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A NEW GENUS OF FAUVELIOPSIDAE (ANNELIDA: POLYCHAETA), WITH A REVIEW OF ITS SPECIES AND REDESCRIPTION OF SOME DESCRIBED TAXA

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ABSTRACT

Material collected by the BIOFAR and BIOICE surveys off the Faroe Islands and Iceland contained three species of the polychaete family Fauveliopsidae, one of which represents a new genus. The family is newly reported from Iceland. The family definition is emended and two genera are recognized: *Fauveliopsis* McIntosh, 1922, herein redefined and restricted, and *Laubieriopsis* new genus. *Fauveliopsis* has about 16 species, some of which are described but not named, several of which are incompletely known. *Laubieriopsis* has four named (three currently accepted) species, one of which (*L. brevis* (Hartman, 1965), new combination) appears to be a species complex. *F. cabiochi* Amoureux, 1982 is redescribed and refigured from syntypes and BIOFAR and BIOICE material; a lectotype is designated and the species is transferred to *Laubieriopsis*, new combination, type species by designation herein. A transverse, weltlike genital papilla is present on nearly all specimens at the posterior edge of chaetiger 8, just anterior to the right notochaetae of chaetiger 9. Bidentate chaetae are newly reported for the species and family. All known species of *Laubieriopsis* are free living and have segment constancy. A key is given; the syntypes of *L. hartmanae* (Levenstein, 1970), new combination, have been examined and some figures are provided. The status of the species, usually synonymized with *L. brevis*, is still uncertain. The holotype of *Fauveliopsis challengeriae* McIntosh, 1922, type species of the genus, is redescribed and figured, and the genus is redefined. A genital papilla is present on the posterior edge of chaetiger 11, just anterior to the right chaetae of chaetiger 12. Three transverse, beltlike cuticular thickenings are present ventrally at midlength. Some differences between the holotype and other material identified as *F. challengeriae* are pointed out.

The present material was obtained during the BIOFAR (Benthic Investigations of the Faroes) survey (1987–1990) (Nørrevang, 1992) and the corresponding BIOICE survey in Icelandic waters (1991–1993). Three species of fauveliopsids were present: *Fauveliopsis cabiochi* and two new species that will be described elsewhere. Differences between the three species suggested that two genera might be involved. As descriptions of *F. challengeriae* and *F. olgae* Hartmann-Schröder, 1983, with which one of the new species was confused, lack information about several features, the type material and additional specimens of these species and also five syntypes of *F. cabiochi* were examined, as were the types of *F. hartmani* Levenstein, 1970.

For persons unfamiliar with fauveliopsids, identification to family may be a problem. The family usually cannot be keyed out in Fauchald (1977); because fixed specimens of fauveliopsids usually have the prostomium and peristomium retracted between the first chaetigers, most specimens run into a dead end at couplet 14, although the key works if the prostomium is extended or can be dissected. Because they lack tentacles, anterior threadlike branchiae and head appendages, no fauveliopsids key out to the order Flabelligerida in George and Hartmann-Schröder (1985), in which a key to the families of Flabelligerida is given. The family is also treated by Pettibone (1982) and Wolf (1984), but neither of these very useful works provide keys to families, nor do Uebelacker and

Johnson (1984), Fauchald and Rouse (1997) or Rouse and Fauchald (1997), who review characters of most families of polychaetes in connection with a cladistic analysis of the group.

MATERIALS AND METHODS

Descriptions of the purpose of the BIOFAR survey and the general methods used are given by Nørrevang (1992) and Nørrevang et al. (1994); the latter publication also contains a list of the BIOFAR stations from 1987 to 1990. The hydrography and benthic temperatures in the area are treated by Westerberg (1990).

For examination of surface structures, and especially for figures, worms were lightly stained by placing them in (aqueous) Shirlastain A (see Petersen, 1998) for a few seconds or the stain (not measured) was added to 80% ethanol and the worms were stained in this. Very small specimens were stained in depression slides. As soon as the desired contrast was obtained (observed under a stereomicroscope), specimens were transferred to clean alcohol; larger worms were first placed on filter paper for a few seconds to remove excess stain. The stain is rarely specific for any particular polychaete tissue but temporarily darkens protruding structures, thus making them easier to see. It fades and eventually disappears in alcohol but appears to be permanent when used on preparations that are dehydrated and mounted in media such as Euparal®. In this study it was especially useful for revealing the exact location of interramal papillae and genital papillae (not always easy to see on intact worms), micropapillae, and the shape and extent of the ventral shield. Drawings were made with the aid of a camera lucida. Measurements of the holotype of *Fauveliopsis challengeriae* (Table 1) were made using the ocular micrometer of a stereomicroscope at 8 × 8 magnification; measurements of soft parts (segments, parapodia) were rounded off to nearest 10 μm. Variation in structure of modified aciculars of segments 1–4 (Table 2) was observed under high dry magnification on temporary mounts of intact specimens in alcohol in a depression slide.

TERMINOLOGY AND ABBREVIATIONS FOR STRUCTURES.—Acicular chaetae are referred to as aciculars throughout, parallel to the commonly accepted usage of capillaries for capillary chaetae; no internal aciculae (supporting chaetae) are present. As the first segment after the peristomium is chaetigerous, the terms segment and chaetiger both refer to the same chaetigerous segment.

Abbreviations for the different types of modified chaetae and a few other structures are given in the relevant sections and tables. When present, modified chaetae (see Systematics) of anterior segments are generally larger and conspicuously different in shape from chaetae of the first body segments, where the typical arrangement in each ramus is an outer capillary (c) and an inner sigmoid acicular (A), abbreviated as cA/Ac, with the slash separating notochaetae and neurochaetae, respectively.

Based on chaetation, the anterior region appears to comprise 0 to 4 segments in all known taxa. Some taxa that appear to lack modified chaetae anteriorly are very small or poorly known, so the diagnosis of these may change when more material becomes available. In both genera, some species occasionally have the last anterior segment partly or entirely with chaetation typical of the middle region or the first middle segment with chaetation of the anterior region. If several specimens are available in a sample, the typical condition can usually be determined, but if only one specimen is present, and the abnormal condition is only on one side, both possibilities should be considered possible unless other features indicate otherwise.

cA/Ac has been considered the typical chaetal arrangement in the family for middle and posterior segments, and usually occurs on at least some middle segments in all species. However, as also indicated in the descriptions, e.g., Hartmann-Schröder (1983), in some species of *Fauveliopsis* one or both rami may have multiple chaetae rather than the simple arrangement above, either as (1) occasional accidentals (replacement chaetae?), i.e., the unpredictable occurrence of usually 1–2 extra chaetae, often on a single parapodial ramus, not necessarily on both sides of the animal, or as (2) a normal, predictable arrangment occurring on several adjacent segments. When multiple chaetae are present, they are on middle and/or posterior segments, sometimes preceded by a few transitional segments between segments with cA/Ac and ones with multiple chaetae. In known species of *Laubieriopsis* the middle and posterior segments both have cA/Ac and do not differ in an externally recognizable way, so both here and in *Fauveliopsis* species such as *F. challengeriae* (see redescription), middle and posterior segments should be considered used loosely.

ABBREVIATIONS IN MATERIAL EXAMINED.—A list of BIOFAR stations and information on abbreviations are given in Nørrevang et al. (1994). For BIOICE all numbers are sample numbers, but no list of the BIOICE samples and stations has yet been published. Collecting gear and water masses: Ds = detritus sledge (Sneli), RP = Rothlisberg-Piercy hyperbenthic sledge. For BIOICE, NAW = North Atlantic Water.

Institutions: BMNH = The Natural History Museum, London (NHM); HZM = Hamburg Zoological Museum; IMNH = Icelandic Museum of Natural History, Reykjavík; LACMNH = Los Angeles County Museum of Natural History; MNHNP = Museum National d'Histoire Naturelle, Paris; MNHT = Museum of Natural History, Tórshavn, Faroe Islands; PPSIO = P. P. Shirshov Institute of Oceanology, Moscow; USNM = U.S. National Museum of Natural History, Washington, D.C. (NMNH); ZMUC = Zoological Museum, University of Copenhagen.

Some representative specimens of the BIOFAR and BOICE material are deposited in ZMUC; the remaining material is deposited in MNHT and IMNH, respectively, where the bulk of the identified material will also be kept; a BIOFAR reference collection is stored with the BIOFAR Collections in the Kaldbak Laboratory, FR-180 Kaldbak, Faroe Islands.

SYSTEMATICS

Fauveliopsidae Hartman, 1971, emended

Fauveliopsidae Hartman, 1971: 1411. Fauchald, 1977: 117–118. Pettibone, 1982: 30. Wolf, 1984: 48–1 to 48–3. George and Hartmann-Schröder, 1985: 41. Fauchald and Rouse, 1997: 98. Rouse and Fauchald, 1997: 190. Blake and Petersen, 2000: 31–32.

Diagnosis.—Terebellida sensu Rouse and Fauchald, 1977 with body slender and elongate to fusiform, with or without pronounced segmental limits, usually weakly divided into 2–3 regions recognizable by differences in chaetation. With 0–4(5) anterior segments with modified aciculars. Prostomium and peristomium distinct, without appendages, retractable within anterior segments; peristomium with one annulus. Palps absent. Nuchal organs flat ciliated patches at posterolateral border of prostomium. Pharynx protrusible, unarmed; with ventral muscular pad. Mouth opening in *Fauveliopsis* anchor-shaped, with partly cleft upper lip, entire lower lip, and a large lateral saclike structure on either side; mouth opening in *Laubieriopsis* new genus incompletely known. Cuticle tough, surface variable: smooth, multiannulate or rugose; shiny or dull; with or without conspicuous papillae. Parapodia rudimentary, biramous throughout, with sessile or stalked papilla interramally. Chaetae all simple, may include smooth or convexly hispid sigmoid or falcate aciculars and smooth capillaries. Pygidium terminal, may be retractable within last segments and/or surrounded by papillae. Some, perhaps all, species with one or a pair of genital papillae.

Remarks.—Fauchald and Rouse (1997) could not find evidence for monophyly of the family, pointing out that the interramal papilla, included in Fauchald's (1977) definition of the family, is similar to that of flabelligerids. Their suggestion that Hartman (1971) used this feature to define the famly appears to be an error; she erected the family for ten species in four “flabelligerid-like genera” with the main difference being that members of the four genera lacked the cephalic cage and retractile oral branchiae characteristic of Flabelligeridae. Three of the four originally included genera have since been referred to Polynoidae (*Bruunilla* Hartman, 1971), Acrocirridae (*Flabelligella* Hartman, 1965) and Flotidae (Buzhinskaja, 1996: *Flota* Hartman, 1967). A review of the taxonomic history is given by Blake and Petersen (2000). At present the type genus, *Fauveliopsis* McIntosh, 1922, is the only recognized genus in the family, with about 20 species, several of which are unnamed, four of which are herein referred to the new genus *Laubieriopsis*. The two genera are diagnosed and characterized herein. As some species are incompletely described, their generic affinities are presently uncertain.

According to Fauchald and Rouse (1997), paired palps are present at the corners of the mouth and nuchal organs are ciliated grooves; Rouse and Fauchald (1997: 190) state that “a pair of peristomial grooved palps appear to be present based on descriptions by McIntosh (1922) and Hartman (1971)”, and nuchal organs are present. McIntosh (1922: 5) states “the flattened ventral eminences on each side of the mouth are probably related to the peristomium. Dorsally the anterior margin is rounded but ventrally the two flattened eminences *probably represent the palpi* [italics by MEP], the fissure between them leading apparently to the mouth.”

There are no palps. Hartman’s (1971) implication that palps were present appears to be based either on *Flabelligella*, now excluded, or, more likely, on the above-cited suggestion by McIntosh (1922), as Hartman (1971: 1411) keyed out *Flabelligella* and *Fauveliopsis* as (in part) having “Palpi retractile into the oral cavity”, probably using her own observations on *Flabelligella* and McIntosh’s statement on *Fauveliopsis*. Later, based upon dissection of a fauveliopsid from ELTANIN sta. 1668 in the Pacific Ocean near or in the Amundsen Sea, Hartman (1978: 176) stated “Branchiae, palpi, and other cephalic structures are absent [in fauveliopsids].” This has since been confirmed by Riser (1987), Purschke and Tzetlin (1996) and Purschke (1997, based on unpublished observations by Westheide and Langhage), and by me during examination of the holotype of *F. challengeriae* (Fig. 1A–D,G–H), and specimens of several other species where the prostomium was extended, including some examined by Hartman (see Remarks under redescription of *F. challengeriae*) and two in the new genus.

Similarly, the nuchal organs are prominent but appear to be flat patches of cilia, and not ciliated grooves. Purschke (1997: fig. 2L) gives a beautiful SEM photo of the extended prostomium in a specimen of *Fauveliopsis* near *adriatica* (not *F.* cf. *adriatica* of Katzmann and Laubier, 1974), and I have observed a very similar arrangement in one of the new species of *Fauveliopsis* from the Faroes and in species of the new genus.

Fauchald and Rouse (1997: 98) state that “The larger chaetae might be called spines, but do not differ structurally from the slender capillaries present, and chaetae transitional in size are present.” Rouse and Fauchald (1997: 190) simply state “Capillary chaetae are present.” I agree that the basic structure of these chaetae is very similar, and that transitional forms occur, but this does not take into account that the typical sigmoid body aciculars fit the definition of hooks in Fauchald and Rouse (1997: 88: “Hooks are thick, distally curved chaetae. They may be falcate or dentate and have various forms of guards or hoods. Simple, falcate unprotected hooks are present in…a few polychaete groups”), as do the anterior aciculars, which may be strongly modified in some species presently assigned to *Fauveliopsis* and blunt-tipped and/or more or less bidentate in the new genus; moreover, also strongly modified posterior aciculars may occur, as in *Fauveliopsis armata*

Fauchald and Hancock, 1981, where the posterior aciculars are not only unusually large but also blunt-tipped and strongly hooked. To call such chaetae capillary is misleading and serves no practical purpose. Moreover, the distinction between capillaries and spines (aciculars) has traditionally been a relative concept. What is clearly an acicular in a very tiny specimen might well be considered a capillary in a larger one, but by retaining the current usage one is made aware of two visibly different shapes/sizes of chaetae, often alternating, usually in the same parapodium. The distinction is therefore maintained herein.

An interramal papilla (IRP) between the notochaetae and neurochaetae is a characteristic feature of the family. In anterior segments it is located midway between the two rami, whereas in posterior segments it becomes smaller and more dorsal and is usually associated with the notopodium. Differences in shape (see key to genera) appear to be of generic value.

One or less commonly a pair of genital papillae (GP) occurs in both sexes of most species although Riser (1987: 215) found a pair of GP in males (but none in females) of nontype material identified by Hartman (Hartman and Fauchald, 1971, WHOI station AII-73, close to the type locality) as *Fauveliopsis brevis*. In many *Fauveliopsis* species the GP appears to arise in direct association with the right parapodium (or both parapodia if a pair) of the following segment (e.g., Fig. 1D,G), whereas in the two species of *Laubieriopsis* seen by me, the (retracted) papilla is visible as a small, transversely oval welt or blisterlike structure slightly anterior to the posterior segmental boundary and slightly dorsal to the notochaetae of the following segment (Fig. 2G,K). In most fauveliopsids examined the GP has been retracted, but in the holotype of *F. glabra* (Hartman, 1960) it is extended (Blake and Petersen, 2000: fig. 3.3A).

I have chosen to recognize 1–3 body regions in fauveliopsids as a practical feature that may prove useful in separating similar species by providing distinct or diffuse landmarks, depending on amount of variation and whether the change is abrupt or with transitional segments. In all but the smallest species of both genera, chaetation of the anteriormost segments is conspicuously different from that of the adjacent middle or middle/posterior region, where cA/Ac is the rule unless a transitional segment is present on one or both sides. In both genera cA/Ac may continue throughout the rest of the body (then = middle/posterior region), but in some species of *Fauveliopsis* there may be a third, posterior, region with multiple chaetae in neuropodia or also in notopodia.

Up to now, most workers have been strongly influenced by the fact that some of the first-described species have segment constancy, and have used the number of segments as a simple objective way to separate species, or to synonymize them (see Remarks under *L. brevis* complex). This approach may work in a limited geographical area, but it is not likely to be dependable worldwide, as also suggested by several conflicting descriptions of what are reported as the same species.

Characters of use in separating genera are given in the key below; expression of the generic characters (size, shape, number, etc.), alone or in combination with other characters, is of value in defining species. To specific characters can be added the location and number of genital papillae (one or a pair), which appear to be invariate in some species and variable in others (overlooked before the work of Riser, 1987, this structure is only mentioned in few descriptions, so for most species the variation is not yet defined); relative length and proportion of anterior body segments, at least in *Fauveliopsis* (see Remarks under *F. challengeriae*), and shape and position of the parapodia—whether or not the ventral portion is visible ventrally.

KEY TO GENERA OF FAUVELIOPSIDAE

1a. Body elongate to fusiform or club-shaped, often swollen posteriorly; number of segments usually variable. Cuticle dull, opaque, multiannulate or rugose, often with minute papillae. Modified aciculars falcate, dissimilar, or absent(?); middle and sometimes posterior segments with cA/Ac, or with multiple chaetae ventrally (middle segments) or in both rami (posterior segments). IRP prominent at least anteriorly, usually long-stalked. Posteriormost segments conspicuously smaller than preceding ones, chaetae fewer and smaller; last segment not bilobed. with or without a ventral shield. Often in shells of molluscs or tubular tests of foraminiferans .... *Fauveliopsis*

1b. Body linear; with fixed number of segments in adults. Cuticle shiny, smooth, without conspicuous surface papillae. Modified aciculars weakly sigmoid, of similar thickness, may include bidentate forms; middle and posterior segments with cA/Ac. IRP inconspicuous throughout, usually short-stalked or sessile. Posteriormost segments similar in size to preceding ones; last segment bilobed, aciculars often elongated. Without a ventral shield. Free living? .... *Laubieriopsis*, new genus

Fauveliopsis McIntosh, 1922, restricted

Type species.—*Fauveliopsis challengeriae* McIntosh, 1922, by monotypy.
Synonyms: *Brada* of authors, not Stimpson, 1853.

Extended Diagnosis.—Fauveliopsids with bodies short, comma-shaped to elongate, usually somewhat inflated in middle or towards posterior end, tapering posteriorly, with last segments rudimentary and conspicuously smaller than preceding ones. Adults with 10 to about 90 segments. Body weakly divided into two or three regions recognizable by features of segments and chaetae, or without discernible regions. Segmental boundaries distinct at least ventrally throughout anterior and middle regions, may be less so posteriorly. Cuticle dull, often transversely wrinkled (rugose) or multiannulate, opaque anteriorly, often transparent posteriorly, with one or more types of papillae; some species with cuticular ventral shield in middle and/or posterior segments. Prostomium smooth, bluntly conical, with or without eyespots; pair of densely ciliated nuchal organs as flat patch (not grooved) on either side of prostomium; upper lip bilobed, lower lip entire, between the two a membranous saclike (not flaplike) structure on either side, arising inside mouth and fused to lateral portions of mouth opening, meeting but not joined midventrally; mouth opening anchor-shaped. Peristomium fused to prostomium, finely ciliated, resembling a velvety ring when viewed under a stereomicroscope. Interramal papillae mostly stalked, conspicuous, well developed anteriorly, smaller posteriorly. Chaetae include weakly or strongly curved falcate aciculars; curved, smooth or convexly hispid sigmoid aciculars (*Fauveliopsis* sp. A of Wolf, 1984; perhaps hirsute, material not seen); and slender, limbate pointed chaetae (capillaries or very slender aciculars). Genital papilla in some (all?) species. Pygidium inconspicuous, with or without papillae, not retractable(?).

Habitat.—When known, in gastropod or scaphopod shells or tubular tests of foraminiferans.

Remarks.—*Fauveliopsis* is herein restricted as outlined above and in the key; four other named taxa plus several variants of them that may be distinct are referred to *Laubieriopsis* new genus. Several species of *Fauveliopsis*, including the type species, are incompletely known and more material needs to be examined before generic affinity of the other species can be ascertained.

Fauveliopsis is similar to *Laubieriopsis* new genus but differs from it as indicated in the key to genera. Apomorphies appear to include a finely rugose or multiannulate cuticle with minute surface papillae and in some species, a variously shaped, thickened cuticular ventral shield, perhaps a feature associated with the habit of most species of inhabiting the tests of tubular foraminiferans (e.g., *F. challengeriae*, Fig. 1B,D; *F. olgae*, Fig. 1E–F) or empty shells of gastropods or scaphopods. The beltlike cuticular thickenings on the holotype of the type species are considered an apomorphy for this species, and not typical of the genus as a whole. Use of the term 'ventral shield' is not meant to imply homology with the similar structure in Sternaspidae, but to provide a descriptive term for a feature observed on many species of this genus.

Although many polychaetes are known to be commensals or occasionally to utilize empty shells as a habitat, the apparent regularity with which many (all?) species of *Fauveliopsis* inhabit shells or foraminiferan tests as a habitat appears to be unique among the polychaetes.

Other easily observed characters are anterior segments with aciculars falcate and of two different sizes per ramus, neuroaciculars directed ventrally and at least in several species, the presence of a ventral shield.

A few probable members of this genus have been reported to be inflated anteriorly rather than posteriorly (e.g., *F. scabra* Hartman and Fauchald, 1971, *F. arabica* Hartman, 1975). Examination of material and the available information in the literature shows that the orientation of these species has been misinterpreted. Hartmann-Schröder's (1975) figure of the supposed posterior end of *F. scabra* is in fact a figure of the anterior end of one of the new BIOFAR species, and new material from the Andaman Sea (DANIDA-PMBC BIOSHELF Project) shows that also the 'anterior' end of *F. arabica* figured by Hartman (1975: fig. 12a,b) must be a misinterpreted posterior end (MEP, in prep.).

About 16–17 taxa appear to be referable to *Fauveliopsis*, but several of these need to be reexamined. None appear to belong to *Laubieriopsis*. The most recently described species, *F. jameoaquensis* Nuñez, 1997, from a lagoon on the Canary Islands, is not quite typical. It is described as having a brownish cuticle covered with sediment, suggesting the presence of minute surface papillae even though none were obvious (Nuñez, 1997). The species is minute (0.8–1.3 mm long) and all 4 specimens found had 10 chaetigers; what appeared to be sexual products were present in chaetigers 6–9. The generic status is presently uncertain.

Fauveliopsis challengeriae McIntosh, 1922, emended
(Fig. 1A–D, G–H, Table 1)

Fauveliopsis challengeriae McIntosh, 1922: 5–7, pls. I: figs. 7–8, II: figs. 1–8, III: fig. 2. Hartman, 1966: 33–35, 141, pl. IX: figs. 7–10; 1967: 123–124; 1971: 1422; 1975: 236. Levenstein, 1970: 227–228, figs. 1, 3; 1971/72: 173, fig. 1, 178 ff. Hartman and Fauchald, 1971: 114–115. Fauchald, 1972a: 101; 1972b: 221. Katzmann and Laubier, 1974: 540. Fauchald and Hancock, 1981: 38. Amoureux, 1982: 192. Hartmann-Schröder, 1983: 173. Wolf, 1984: 48-1, 48-3. Blake and Petersen, 2000: 33.

Type Material Examined.—Antarctic Seas: Southern Indian Ocean: Midway between Australia and Antarctica, CHALLENGER sta. 157, 53º55′S, 108º35′E, 1950 fms (3569 m), diatomaceous ooze, [in tubular test of sand-agglutinating foraminiferan, perhaps *Rhabdammina* sp.], 3 Mar. 1874 (Holotype, BMNH.1921.3.1.4580).

Other Material Examined [identified as F. challengeriae*].*—Antarctic Seas: Southeast Pacific Basin: 63º53′S, 109º39′W, ELTANIN Cruise, sta. 1668, 27–28 Apr. 1966, 4930–4963 m, [in tubular tests of foraminiferans, perhaps *Bathysiphon* sp.], ident. Olga Hartman (4 spec. [3 on vial label], USNM 56703; 1 spec. with eyespots in LACMNH [not seen]).—Southwest Atlantic Ocean: Weddell Sea, USCGC GLACIER, Cruise 2, sta. 22: 73º28.4′S, 30º26.9′W, 3111 m, [in tubular tests of sand-agglutinating foraminiferans, perhaps *Rhabdammina* sp.], 13 Mar. 1969, coll. J. S. Rankin, ident. Olga Hartman (13 spec. [12 on vial label], USNM 46834).

Diagnosis.—A *Fauveliopsis* with 3 (or 4?) anterior segments (not 5 as claimed by McIntosh, 1922) with falcate modified neurochaetae; genital papilla at right posterior edge of segment 11, just anterior to notochaetae of segment 12; ventral shield as 3 beltlike ventral thickenings at midbody (chaetigers 14–16 in holotype); parapodia of middle and posterior regions with 1 capillary + 1 acicular per ramus (cA/AC) except for accidentals, parapodia 10–16 wider than long, with pointed ventral ends of neuropodia visible ventrally.

Redescription of Holotype.—The holotype is shown in Figure 1. It is complete except as described below and presently 15.1 mm long and 1.7 mm wide at segment 15 (greatest width, = midlength, see Fig. 1D; same segment 1.3 mm wide in lateral view), with 39–40 chaetigers (17 mm long, with 33 chaetigers according to McIntosh, 1922; difference probably because of shrinkage in alcohol over time and overlooking some of the last posterior segments). Anterior end damaged, with left side removed during earlier dissection and most chaetae of right side broken; however, there appear to be only three segments with modified chaetae, or at most four. Two remaining neurochaetae of segment 1 slender and falcate (Fig. 1A,C,H), of similar length but with upper neurochaeta slightly wider than lower one; broken bases of two more neurochaetae suggest a second pair similar to those remaining. Except for the curved tip of an emerging neurochaeta in segments 2 and 4, all other chaetae of segments 1–4 are broken and crystals have formed between the chaetal rami, making it difficult to see the interramal papilla, which is only clear on segment 4 (Fig. 1A, arrow). Segments 5–39/40 with cA/Ac except for a few segments with accidentals (or replacement chaetae; Table 1). Nothing suggests that multiple chaetae are a standard feature of this species.

The basic shape of the body is in good agreement with the figures given by McIntosh (1922), but he did not show the parapodia, and the cuticle is not smooth and shiny, but dull and minutely rugose. Moreover, the segments after 16 are not clearly defined ventrally (shown as such by McIntosh, 1922). Table 1 summarizes counts and measurements of features of parapodia and chaetae. The total length from segments here is 12.5 mm, thus slightly shorter than the 15.1 mm given above, but the last 8–9 segments were not measured, and because of various folds and irregularities, lengths were not always completely accurate. The measurements are included to show the general trends in segment length and parapodial proportions throughout the body, which are different from those of at least some material reported by Hartman (1978, see below).

Parapodia vary in location, shape and discernibility throughout the body. They are lateral through segment 14, becoming dorsolateral from 15–16. They are transversely elon-

Table 1. *Fauveliopsis challengeriae* McIntosh, 1922. Meristics of holotype; counts and measurements of right side (left side damaged, see Fig. 1).

Right side:		Approximate segment:			Parapodia:		Length of body chaetae:			
Seg. No.	Chaetae: No/Ne	Length µm	No. of annuli Lateral	Ventral	Length µm	Width µm	NoC µm	NoA µm	NeA µm	NeC µm
1	oO/fFOO	Segs.	-	-	-	-	—	—	Figs.	—
2	oO/Ofo	1–5	-	-	-	-	—	—	—	—
3	oO/Oo	=	-	-	-	-	—	—	—	—
4	oO/Ofo	1,480	-	-	-	-	—	—	—	—
5	?/Ac	total	-	-	-	-	—	—	foreshortened	
6	cA/Ac	510	10	22	150	450	306	255	238	357
7	cA/Ac	680	12	24	220	560/650	(torn)	(torn)	255	408
8	cA/Ac	760	12 ?	26	260	750	357	323	289	459
9	cA/Ac	650	11	22 ?	290	940	391	306	272	459
10	cAcA/Ac	510	5	12	340	720	340 *	*187* *	289	—
11**GP**	cA/Ac	420	7	11–12	260	780	340	255	255	—
12	cA/none	370	7	10	200	870	357	—	none	none
13	cA/Ac	340	5 ?	-	220	940	306	—	(187)	(340)
14	cA/Ac	340	5	-	220	990	340	204	170	255
15	cA/Ac	340	4 ?	-	220	870	—	170	136	*204*
16	cA/Ac	360	6 ?	-	200	680	(255)	170	119	*187*
17	cA/Ac	420	5 ?	-	220	460	238	170	—	—
18	cA/Ac	420	4 ?	-	200	340	—	170	170	239
19	cA/Ac	420	-	-	270	340	—	—	—	—
20	cA/Ac	480	-	-	-	220	—	—	—	—
21	cA/AcAc	510	-	-	-	170	—	—	—	—
22	cA/Ac	420	-	-	-	170	—	—	—	—
23	cA/AcAc	480	-	-	-	140	238	170	187 *	272 *
24	cA/Ac	410	-	-	-	100	238	221	170	255
25	cA/Ac	420	-	-	-	-	—	—	—	—
26	cA/Ac	260	-	-	-	-	—	—	—	—
27	cA/Ac	320	-	-	-	-	255	170	119	255
28	cA/Ac	290	-	-	-	-	none	170	136	340
29	cA/Ac	200	-	-	-	-	—	—	—	—
30	cA/Ac	340	-	-	-	-	—	—	—	—
31	cA/Ac	340	-	-	-	-	?	170	170	?
32–39 or 40: all appear to be with cA/Ac (see Fig. 1)										

Measurements made in situ under stereomicroscope using 8 × 8 magnification. Columns 4–7 (segments and parapodia): short dash (-) = irrelevant, or accurate counts or measurements not possible; columns 8–11 (chaetae): long dash (—) = chaetae broken at base; **italics** = tips of chaetae broken, measurement thus less than for an intact chaeta; and * = 2 or more chaetae of this kind (see column 2). Segments 1–4: **F, f** = intact thick (F) or thin (f) falcate chaeta; **o, O** = broken slender (o) or thick (O) chaeta, latter usually 2× as large as smaller one (o); in rest of body basic arrangement is **cA/Ac** (see text). **Segment lengths** were measured at level where bases of chaetae emerge, as segmental boundaries disappear in posterior region. **Annuli** were counted both midventrally and midlaterally on right side; counts are as accurate as possible but should be considered approximate, as limits of annuli are not always clear; they are not countable in posterior segments. **Lozenge-shaped parapodia** (start on chaetiger 6?—condition on 5 not clear because of poor condition of specimen): **length** = anterior-posterior measure at neurochaetae, **width** = dorsoventral measure (= longest dimension), **GP** = genital papilla, **ne** = neuropodial, **no** = notopodial.

Remarks.—Segment 9: J-shaped tear in body.—Segments 13 NeA+c and 16 NoA foreshortened.—Segments 13–14: Split in body.—Segments 18 and 28: NoA heavier than usual.—Segments 22–23 and 26–27: Slight transverse fold between 22–23, and 26–27, lengths 22 and 26 thus a bit too short.—Segments 32–39 or 40: segments gradually become shorter, but not measureable; chaetae not measurable.

gate, more or less pointed ventrally (Fig. 1B,D,G), somewhat less so dorsally, with a sharply delimited posterior edge; the ventral part is visible ventrally on segments 10–16, after which parapodial limits become more diffuse again. Width (Table 1, Fig. 1G) is usually twice or more the length.

Genital papilla appearing as transverse, obtusely triangular, fold at right posterior edge of segment 11, just anterior to right parapodium 12 (Fig. 1D, arrow; G). Neurochaetae are absent in right parapodium 12 (no detectable stubs of broken chaetae), but this is probably an anomaly.

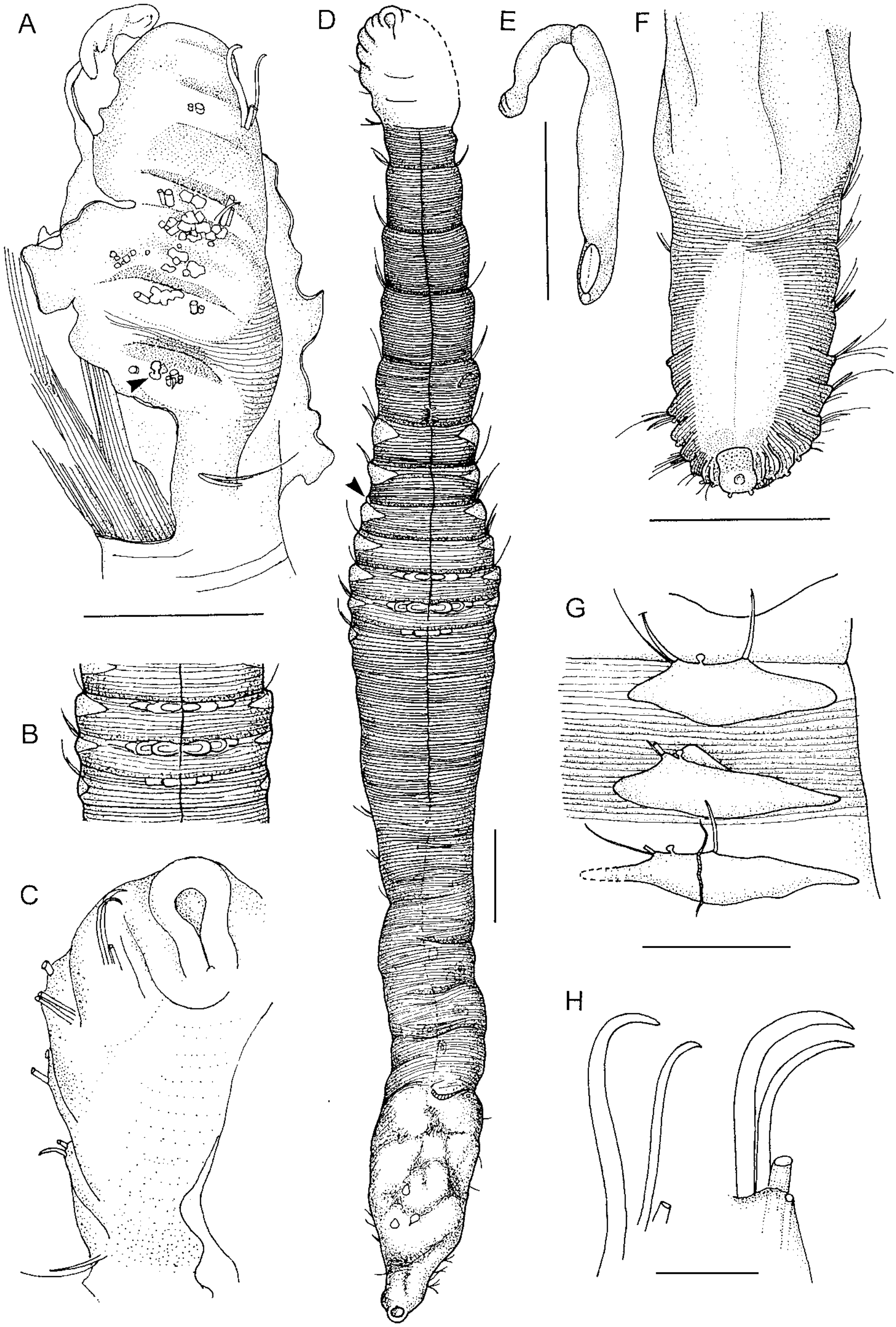
Ventral shield(?) present as three beltlike ventral bands on segments 14–16 (Fig. 1B,D).

Remarks.—Hartman (1967: 124; 1978: 175–176, 212, fig. 2a–b) has reported *F. challengeriae* from several Antarctic localities (1967: Cape Horn, Drake Passage; 1978: Weddell Sea, SE Pacific Basin), but the two USNM samples seen by me, chosen because they contained several specimens and thus could help to define variation, almost certainly belong to one or more other species and not to *F. challengeriae*. The specimens agree in having falcate modified chaetae, and in size and number of segments (18–24 mm long, 1–1.3 mm wide, 36–41 segments in 3 complete spec. in USNM 56703; 10.1–13.4 mm long, 0.7–1.15 mm wide, 34–37 segments in 6 of 11 specimens (5 still in foram tests, not removed) + 2 anterior ends in USNM 46834) (both Hartman and McIntosh overlooked some of the most posterior segments), but differ (1) in location of the genital papilla (on segments 10 (6 spec.), 12 (1 spec.), or 13 (1 spec.) in USNM 46834 (5 spec. not removed from foraminiferan tests) or 10 (2 spec.) or 16 (2 spec.) in USNM 56703, but not on 11 as in *F. challengeriae*), (2) in lacking the beltlike ventral shield of *F. challengeriae*, (3) in position and shape of the parapodia (ventral part visible ventrally, parapodial 'lozenge' wider than long throughout and ventrally pointed in *F. challengeriae*; parapodia not visible ventrally, often longer than wide in posterior segments, and usually not pointed ventrally in other material), (4) in having segments short and of similar length throughout rather than anterior body segments being conspicuously longer than those at midlength as in *F. challengeriae* (Fig. 1C), and (5) in having multiple chaetae posteriorly (USNM 46834), rather than cA/Ac throughout as in *F. challengeriae*; USNM 56703 may be something else.

The location of the genital papilla (1) appears to vary intraspecifically in *Fauveliopsis* (MEP, unpublished), and the beltlike ventral shield (2) may be an artifact—this type of shield has only been seen on the holotype of *F. challengeriae* and not on any other spe-

Figure 1. A–D, G–H *(opposite page). Fauveliopsis challengeriae* McIntosh, 1922. Holotype. A, C. Right lateral and ventral views of anterior end, showing two falcate neurochaetae on chaetiger 1 and broken remains of chaetae on chaetigers 2–4 (see Table 1). An interramal papilla (IRP, arrow) is visible on chaetiger 4 in A; chaetiger 5 has normal complement ventrally, but notochaetae are lost. White crystals have formed on the surface; torn longitudinal muscle fibers are seen at left. D. Ventral view of entire specimen, left side of head damaged. Genital papilla (GP, arrow) at right posterior edge of chaetiger 11, just above right parapodium 12; ventral shield(?) on chaetigers 14–16; enlarged detail in B. Segmental limits disappear ventrally soon after midlength. G. Right lateral view of parapodia 11–13, showing transversely elongate shape, IRP, and GP behind right parapodium 12 (but associated with segment 11). Right parapodium 13 torn. H. Two right neurochaetae of segment 1 in two slightly different views; bases of two broken chaetae visible in view at right.—E–F. *Fauveliopsis olgae* Hartmann-Schröder, 1982 (complete paratype, 28 segments, BMNH 1982.38). E. Outline of entire specimen in left lateroventral view, showing location of ventral shield (chaetae omitted). F. Detail of posterior end in ventral view showing smooth ventral shield, multiannulate cuticle, multiple chaetae in posterior segments, and pygidium.

Scales: A,C,G = 0.5 mm; D,F = 1 mm; E = 5 mm; H = 100 μm.


A
D
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cies. However, its symmetry, its location at the broadest part of the body (and thus the area most likely to be in contact with the test), and its good condition suggest that it is a normal feature and not an artifact. Features 3–5, however, are extremely constant on the examined material identified by Hartman and would appear to be of specific value. Whether the holotype has (or has had!) eyespots probably cannot be determined because of the very damaged condition of the anterior end.

Distribution.—Based on material examined, with certainty still only known from type locality: Midway between Australia and Antarctica, 53º55′S, 108º35′E, 3569 m.

Laubieriopsis new genus

Type species.—*Fauveliopsis cabiochi* Amoureux, 1982, by designation herein.
Synonyms: *Fauveliopsis* of authors (part), not McIntosh, 1922; *Brada* of authors, not Stimpson, 1853.

Diagnosis.—Fauveliopsids with body relatively short, linear, of similar width throughout, weakly divided into two regions recognizable by features of segments and chaetae. Epithelium smooth, iridescent, mostly without papillae, or papillae minute and inconspicuous except for a few around anus. Segments weakly defined externally; parapodial lobes absent, chaetae emerging from low welts or directly from body wall. Interramal papillae small, mostly sessile and inconspicuous. Chaetae include weakly curved uni- or bidentate (in small specimens) aciculars, sigmoid aciculars and slender, flattened, smooth, pointed chaetae (capillaries). Last segment well developed, similar in size to preceding ones, bilobed in dorsal and ventral views, often with elongated chaetae and a few papillae. Pygidium usually recessed within last chaetiger. Habitat: Appears to be free living. Gender: Feminine.

Remarks.—Apomorphies for the genus appear to include an invariate number of segments (16, 21 or 25); bidentate, weakly sigmoid modified aciculars in four anterior segments; only two chaetae per ramus (cA/Ac) in all body segments; a last segment as large as the preceding one, rather than smaller, as in *Fauveliopsis* and most other polychaetes; and an anal opening that is usually retracted within the last segments.

Both *Fauveliopsis* and *Laubieriopsis* can completely retract the anterior end, which is only rarely everted in fixed material, but only *Laubieriopsis* appears to retract the pygidium as well.

Bidentate anterior modified aciculars have not previously been reported for any fauveliopsids or for the closely related family Flabelligeridae. The most obvious differences between the two genera are the linear rather than swollen body; the smooth and shiny rather than dull, often rugose or papillate cuticle; and the bilobed rather than tapering posterior end, with the last few segments as long as preceding ones rather than markedly smaller.

For summary of information on accepted species of *Laubieriopsis*, main characters, and points in need of further clarification, see Key (below). Better information on the number and kind of chaetae of the anterior chaetigers is needed for most species.

Etymology.—The genus is named in honor of Professor Lucien Laubier, Station Marine d’Endoume, Centre d’Oceanologie de Marseille, in recognition of his many careful contributions to polychaete taxonomy, including studies on some of the fauveliopsids here referred to this genus.

Laubieriopsis cabiochi (Amoureux, 1982), new combination
(Fig. 2A–K, N–P, Tables 2–3)

Fauveliopsis cabiochi Amoureux, 1982: 192–194, fig. 3. Blake and Petersen, 2000: 34.

Type Material Examined.—Northeast North Atlantic: Continental slope S of Ireland: THALASSA 1973, sta. Z 457, [Bocal A 884], 48°38′2″N, 9°52′06″W, 800 m, soft mud + compact lumps (5 of 38 syntypes, MNHNP AS 417; Lectotype: AS 417a + 4 examined paralectotypes: AS 417b).

Other Material Examined.—Northeast North Atlantic: Faroe Islands: BIOFAR sta. 516, 60°40.05′N, 11°40.56′W, 914 m, gravel, 26 Jul. 1989, Ds, 6.70 ± 0.40°C, 35.20‰ S, AW+AI, velocity −1.00 (2 spec., ZMUC POL-831).—BIOFAR sta. 736, 61°17.06′N, 10°32.07′W, 1157 m, silt+clay, 30 Sep. 1990, Ds, 6.50 ± 0.30°C, 35.20‰ S, AW, velocity −1.00 (2 spec., ZMUC POL-832).—BIOFAR sta. 775, 62°12.7′N, 4°15.9′W, 287 m, sand+sponge spicules, 8 Oct. 1990, Ds, 6.30 ± 2.20°C, 35.20‰ S, AW, velocity 27.12 (10 spec., ZMUC POL-833+ NHMT).

Iceland: BIOICE 2219, 64º12.57′N, 25º16.78′W, 265 m, (no sediment information), 3 Sep. 1992, RP sledge, 6.4ºC, 35.1‰S, NAW (3+2 spec., ZMUC Pol-834 + IMNH). BOICE 2268, 63º09.05′N, 25º11.70′W, 450 m, (no sediment information), 8 Sep. 1992, RP sledge, 6.8ºC, 35.1 ‰ S, NAW (6 spec., IMNH + ZMUC Pol-835).—BIOICE 2303, 63º03.88′N, 22º41.22′W, 600 m, muddy sand, 10 Sep. 1992, RP sledge, 6.8ºC, 35.1‰S, NAW (1 spec., IMNH).

Diagnosis.—*Laubieriopsis* with 21 segments; modified aciculars of segments 1–4 more or less bidentate in all but largest and smallest specimens; weltlike genital papilla on right side, at posterior edge of segment 8, just anterior to notochaetae of segment 9; posterior end bilobed, with 4 small papillae; aciculars + capillaries of segment 21 extending beyond end of body.

Description.—All examined BIOFAR and BIOICE specimens complete, in good agreement with 5 examined types. Lectotype (MNHNP 417a, Fig. 2C–E) a female with oocytes, 7.3 mm long; widths in dorsal view: segments 2–3: 0.43 mm; segment 5 (= narrow area behind anterior segments): 0.37 mm; 11: 0.7 mm (= greatest width); 19: 0.43 mm; 20: 0.38 mm; 21: 0.26 mm. Other specimens with body 1.5–9.2 mm long (3–8 mm in Amoureux's material, 5.9–6.8 mm long in 4 examined paralectotypes; 9.2 mm specimen from BIOFAR sta. 516, not in Table 2 as most chaetae of segments 1–4 broken), 0.3–0.5 mm wide at segment 5, 0.3–0.6 mm wide at greatest width (usually segments 10–13); all but smallest specimens with 21 segments; 3 smallest worms 1.5 mm long, with 13–15 segments (Table 2).

Body slender, without obvious regionation except for segments 1–4, which usually form an oval unit distinct from rest of body; without visible internal septa when viewed as whole mounts (Fig. 2G), with or without regular segmental annulations depending on degree of contraction. Epithelium smooth, shiny to iridescent, translucent, without visible papillae under low (64×) magnification, a few conical micropapillae (c. 3–4 µm broad at base, 8 µm long) visible on anterior and posterior segments (Fig. 2N–P) under higher magnification. Ventral nerve cord visible by transparency; most anterior portion inverted-triangular in shape and granular in appearance, beginning posterior to aciculars of segment 1, thereafter as series of irregularly rectangular whitish areas with few or no granules (Fig. 2B).

Prostomium retracted on all but one 2.8 mm-long specimen (BIOFAR sta. 775-3), where it is small, rounded, without visible ciliation or appendages, and surrounded by one achaetous peristomial ring (Fig. 2A–B). If visible, nuchal organs were not recognized as such. The prostomium does not seem to be completely everted, but it was not possible to see further details without risk of damaging the specimen.

Parapodia biramous and lateral throughout, best developed and present as lateral transverse welts in segments 1–4, inconspicuous in middle and posterior segments. Chaetae emerging from anterior part of anterior segments, posterior part of posterior ones.

Chaetae of 3 basic types: elongated pale to yellowish, fairly straight sigmoid aciculars (SA, segments 1–4); and short curved SA + fine smooth capillaries (segments 5–21).

Segments 1–3 with 4 (occasionally 3 or 5) pale to yellowish sigmoid aciculars per ramus, without capillaries. Noto- and neuroaciculars similar, usually 2 longer + 2 shorter per ramus, held close to one another and forming a compact bunch (Fig. 2A–D,G–J,O), neuroaciculars of segments 2 and 3 sometimes slightly twisted anteroventrally. Distal sculpture of aciculars variable (Fig. 2H–J, Table 2), with at least some aciculars of one or both rami more or less bifid distally (Fig. 2H–J) in all but largest two specimens (8.7 and 9.2 mm long, BIOFAR sta. 516), where they are blunt (Fig. 2O), as also shown by Amoureux (1982: fig. 3:2); more strongly bifid forms more common among shorter notoaciculars but not limited to these. A weak bidentation also present in lectotype and 3 of 4 examined paralectotypes.

Segment 4 transitional, without capillaries, either with 3–4 SA in both rami of both sides, as in segments 1–3, or asymmetrical, with notopodium of one or both sides with 1 short stout SA approaching type in segments 5–21 and 1 more slender SA, often intermediate between an acicular and a capillary (4–5 BIOFAR specimens, at least 3 of 5 types, viewed in toto, thus uncertainty).

Figure 2. A–K, N–P *(opposite page). Laubieriopsis cabiochi* (Amoureux, 1982), new genus, new combination. See Table 2 for additional details. A–B. Right lateral (A) and ventral (B) views of specimen with bidentate modified aciculars and partly extruded anterior end (BIOFAR 775-3); interramal papillae (IRP) visible in A as small circles between noto- and neuropodia. C–E. Lectotype. Right lateral (C) and frontal (D) views, showing partly extruded anterior end. E. Outline of entire specimen, anterior part in dorsal view, posterior part in ventral view. F. Left parapodium 18 showing dorsal location of IRP in posterior segments (BIOFAR 775-7). G–J. Dorsal view (G) and details of 5.9 mm female with oocytes, genital papilla (arrow), and bidentate aciculars on segments 1–4 (BIOFAR 775-10); H = strongly dentate right notochaetae and IRP of segment 1; I–J = weakly dentate and entire right neurochaetae of segments 3–4, respectively. K. Segments 8–10, right side showing genital papilla on posterior edge of segment 8, above notochaetae of segment 9, not to scale. N. Posterior end, ventral view, of female from BIOFAR 775-9; note capillaries (arrow) in segment 21. O–P. Anterior end dorsal view (O) and posterior end ventral view (P) of 8.7 mm female from BIOFAR 516; anterior modified aciculars are blunt-tipped, segment 21 has capillaries in addition to aciculars, and anal opening is surrounded by distinct papillae.—L–M. *Laubieriopsis hartmanae* (Levenstein, 1970), new combination, from Vitiaz sta. 5608, Kurile-Kamchatka Trench, 6835 m. L. Outline of entire specimen, 8.12 mm long, 0.68 mm at midlength, to show general shape (compare with E). M. Anterior end of same, prostomium partly extended, nuchal organs visible as dense patches of cilia, mouth obscured by sediment.

Scales: A–B, N–O = 250 μm; C–D,G = 0.5 mm; E, L = 1.4 mm; F = 50 μm, H–J = 25 μm; M = 110 μm, P = 100 mm.

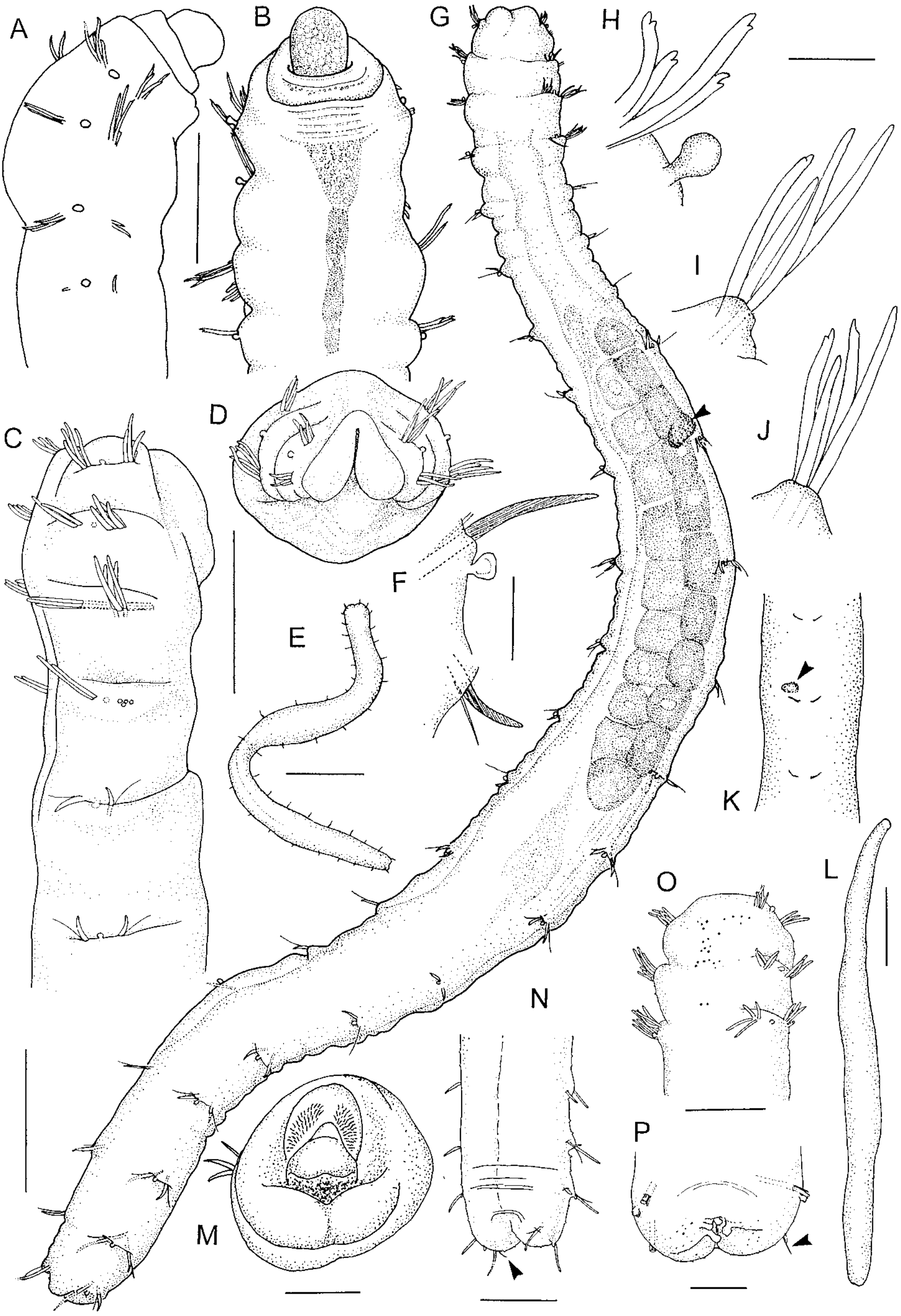
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Table 2. *Laubieriopsis cabiochi* (Amoureux, 1982), new genus, new combination, from S of Ireland (5 syntypes, MNHNP AS 417: lectotype = 417a; examined paralectotypes 1–4 = 417b), the Faroe Islands (BIOFAR, "BF"), and Icelandic waters (BIOICE, "BI"). Intraspecific variation in structure and distribution of aciculars on left (L) and right (R) sides of segments 1–4. For BIOICE and BIOFAR material, types and numbers of chaetae in R and L noto- and neuropodia are summed, with range if different numbers on R and L.

Locality	Sex	GP	Length × width (mm)	Segment 1	Segment 2	Segment 3	Segment 4
S of Ireland (types)							
Lectotype	F	+	7.3	L: 2b2e/4e R: 1b3e/4e	L: 2B2e/4e R: 2B2e/4e	L: 1B?3e/4e R: 4e/4e	L: **1A1e**/4e R: 4e/3e1x
Paralectotype 1	?	+	c. 6.8	L: 2x/4e R: 3e?/?	L: 1x3e/1x1B2e R: 4e/?	L: 1x3e/4e R: 1x3e/2b2e	L: **1A?1x**/2b2e R: **1A?1x**/2B2x
Paralectotype 2	M?	+	5.9	L: 2e2x/1x3e R: 4e/1e3x	L: 4e/4e R: 1e2x/3e1x	L: 4e/2b2e R: 4e/3e1x	L: 2e/4e R: 2e/2e2x
Paralectotype 3	F	+	6.4	L: ?4e/4e R: 3e1x?/4e	L: 2e2x/2e2x R: 4e/3x	L: 4e/4x R: 1e3x/4x	L: ?2e/2e2x R: ?2e/3x
Paralectotype 4	F	+	6.7	L: 4e/1e3x R: 4x/2e2x	L: 3e1x/1e1x(2x?) R: 3e/2e2x	L: 2e1x/3e R: 2B2e/1b2e1x	L: **1A1x**/3e1x R: 1b2e/3e1x
Faroe Islands							
BF 516	?	+?	8.7 × 0.4	e/e, 4/4	e/ex, 4/4	e/ex, 4/4	e/e, 2–4/3–4
BF 775-1, 17 seg.	?	–	2.0 × 0.3	be/Bex, 4/4	Be?/Be?, ?–3/?–4	B?/Be?, ?–4/?–4	ex/ex, 1–3/1–?
BF 775-2	?	+?	3.1 × 0.3	Bex/Bex, 4/3	Be/ex, 4/1–3	Bex/be, 2–3/3–4	Bex/Bex, 2–?/2–4
BF 775-3	?	+	2.8 × 0.3	Bex/e?, 3–4/?–4	Bex/ex?, 4/?–4	bex/e?, 2–4/?–4	e**A**x/Bx, 2–3/?–2
BF 775-4	?	+	3.4 × 0.3	Be/Be, 4/3–4	Be/bex, 4/3–4	Be/Bbex, 4/2–4	e**A**/Bex, 2–4/1–4
BF 775-5	F	+	3.4 × 0.3	e/e? /4/?–4	Bex/e, 4–5/4	ex/e, 1–4/4	**A**x/e, 1/3–4
BF 775-6	?	+	3.9 × 0.3	Be/Bex, 3–4/4	Bx?/be, ?–4/4	B?/Bbx, ?–4/3–4	e?/Bex, 2–3/3
BF 775-7	?	+	3.6 × 0.3	Bex/Bb, 4/4	Bex/Be, 4/4	Bex/Be?, 4–5/?–4	**A**x?/Bbex, 1–2/3–4
BF 775-8	?	+	4.2 × 0.3	Be/Bbx, 4/3–4	Bex/Be, 4/4	bx/bex, 5/4	**AB**/Bbe, 1–3/4–5
BF 775-9	F	+	4.5 × 0.4	Be/x, ?–5/1–4	Be?/ex, 2–4/2	e/ex, 2–?/3–4	?/ex, ?/4–5
BF 775-10 (Fig. 2H–J)	F	+	5.9 × 0.4	4B/bx, 4/3–4 R: 4B/3x, Fig.	Bb/x, 4/1–4	Bb/be, 4/?–4 R: 2B2e/1b3e, Fig.	**AB**x/b?, 2/?–4, Fig.

Table 2. Continued.

Locality	Sex	GP	Length × width (mm)	Segment 1	Segment 2	Segment 3	Segment 4
Iceland							
BI 2219-1, 13 seg.	Juv.	–	c. 1.5	Appear to be 4e/4e on all of segments 1–4			
BI 2219-2, 14 seg.	Juv.	–	c. 1.5	Appear to be 4e/4e on all of segments 1–4			
BI 2219-3, 15 seg.	Juv.	–	c. 1.5	e/e?, 3/?–4	e/ex, 3–4/?–3	e/e, 4/4	**cA/Ac**, 2/2
*BI 2219-4	?	–	c. 3.1	Be/bx, 4/3–4	Bbe/Bbe, 4/4	Bbe/bex, 4/4	**cA**/e, 2/4
BI 2219-5	?	–	3.9	Bex/x, 3–4/?–4	Bbx/**A**bex, 4/2–4	Bbe?x/bex, 4/3–4	Bbe**A**x/Bbe, 2–4/?–3
BI 2268-1, oocytes	F	+	8.0 × 0.5	Most chaetae broken, no bidentate ones seen.			
*BI 2268-2	?	–	6.4 × 0.4	be/bex, 4/4	bex/bx, 4/3–4	Bbe?/bx, 3–4/4	ex/x, 2–4/3–4
BI 2268-3, oocytes	F	+	7.3 × 0.5	bex/bex, 4/4	be/bex, 4/4	bex/bex, 4–5/4	be**A**x/bx, 2–4/4
BI 2268-4	?	–	5.6 × 0.4	bex?/bex, 4/4	ex/ex, 4/e–4	ex/ex, 3–4/3–4	e**A**x/bx, 2–3/3–4
BI 2268-5	?	–	5.6 × 0.4	ex/e?x, 2–4/2?–4	ex/x, 2–4/2–4	ex/ex, 2–4/2–4	be**cA**/be, 2–3/3–4
BI 2268-6	?	–	6.3 × 0.4	x/x, 3–4/3–4	ex/ex, 4/3–4	ex/ex, 3–4/3–4	e**A**x/ex, 2–4/2–4
BI 2303	?	+	7.0	Most chaetae broken. Only weak identation in remaining ones; surface appears hammered.			

Abbreviations: xx/xx = notochaetae/neurochaetae, A = sigmoid acicular (usually first present from segment 5, but occasionally from 4, then in **bold**), B = clearly bidentate, b = weakly bidentate, c = capillary; e = entire tips, F = female, **Fig**.= see Fig. 2, GP = genital papilla, juv. = juvenile, M = male, seg. = segment(s), x = broken, ? = evaluation impossible (sex, column 2) or uncertain (chaetal types), * = prostomium everted, + = present, – = absent. For segments 1– 4, e.g., 2B2b/1e3x = 2 clearly bidentate + 2 weakly bidentate/1 with entire tips + 3 broken.

Chaetigers 5–21 with 1 fine slender capillary + 1 blunt-tipped to knifelike SA per ramus (Fig. 2F–G), capillaries outermost and usually twice as long as SA. Capillaries often broken or difficult to see but present also on segment 21 in all BIOFAR specimens (Fig. 2N, P: arrows) and also recognizable in a few syntypes. Aciculars of segments 5–17(18) shorter, distally entire; those of last 2–3 segments longer and more slender, especially dorsally, with hooked, entire tip (Fig. 2G, chaetiger 20). All aciculars with slight constriction at point where they emerge from epithelium. Notoaciculars longer and thicker than neuroaciculars throughout. Occasional doubling of one or both types of chaetae may occur, but is rare.

Interramal papillae pyriform, short-stalked or sessile, distally smooth to irregular, small, visible but inconspicuous and easily overlooked under low (64×) magnification, situated midway between noto- and neuropodia in segments 1–4 or 5 (Fig. 2A,C), thereafter more closely associated with notopodia, of similar size throughout, c. 14–18 μm long (incl. stalk), 8–14 μm broad (BIOFAR 775-10 and largest paralectotype).

Anus terminal, usually withdrawn within bilobed last segment. Boundary between distal part of last segment and pygidium indistinct. Retracted part (morphologically distal to chaetae) with 1 papilla on either side of middorsal cleft and at least 1 additional slightly smaller papilla outside and 1 inside these (Fig. 2P), perhaps also on either side of midventral cleft.

Reproductive Biology.—Oocytes of two distinct size groups are present. The largest, c. 185–200 μm in diameter, occur in the two largest specimens from BIOFAR sta. 775 (Fig. 2G, spec. 775-10); they are arranged in a double row in segments 7–13, each row with about 10 oocytes (viewed in situ) in the figured specimen (5.9 mm long, cleared in glycerine) and appear to be enclosed in a single elongate ovisac, apparently located in the right half of the coelomic cavity. In the lectotype, oocytes are more numerous and much smaller, c. 85 μm in diameter, forming two irregular rows that fill most of the coelom to the level of segment 18. In a 6.4 mm paralectotype large squarish oocytes are present as a long row from between segments 7 and 8 to segment 18 or 19; numerous smaller roundish bodies, possibly gametes, are present in the adjacent area. Among 14 BIOFAR nontypes + 5 syntypes, 6 specimens with oocytes and 4 with what may be sperm were observed.

Genital Papilla.—Riser (1987: 215) found “a papilla bearing the male pore…on both sides just anterior to parapod 7” in *L. brevis*, a species with paired sperm sacs. This was the first report of genital papillae in the family. A similar pair of pores was not found in the present material of *L. cabiochi*. However, in all five examined syntypes, 12 of the 14 BIOFAR specimens (not all in Table 2), and 2 of 12 BIOICE specimens, a single, unpaired, short, transversely oriented, weltlike oval swelling was observed on the posterior part of segment 8, just anterior to the right notochaetae of segment 9 (Fig. 2G,K). A pore was not identified with certainty but may have been a lighter central area in the swelling. No similar swelling was seen on the left side, and the structure was present in all worms with oocytes or possible sperm and also some without recognizable gametes, including a specimen only 2.8 mm long. It is particularly clear on the largest paralectotype, less so on many of the smaller worms, where it is low and easily overlooked; here the papilla is most easily recognized by the more dense, opaque appearance of the epithelium; in larger worms the swelling is higher and easier to see.

Remarks.—This is the only species of *Laubieriopsis* reported to have 21 segments. It can further be separated from other species of the genus by the characters mentioned in the diagnosis. The species was originally described from 156 specimens from 15 stations on the continental slope off the entrance to the English Channel, bottoms with some mud, 500–1200 m; it has not been reported since. All specimens counted by Amoureux (number not indicated) had 21 segments and all 156 were stated to lack capillaries on the last (21st) segment; segments 1–4 had 4 (3–5) aciculars per ramus, thereafter 1 acicular + 1 capillary per ramus (cA/Ac); in the present material, parapodia of segments 1–2 occasionally had 5 aciculars dorsally (Table 2), and capillaries or broken remains of such were present on segment 21 (Fig. 2G,N,P), suggesting that they had been broken off —and thus overlooked—on the material described by Amoureux. Examination of five syntypes showed this to be the case. The examined BIOFAR specimens and syntypes are generally more slender (Fig. 2G) than the specimen figured by Amoureux, and the arrangement of aciculars on segment 1 differs slightly (shown with noto- and neurochaetae dorsally displaced, forming a transverse series in Amoureux 1982, fig. 3:1 rather than in line with other notochaetae in present specimens), but apart from the presence of bidentate aciculars, the specimens are otherwise in good agreement with the species as described as him.

As bidentate aciculars have not previously been reported for the Fauveliopsidae, the smaller specimens (BIOFAR sta. 736, 775) were at first thought to belong to an undescribed species. It later became apparent that this feature had probably been overlooked by Amoureux, and examination of five syntypes proved this to be correct (Table 2). The bidentation ranges from distinct, often mittenlike, to imperceptible, and is most pronounced in smaller worms; however, it was not observed in three juveniles (BIOICE 2219, spec. 1–3, 13–15 segments, 1.5 mm long) in the BIOICE material. Although it is not detectable in the two larger worms from BIOFAR sta. 516, it is not restricted to smaller worms and was also observed in specimens with oocytes (e.g., Fig. 2G, BIOFAR sta. 775-10). The bidentation seems to be partly size related; it is easily overlooked and does not appear to indicate a specific difference.

Variation in the notopodial chaetation of segments 4 and 5 has not previously been noted, although it appears to be figured for a specimen of the *L. brevis* complex by Katzmann and Laubier (1974), who show right notopodium 5 to have chaetae typical of segments 1–4 rather than a sigmoid acicular innermost and a slender capillary outermost in each ramus.

Although exact counts are difficult to obtain, such variation appears to be normal, but could easily lead to confusion in a genus where number of anterior segments with modified aciculars has been widely used for defining or keying out species. While useful, this character should not be used alone. Some species with recognizable regions or types of chaetae always ‘count’ correctly, and never have as much as a single misplaced chaeta or a segment too many, whereas in others this is usually but not always the case.

Riser (1987) suggested that relative size of oocytes was a useful species character easily observed from glycerin mounts. The variation in oocyte size in the present material suggests that at least for this species, we do not yet know enough about the reproductive biology.

Distribution.—Northeast Atlantic: Continental slope off entrance to English Channel, and Faroe Islands and Iceland, 265–1200 m, on bottoms with mud, muddy sand, gravel, silt+clay, and sand with sponge spicules.

KEY TO CURRENTLY ACCEPTED SPECIES OF *LAUBIERIOPSIS* NEW GENUS

1a. With 16 segments, last segment with aciculars extending beyond end of body; GP perhaps unpaired, on right side of 6/7 (segments 1–4 of holotype without bidentate modified chaetae) .... *L. brevis**

1b. With more than 16 segments 2

2a. With 21 segments; aciculars of last segment extending beyond end of body; GP unpaired, on right side of 8/9; (segments 1–4 usually with some modified chaetae strongly or weakly bidentate, Fig. 2H–J, Table 2) .... *L. cabiochi*

2b. With 25 segments; aciculars of last segment not reaching end of body; GP paired, on both sides of 6/7; (segments 1–4 without bidentate modified chaetae?) .... *L. arenicola* (Riser, 1987)

* (see Table 3 and below for variation among species keying out to this).

Remarks.—There is some confusion regarding species of the *L. brevis* complex. The species was not figured when it was first described, and the figure in Hartman and Fauchald (1971: pl. 16) is from a nontype specimen, collected later from a nontype station. Hartman's (1965: 172–173) original description is incorrect. The holotype (LACMNH-Poly 0527, from station G-1 and in good condition; paratypes not seen) was reexamined by J. A. Blake, who kindly provided the corrected information (Table 3). There are not 4–5c+4–5A per ramus in segments 1–4, but usually 2 of each type, and the chaetation of segments 5–16 is cA/Ac as in the other species. For size, the data given by Hartman (1965) were probably correct when noted, as worms shrink in alcohol; the size in brackets is that as of 1999 (from JAB). The GP on the holotype appears to be unpaired, at the posterior edge of segment 6, but was difficult to see and could only be observed under oil immersion (JAB). Modified aciculars of segments 1–4 "taper to a pointed, but clearly blunt tip". Capillaries of the following segments are "much thinner than the thin spines of setigers 1–4 and definitely capillary tipped" (JAB).

The material of *L. brevis* examined by Riser (1987), who found paired GP on the posterior edge of segment 6, was also from a nontype station, but close to the type locality, so if the apparent difference in number of GP is real, and not just a matter of small size, this would support recognition of *L. hartmanae.* Whether any of the Atlantic material should be referred to this species is something else.

The syntypes of *L. hartmanae* were examined by me. They originate from the Japan Trench, 5400 m (1 sta., 1 spec.), the Kurile-Kamchatka Trench, 4090–6700 m (3 sta., 6 spec.) and off Peru, 5300 m (1 sta., 5 spec. + 2 Opheliidae) (depths are label depths and appear to be those used in Levenstein, 1975). The species appears to differ from *L. brevis* in having paired GP, perhaps also in having weakly bidentate anterior aciculars, but in the present material it is not possible to decide if these irregularities should be interpreted as bidentate or not; a series of specimens is necessary for a certain comparison. The specimens are fairly large, which may explain the apparent absence of this feature. One of four specimens (8.12 mm long, 0.68 mm wide at midlength) from the Kurile-Kamchatka Trench, Vitiaz sta. 5608, 6835 m, has the prostomium well extended (Fig. 2L–M), revealing the flat, ciliated nuchal organs; because of sediment around the mouth it was not possible to see if the upper lip is divided. No similar view of the prostomium of other species of *Laubieriopsis* has yet been published.

Laubieriopsis hartmanae was originally described as *Fauveliopsis hartmani* and compared with *F. brevis* Hartman, 1967. *F. brevis* Hartman, 1967 is a *Fauveliopsis* as herein

Table 3. Variation in the *Laubieriopsis brevis* group. From literature and as *Fauveliopsis brevis* except as indicated. Chaetae: a = thin acicular, A = thick acicular, c = capillary; GP = genital papilla(e); H = holotype, spec. = specimens, * = material or features seen by author (M. E. Petersen).

Reference	GP	No. of chaetae per ramus in segments:		No. of spec.	Length × width (mm)	Locality	Depth (m)
		1–4	5–16				
[1]Hartman, 1965 (as *Brada brevis*)	[H: single, on 6]	[2a+2A] thick curved, yellow spines	[1c+1A]	9	7.1 × 1.3 [6.7 × 0.7]	NW Atlantic off New England	2,000
Hartman and Fauchald, 1971: pl. 16	Paired, on 6 (Riser, 1987)	2c+2A	1c+1A	188	[c. 8, from figure]	W Atlantic	1,330–5,007
Laubier, 1972	?	2c+2A	1c+1A	100 of >1400	3–7?	Mediterranean	2,090–2,920
Katzmann and Laubier, 1974	?	4A	1c+1A	?	5.7	Bay of Biscay and SE Atlantic	2,025–2,989 and 2,514
[2]Hartman, 1978	?	?1c+1A	1c+1A	26	7–8 0.5–0.7	Antarctic: Weddell Sea	3,111–4,575
[3]*Levenstein, 1970 (as *F. hartmani*)	*Paired, on 6	*2–3a+2–3A	*1c+1A	14 [12]	7–13 0.3–1	W Pacific and off Peru	4,065–6,835

[1] See text. Information in brackets from J. A. Blake; only holotype was examined.

[2] Hartman (1978: 175) does not describe the number or kinds of chaetae in segments 1–4, simply that parapodia have the above, and in the key indicates that there may be 16–17 setigers. Variation in segment number appears to be unusual in this group. Material should be reexamined.

[3] *Laubieriopsis hartmanae* (Levenstein, 1970), new combination, perhaps distinct, but direct comparison with material from other areas necessary to resolve the question. Only 14 specimens in original material sent (= all 5 samples), 2 specimens of which are Opheliidae. Some aciculars of segments 1–4 with very weak distal irregularities, but no convincing bidentation.

restricted and a junior homonym of *Brada brevis* Hartman, 1965, later transferred to *Fauveliopsis* and herein transferred to *Laubieriopsis*. Levenstein (1971/1972) corrected the termination of her species to *F. hartmanae*, and *F. brevis* Hartman, 1967 was by Hartman (1971) renamed *F. brevipodus* Hartman, 1971.

Katzmann and Laubier (1974) referred *F. hartmanae* to *F. brevis* (Hartman, 1965); this synonymy was accepted by Levenstein (1975), who reported additional material of the species from the South Sandwich Islands, 4270–6150 m (4 stations, 81 specimens in all) and the South Orkney Islands, 5474–5465 m (1 specimen). Until more material of both species has been examined and compared, the status of *L. hartmanae* (presently referred by most authors to *L. brevis* because both have 16 segments) and other reports of *L. brevis* cannot be decided.

Discussion

This is the first report of Fauveliopsidae from Iceland and the first detailed report on a species from the Faroes (the presence of the family there was noted by Blake and Petersen, 2000). The variation observed in this limited study shows the necessity of using as many characters as possible when defining new taxa. Relying solely upon counts, as has often been done in this family, is clearly inadequate and at best can be used to define species groups or perhaps to key out species in a limited geographic area.

In fauveliopsids, the number of anterior segments with modified chaetae appears to be relatively stable for a given species, but not completely so, and in *Laubieriopsis cabiochi*, especially parapodia of segments 4 and 5 often had chaetation typical of the adjacent region (anterior region if segment 5 and middle/posterior region if segment 4) .

Bidentate chaetae have not previously been reported for fauveliopsids and were also overlooked by Amoureux (1982) in his original description of *L. cabiochi*. Their presence in the examined syntypes of *L. cabiochi* confirmed that this feature is typical of at least this species. A distal irregularity faintly suggestive of this was also seen modified anterior chaetae in the types of *L. hartmanae*, but many of the anterior chaetae were missing and more convincing material is required for confirmation. No material of *L. brevis* or other specimens keying out to this, or of *L. arenicola* has been seen by me, and J. A. Blake could not see any in the holotype of *L. brevis*.

Bidentate aciculars are also present in early stages of species of the cirratulid genus *Cirriformia* (Wilson, 1936; Blake, 1975, 1996), but are absent in adults. In *Laubieriopsis*, the smallest specimens (BIOICE, c. 1.5 mm long, 13–15 segments) and the largest ones (e.g., BIOFAR 516, 8.7 mm) appeared to lack them, whereas strongly and weakly bidentate chaetae were present in specimens 2 mm long or more (17–21 segments) and also in ones with oocytes (Fig. 2G–J, Table 2). None of the examined *Fauveliopsis* species appear to have any bidentate chaetae, but unless the bidentation is strong, this feature is easily overlooked.

A ventral shield is present in many species of *Fauveliopsis* but not in examined material of *Laubieriopsis*, all species of which appear to be free-living. Based on its location, the ventral shield appears to be a callus-like structure perhaps resulting from long-term contact with a mollusc shell or foraminiferan test. As might be expected, it is best developed on larger animals, and the shape, while variable, appears to be species specific (MEP, unpublished). Surprisingly, a ventral shield was not found on any specimens in the two samples identified as *F. challengeriae* by Hartman, both inhabiting tests of tubular foraminiferans. Although the material is probably (an)other species, it was predicted that some sort of a ventral shield would be present in specimens living in foram tests. Variation in this structure will be dealt with in more detail elsewhere. The ventral shield of *F. olgae* (Fig. 1E–F) is typical of the general type seen in several of the shell- or foraminiferan-inhabiting species examined, whereas the beltlike ventral shield(?) of the holotype of *F. challengeriae* (Fig. 1B,D) has not been seen on other specimens of this species group and may be an artifact and not typical of the species. As the type material of this species consists of but a single specimen, additional material from the type locality is desirable. Other material identified as this differed in several respects, including having multiple chaetae in posterior segments, suggesting that another species was involved.

The genital papilla was first reported by Riser (1987) and later incorporated in descriptions by Blake and Petersen (2000). In species with only a single papilla, this always appears to be on the right side. The location of this structure appears to be invariate in the species of *Laubieriopsis* that have been examined, whereas the same does not appear to apply to *Fauveliopsis*, where members of a given population did not always have the genital papilla on the same segment and occasionally had two.

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