

A NEW GENUS AND SPECIES OF SPIONIDAE (ANNELIDA: POLYCHAETA) FROM THE NORTH AND SOUTH ATLANTIC

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Abstract.—A new genus and species of spionid polychaete has been discovered in collections from widespread areas in the north and south Atlantic Ocean. *Aurospio dibranchiata* n. gen., n. sp., described herein, occurs from slope to abyssal depths ranging from 300 m to 3600 m, and from areas as far north as the Rockall Trough off Ireland to as far south as the Argentine Basin. *Aurospio* is closely related to *Prionospio*, with which it is compared. The holotype of *Anaspio boreus* Chamberlin, 1920 was re-examined, and determined to be a damaged *Prionospio* sp., thus invalidating the genus *Anaspio*.

Extensive collections of deep-sea infauna from several areas in the north and south Atlantic have been made available for study through the work of Drs. Howard L. Sanders and J. Frederick Grassle of the Woods Hole Oceanographic Institution. Examination of the spionid polychaetes in these collections has revealed a new genus and species to be a common component of the fauna. Some specimens were found in samples previously examined by Hartman (1965), and Hartman and Fauchald (1971) and deposited in the Allan Hancock Foundation. Additional material was obtained from collections made by Dr. John Gage, Dunstaffnage Marine Research Laboratory, in the Rockall Trough west of Ireland.

These specimens agreed with the generic diagnosis of *Anaspio* Chamberlin, 1920, which has not been reported since its original description from Alaska. The holotype of *Anaspio boreus* Chamberlin was located at the Museum of Comparative Zoology, Cambridge, Massachusetts (MCZ Catalog No. 2323) and re-examined. It was found to be a damaged specimen of *Prionospio* sp. which had lost the first gill pair and any gills subsequent to the third pair. (These branchial pairs are apparently lost very easily; this condition is routinely seen in deep-sea specimens of *Prionospio*.) The hooded hooks, which were described by Chamberlin as lacking an apical denticle, with the process "cleft somewhat like the beak of a bird" (Chamberlin, 1920, p. 19B), were seen under oil immersion to be multidentate, with 6-8 teeth above the main fang. Thus, the genus *Anaspio* Chamberlin is considered a junior synonym of *Prionospio*, and the specimens reported upon herein are referred to a new genus, *Aurospio*, which is described below.

The holotype and a set of paratypes have been deposited in the Smithsonian Institution (USNM), Washington, D.C. Paratype materials have been deposited in the following museums: Allan Hancock Foundation (AHF), California Academy of Sciences (CAS), Museo Argentino de Ciencias Naturales, Buenos Aires (MACN), British Museum of Natural History (BMNH), and the Zoological Museum of Hamburg (ZMH). Some material has been retained for histological and SEM examination, and some material has been returned to the collectors: Drs. Howard L. Sanders (HLS), J. Frederick Grassle (JFG), and John Gage (JG).

Aurospio new genus

Type-species.—*Aurospio dibranchiata* n. sp. Gender, feminine.

Diagnosis.—Prostomium broadly rounded anteriorly, prolonged posteriorly as a keel, eyes 0–2 pairs, no occipital tentacle. Peristomium partly fused to setiger 1, not developed into wings or hood. Branchiae 2 pairs, on setigers 3–4, cirriform, partly fused to notopodial lamellae. No interrampal or interparapodial pouches. Anterior setae capillaries, notopodial and neuropodial multidentate hooded hooks posteriorly, lacking secondary hood, one ventral sabre seta posteriorly. Pygidium with 1 long medial and 2 short lateral cirri.

Remarks.—*Aurospio* is closely related to *Prionospio* Malmgren, 1867, in the nature of the development of the peristomium and setiger 1, form of the dorsal lamellae, and nature of the pygidium. The major character separating the two genera is the initial appearance of the branchiae on setiger 2 in *Prionospio* and on setiger 3 in *Aurospio*. As mentioned above, specimens of *Prionospio* often lose the first branchial pair and those subsequent to the third pair, and workers must be careful not to confuse damaged *Prionospio* with *Aurospio* or other genera. However, other, more subtle differences in the branchiae also distinguish *Aurospio* from *Prionospio*: in *Aurospio* the gills appear thin and flat (in light microscopy, but see Fig. 3), and are partially but obviously fused to the notopodial lamellae, while in *Prionospio* the gills are stouter, rounder, and clearly separated from the dorsal lamellae. In over 2000 specimens of *Aurospio* examined, 2 individuals were found having an additional branchial pair on setiger 2, these being about as long as the pair on setiger 3. Because the 2 specimens agreed in all other characters with *Aurospio*, they are considered to represent anomalous individuals of the genus.

Hooded hooks are present in both rami of the 2 genera, but differ in that in *Prionospio* a secondary hood is present, although inconspicuous; while in *Aurospio* a secondary hood is lacking.

In a recent study of Australian Spionidae, Blake and Kudenov (1978) recognized a complex of 4 closely related genera: *Paraprionospio* Caullery,

Streblospio Webster, *Orthoprionospio* Blake and Kudenov, and *Prionospio* Malmgren (*sensu lato*), with the latter including 3 subgenera: *Prionospio* (*sensu stricto*), *Aquilaspio* Foster, and *Minuspio* Foster. This arrangement reflects Blake and Kudenov's position that branchial form alone is not a sufficient character on which generic distinctions can be based, as was suggested by Foster (1971a) in her revision. In the context provided by Blake and Kudenov, *Aurospio* should be considered the fifth genus in this complex. A single species is known.

Etymology.—*Aurum*, L.—gold; *spio*, L.—sea nymph. The deep golden color of the pigmented inclusions in the first setiger of many specimens suggested the generic name.

Aurospio dibranchiata new species

Figs. 1–3

Prionospio cirrifera: Hartman, 1965 (in part; SL4, Bel, Be4, E3).—Hartman and Fauchald, 1971 (in part; *Chain* cruise 58, Sta. 105). (Not Wirén, 1883).

Prionospio steenstrupi: Hartman, 1965 (in part; SL3). (Not Malmgren, 1867).

Laonice antarcticae: Hartman and Fauchald, 1971 (in part, *Chain* cruise 50, Sta. 87). (Not Hartman, 1953).

Material examined.—Atlantic Ocean: Gay Head–Bermuda Transect.—*Panulirus*, Bermuda Sta. 1, 13 April 1960, 32°16.5'N, 64°42.5'W, 1000 m, anchor dredge, 31 specimens (AHF). Bermuda Sta. 4, 2 May 1960, 32°17.0'N, 64°35'W, 1700 m, anchor dredge, 1 specimen (AHF).—*Atlantis* cruise 264, Sta. HH3, 21 May 1961, 38°47'N, 70°08'W, 2900 m, anchor dredge, 2 specimens (AHF). Sta. E3, 25 May 1961, 39°50.5'N, 70°35'W, 824 m, anchor dredge, 20 specimens (6 for SEM, 14 AHF).—*Atlantis* cruise 283, Sta. Slope 3, 28 August 1962, 39°58.4'N, 70°40.3'W, 300 m, anchor dredge, 1 specimen (AHF). Sta. Slope 4, 30 August 1962, 39°56.5'N, 70°39.9'W, 400 m, anchor dredge, 2 specimens (AHF).—*Atlantis II* cruise 12, Sta. 71, 24 August 1964, 38°08'N, 71°47.5'W, 2946 m, anchor dredge, 15 specimens (AHF).—*Chain* cruise 50, Sta. 87, 6 July 1965, 39°48.7'N, 70°40.8'W, 1102 m, epibenthic sled, 19 specimens (AHF).—*Chain* cruise 58, Sta. 105, 5 May 1966, 39°56.6'N, 71°03.6'W, 530 m, epibenthic sled, 4 specimens (AHF).—*Oceanus* cruise 10, Sta. 350, 10 July 1976, 38°17.0'N, 69°37.8'W, 3600 m, box core, 11 specimens (JFG). Sta. 352, 11 July 1976, 38°16.5'N, 69°38.5'W, 3600 m, box core, 14 specimens (JFG). Sta. 367, 19 July 1976, 39°45.5'N, 70°37.2'W, 1764 m, box core, 65 specimens (JFG).—*Alvin* Dive, WHOI Deep Ocean Station No. 1, 39°46'N, 70°40'W, 1760 m. Dive #407, 12 June 1972, 3 specimens (JFG). Dive #408, 14 June 1972, 2 specimens (JFG). Dive #459, 26 September 1972, 5 specimens (JFG). Dive #460, 11 October 1972, 10 specimens (JFG). Dive #546, 5 October 1974, 1 specimen (JFG). Dive

#597, 30 August 1975, 4 specimens (JFG). Dive #773, 29 July 1977, 3 specimens (JFG). Dive #744, 30 July 1977, 1 specimen (JFG). Dive #776, 1 August 1977, 4 specimens (JFG).—*Alvin* Dive, WHOI Deep Ocean Station No. 2, 38°18'N, 65°35'W, 3600 m. Dive #657, 10 June 1976, 2 specimens (JFG). Dive #777, 3 August 1977, 3 specimens (JFG).—*Alvin* Dive, Tongue of the Ocean, 24°53.4'N, 77°40.2'W, 2032 m. Dive #753, 5 May 1977, 1 specimen (JFG). Dive #755, 12 May 1977, 2 specimens (JFG).—Ireland—Woods Hole Transect. *Chain* cruise 106. Sta. 313, 17 August 1972, 51°32.2'N, 12°35.9'W, 1491–1500 m, epibenthic sled, 586 specimens (50 specimens, HLS; 536 specimens, USNM 60343). Sta. 323, 21 August 1972, 50°08.3'N, 13°53.7'W, 3338–3356 m, epibenthic sled, 193 specimens (USNM 60344).—Rockall Trough. *Challenger* cruise 12B/75, 7 September 1975, Sta. 46, 55°03.7'N, 12°06'W, 2875 m, box core, 22 specimens (JG). Sta. 47, 55°03.5'N, 12°03.5'W, 2875 m, box core, 28 specimens (JG). Sta. 48, 55°03.9'N, 12°03.9'W, 2875 m, box core, 21 specimens (JG). Sta. 49, 55°03.4'N, 12°05.3'W, 2875 m, box core, 22 specimens (JG). Sta. 50, 55°04.1'N, 12°02.6'W, 2875 m, box core, 21 specimens (JG). Sta. 51, 55°03.3'N, 12°02.7'W, 2875 m, box core, 5 specimens (JG).—*Challenger* cruise 9/76, 23 June 1976, Sta. 58, 54°41'N, 12°17'W, 2900 m, box core, 24 specimens (JG). Sta. 60, 56°35'N, 11°03'W, ca 2500 m, box core, 2 specimens (JG). Sta. 61, 57°08'N, 12°09'W, ca 1200 m, box core, 8 specimens (JG). Sta. 63, 56°37'N, 10°12'W, ca 1800 m, box core, 2 specimens (JG). Sta. 65, 56°39'N, 09°40'W, ca 1600 m, box core, 38 specimens (JG).—*Challenger* cruise 10/76, 1 July 1976, Sta. 68, 58°42'N, 09°43'W, ca 1800 m, box core, 38 specimens (JG).—Bay of Biscay. *Sarsia* Sta. 33, 13 July 1967, 43°40.8'N, 03°36'W, 1784 m, anchor dredge, 18 specimens (USNM 60329). Sta. 44, 16 July 1967, 43°40.8'N, 03°35.2'W, epibenthic sled, 1739 m, 1 specimen (NJM). Sta. 65, 25 July 1967, 46°15.0'N, 04°50'W, epibenthic sled, 1922 m, 152 specimens (USNM 60330).—Canary Islands. *Discovery* Sta. 6697, 15 March 1968, 27°57'N, 13°46'W, 1564 m, epibenthic sled, 44 specimens (USNM 60331). Sta. 6709, 18 March 1968, 27°29.8'N, 15°20'W, 2351 m, epibenthic sled, 76 specimens (USNM 60332). Sta. 6710, 19 March 1968, 27°23.6'N, 15°39.6'W, 2670 m, epibenthic sled, 71 specimens (USNM 60333). Sta. 6711, 20 March 1968, 27°13'N, 15°41'W, 2988 m, 38 specimens (USNM 60334).—Walvis Bay—Luanda Transect. *Atlantis II* cruise 42. Sta. 193, 17 May 1968, 22°56'S, 12°18'E, 2094–2191 m, anchor dredge, 1 specimen (USNM 60335). Sta. 200, 22 May 1968, 09°41'S, 10°55'E to 09°43.5'S, 10°57'E, 2644–2754 m, epibenthic sled, 4 specimens (USNM 60336). Sta. 201, 23 May 1968, 09°29'S, 11°34'E to 09°25'S, 11°35'E, 1964–2031 m, epibenthic sled, 59 specimens (USNM 60337). Sta. 202, 23 May 1968, 09°05'S, 12°17'E to 08°56'S, 12°15'E, 1427–1643 m, epibenthic sled, 47 specimens (USNM 60338).—Argentine Basin. *Atlantis II* cruise 60. Sta. 239, 11 March 1971, 36°49.0'S, 53°15.4'W, 1661–1679 m, epibenthic sled, 92 specimens (12

removed for histology, 30 paratypes USNM 60328, 10 paratypes AHF Poly 1289, 10 paratypes CASIZ type-series 1133, 10 paratypes MACN 29.610, 10 paratypes BMNH ZB1980:82–91, 10 paratypes ZMH P-16407). Sta. 264A, 28 March 1971, 36°12.7'S, 52°42.7'W, 2041–2048 m, epibenthic sled, 52 specimens (1 entire specimen, holotype USNM 60326, 51 paratypes USNM 60327).—Surinam. *Knorr* cruise 25. Sta. 293, 27 February 1972, 08°58.0'N, 53°04.3'W, 1456–1518 m, epibenthic sled, 169 specimens (USNM 60339). Sta. 295, 28 February 1972, 08°04.2'N, 54°21.3'W, 1000–1022 m, epibenthic sled, 260 specimens (1 entire specimen, USNM 60340, 259 specimens USNM 60341). Sta. 301, 29 February 1972, 08°12.4'N, 55°50.2'W, 2487–2500 m, epibenthic sled, 11 specimens (USNM 60342).

Diagnosis.—Prostomium broadly rounded anteriorly, extending as keel to end of setiger 1, 0–2 pairs of indistinct red eyespots; no occipital tentacle. Peristomium partly fused to setiger 1, not developed into wings or hood; surrounding prostomium posteriorly as a yoke. Branchiae 2 pairs, on setigers 3–4, each partially fused to dorsal lamellae, first pair longer than second, both usually shorter than lamellae. Setiger 1 reduced; subsequent notopodial lamellae larger, foliaceous, becoming prolonged medially over dorsum, largest on setigers 2–6, thereafter smaller, rounded; neuropodial lamellae largest on setiger 3, thereafter small, rounded, displaced dorsally in anterior setigers, ventrally placed by setiger 10. Setae of 3 types: narrow, striated capillaries, multidentate hooded hooks, heavily granulated ventral sabre setae. Anterior setae all capillaries, arranged in 2 tiers; neuropodial hooded hooks from setiger 9–11 (usually 10); long-shafted notopodial hooded hooks from setiger 24–38; ventral sabre setae from setiger 9–11. Pygidium with 1 long, thin medial cirrus and 2 short, stout lateral cirri.

Description.—This is a small species, measuring up to 0.6 mm wide and 5.0 mm long for 38 setigers. The color in alcohol is white to pale yellow; some specimens have dark golden inclusions on the dorsal edge of setiger 1, and sometimes also on the posterior tip of the prostomium.

The prostomium is broadly rounded anteriorly, extending posteriorly as a narrow keel to the end of setiger 1 (Fig. 1A). On some specimens, a pair of small red eyes, each composed of a cluster of pigment spots, are present about halfway down the length of the prostomium. On a few specimens, a second pair of eyespots is present anterior to the first pair. There is no occipital tentacle. Some variation in the shape of the prostomium is seen; most specimens have a prostomium as in Fig. 1A, but some prostomia were found with tiny peaks either medially or at the lateral edges (Fig. 1B, C). These variations are thought to be fixation artifacts, or due to the eversion or non-eversion of the pharynx, and are not considered to be taxonomically significant.

The peristomium is partly fused to setiger 1, appearing distinct ventrally and laterally, but fused dorsally (Fig. 1A). The peristomium forms a yoke

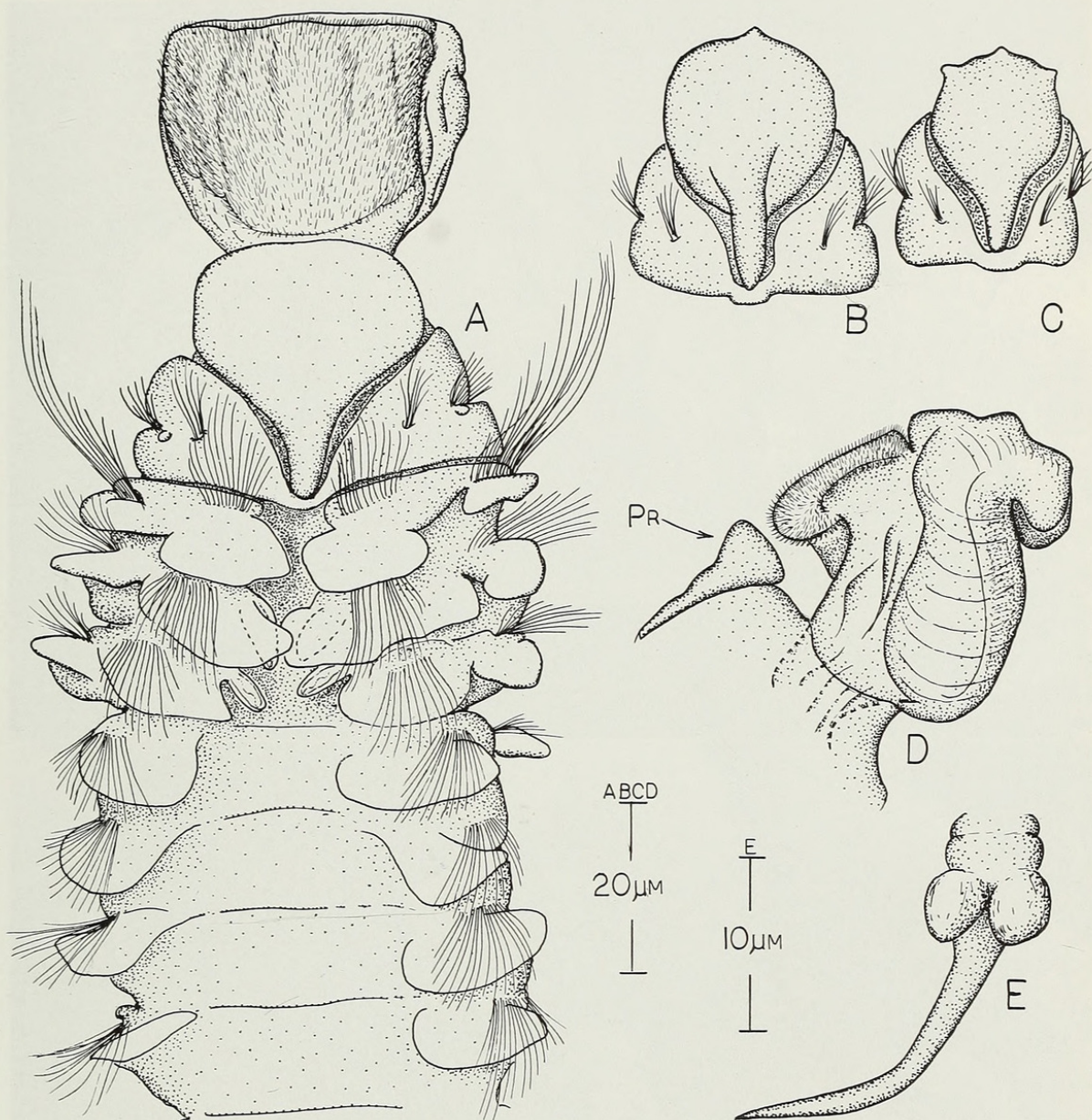


Fig. 1. *Aurospio dibranchiata*: A, Anterior end in dorsal view; B–C, Prostomia, showing medial and lateral peaks of some specimens; D, Everted pharynx in lateral view [Pr = prostomium]; E, Pygidium.

around the posterior tip of the prostomium. This yoke is most obvious in specimens which have large amounts of the golden pigment mentioned above. A pair of grooved palps are present at the junction of the peristomium and prostomium, and extend about one-third to one-half the length of the body. The palps were lost in all but a few (3–4) of the specimens examined.

The pharynx is an eversible pouch, heavily muscularized on the ventral surface, and ciliated on the anterodorsal surface (Fig. 1A, D).

Branchiae are present on setigers 3–4. They are short and fused for one-

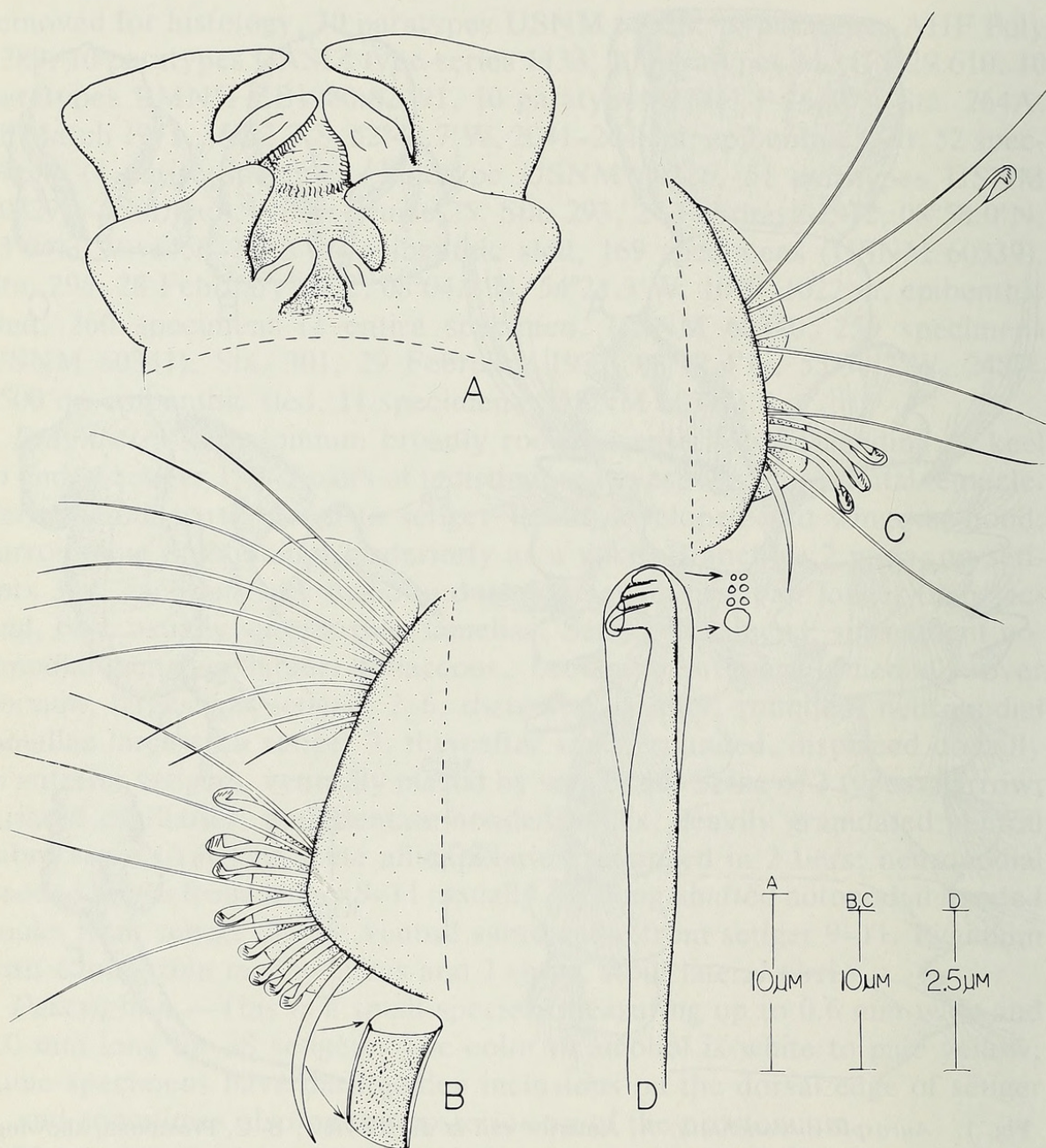


Fig. 2. *Aurospio dibranchiata*: A, Notopodia and branchiae of setigers 3 and 4 in posterior view; B, 15th setiger, with enlargement of sabre seta, in anterior view; C, 30th setiger in anterior view; D, Neuropodial hooded hook, inset [not to scale] showing arrangement of teeth.

quarter to one-third their length to the dorsal lamellae, beyond which they do not extend, and by which they are usually completely hidden (Figs. 1A, 2A, 3). The gills on setiger 3 are longer than those on setiger 4, which are stubby in appearance. Cilia line the medial edge of the gills on setiger 3, and continue across the dorsum (Fig. 3A, B), but are not present on the gills on setiger 4.

The notopodium of setiger 1 is reduced; on setigers 2–6, the notopodial

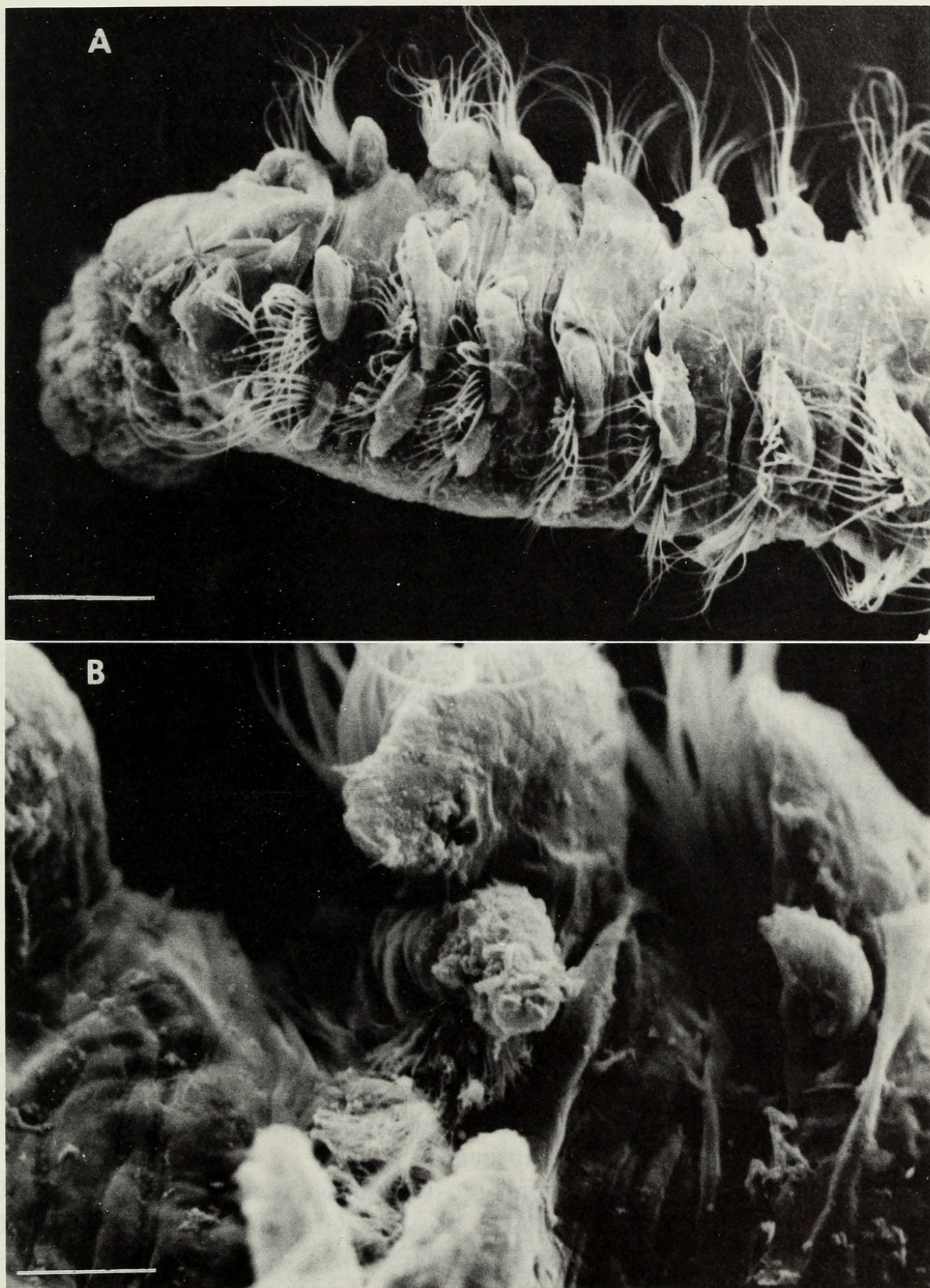


Fig. 3. *Aurospio dibranchiata*: A, SEM of anterior end in dorsolateral view [scale = 20 μm]; B, SEM of branchiae on setigers 3 and 4 [scale = 4 μm].

lamellae are large, broad and foliaceous, with the medial edge prolonged over the dorsal surface. From setigers 6–14 the lamellae become increasingly smaller. A few specimens appear to have very low dorsal ridges on setigers 5–10, but the appearance of this character is variable within the species.

The neuropodium of setiger 1 is also reduced to a small, rounded lamella, and displaced dorsally. On setiger 2 it is a small auricular lobe which becomes larger on setiger 3 and then smaller on subsequent setigers. The neuropodia of setigers 2–10 are increasingly ventral in position (Fig. 1A). In posterior setigers, both noto- and neuropodia are small, rounded lobes (Fig. 2B, C).

Setae consist of 3 types: capillaries, multidentate hooded hooks and ventral sabre setae. Anterior setae are all capillaries, arranged in 2 tiers. These setae are often extremely long, particularly the neurosetae in setiger 2 (Fig. 1A), but also both the noto- and neurosetae posteriorly. They appear narrow, uni- or bilimbate (depending on the angle at which they are viewed; see Foster, 1971b), and striated with punctations along the striae. Neuropodial hooded hooks appear from setiger 10, occasionally from setiger 11, and less frequently from setiger 9. Long-shafted notopodial hooks appear in the last few setigers (24–38), and will probably not be seen unless complete specimens are collected. These hooks appear quadridentate if viewed from the side (Fig. 2D), but actually have 3 pairs of teeth arranged above the main denticle (Fig. 2D—inset). There is no secondary hood. Hooks number 6–9 per neuropodial ramus, and 2–3 per notopodial ramus. Accompanying capillaries number up to 8 in the neuropodium; up to 3 in the notopodium. A single heavily granulated and bilimbate ventral sabre seta is present from setiger 10 (9–11) (Fig. 2B). Rarely, a second sabre seta is present.

The pygidium is rarely retained in entirety. The pygidium of the holotype has 1 long medial cirrus and 2 short, stout lateral cirri (Fig. 1E).

Remarks.—*Aurospio dibranchiata* is an extremely widespread species, occurring over most of the Atlantic Ocean (Fig. 4), and from slope depths of 300 m to abyssal depths of 3600 m. Twenty-six of the 30 records are from depths greater than 1000 m. The records from shallower depths are all from the Gay Head–Bermuda transect, although stations in less than 1000 m were sampled on most of the other transects.

A. dibranchiata was the second most common species, comprising 5.1 percent of the fauna, in core samples taken by Grassle (1977) at 1760 m off Woods Hole. It was also found in samples taken from recolonization experiments conducted at the same site. Almost nothing is known about its life history: only one specimen containing oocytes was found; these measured 50–90 microns for the greatest visible dimension.

The consistency of taxonomic characters in *A. dibranchiata* over its depth and geographic range is notable. Neuropodial hooded hooks began in setiger

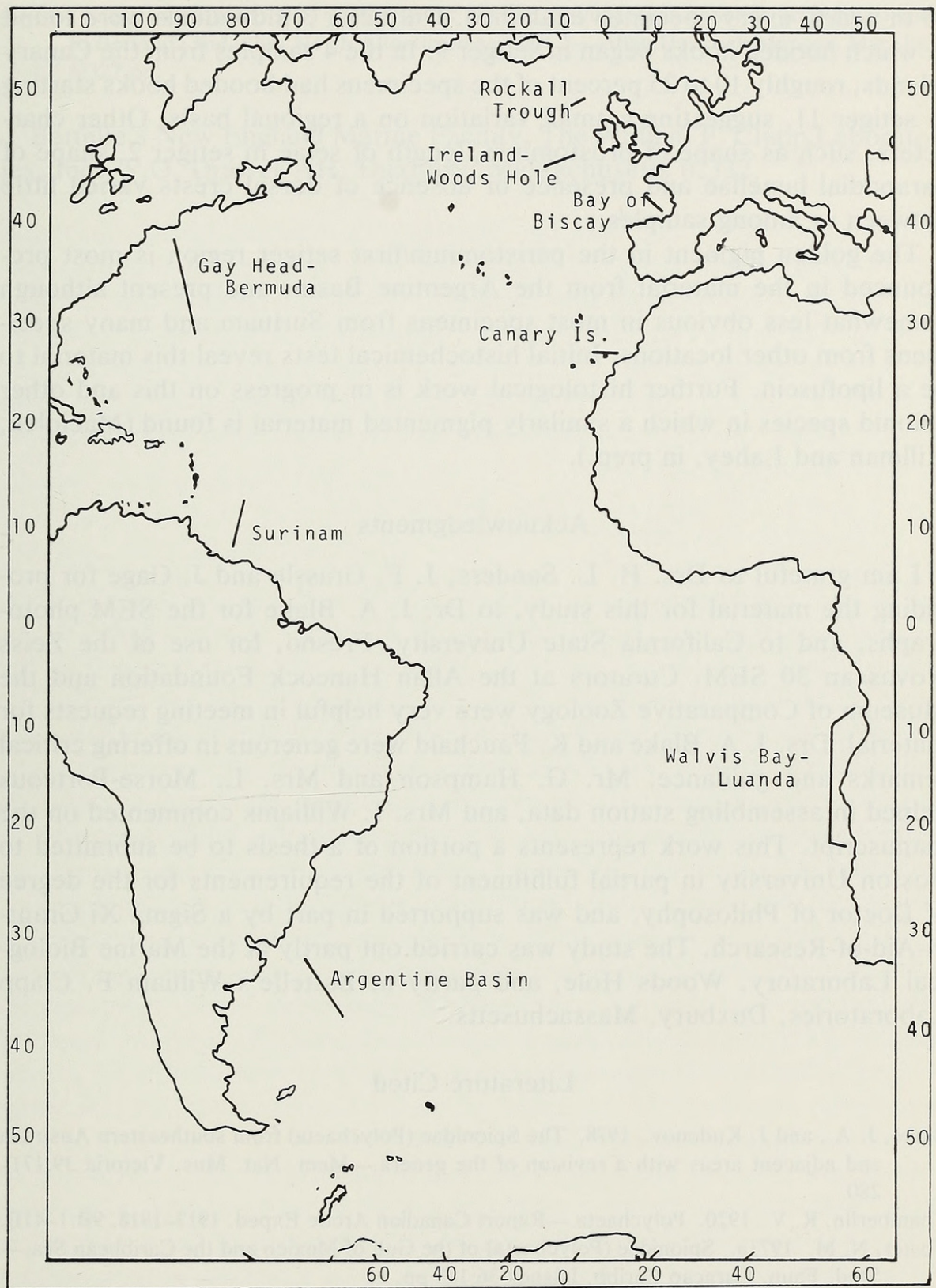


Fig. 4. Sampling transects in the north and south Atlantic Ocean from which *Aurospio dibranchiata* was collected.

10 in nearly every specimen examined. Only 2 or 3 individuals were found in which hooded hooks began in setiger 9. In the 4 samples from the Canary Islands, roughly 10 to 25 percent of the specimens had hooded hooks starting in setiger 11, suggesting a small variation on a regional basis. Other characters, such as shape of prostomium, length of setae in setiger 2, shape of parapodial lamellae and presence or absence of dorsal crests varied little between or among samples.

The golden pigment in the peristomium/first setiger region is most pronounced in the material from the Argentine Basin, and present although somewhat less obvious in most specimens from Surinam and many specimens from other locations. Initial histochemical tests reveal this material to be a lipofuscin. Further histological work is in progress on this and other spionid species in which a similarly pigmented material is found (Maciolek, Hillman and Lahey, in prep.).

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