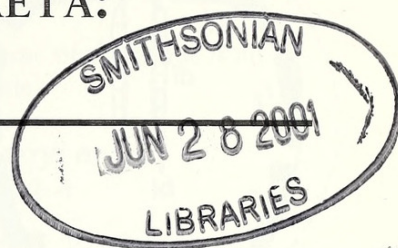


A NEW DEEP-WATER GENUS AND SPECIES OF FABRICIINAE FANWORM (POLYCHAETA: SABELLIDAE) FROM ANTARCTICA

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ABSTRACT. A new Fabriciinae fanworm genus and species, *Raficiba barryi*, from continental slope depth (318–335 m) off Antarctica is described. The species is the first in the subfamily to be described from this region, as well as the first species known to occur at a depth beyond the continental shelf. *Raficiba* is most similar to *Fabricia* Blainville, *Parafabricia* Fitzhugh, and *Brifacia* Fitzhugh in having well-developed branchial crown dorsal lips distinct from the dorsal radioles, absence of ventral filamentous appendages, and an anterior peristomial ring collar developed as a ventral lobe. Features distinguishing *Raficiba* from these genera include shapes of the branchial lobes and collar, the distribution of inferior thoracic pseudospatulate notosetae, and dentition in thoracic neuropodial uncini. A revised key to Fabriciinae genera is provided.

INTRODUCTION

The records of Fabriciinae sabellids (*sensu* Fitzhugh, 1991a) from Antarctic waters are few, probably in part because of the small body size of specimens, the greater tendency for species to occur only in intertidal and shallow subtidal habitats, and the relatively infrequent sampling of benthic habitats around Antarctica. Of those taxa that have been reported, their assignment to the Fabriciinae is questionable. For instance, Ehlers (1913; see also Hartman, 1966) reported the occurrence of *Fabricia stellaris* (Müller) (as *F. sabella* (Ehrenberg)) from the Baie de l'Observatoire, Kerguelen Islands, Indian Ocean (approximately 50°S, 70°E). Ehlers' identification of this species is highly dubious in that he described specimens having multiple eyespots on the pygidium, which is not typical of *F. stellaris*, not to mention that the species has only been reliably documented from the North Atlantic (Fitzhugh, 1990a). When present, pygidial eyespots in individuals of the Fabriciinae usually occur as a single pair; only rarely are dispersed eyespots seen (e.g., *Pseudofabriciola longipyga* Fitzhugh, Giangrande, and Simboursa, 1994: fig. 6B, C; Fitzhugh, pers. obs.). It is likely that Ehlers' specimens belong in the Sabellinae. Ehlers (1913) also reported specimens identified only as *Fabricia* sp. off the Wilhelm II Coast of Antarctica, Indian Ocean, from 380 to 385 m. Unfortunately, he provided no description of the specimens.

Hartman (1967) reported the occurrence of *Fabricia stellaris* (as *F. sabella*) off the Antarctic Peninsula from 69 m depth. She also recorded several unidentified specimens as *Fabricia* sp. from 641 m

in the Drake Passage and from the "shore" on the Antarctic Peninsula. In the same study, Hartman also classified several specimens in *Fabricia* sp. from 81 m in the Strait of Magellan, South America, and from 101 to 119 m off the Falkland Islands. Unfortunately, Hartman provided no descriptions of the specimens.

The present report describes a new Fabriciinae genus and species from the Ross Sea, off Antarctica. This description raises the number of described genera in the subfamily to 14. In addition to the genus described herein, five other Fabriciinae genera are monotypic: *Fabricia* Blainville (*F. stellaris* (Müller); Fitzhugh, 1990a); *Monroika* Hartman, 1951 (*M. africana* (Monro)); *Pseudofabricia* Cantone, 1972 (*P. aberrans*); *Parafabricia* Fitzhugh, 1992 (*P. ventricingulata*); and *Brifacia* Fitzhugh, 1998 (*B. metastellaris*). While only one species has been formally described in *Brandtika* Jones, 1974 (*B. asiatica*), Jones (1974) provided a partial description of what he considered an additional, unnamed species.

All specimens in the type series have been deposited in the Allan Hancock Foundation Polychaete Collection of the Los Angeles County Museum of Natural History (LACM-AHF).

SYSTEMATICS

Family Sabellidae Latreille, 1825

Subfamily Fabriciinae Rioja, 1923

Raficiba n. gen.

TYPE SPECIES. *Raficiba barryi*, new species, by original designation.

DIAGNOSIS. Small-bodied fabriciini species with 8 thoracic and 3 abdominal setigers. Branchial crown with 3 pairs of radioles; distal ends of radioles filamentous, about same width as pinnules.

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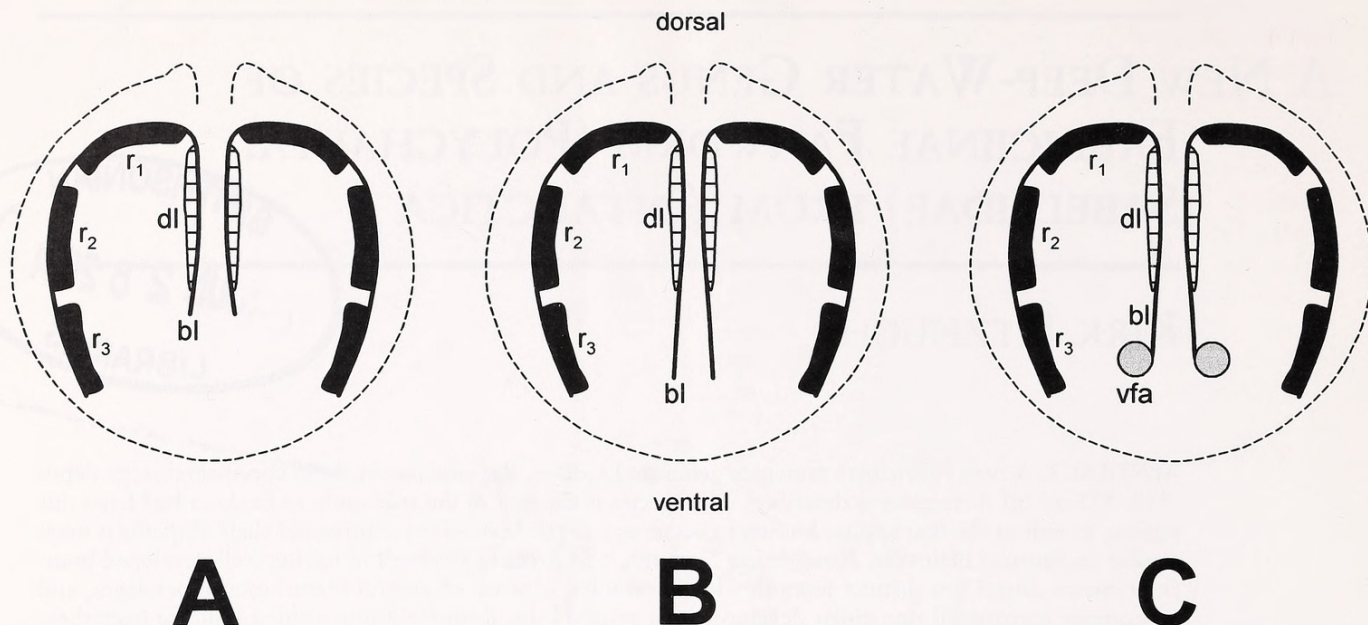


Figure 1 Schematic arrangements of branchial crown structures in some Fabriciinae genera, showing relative positions of radioles, dorsal lips, ventral filamentous appendages, and branchial lobes adjacent to the ventral margins of dorsal lips. Dashed line denotes anterior peristomial ring collar. **A**, very narrow branchial lobes extending from ventral margins of well-developed dorsal lips, typical of *Fabricia*, *Parafabricia*, *Brifacia*, and some *Fabricinuda*; **B**, elongate branchial lobes extending from ventral margins of well-developed dorsal lips, as seen in *Raficiba barryi*; **C**, elongate branchial lobes extending from ventral margins of well-developed dorsal lips to ventral filamentous appendages, seen in *Augeneriella*, *Pseudofabricia*, and *Pseudoaugeneriella*. Abbreviations: bl, branchial lobe; dl, dorsal lip; r_{1-3} , radioles; vfa, ventral filamentous appendages

Pinnules terminate at same height as radioles. Dorsal lips erect, well developed; branchial lobes adjacent to ventral margin of each lip extended as distinct, thin, membranous flap. Ventral lips and ventral filamentous appendages absent. Branchial lobes only slightly narrower than peristomium; point of attachment to peristomium wide. Branchial hearts present. Anterior margin of anterior peristomial ring a low ridge dorsally and laterally; ventrally as very elongate, scoop-shaped lobe. Anterior peristomial ring, excluding collar, wider than long. Annulation between anterior and posterior peristomial rings distinct dorsally and laterally. Peristomial eyes black, reniform to round; pygidial eyes black, round. Superior thoracic notosetae elongate, narrowly hooded. Inferior thoracic notosetae in setigers 2–8 pseudospatulate. Thoracic uncini acicular; main fang slender, single large tooth situated medially over main fang followed by 4–5 arching rows of smaller teeth. Abdominal uncini as rasp-shaped plates; manubrium about same length as dentate region; dentate region with 15–17 rows of teeth, 5–6 teeth per row. Abdominal neurosetae very elongate, narrowly hooded. Body wall pigmentation absent. Males with spermiogenesis occurring in setigers 6–8; females with oocytes in setiger 4.

REMARKS. Individuals in *Raficiba* exhibit at least three features that are unique among Fabriciinae sabellids: 1) branchial lobes ventral to dorsal lips extended as membranous flaps; 2) elongate, scooplike shape of the ventral collar lobe, and 3)

dentition above the main fang of thoracic uncini. A possible additional diagnostic feature might be the occurrence of thoracic pseudospatulate setae in setigers 2–8.

As is typical of most specimens in the Fabriciinae, individuals in *Raficiba* have erect, distally rounded dorsal lips that are well separated from the dorsalmost radioles. The main exceptions to this include some species in *Pseudofabriciola* Fitzhugh, 1990b, and all species in *Novafabricia* Fitzhugh, 1990b, where the dorsal lips are in the form of low, rounded ridges fused to some extent with the dorsalmost radioles. In either case, the branchial lobes extend from the ventral margins of the dorsal lips as narrow, vertical or slightly oblique shelves (Fig. 1A), except when ventral filamentous appendages are present. In the case of the latter, the ventral extensions of the lobes are more pronounced to accommodate the filamentous appendages, which are located ventral to the lips (Fig. 1C). The condition of the branchial lobes ventral to the dorsal lips in *Raficiba* most closely resembles that of species with ventral filamentous appendages, except that appendages are absent. As a result, the branchial lobe margins form high, well-developed flaps which extend to near the ventral margin of the crown.

Raficiba resembles *Augeneriella* Banse, 1957, *Novafabricia*, *Brifacia*, and *Pseudoaugeneriella* Fitzhugh, 1998 (Fitzhugh, 1999), in that each has an anterior peristomial ring collar developed ventrally as a lobelike extension. However, this ventral lobe in *Raficiba* specimens is much more elongate

and scoop-shaped in comparison to what is seen in individuals in other genera. Two species which come closest to having similar ventral lobes are *N. brunnea* (Hartman, 1969) and *Parafabricia ventricingulata* Fitzhugh, 1992. The lobes in *N. brunnea* and *P. ventricingulata* are not nearly as pronounced, being about as wide as long (Fitzhugh, 1990a: figs. 2, 3; Fitzhugh, 1992: fig. 2A; Fitzhugh, 1993: fig. 1), whereas in *Raficiba* specimens the lobe is about two-thirds longer than wide.

In a review of the dentition patterns among Fabriciinae thoracic neuropodial uncini, Fitzhugh (1998: figs. 15, 16) identified three types: 1) a series of uniformly small teeth above the main fang; 2) teeth gradually decrease in size away from the main fang; and 3) a large tooth slightly offset from the midline of the main fang, followed by a series of smaller teeth. The dentition in specimens of *Raficiba* are of a fourth type: a single large tooth above the midline of the main fang, followed by a series of smaller teeth. This arrangement is similar to what has been observed in some species of *Amphicorina* Claparède, for example, *A. brevicollaris* (Rouse, 1990: fig. 3f–g). In his original description of *Fabriciola mossambica* (now *Augeneriella mossambica*, see Fitzhugh, 1991b), Day (1957: fig. 8m; see also Day, 1967: fig. 37.8e) incorrectly illustrated a thoracic uncinus with a single large tooth over the midline of the main fang (Fitzhugh, 1991b).

The distribution of thoracic pseudospatulate setae in setigers 2–8 in *Raficiba* specimens might be unique among Fabriciinae taxa. A possible exception is *Brandtika asiatica*, which Jones (1974) described as having pseudospatulates in setigers 2–8. I have not examined the available material of this species to determine if this is the actual distribution. Among other genera with species with pseudospatulates, none have a distribution in setigers 2–8: *Manayunkia* Leidy, 1859 (usually setigers 2–5 or absent; Rouse, 1996; pers. obs.); *Monroika* (setigers 3–5, *contra* Jones, 1974; Fitzhugh, 1992), *Augeneriella* (setigers 3–6 or 3–7; Fitzhugh, 1990c, 1991b); *Novafabricia* (setigers 3–5, 3–6, 3–7, or absent; Fitzhugh, 1990b, 1993, 1998; Martin and Giangrande, 1991); *Fabricinuda* Fitzhugh, 1990d (setigers 3–8; Fitzhugh, 2001); *Pseudoaugeneriella* (setigers 3–6; Fitzhugh, 1998, 1999); *Brifacia* (setigers 3–7; Fitzhugh, 1998); *Fabricia* (setigers 3–7; Fitzhugh, 1990a); and *Parafabricia* (setigers 3–7; Fitzhugh, 1992).

The cladistic relationships of *Raficiba* to other Fabriciinae genera are unsettled. The results of a cladistic analysis including *Raficiba* are presented in Fitzhugh (2001). The most significant problem is that in recent analyses (Fitzhugh, 1998, 1999), with the inclusion of additional species and genera, results allow for several genera to be either monophyletic or paraphyletic. These genera include *Fabriciola*, *Augeneriella*, and *Novafabricia*. Similar results have been obtained with the inclusion of *Raficiba* (Fitzhugh, 2001). As a result, insights into the

relationships of *Raficiba* to other genera are extremely limited at this time.

Comments on the depth of occurrence of this genus relative to what is known for other Fabriciinae genera are provided under the remarks on the type species.

ETYMOLOGY. The name of the genus is an anagram of *Fabricia* Blainville.

Raficiba barryi n. sp.

Figures 2–4

MATERIAL EXAMINED. Pacific Ocean, Ross Sea, Antarctica. Holotype: LACM-AHF 1972, MBARI sta. NBP 96-6-093, subcore 5, depth 318 m, 75°30.0'S, 175°0.1'E, coll. J. Barry, 3 January 1997. Paratypes: LACM-AHF 1973, same locality as holotype; 3 complete specimens with branchial crowns, 1 incomplete specimen with branchial crown and 2 thoracic setigers, 1 specimen complete except for missing branchial crown, 2 posterior fragments with several thoracic and all abdominal setigers. Paratypes: LACM-AHF 1974, MBARI sta. NBP 96-6-098, depth 335 m, 75°0.0'S, 170°14.6'E, coll. J. Barry, 4 January 1997; 3 complete specimens with branchial crowns, 1 posterior fragment with 5 thoracic and 3 abdominal setigers.

DESCRIPTION. Holotype a complete male with 8 thoracic and 3 abdominal setigers. Branchial crown length 0.90 mm, remainder of body 2.60 mm long, maximum width 0.25 mm. Body slender, nearly uniform in width except for slight tapering posteriorly (Fig. 2A). Branchial crown with 3 pairs of radioles, distal ends filamentous, same width as pinnules. Dorsalmost radioles with 5–6 pairs of pinnules, ventralmost radioles with 4 pairs, all terminating at about same height as ends of radioles. Dorsal lips erect, distally rounded and highest near dorsal margin, distinct from dorsalmost radioles (Figs. 2B, 3A). Branchial lobes adjacent to ventral margins of dorsal lips extend to ventral crown margins as prominent, membranous flaps (Figs. 2B, 3B). Low, distally rounded, ventral liplike process present at base of proximalmost pinnule of ventralmost radioles (Fig. 2B). Ventral filamentous appendages absent. Dorsal margins of branchial lobes not fused to one another. Branchial hearts present (Figs. 2, 3B). Anterior margin of anterior peristomial ring a low ridge dorsally and laterally; no mid-dorsal gap (Figs. 2A, 3A–B). Ventral margin of anterior peristomial ring with prominent, broadly rounded, scoop-shaped collar (Figs. 2A, 3); about same length as posterior peristomial ring and setiger 1 combined, nearly uniform on width; inner basal margin of collar adjacent to branchial crown fused with a distally rounded lobe about one-third height of collar (Fig. 3), with base of collar having a more thickened appearance. Middorsal medial lobe just dorsal to mouth about one-third height of collar (Fig. 3A). Pair of round black eyes near anterior margin of posterior peristomial ring (Figs. 2A, 3A–B). Setiger 1 nearly two times longer than

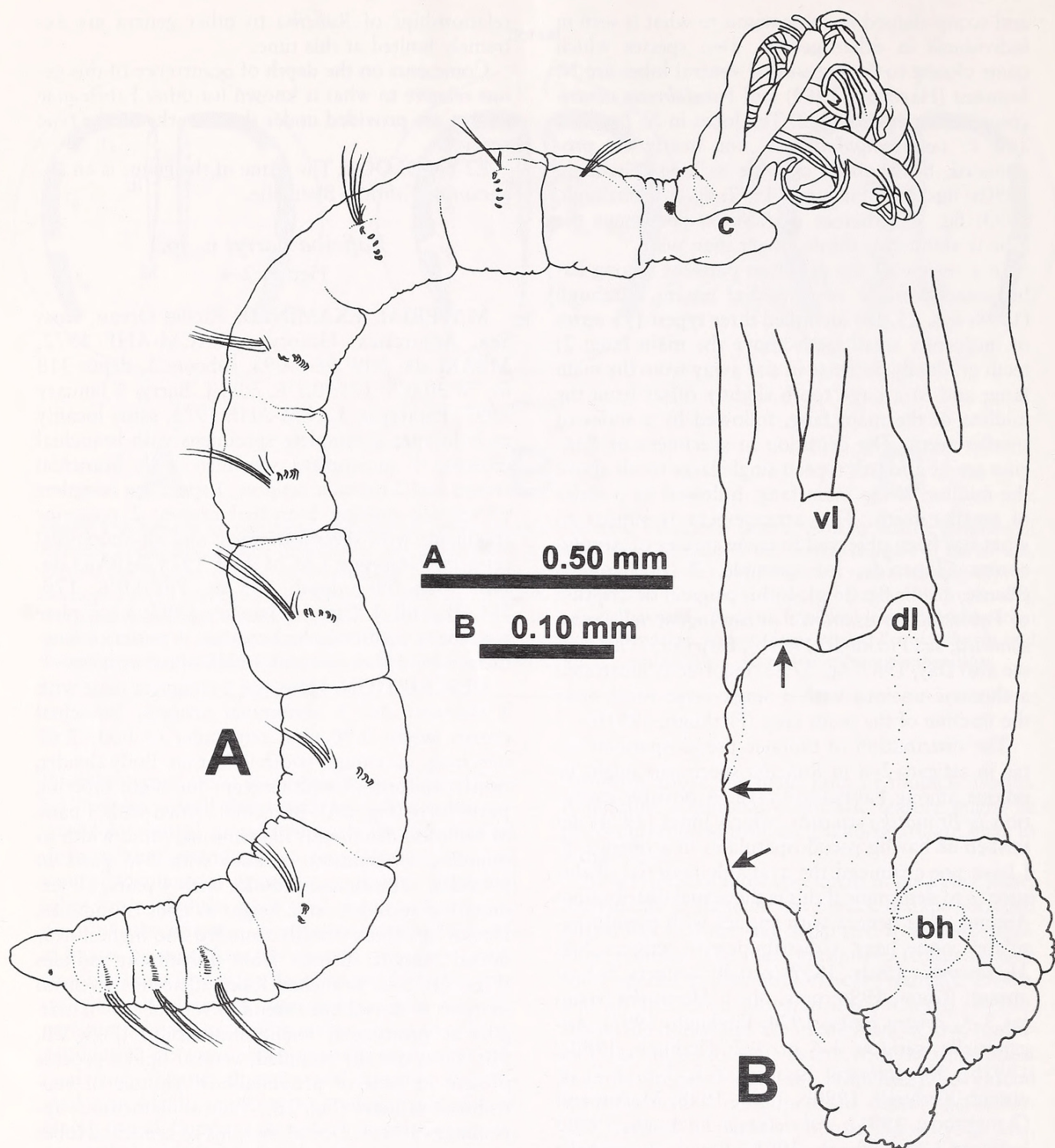


Figure 2 *Raficiba barryi* n. gen., n. sp. **A**, entire animal, lateral view (holotype, LACM-AHF 1972); **B**, right half of branchial crown, inner view; arrows indicate ventralmost border of branchial lobe adjacent to ventral margin of dorsal lip (paratype, LACM-AHF 1973). Abbreviations: bh, branchial heart; c, anterior peristomial ring collar; dl, dorsal lip; vl, ventral liplike process

posterior peristomial ring (slightly shorter in some paratypes), wider than long; setigers 2–8 each about same length as setiger 1 or slightly longer. Setiger 9 about one-half length of thoracic setigers, with setigers 10–11 each slightly shorter than 9. Pygidium about same length as setiger 11, posterior margin slightly tapered, rounded. Pair of round, black pygidial eyes (Fig. 2A). Superior thoracic no-

tosetae elongate, narrowly hooded, 4–6 per fascicle. Inferior thoracic notosetae in setigers 2–8 pseudospatulate (Fig. 4A), 2–4 per fascicle. Abdominal neuropodia of setigers 9–11 with superior group of very short, narrowly hooded setae, 1–2 per fascicle, and inferior group of very elongate, narrowly hooded setae, 3–5 per fascicle. Thoracic uncini acicular, main fang slender (Fig. 4B); single large

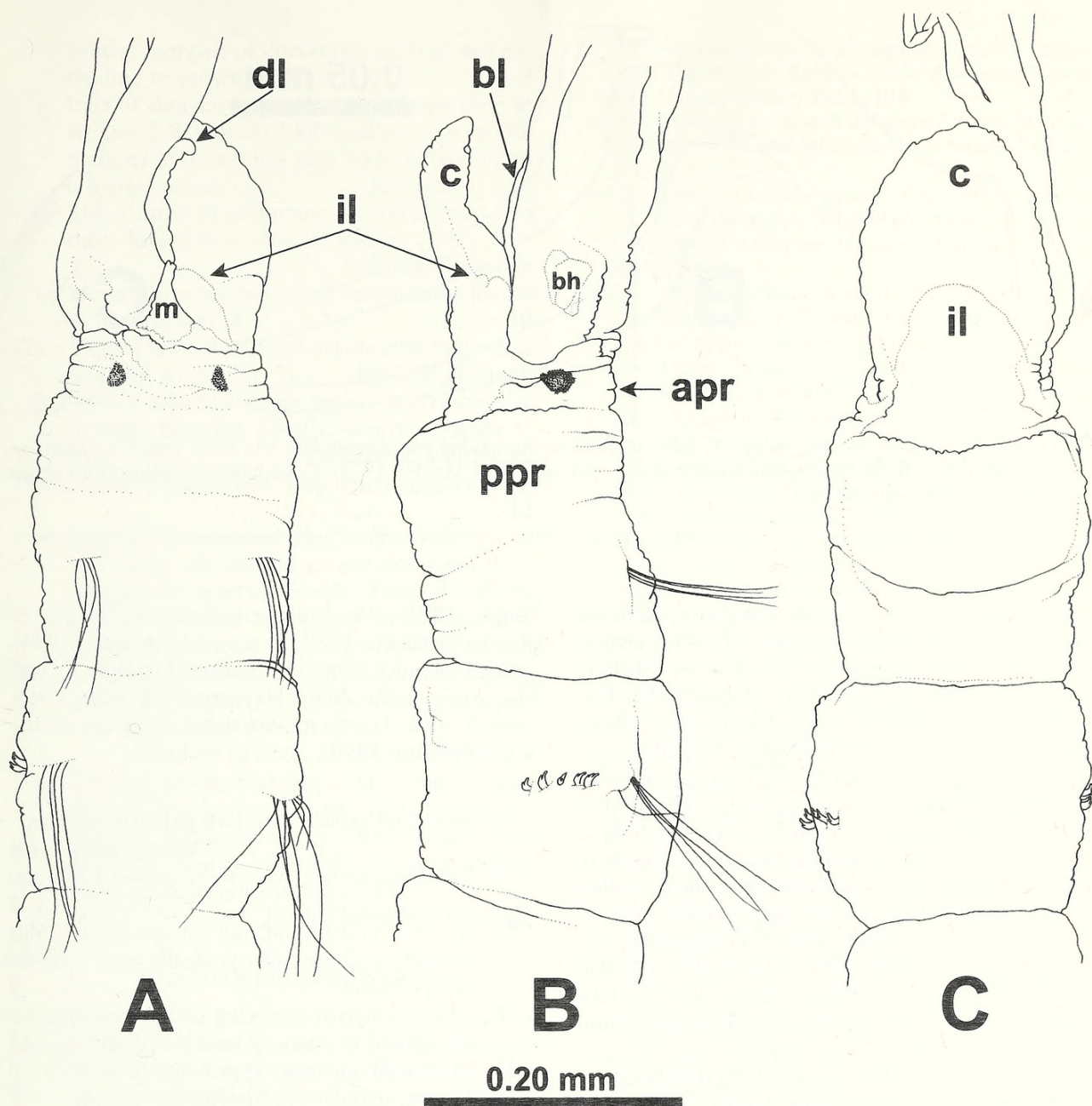


Figure 3 *Raficiba barryi* n. gen., n. sp. A–C, dorsal, lateral (left side), and ventral views of anterior end, respectively (paratype, LACM-AHF 1973). Abbreviations: apr, anterior peristomial ring; bh, branchial heart; c, ventral collar lobe extension of anterior peristomial ring; bl, branchial lobe extension from ventral margin of dorsal lip (cf. Fig. 2B); dl, dorsal lip; il, inner lobe of collar; m, median lobe above mouth; ppr, posterior peristomial ring

tooth present above midline of main fang, all teeth behind large tooth extremely small and of uniform size; hood present; 4–6 uncini per fascicle in irregular single rows. Abdominal uncini with 15–17 rows of teeth in profile, 5–6 teeth per row (Fig. 4C); manubrium about same length as dentate region, slightly expanded proximally; uncini in setigers 9–11 number 16, 14, and 13, respectively. Anus mid-ventral, along anterior margin of pygidium. Males with spermiogenesis occurring in setigers 6–8, oocytes in females in setiger 4. Preserved specimens white, no pigmentation on crown or body wall. Tubes composed of fine, flocculent material, slightly longer than occupants; tube width about 2–3 times

wider than individuals. Brooding of young not observed.

REMARKS. The longest paratype, which lacks a branchial crown, has a combined thorax and abdomen length of 6.0 mm. Among the six paratypes with branchial crowns and complete trunks, respective crown/trunk lengths (in mm) are:

0.6/1.8
0.8/2.8
1.0/2.0
1.0/2.3
1.2/3.0
2.0/5.0

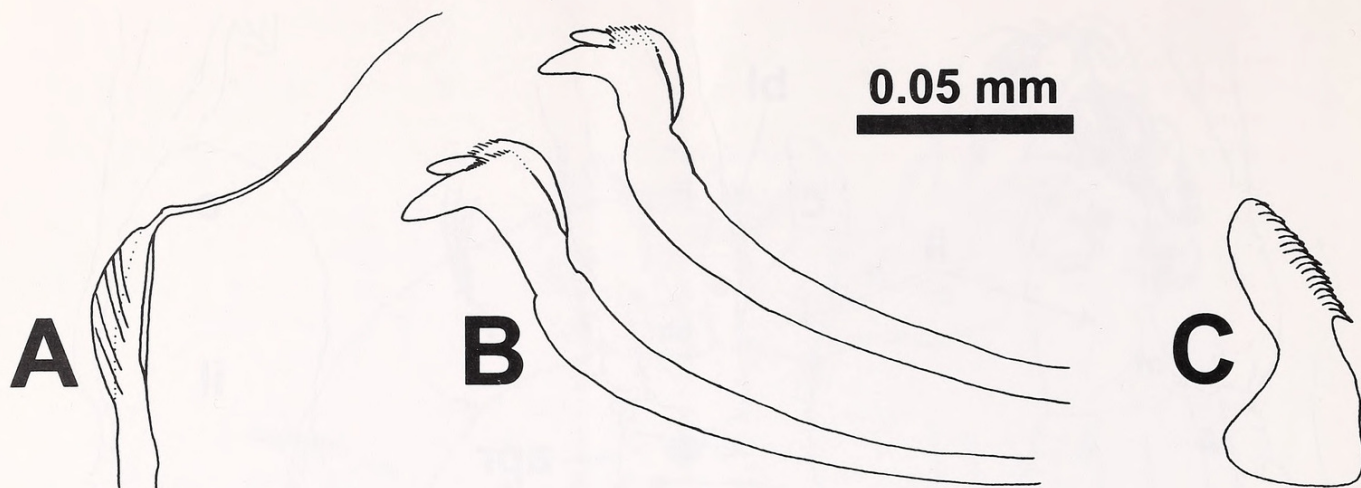


Figure 4 *Raficiba barryi* n. gen., n. sp. A, inferior thoracic notopodial pseudospatulate seta from setiger 4 (paratype, LACM-AHF 1973); B, thoracic uncini from setiger 6 (paratype, LACM-AHF 1973); C, abdominal uncinus from setiger 9 (paratype, LACM-AHF 1973)

As noted in the remarks on the genus, *Raficiba barryi* shows similarities to the following genera with respect to the presence of a ventral, lobelike, anterior peristomial ring collar: *Augeneriella*, *Bri-facia*, *Fabricia*, *Novafabricia*, *Parafabricia*, *Pseu-doaugeneriella*, and *Pseudofabricia*. In addition to the more elongate, scooplike shape of the collar in *R. barryi*, it is also unusual in having a small inner lobe or thickening at the collar base (Fig. 3). In fact, it is this smaller lobe that has the dimensions more typical of those Fabriciinae taxa with such a collar.

The absence of body wall pigmentation in *Raficiba barryi* is somewhat unusual in that other fabri-cini with a ventral collar lobe, and in the size range of *R. barryi*, typically have light to dark brown pigmentation at least on the peristomium and some anterior thoracic setigers.

Raficiba barryi is the first confirmed Fabriciinae species from continental slope depths. While most Fabriciinae species are known from intertidal to shallow subtidal depths, notable exceptions include 7 of the 13 species of *Pseudofabriciola* from depths ranging from 18 to 112 m (Fitzhugh, 1996, 2001). A new species of *Fabricinuda* (Fitzhugh, 2001) from 60 to 70 m depth in the Gulf of Thailand extends the known range of this genus into the sub-tidal.

ETYMOLOGY. The species is named in honor of Dr. James P. Barry, Monterey Bay Aquarium Re-search Institute, for his generosity in making the specimens available for study.

KEY TO THE FABRICIINAE GENERA

This key is similar to that provided by Fitzhugh (1998) except that *Monroika* and *Brandtika* are not included here. Known specimens in both genera are poorly preserved. The branchial crown and anteri-or peristomial ring collar in both genera have not been adequately characterized to readily discrimi-nate them from other genera (Jones, 1974; Fitz-

hugh, 1992). The undescribed taxon, "Genus A" (*sensu* Fitzhugh, 1989; Rouse and Fitzhugh, 1994), which includes several undescribed species, as well as *Augeneriella dubia* Hartmann-Schröder, 1965, and *A. alata* Hartmann-Schröder, 1991 (cf. *A. du-bia* of Rouse, 1990), are also included.

- 1a. Branchial crown with two pairs of radioles *Manayunkia* Leidy
- b. Branchial crown with three pairs of radioles 2
- 2a. Anterior peristomial ring collar as a low ridge dorsally and laterally, ventrally as a well-de-veloped lobe 3
- b. Anterior peristomial ring collar membranous all around or reduced to a low ridge ... 11
- 3a. Ventral filamentous appendages present ... 4
- b. Ventral filamentous appendages absent ... 7
- 4a. Ventral filamentous appendages nonvascular-ized *Pseudofabricia* Cantone
- b. Ventral filamentous appendages vascularized 5
- 5a. Ventral filamentous appendages branched ...
- b. Ventral filamentous appendages unbranched 6
- 6a. Peristomial and pygidial eyespots black in liv-ing and preserved specimens *Pseudoaugeneriella* Fitzhugh
- b. Peristomial and pygidial eyespots red in living specimens, absent in preserved specimens ... "Genus A"
- 7a. Ventral lips well developed, triangular, and distinct from dorsal radiole 8
- b. Ventral lips as low ridges, fused with proxi-malmost pinnule of dorsal radiole *Novafabricia* Fitzhugh
- 8a. Inferior thoracic neurosetae pseudospatulate in setigers 3–7; branchial lobes adjacent to

- ventral margins of dorsal lips narrow, not extending to crown ventrum 9
- b. Inferior thoracic neurosetae pseudospatulate in setigers 2–8; branchial lobes adjacent to ventral margins of dorsal lips very wide, extending to crown ventrum **Raficiba** n. gen.
- 9a. Manubrium of abdominal uncini at least two times longer than dentate region **Fabricia** Blainville
- b. Manubrium of abdominal uncini same length as dentate region 10
- 10a. Ventral lobe of anterior peristomial ring collar low and triangular **Brifacia** Fitzhugh
- b. Ventral lobe of anterior peristomial ring collar broadly rounded distally, nearly as wide as long **Parafabricia** Fitzhugh
- 11a. Anterior peristomial ring collar membranous 12
- b. Anterior peristomial ring collar reduced to low ridge all around except for conical to elongate lobes on either side of dorsal midline; inferior thoracic neurosetae in setigers 3–8 pseudospatulate **Fabricinuda** Fitzhugh
- 12a. Anterior peristomial ring collar incomplete middorsally; nonvascularized ventral filamentous appendages present **Fabriciola** Friedrich
- b. Anterior peristomial ring collar complete middorsally (some species with collar margin incised or middorsal surface with longitudinal groove); ventral filamentous appendages, when present, are vascularized **Pseudofabriciola** Fitzhugh

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