First record of the genus *Atlantistylis* Reyss, 1975 (Crustacea: Cumacea) from the North Atlantic, with the description of a new species

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Abstract
A new species of the genus *Atlantistylis* Reyss, 1975 (Diastylidae) is described from the Atlantic Frontier Margin (North-East Atlantic). This is the first record of the genus *Atlantistylis* from the North Atlantic. The new species *Atlantistylis borealis* can be recognized by the presence of spines on the frontal and lateral lobes of the carapace combined with their absence on the pereon and pleon; the first pereopods are very long. The small telson with two small apical acuminate setae and the absence of pleopods in the male are characteristic of the genus.

Keywords: *Atlantistylis*, Crustacea, North Atlantic

Introduction
In 1996, the Atlantic Frontier Environmental Network (AFEN) mapped and sampled 20,000 km² of seabed lying to the west of Shetland that had been licensed for oil and gas exploration before or during 1996. In 1998, a further 10,000 km² north and west of Scotland that covered the 17th oil licensing round was surveyed (see Bett 1997, 1999, 2001a for the survey area and sampling details). The aim of the AFEN surveys was to give a broad view of the sea-bed habitats and faunal communities, in order to provide a regional context in which to place site-specific surveys and future monitoring. More recently, in 2000, the UK Department of Trade and Industry (DTI) conducted a survey in the area north-west of Scotland in the Faeroe–Shetland channel (White Zone survey) as part of preparations for a 19th round of oil licensing (see Bett 2001b for cruise and station details).

The family Diastylidae currently contains 20 genera and over 260 described species. The genus *Atlantistylis* can be recognized by the absence of pleopods in the adult male, and the very short telson, as wide as long, with a pair of terminal spines only, in both sexes (Reyss 1975; Day 1980). This paper follows the terminology of Watling (1989) by referring to...
these “terminal telsonic spines” as setae, since they are articulated projections. The type species by monotypy, *Atlantistylis chauvini* Reyss, 1975, was described from south of Dakar, tropical Atlantic, at 587–3740 m. Subsequently, *Atlantistylis japonica* was described from the north-western Pacific waters of Japan, at 314–320 m (Gamó 2001). Here we present the first record of the genus from the North Atlantic, with the description of a third species from White Zone and AFEN material.

**Material and methods**

Details of the Atlantic stations from which specimens were obtained are shown in Table I. Measurements of total body length were made from the anterior tip of the pseudorostrum to the end of the telson. The stated carapace lengths include the pseudorostrum. In the descriptions, the term “preparatory female” is used for the developmental stage prior to a brooding instar, in which oostegites are present as non-overlapping buds; in iteroparous species, this morphology would include inter-brood females. The term “immature male” is used for the developmental stage prior to the preparatory and mature stages, in which the second antenna reaches approximately three-quarters of the way along the ventral margin of the carapace, with the peduncle lacking setae and the flagellum containing only a few segments. The long plumose setation of the exopods of the third maxilliped and the pereopods is not illustrated in the diagrams. The AFEN and the White Zone material has been deposited in the National Museum of Scotland (NMS).

**Description**

*Atlantistylis borealis* sp. nov.

(Figures 1, 2)

**Type material**

Holotype: preparatory ♀, length 4.5 mm; White Zone 55204#2, co-ordinates: 59°40.65′N, 08°42.27′W, depth 1295 m; NMSZ 2000.249.0004. Paratypes: one brooding ♀, two immature ♂♂, one manca, AFEN 54579#2A, NMSZ 1999.238.0076; one brooding ♀, one preparatory ♀, one immature ♂, AFEN 54580#1A/B, NMSZ 1999.238.0077.

**Other material.** Five brooding ♀♀, two preparatory ♀♀, Institute of Oceanographic Sciences (IOS), Discovery collections 9753#7.

| Institution, ship and/or cruise     | Station | Year | Latitude       | Longitude       | Depth (m) | Gear   |
|-------------------------------------|---------|------|----------------|-----------------|-----------|--------|
| DTI—White Zone                      | 55204#2 | 2000 | 59°40.65′N     | 08°42.27′W      | 1295      | MC     |
| AFEN—RRS Charles Darwin             | 54579#2 | 1998 | 56°49.66′N     | 09°36.94′W      | 1796      | BC     |
| AFEN—RRS Charles Darwin             | 54580#1 | 1998 | 56°45.92′N     | 09°26.71′W      | 1612      | BC     |
| IOS Discovery Cruise 92             | 9753#7  | 1978 | 50°45.50′N     | 12°10.90′W      | 1942      | BN1.53M|

DTI, UK Department of Trade and Industry; AFEN, Atlantic Frontier Environmental Network; IOS, Institute of Oceanographic Sciences; MC, multiple corer; BC, box core; BN1.53M, triple net epibenthic sledge.
Figure 1. *Atlantistylis borealis* sp. nov. (A) Holotype: NMSZ 2000.249.0004, White Zone 55204#2, preparatory female, whole animal lateral view. (B-E) Paratype NMSZ 1999.238.0077, AFEN 54580#1A/B, preparatory female: (B) first antenna; (C) third maxilliped; (D) first pereopod; (E) second pereopod. (F) Paratype NMSZ 1999.238.0076, AFEN 54579#2A, immature male, carapace dorsal view. Scale bar: 1 mm (A, F); 0.2 mm (B–E).
Figure 2. *Atlantistyliis borealis* sp. nov. (A–D) Paratype NMSZ 1999.238.0077, AFEN 54580#1A/B, preparatory female: (A) third pereopod; (B) fourth pereopod; (C) fifth pereopod; (D) uropod. (E–G) Paratype NMSZ 1999.238.0076, AFEN 54579#2A, immature male: (E) immature male second antenna; (F) immature male third pereopod; (G) immature male fourth pereopod.
Diagnosis

Pseudorostrum long, with four to six spines on either side of the dorsal margin (i.e. a double row) and minute teeth on the ventral margin; frontal lobe with a crescent-shaped group of spines, pseudorostral lobe with a row of spines extending on to the lateral lobe, dorsal crest with a double row of spines on the anterior half; first pereopods very long; telson small, one-quarter the length of the uropod peduncle and with two small apical acuminate setae only; uropodal endopod longer than exopod; male without pleopods.

Preparatory and brooding-form females (Figure 1A). Body length 4.5–4.9 mm. Carapace depth 0.47–0.50 times carapace length. Pereon 0.7–0.8 times carapace length. Pleon 1.75–1.95 times carapace length, pleonite 6 0.5 times the length of pleonite 5.

Carapace (Figure 1A). Laterally compressed, deep, no antennal notch, antero-lateral corner not defined. Dorsal crest with a double row of ca seven very small spines on the anterior half, a few denticles on the posterior half. Frontal lobe with small narrow eyelobe with no eyes, a crescent shaped group of ca 8–10 spines and a few scattered denticles. Pseudorostrum long, 0.46 times length of remainder of carapace, tapering to a narrow point in undamaged material. Dorsal margin with double row of four to six spines, ventral margin with small teeth continuing past the antero-lateral corner and to the posterior portion of the ventral margin. Pseudorostral lobe with a row of ca seven to nine spines extending on to the lateral lobe.

First antenna (Figure 1B). Long, exceeding the length of the pseudorostrum. Peduncle and flagellum both three-segmented. First segment of the peduncle 1.1 times the length of the second segment, third segment 1.2 times the length of the first segment. Three-segmented accessory flagellum 0.6 times the length of the main flagellum.

Third maxilliped (Figure 1C). Slender, basis 0.88 times the length of the distal articles combined, with very fine teeth on the ventral margin. Exopod slender, shorter than basis, basal segment with minute teeth on the lateral margin.

First pereopod (Figure 1D). Very long and slender, carpus exceeding the tip of the pseudorostrum. Basis 0.48 times the distal articles combined, with very fine teeth on the lateral and ventral margins. Dactyl 0.5 times propodus. Exopod slender, 0.7 times length of basis.

Second pereopod (Figure 1E). Basis strongly curved, 0.5 times the distal articles combined. Ischium 0.4 times merus, carpus subequal to propodus plus dactylus. Exopod slender, subequal to basis.

Third pereopod (Figure 2A). Basis long and cylindrical, 1.7 times distal articles combined. Exopod rudimentary, two-segmented, 0.2 times basis.

Fourth pereopod (Figure 2B). Basis 1.3 times length of distal articles combined. Exopod rudimentary, two-segmented, 0.3 times basis.

Fifth pereopod (Figure 2C). Basis 0.9 times length of distal articles combined. No exopod.
Uropods and telson (Figure 2D). Uropod 0.24 times body length, peduncle 1.25 times the length of the endopod. Exopod shorter than endopod, extending 0.72 of way along endopod. First segment of endopod 1.1 times the length of second; second and third segments subequal. Number of setulose stout setae on median margin: peduncle, five; segment 1 of endopod, two; segment 2 of endopod, two; segment 3, one and one long simple terminal seta. Terminal seta of segment 3 of endopod 1.75 times the length of the segment. Median margin of the endopod segments 2 and 3 with serrated edge. First segment of exopod relatively long, 0.5 times segment 2. Exopod distal segment with four setulose stout setae on the median margin and three setae terminally. Telson very short, slightly wider than long, 0.4–0.5 times the length of pleonite 6, with a single pair of terminal acuminate setae; postero-lateral border serrated.

Immature male. Body length 3.7–3.8 mm. Carapace depth 0.6–0.7 times carapace length. Pereon 0.7–0.8 times carapace length. Pleon 1.7–1.9 times carapace length. Carapace dentition (Figure 1F) similar to that of female. Second antenna reaching 0.75 of the way along the ventral margin of the carapace; flagellum with few segments (Figure 2E). Exopod present on maxilliped 3 and pereopods 1 to 4, absent from pereopod 5 (Figures 2F, G for pereopods 3 and 4). No pleopods, pleon similar to that of female. Uropod resembling that of female, i.e. with three-segmented endopod.

Etymology

The name borealis refers to the northern occurrence of the new species.

Remarks

The telson in Atlantistylis borealis sp. nov. is relatively inconspicuous and the species could be mistaken for a leuconid.

The only other two species in the genus are Atlantistylis chauvini Reyss, 1975, from the tropical Atlantic, and A. japonica Gamô, 2001 from the Pacific. The new species is referred to Atlantistylis because it shares with A. chauvini the combination of (1) the absence of pleopods in males; (2) the small telson lacking lateral setae; and (3) the three-segmented uropodal endopod of females. The description of A. japonica Gamô, 2001 is based on a single adult male with an incomplete pleon (the first two pleonites only). The latter shares with A. chauvini and A. borealis sp. nov. the absence of pleopods in males. The species of the genus Atlantistylis Reyss, 1975 can be separated by the following key.

Key to the species of the genus Atlantistylis Reyss, 1975

1  No spines on the frontal and lateral lobes of the carapace………A. chauvini Reyss, 1975
   – Carapace with spines on the frontal and lateral lobes..........................................................2

2  Pseudorostrum moderately arched, peronites 1–5 each with one pair of strong dorsal spines, pleonites 1–2 spinose..............................A. japonica Gamô, 2001
   – Pseudorostrum not arched, no dorsal spines on pereon or pleon......A. borealis sp. nov.

The immature male of A. borealis sp. nov. has a three-segmented uropodal endopod, whereas this ramus is described by Reyss (1975) as two-segmented in mature male A. chauvini. This difference might reflect developmental stage, with immature males sharing
the female condition, or might be a genuine distinction between the species. The club-shaped peduncle of the first antenna of mature male *A. japonica*, with a rounded and densely setiferous final segment, suggests a possible affinity with the genus *Leptostylis* Sars, 1869.

**Distribution**

This species has been found exclusively on the lower slope of the Hebrides Ridge (Atlantic Margin) and the Rockall Trough at depths of 1295–1796 m.

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