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Discovery of Novocriniidae (Copepoda, Harpacticoida) from cold-water corals in the Porcupine Seabight (NE Atlantic), with description of a new species of *Atergopedia* Martínez Arbizu & Moura, 1998

Hendrik Gheerardyn[a,*], Pedro Martínez Arbizu[b,c], Ann Vanreusel[a]

[a]*Marine Biology Section, Biology Department, Ghent University, Campus Sterre – Building S8, Krijgslaan 281, 9000 Ghent, Belgium*
[b]*Forschungsinstitut und Naturmuseum Senckenberg, Abt. Deutsches Zentrum für Marine Biodiversitätsforschung DZMB, Südstrand 44, 26382 Wilhelmshaven, Germany*
[c]*Institut für Biologie und Umweltwissenschaften, Fakultät V, Universität Oldenburg, 26111 Oldenburg, Germany*

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Abstract

The female of *Atergopedia longicaudata* sp. n. is described from dead cold-water coral fragments collected from the Porcupine Seabight (NE Atlantic). The new species is the fourth representative of the family Novocriniidae (Copepoda, Harpacticoida); it can be distinguished from its congeners by the elongate caudal rami and the ancestral armature on enp-3 of P1. Rediscovery of *Atergopedia vetusta* Martínez Arbizu & Moura, 1998, originally described from the Arctic Barents Sea, results in corrections to the species description. *Archaeotisbe confluenta* Kornev & Chertoprud, 2008 is transferred to the genus *Atergopedia* Martínez Arbizu & Moura, 1998, and *Archaeotisbe* Kornev & Chertoprud, 2008 is newly treated as a junior synonym of *Atergopedia*. Diagnoses (as ground patterns) for the two novocriniid genera (*Atergopedia* and *Novocrinia* Huys & Iliffe, 1998) are provided, and autapomorphies are indicated.

Keywords: *Archaeotisbe confluenta*; *Atergopedia longicaudata* sp. n.; *Atergopedia vetusta*; Cold-water corals; Porcupine Seabight

Introduction

Recent studies on the ecology of cold-water coral reefs show that the latter sustain highly diverse communities of associated macro- and megafauna (Jensen and Frederiksen 1992; Rogers 1999; Roberts et al. 2006, 2008; Henry and Roberts 2007; Cordes et al. 2008). Raes and Vanreusel (2005, 2006) focused on the associated meio- and nematofauna of *Lophelia pertusa* (Linnaeus, 1758) reef degradation zones in the Belgica Mound Province (Porcupine Seabight, NE Atlantic), and demonstrated that the presence of coral degradation products greatly influences the meiobenthic community. The first study on the associated harpacticoid copepod fauna by Gheerardyn et al. (in press) will describe an also highly diverse community in the coral degradation zone, including typically epifaunal taxa indicative of the exceptionality of this habitat. Several specimens of the harpacticoid family Novocriniidae Huys & Iliffe, 1998

*Corresponding author.
E-mail address: hendrik.gheerardyn@ugent.be (H. Gheerardyn).

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were collected from samples of dead coral fragments, and found to belong to *Atergopedia vetusta* Martínez Arbizu & Moura, 1998 and a new representative of the genus *Atergopedia* Martínez Arbizu & Moura, 1998, respectively.

Originally, *A. vetusta* was described from muddy sediments covered by a mat of sponge spicules on the continental slope of the Arctic Barents Sea, north-west off Franz-Josef-Land (Martínez Arbizu and Moura 1998). To accommodate their new species, its authors proposed a new family name, Atergopediidae, but this became a junior synonym as Huys and Iliffe (1998) had established the name Novocriniidae earlier in the same year. The latter authors described *Novocrinia trifida* Huys & Iliffe, 1998 from two anchialine caves on the Belize barrier reef, and considered their species as semi-planktonic in habit. Recently, Kornev and Chertoprud (2008) added a third genus and species, *Archaeotisbe confluenta* Kornev & Chertoprud, 2008, from shallow, shelly bottoms in the White Sea.

With only three known species, the Novocriniidae is a very small family; the present description of a fourth species contributes to better knowledge of this rare taxon. In addition, we transfer *Archaeotisbe confluenta* to *Atergopedia* and consider the genus name *Archaeotisbe* as a junior synonym of *Atergopedia*. Previously, Novocriniidae was believed to be endemic to anchialine caves (Huys and Iliffe 1998), but the discoveries of *Atergopedia* in the Arctic Ocean, the shallow White Sea, and now from cold-water corals in the Porcupine Seabight suggest a much wider distribution of the family. *Atergopedia longicaudata* sp. n. is the fourth harpacticoid species described from a cold-water coral ecosystem, next to *Halophytophilus lopheliae* Gheerardyn et al., 2008 (Ectinosomatidae), *Parameiropsis antennafortis* Corgosinho & Gheerardyn, in press (Harpacticoida incertae sedis), and a new species of *Ancorabolina* George, 2006 (Ancorabolidae) (Gheerardyn et al. 2008; Corgosinho and Gheerardyn 2009; Gheerardyn and George in press).

Material and methods

The new material described in this paper was collected during expedition RV Belgica 01/12 in the Belgica Mound Province of the Porcupine Seabight (NE Atlantic Ocean), in May 2001. Samples were taken with a box corer in the coral degradation zone of *Lophelia pertusa* reefs, at depths between 880 and 972 m. In the box corers, the surface of the sediment was partly or entirely covered with several dead fragments of the cold-water coral *L. pertusa*. After collecting the coral fragments, meiofauna of underlying sediment was sampled with three sediment cores (surface area 10 cm^2). All material was fixed in 4% buffered formaldehyde. In the laboratory, each coral sample was rinsed thoroughly over 1 mm and 32 μm sieves to collect macro- and meiofauna, respectively. Meiofauna from the sediment was extracted by density-gradient centrifugation, using Ludox HS40 (specific density 1.18) as a flotation medium (Heip et al. 1985; Vincx 1996). Harpacticoid copepods were sorted and counted using a Wild M5 binocular microscope. Dissected parts of the specimens were mounted in glycerine, and preparations sealed with insulating varnish. Drawings were made with the aid of a drawing tube on a Leica DMR microscope equipped with differential interference contrast (DIC), at 1000x magnification. Whole specimens were stored in 75% ethanol.

The new specimens have been deposited in the Invertebrate Collections of the Royal Belgian Institute of Natural Sciences (KBIN), Brussels, labelled with collection numbers beginning with the letters "COP". Additional material mentioned below is kept at the Forschungsinstitut und Naturmuseum Senckenberg, Frankfurt, Germany (SMF), and at the Shirshov Institute of Oceanology, Russian Academy of Sciences, Moscow, Russia (SIO), respectively.

The following abbreviations are used in the descriptive text: A1 = antennule; A2 = antenna; aes = aesthetasc; benp = baseoendopod; enp = endopod; enp-1 (2, 3) = proximal (middle, distal) segment of endopod; exp = exopod; exp-1 (2, 3) = proximal (middle, distal) segment of exopod; P1–P6 = first to sixth thoracopod. Scale bars in the figures are given in μm.

Taxonomic section

Family Novocriniidae Huys & Iliffe, 1998

Atergopediidae Martínez Arbizu & Moura, 1998

Genus *Atergopedia* Martínez Arbizu & Moura, 1998

Archaeotisbe Kornev & Chertoprud, 2008, syn. n.

Diagnosis (ground pattern, apomorphies in boldface)

Novocriniidae. First pedigerous somite **incompletely fused to cephalosome and lacking tergite**. Posterolateral corners of cephalic shield and P2–P4-bearing somites rounded. Pseudoperculum absent. Rostrum triangular, with simple tip. Enp-1 of A2 **without abexopodal seta**. Enp-2 of A2 with **multiplication of lateral, distinct setae** in female (without setoid tuft), and additionally with a lateral and a subapical setoid tuft in male. Mandibular endopod one-segmented. Maxillipedal syncoxa with seta. Enp-1 of P1 **without inner seta**. Baseoendopod

and exopod of P5 **fused in female**. Endopodal lobe of male P5 with 2 spines.

Atergopedia longicaudata sp. n.

(Figs. 1–8; 9A, B)

Etymology

The species epithet is derived from the Latin words longus (meaning long) and cauda (tail), in reference to the long caudal rami. It is to be treated as an adjective for the purposes of nomenclature.

Type material

Holotype female, dissected on 14 slides (COP 7696a–n); North-East Atlantic Ocean, Porcupine Seabight, box corer Bbc01-1203 (Belgica Cruise 01/12), 51°25.3120′N, 11°46.0226′W, depth 969 m, sample of dead coral fragment, 7 May 2001, leg. G. De Smet.

Paratypes. One female preserved in 75% alcohol (COP 7697), data as for holotype. One female dissected on 14 slides (COP 7698a–n) and one female preserved in 75% alcohol (COP 7699); data as for holotype, except box corer Bbc01-1205, 51°25.9290′N, 11°46.2717′W, depth 880 m.

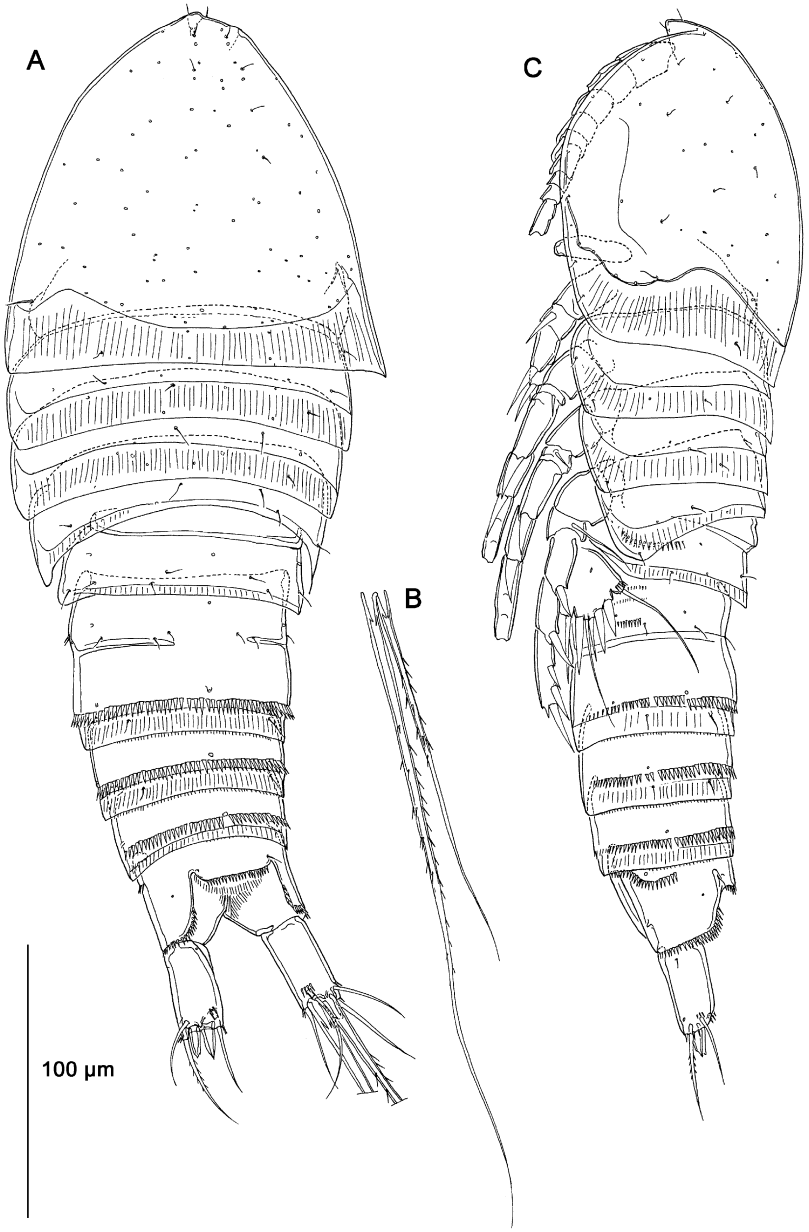

Fig. 1. *Atergopedia longicaudata* sp. n., holotype female. (A) Habitus, dorsal. (B) Caudal setae IV and V, dorsal. (C) Habitus, lateral.

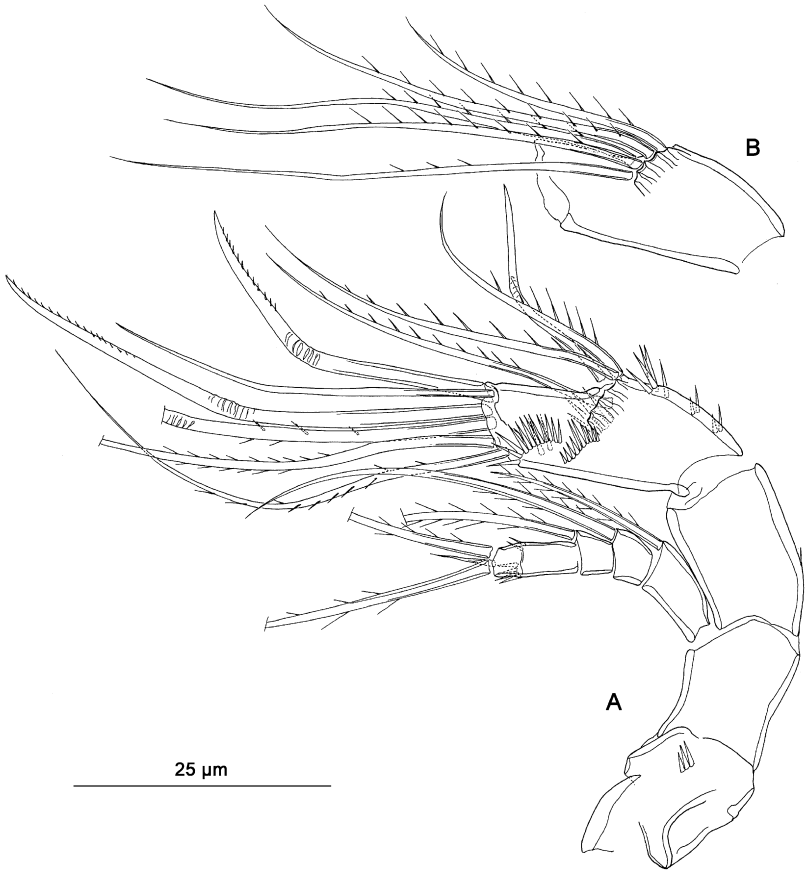

Fig. 2. *Atergopedia longicaudata* sp. n., holotype female. (A) Antenna, 5 setae on enp-2 omitted; see subfigure B. (B) 5 setae on enp-2 of antenna.

Diagnosis

The female of *Atergopedia longicaudata* sp. n. can be differentiated from its congeners by the combination of elongate caudal rami (two times as long as wide), loss of abexopodal seta on basis of antenna, loss of seta on basis of maxilliped, ancestral armature on enp-3 of P1 (with two inner setae), loss of outer spine on enp-3 of P2, and characteristic numbers of setal versus spiniform elements on female P5.

Description of female holotype

All illustrations made from holotype, except Fig. 3A (showing A1 of paratype COP 7698), as most antennular setae of holotype were broken after dissection.

Habitus (Fig. 1A, C) fusiform, tapering posteriorly, with slight demarcation between prosome and urosome. Body length (measured from anterior margin of rostrum to posterior margin of telson) 346 µm. Length of caudal rami 32 µm. First pedigerous somite incompletely fused to cephalosome (Figs. 1A, B; 9B) and practically free, but lacking a tergite and concealed beneath an extension of the cephalic shield and a broad, striated frill. Cephalic shield with sensilla and pores as figured; increasing in width posteriorly (Fig. 1A: slightly wider than natural condition due to mounting). Rostrum broad triangular with simple tip, fused to cephalic shield, with 2 sensilla (Fig. 8C, D). Hyaline frills striated and smooth on prosomites and first urosomite; striated and finely serrated on second half of genital double-somite and following two urosomites (Fig. 8A). Genital double-somite and following two urosomites with continuous transverse row of spinules ventrally, laterally and dorsally near posterior margin. P5-bearing somite with lateral spinule row as figured (Fig. 1C). Telson with proximal rows of spinules laterally and ventrally, and with row of spinules along posterior margin (Figs. 8A, B; 9A). Anal operculum weakly developed, with row of spinules along posterior margin (Fig. 9A). Caudal rami (Figs. 8A, B; 9A) cylindrical and elongate, 2 times as long as wide, bearing 7 setae. Seta I minute, inserting at one fourth length of outer margin. Setae I, II and VII bare; setae III, IV, V and VI pinnate. Setae IV and V long, with distinct fracture planes. Seta VII triarticulate at base.

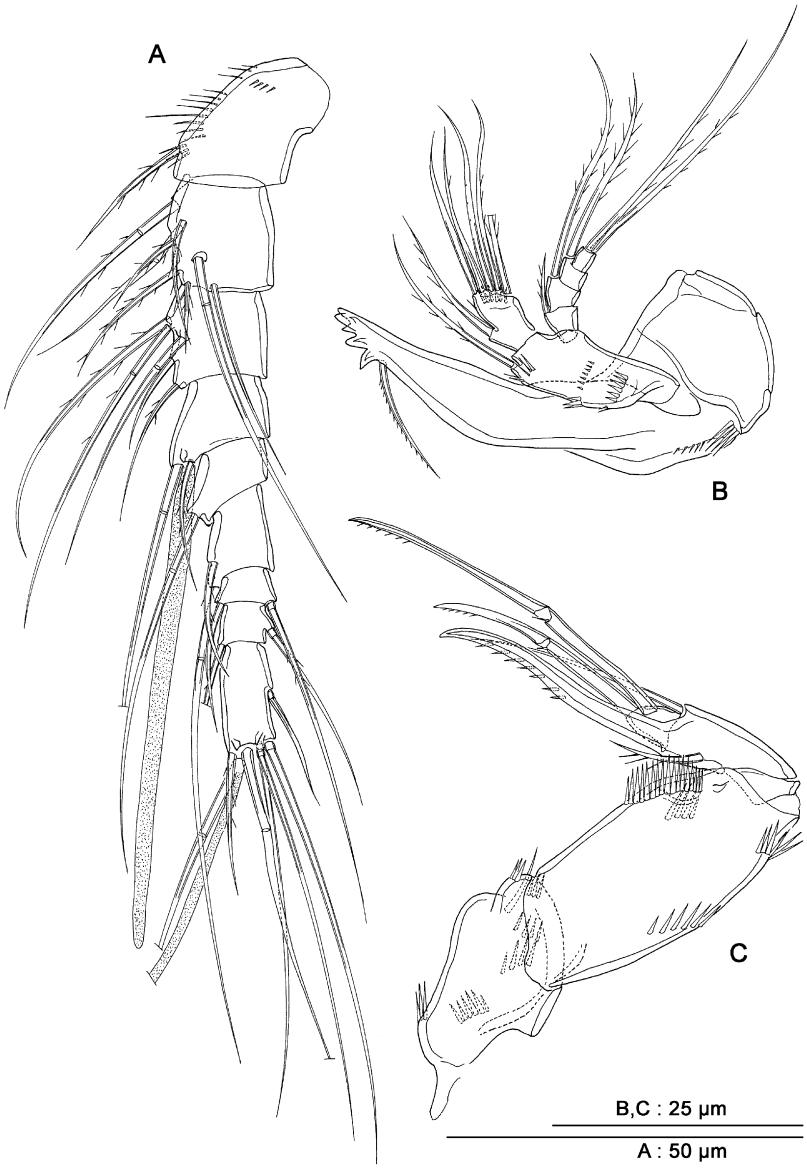

Fig. 3. *Atergopedia longicaudata* sp. n., (A) paratype female COP 7698, (B, C) holotype female. (A) Antennule. (B) Mandible. (C) Maxilliped.

Antennule (Fig. 3A) 9-segmented, slender, with aesthetascs on fourth and last segments. First segment with spinules along inner margin. Armature formula: 1/8/5/2 + ae/1/2/2/2/7 + ae.

Antenna (Fig. 2A, B) with short coxa. Basis without seta, completely separate from endopod. Exp 4-segmented, distal segment indistinctly subdivided; segments 1–3 each with 1 long pinnate seta; segment 4 with 2 long pinnate setae and 1 minute smooth seta. Enp 2-segmented; enp-1 without seta; enp-2 with several rows of spinules, medially with 8 unipinnate setae and 1 geniculate seta on inner and anterior margin, distally with 3 geniculate and 3 slender setae.

Mandible (Fig. 3B). Coxa elongate, gnathobase with 1 pinnate seta and several distal teeth. Basis with 1 inner seta; exp 4-segmented, with setal formula 1/1/1/2 and a 1-segmented enp bearing 1 inner and 5 distal setae.

Maxillule (Fig. 4A–D). Praecoxa subdistally with 4 setae on anterior protrusion, apically with 5 setae; anteriorly with 2 surface setae. Coxal endite cylindrical, with 5 setae. Basis with two endites bearing 4 setae each. Exopod 1-segmented, small and cylindrical, outwardly directed, bearing two long, apical setae. Endopod 1-segmented, bearing 6 distal setae.

Maxilla (Fig. 4E, F). Syncoxa with 1 endite bearing 2 setae. Basis drawn out into strong, pinnate claw; accessory armature consisting of 1 pinnate and 1 smooth seta. Endopod 2-segmented, with 2 geniculate setae on proximal segment and 3 geniculate setae as well as 1 slender seta on distal segment.

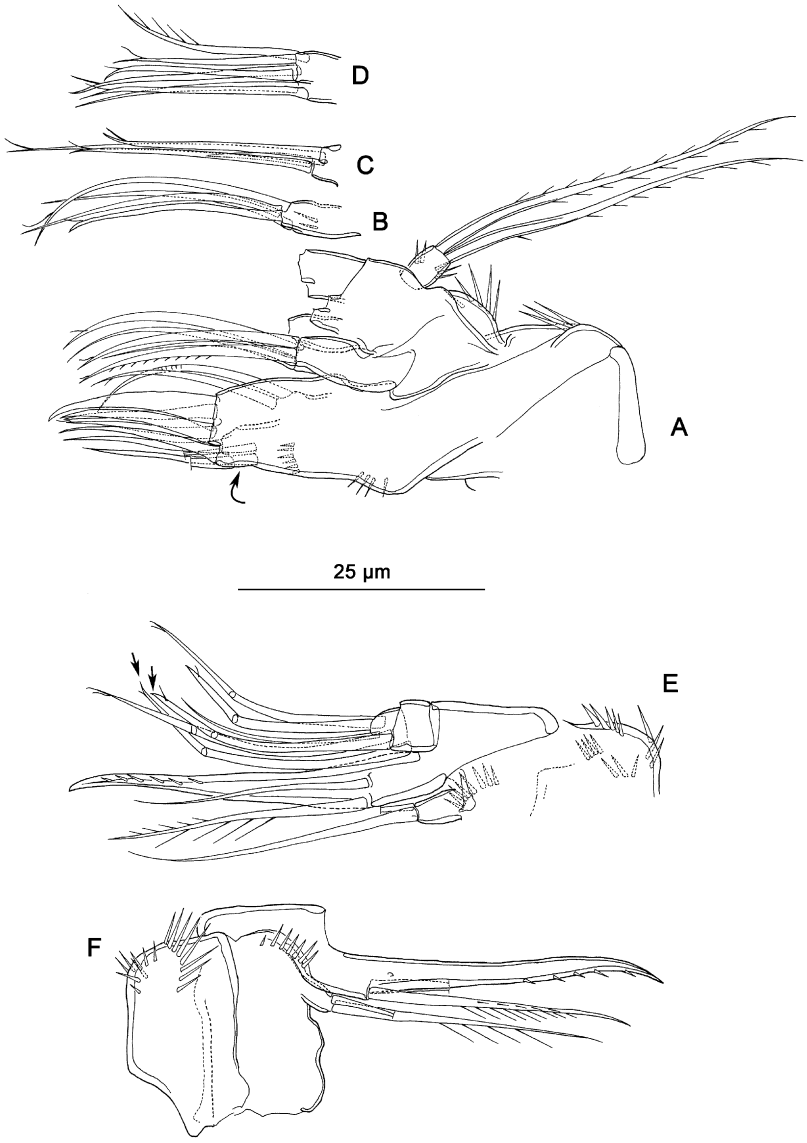

Fig. 4. *Atergopedia longicaudata* sp. n., (A–E) holotype female, (F) paratype female COP 7698. (A) Maxillule; arrow indicates anterior protrusion of praecoxa. (B) Proximal endite of basis of maxillule. (C) Distal endite of basis of maxillule. (D) Endopod of maxillule. (E) Maxilla (slightly tilted), syncoxa proximally damaged; arrows indicate setae on enp-1. (F) Maxilla, endopod omitted.

Maxilliped (Fig. 3C). Subchelate, well developed. Syncoxa with 1 small inner seta at distal corner, with spinular pattern as figured. Basis without seta, with several rows of spinules along palmar and outer margin. Endopod 2-segmented; first endopodal segment with 1 short, inner seta, and distal margin produced into a strong, pinnate claw; second endopodal segment with 1 slender seta proximally inserted on base of segment, and 2 distal, geniculate setae.

Swimming legs P1–P4 (Figs. 5A–C; 6A–C; 7B, C) with well developed praecoxae, coxae, bases, and 3-segmented rami; with pattern of pores and long and minute spinules as figured. Intercoxal sclerites rectangular; of P1 with, of P2–P4 without distal spinules. Bases forming triangular process between insertion sites of rami; with outer pinnate spine (P1–P2) or pinnate seta (P3–P4); inner distal corner with inner pinnate spine (P1). Endopods reaching to middle of respective exp-3.

P1 (Fig. 5A, B) more slender than following swimming legs. Exp-2 about 1.5 times as long as wide. Distal outer corners of exp-2, enp-1 and enp-2 of P1 forming spinous processes. Posterior surface of exopodal segments, enp-2 and enp-3 with short spinule rows. Enp-3 with distinctly stepped inner margin; bearing 2 inner setae, 2 distal setae and 1 slender outer spine. Exp-3 with 6 elements.

P2–P4 (Figs. 5C; 6A–C; 7B, C). Outer exopodal spines more strongly developed than in P1. Posterior

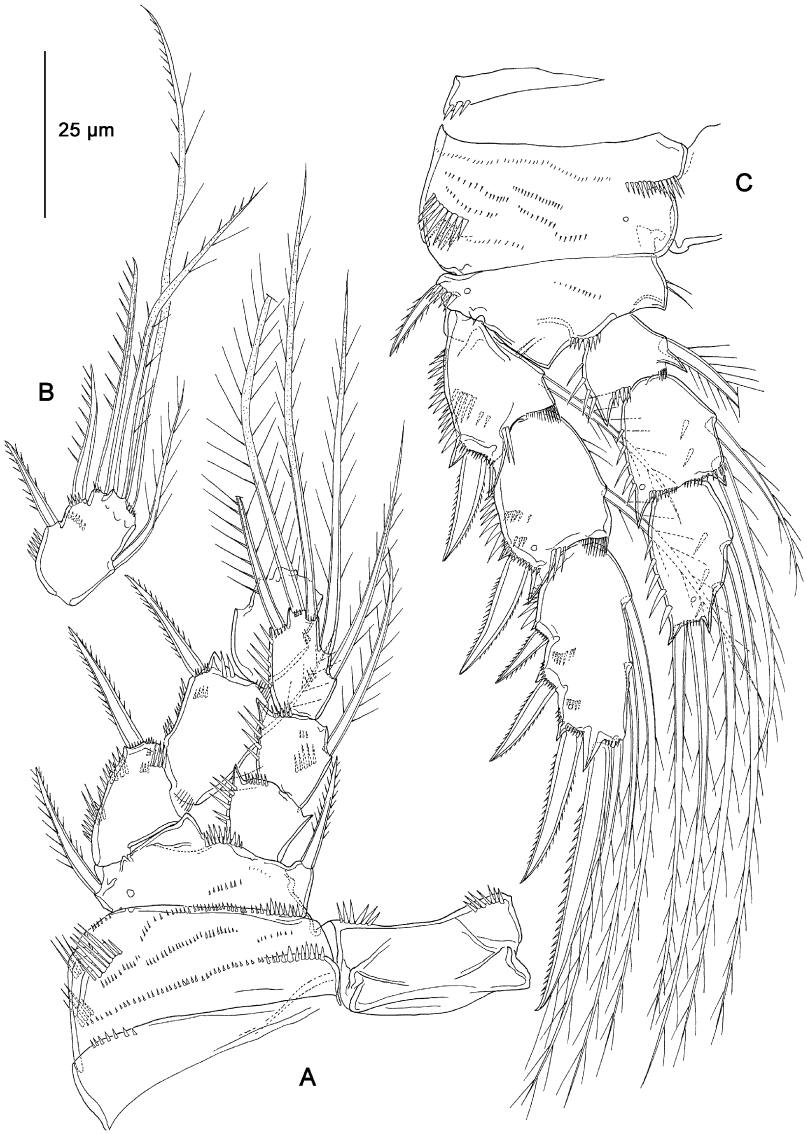

Fig. 5. *Atergopedia longicaudata* sp. n., holotype female. (A) P1, armature of exp-3 omitted. (B) Exp-3 of P1. (C) P2.

surface of exopodal segments with short spinule rows, of enp-2 and enp-3 with few, single spinules. Outer distal corners of exopodal segments and inner and outer distal corners of endopodal segments forming spinous processes. Swimming-leg setal formulae as in Table 1.

P5 (Fig. 7A). Benp and exp fused, forming one wide plate; with 3 pores on anterior surface; with outer basal seta arising from short setophore. Endopodal lobe with 4 strong spines, exopodal lobe with 3 strong spines and 2 setae. Small spinous process present between endopodal and exopodal lobe. Small intercoxal sclerite present.

Genital double-somite (Figs. 1A, C; 8A) wider than long; with subcuticular ridge ventrally and laterally, representing original segmentation. Genital field located in proximal half of genital double-somite. Copulatory pore located medially. Sixth legs represented by two plates medially fused, armed with 3 setae each.

Variation

Body length (measured from anterior margin of rostrum to posterior margin of telson) 306–346 µm (average 334 µm; n = 4).

Male

Unknown.

Atergopedia vetusta Martínez Arbizu & Moura, 1998

(Fig. 9C–E)

Material examined

Holotype female, dissected on 17 slides (SMF coll. nos. 1997.20/1–1997.20/17); Arctic Ocean, continental slope of Barents Sea, north-west off Franz-Josef-Land,

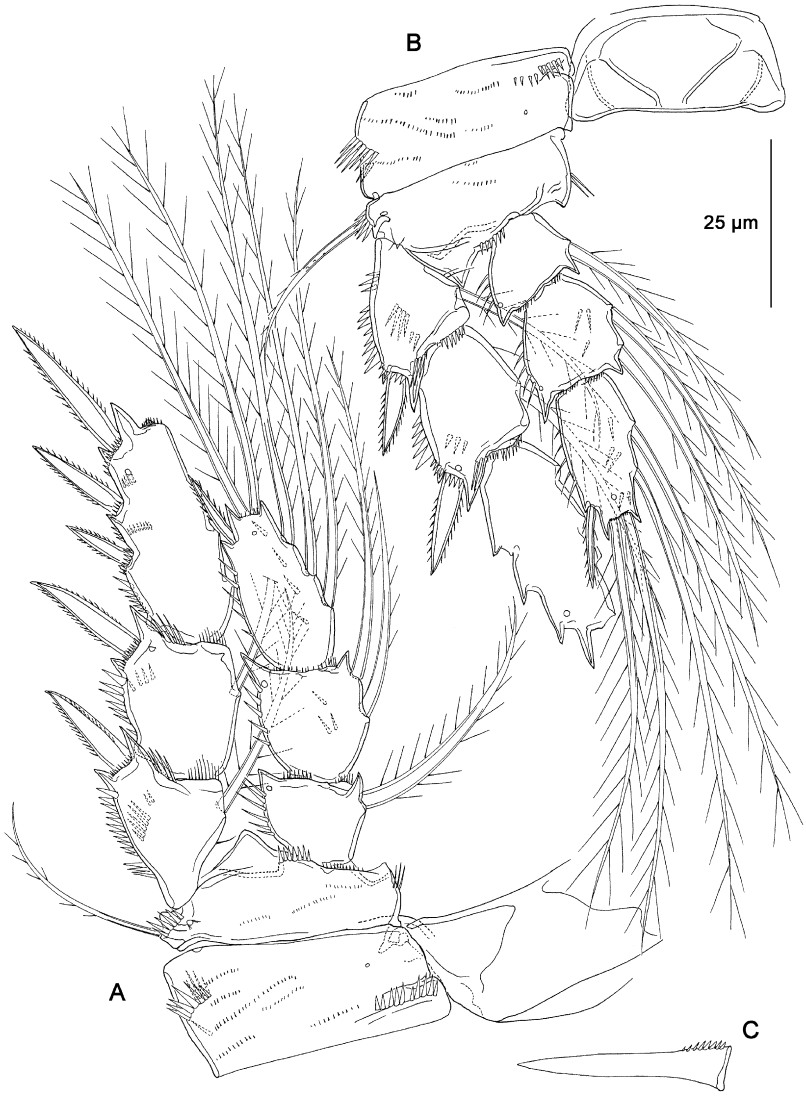

Fig. 6. *Atergopedia longicaudata* sp. n., holotype female. (A) P3, armature of exp-3 partly omitted. (B) P4, armature of exp-3 omitted. (C) Praecoxa of P3.

82°7.42′N, 42°32.35′E, depth 534 m, box corer sample from muddy sediments covered by mat of sponge spicules about 2 cm thick, 28 August 1993 (Martínez Arbizu and Moura 1998). Allotype male, dissected on 13 slides (SMF coll. nos. 1997.21/1–1997.21/13), data as for holotype.

Two females in 70% alcohol (COP 8650); North-East Atlantic Ocean, Porcupine Seabight, box corer Bbc01-1203 (Belgica Cruise 01/12), 51°25.3120′N, 11°46.0226′W, depth 969 m, sample of dead coral fragment, 7 May 2001, leg. G. De Smet. One male and one female in 70% alcohol (COP 8651); as previous, except box corer Bbc01-1205, 51°25.9290′N, 11°46.2717′W, depth 880 m.

Corrections to species description

Female A1 (Fig. 9C) segment 7 bears 2 setae (rather than 1).

Proximal basal endite of maxillule (Fig. 9D) bears 4 (rather than 3) distal setae.

Basis of maxilla (Fig. 9E) bears 2 setae (rather than 1), which are proximally inserted.

Atergopedia confluenta (Kornev & Chertoprud, 2008), comb. n.

Archaeotisbe confluenta Kornev & Chertoprud, 2008

Type material (not seen)

Holotype female, dissected on 4 slides (SIO coll. nos. Har28–Har31); White Sea, Maliy Eremey Island (Rugoserskaya Gulf, Karelian Coast, Kandalaksha Bay), 66°33′N, 33°07′E, depth 10 m, shelly bottoms (Kornev and Chertoprud 2008). Allotype male,

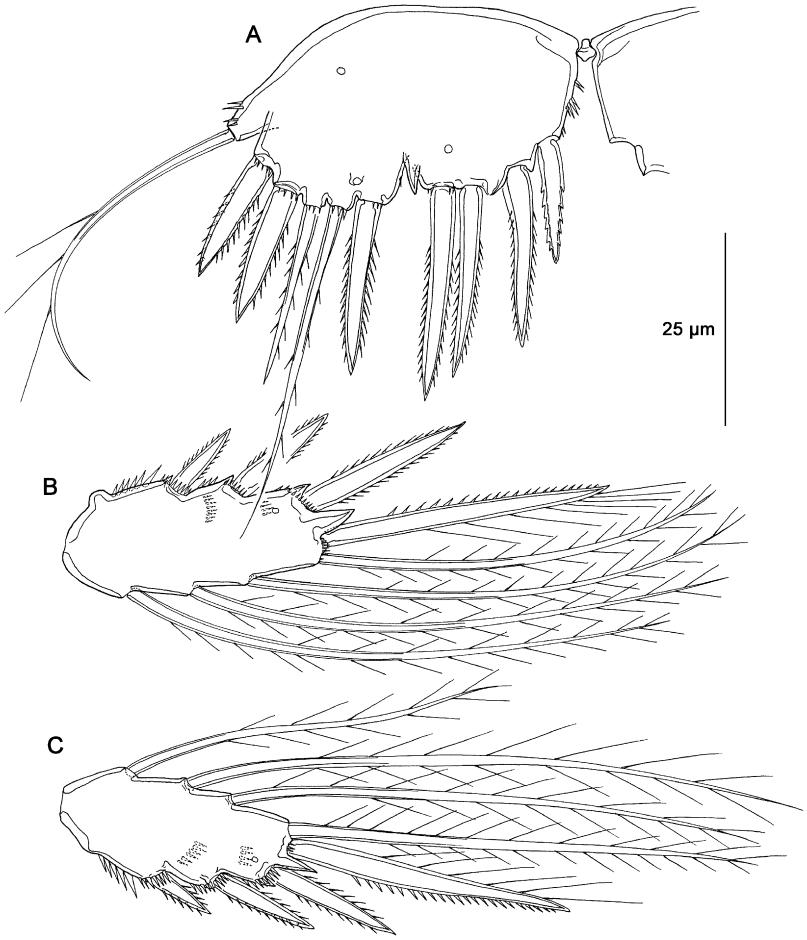

Fig. 7. *Atergopedia longicaudata* sp. n., holotype female. (A) P5. (B) Exp-3 of P3. (C) Exp-3 of P4.

dissected on 1 slide (SIO coll. no. Har32); data as for holotype.

Remarks

Unaware of the publication by Martínez Arbizu and Moura (1998), Kornev and Chertoprud (2008) proposed the new genus and species *Archaeotisbe confluenta* for a novocriniid collected from the White Sea. The drawings of *A. confluenta* show only minor differences with *Atergopedia vetusta* (limited numbers of fewer setae on male A1, female A1 and A2, respectively; one endite less on maxillar syncoxa; no seta on basis of maxilliped), which could possibly be due to observational errors. The habitus seems wider and slightly compressed in *A. confluenta*, more elongate in *A. vetusta*. We have doubts about the validity of *A. confluenta*, which might be synonymous with *A. vetusta*. However, since the type material was not available for study, we abstain from formal synonymisation.

However, the few, small differences noted above do not justify a separate genus *Archaeotisbe*; instead, *A. confluenta* fits within *Atergopedia* without any problems. Therefore, *Archaeotisbe* is treated as a junior synonym of *Atergopedia* here.

Genus *Novocrinia* Huys & Iliffe, 1998

Diagnosis (ground pattern, apomorphies in boldface)

Novocriniidae. Cephalothorax incorporating first pedigerous somite. Posterolateral corners of cephalic shield and P2–P4-bearing somites **produced into spinous processes. Pseudoperculum** moderately developed and semicircular. Dorsal rear margins of caudal rami produced into **backwardly directed spinous processes**. Caudal seta I **absent**. Rostrum with **trifid tip**. Anterior margin of first antennular segment **produced into small spinous process. Modified spines present** on proximal segments of antennule. Enp-1 of A2 with abexopodal seta. Enp-2 of A2 with **lateral setoid tuft in female,** and with additional, subapical setoid tuft in male. Mandibular endopod **2-segmented**. Maxillipedal syncoxa **without** seta. Enp-1 of P1 with inner seta. Baseoendopod and exopod of P5 not fused. Endopodal lobe of male P5 **with 4 spines**.

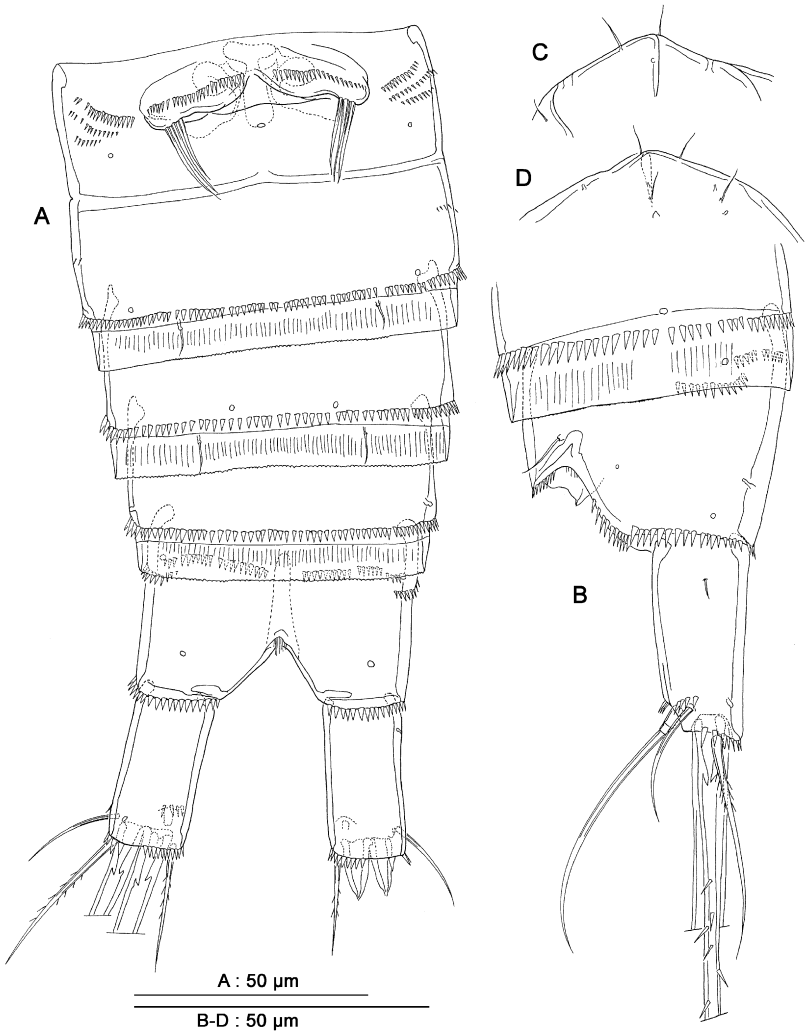

Fig. 8. *Atergopedia longicaudata* sp. n., holotype female. (A) Urosome, ventral. (B) Telson and caudal ramus, lateral. (C) Rostrum, ventral. (D) Rostrum, dorsal.

Discussion

The main apomorphy of Novocriniidae is the presence of sexually dimorphic setoid tufts on the inner margin of the second endopodal segment of the antenna, the condition of which is not exactly the same in the two genera, *Atergopedia* and *Novocrinia*. Each setoid tuft consists of a dense cluster of filamentous structures; this condition is interpreted as a secondary multiplication of setal elements (Huys and Iliffe 1998; Martínez Arbizu and Moura 1998). In the female of *Novocrinia trifida*, the lateral armature of this antennary segment consists of two setae and a setoid tuft (conceivably representing the missing third setal element). The male additionally carries a subapical, second setoid tuft (which is regarded as a transformed distal setal element) (Huys and Iliffe 1998). The situation is different in *Atergopedia*, where the female antennary enp-2 lacks a dense cluster of filamentous structures. However, the lateral armature shows a multiplication of distinct setae and consists of 1 geniculate seta and 6 or 8 slender setae in *A. vetusta* and *A. longicaudata*, respectively. The male antenna of *A. vetusta* additionally bears a medial and a subapical setoid tuft. However, due to the high number of these seta-like structures, it could not be evaluated whether there are 1 apical and 1 medial seta less than in the female, which would be the homologues of these setoid tufts. The condition in the male of *A. longicaudata* remains to be seen, as only the female has been found.

Because both novocriniid genera were established almost simultaneously, the recognition of autapomorphies for each genus was impossible at the time. Although *Novocrinia* and *Atergopedia* are still very small genera (with one and three species, respectively), we consider the major diagnostic apomorphies of *Atergopedia* to be the following (plesiomorphic conditions in brackets): First pedigerous somite incompletely fused to cephalosome and lacking tergite (fused to cephalosome); baseoendopod and exopod of P5 fused in female (separate); loss of

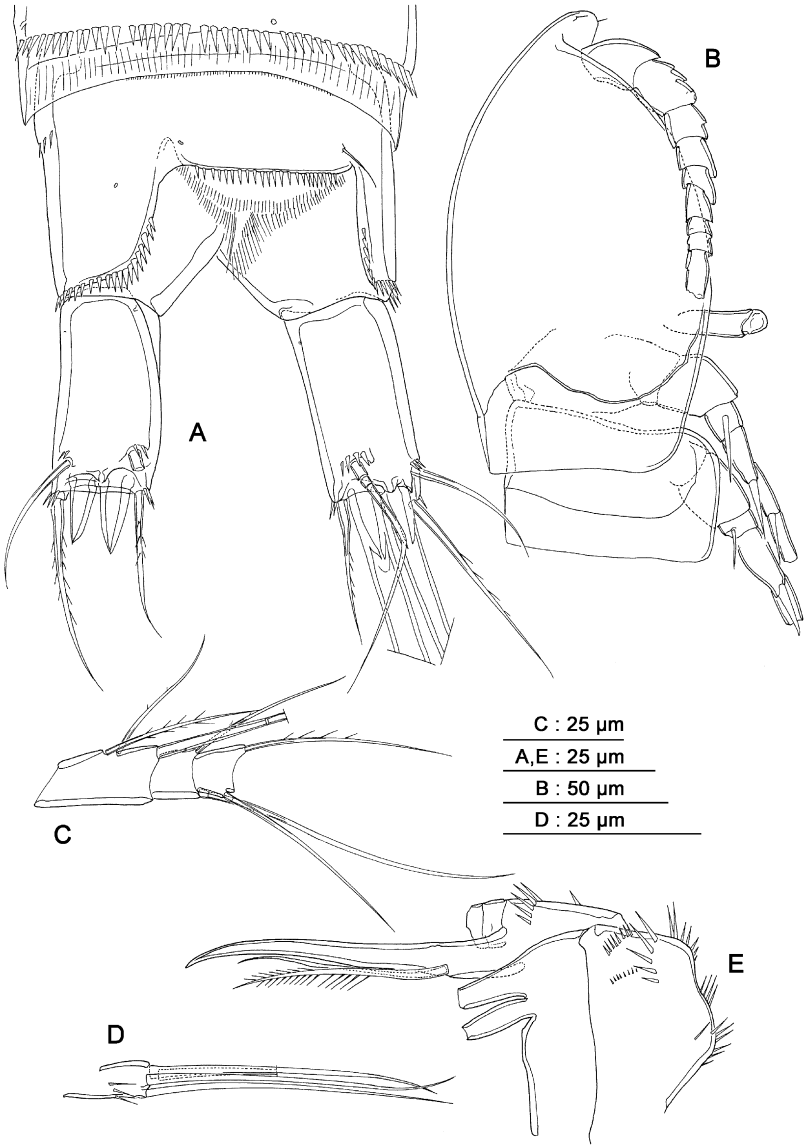

Fig. 9. (A, B) *Atergopedia longicaudata* sp. n., holotype female; (C–E) *A. vetusta* Martínez Arbizu & Moura, holotype female. (A) Telson and caudal rami (setae IV and V of left caudal ramus broken), dorsal. (B) Habitus, lateral, showing first pedigerous somite incompletely fused to cephalosome. (C) Segments 6–8 of antennule. (D) Proximal basal endite of maxillule. (E) Maxilla, armature of syncoxal endites and endopod omitted.

Table 1. *Atergopedia longicaudata* sp. n., swimming-leg setal formulae.

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

abexopodal seta on enp-1 of A2 (seta present); and loss of inner seta on enp-1 of P1 (seta present).

For the genus *Novocrinia*, the following characters are considered as the major apomorphies (plesiomorphic conditions in brackets): Anterior margin of first antennular segment produced into small spinous process (process absent); modified spines present on proximal segments of antennule (normal setae); 4 spines present on endopodal lobe of male P5 [considered as a secondary phenomenon; Huys and Iliffe 1998] (fewer than 4 spines present). Additionally, Seifried (2003) considered the 2-segmented condition of the mandibular endopod also as a secondary phenomenon and as apomorphic for *Novocrinia*.

Distribution

The rediscovery of *Atergopedia vetusta* from the continental slope of the Porcupine Seabight extends

the distribution range of this species to a depth of 969 m and to a longitude of 51°25.3′N in the NE Atlantic Ocean. The collection of *Atergopedia* from the shallow waters of the White Sea (Kornev and Chertoprud 2008) also indicates a wide bathymetrical range for this genus. Together with the present description of a new species from cold-water corals in the Belgica Mound Province, these findings further show that Novocriniidae is not an exclusively cavernicolous taxon. Nevertheless, with only four known species, the Novocriniidae still form a small and rare harpacticoid family.

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References

Cordes, E.E., McGinley, M.P., Podowski, E.L., Becker, E.L., Lessard-Pilon, S., Viada, S.T., Fisher, C.R., 2008. Coral communities of the deep Gulf of Mexico. Deep-Sea Res. Pt. I 55, 777–787.

Corgosinho, P.H., Gheerardyn, H., 2009. A new species of *Parameiropsis* Becker, 1974 (Copepoda: Harpacticoida) from the Porcupine Seabight (NE Atlantic). Mar. Biodiv.

Gheerardyn, H., De Troch, M., Vincx, M., Vanreusel, A., in press. Harpacticoida (Crustacea: Copepoda) associated with cold-water coral substrates in the Porcupine Seabight (NE Atlantic): species composition, diversity and reflections on the origin of the fauna. Sci. Mar.

Gheerardyn, H., George, K.H., in press. New representatives of the genus *Ancorabolina* George, 2006 (Harpacticoida, Ancorabolidae) including remarks on ancorabolid phylogeny. Zool. J. Linn. Soc.

Gheerardyn, H., Seifried, S., Vanreusel, A., 2008. A new species of *Halophytophilus* Brian, 1919 (Copepoda: Harpacticoida: Ectinosomatidae) from cold-water corals in the Porcupine Seabight (NE Atlantic). Zootaxa 1761, 1–16.

Heip, C., Vincx, M., Vranken, G., 1985. The ecology of marine nematodes. Annu. Rev. Oceanogr. Mar. Biol. 23, 399–489.

Henry, L.-A., Roberts, J.M., 2007. Biodiversity and ecological composition of macrobenthos on cold-water coral mounds and adjacent off-mound habitat in the bathyal Porcupine Seabight, NE Atlantic. Deep-Sea Res. Pt. I 54, 654–672.

Huys, R., Iliffe, T.M., 1998. Novocriniidae, a new family of harpacticoid copepods from anchihaline caves in Belize. Zool. Scr. 27, 1–15.

Jensen, A., Frederiksen, R., 1992. The fauna associated with the bank-forming deepwater coral *Lophelia pertusa* (Scleractinaria) on the Faroe shelf. Sarsia 77, 53–69.

Kornev, P.N., Chertoprud, E.S., 2008. Veslonogie Rakoobraznye Otryada Harpacticoida Belogo Morya: Morfologiya, Sistematika, Ekologiya. [Copepod Crustaceans of the Order Harpacticoida of the White Sea: Morphology, Systematics, Ecology]. Tovarishchestvo Nauchnikh Izdanii KMK, Moscow. In Russian.

Martínez Arbizu, P., Moura, G., 1998. Atergopediidae, a new family of harpacticoid copepods (Crustacea) from oligothrophic Arctic sediments. Zool. Beitr. 38, 189–210.

Raes, M., Vanreusel, A., 2005. The metazoan meiofauna associated with a coldwater coral degradation zone in the Porcupine Seabight (NE Atlantic). In: Freiwald, A., Roberts, J.M. (Eds.), Cold-water Corals and Ecosystems. Springer, Berlin, Heidelberg, pp. 821–847.

Raes, M., Vanreusel, A., 2006. Microhabitat type determines the composition of nematode communities associated with sediment-clogged cold-water coral framework in the Porcupine Seabight (NE Atlantic). Deep-Sea Res. Pt. I 53, 1880–1894.

Roberts, J.M., Henry, L.-A., Long, D., Hartley, J.P., 2008. Cold-water coral reef frameworks, megafaunal communities and evidence for coral carbonate mounds on the Hatton Bank, north east Atlantic. Facies 54, 297–316.

Roberts, J.M., Wheeler, A.J., Freiwald, A., 2006. Reefs of the deep: the biology and geology of cold-water coral ecosystems. Science 312, 543–547.

Rogers, A.D., 1999. The biology of *Lophelia pertusa* (Linnaeus 1785) and other deep-water reef-forming corals and impacts from human activities. Int. Rev. Hydrobiol. 84, 315–406.

Seifried, S., 2003. Phylogeny of Harpacticoida (Copepoda): Revision of "Maxillipedasphalea" and Exanechentera. Cuvillier Verlag, Göttingen.

Vincx, M., 1996. Meiofauna in marine and freshwater sediments. In: Hall, G.S. (Ed.), Methods for Examination of Organismal Diversity in Soils and Sediments. CAB International, Wallingford, pp. 187–195.