



Atlantic occurrence of the genus *Bellottia* (Teleostei, Bythitidae) with two new species from the Western North Atlantic

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Abstract

Thirteen specimens of the bythitid fish-genus *Bellottia* have been reported from the Western North Atlantic and Gulf of Mexico. A comparison with the three known species, *B. apoda* Giglioli, 1883 from the East Atlantic and the Mediterranean, *B. armiger* (Smith & Radcliffe, 1913) from the Philippines and *B. galathea* Nielsen & Møller, 2008 from the Solomon Sea and Philippines showed that the 13 specimens are different from all three. Furthermore, the 12 specimens from the Gulf of Mexico (*B. robusta*) are specifically different from the specimen caught off southern Georgia (*B. cryptica*) based on differences in body depth at origin of anal fin, presence or absence of spine on preopercular crest and number of precaudal vertebrae. The two new species appear to be associated with deep-sea coral or reef habitats and likely may have wider distributions than are apparent at present.

Key words: Bythitidae, *Bellottia*, two **n. sp.**, Gulf of Mexico, off southern Georgia, deep-sea corals

Introduction

Hitherto, three species of the viviparous ophidiiform genus *Bellottia* have been described: *B. apoda* Giglioli, 1883 known from numerous specimens from the Mediterranean and five specimens from off Portugal and southwest of Madeira, *B. armiger* (Smith & Radcliffe in Radcliffe, 1913) known from one specimen from the Philippines, and *B. galathea* Nielsen & Møller, 2008 known from two specimens from the Solomon Sea and the Molucca Sea. The single paratype of *B. armiger* was considered conspecific with *B. galathea* by Nielsen & Møller (2008: 34). In the present paper two additional species are described, one from the Gulf of Mexico based on 12 specimens and one from off southern Georgia based on one specimen. One of the Gulf of Mexico specimens examined here was referred to as “*Bellottia* sp.” in Cordes *et al.* (2008), and several specimens, also examined here, were listed as *B. apoda* and new records for the Gulf of Mexico in McEachran & Feckhelm (2005). The specimen from off Georgia was identified as *B. apoda* and noted as a new record for the region in Ross and Quattrini (2007). This specimen was referred to as *Bellottia*. **n. sp.** in Ross and Quattrini (2008).

Material and methods

Field Collections: Ten of the Gulf of Mexico specimens were collected during investigations of cold-seeps and deep-sea coral habitats (2002–2004) in 506–569 m. Quantitative samples were collected in tubeworm or tubeworm plus coral habitats using the Bushmaster Jr. device deployed from the Johnson-Sea-Link (JSL) submersible. See details of collection and these study sites in Cordes *et al.* (2008). The specimen collected off

southern Georgia (JSL 4685, 629 m) was also collected using the JSL, and the specimen was captured using the JSL suction sampler supplemented with rotenone. This collection was part of a larger study of deep-sea coral communities detailed in Ross and Quattrini (2007, 2008).

Comparative material. *Bellottia armiger* (Smith & Radcliffe in Radcliffe, 1913): radiograph of holotype (USNM 74153). – *Bellottia galatheae* Nielsen & Møller, 2008: holotype (ZMUC P771582) and paratype (USNM 99222).

Abbreviations. HT=holotype, JSL=Johnson-Sea-Link, LT=lectotype, SL=Standard length in mm, Institutional abbreviations are listed at <http://www.asih.org/codons.pdf>.

***Bellottia* Giglioli, 1883**

Bellottia Giglioli, 1883: 399, type species *Bellottia apoda* Giglioli, 1883 by monotypy (type locality: Gulf of Naples, Italy).

Xenobythites Smith & Radcliffe in Radcliffe, 1913, type species *Xenobythites armiger* Smith & Radcliffe in Radcliffe, 1913: 173 by original designation (type locality: Mindanao, Philippine Isls.)

Diagnosis. The diagnosis in Nielsen *et al.* (1999: 97) is here slightly modified based on additional material. Body short, depth at origin of anal fin 13.0–23.0 % SL, head partly scaled, 3–5 spines at lower half of hind margin of preopercle, a pointed spine near upper angle of opercle, palatine teeth present, a few, large sensory pores behind and below eye and on mandible, long rakers on anterior gill arch 3–6, pectoral fin rays 19–28, pelvic fins absent, precaudal vertebrae 10–13, males with large genital hood.

Similarity. The subfamily Bythitinae is characterized by continuous dorsal, caudal and anal fins and the penis being an integrated part of the large genital hood. In addition to *Bellottia*, two genera contain species that lack pelvic fins: *Pseudonus* Garman, 1899 and *Hepthocara* Alcock, 1892. The former of these is most similar to *Bellottia* with one species without and 1–2 species with pelvic fins, large sensory pores on head, a partly naked head and a very similar otolith. *Hepthocara* holds 1–2 species both without pelvic fins, but with no large sensory pores, a naked head and an otolith less similar to that of *Bellottia*.

Species. Besides the five species mentioned in the introduction, Nielsen *et al.* (1999: 97) noted that two specimens collected in midwater (one from off Portugal and one from the Galapagos Islands) may represent undescribed species. Unfortunately, neither of the two specimens can be located.

Key to species of *Bellottia* spp.

- 1a Long rakers on anterior gill arch 5–6..... 2
- 1b Long rakers on anterior gill arch 3–4..... 4
- 2a Caudal fin rays 6, precaudal vertebrae 10, total vertebrae 45, anal fin rays 74..... *B. armiger* (Philippine Islands)
- 2b Caudal fin rays 7, precaudal vertebrae 10–12, total vertebrae 48–51, anal fin rays 75–88..... 3
- 3a Precaudal vertebrae 12, preopercular crest with spine (Fig. 3), depth at origin of anal fin 17.5–23.0 % of SL
..... *B. robusta* (Gulf of Mexico)
- 3b Precaudal vertebrae 10, preopercular crest without spine, depth at origin of anal fin 17.0 % SL.....
..... *B. cryptica* (off southern Georgia)
- 4a Dorsal fin rays 70–72, pectoral fin rays 19–20, origin of anal fin below dorsal fin ray no. 12–13, predorsal 44.0–45.5 % SL, spine on cleithrum present, no fangs on dentigerous bones.....
..... *B. galatheae* (Solomon Sea and Philippine Islands)
- 4b Dorsal fin rays 83–94, pectoral fin rays 21–26, origin of anal fin below dorsal fin ray no. 17–19, predorsal 35.5–40.0 % SL, spine on cleithrum absent, all dentigerous bones with retrorse fangs.....
..... *B. apoda* (Mediterranean and NE Atlantic)

***Bellottia robusta*, new species**

(Figs.1–4)

Bellottia apoda: McEachran & Fechhelm (2005: 18)

Bellottia sp.: Cordes *et al.* (2008: 783)

Material examined (12 specimens, SL 43–82): Holotype: USNM 394117, SL 62, male, Gulf of Mexico, Green Canyon 234, 27°45'N, 91°13'W, st. JSL-4712, 535 m, coll. C. Fisher, 10 July 2004.

Paratypes: TCWC 10956.01, SL 64, female, Gulf of Mexico, 27°46.96'N, 91°30.46'W, st: BH AT 1, 98 GOM JSL 4035, 540–580 m, coll. Tracy Ward, 7 Aug.1998. - TCWC 10957.01, SL 53, female, Gulf of Mexico, 27°44.7'N, 91°13.3'W, st: GC AT 1, 98 GOM JSL 4033, 540 m, coll. Tracy Ward, 7 Aug. 1998. – USNM 394118, SL 34, male, Gulf of Mexico, Green Canyon 232, 27°44.49'N, 91°19.07'W, st. JSL-4437, 569 m, coll. C. Fisher, 24 June 2002. – USNM 394119, SL 35, male, Gulf of Mexico, Green Canyon 234, 27°44.78'N, 91°13.30'W, st. JSL-4569, 538 m, coll. C. Fisher, 26 Aug. 2003. – USNM 394120, SL 49, male, Gulf of Mexico, Garden Banks 543, 27°27.32'N, 93°11.29'W, st. JSL-4582, 546 m, coll. S. Hourdez, 3 Sep. 2003. – USNM 394121, SL 82, female, and ZMUC P771652, female, Gulf of Mexico, same data as for holotype. – USNM 394122, SL 77, female, and ZMUC P771653, SL 72, male, Gulf of Mexico, Green Canyon 234, 27°45.80'N, 91°13.30'W, st. JSL-4713, 532 m, coll. C. Fisher, 10 July 2004. – USNM 394123, SL 50, male, Gulf of Mexico, Green Canyon 234, 27°44.76'N, 91°13.46'W, st. JSL-4720, 506 m, coll. K. Zelnio, 13 July 2004. – USNM 394124, SL 51, male, Gulf of Mexico, Green Canyon 234, 27°44.76'N, 91°13.46'W, st. JSL-4721, 506 m, coll. C. Fisher, 14 July 2004.



FIGURE 1. *Bellottia robusta*. Holotype. USNM 394117. SL 62.

Condition of material. In most specimens the body is much curled up and the mouth wide open making precise measurements difficult to obtain.

Diagnosis. *Bellottia robusta* differs from its congeners by the following combination of characters: depth at origin of anal fin 17.5–23.0 % SL, small teeth blunt or pointed, four spines on hind margin and one on crest of preopercle, distinct spine on cleithrum above base of pectoral fin, anterior gill arch with 5–6 long rakers, predorsal 44.0–49.5 % SL and precaudal vertebrae 12.

Similarity. *Bellottia robusta* is most similar to *B. cryptica*, in e. g. presence of a spine on cleithrum and in fin ray and total vertebral counts, but differs by the heavier body (17.5–23.0 vs 17.0 % SL at origin of anal fin), origin of anal fin below dorsal fin ray 10–15 vs 8, precaudal vertebrae 12 vs 10 and spine on preopercular crest vs no spine in *B. cryptica*. It differs from *B. apoda* by the deeper (17.0–23.0 vs 13.0–16.0 % SL) and

darker body, more caudal fin rays (7 vs 6), poorly developed fangs (vs distinct, retrorse fangs), more long rakers on anterior gill arch (5–6 vs 3–4) and longer predorsal (44.0–49.5 vs 35.5–40.0 % SL). From *B. galathea* it differs e. g. by the higher number of rays in dorsal (85–83 vs 70–72), caudal (7 vs 6), anal (75–88 vs 61) and pectoral (23–25 vs 19–20) fins. From *B. armiger* it differs by having more precaudal vertebrae (12 vs 10), more caudal fin rays (7 vs 6) and a larger predorsal length (44.0–49.5 vs 41.5 % SL).

Description. The principal meristic and morphometric characters are shown in Table 1. The description is based mainly on the holotype. Differences of paratypes are given in brackets and in Table 1.

TABLE 1. Meristic and morphometric characters of Atlantic *Bellottia* spp. (n=number of specimens examined).

	<i>B. robusta</i>		n	<i>B. cryptica</i>	<i>B. apoda</i>	n
	Gulf of Mexico			West. Atl.	East. Atl. + Med.	
	HT	HT+11 paratypes		Holotype	n=16 including LT	
Standard length	62	34–82		42	26–65	
Meristic characters						
Dorsal fin rays	87	85(88.8)93	10	92	83(89.0)94	14
Caudal fin rays	7	7	10	7	6	14
Anal fin rays	81	75(81.2)88	12	84	68(74.0)82	15
Pectoral fin rays	24	23(23.9)25	11	23	21(22.9)26	12
Precaudal vertebrae	12	12	11	10	12(12.6)13	15
Caudal vertebrae	38	36(37.6)39	11	39	33(36.0)37	15
Total vertebrae	50	48(49.3)51	11	49	46(48.5)50	15
Pseudobranchial filaments	2	2	12	2	0(1.2)2	15
Anterior dorsal ray above vertebra no.	10	10(10.4)11	10	11	8(8.9)10	15
Anterior anal ray below dorsal ray no.	10	10(12.6)15	10	8	17(18.2)19	13
Anterior anal ray below vertebra no.	14	14(15.3)16	11	14	15(15.7)17	15
Long gill rakers	5–6	5(5.3)6	12	5–6	3(4.0)4	16
Total gill rakers	15	14(15.7)18	11	17	11(13.5)16	15
Spines on preopercle m margin	4	4	12	4	3(4.1)5	16
Spines on preopercle crest	1	1–2	12	0	1	16
Morphometric characters in % of SL						
Head length	31.0	27.5(30.0)32.0	11	32.0	26.5(28.4)30.5	15
Depth at anal fin origin	22.0	17.5(20.0)23.0	11	17.0	13.0(14.5)16.0	12
Upper jaw length	15.0	14.0(15.0)16.0	11	14.5	13.5(15.0)16.0	15
Depth of posterior maxillare	5.3	4.3(4.9)5.6	11	5.1	4.2(4.8)5.3	13
Dia. eye window	5.3	4.7(5.2)5.5	11	5.5	3.5(4.6)5.8	15
Postorbital length	19.5	16.5(18.2)20.0	11	18.5	15.5(16.8)18.0	13
Preanal length	52	52(55.9)59	11	51	51(53.0)56	14
Predorsal length	49.5	44.0(46.2)49.5	10	46.5	35.5(37.8)40.0	12
Length of long gill raker	2.3	1.9(2.3)2.6	10	2.2	1.1(1.7)2.3	11

Body robust, highest near base of pectoral fin, completely covered with oval, ca.1.5 mm, cycloid scales. Anterior segment of lateral line extending close to dorsal margin of body and from above anus along midline of body. Head profile convex, cheek and gill-cover scaled, while rest of head naked. Mouth slightly oblique with posterior margin of maxillary vertically expanded ending well behind eye. Anterior nostril closer to upper lip than to posterior nostril, both with low rim. Small opercular spine strong and pointed, almost

completely covered by skin, and not reaching posterior margin of opercle (a few specimens with spine reaching just beyond hind margin of opercle). Ventral margin of preopercle with four distinct spines and one spine on preopercular crest (Fig. 3) (spine often covered by skin; one specimen with two spines on crest). Origin of dorsal fin above tip of pectoral fin, anal fin origin just behind midpoint of fish (some specimens with preanal up to 59 % SL). Pectoral fin placed on mid-body level with peduncle higher than long. A distinct spine on cleithrum just above base of pectoral fin (one specimen with spine ending in a blunt tip). Anterior gill arch with 2–3 (2–4) plate-like rakers on upper branch, one long raker in the angle between the two branches and lower branch with 4–5 long rakers, followed by seven (6–9) plate-like rakers. Longest gill filament slightly shorter than longest raker. Two minute pseudobranchial filaments.

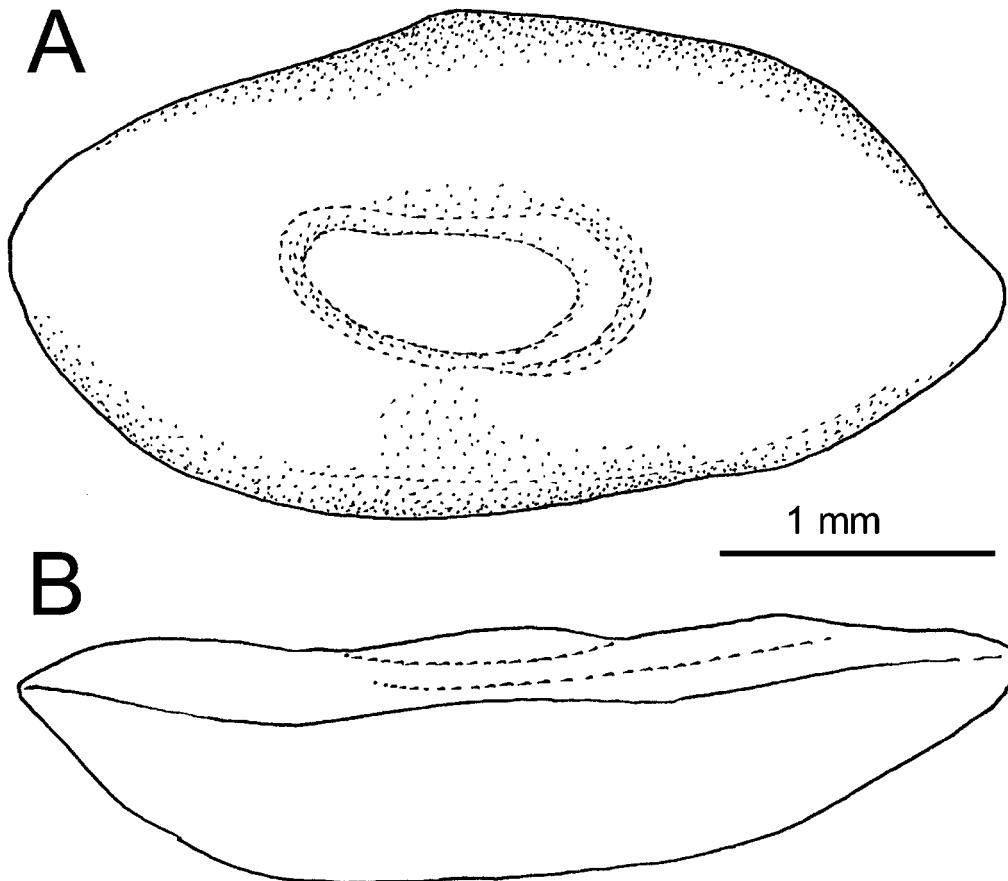


FIGURE 2. *Bellottia robusta*. Paratype. TCWC 10956.01. SL 64. Right sagitta: A—median view, B—ventral view.

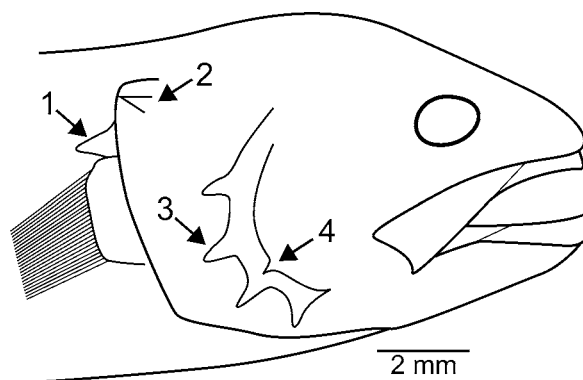


FIGURE 3. *Bellottia robusta*. Paratype. USNM 394118. SL 34. Head spines: 1—spine on cleithrum, 2— opercular spine, 3—preopercular spines, 4- spine on preopercular crest.

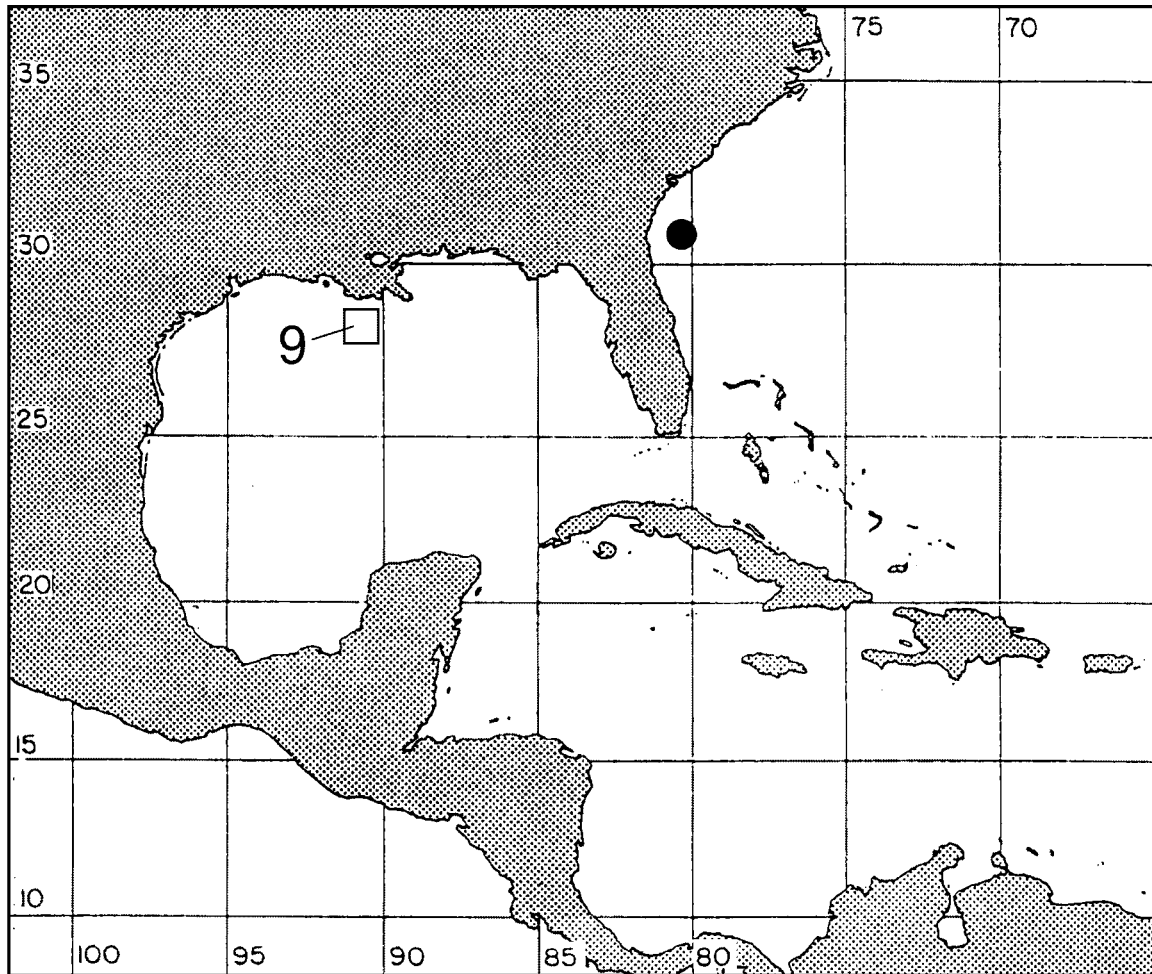


FIGURE 4. Records of *Bellottia robusta* (□) and *Bellottia cryptica* (●). The number indicates the number of neighbouring stations.

Head pores: Because of thin, often torn skin, pores are difficult to observe. A few, large pores, with three (2–3) in a vertical row behind eye, three below eye and four pores on mandible. Small whitish papillae spread over head.

Dentition: Most teeth are small and blunt. Head of vomer slightly curved with one tooth row of ca. ten small, blunt teeth. Posterior half of palatines edentate, and anterior half with one row of small, blunt teeth. Dentaries with posterior fifth edentate and dentigerous part with one tooth row increasing to 2–3 rows at symphysis; outer row with retrorse fangs. Premaxillaries with posterior third edentate and dentigerous part with one tooth row increasing to 4–5 rows at symphysis; outer row with larger, pointed teeth (three specimens with larger, pointed teeth on all dentigerous bones).

Axial skeleton (based on radiographs): Tips of neural and haemal spines thin and pointed. Anterior neural spine one third the length of second spine. Neural spines 3–7 (2–7) slightly depressed. Bases of neural spines 4–7 (4–8) enlarged. Parapophyses present on vertebrae 8–12 (7–12) and pleural ribs on 4–10 (3–11). Epipleural ribs indistinct.

Otolith (Fig. 2): The 3.5 mm elongate sagittal otolith (from a 64 mm SL paratype, TCWC 10956.01) is twice as long as high and twice as high as thick. Dorsal and ventral rim roundish, vaguely pointed posteriorly. Sulcus undivided, 1/3–1/4 the length of the otolith. No osteal channel.

Coloration: Fig. 1 shows the holotype after four years of preservation. The body is brownish with light vertical fins. The abdomen, operculum and eye-surroundings dark blue and the rest of the head colored like the body. The body of some of the smaller paratypes is dark brown.

Biology. This species appears to be very closely associated with complex habitat, provided by tubeworms or deep-sea corals (e.g., *Lophelia pertusa*). Rocky substrata are also likely habitats for *B. robusta*, even though it has not yet been collected there. This species is well concealed within crevices provided by these habitats, and specimens were not observed prior to collection. Because of its cryptic nature there are no more data on the biology or ecology of this species. A 53 mm specimen (TCWC 10957.01) contained eggs up to 0.7 mm in diameter; embryos were not observed.

Etymology. The specific name, *robusta*, refers to the short, deep body.

Distribution (Fig.4). Known from nine localities in a restricted area of the northern Gulf of Mexico all caught by JSL at depths of 506–580 m.

***Bellottia cryptica*, new species**

(Figs. 4–7)

Bellottia apoda: Ross & Quattrini (2007: 985, 996)

Bellottia n. sp.: Ross & Quattrini (2008: 80)

Material examined (1 specimen, SL 42 mm): Holotype: NCSM 44451, SL 42, female, off southern Georgia, 30°48.74'N, 79° 37.96'W, st. JSL-04-4485, 629 m, coll. S.W. Ross, 11 June 2004.

Condition of material. The holotype and only specimen was eviscerated for ecological studies, but is otherwise in good condition. Organs removed are archived with the specimen.

Diagnosis. *Bellottia cryptica* differs from its congeners by the following combination of characters: body slender (17.0 % SL at origin of anal fin), teeth small and pointed, caudal fin rays 7, origin of anal fin below dorsal fin ray 8, anterior gill arch with 5 long rakers, predorsal length 46.5 % SL, precaudal vertebrae 10, cleithrum with distinct spine just above base of pectoral fin, no spine on preopercular crest.



FIGURE 5. *Bellottia cryptica*. Holotype. NCSM 44451. SL 42.

Similarity. *Bellottia cryptica* is most similar to *B. robusta*, in e. g. presence of spine on cleithrum and in fin ray and total vertebral counts, but differs by the more slender body (17.0 vs 17.5–23.0 % SL at origin of anal fin), origin of anal fin below dorsal fin ray 8 vs 10–15, precaudal vertebrae 10 vs 12 and no spine on preopercular crest vs 1 spine in *B. robusta*. It differs from *B. galathea* by having 5–6 long rakers on anterior gill arch vs 4, and by having more rays in dorsal (92 vs 70–72), anal (84 vs 61) and pectoral (23 vs 19–20) fins. From *B. apoda* it differs by having 10 precaudal vertebrae vs 12, spine on cleithrum vs spine absent and 5–6 long rakers on anterior gill arch vs 3–4. From *B. armiger* it differs by having 7 caudal fin rays (vs 6), total vertebrae 49 (vs 45) and no spine on preopercular crest (vs spine present).

Description. The principal meristic and morphometric characters are shown in Table 1.

Body short, highest near base of pectoral fin, completely covered with oval ca. 0.7 mm cycloid scales. Lateral line indistinct with anterior part apparently near dorsal margin of body. Head profile convex, cheek

and gill cover scaled with rest of head naked. Mouth oblique with posterior part of maxilla vertically expanded ending just behind eye. Anterior nostril with low rim placed closer to upper lip than to posterior nostril. Small opercular spine strong and pointed, reaching beyond posterior margin of opercle. Lower edge of preopercle with four distinct spines, and no spine on preopercular crest (Fig. 3). Origin of dorsal fin above tip of pectoral fin, anal fin origin at midpoint of fish. Pectoral fin placed on mid-body level with peduncle higher than long. A prominent spine on cleithrum just above base of pectoral fin. Anterior gill arch with 3–4 plate-like rakers on upper branch, one long raker in the angle between the two branches and lower branch with 4–5 long rakers followed by 8–9 plate-like rakers. Longest gill filament about 1/3 of longest raker. Two short, broad pseudobranchial filaments.

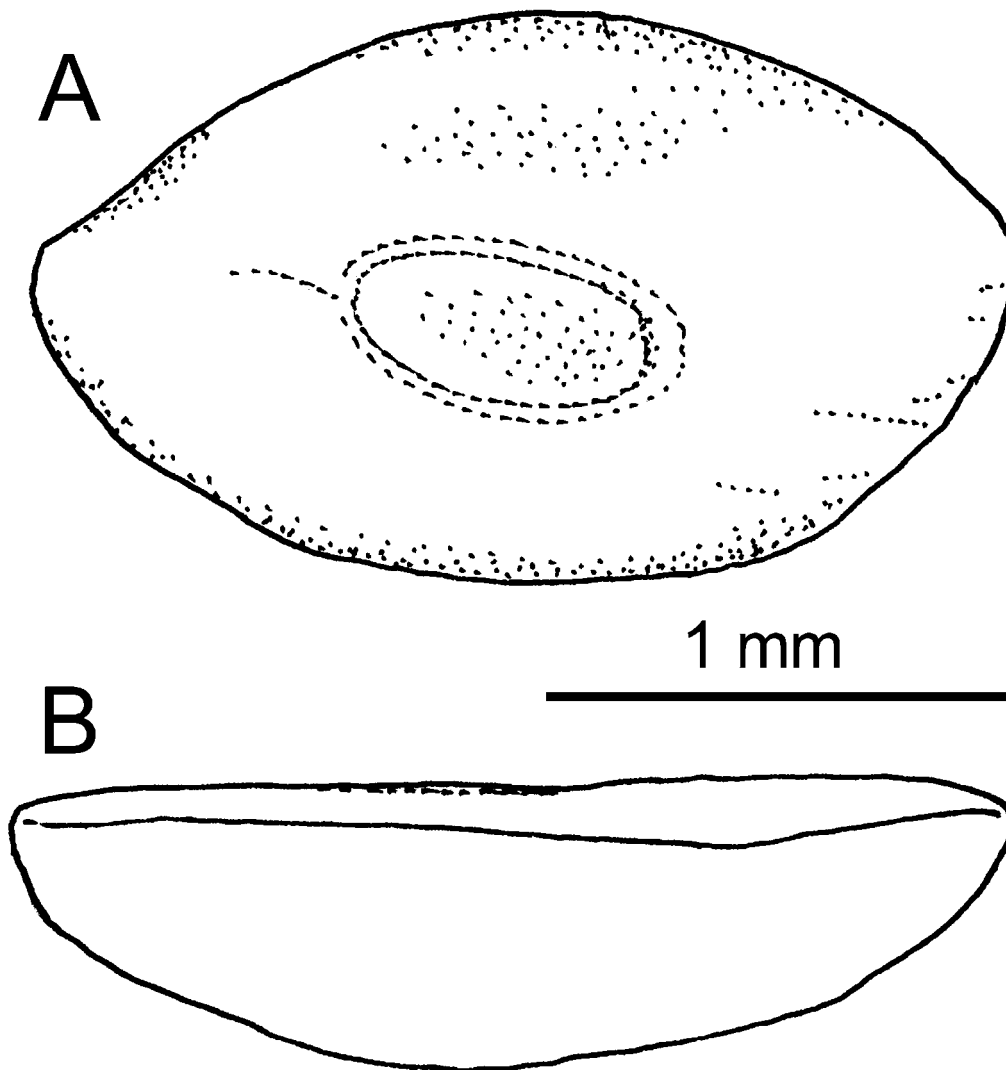


FIGURE 6. *Bellottia cryptica*. Holotype. Right sagitta: A—median view, B—ventral view.

Head pores: The loose and partly torn skin makes it difficult to observe the head pores. The following large, distinct pores were seen: three behind and three below the eye and four pores on the mandible. A few whitish sensory papillae distributed over the head.

Dentition: Head of vomer slightly curved with about 10 very small, blunt teeth in one row. Posterior half of palatines edentate, anterior half with small teeth in one row. Posterior half of dentaries edentate, anterior half with one row increasing to 4–5 tooth rows at symphysis with large and pointed teeth in outer row. Premaxillaries with posterior fourth edentate and further anteriorly small teeth in one row increasing to 4–5 rows at symphysis with larger and pointed teeth in outer row.

Axial skeleton (based on radiographs): Tips of neural and haemal spines thin and pointed. Anterior neural spine one third the length of second spine. Neural spines 2–8 depressed. Bases of neural spines 6–8 enlarged. Parapophyses present on vertebrae 7–10 and pleural ribs on vertebrae 4–9. Epipleural ribs indistinct.

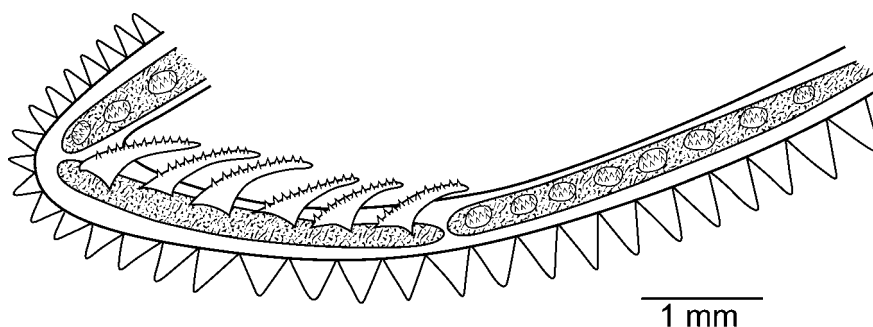


FIGURE 7. *Bellottia cryptica*. Holotype. Anterior right gill arch.

Otolith (Fig. 6): The 2 mm elongate sagittal otolith is 1.5 times as long as high and twice as high as thick. Dorsal and ventral rim rounded, vaguely pointed anteriorly. Sulcus undivided and 1/3–1/4 the length of the otolith. No osteal channel.

Coloration: Fig. 5 shows the holotype just after capture. The body is light brown, the margin of the vertical fins dark, the abdomen dark blue, the gill cover and side of head reddish brown and the eye is dark brown.

Biology. The general benthic habitat in the area where this specimen was collected consisted of a rugged, rocky ledge that was colonized by scattered hard corals (mostly *Lophelia pertusa*), black corals, bamboo corals, sponges and hydroids. Bottom temperature was 7.8° C and salinity was 34.9 ppt. This specimen was swimming about 1.5–2 m above the ledge and was collected by suction sampler. A large amount of rotenone was spread in the area, and it seems likely this fish was escaping from that. We assume that this species is normally benthic and cryptic, similar to *B. robusta*. The stomach of this specimen was about one third full of unidentified crustacean parts.

Etymology. The specific name, *cryptica*, refers to its hidden nature.

Distribution (Fig. 4). Known from a single specimen caught off southern Georgia, 30°48.74'N, 79°37.96'W, by suction-sampling from JSL at a depth of 629 m. We predict that it has a wider distribution along the slope between North Carolina and southeastern Florida.

***Bellottia apoda* Giglioli, 1883**

(Figs. 8–10)

Bellottia apoda Giglioli, 1883: 399 (type locality Gulf of Naples, Italy); Nielsen & Cohen 1968: 99 (selection and illustration of lectotype MZUF 5668); Nielsen *et al.* 1968: 245 (spermatophores); Maul 1976: 53 (off Portugal and on Great Meteor Bank southwest of Madeira); Orsi 1976: 38 (Ligurian Sea); Papaconstantinou 1984: 103 (Gulf of Evoikos, Greece); Berdar *et al.* 1977: 77 (Strait of Messina); Papaconstantinou *et al.* 1977: 279 (Gulf of Saronikos, Greece); Jardas 1979: 1 (Adriatic Sea); Sardou 1980: 69 (Villefranche-sur-Mer, South France; illustration of head pore system); Schwarzzhans 1981: 103 (otolith); Allué 1984: 41 (near Barcelona); de Ranieri & Sbrana 1992: 177 (Northern Tyrrhenian Sea); Gramito & Coen 1997: 163 (Adriatic Sea); Anon. 2002 (Mallorca) - *non Bellottia apoda*; Mytilineou *et al.* 2005: 230 (eastern Ionian Sea).

Material examined (16 specimens, SL 26–65 mm): Lectotype: MZUF 5668, SL 28, male, Gulf of Naples, trawl, *Posidonia*-bottom, 30 m, 20 Dec. 1882. - Paralectotype: MZUF 5669, SL 26, female, same data as for lectotype.

Non-type material: MMF 22516, SL 52–55, male and female, off Portugal, 37°41.5'N, 9°11.9'W, R/V

Meteor, st. 11a-AT 7, Agassiz trawl, 500 m, 20 Jan. 1967. MMF. 22860, SL 39+ -65, ?- male, off Portugal, 37°21.5'N, 9°12.5'W, R/V Meteor, st. 90d-AT 26, Agassiz trawl, 320–385 m, 22 June 1967. ZMUC P77698, SL 46, male, Great Meteor Bank, 29°50.2'N, 28°29.8'W, R/V Meteor, st. 159a, bottom trawl, 308–310 m, 18 July 1967. ZMUC P771651, SL 38, female, Central Adriatic Sea, 42°51'N, 14°44.6'E, bottom trawl, 247 m, 30 Jan. 1980. BMNH 1999.3.23.1, SL 41, male, Adriatic Sea, 42°48.5'N, 14°48.0'E, 18 June 1980. IIPB 454/1982 and 455/1982, SL 47–52, male and female, off Barcelona, 41°6.05'N, 2°3.1'E, bottom trawl, 446–516 m, 30 June 1981. ZMUC P771646-1650, SL 29–45, males, Central Adriatic Sea, 42°48.9'N, 14°41.5'E, bottom trawl, 217–219 m, 15 Apr. 1994.

Diagnosis. *Bellottia apoda* differs from all its congeners by having retrorse fangs on all dentigerous bones and lacking a distinct spine on cleithrum above base of pectoral fin and by the following combination of characters: body slender (13.0–16.0 % SL at origin of anal fin), spine on preopercular crest, caudal fin rays 6, anterior gill arch with 3–4 long rakers, precaudal vertebrae 12–13 and predorsal length (35.5–40.0).



FIGURE 8. *Bellottia apoda*. IIPB 454/1982. SL 52.

Similarity. Judging from Table 2, *B. apoda* seems to differ equally much from all the other *Bellottia* species making it difficult to select one species as the most similar. It differs from *B. robusta* e.g. by a more slender (13.0–16.0 vs 17.5–23.0 % SL) and more light-colored body, by fewer caudal fin rays (6 vs 7), fewer long rakers on anterior gill arch (3–4 vs 5–6), lacking spine on cleithrum (spine present) and shorter predorsal length (35.5–40.0 vs 44.0–49.5). From *B. cryptica* it differs e.g. by having fewer caudal fin rays (6 vs 7), more precaudal vertebrae (12–13 vs 10), fewer long rakers on anterior gill arch (3–4 vs 5–6) and presence of a spine on preopercular crest (spine absent). From *B. armiger* it differs e.g. by having fewer long rakers on anterior gill arch (3–4 vs 5), more precaudal vertebrae (12–13 vs 10), and origin of anal fin below dorsal fin ray 17–19 (vs 11). From *B. galatheae* it differs i. a. by having more rays in dorsal fin (83–94 vs 70–72), anal fin (68–82 vs 61), pectoral fin (21–26 vs 19–20), and a shorter predorsal length (35.5–40.0 vs 44.0–45.5).

Description. The principal meristic and morphometric characters are shown in Table 1. Nielsen & Møller (2008, table 3) used the same set of characters as in the present paper based on 13 specimens three of which they examined while the characters of the rest were taken from the literature. For comparative reasons we have here only included characters from the 16 specimens examined by us.

B. apoda is thoroughly described and illustrated by Nielsen & Cohen (1968), Sardou (1980) and Gramitto & Coen (1997), rendering a detailed description here redundant. A few characters that have not been focused on in earlier papers are mentioned below.

Dentition. In males vomer, palatines and dentaries with many large, retrorse fangs; premaxillaries with small, pointed teeth besides fangs. In females fangs on all four dentigerous bones, but fewer and shorter than in males.

TABLE 2. Comparison of diagnostic characters of *Bellottia* spp.

	<i>apoda</i>	<i>armiger</i>	<i>galathea</i>	<i>robusta</i>	<i>cryptica</i>
Dorsal fin rays	83–94	86	70–72	85–93	92
Caudal fin rays	6	6	6	7	7
Anal fin rays	68–82	74	61	75–88	84
Pectoral fin rays	21–26	22	19–20	23–25	23
Precaudal vertebrae	12–13	10	11	12	10
Total vertebrae	46–50	45	44–45	48–51	49
Long gill rakers	3–4	5	4	5–6	5–6
Spine on preopercle crest	yes	yes	yes	yes	No
Spine on cleithrum	no	yes	yes	yes	Yes
Predorsal in % SL	35.5–40.0	41.5	44.0–45.5	44.0–49.5	46.5
Depth at anal fin origin	13.0–16.0	17.5	16.5	17.5–23.0	17.0

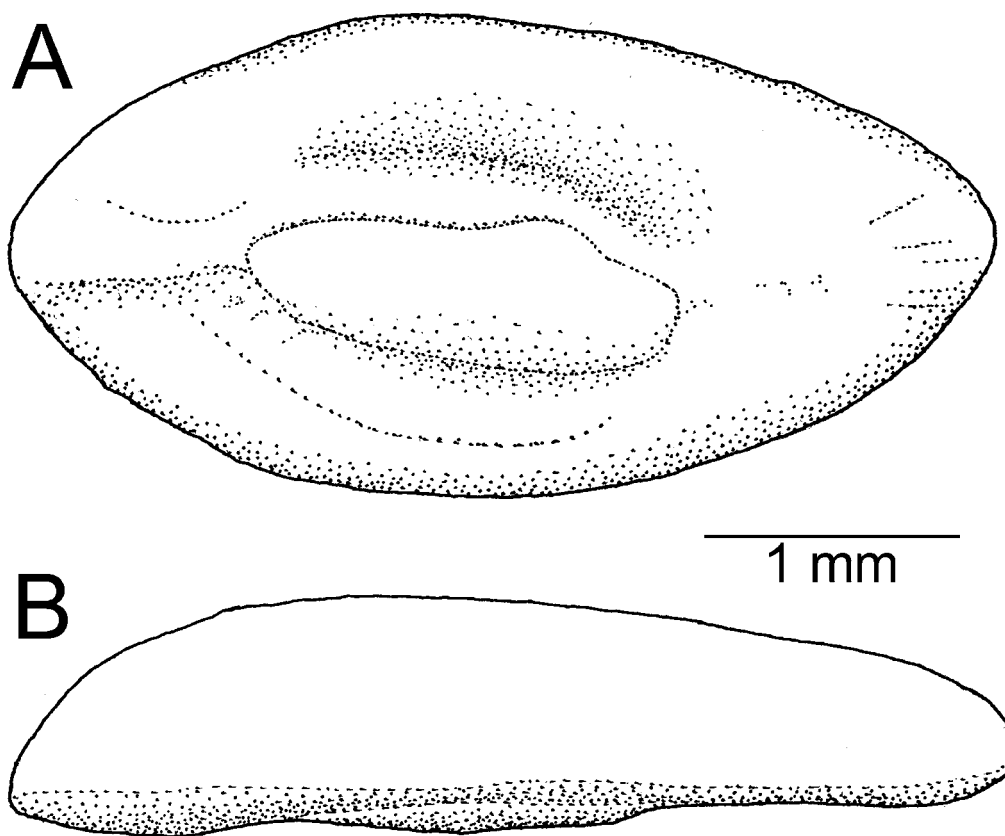


FIGURE 9. *Bellottia apoda*. MMF 22860. SL 65. Right sagitta: A—median view, B—dorsal view.

Axial skeleton (based on radiographs): Tips of neural and haemal spines thin and pointed. Anterior neural spine 1/2 to 1/1 the length of second spine. Neural spines 2–9 depressed. Bases of neural spines 4–9 enlarged. Parapophyses present on vertebrae 7/8 to 12/13, pleural ribs on vertebrae 2/3 to 10/11 and epipleural ribs on vertebrae 4/5 to 11/12; the latter observed on few specimens only.

Otolith (Fig.9). The 3.9 mm elongate sagittal otolith (from a 65 mm SL specimen, MMF 22860) is twice as long as high and twice as high as thick. Dorsal and ventral rim evenly rounded. Sulcus undivided, almost half as long as the otolith. No osteal channel.

Coloration: Fig. 8 shows a specimen after 27 years of preservation. It is uniformly light brown except for the dark eyes. A photo (provided by E. Gramitto, Ancona) of a specimen of unknown length from the Adriatic Sea taken just after capture shows a light brown body with darker vertical fins, a dark brown head with many spots and dark blue eyes.

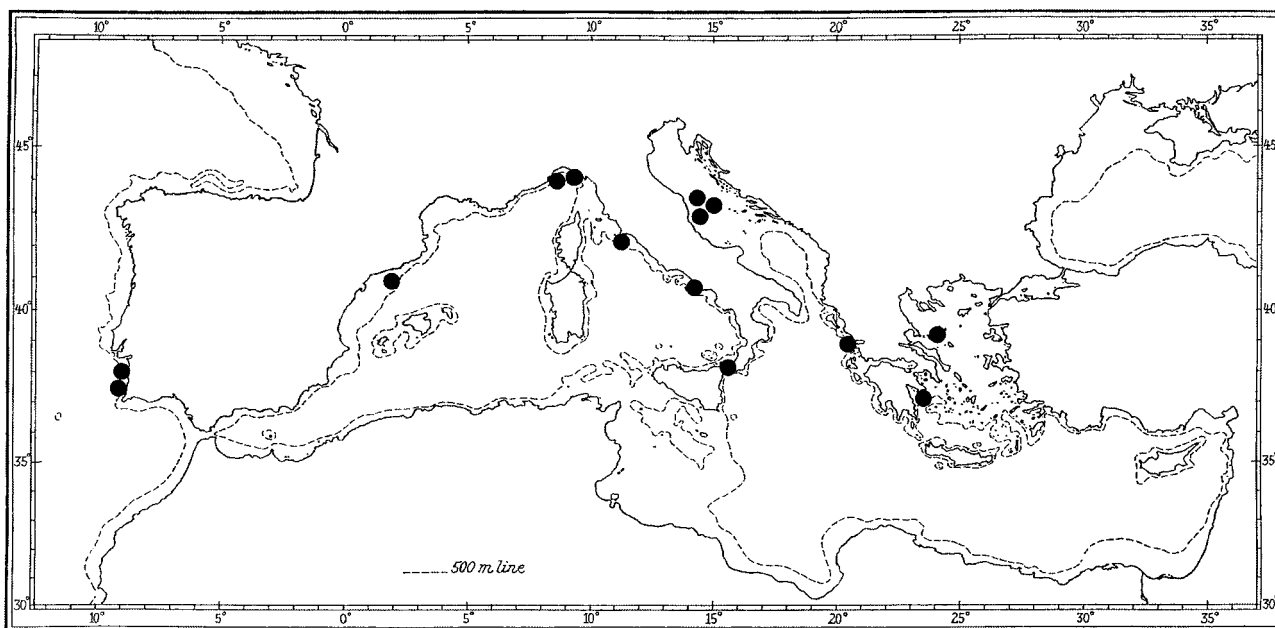


FIGURE 10. Records of *Bellottia apoda*. One record outside the map on Great Meteor Bank (29°50.2'N, 28°29.8'W).

Biology. All specimens have been caught on or near the bottom. The type material was trawled at 30 m on *Posidonia*-bottom and all specimens since then at depths of 150–569 m. This is a viviparous genus in which the male transfers the spermatozoans packed in spermatophores into the female (Nielsen *et al.* 1968: 245). A 38 mm specimen (ZMUC P 771651) contained eggs up to 1 mm in diameter; embryos were not observed. Gramitto & Coen (1997: 170) observed embryos ready to hatch of 5 mm total length. According to Gramitto & Coen (1997:168), the stomach contents from 23 Adriatic specimens showed that the diet consisted of pelagic and benthic crustaceans with copepods as the most important prey.

Distribution. Fig. 10 shows that *B. apoda* is found from Greece to off Barcelona, off southern Portugal and furthermore on Great Meteor Bank at depths of 30–569 m.

Remarks. *B. apoda* seems to be a rather common species in the Mediterranean as 128 specimens were caught in the Central Adriatic Sea between 1970 and 1994 (Gramitto & Coen 1997: 163). In order to determine whether the specimens from the East Atlantic Ocean differ from the Mediterranean ones, we have compared the set of characters used in Table 1 between these areas. Overlap was observed in all but one character, *viz.* number of pectoral fin rays: 21–23 in the Atlantic and 23–26 in the Mediterranean specimens, suggesting that there is no difference between the two populations.

Acknowledgments

We thank the following persons for helping with material and information: M. Bisquito (MMF), B. Brown (AMNH), M.E. Gramitto (Inst. Sci. Mar., Ancona), D. Lloris (IIPB, Barcelona), J. Maclaine (BMNH), J. McEachran (TCWC), H. Prestridge (TCWC), A.M. Quattrini (UNCW), D. Smith (USNM), W.C. Starnes and G. Hogue (NCSM). W. Schwarzhans (Hamburg) kindly made the illustrations of the otoliths, B. Rubæk (ZMUC) the remaining illustrations and G. Brovad (ZMUC) the photos. We thank C.R. Fisher, E.E. Cordes, and E. Becker for providing Gulf of Mexico specimens and data from their cruises. Support for sampling off

the southeastern US Atlantic coast was provided by grants from NOAA Office of Ocean Exploration (to S.W. Ross), and additional support for Atlantic sampling was provided to SWR by US Geological Survey and US Minerals Management Service. A.M. Quattrini assisted with handling Atlantic project sampling and data.

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