

A new species of *Orbiniella* (Polychaeta: Orbiniidae) from deep basins of Antarctica

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During the 2002 Antarctic Deep-sea Biodiversity (ANDEEP) programme to the Drake Passage, Weddell Sea Basin and South Sandwich Slope and trench, a new deep-water species of orbiniid polychaete was collected: *Orbiniella andeepia* sp. nov. *Orbiniella andeepia* appears to be most closely related to *O. marionensis* but differs in capillary setal structure, the type and number of acicular spines found in each podial lobe. *Orbiniella andeepia* is only the third deep-water species of *Orbiniella* to be discovered. It exhibits both a wide depth- and geographic-range within the Antarctic slope and abyssal sediments.

INTRODUCTION

Polychaetes of the family Orbiniidae are sub-surface deposit feeders that are relatively common in marine sediments and often important contributors to benthic assemblages. A review of the systematics and phylogenetic interrelationships of the genera of the Family Orbiniidae was presented by Blake (2000). Previously, the Orbiniidae had been divided into two sub-families: Orbiniinae and Protoariciinae, both established by Hartman (1957). This arrangement was based on the number of peristomial rings where species assigned to the Orbiniinae had one ring and those assigned to the Protoariciinae had two rings. Blake (1996, 2000) demonstrated that some orbiniids of the sub-family Protoariciinae were in fact juveniles of larger species in the Orbiniinae based on larval and juvenile morphology. The developmental morphology of *Naineris* species clearly indicated that juveniles had two peristomial rings while adults had one. Fauchald & Rouse (1997) indicated that the first achaetous ring in orbiniids was peristomial whereas the second ring is actually thought to be an achaetous segment.

Blake (2000) therefore presented a phylogenetic analysis and reclassified the Orbiniidae into three sub-families based on characters other than the number of peristomial rings: the Methanoariciinae with one known genus; the Microrbiniinae with four genera; and the Orbiniinae with 11–12 genera.

The genus *Orbiniella* was assigned to the sub-family, Microrbiniinae. Polychaetes of this sub-family generally have small bodies, lack distinct body regions, have either a broad or elongate prostomium, typically bear nuchal organs, and the peristomium consists of 1–3 rings. The parapodia are poorly developed with only simple podial lobes or these are entirely absent. Crenulated or camerated capillary setae are always present; prominent acicular spines may be present or absent; and furcate setae are always absent. The branchiae are absent and the pygidium has few to no anal cirri.

Their very simple, relatively unmodified bodies characterize species of *Orbiniella*. Among the known species of *Orbiniella*, individual species are defined largely on the basis of the development of podial lobes, postsetal lamellae, structure of the capillaries and the presence or absence of acicular spines. The bodies of some species are thin and elongate, whereas others are short and thick. Shallow-water species often have eyes.

Gillet (1999) tabulated ten species of *Orbiniella* of which only two were known from the deep sea; another species, *O. drakei* Hartman, 1967 is not an *Orbiniella* and is being referred elsewhere. As part of the Antarctic Deep-sea Biodiversity Programme (ANDEEP) samples were collected from transects in the Drake Passage, Scotia Sea, Weddell Sea, and the slope off the South Sandwich Islands. Included among the many polychaete species encountered was a new species of *Orbiniella*. The description of this new species is presented here together with records of its distribution and habitat.

MATERIALS AND METHODS

Specimens of *Orbiniella* were collected at one station in the Drake Passage, South Shetland Islands, one station in the Weddell Sea Basin and two stations on the South Sandwich Slope, by J.A. Blake on the FS 'Polarstern' (PS) ANDEEP cruises, ANT-XIX/3&4 during the 2002 austral summer. The stations were sampled using a vegematic box-corer and a multi-corer and were situated at depths of 4000–4500 m, and were part of a transect running east to west across the Weddell Sea abyssal plain. Characteristics of the area are reported in Howe et al., 2004 and the faunal assemblages in Blake & Narayanaswamy, 2004.

The material was collected from the upper 4 cm of the box-corer sub-cores and from the individual multi-cores. The sediment was elutriated using a glass elutriation chamber and the small infauna were washed onto a 250 µm sieve. This method was initially developed for the collection

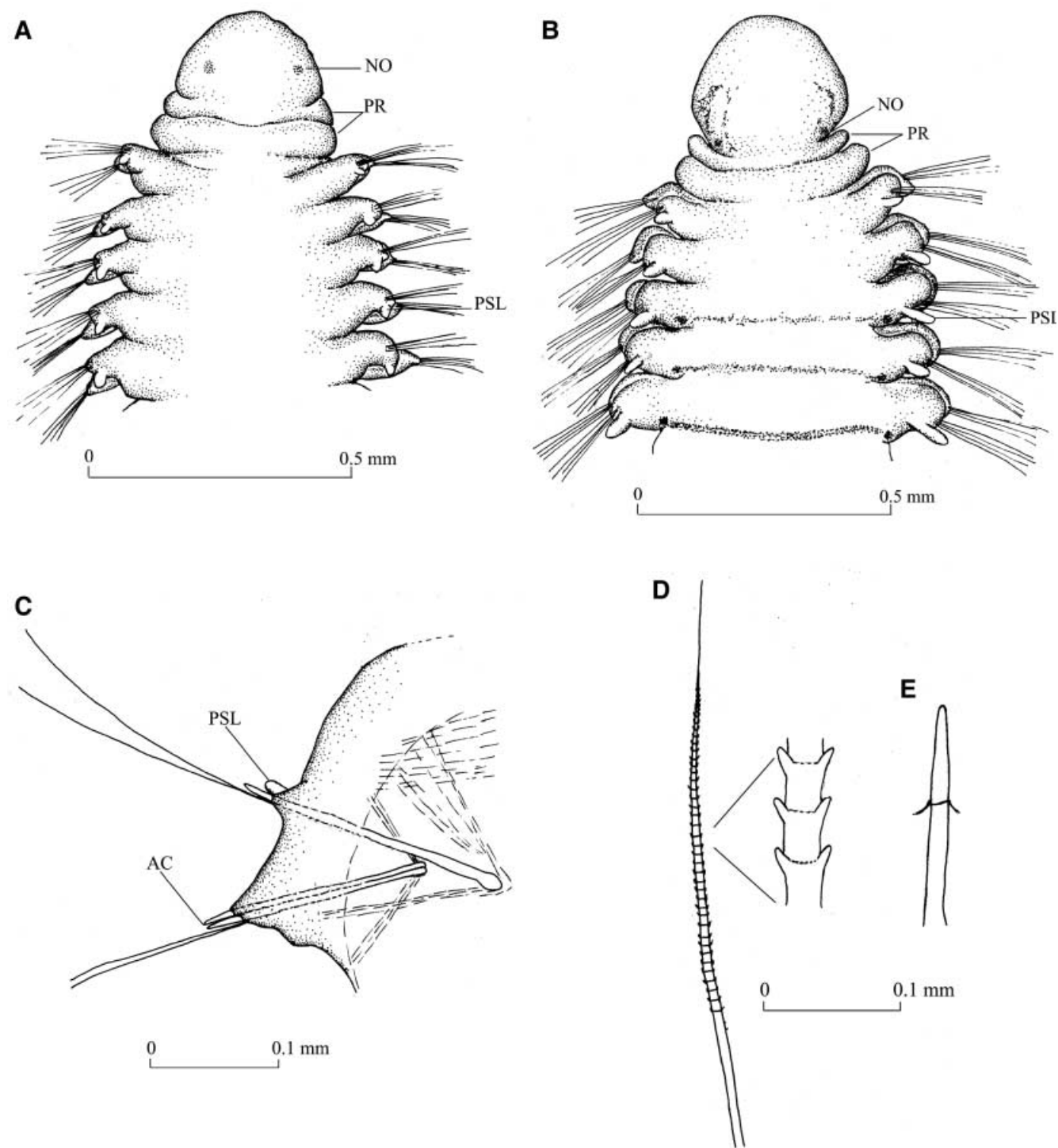


Figure 1. *Orbiniella andeepia*. (A) Holotype, anterior end, dorsal view; (B) paratype, anterior end, dorsal view; (C) parapodium from anterior segment; (D) detail of camerations on seta with details of barbs (insert not to scale); (E) anterior notopodial acicular spine. AC, acicula; NO, nuchal organ; PR, peristomial rings; PSL, post-setal lamellae.

of post-larval polychaetes from marine sediments (Kudenov, 1979) and has been found to be useful in areas where the fauna are comparatively small. The resultant fauna were kept alive on ice prior to being examined and initially identified. The specimens were then fixed in 10% buffered formalin and preserved in 70% ethanol. Further identification was undertaken back in the laboratory. Type specimens have been deposited at the Zoologisches Institut und Zoologisches Museum in Hamburg (P-24676) and the British Natural History Museum, London (BNMH 2004.2836).

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RESULTS

SYSTEMATICS

Family ORBINIIDAE

Genus *Orbiniella* Day 1954

Orbiniella andeepia, new species

Material examined

Drake Passage, South Shetland Islands paratype PS-61-114-8, 2896 m, 61°43.46'S 60°43.39'W; Northern Weddell

Sea Basin paratype PS-61-138-5, 4539.9 m, 62°57.82'S 27°54.01'W; holotype PS-61-138-8, 4538.5 m, 62°57.98'S 27°53.96'W; paratype PS-61-138-10, 3965 m, 62°58.15'S 27°54.20'W; South Sandwich Slope paratype PS-61-139-7, 3935.1 m, 58°14.10'S 24°20.73'W; paratype PS-61-141-7, 2257.9 m, 58°24.91'S 25°1.24'W.

Description

Holotype incomplete (Figure 1A), 5.2 mm long and 0.71 mm wide including parapodia, for 32 setigers. In general length varied between 3–5 mm and width between 0.3–0.8 mm. Five paratypes: two complete specimens and three incomplete specimens. Paratypes closely resembled holotype. Number of setigers for incomplete specimens varies between 31 and 38.

A relatively large species. Body uniform, with no differentiation between thorax and abdomen. One specimen had defined brown pigmentation bands on setigers 3–5 with a darker circular patch on each podial lobe (Figure 1B). Most other specimens lacked pigmentation apart from two brownish circular patches on prostomium that are believed to be nuchal organs. Prostomium rounded, wider than long; in some specimens prostomium was found more rounded, possibly indicating a more mature stage of development. Two peristomial segments present with first narrower than second, distinctly separated from setiger 1. Branchiae entirely absent. Notopodia with small, postsetal lamellae (Figure 1C); these are absent in neuropodia. Notopodia bearing 3–5 long camerated capillaries and one stout smooth acicula (Figure 1D,E); neuropodia also with 3–5 camerated capillaries and two stout smooth aciculae. Camerations occur along three-quarters of the length of all capillary setae. Barbs occur in two symmetrical rows on the camerated setae. Furcate setae absent. Pygidium bilobed with two cirriform appendages.

Etymology

This species is named after the acronym used for the Antarctic Deep-sea Biodiversity programme—ANDEEP.

Distribution

To date, *Orbiniella andeepia* has only been found in the Drake Passage, the Northern Weddell Sea Basin and on the South Sandwich Slope at depths of 2257 to 4539 m. The species is found in varying sediment types from fine-medium silts in the Northern Weddell Sea and the Drake Passage, South Shetland Islands, to coarse silts and medium sands at the shallower station on the South Sandwich Slope.

DISCUSSION

Among ten known species of *Orbiniella* reviewed by Gillet (1999) only two were reported to have dorsal or ventral cirri. Of these, *Orbiniella drakei* Hartman, 1967 has been determined to belong to the genus *Leitoscoloplos* and is being redescribed separately. The second species, *Orbiniella marionensis* Gillet, 1999 from shelf depths off Marion Island in the south-western Indian Ocean has a dorsal postsetal lamella and in this respect most closely resembles *Orbiniella andeepia*. *Orbiniella andeepia* differs from *O. marionensis* in the structure of the capillary setae. In *O. andeepia* the barbs along the shaft are very small,

visible only under 400× and arranged in two symmetrical rows as is typical for the camerated setal form often found in orbiniids. In contrast, Gillet (1999) depicts numerous crenulations or serrations on the shaft of capillaries in *O. marionensis*. Further differences include the projecting acicular spines; these are blunt-tipped in *O. marionensis* and pointed in *O. andeepia*. Gillet (1999) records up to four spines per podium in *O. marionensis*; we have never seen more than two per podial lobe in *O. andeepia*.

Two other deep-sea species of *Orbiniella* have been reported: *Orbiniella aciculata* Blake, 1985 from the vicinity of hydrothermal vents at the Galapagos Rift (~2730 m) and *Orbiniella hobsonae* Blake & Hilbig, 1990 from the Endeavour Segment of the Juan de Fuca Ridge (~2216 m) (Blake, 1985; Blake & Hilbig, 1990). In contrast to *O. andeepia*, these two species have poorly developed podial lobes and no postsetal lamellae. *Orbiniella andeepia* occurs over a much greater depth-range (2257 m to >4500 m) and appears to be widespread in Antarctic slope and abyssal sediments. The species is one of several new polychaetes that characterize Antarctic deep-basin infaunal assemblages.

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