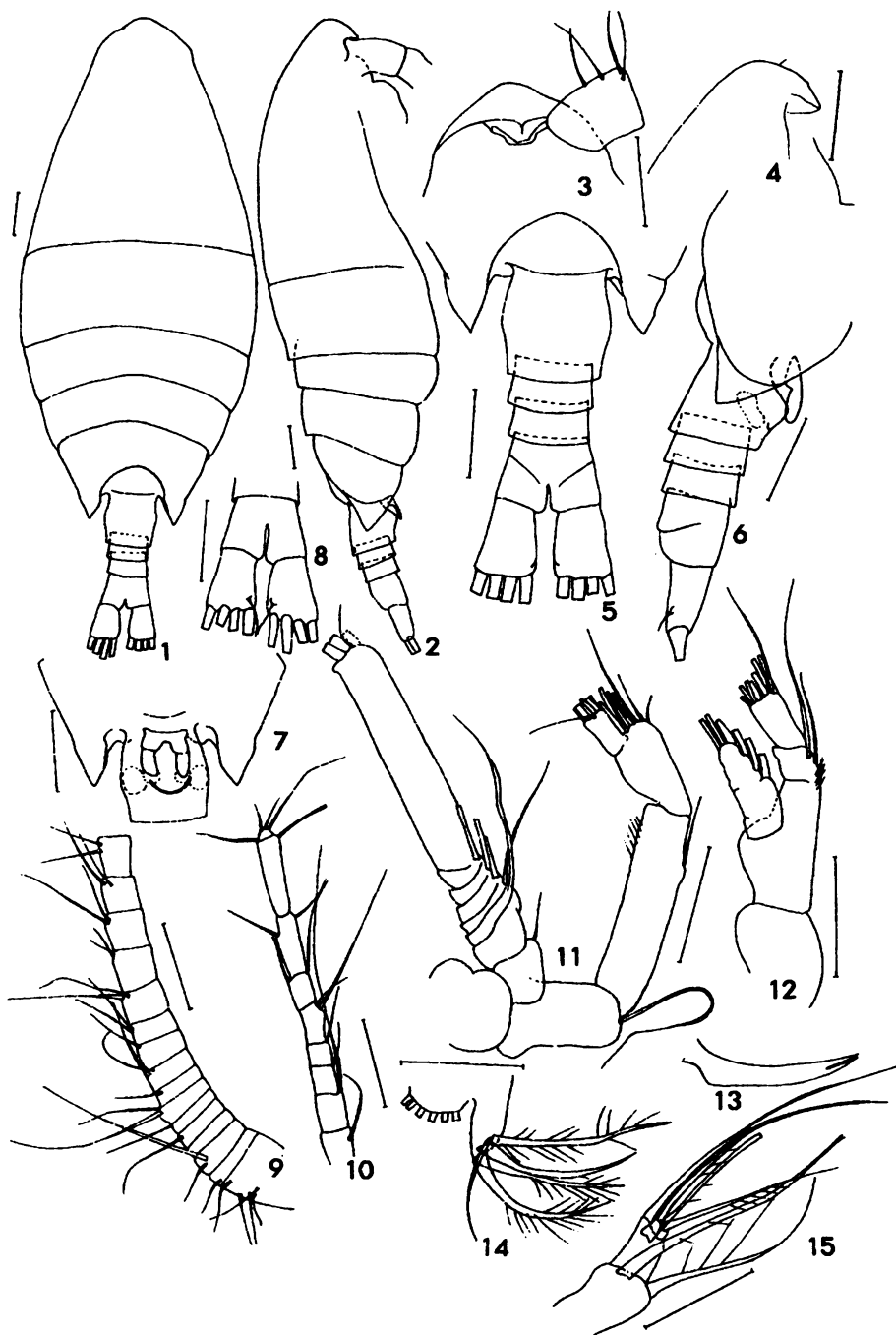
coxal epipodite (= first external lobe); Mx2, maxilla; Mx2 Li1-2, praecoxal endites (= first and second lobes); Mx2 Li3-4, coxal endites (= third and fourth lobes); Mx2 Li5, basal endite (= fifth lobe); Mxp, maxilliped; P1-P4, swimming legs 1-4; Pd1-5, pedigerous somites 1-5; Pr, prosome; Ur, urosome.

Disco triangularis sp. n. (Figs 1-21)

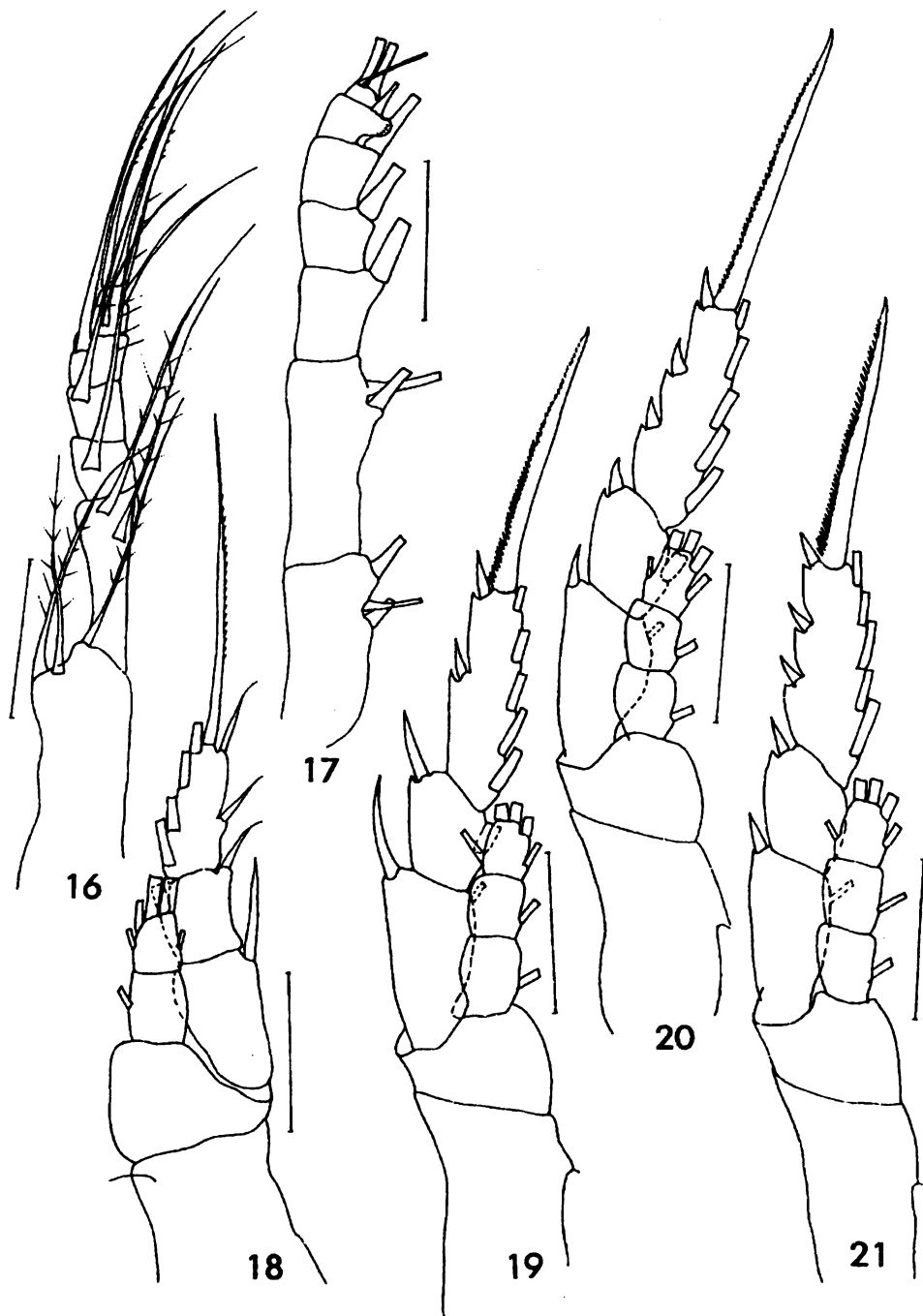
Holotype. Female (total length 1.40 mm), ZIN 66835, Makarov Basin, 81° 12' N 150° 14' E, from net tows taken in R/V Polarstern cruise ARK XI/1, St. 057, 2500-1500 m vertical haul, 28 August 1995.

Paratypes: 1 juvenile male (CIV), ZIN 66837, the same locality as holotype; 1 female (total length 1.35 mm), ZIN 66836, Eastern Eurasian Basin, 81° 03' N 136° 32' E, from net tows taken in R/V Polarstern cruise ARK XI/1, St. 049, 2600-1000 m vertical haul, 22 August 1995. Holotype and paratypes kept in the Zoological Institute (St. Petersburg).

Description. Female. Total length 1.35-1.40 mm. Pr nearly 3.6 times as long as Ur (Fig. 1). Rostrum (Figs 3-4) absent. Pd4 and Pd5 completely fused (Figs 1-2). Posterior corners of Pd5 extended into triangular



Figs 1-15. *Disco triangularis* sp. n., female (holotype). 1, dorsal view; 2, right lateral view; 3, cephalon (ventral view); 4, the same (right lateral view); 5, Pd5 & Ur (dorsal view); 6, the same (right lateral view); 7, Pd5 & Gns & P5 (ventral view); 8, caudal rami (ventral view); 9, A1, 1st-16th free segments; 10, the same: 17th-25th free segments; 11, A2 (right); 12, Mdp (right); 13, Gn (left); 14, Mx1 (right); 15, Mx2 (right). Scale bars 0.1 mm.



Figs 16-21. *Disco triangularis* sp. n., female (holotype). 16, Mxp (right); 17, Mxp (left); 18, P1; 19, P2; 20, P3; 21, P4. Scale bars 0.1 mm.

lobes reaching at least the middle of Gn5 (Figs 5-7). Caudal ramus with 1 ventral seta and 4 caudal setae (Fig. 7). A1 25-segmented (Figs 9-10), reaching Pd3. A2 Exp1 with 1 short seta; Exp2 without seta; Exp3 to Exp7 with 1 seta each; terminal segment (Exp8) the longest, with 3 long and 1 short terminal setae (Fig. 11). Mdp without seta at the basis; Enp1 with 2, Enp2 with 8 setae; Exp with 4 setae at each of the incompletely separated Exp1-4 segments and 2 terminal setae at Exp5 (Fig. 12); masticatory edge of Md Gn with 2 teeth (Fig. 13). Mx1 reduced to Lel and apparently Lil (Fig. 14). Mx2 reduced to two endites with 2 setae each; distal part of Mx2 with 2 setae (Figs. 15). Mxp with 3 setae at coxa distally; basis with 2 setae; Enp 5-segmented; Enp1-Enp4 with 1 seta each; Enp5 with 3 terminal setae (Figs 16-17); Enp4 with distal lobe (Fig. 17). P1-P4 coxa and basis without internal and external setae (Figs 18-21). P1 Exp1-1 with 1 external spine each; Exp3 with 2 external spines and 4 internal setae. P1 Enp 2-segmented; Enp1 with 1 internal seta; Enp2 with 5 setae (Fig. 18). P2-P4 Exp and Enp 3-segmented, their Enp1-2 with 1 internal seta each; Enp3 each with 5 setae. P2 Exp3 with 2 external spines; P3-P4 Exp3 with 3 external spines and 5 internal setae (Figs 19-21). P5 present, 2-segmented with fused coxal segments (Fig. 7).

Male unknown.

Remarks. The genus *Disco* Grice & Hulsemann, 1965 (Discoidae, Arietelloidea) includes 20 species (Schulz, 1993). Schulz (1993: 199-200) subdivided this genus into 3 groups of species according to the degree of reduction of Mx1, Mx2 and Mxp. *D. triangularis* sp. n. with moderate reductions in these limbs is placed here in the Group II which includes also *D. caribbeanensis* Gordejeva, 1974, *D. inflatus* Grice & Hulsemann, 1965, *D. marinus* Gordejeva, 1974, *D. minutus* Grice & Hulsemann, 1965, *D. peltatus* Gordejeva, 1974, *D. vulgaris* Gordejeva, 1974 and *D. hartmani* Schulz, 1993.

The family Discoidae is distributed in the Atlantic and Indian oceans and in the Mediterranean and Caribbean seas (Gordejeva, 1974a, 1974b; 1975a, 1975b; 1976; Grice & Hulsemann, 1965, 1967; Park, 1970; Schulz, 1993). This is the first and the northernmost record of the family in such high latitudes in the Arctic Basin as it was registered earlier in the Arctic at 60° N from the Norwegian fjords (*D. fiordicus* Fosshagen, 1967, see Fosshagen, 1967). Most likely the "unidentified sp. A" of Harding (1966: 35, fig. 13) be-

longs to *Disco*, however because of the poor description its specific status remains doubtful.

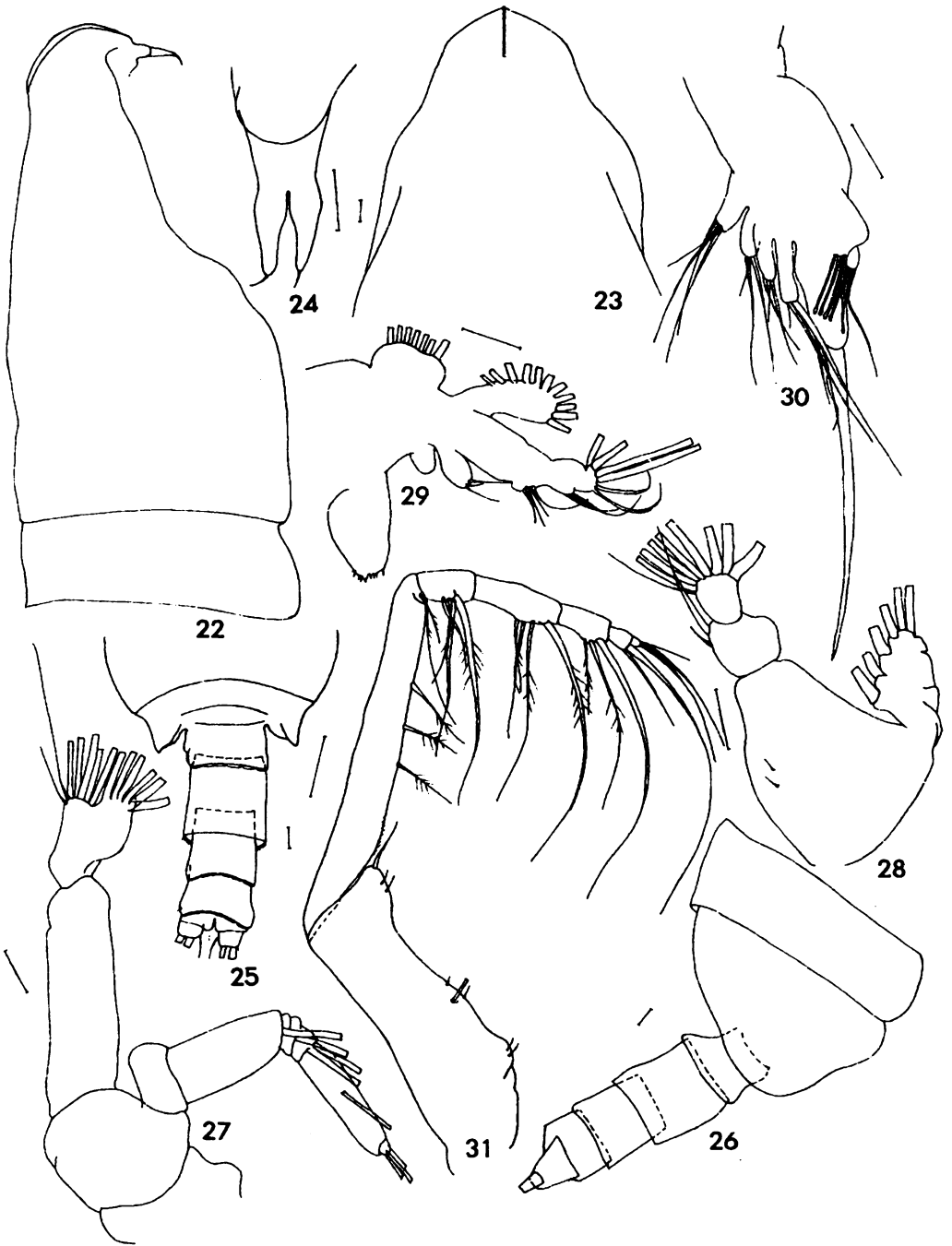
Comparison. *D. triangularis* sp. n. is clearly distinguished from the other discoids of the Group II by the larger size (1.35-1.40 mm contrary to 0.39-0.70 mm typical of other species, with the exception of *D. inflatus* which is slightly larger: 0.86-1.18 mm), presence of 5 setae at P2 Enp2 and 5 setae at P3-P4 Enp3 (3-4 setae in the remaining species), Md Gn with 2 teeth (3-5 teeth in other species), and, except for *D. inflatus*, by 2-segmented P5 in females (1-segmented or absent in other species). The male described under the name *D. inflatus* Grice & Hulsemann, 1965 (Grice & Hulsemann, 1967: 29-30, Figs 148-161) differs from the remaining discoids of the Group II in the basic characters (Md Gn with 2 teeth, P2 Enp2 and P3-P4 Enp3 with 5 setae), as well as from the female of *D. inflatus* (see Grice & Hulsemann, 1965: 256, Figs 23 l, 24 b-e). In these characters it is most similar to the female of *D. triangularis* sp. n., however it is not identical to it, differing in minor details of setation in Mdp (Enp2 with 7 setae in *D. inflatus*), Mx1 (apparently Enp with 2 setae in *D. inflatus*), and Mxp (Enp4 lacking lateral lobe, Enp5 strongly reduced in *D. inflatus*) (see Grice & Hulsemann, 1967: Figs 151, 153, 154-156). Probably in further study the males assigned to *D. inflatus* should be established as separate species.

***Onchocalanus cristogerens* sp. n.** (Figs 22-37)

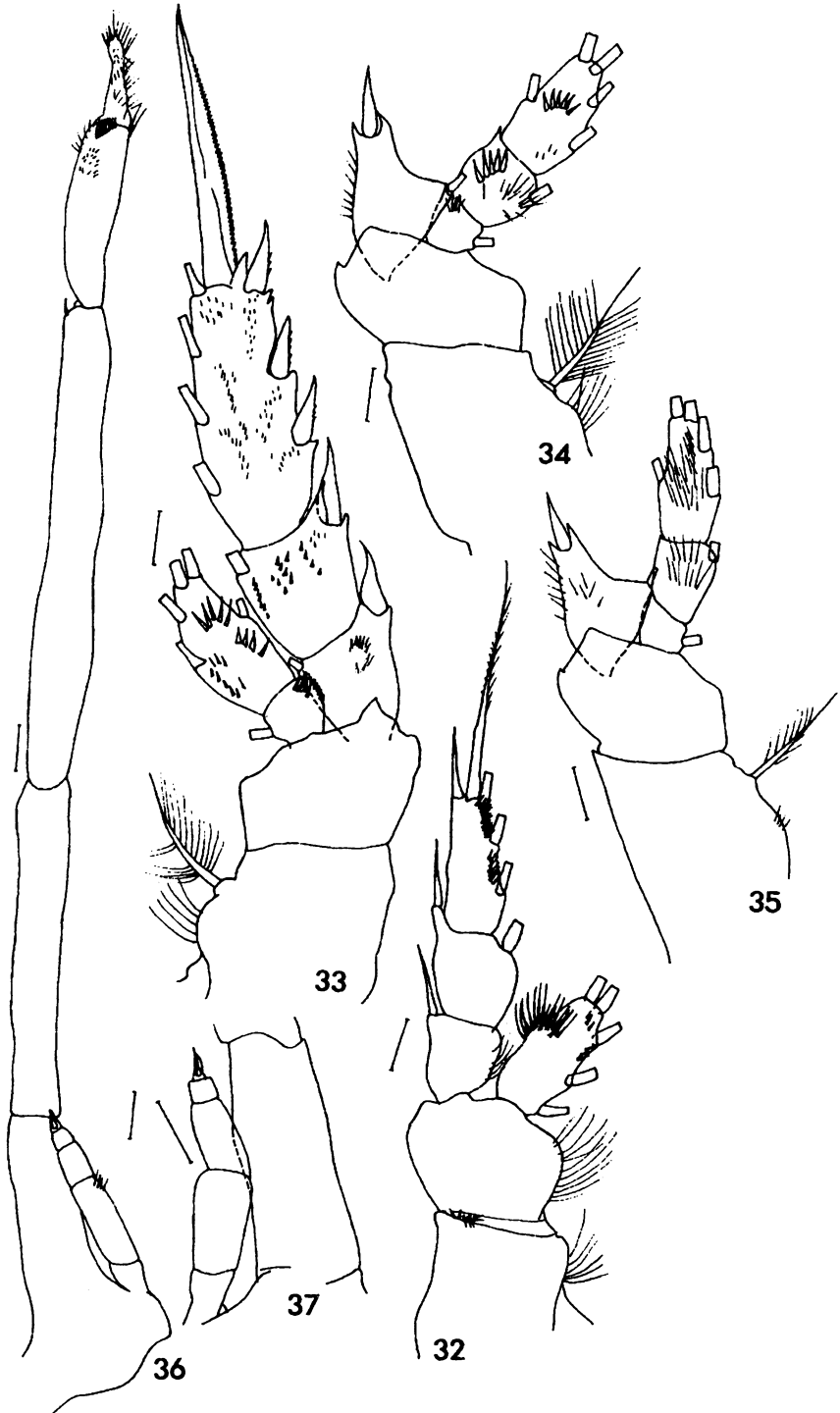
Onchocalanus cristatus (non Wolfenden, 1904): Harding, 1966: 28, fig. 9. Misidentification.

Holotype. Male (total length 5.1 mm), ZIN 66838, Eastern Eurasian Basin, 80° 55' N 122° 39' E, from net tows taken in R/V Polarnstern cruise ARK XI/1, St. 075, 3566-2000 m vertical haul, 4 September 1995, kept in the Zoological Institute (St. Petersburg).

Description. Male. Total length 5.1 mm. Pr nearly 3.8 times as long as Ur. Crest moderately pronounced (Figs 22-23). Rostrum with thin filaments terminally (Fig. 24). Pd4 and Pd5 incompletely fused (Figs 25-26). Posterior corners of Pd5 rounded in lateral view and triangular in dorsal view. A1 as long as body. A2 Exp1-2 without seta; Exp7 with 3 long terminal setae (Fig. 27). Mdp with 2 minute setae at the basis; Enp1 with



Figs 22-31. *Onchocalanus cristogerens* sp. n., male (holotype). 22, anterior part of the body in lateral view; 23, the same in dorsal view; 24, rostrum; 25, Pd5 & Ur (dorsal view); 26, Pd3-5 & Ur (lateral view); 27, A2; 28, Mdp; 29, Mx1; 30, Mx2; 31, Mxp. Scale bars 0.1 mm.



Figs 32-37. *Onchocalanus cristogerens* sp. n., male (holotype). 32, P1; 33, P2; 34, P3 (part.); 35, P4 (part.); 36, P5; 37, P5 right & P5 left first segment. Scale bars 0.1 mm.

2, Enp2 with 9 setae; Exp with 4 setae at each of Exp1-4 segments and 2 terminal setae at Exp5 (Fig. 28). Mx1 Li1 setation reduced, without well developed spines; Mx1 Li2 without setae; Li3 with 3, Li4 with 4 setae; Enp with 8 setae; Exp with 11, Le1 with 7 setae (Fig. 29). Mx2 with 4 setae at Li1 and 3 setae at each of Li2-Li4; at Li5 one of 3 setae is spine-like; distal part of Mx2 with 1 worm-like and 6 brush-like setae, probably 7th brush-like seta typical of Phaennidae is broken (Fig. 30). Mxp with 2, 3 and 3 setae at coxa from proximal to distal; basis with 3 setae; Enp 6-segmented; Enp2-Enp6 with 4, 4, 3, 2 and 3 setae respectively (Fig. 31). P1-P4 typical of *Onchocalanus* (Figs 32-35). P5 uniramous; left leg 5-segmented, slightly more than twice as long as Ur; right leg 4-segmented, short, with stout thick terminal spine reaching the distal border of the first segment of the left leg (Figs 36-37).

Remarks. The genus *Onchocalanus* was registered in the Arctic Basin by Harding (1966) and Dunbar & Harding (1968). They referred to the species as *Onchocalanus cristatus* (Wolfenden, 1904), but mentioned: "the form recorded in the Arctic Ocean has probably diverged somewhat and should be given variety or other subspecific status" (Dunbar & Harding, 1968). Comparison with the recent detailed redescrptions of *O. cristatus* (Park, 1983; Tanaka, 1992) prove their supposal, but we consider the Arctic form as a separate species.

Comparison. The genus *Onchocalanus* Sars, 1905 includes 10 species, of which 7 species are known from females only (Park, 1983; Razouls, 1995). *O. cristogerens* sp. n. is similar to *O. cristatus* (Wolfenden, 1904) (female and male are known) and *O. subcristatus* (Wolfenden, 1906) (male unknown) in the presence of a crest, and differs in this character from the remaining species of the genus. The shape and the rate of crest development (Fig. 22) distinguish the described new species from above mentioned species. In the P5 slightly more than twice as long as the urosome, *O. cristogerens* sp. n. differs from *O. affinis* With, 1915, *O. cristatus* (Wolfenden, 1904), *O. paratrigoniceps* Park, 1983, *O. trigoniceps* Sars, 1905 and *O. wolfendeni* Vervoort, 1950 with P5 as long as urosome. It is similar to *O. hirtipes* Sars, 1905 and *O. magnus* (Wolfenden, 1906) in the P5 1.4-2 times as long as urosome, but may be distinguished from them by the size (4.04 mm in *O. hirtipes* and 7.83-8.33 mm in *O. magnus*) and P5 structure: (in *O. hirtipes*,

P5 is 4-segmented and nearly as long as the first segment of the left leg, but differing in the reduced terminal segment (With, 1915, text-fig. 74 h); in *O. magnus*, P5 is 3-segmented, much shorter than the first segment of left leg.

Scolecithricella laminata (Farran, 1926) (Figs 38-47)

Scolecithrix laminata Farran, 1926: 265, pl. 8; Bradford, 1973: 143, 145; Bradford, Haakonssen & Jillett, 1983: 103.

Scolecithricella laminata: Grice & Hulsemann, 1965: 239-240, figs. 14 g-m, 15 a-j; 1967: 16; Roe, 1975: 320, figs. 9 s-v; Razouls, 1995: 357.

Material examined. Three females (2.85-3.00 mm) and one male (about 3 mm) were found in Makarov Basin, 81° 12' N 150° 14' E, from net tows taken in R/V Polarstern cruise ARK XI/1, St. 057, 2500-1500 m vertical haul, 28 August 1995.

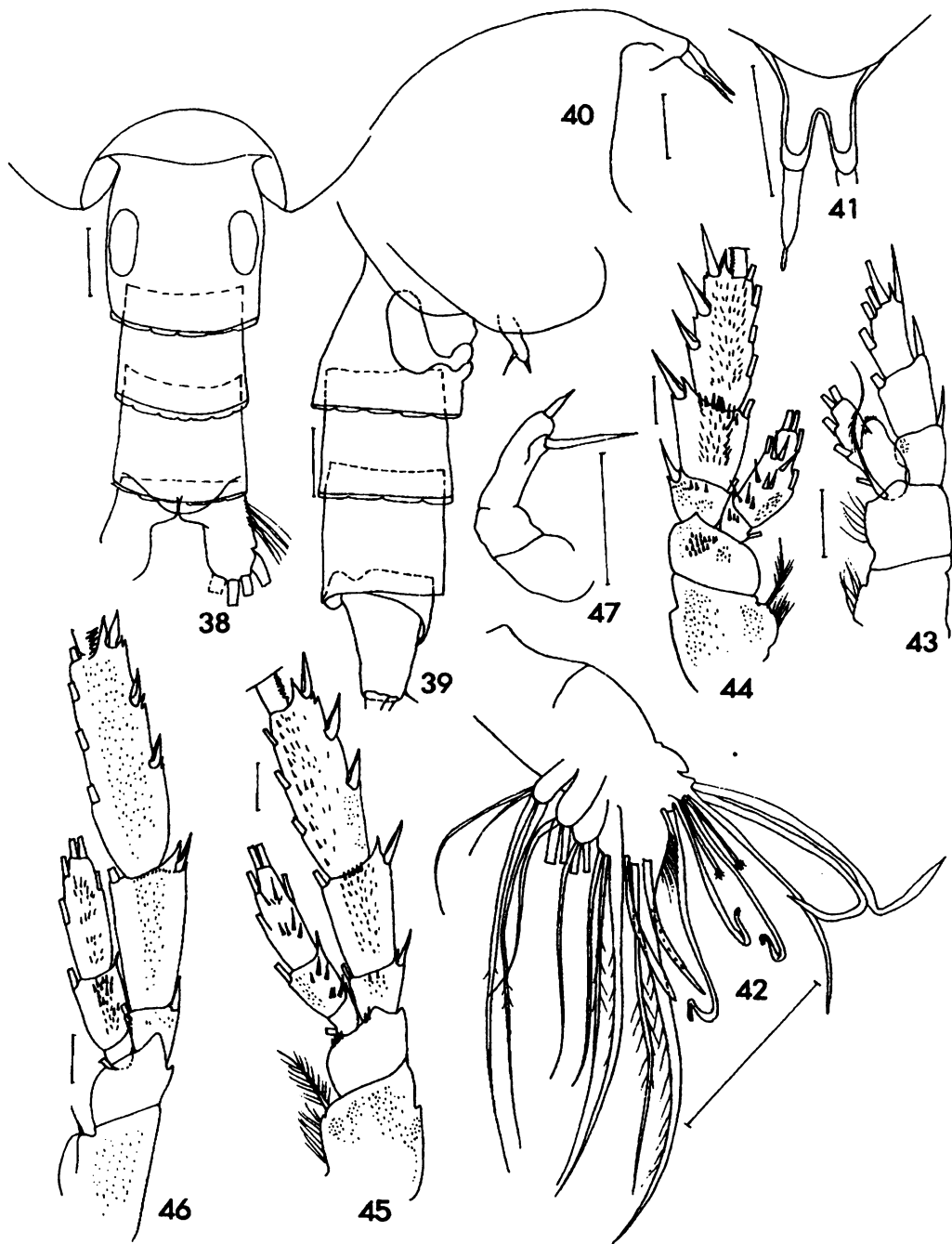
Examination of Mx2 in the obtained specimens showed that the sensory setae composition of Mx2 is typical of Scolecitrichidae: 3 worm-like and 5 brush-like setae, however the 3 brush-like setae are long with weak brushes. Earlier the taxonomic position of this species was unclear as the sensory setae composition was described poorly and was considered to include 2 short brush-like and 6 long worm-like setae in the distal part of Mx2 (Roe, 1975; Bradford et al., 1983 with reference to Roe, 1975), or 7 worm-like setae (?) (Grice & Hulsemann, 1965 (see fig. 14 m) that does not fit the diagnosis of the family Scolecitrichidae. Figures of the examined female given here may be helpful in the future revision of the genus *Scolecithricella*.

Acknowledgements

The work of K.N. Kosobokova was supported by Russian Foundation for Basic Research, RFFI grants 95-05-15424 and 98-05-64526.

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Figs 38-47. *Scolecithricella laminata* (Farran, 1926), female. 38, Pd5 & Ur; 39, the same; 40, rostrum (lateral view); 41, the same (ventral view); 42, Mx2; 43, P1; 44, P2; 45, P3; 46, P4; 47, P5.

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Received 19 January 1998