

Two new species of Orbiniidae (Annelida, Polychaeta) from the Condor Seamount, Azores, NE Atlantic Ocean


JAMES A. BLAKE^{1,2*}, ASCENSÃO RAVARA³ & LUCIA BONGIORNI⁴


¹Aquatic Research & Consulting, 24 Hitty Tom Road, Duxbury, MA 02332 USA.

²Department of Invertebrate Zoology, Museum of Comparative Zoology, Harvard University, 26 Oxford Street, Cambridge, MA 02138 USA.

³Departamento de Biologia & Centro de Estudos do Ambiente e do Mar (CESAM), Universidade de Aveiro, Campus Universitário de Santiago, 3810-193, Aveiro, Portugal.

⁴National Research Council, Institute of Marine Sciences, Arsenale, Tesa 104, Castello 2737/F, 30122, Venice, Italy.

✉ jablake9@gmail.com;  <https://orcid.org/0000-0001-8217-9769>

✉ aravara@ua.pt;  <http://orcid.org/0000-0002-1689-2985>

✉ lucia.bongiorni@ve.ismar.cnr.it;  <https://orcid.org/0000-0001-9033-4992>

*Corresponding author

Abstract

Two new species of Orbiniidae (Annelida, Polychaeta) from the Condor Seamount in the NE Atlantic Ocean off the Azores are described. The first, *Berkeleyia condoriensis* **sp. nov.**, is the seventh species of the genus to be described and the first from the North Atlantic Ocean. The new species is from 1006 m on the southern flank of the Condor Seamount. The second species, *Microrbinia hartmanae* **sp. nov.**, is only the second species of the genus to be described, both from the North Atlantic Ocean. Like the first, *M. linea* Hartman, 1965, the new species has a unique dorsal glandular organ on some specimens. These organs are believed to be male copulatory organs and are unique within the family. *Microrbinia hartmanae* **sp. nov.** is from 206 m on the summit of the seamount.

Key words: *Berkeleyia*, *Microrbinia*, deep-sea

Introduction

The Condor Seamount is a submarine volcano located approximately 17 km southwest off Faial Island, Azores archipelago, in the northeast Atlantic Ocean. The seamount rises from a depth of approximately 2000 m to about 185 m beneath the sea surface. The seamount has a flat rocky summit with gravel and coarse bioclastic sediments and steep, smooth slopes with sandy-muds, the flanks are mainly composed of fine sediments (Bongiorni *et al.* 2013; Zeppilli *et al.* 2013).

Biological samples were obtained from the summit and slopes of the Condor Seamount in July–August 2010. Benthic invertebrates were subsequently sorted in the laboratory and individual organisms identified to species. Among the polychaetes were two unusual species of Orbiniidae in genera not often collected in the North Atlantic Ocean. These belonged to the genera *Berkeleyia* Hartman, 1971, a genus mainly known from the southern hemisphere (Blake 2017), and *Microrbinia* Hartman, 1965, known only from a single species from deep water in the western North Atlantic (Hartman, 1965; Blake 2021). The two new species are herein reported and described.

Materials and methods

The specimens on which this study is based were collected as part of surveys on the Condor Seamount off Faial Island, Azores, Portugal, in July 2010. Scientists used a USNEL 0.25-m² box core deployed from the R/V *Noruega* to collect the samples. Orbiniids were identified from Site 4, on the south flank at 2006 m and Site 9, on the summit

at 206 m. Two replicates for biology were collected from Site 4 and three replicates from Site 9; these were sieved with a 0.5-mm-mesh screen, fixed in 4% formalin, and subsequently sorted and preserved in 70% ethyl alcohol (ETOH). Specimens were identified to the lowest taxonomic category; species not identified to a known species were provided with a provisional designation. Specimens of the two orbiniid species were subsequently sent to the first author for further analysis.

Specimens were examined using a Wild M-5 stereomicroscope and a Zeiss RA research microscope equipped with phase contrast optics. Photomicrographs were taken with a Nikon D7100 camera mounted on both the stereo- and compound microscopes. For observation, specimens were first stained with an aqueous solution of Shirlastain A to highlight difficult-to-see surficial morphology. Measurements were taken with a calibrated micrometer on the compound microscope. Line drawings were first sketched in pencil using a camera lucida on the Zeiss RA microscope and later transferred to Dura-Lar® matte film and inked. The photographs and drawings were subsequently edited in Photoshop CS3®.

Type material was deposited at the Museum of Comparative Zoology, Department of Invertebrate Zoology, Harvard (MCZ IZ) and non-type material at the Biological Research Collection of the Department of Biology, University of Aveiro, Portugal (DBUA).

Abbreviations in text: DBUA, Department of Biology, University of Aveiro; ETOH, Ethyl alcohol; MCZ IZ, Museum of Comparative Zoology, Department of Invertebrate Zoology; NE, Northeast; NW, Northwest; USNEL, United States Naval Electronics Laboratory (box core); spms, specimens.

Results

Annelida, Polychaeta

Family ORBINIIDAE Hartman, 1942

Subfamily Orbiniinae Hartman, 1957. Emended by Blake 2000.

Genus *Berkeleyia* Hartman, 1971. Emended by Blake 2017.

Type species. *Berkeleyia profunda* Hartman, 1971, Mozambique Basin, 4886–5069 m.

Diagnosis. (after Blake 2020) Prostomium pointed, conical; peristomium with one or two asetigerous rings. Branchiae from posterior thoracic or abdominal segments. Thoracic noto- and neuropodia with one postsetal lobe, sometimes absent or inconspicuous on anteriormost setigers; subpodial lobes absent; abdominal setigers with simple noto- and neuropodia; neuropodia with or without ventral cirrus; interramal cirri absent. Thoracic noto- and neurosetae all capillaries. Abdominal notosetae include capillaries; pointed spines present or absent; furcate setae present or absent; neuropodia with capillaries and protruding acicular spines, or only spines.

Remarks. The genus *Berkeleyia* is similar to *Leitoscoloplos* Day, 1977 in lacking spines or uncini in thoracic neuropodia. Species of *Berkeleyia* differ in having neuropodial spines in abdominal setigers and abdominal notopodial spines present or absent. Until recently, *Berkeleyia* was known for a single deep-water species, *B. profunda* Hartman, 1971, from the Indian Ocean. Blake (2017) subsequently described four additional species from off South America and Antarctica, three of which were from deep water, with *B. hadala* Blake, 2017 from the Peru-Chile trench in 6143 m representing the deepest known occurrence for an orbiniid polychaete. Another deep-water species, *B. lelievrei* Blake, 2020, was recently described from hydrothermal vents on the Juan de Fuca Ridge. Another deep-water species from the Condor Seamount off the Azores is described herein as new to science and is the first species of the genus to be reported in the North Atlantic Ocean. A comparison of the now seven known species of *Berkeleyia* is presented in Table 1.

TABLE 1. Comparison of seven known species of *Berkelevia*

Species/ Morphology	Prostomium	Peristomium	Number Thoracic setigers	Branchiae	Dorsal Organs	Abdominal Post acicular spines	Furcate setae	Pygidium	Geographic and Depth Distribution
<i>B. profunda</i> Hartman, 1971 Type Species	Conical, narrow, rounded ant margin	A single smooth ring	Th w/ 12 set	Short, from ant abd set	Not reported	A simple curved falciger in neP	Absent	Not reported	Mozambique Channel, 4886–5069 m
<i>B. abyssala</i> Blake, 2017	Triangular, w/ pointed tip	A single ring, merging with pr	Th w/ 10–11 set	From set 9–10, ea short, subtriangular	Absent	W/ 2–3 curved acSp w/ pointed tip in neP	From set 9–10, w/short stubby tynes & web of needles between	Not available	Southern Ocean, Drake Passage; South Orkney Islands; Weddell Sea; 3111–4176 m
<i>B. condoriensis</i> Blake & Ravara sp. nov.	Triangular, tapering to narrow tip	A single ring, merging with pr & set 1; ca. as long as set 1	Th w/ 11–12 set	From set 11–12, ea short, rounded	W/ 2 papillae between branchiae	W/1–2 AcSp in abd neP; spines curved w/ narrow blunt tips	From set 12–13 in noP & neP, w/ long shafts, thick tynes w/ enlarged blunt tips & row of needles between tynes	Not available	N Atlantic Ocean, Condor Seamount, off Azores, 1006 m
<i>B. hadala</i> Blake, 2017	Triangular, tapering to narrow tip	A single ring; narrow ant, wider post	Th w/ 8–11 set	From set 24, short at first, narrow, swollen medially	Absent	NoP AcSp brass colored, curved w/ pointed tips; neP AcSp, similar, straight w/ blunt tips	Absent	Not available	W South America, Peru- Chile Trench; 2681–6143 m
<i>B. heriae</i> Blake, 2017	Conical, rounded ant margin	A smooth ring, 2x as long as 1 st set	Th w/ 10–11 set	From abd set 19–24; short, then long & strap-like	Absent	NeP Spines w/ bifid tip & rows of barbs on shaft	From set 11–12; w/ thick tynes & row of needles between tynes	W/ 2 large lobes, each w/ a single anC	Staten Island, off Argentina, intertidal to 1 m

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TABLE 1. (Continued)

Species/ Morphology	Prostomium	Peristomium	Number Thoracic setigers	Branchiae	Dorsal Organs	Abdominal Post acicular spines	Furcate setae	Pygidium	Geographic and Depth Distribution
<i>B. lelievrei</i> Blake, 2020	Conical w/ rounded ant margin	With 1 or 2 rings; ca. 2x as long as set 1	Th w/ 10–11 set	From set 12, short, then longer, tapering w/ lat folds	Absent	NoP & neP w/ brass colored, curved spines w/ pointed tips	Absent	Not available	E North Pacific, hydrothermal vents, Juan de Fuca Ridge, 2196 m
<i>B. weddellia</i> Blake, 2017	Short, triangular, tapering to narrow pointed tip	A single smooth ring, narrower than set 1, of similar length	Th to ca. set 8	From set 18, full size by set 20; ea short, thick, w/ rounded tip	Absent	NeP spines curved, narrowing to pointed tips	From ca set 9; ea w/ thick tynes w/ rounded tips & thin needles between tynes	Not available	Antarctica, Weddell Sea Basin, 2164 m

Abbreviations: abd, abdomen(al); acSp, acicular spine; anC, anal cirrus; ant, anterior(ly); ca, about; ea, each; lat, lateral; neP, neuropodia; noP, notopodia; post, posterior(ly) pr, prostomium; set, setiger; Th, thorax; w/, with.

***Berkeleyia condoriensis* Blake & Ravara, new species**

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Figures 1–2

Berkeleyia sp. A. Bongiorno *et al.* 2013: 10.

Material examined. North Atlantic Ocean, Condor Seamount, off Faial Island, Azores, coll. Jul 2010, R/V *Noruega*, USNEL 0.25-m² box core, **Site 4**, South Flank, 38.53966°N, 29.10116°W, 1006 m, Rep. 2, **holotype** (MCZ IZ 172989), 2 spms (DBUA 3538.01); Rep. 3, 3 **paratypes** (MCZ IZ 172990), 5 spms (DBUA 3538.02).

Description. A moderately sized species, all specimens incomplete. Body generally cylindrical in cross section throughout; setigers 1–4 longest, then all segments consistently short to end of body. Holotype (MCZ IZ 0172989) with 28 setigers, posterior setigers coiled, 7.1 mm long as stretched out, 0.5 mm wide across setiger 6; largest paratype (MCZ IZ 172990) with 25 setigers, 7.4 mm long, 0.8 mm wide. Posterior end missing on all specimens. Color in alcohol: light tan without pigment.

Pre-setiger region triangular, about as long as first two setigers (Fig. 1A–B, 2A). Prostomium narrow, tapering anteriorly to pointed tip, posteriorly merging indistinctly with peristomium; eyes absent; nuchal organs not observed. Peristomium a single smooth ring dorsally (Fig. 1A, 2A); ventrally with mouth bordered by a pair of anterior lips and a curved crenulated posterior lip (Fig. 1B); largest paratype with oblong proboscis everted (Fig. 2B).

Thoracic segments include first 11–12 setigers, with short cirriform notopodial postsetal lobes from setiger 5 (Fig. 1A), these gradually increasing in length over subsequent setigers becoming elongate and fingerlike in anterior abdominal setigers (Fig. 1A) and continuing throughout; neuropodia similar to notopodia with short cirriform postsetal lobe from setiger 6 (Fig. 1B); most thoracic setigers with lateral parapodia, shifting dorsally by about setigers 9–10 (Fig. 1A). Abdominal parapodia shifted dorsally and identified by appearance of prolonged neuropodium bearing short ventral cirrus (Figs 1A, C, 2C); notopodia rounded lobes bearing elongate postsetal lobe (Figs 1A, 2C); subpodial lobes absent. Branchiae from setigers 11–12 or transition from thoracic to abdominal setigers, continuing to near posterior end; branchiae short, rounded apically (Figs 1A, 2C). Anterior dorsal segmental border of branchial-bearing setigers with a pair of minute papillate dorsal organs (Fig. 1A [arrows], 2C–D [arrows]).

Setae include crenulated capillaries, furcate setae, and narrow neuropodial acicular spines (Fig. 1C–G). Thoracic noto- and neuropodial setae with long, crenulated capillaries with up to 25 setae in dense bundle, reduced in number over last 2–3 thoracic setigers; furcate setae first appearing among capillaries of setigers 12–13 or last thoracic setigers in both noto- and neuropodia. Abdominal notopodia with 2–3 crenulated capillaries and 1–2 furcate setae; abdominal neuropodia with furcate setae, a few crenulated capillaries and 1–2 narrow acicular spines. Furcate seta with long shafts and two short blunt-tipped tynes, each tyne with fine needles forming a web between tynes (Fig. 1C, G). Spines only weakly curved, with narrow blunt tip (Fig 1C–F).

Pygidium unknown.

Remarks. *Berkeleyia condoriensis* **sp. nov.** is the seventh species of the genus to be described (Table 1). The new species is most similar to *B. abyssala* Blake, 2017 and *B. weddellia* Blake, 2017, both from deep-water in Antarctic seas, in having a triangular-shaped pre-setiger region consisting of a short pointed prostomium merged almost indistinctly with the peristomium. *Berkeleyia abyssala* has the change from thorax to abdomen at setigers 10–11, branchiae from setigers 9–10, and furcate setae from setigers 9–10; in *B. weddellia* the thorax/abdominal change is at setiger 8, branchiae start on setiger 18 and furcate setae on setiger 9. In contrast, in *B. condoriensis* **sp. nov.** the thorax/abdominal change is at setigers 11–12, branchiae start on setigers 11–12 and furcate setae on setigers 12–13. The minute paired papillate dorsal organs on the anterior segmental border anterior to the branchiae in *B. condoriensis* **sp. nov.** have not been observed on other species of the genus.

Biology. Apart from *Berkeleyia heroae* Blake, 2017 from intertidal and shallow subtidal depths off Argentina, the other six species are all from deep water of 1000 m or greater. The new species, *B. condoriensis* **sp. nov.**, is the first species of the genus to be reported from the North Atlantic Ocean and from a seamount.

Etymology. This species is named for its locality on the Condor Seamount off the Faial Island, Azores.

Distribution. NE Atlantic Ocean, Condor Seamount, off the Faial Island, Azores archipelago, 1006 m.

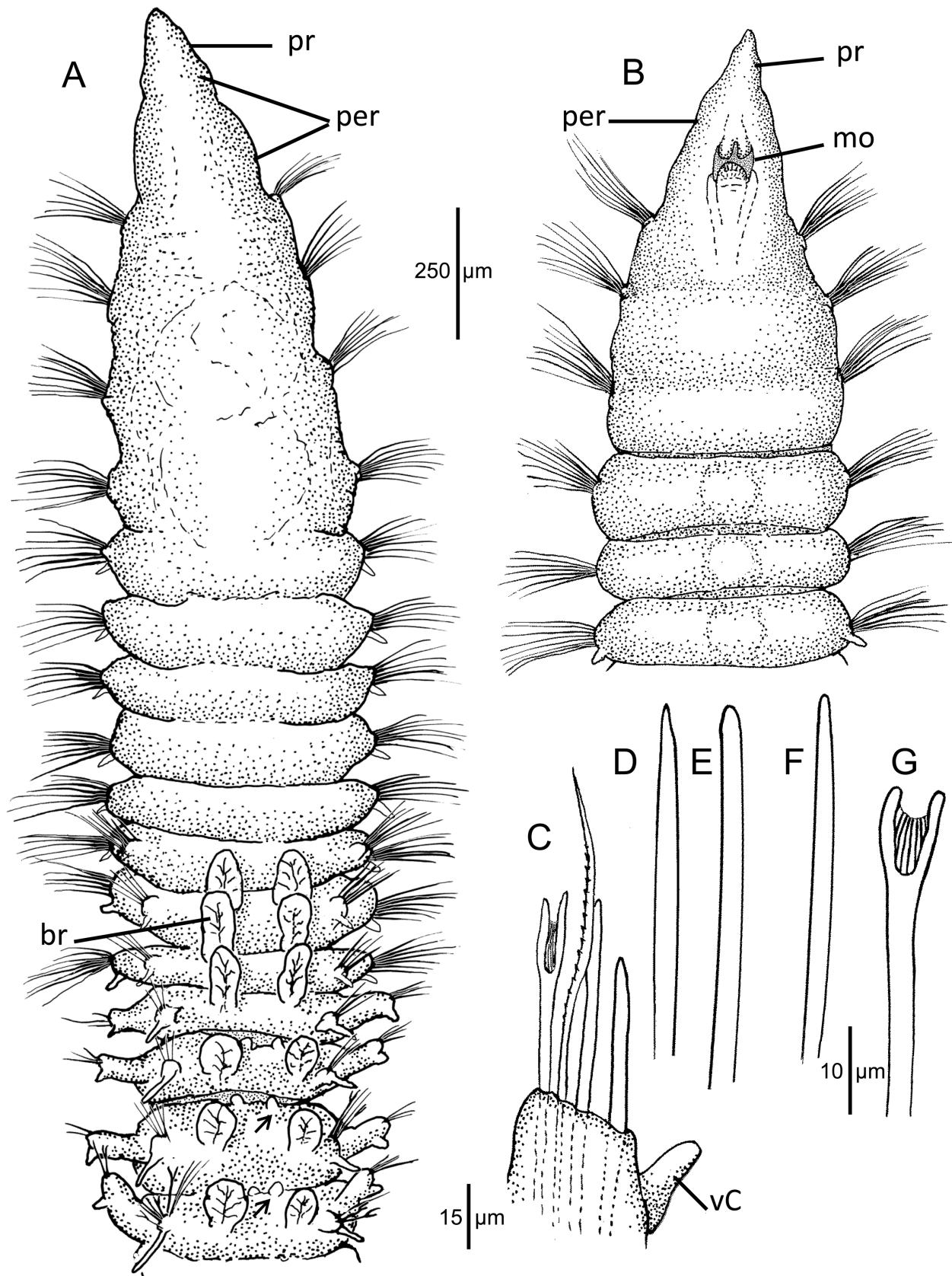


FIGURE 1. *Berkeleyia condoriensis* sp. nov. A, anterior end, dorsal view; B, anterior end, ventral view; C, abdominal neuropodium, setiger 18, anterior view; D, E, F, neuropodial acicular spines; G, furcate seta. A, holotype (MCZ IZ 172989); B–G, paratype (MCZ IZ 172990). Abbreviations: br, branchiae; mo, mouth; per, peristomium; pr, prostomium; vC, ventral cirrus. Arrows denote medial dorsal organs.

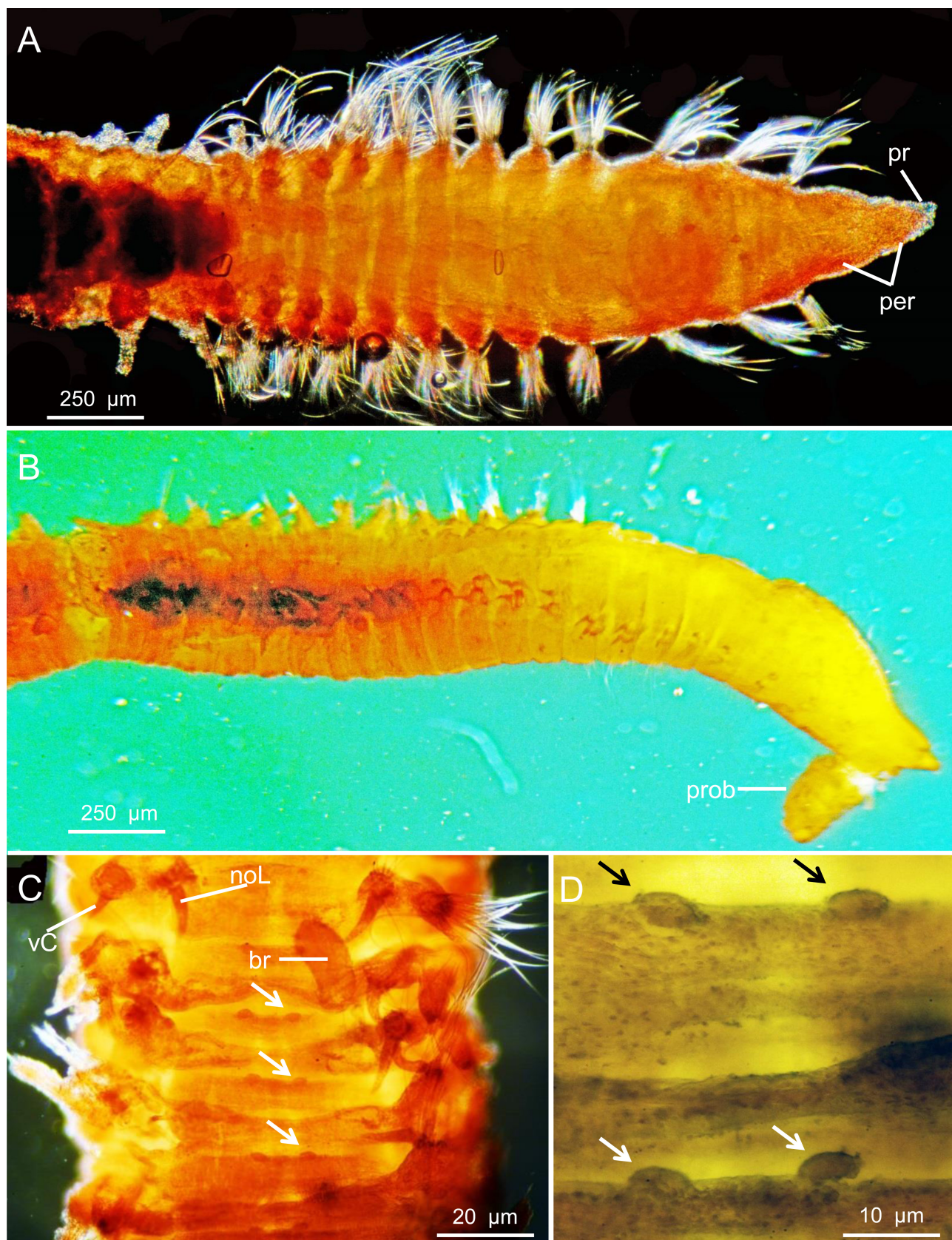


FIGURE 2. *Berkeleyia condoriensis* sp. nov. A, anterior end, dorsal view; B, anterior end and middle setigers, right lateral view; C, branchial region, dorsal view; D, detail of paired papillae medial to branchiae. A, holotype (MCZ IZ 172989); B–D paratype (MCZ IZ 172990). Abbreviations: br, branchiae; noL, notopodial lobe; per, peristomium; pr, prostomium; prob, proboscis; vC, ventral cirrus. Arrows denote medial dorsal organs.

Subfamily Microrbiniinae Blake, 2000

Type genus. *Microrbinia* Hartman, 1965. Designated by Blake 2000.

Inclusive genera. *Microrbinia*, *Orbiniella* Day, 1954, *Proscoplos* Day, 1954, and *Pettibonella* Solis-Weiss & Fauchald, 1989.

Diagnosis. (Emended). Body small, separation of body into thoracic and abdominal regions weakly defined or lacking; parapodia lateral throughout, not shifted dorsally in abdominal segments. Branchiae present or absent. Prostomium broad, bluntly rounded or more elongate and conical or acute; nuchal organs present. Peristomium with 1–2 achaetous rings, separated from prostomium, sometimes only vaguely defined dorsally, laterally, or ventrally. Noto- and neuropodial postsetal lamellae with short postsetal lobes or absent. Bases of podia separated throughout; setal tori reduced. Setae consisting of capillaries always present, blunt-tipped spines or uncini and swan hooks present or absent; furcate setae typically absent. Pygidium with anal cirri present or absent.

Genus *Microrbinia* Hartman, 1965

Type species. *Microrbinia linea* Hartman, 1965, by monotypy.

Diagnosis. (Emended) Body long, threadlike; thoracic region with a few short uniannulate segments gradually transitioning to elongate (biannulate) abdominal segments. Prostomium conical, tapering anteriorly; with paired nuchal organs; eyespots absent. Peristomium with one or two asetigerous rings. Noto- and neuropodia with well-developed postsetal lobes; branchiae absent; parapodia lateral to dorsolateral, some notopodia directed dorsally, but not shifted onto dorsal surface in abdominal segments. Branchiae absent. Setae include crenulated capillaries throughout; posterior notosetae include acicular spines; neuropodia with acicular spines present or absent; furcate and flail setae absent. Pygidium with 2–4 anal cirri. Males with a conical gland-like dorsal organ on a few abdominal segments.

Remarks. The genus *Microrbinia* is currently known only from the type-species, *M. linea* from the U.S. Atlantic continental slope (600–3015 m) (Hartman 1965; Blake 1993, 1994, 2021). The species is unusual among orbiniids in having a conical gland-like structure on the dorsal surface of some anterior abdominal segments (Blake 1993; 2021). These structures appear to be associated with males; females have one or two elongate swollen segments containing large eggs, but none of the gland-like dorsal organs. *Microrbinia linea* has unusual serrated notopodial acicular spines in middle and posterior abdominal segments that have not been reported in other orbiniids. Another species has been found among the orbiniids collected from the Condor seamount and has several characters that required the definition of the genus to be emended. The new species has two peristomial rings instead of one, two anal cirri instead of four, and the acicular spines occur in both noto- and neuropodia instead of only notopodia and are smooth instead of serrated.

Microrbinia hartmanae Blake & Ravara new species

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Figures 3–4

Questa sp. A: Bongiorno *et al.* 2013: 10.

Material examined. North Atlantic Ocean, Condor Seamount, off Faial Island, Azores, coll. Jul 2010, R/V *Noruega*, USNEL 0.25 m² Box core, **Site 9**, Summit, 38.549°N, 29.0478°W, 206 m, Rep. 1, **holotype** (MCZ IZ 172991), 5 **paratypes** (MCZ IZ 172992), 3 spms (DBUA 3539.01); 1 **paratype** as permanent slide mount (MCZ IZ 172994); Rep 3, 4 **paratypes** (MCZ IZ 172993).

Description. A small threadlike species; holotype (MCZ IZ 172991) complete with 38 setigers, 4.2 mm long, 0.2 mm wide across setiger 16; incomplete paratype (MCZ IZ 172992) larger, with 27 setigers, 5.0 mm long, 0.35 mm wide across setiger 4. Body cylindrical, with 5–7 short thoracic setigers with uniannulate interrampal rings, followed by larger, thicker, abdominal setigers with biannulate interrampal rings along most of body (Figs 3A–B, 4A); a few transitional setigers with either uni- or biannulate interrampal rings variously developed; thoracic setigers

with parapodia lateral, shifting a little dorsally along abdominal setigers, but never completely dorsally elevated. Dorsal and ventral groove and ridges absent apart from a large flattened narrow plate on ventral surface of thoracic setigers (Fig. 3B). Specimens believed males with a large conical gland-like dorsal organ on individual segments (Fig. 4B–C); these with distinct apical pore present (Fig. 4C). No specimens observed with oocytes or ova. Color in alcohol light tan.

Pre-setiger region long, narrow, about as long as first 2.5 to 3 setigers, merging with setiger 1 both dorsally and ventrally (Figs 3A–B, 4A). Prostomium conical, tapering to narrow rounded tip (Fig. 4A); nuchal organs not observed; eyespots absent. Peristomium with two rings, first smaller, merged anteriorly with short prostomium (Fig. 4A); second larger, encompassing mouth ventrally with about ten short lobes (Fig. 3B); proboscis not observed.

Thoracic setigers numbering 5–7, each relatively short, about 2–3 times wider than long and with a single narrow transverse intersegmental ridge or ring both dorsally and ventrally (Fig. 3A–B). Transition to abdominal segments denoted by a narrowing and elongation of individual segments and with change from a single intersegmental ring to two rings (Figs 3A, 4A). Abdominal parapodia and setae arising from middle of each segment. Branchiae entirely absent.

Notopodia short, conical, with a distinct postsetal lobe on all setigers; this becoming longer and fingerlike along most of body (Fig. 3A, D); neuropodia short, weakly curved, with a short digitate postsetal lobe first present in posterior thoracic setigers continuing posteriorly, not as long as in notopodia (Fig. 3B, D).

Setae include camerated capillaries and noto- and neuropodial acicular spines (Fig. 3E–F). Noto- and neuropodia with a spreading fascicle of 6–10 camerated capillaries in thoracic setigers and anterior abdominal setigers; gradually reduced to 2–5 capillaries in abdominal setigers. Notopodia with 1–2 curved acicular spines with hooked tips from setigers 12–14, continuing posteriorly; neuropodia with 1–2 pointed acicular spines from setigers 8–9.

Pygidium divided into two lobes; with two anal cirri, one arising on each lobe (Fig. 3C).

Remarks. *Microrbinia hartmanae* **sp. nov.** is the second species of the genus to be described. The first, *M. linea*, was described by Hartman (1965) from off New England in deep water. Blake (2021) provided a detailed description of the species based on extensive collections off the U.S. Atlantic coast in 600–3015 m. Blake (1993, 2021) reported that some specimens of *M. linea* had unusual a conical gland-like dorsal organ on some abdominal segments. These were suggested to be on males because other specimens with eggs were obviously females and lacked these structures. In the present study, similar dorsal organs were observed on a few specimens of *M. hartmanae* **sp. nov.** However, no evidence of eggs or oocytes were found either on these specimens or those that lacked the dorsal organs.

Morphologically, *M. hartmanae* **sp. nov.** differs from *M. linea* in having a small conical-shaped prostomium, two peristomial rings, abdominal segments that are about as wide as long and with parapodia arising from mid-body, blunt-tipped and apically curved acicular spines in the notopodia and straight, more pointed spines in the neuropodia, and a pygidium with two anal cirri. In contrast, *M. linea* has a larger, triangular-shaped prostomium, one peristomial ring, abdominal segments that are narrow and as much as three times longer than wide and with parapodia arising from near the posterior end of each segment. In addition, the notopodial acicular spines of *M. linea* are serrated along one edge before curving to a pointed tip instead of smooth shafts, neuropodial spines are absent instead of present, and the pygidium has four anal cirri instead of two.

Biology. *Microrbinia hartmanae* **sp. nov.** is known only from the summit of the Condor Seamount in 206 m. In contrast, *M. linea* is a deep-water species that occurs off the U.S Atlantic coast from 600 to 3015 m and off the Amazon River in 770–1500 m (Hartman 1965; Blake 2021). The unusual dorsal glandular organs found in both species have not been reported for other orbiniids. It is likely that these are a copulatory organ because specimens of *M. linea* with eggs did not have these organs (Blake 1993, 2021).

According to Bongiorno *et al.* (2013), a total of 1711 specimens of benthic invertebrates were identified from three replicate box cores collected at Station 9 on the summit where *Microrbinia hartmanae* **sp. nov.** was collected. From these specimens, 81 species were identified, of which 45 species were polychaetes. The onuphid polychaete, *Mooreonuphis pallidula* (Hartman, 1965), the syllid polychaete, *Pionosyllis weismanni* (Langerhans, 1879), and an amphipod, *Lembos* sp., collectively comprised 76% of the total macrofaunal abundance at the site.

Microrbinia hartmanae **sp. nov.** is likely a subsurface deposit feeder, but owing to its small size and narrow body, probably occurs within 5 cm of the surface. Its only congener, *M. linea*, was found to have 96.5% of its total abundance in the upper 5 cm of sediment cores, with the majority in the 2–5 cm depth interval (Blake 1994).

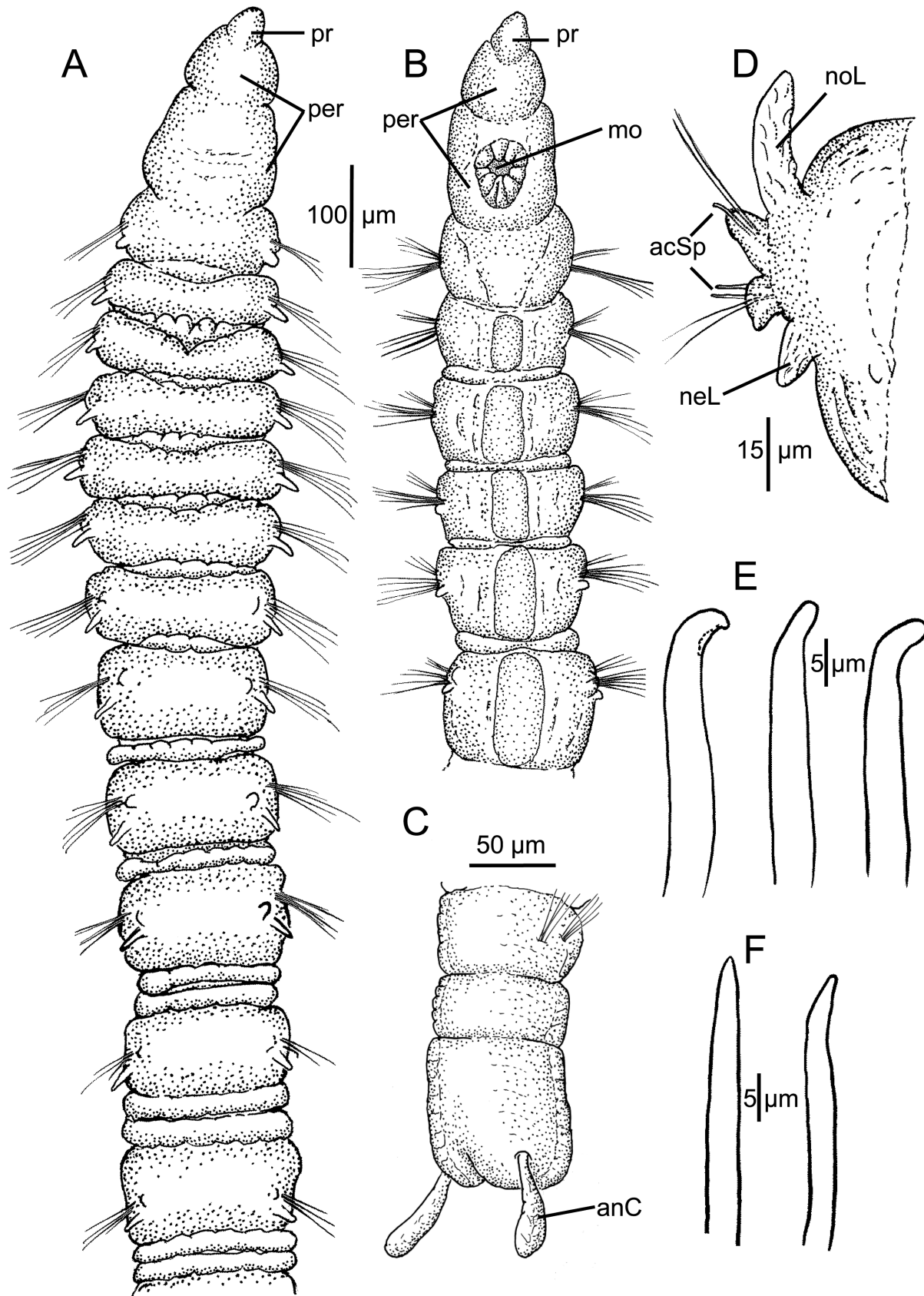


FIGURE 3. *Microrbinia hartmanae* sp. nov. A, anterior end, dorsal view; B, anterior end, ventral view; C, posterior end ventrolateral view; D, setiger 20, anterior view of parapodia; E, notopodial acicular spines in different orientations; F, neuropodial acicular spines. A, C holotype (MCZ 172991); B, D, E, F paratype (MCZ IZ 172992). Abbreviations: anC, anal cirrus; acSp, acicular spines; mo, mouth; neL, neuropodial lobe; noL, notopodial lobe; per, peristomium; pr, prostomium.

Etymology. This species is named for the late Dr. Olga Hartman, prominent annelid systematist who originally described the genus *Microrbinia*.

Distribution. NE Atlantic Ocean, Condor Seamount, off the Faial Island, Azores archipelago, 206 m.

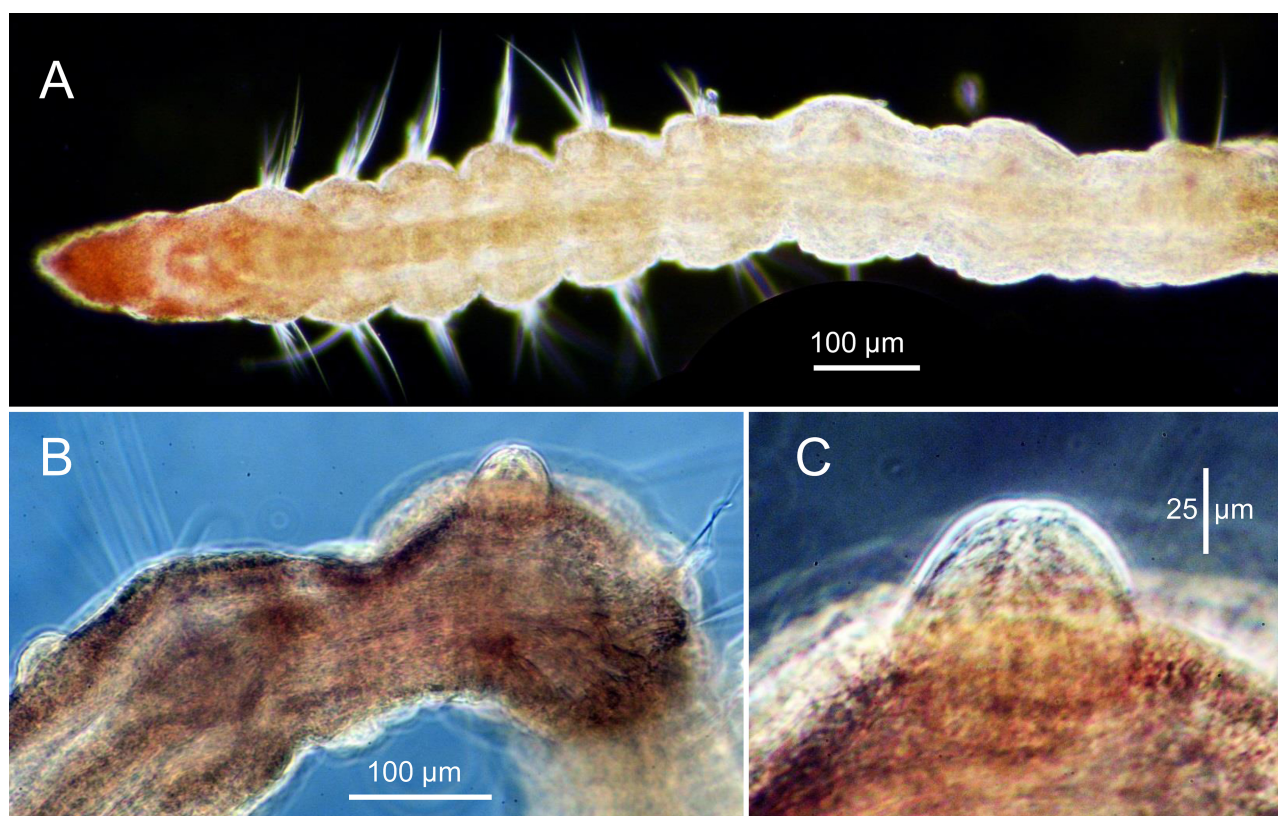


FIGURE 4. *Microrbinia hartmanae* sp. nov. A, anterior end, ventral view; B, posterior segment with dorsal glandular organ; C, detail of dorsal glandular organ. A, holotype (MCZ IZ 172991); B, C paratype (MCZ IZ 172992).

Discussion

Orbiniid polychaetes have rarely been encountered in seamount surveys near and adjacent to the Azores. Early surveys of seamounts in the NE Atlantic Ocean off Europe and NW Africa included (1) the Hyeres and Meteor seamounts (Bellan 1964); (2) Josephine and Meteor seamounts (Hartmann-Schröder (1979); (3) Atlantis, Hyeres, Irving, Meteor, and Plato seamounts (Gillet & Dauvin 2000, 2003). From these, only a single specimen of Orbiniidae, identified as *Orbinia cuvieri* (Audouin & Milne-Edwards, 1833), was recorded from the Plato Seamount (Gillet & Dauvin 2003).

The lack of orbiniids from these early surveys was possibly due to benthic samples being collected by trawls and dredges and the use of coarse mesh sizes (2–5 mm mesh) to separate the fauna from the sediment. In addition to the lack of orbiniids, other polychaete families that are typical of offshore sediments such as Cirratulidae, Paraonidae, and Spionidae were rare or absent. Instead larger, polychaetes such as predatory onuphids and eunicids or deep-burrowing deposit feeding terebellids were common.

The two most recent surveys of the Senghor Seamount, Cape Verde Archipelago (Chivers *et al.* 2013) and Condor Seamount, off the Azores (Bongiorni *et al.* 2013; Zeppilli *et al.* 2013) used multicorers and box corers together with fine-mesh sieves (250–500 µm mesh) to separate fauna from the sediments. These studies included most of the more typical polychaete families that characterize deep-benthos.

Chivers *et al.* (2013) found 954 specimens of polychaetes distributed among 135 species at the Senghor Seamount. The dominant polychaete families (numbers of species) recorded were: Syllidae (19), Spionidae (16), Cirratulidae (11), Paraonidae (9), Capitellidae (7), Maldanidae (6), Acrocirridae (5), Hesionidae (5), and Sigalionidae (5). However, no orbiniids were encountered.

Bongiorni *et al.* (2013) found 1661 specimens of polychaetes distributed among 65 species. The dominant polychaete families (numbers of species) recorded were: Syllidae (8), Spionidae (7), Lumbrineridae (4), Polynoidae (4), and 13 additional families, including Orbiniidae with 2 species.

The conclusion to be reached relative to orbiniids from northeast Atlantic seamounts is that they are rare, but can be collected with sediment cores and use of fine-mesh sieves of 250–500 µm. *Microrbinia hartmanae* **sp. nov.**, in particular, is threadlike and fragile, but some specimens were complete. *Berkeleyia condoriensis* **sp. nov.**, although larger, is still a small species and easily damaged as evidenced by the fact that none of the specimens examined were complete.

Both of these new species belong to genera that are relatively uncommon within the Orbiniidae. *Microrbinia hartmanae* **sp. nov.** is only the second species of the genus to be described; interestingly, both are from the North Atlantic Ocean (Hartman 1965; Blake 2021; this study). *Berkeleyia condoriensis* **sp. nov.** is the seventh species of the genus to be described and the first from the North Atlantic Ocean. Four species occur in South America and Antarctica, one from the Indian Ocean, and one from the NE Pacific Ocean (Hartman 1971, Blake 2017, 2021, this study). Six species are from deep water, greater than 1000 m (Table 1).

Acknowledgements

Specimens were collected as part of the project PTDC/MAR/105486/2008 “Microbial biodiversity and functional role in benthic food webs of the Condor seamount (NE Atlantic)”, funded by the Fundação para a Ciência e Tecnologia (Portugal) and granted to Lucia Bongiorni (IMAR-Department of Oceanography and Fisheries/Universities of the Azores) and the CONDOR project (Observatory for long term study and monitoring of Azorean seamount ecosystem, EEA Grants- PT0040/2008, Iceland, Liechtenstein and Norway) coordinated by Gui Menezes and Eva Giacomello (University of the Azores). We thank the Captain and crew of the R/V *Noruega*, and cruise participants from IMAR-DOP/Uac) and IPIMAR (Portugal) for their help during sampling. We also thank Paola Parretti for sample sorting. IMAR-DOP/Uac is a Research and Development Unit #531 and LARSyS-Associated Laboratory funded by FCT (OE, FEDER, POCI2001, FSE, COMPETE) and by the Azores Directorate for Science, Technology and Communications (DRCTC). CESAM is a Research Unit of the University of Aveiro with the status of Associated Laboratory, funded by national funds (OE), through FCT – Foundation for Science and Technology, I.P., in the scope of the project UID/50006 + LA/P/0094/2020. AR was funded by national funds, through FCT, I.P., in the scope of the framework contract foreseen in the numbers 4, 5 and 6 of the article 23, of the Decree-Law 57/2016, of 29 August 2016, changed by Law 57/2017, of 19 July 2017. The type specimens archived with the MCZ Invertebrate Zoology Department, were assigned catalog numbers and curated by Mr. Adam Baldinger, Collections Manager. A draft of this manuscript was carefully reviewed by Dr. Nancy J. Maciolek.

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