

See discussions, stats, and author profiles for this publication at: <https://www.researchgate.net/publication/249957325>

New species of small, bathypelagic calanoid copepods from the Arctic Ocean: *Brodskius arcticus* sp. nov. (Tharybidae) and three new species of *Pertsovius* gen. nov. (Discoidae)

Article in *Zootaxa* · April 2011

DOI: 10.11646/zootaxa.2809.1.3

CITATIONS

5

READS

123

2 authors:



Vladimir N. Andronov

P.P. Shirshov Institute of Oceanology

1 PUBLICATION 5 CITATIONS

SEE PROFILE



Ksenia N. Kosobokova

P.P. Shirshov Institute of Oceanology

111 PUBLICATIONS 2,887 CITATIONS

SEE PROFILE

Some of the authors of this publication are also working on these related projects:



RUSALCA [View project](#)



New species of small, bathypelagic calanoid copepods from the Arctic Ocean: *Brodskius arcticus* sp. nov. (Tharybidae) and three new species of *Pertsovius* gen. nov. (Discoidae)

VLADIMIR N. ANDRONOV¹ & KSENIA N. KOSOBOKOVA²

¹Atlantic Branch of P.P. Shirshov Institute of Oceanology, Russian Academy of Sciences, Prospect Mira 1, Kaliningrad 236000, Russia. E-mail: vandro@mail.ru & andronov@ioran.baltnet.ru

²P.P. Shirshov Institute of Oceanology, Russian Academy of Sciences, Nakhimova ave. 36, Moscow 117997, Russia. E-mail: xkosobokova@ocean.ru

Abstract

A new calanoid copepod species, *Brodskius arcticus* sp. nov. (family Tharybidae Sars, 1902), and three new species of a new genus *Pertsovius* gen. nov. (family Discoidae Gordejewa, 1975) are described from deep waters of the Arctic Canada Basin. The female of *Brodskius arcticus* differs from five of the other six known species of this genus in the absence of rostral filaments, the lack of which it shares with *B. abyssalis* Markhaseva & Schulz, 2007. This new species differs from *B. abyssalis* in having two very short outer proximal spines at the distal segment of the fifth swimming legs (P5). The length of these spines is less than half the width of the segment, whereas in *B. abyssalis* they are longer than the width of the segment. The new genus *Pertsovius* is created here for a group of seven species within the family Discoidae which have one-segmented endopods of P2-P4. In contrast, the other genera of this family have three-segmented endopods of P2-P4. The three new species of *Pertsovius* differ from each other in the appearance of the genital field, and in the number of outer border spines on the distal exopodal segment of P2. In *Pertsovius tridentatus* sp. nov. this segment bears three external spines on both left and right P2. The left P2 of *P. heterodentatus* sp. nov. has three spines, while the right P2 bears two spines only. The distal segments of both left and right P2 of *P. serratus* sp. nov. have two external spines, but the proximal part of the external margin on the left P2 bears three relatively large denticles. The distal exopodal segments of P2 of the other four species here transferred to the genus *Pertsovius* are smooth with no external spines or denticles, but each bears two outer border spines.

Key words: Copepoda, Calanoida, taxonomy, diversity, Arctic Canada Basin, deep water

Introduction

Studies of the species composition of the zooplankton of the Arctic Ocean stretch back for more than a century (Sars 1900; Brodsky & Nikitin 1955; Virketis 1957, 1959; Johnson 1963; Brodsky 1967; Grainger 1965; Dunbar & Harding 1968; Mumm 1993; Sirenko *et al.* 1996; Kosobokova *et al.* 1998; Kosobokova & Hirche 2000; Auel & Hagen 2002; Hopcroft *et al.* 2005; Kosobokova & Hopcroft 2010). During this period, the Copepoda Calanoida have received more attention than other zooplankton taxa, and their specific composition in the Arctic Ocean is considered to be well known (Kosobokova & Hopcroft 2010). Nonetheless, recent examination of the deep water zooplankton collections from the Arctic Ocean have revealed that there are some species new to science and not described yet even within this taxon (Kosobokova *et al.* in press). In particular, during routine processing of collections from two expeditions from the Canada Basin we found several unknown species of small calanoids with body lengths less than 1 mm. One of these species represents a new species of the calanoid genus *Brodskius* Markhaseva & Ferrari, 2005 and the other three are attributed to a new genus, created here to accommodate a group of seven species within the family Discoidae Gordejewa, 1975.

Material and methods

Samples containing the undescribed species were collected with a Hydrobios Multinet multiple opening-closing net with mouth opening 0.25 m² and 0.150 mm mesh size during the R/V “Polarstern” cruise ARK 14/1a to the Makarov Basin (1998) and the US Coast Guard Cutter “Healy” Ocean Exploration-05/2 expedition to the Canada Basin of the Arctic Ocean (2005). Sampling details are presented in Kosobokova & Hopcroft (2010) and Kosobokova *et al.* (in press). The specimens were preserved in 4% buffered formalin and dissected in glycerin. Drawings were made from the microphotos taken with a “Kodak EasyShare C643” camera. The details of these drawings were compared with details visible under the microscope, and corrected when necessary.

All measurements were taken from specimens immersed in glycerin. The scale bars for all figures are 0.1 mm.

The terminology used in descriptions follows Huys & Boxshall (1991), but the maxilliped syncoxa is considered to consist of three praecoxal endites and one coxal endite, according to Ferrari & Markhaseva (2000). The following abbreviations are used in the descriptions: P1-P5, swimming legs one-five.

Type material is deposited at the Zoological Institute, Russian Academy of Sciences, St. Petersburg (ZIN).

Systematics

Subclass Copepoda Milne Edwards, 1840

Order Calanoida Sars, 1903

Family Tharybidae Sars, 1902

Genus *Brodskius* Markhaseva & Ferrari, 2005

Brodskius arcticus sp. nov.

(Figures 1–2)

Material examined. Holotype: adult female, dissected. ZIN accession number 91095. Collected during the USCGC “Healy”, Ocean Exploration-05/2 cruise, station 5, Canada Basin (73° 24'N, 153° 33'W), 24 June 2005, bottom depth 3850 m, depth of collection 2000–1000 m.

Species description. Adult female of total length 1.04 mm with elliptical prosome nearly 4.5 times longer than urosome, dorsal prosome length to width ratio 2.46 (Fig. 1: 1, 2). Rostrum without filaments (Fig. 1: 4, 5). Cephalosome and pediger one not completely separated; fourth and fifth pedigers separate. Posterior corners of prosome significantly indented in lateral view (Fig. 1: 2). Genital double somite symmetrical, with elongate spermathecae (Fig. 1: 1, 6, 7).

Antennule (Fig. 1: 2) of typical structure for genus, slightly longer than prosome, consisting of 24 expressed segments.

Antenna (Fig. 1: 3): coxa and basis lacking setae; first endopodal segment with one seta, second endopodal segment compound, with 11 setae; exopod consisting of seven segments with setal formula 0.1.1.1.1.0.3.

Mandible (Fig. 1: 8–10): gnathobase elongate, narrow; cutting edge narrow with deep incision. Exopod of five segments, with setal formula 1.1.1.1.1; first endopod segment with one seta, second endopod segment with nine setae.

Maxillule (Fig. 1: 11): praecoxal endite with nine terminal and two posterior setae; coxal endite with two setae, coxal epipodite with six setae; proximal basal endite with two setae, one longer and thicker than other; distal basal endite fused to endopod with nine setae in total, two of them longer and thicker; exopod with two setae.

Maxilla (Fig. 1: 12): proximal praecoxal endite with four setae, distal with three setae; proximal and distal coxal endites with three and two setae; proximal basal endite with three setae of different appearance: first worm-like, second thicker than others and heavily setulate, third of typical shape; distal basal endite plus endopod with one sclerotized seta and eight sensory setae: four worm-like and four brush-like, very small and difficult to see.

Maxilliped (Fig. 1: 13): syncoxa without setae on proximal praecoxal endite; one seta on middle endite, and three setae on distal praecoxal endite; coxal endite with two setae. Basis with three medial setae. Endopod of six segments with setal formula 2.4.3.2.2+1.4. First segment of endopod clearly separated from basis.

Swimming legs one to three (Fig 2: 1–3) with trimerous exopods; endopods one-segmented (P1), two-segmented (P2), and three-segmented (P3, P4). Coxae of P2-P4 each with medial seta. Armature formula as in Table 1.

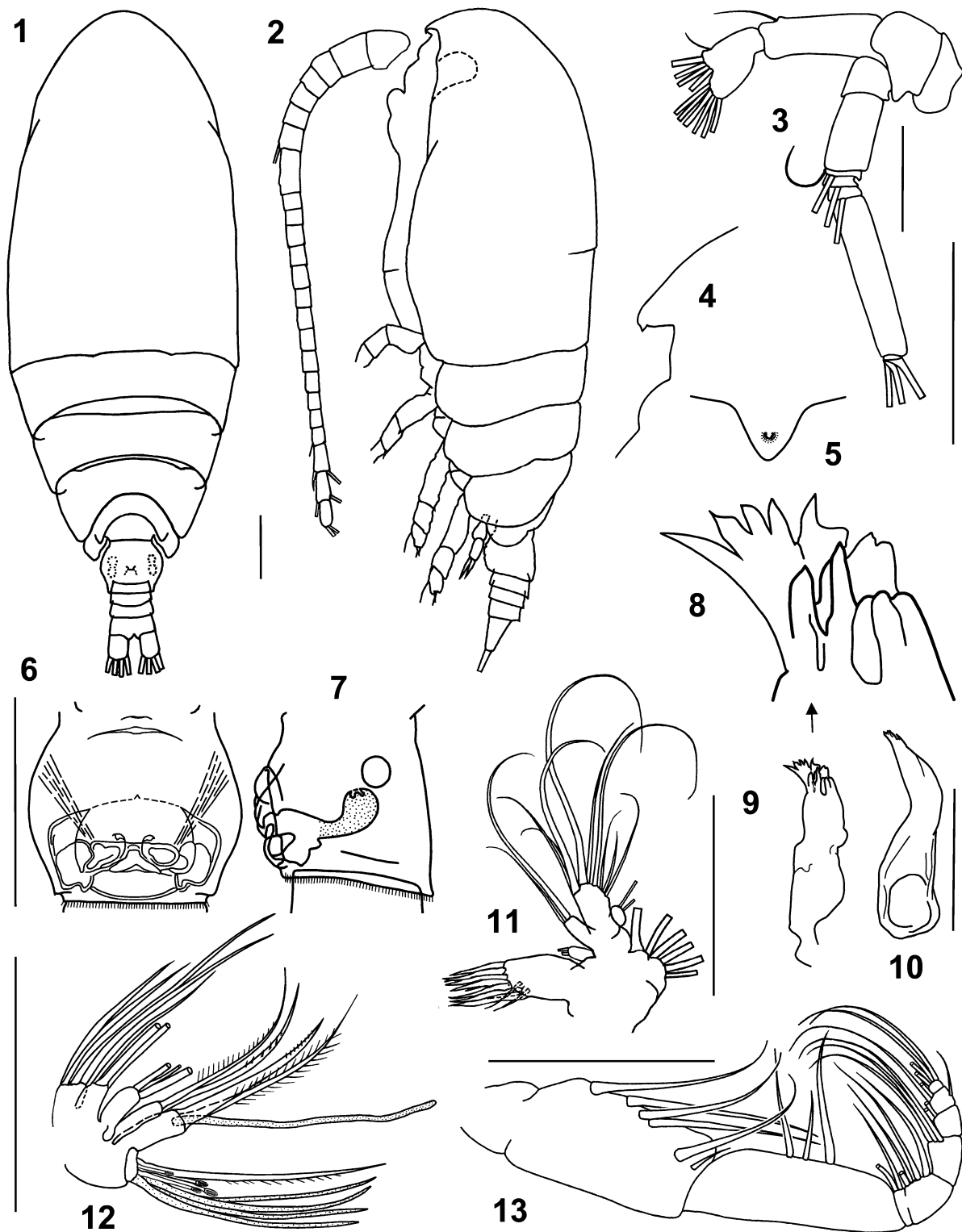


FIGURE 1. *Brodskius arcticus* sp. nov. Holotype female. 1—habitus dorsal; 2—habitus from the left side; 3—antenna, 4—rostrum, from the left side; 5—rostrum, frontal view; 6—genital double somite, ventral; 7—same, from the left side, 8–10—mandibular blade, 11—maxillule, 12—maxilla, 13—maxilliped. Scale bars: 0.1 mm.

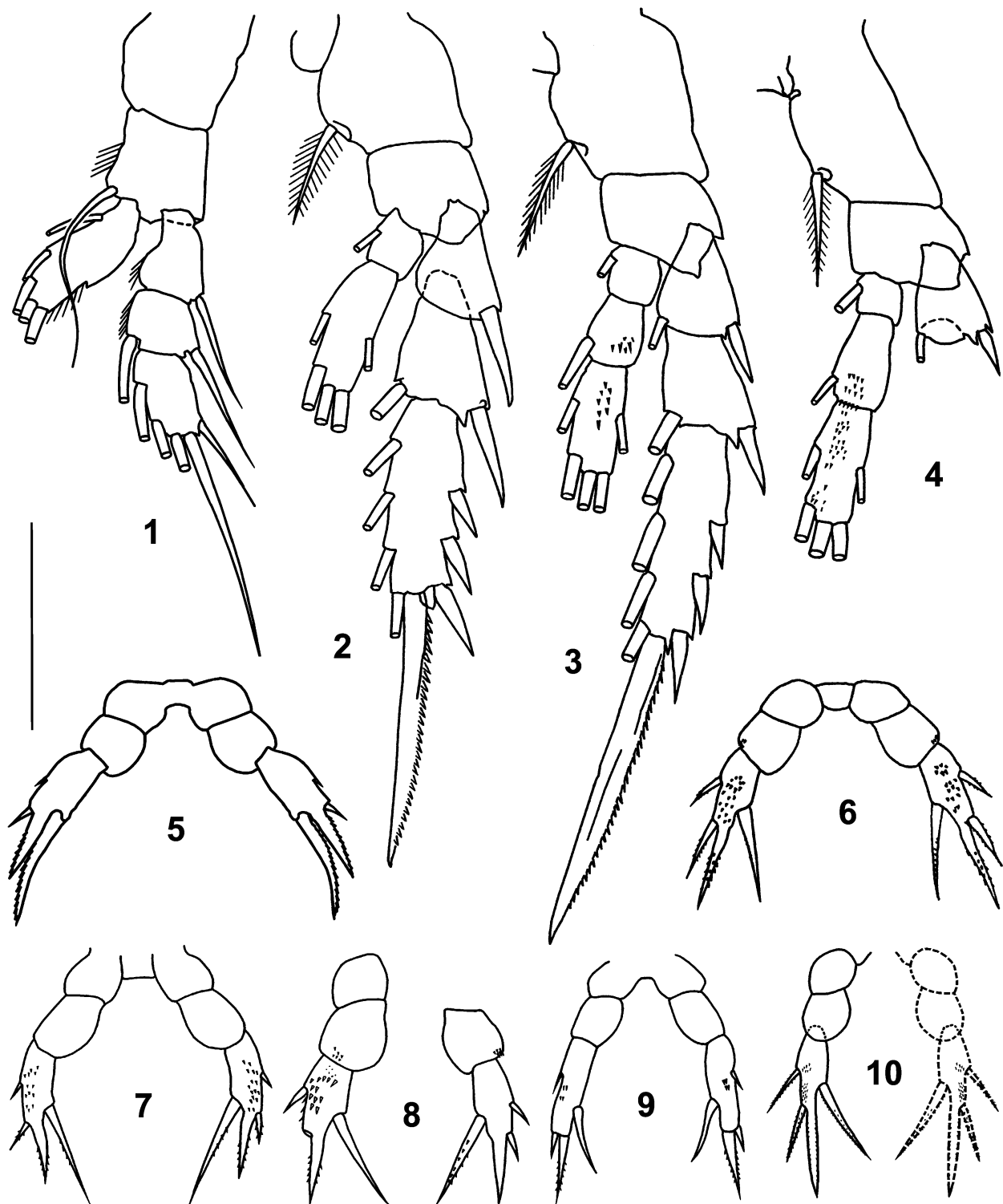


FIGURE 2. Swimming legs of *Brodskius* spp. 1–5—P1–P5 of *Brodskius arcticus* sp. nov., holotype female; 6–10—P5 of females of other *Brodskius* species for comparison: 6—*B. abyssalis* Markhaseva & Schulz 2007 (from Markhaseva & Schulz, 2007; reproduced with permission from Taylor & Francis); 7—*B. paululus* (Park, 1970) (from Park 1970; reproduced with permission from University of Miami); 8—*B. benthopelagicus* Markhaseva & Ferrari, 2005 (after Markhaseva & Ferrari 2005 with changes; reproduced with permission from KMK Publishing House, Moscow); 9—*B. robustipes* (Grice & Hulsemann, 1965) (from Grice & Hulsemann 1965; reproduced with permission from John Wiley and Sons); 10—*B. paraincertus* (Grice & Hulsemann, 1965) (after Grice & Hulsemann 1965 with changes; reproduced with permission from John Wiley and Sons). Scale bar for figures 1–5: 0.1 mm.

TABLE 1. Spine and setal formula of swimming legs in *Brodskius arcticus* **sp. nov.**

Leg	Coxa	Basis	Exopod			Endopod		
			1	2	3	1	2	3
P1	0-0	0-1	I-0	I-1	I-1-3	0-2-3	-	-
P2	0-1	0-0	I-0	I-1	III-1-4	0-1	1-2-2	-
P3	0-1	0-0	I-1	I-1	III-1-4	0-1	0-1	1-2-2
P4	0-1	0-0	I-1	?	?	0-1	0-1	1-2-2

P1 (Fig. 2: 1): basis with curved inner distal seta. All outer distal spines of exopod very long, 1.5–2.0 times longer than exopod second segment, distal spine slightly shorter. Endopod one-segmented with five setae and small setules along outer edge distally; lateral outer lobe poorly developed.

P2 (Fig. 2: 2): first and second exopod segments each with large outer distal spine, terminal spine of third segment very finely serrate. Surface of first and second endopod segments not ornamented.

P3 (Fig. 2: 3): terminal spine of exopod very finely serrate. Second and third endopod segments with scattered spinules on posterior surface.

P4 (Fig. 2: 4): only proximal exopod segment intact, with one outer spine and one inner seta distally. Second and third endopod segments with scattered spinules on posterior surface.

P5 (Fig. 2: 5): uniramous, three-segmented; coxae naked and fused to intercoxal sclerite; basis unarmed; exopod with one very small proximal outer spine, moderately short subterminal spine, one long terminal unarticulated toothed extension of segment, length approximately equal that of segment, and one long medial toothed spine. Terminal unarticulated extension exceeding two thirds length of medial spine. Surfaces of all segments naked.

Remarks. The genus *Brodskius* Markhaseva & Ferrari, 2005 has been erected for several deep-water calanoid species from the group of bradfordian families. The species of this genus differ from other representatives of these families mainly in the structure of the mandible and maxillule. The genus includes six species for which only females are currently known: *B. paraincertus* (Grice & Hulsemann, 1965); *B. robustipes* (Grice & Hulsemann, 1965); *B. paululus* (Park, 1970); *B. benthopelagicus* Markhaseva & Ferrari, 2005; *B. confusus* Markhaseva & Ferrari, 2005 and *B. abyssalis* Markhaseva & Schulz, 2007. The second and third species are epibenthic, the other four are pelagic. The total body length of the females ranges from 0.9 to 1.6 mm. Additionally, descriptions of males of two species exist, but their specific affinity is not clear (Roe 1975; Markhaseva & Ferrari 2005). Markhaseva & Schulz (2007) include the genus *Brodskius* in the family Tharybidae Sars, 1902. The known species of *Brodskius* are widespread from Antarctic waters to the latitude of 40°N.

The female of *B. arcticus* **sp. nov.** differs from females of the other six species of this genus by: (1) absence of rostral filaments, (2) morphology of P5 (presented on Fig. 2: 5–10 for easier comparison of different species), and (3) appearance of the genital field. Rostral filaments are absent only in *B. arcticus* and *B. abyssalis*, but these two species differ from each other in size of the outer border articulated spine on the distal P5 segment. While in *B. arcticus* this spine is very small, four to five times shorter than the width of the segment, in *B. abyssalis* the length of this spine is approximately equal to the width of the segment (Fig. 2: 5–6). In all other species of this genus the length of this spine is ca. two times less than width of the segment bearing it (Fig. 2: 7–10). The length of the distal outer spine of P5 in *B. arcticus* is less than one third of the length of the terminal pointed appendix, whereas in *B. abyssalis* it is approximately equal to two thirds of its length. The inner spine in *B. arcticus* is approximately 1.5 times longer than its terminal appendix, the same spine and appendix in *B. abyssalis* are approximately of identical length (Fig. 2: 5–6).

It is impossible to compare the appearance of the genital field of the *Brodskius* females, as most published drawings have very little detail. More or less detailed drawings are known only for *B. abyssalis* (Markhaseva & Schulz 2007). A comparison of Fig. 1: H, I from Markhaseva & Schulz (2007) with our Fig. 1: 6 and 7 shows clearly that they depict different species.

Family Discoidae Gordejeva, 1975

Genus *Pertsovius* gen. nov.

Diagnosis. Small calanoid copepods with body length seldom exceeding 1 mm. Prosome of females of oval shape, anterior head rounded. Cephalon fully or partly separated from first pediger, fourth and fifth pedigers completely fused. Urosome consisting of four free somites. Genital double somite usually expanded laterally and protruding ventrally, frequently forming very large fold. Caudal rami usually of unequal lengths, longer on left; each bearing four setae, with outer setae shorter and thinner than others; outer seta on left ramus usually longer and thicker than corresponding seta on right one. Rostrum large, obtusely rounded, directed ventrally, without filaments. Antennule consisting of 24–25 free segments, with ancestral segments I–III fused, segments IX–XI separate, distal ancestral segments XXVI and XXVII + XXVIII often fused, but in *Disco fiordicus* Fosshagen, 1967 and *D. oceanicus* Gordejeva, 1974 segments XXVI and XXVII + XXVIII separate. Antenna, mandible, maxillule and maxilliped of same structure in all species of genus. Antenna exopod longer than endopod. Mouthparts relatively well developed compared to other discoid genera. Mandible endopod and exopod similar in length; cutting edge of gnathobase bearing five to seven large unicuspidate teeth. Maxillule bearing six setae on first inner lobe, two setae on second inner lobe, one seta on basis, eight setae on endopod, two setae on exopod, and four setae on outer lobe. Maxilla first lobe with four setae, second to fourth lobes two setae each, fifth lobe with one seta, and endopod with four setae. Maxilliped with well-developed syncoxa and basis, bearing five–six setae on syncoxa and two setae on basis; endopod with five free segments with setal formula 1.2.2.2.3. P1–P4 coxae and basis have no setae, endopods typically one-segmented and exopods three-segmented, with exception of *D. longus* Grice & Hulsemann, 1965, where P4 endopod two-segmented. Endopods of P1–P4 bearing three, four, five and five setae, respectively. Distal segment of P1 exopod with two lateral spines, of P2 with two or three, and of P3 and P4 with three outer border spines. Surface of P1–P4 rami not ornamented. P5 absent. Male unknown.

Type species. *Pertsovius tridentatus* gen. et sp. nov.

Other species. *Pertsovius longus* (Grice & Hulsemann, 1965); *P. fiordicus* (Fosshagen, 1967) (only female); *P. oviformis* (Park, 1970); *P. oceanicus* (Gordejeva, 1974); *P. heterodentatus* gen. et sp. nov. and *P. serratus* gen. et sp. nov.

Etymology. The generic name is proposed in the memory of Nikolay Andreevich Pertsov (1924–1987), the founder and a well-known Head of the White Sea Biological Station (“Nikolay Pertsov White Sea Biological Station”, WSBS) of the Moscow State University (MSU) from 1951 to 1987. Employees of WSBS, professors of the Biological Department of the MSU and former students, ourselves included, first became acquainted with marine biota at the WSBS, and remember this remarkable person with great affection. Gender masculine.

Differential diagnosis. The species of the new genus *Pertsovius* gen. nov. have one-segmented endopods of P2–P4 (with exception of *Disco longus*). In contrast, the representatives of the other genera of this family have three-segmented endopods of P2–P4. Maxillule, maxilla and maxilliped with complete armature.

Remarks. The family Discoidae Gordejeva, 1975 currently includes 29 species (Razouls *et al.* 2005–2010) belonging to three genera: *Disco* Grice & Hulsemann, 1965; *Prodisco* Gordejeva, 1975 and *Paradisco* Gordejeva, 1975. Only females are currently described in the majority of these species. Some males are also described, but their assignment to particular species is debatable. For example, the female and male *Disco fiordicus* Fosshagen, 1967 are very similar in appearance of prosome; however, the specific details of their P1–P4 may indicate their affinity to different genera.

Research on the Discoidae in the high Arctic is just beginning. Only one species within this family, *Disco triangularis* Markhaseva & Kosobokova, 1998 has been reported so far poleward of 80°N. The most northerly record of the other known species is about 60°N (*D. fiordicus* Fosshagen, 1967). All other Discoidae were found further south (Grice & Hulsemann 1965, 1967; Fosshagen 1967; Gordejeva 1974a, 1974b, 1974c, 1975a, 1975b, 1976; Schulz 1993, 2003). It is noteworthy that the species of this family are inhabitants of bathy- and mesopelagic depths, where conditions are fairly constant across different climatic zones. Hence, one might expect to find the species described from lower latitudes also in high latitudes. Thus, processing samples from the Arctic Ocean we often encountered *D. hartmanni* Schulz, 1993, originally described from samples collected at 41°36' N, 09°30' W (Kosobokova *et al.* in press).

Several species within the family Discoidae are very similar to each other: *Disco longus* Grice & Hulsemann, 1965; *D. fiordicus* Fosshagen, 1967 (only female); *D. oviformis* Park, 1970 and *D. oceanicus* Gordejeva, 1974a.

Park (1970) and Schulz (1993) noted their close similarity, which could warrant their placement within a unique taxonomic clade. The discovery of three additional species affiliated with this clade during the present study in the Arctic Ocean further warrants erection of a distinct genus. Here, the new genus, *Pertsovius*, is created for this group of seven species, along with the description of three new species within this genus.

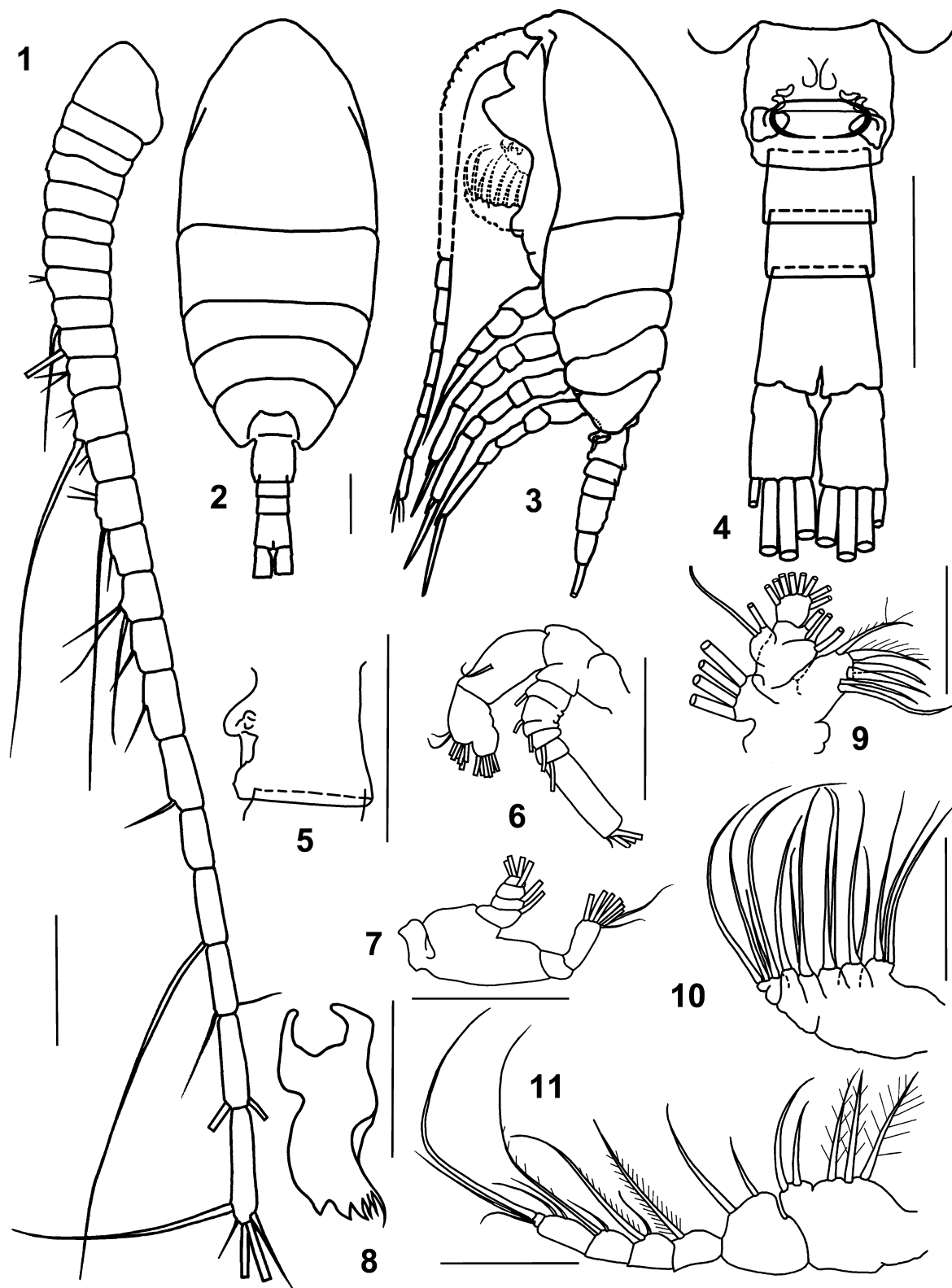


FIGURE 3. *Pertsovius tridentatus* gen. et sp. nov. Holotype female. 1—antennule, 2—habitus, dorsal; 3—habitus, from the left side; 4—urosome, ventral; 5—genital double somite, left side; 6—antenna; 7—mandibular palp; 8—mandibular blade, 9—maxillule, 10—maxilla, 11—maxilliped. Scale bars: 0.1 mm.

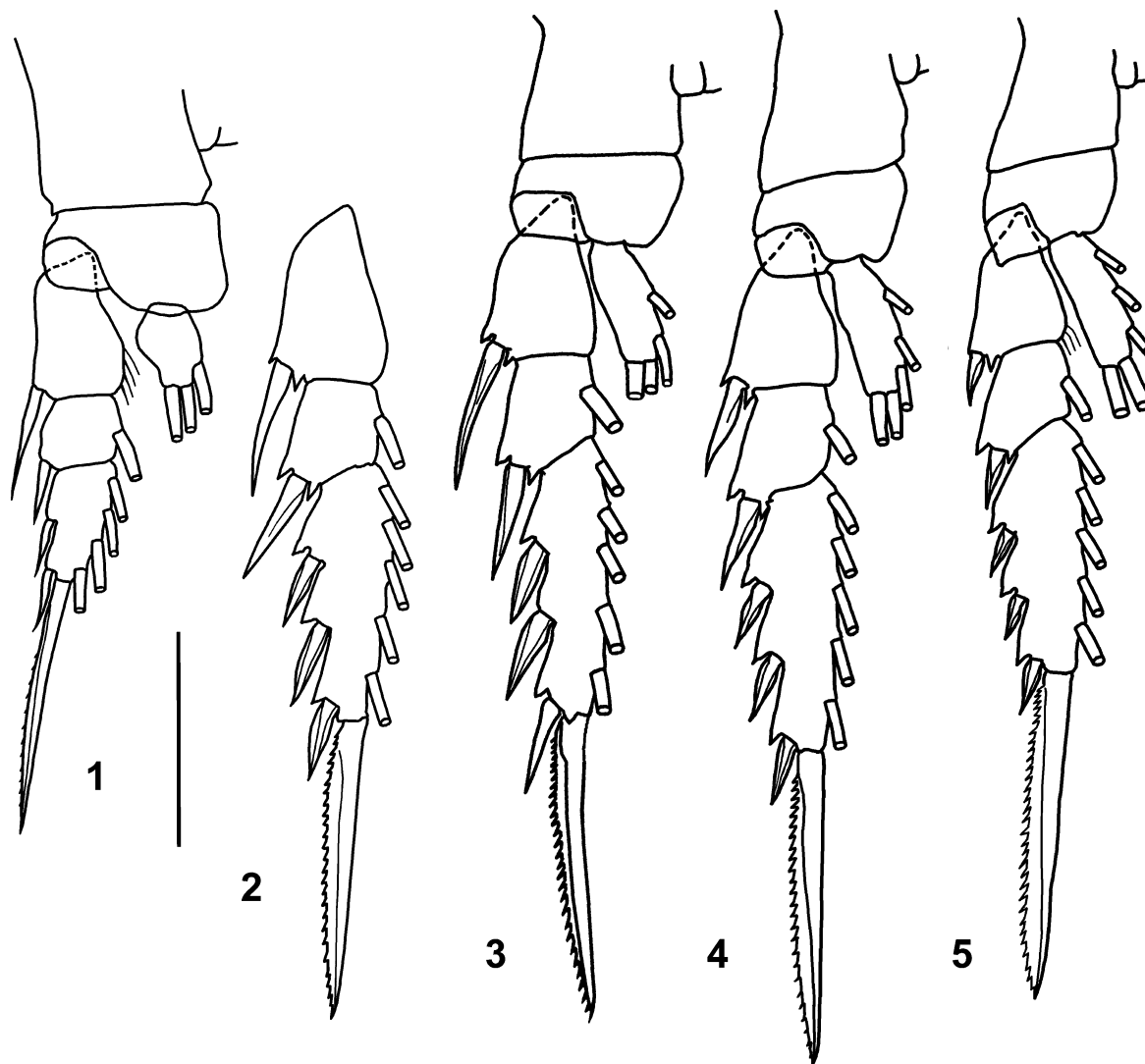


FIGURE 4. *Pertsovius tridentatus* gen. et sp. nov. Female (1–2 and 4–5—holotype, 3—paratype). 1—P1; 2—exopod of P2; 3—P2; 4—P3; 5—P4. Scale bar: 0.1 mm.

***Pertsovius tridentatus* gen. et sp. nov.**

(Figures 3–4)

Material examined. Holotype: adult female, dissected, total body length 1.00 mm. ZIN accession number 91096. Collected during the R/V “Polarstern” cruise ARK XIV/1a, station 45, Makarov Basin (85° 45’N and 177° 03’E), 18 July 1998, bottom depth 2452 m, depth of collection 2000–1500 m. Paratype: adult female, dissected, total body length 1.00 mm. ZIN accession number 91097. Collected during the R/V “Polarstern” cruise ARK XIV/1a, station 45, Makarov Basin (85° 45’N and 177° 03’E), 18 July 1998, bottom depth 2452 m, depth of collection 2350–2000 m.

Species description. Prosome ovoid in dorsal view (Fig. 3: 2), nearly 2.9 times as long as urosome and 2.1 times as long as wide. The first pediger separate from cephalosome, pedigers four and five fused.

Genital double somite almost symmetrical ventrally (Fig. 3: 4), slightly expanding laterally approximately equal in length to two following somites combined. Anterior part of genital double somite protruding ventrally (Fig. 3: 5). Spermathecae visible in ventral view but not obvious when viewed laterally. Anal somite nearly two times longer than preceding somite. Caudal rami slightly asymmetrical, with left ramus slightly longer than right, both bearing four setae.

Antennule of 24 free segments not reaching anal somite (Fig. 3: 3). Mouthparts (Fig. 3: 6–10) relatively well developed compared with other discoid genera, and of typical structure for genus. Maxilliped (Fig. 3: 11) syncoxa with no setae on lobe one.

P1-P4 (Figs. 4: 1–5) of typical structure for genus: endopods one-segmented, and exopods three-segmented. Outer spine on first segment of P1 exopod relatively long, but not reaching middle of third segment. Outer spines of second and third segments of exopod approximately equal in length, and almost two times shorter than outer spine on first segment. Outer spine on first exopodal segment of P2 reaching distal border of second segment. Outer edge of third segment of P2 exopod with three external spines on both legs in holotype and paratype.

Differential diagnosis. In the presence of three external spines on third segment of P2, *P. tridentatus* **sp. nov.** can be distinguished from all other species of this genus.

Etymology. The specific name refers to the number of external spines on the distal segment of P2 exopod.

***Pertsovius heterodentatus* n. gen. et sp. nov.**

(Figures 5–6)

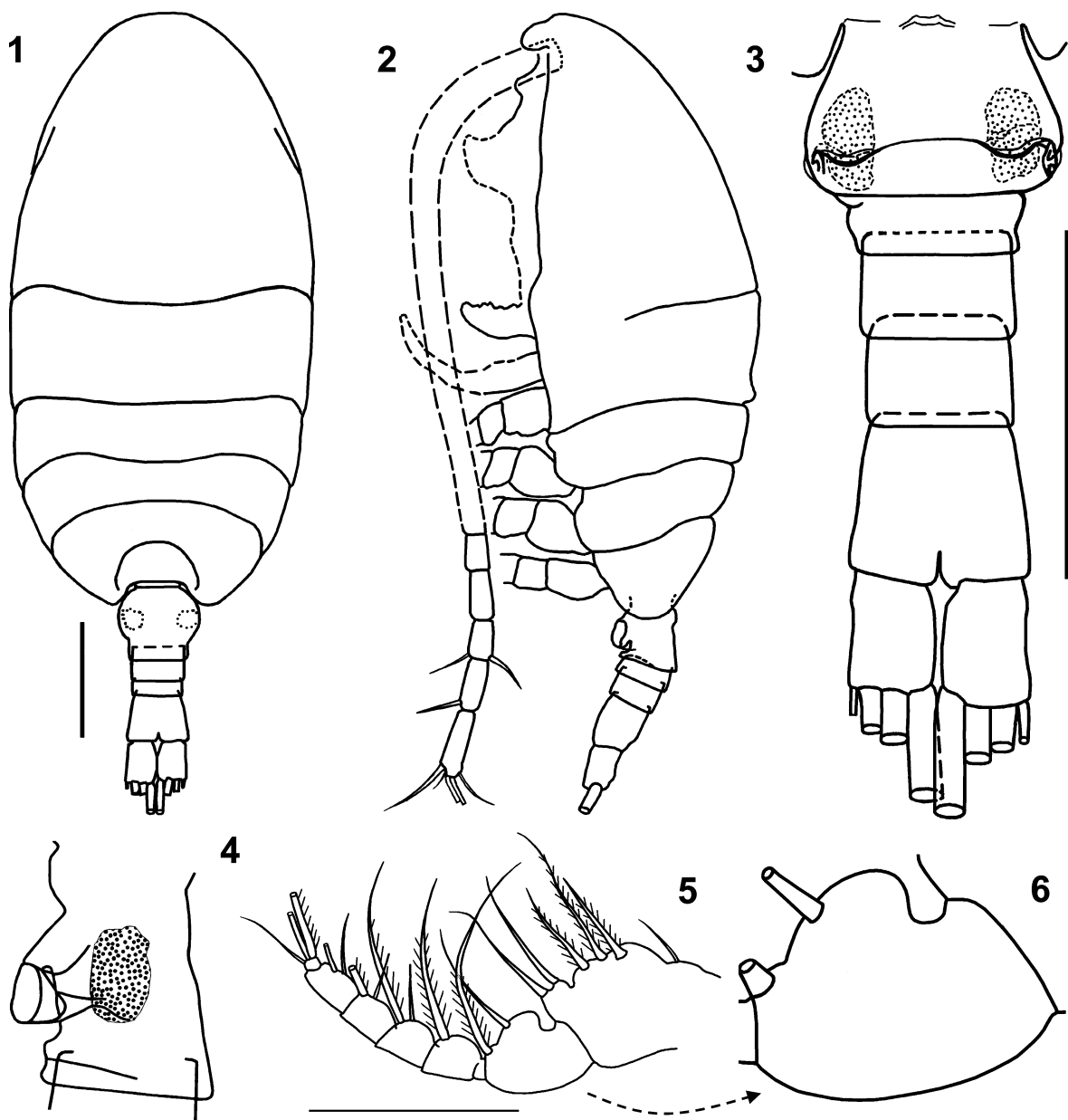


FIGURE 5. *Pertsovius heterodentatus* **gen. et sp. nov.** Female (1–2—paratype, 3–6—holotype). 1—habitus dorsal; 2—habitus lateral; 3—urosome, ventral; 4—genital double somite, left side; 5—maxilliped; 6—basis of maxilliped. Scale bars: 0.1 mm.

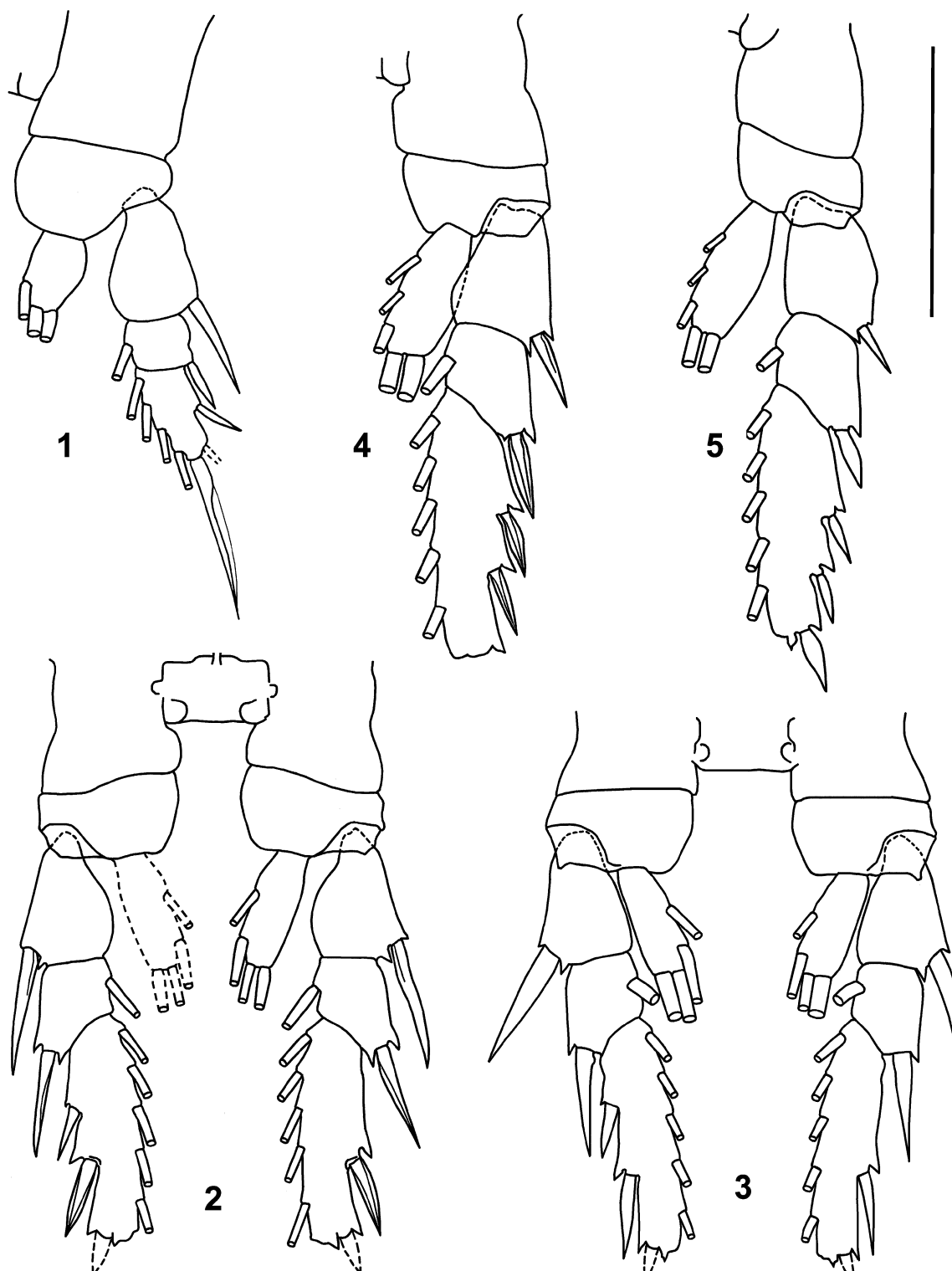


FIGURE 6. *Pertsovius heterodentatus* gen. et sp. nov. Female (1–2, 4–5—holotype, 3—paratype). 1—P1; 2–3—P2; 4—P3; 5—P4. Scale bar: 0.1 mm.

Material examined. Holotype: adult female, dissected, body length 0.70 mm. ZIN accession number 91098. Collected during the USCGC “Healy” Ocean Exploration-05/2 cruise, station 5, Canada Basin (73° 24’N, 153° 33’W), 5 July 2005, bottom depth 3850 m, depth of collection 3000–2000 m. Paratype: adult female, dissected, body length 0.70 mm. ZIN accession number 91099. Collected during the USCGC “Healy” Ocean Exploration-05/2 cruise, station 5, Canada Basin (73° 24’N, 153° 33’W), 5 July 2005, bottom depth 3850 m, depth of collection 2000–1000 m.

Species description. Prosome ovoid in dorsal view (Fig. 5: 1), nearly three times as long as urosome and 1.9 times as long as wide. The first pediger partly separate from cephalosome (Fig. 5: 2), while fourth and fifth pedigers fused.

Genital complex slightly asymmetrical (Fig. 5: 3) with lateral borders strongly convex, and large spermathecae obvious. Genital double somite approximately equal in length to subsequent two somites combined: anterior part strongly protruding ventrally forming a thick wide fold covering middle part of double somite (Fig. 5: 5). Anal somite nearly twice as long as preceding somite. Antennule of 24 free segments, reaching about to posterior border of caudal rami (Fig. 5: 2). Mouthparts as in *P. tridentatus*. No substantial differences from appendages of other species in the genus noted, except for maxilliped syncoxa lobe one having one seta (Fig. 5: 5, 6).

P1-P4 (Fig. 6: 1–5) of typical structure for genus: endopods one-segmented, exopods three-segmented. Outer distal spine on first segment of P1 exopod long, almost reaching middle of outer border of third segment.

Outer distal spine of first exopodal segment of P2 extending beyond distal end of second segment. Outer border edge of third exopodal segment of left P2 armed with three spines, but right P2 with only two spines, both in holotype (Fig. 6: 2) and in paratype (Fig. 6: 3).

Differential diagnosis. The presence of three outer spines on the third exopodal segment of the left P2 and only two spines on the right P2 is characteristic only for this species. The appearance of the genital field, specifically the protruding thick wide fold that covers the middle part of the double somite (Fig. 5: 3 and 4) serves as an additional diagnostic character for the females of this species.

Etymology. The specific name refers to the number of external spines on the distal segment of left (three spines) and right (two spines) exopods of P2.

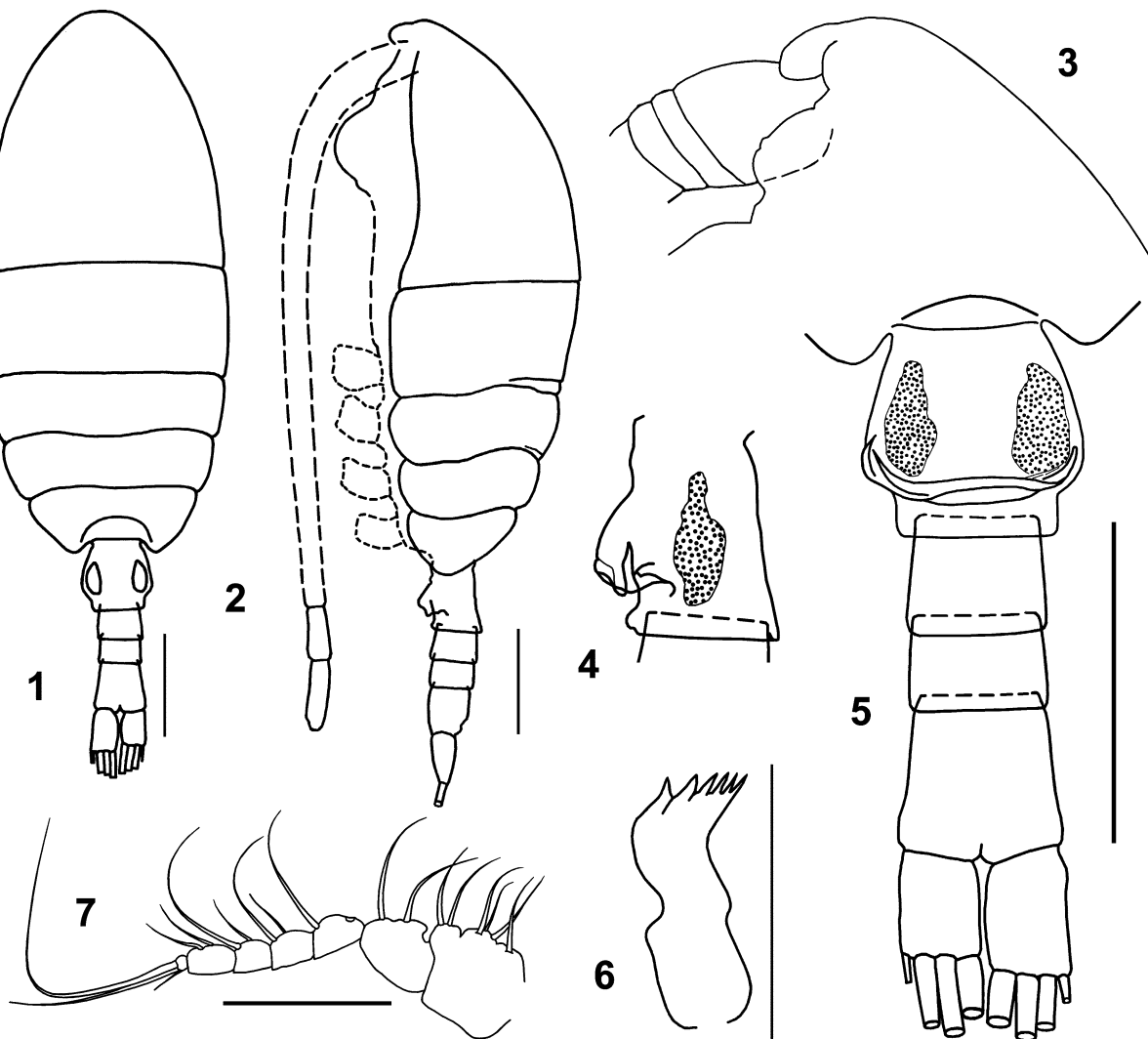


FIGURE 7. *Pertsovius serratus* gen. et sp. nov. Holotype female. 1—habitus dorsal; 2—habitus, lateral; 3—rostral area, left side; 4—genital double somite, left side; 5—urosome, ventral; 6—mandibular blade; 7—maxilliped. Scale bars: 0.1 mm.

Pertsovius serratus gen. nov. et sp. nov.

(Figures 7–8)

Material examined. Holotype: adult female, dissected, total body length 0.65 mm. ZIN accession number 91100. Collected during the USCGC “Healy” Ocean Exploration-05/2 cruise, station 6, Canada Basin (at 74° 07’N, 153° 37’W), 8 July 2005, bottom depth 3850 m, depth of collection 500–300 m.

Species description. Prosome ovoid in dorsal view (Fig. 7: 1), nearly 2.5 times as long as urosome and 2.2 times as long as wide. The first pediger fused to cephalosome, pedigers fourth and fifth fused (Fig. 7: 2).

Genital double somite slightly asymmetrical, with appreciable convexity on each side; curvature on right side more pronounced (Fig. 7: 5). Spermathecae visible in ventral view but difficult to see in lateral view. Anterior part of genital complex protruding strongly ventrally, forming thick wide fold, covering middle part of double somite (Fig. 7: 4).

Antennule of 24 free segments and extending to proximal border of caudal rami (Fig. 7: 2). Mouthparts as in *P. tridentatus*, with first lobe of maxilliped syncoxa with one seta (Fig. 7: 7); no substantial differences from similar appendages of other species.

P1–P4 (Fig. 8: 1–5) of typical structure for genus: endopods one-segmented, exopods three-segmented. Outer distal spine on first segment of P1 exopod extending almost to base of outer proximal spine of third segment. Outer spine of first exopodal segment of P2 reaching beyond base of spine of second segment; both spines of identical length. Lateral borders of P2 third exopod segment on left and right bearing two spines, proximal part of left segment ornamented with three small denticles (Fig. 8: 2).

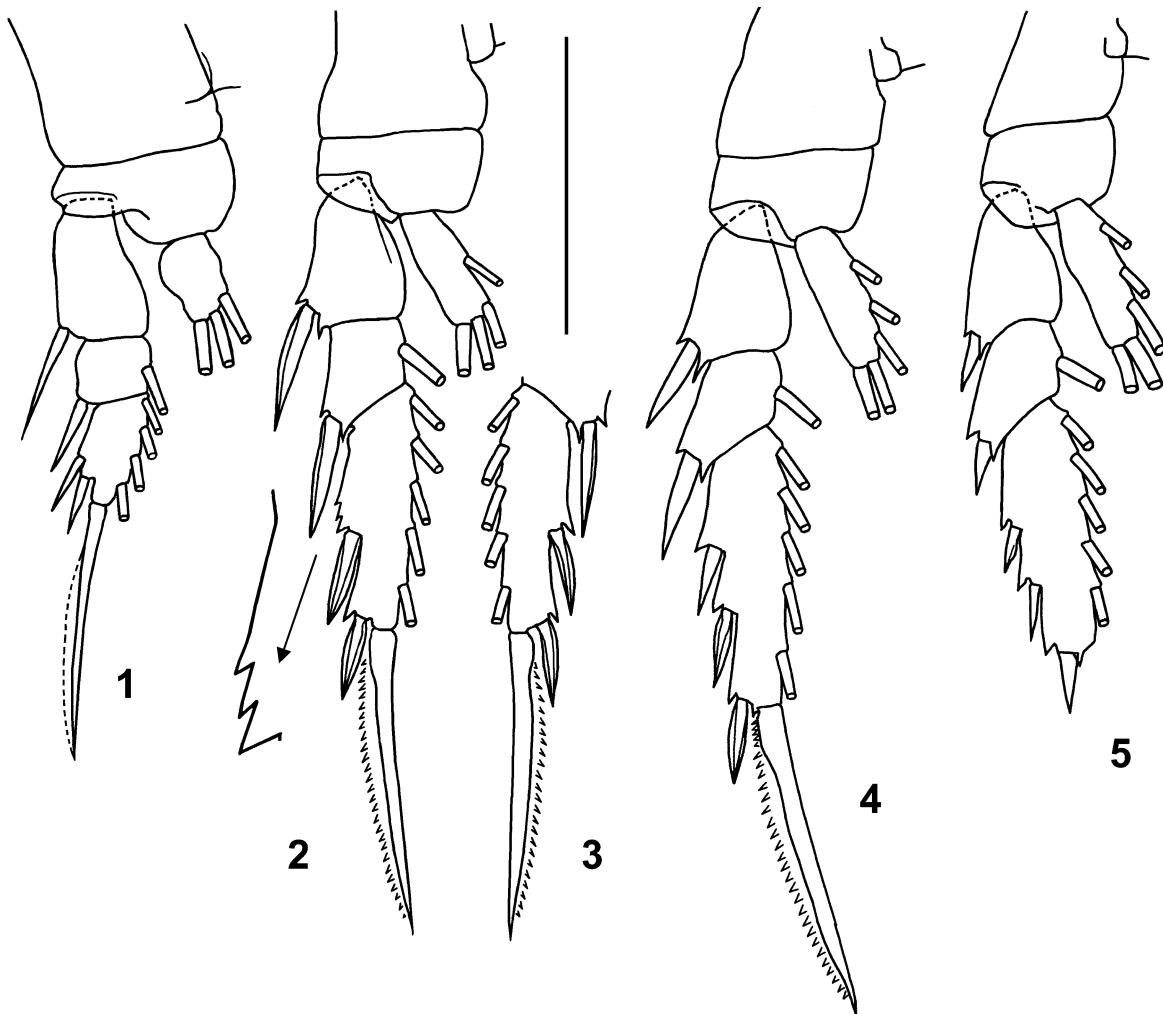


FIGURE 8. *Pertsovius serratus* gen. et sp. nov. Holotype female. 1—P1; 2—left P2; 3—distal segment of the right exopod of P2; 4—P3; 5—P4. Scale bar: 0.1 mm.

Differential diagnosis. The presence of denticles on the outer edge of the third exopodal segment of the left P2 and the appearance of the genital fields separate this species from other species of the genus.

Etymology. The specific name reflects the presence of denticles at the external edge of the distal segment of the left P2 exopod.

Acknowledgements

We thank Russell Hopcroft and Elizaveta Ershova for improvement of the English during the manuscript preparation. We greatly appreciate constructive comments of two anonymous reviewers on an earlier version of the manuscript, and the comments and language corrections of Geoff Boxshall on a later version. This study was supported by a mini grant of the Arctic Ocean Biodiversity (ArcOD) project of the Census of Marine Life to V.N. Andronov.

References

- Auel, H. & Hagen, W. (2002) Mesozooplankton community structure, abundance and biomass in the central Arctic Ocean. *Marine Biology*, 140, 1013–1021.
- Brodsky, K.A. (1967) *Calanoida of the far eastern seas and Polar Basin of the USSR*. Pavlovsky, E.N. (Ed.), Keys to the fauna of the USSR. Israel Program for Scientific Translation 35, Jerusalem, 440 pp.
- Brodsky, K.A. & Nikitin, M.N. (1955) Hydrobiological work. *Observational data of the scientific research drifting station of 1950–1951*. Morskoy Transport, 1, 404–410. (In Russian).
- Dunbar, M.J. & Harding, G. (1968) Arctic Ocean water masses and plankton - a reappraisal. *In: Sater, J.E. (Coord.) Arctic Drifting Stations: A report on activities supported by the Office of Naval Research*. Arctic Institute of North America, pp. 315–326.
- Ferrari, F.D. & Markhaseva, E.L. (2000) *Brachicalanus flemingeri* and *B. brodskyi*, two new copepods (Crustacea: Calanoida: Phaenidae) from benthopelagic waters. *Proceedings of the Biological Society of Washington*, 113 (4), 1064–1078.
- Fosshagen, A. (1967) Two new species of calanoid copepods from Norwegian fjords. *Sarsia*, 29, 307–320.
- Gordejeva, K.T. (1974a) Novye vidy planktonnykh Calanoida iz tropicheskoi Atlantiki i Sredizemnogo morya. [New species of planktonic Calanoida from the tropical Atlantic and the Mediterranean Sea]. *Zoologicheskii Zhurnal*, 53 (6), 841–847. (In Russian with English summary).
- Gordejeva, K.T. (1974b) Novye vidy roda Disco (Copepoda) iz tropicheskoi chasti Atlanticheskogo okeana i Yuzhnykh morei. [New species of the genus Disco (Copepoda) from the tropical zone of the Atlantic and Southern Seas]. *Zoologicheskii Zhurnal*, 53 (8), 1148–1154. (In Russian with English summary).
- Gordejeva, K.T. (1974c) Novye vidy veslonogikh rachkov (Calanoida) iz Karibskogo morya. [New species of Calanoida from the Caribbean Sea]. *Zoologicheskii Zhurnal*, 53 (9), 1414–1416. (In Russian with English summary).
- Gordejeva, K.T. (1975a) Novoe semeistvo, novye rody i vidy Copepoda (Calanoida) iz Atlanticheskogo Okeana i Yuzhnykh morei. [A new family, new genera and species of Copepoda (Calanoida) from the Atlantic Ocean and Southern Seas]. *Zoologicheskii Zhurnal*, 54 (2), 188–194. (In Russian with English summary).
- Gordejeva, K.T. (1975b) Novye vidy veslonogikh rachkov (Calanoida) iz Tsentral'no-Amerikanskikh morei. [New species of Calanoida from the Central American seas]. *Zoologicheskii Zhurnal*, 54 (12), 1887–1890. (In Russian with English summary).
- Gordejeva, K.T. (1976) Novye vidy tropicheskikh Copepoda iz Atlanticheskogo Okeana i Yuzhnykh morei. [New species of tropical Copepoda from the Atlantic Ocean and South Seas]. *Zoologicheskii Zhurnal*, 55 (9), 1398–1401. (In Russian with English summary).
- Grainger, E.H. (1965) Zooplankton from the Arctic Ocean and adjacent Canadian waters. *Journal of Fisheries Research Board Canada*, 22, 543–564.
- Grice, G.D. & Hulsemann, K. (1965) Abundance, vertical distribution and taxonomy of calanoid copepods at selected stations in the northeast Atlantic. *Journal of Zoology*, 146, 213–262.
- Grice, G.D. & Hulsemann, K. (1967) Bathypelagic calanoid copepods of the western Indian Ocean. *Proceedings of the United States National Museum*, 122 (3583), 1–67.
- Hopcroft, R.R., Clarke, C., Nelson, R.J. & Raskoff, K.A. (2005) Zooplankton communities of the Arctic's Canada Basin: the contribution by smaller taxa. *Polar Biology*, 28, 197–206.
- Huys, R. & Boxshall, G.A. (1991) *Copepod Evolution*. The Ray Society, London, 159, 468 pp.
- Johnson, M.W. (1963) Zooplankton collections from the high polar basins with special reference to the Copepoda. *Limnology and Oceanography*, 8, 89–102.
- Kosobokova, K.N., Hanssen, H., Hirche, H.J. & Knickmeier, K. (1998) Composition and distribution of zooplankton in the Laptev Sea and adjacent Nansen Basin during summer, 1993. *Polar Biology*, 19, 63–76.
- Kosobokova, K.N. & Hirche, H.J. (2000) Zooplankton distribution across the Lomonosov Ridge, Arctic Ocean: species inven-

- tory, biomass and vertical structure. *Deep-Sea Research Part I*, 47, 2029–2060.
- Kosobokova, K.N. & Hopcroft, R.R. (2010) Diversity and vertical distribution of mesozooplankton in the Arctic's Canada Basin. *Deep-Sea Research Part II*, 57, 96–110.
- Kosobokova, K.N., Hopcroft, R.R. & Hirche, H.-J. (in press) Patterns of zooplankton diversity through the depths of the Arctic's central basins. *Marine Biodiversity*, DOI 10.1007/s12526-010-0057-9.
- Markhaseva, E.L. & Ferrari, F.D. (2005) New benthopelagic bradfordian calanoids (Crustacea: Copepoda) from the Pacific Ocean with comments on generic relationships. *Invertebrate Zoology*, 2(2), 111–168.
- 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.
- Markhaseva, E.L. & Schulz, K. (2007) New species of *Brodskius*, *Rythabis*, and *Omorius* (Crustacea: Calanoida) from deep Antarctic waters. *Journal of Natural History*, 41 (13–16): 731–750.
- Mumm, N. (1993) Composition and distribution of mesozooplankton in the Nansen Basin, Arctic Ocean, during summer. *Polar Biology*, 13, 451–461.
- Park, T. (1970) Calanoid copepods from the Caribbean Sea and Gulf of Mexico. 2. New species and new records from plankton samples. *Bulletin of Marine Science*, 20 (2), 472–546.
- Razouls, C. de Bovee, F., Kouwenberg, J. & Desreumaux, N. (2005–2009) Diversity and Geographic distribution of marine Planktonic Copepods, <http://copepodes.obs-banyuls.fr/en> (accessed 23 February 2011)
- Roe, H.S.J. (1975) Some new and rare species of calanoid copepods from the northeastern Atlantic. *Bulletin of the British Museum (Natural History), Zoology*, 28(7), 295–372.
- Sars, G.O. (1900) V. Crustacea. In: Nansen, F. (ed) *The Norwegian North Polar Expedition 1893–1896. Scientific Results*, 1–5, 137 pp.
- Schulz, K. (1993) New species of Discoidae from the eastern North Atlantic (Copepoda: Calanoida). *Mitteilungen aus dem Hamburgischen Zoologischen Museum und Institut, Hamburg*, 90, 197–207.
- Schulz, K. (2003) A new species of the genus *Disco* (Copepoda, Calanoida, Discoidae) from the eastern North Atlantic. *Sarsia*, 88 (2), 107–112.
- Sirenko, B.I., Markhaseva, E.L., Buzhinskaya, G.N., Golikov, A.A., Menshutkina, T.V., Petryashov, V.V., Semenova, T.N., Stepanjants, S.D. & Vassilenko, S.V. (1996) Preliminary data on suprabenthic invertebrates collected during RV *Polarstern* cruise in the Laptev Sea. *Polar Biology*, 16, 345–352.
- Virketis, M.A. (1957) Some data on the zooplankton from the central part of the Arctic Basin. *Materials of scientific observations of the drift stations "North Pole 3" and "North Pole 4" 1954/55 Vol. 1*. Moscow, pp. 238–311. (In Russian).
- Virketis, M.A. (1959) Materials on the zooplankton of the central part of the Arctic Ocean. *Results of scientific observations on the drift stations "North Pole 4" and "North Pole 5", 1955–1956*. Moscow, pp. 132–206. (In Russian).