Journal of the
Ocean Science Foundation

2020, Volume 35

A review of Indian Ocean *Foa* cardinalfishes (Percomorpha: Apogonidae: Apogonichthyini), with a new species from Chagos Archipelago and the Maldives

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Abstract

A new species of cardinalfish, *Foa winterbottomi*, is described from the Chagos Archipelago and Maldive Islands. It is characterized by a relatively uniform dusky head and body, fewer than 10 pores between the mandibular and articular pores, and a single line of free neuromasts along the dentary. The new species is compared to the two regional congeners: *Foa madagascariensis*, known from tidal estuaries and shallows of East Africa and the islands of the western Indian Ocean, is characterized by discrete, small, intense dark spots on the body, about 35 pores between the mandibular and articular pores, and multiple linear rows of free neuromasts on the dentary; and *Foa fo*, a widespread species, has indistinct irregular dark bars on the body, about 30 pores between the mandibular and articular pores, and multiple linear rows of free neuromasts on the dentary. The holotype of *Apogonichthys zuluensis* is re-examined and the species is considered a junior synonym of *Foa fo*.

Key words: taxonomy, systematics, ichthyology, coral-reef fishes, SAIAB, J.L.B. Smith.

Citation: Fraser, T.H. (2020) A review of Indian Ocean *Foa* cardinalfishes (Percomorpha: Apogonidae: Apogonichthyini), with a new species from Chagos Archipelago and the Maldives. *Journal of the Ocean Science Foundation*, 35, 18–29.

doi: https://doi.org/10.5281/zenodo.3893961

urn:lsid:zoobank.org:pub:5595397D-E89A-4B97-B860-39B8048BC371

Date of publication of this version of record: 15 June 2020

Introduction

Species of the genus *Foa* Jordan & Evermann in Jordan & Seale, 1905 are more numerous than presently documented (see Fraser & Randall 2011, Fraser 2014). Fraser & Randall (2011) restricted *Foa brachygramma* (Jenkins, 1903) to the Hawaiian Islands, raising the question of the identity of *Foa* species from elsewhere in the Pacific and Indian Oceans.

The status of *Foa* specimens from the Indian Ocean has been in flux, with differing identifications by different authors. Petit (1931) described *Foa madagascariensis* from the peninsula of Sarodrano, Tuléar, in southwestern Madagascar. The original specimens were collected in 5 to 6 meters by a dredge from seagrass (Cymodocea) and coralline sand. The syntypes have been lost (Smith 1961, Bauchot & Desoutter 1987). Smith (1961) translated Petit's original description from the French, although without reviewing any material and suggested the species was doubtfully distinct from *F. brachygramma*. Smith's color figure (Plate 48C) of a cardinalfish from Inhaca, Mozambique, labeled as *Foa brachygramma*, fits the description of *F. madagascariensis*. That specimen may not have been retained and cannot be found (Ofer Gon, pers. comm.). Smith (1961) also considered *Apogonichthys zuluensis* Fowler, 1934 from KwaZulu-Natal, South Africa, to be a synonym of *Foa brachygramma* (previously, Smith (1949) had considered *Apogonichthys zuluensis* valid). Fraser & Randall (2011) did not discuss the status of Fowler's holotype. Most recently, Fricke et al. (2018) reported *F. madagascariensis* as endemic to Madagascar.

Elsewhere, Jones (1969) identifed specimens from Minicoy Island in the Laccadive Archipelago as *F. brachygramma*. Winterbottom et al. (1989) reported *Foa* sp. from the Chagos Archipelago; they considered two of three specimens collected from a depth of 18 m as an unidentified *Foa* with a faded color pattern (BMNH 1908.3.23.81–83 identified by Regan (1908) as *Apogon variegatus* Valenciennes, 1832). Subsequently, Winterbottom & Anderson (1997) identified additional specimens from Chagos (USNM 279789) as *F. brachygramma* and concluded that the BMNH specimens are the same species. Randall & Anderson (1993) identified specimens from the Maldives as *F. brachygramma*, but suggested that they may be distinct. Additional specimens were collected by Randall from Diego Garcia in 1967 and from the Maldives in 1988. Another species, *Foa fo* Jordan & Seale, 1905 (type location: Manila Bay, Philippines), has been reported from Rodrigues Island (Heemstra et al. 2004), the Red Sea (live photograph in Fraser & Randall 2011), and the Red Sea and East Africa (Gon & Randall 2003).

The unidentifed species from Chagos Archipelago and Maldives is described herein as a new species, and compared with its regional congeners *Foa madagascariensis* and *Foa fo*. The holotype of *Apogonichthys zuluensis* is shown to be consistent with *Foa fo*. Only preserved material was available for this review, and many older preserved specimens, especially those collected by J.L.B. Smith & M.M. Smith between 1949 and 1956, are bleached and show no marking patterns and cannot be assigned confidently to any species.

Materials and Methods

The holotype and paratype specimens are deposited at the United States Museum of Natural History-Smithsonian Institution, Washington, DC, USA (USNM) and the Bernice P. Bishop Museum in Honolulu, HI, USA (BPBM).

Methods for meristic data and measurements follow Fraser (2005); values are listed for the holotype followed by the range for paratypes in parentheses, if different. Proportions are percent of standard length. Acronyms used to designate institutions and collections cited follow Fricke & Eschmeyer (2020). Internal characters were obtained from cleared and stained specimens and radiographs. All figures have been processed through Adobe Photoshop CS6 Extended ver. 13.06x64. Film-based radiographs were scanned on Epson Perfection V700 Photo to convert to digital format. All radiographs, initially negatives, were converted to positives in Adobe Photoshop and modified for clarity. Partial head-pore pattern and free-neuromast patterns were based on single or combinations of specimens using a camera lucida attached to a Wild M5D or Leica MZ95 stereo microscope. Drawings were scanned and finalized in Adobe Photoshop.

Foa winterbottomi, n. sp.

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Figures 1–3; Table 1

Foa brachygramma (*non* Jenkins) Winterbottom & Anderson 1997: 9 (Chagos Archipelago).

Holotype. USNM 344872, 35.0 mm SL, British Indian Ocean Territory, Chagos Archipelago, Diego Garcia Atoll, lagoon reef about 1.2 km SE of East Point Village, -7.364º, 72.473º, 1–2 m, HA 67-17, H.A. Fehlmann, 23 June 1967.

Paratypes. USNM 431414, (22) 17.9–33.9 mm SL, same data as holotype; USNM 279789, 22.1 mm SL, British Indian Ocean Territory, Chagos Archipelago, Diego Garcia Atoll, patch reef about 260 m N of East Point, -7.348º, 72.463º, 0.5–2 m, HA 67-18, 26 June 1967; BPBM 33031 (3) 29.0–42.2 mm SL, Maldives, North Male Atoll, Huraa Island, seagrass bed, 4.33º, 73.60º, 0.3–0.7 m, 24 March 1988 (color photograph, 33.9 mm SL).

Diagnosis. A species of *Foa* with no dark bars or discrete small dark spots on body (excluding fins) (Fig. 1), fewer than 10 dentary pores between mandibular and articular pores; a single line of free neuromasts along dentary (Figs. 2D, E & F).

Description. Dorsal-fin elements VII(I)-I,9 (IX spines total), third spine longest and stoutest, hidden nubbin represents eighth spine; anal-fin elements II,8; pectoral-fin rays 12; pelvic-fin rays I,5; principal caudal-fin rays 9+8, uppermost and lowermost unbranched; lateral-line scales about 22, 9 pored (9 or 10), after about 10 pitted: 3 pitted scales behind last pored scale, then interrupted, then 7 pitted scales along midline to base of caudal fin (12 or 13); transverse scale rows above lateral line 1; median predorsal scales 4 (3); transverse scale rows below lateral line 5 (6); circumpeduncular scale rows 12, as 5+2+5; well-developed gill rakers 7, upper arch with 1 raker and 2 rudiments, lower arch with 6 rakers and 4 (4–5) rudiments.

Vertebrae 10+14; 5 free hypurals (Figs. 3C & D), one pair of short slender uroneurals, three epurals with first two expanded, a free parhypural, three supraneurals with no procumbent spines (spurs), two supernumerary spines on first dorsal pterygiophore with no procumbent spines (spurs); posttemporal smooth (one specimen with two tiny serrae); preopercle smooth on vertical and horizontal edges, ridge smooth; infraorbitals smooth, infraorbital shelf present on third bone; interhemal gap 2+4. Scales ctenoid on nape, cheek, opercle, subopercle, breast, and rest of body except cycloid second pelvic scale and last scales at base of caudal fin. Pored lateral line scales with one opening above and one opening below lateralis canal; a single pit in each pitted scale without a developed lateralis canal; free neuromasts present on last few caudal scales; free neuromasts absent on lateralis scales.

Anterior nares tubular, posterior nares with flat rim. Teeth villiform in a band on premaxilla and dentary; 1–2 (1–3) rows on vomer; 2–3 (1–2) rows on palatine; none on ectopterygoid, endopterygoid, or basihyal. Free

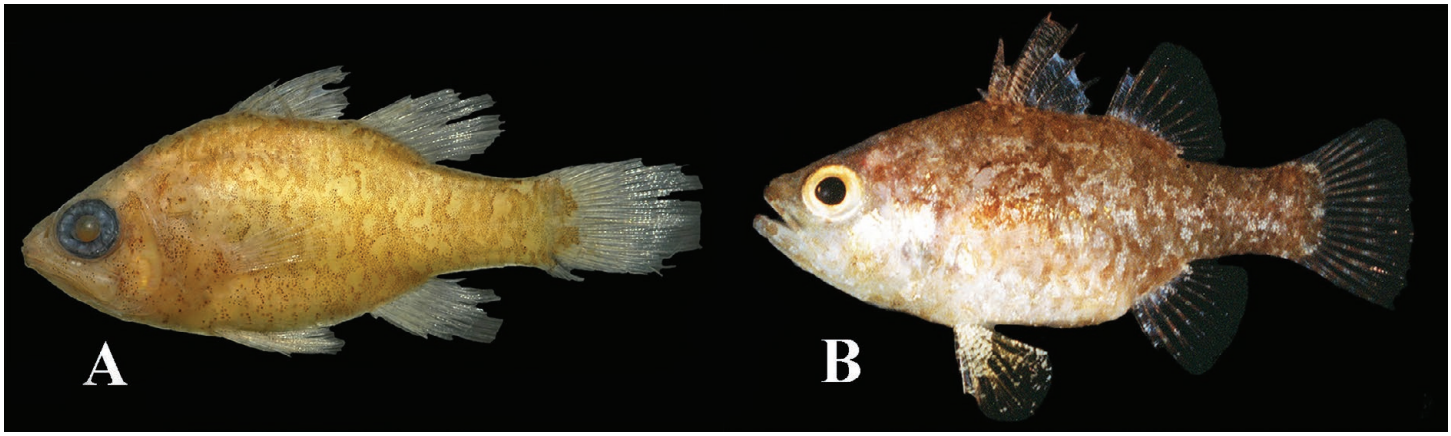

Figure 1. *Foa winterbottomi*, A) preserved holotype, USNM 344872, 35.0 mm SL, Chagos Archipelago; B) post-mortem paratype, BPBM 33031, 42.2 mm SL, North Male Atoll, Maldives (J.E. Randall).

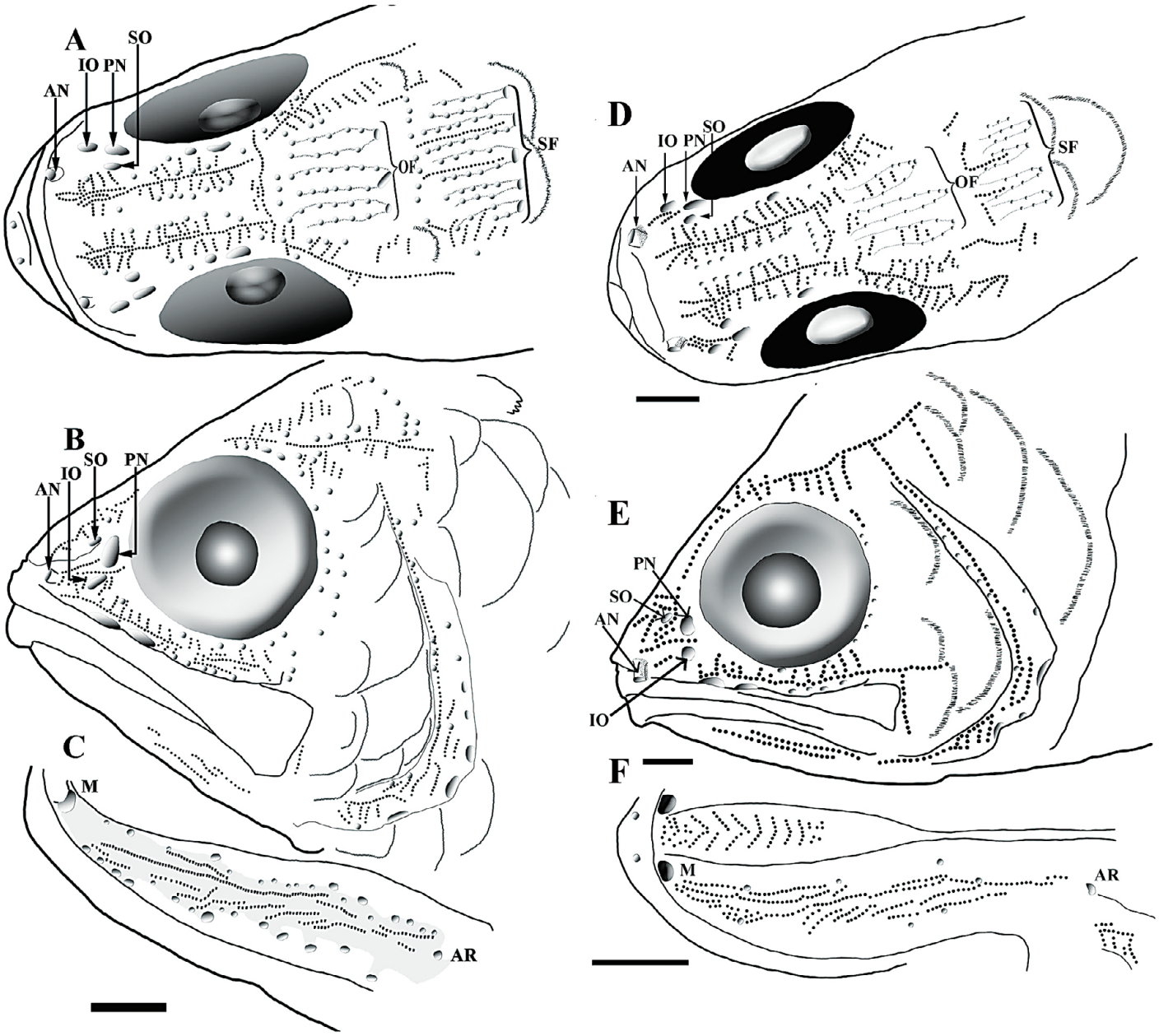

Figure 2. Semi-diagrammatic presentation of cephalic canal pores (circles) and free neuromasts (solid dots); some pores and neuromasts obscured or missing. *Foa madagascariensis*, USNM 344874, 42.7 mm SL, Zanzibar: A) dorsal; B) left lateral; C) ventral (shade outlines the dentary canal and free neuromasts, right dentary reversed). *Foa winterbottomi*, paratype, USNM 431414, 28.1 mm SL, Chagos Archipelago: D) dorsal; E) left lateral; F) ventral (right dentary reversed). AN=anterior naris, AR=articular pore IO=anterior infraorbital pore, M=mandibular pore, PN= posterior naris, SO=second supraorbital pore, OF=orbital flutes, SF=supratemporal flutes. Scales=1 mm (T. Fraser).

neuromasts visible, but incomplete; present along dentary on lower jaw in a single line, as well as on lachrymal, infraorbitals, preopercle, snout, supraorbitals, and nape (Figs. 2D, E & F). Head pores large at anterior end of lower jaw (Fig. 2F) with small pores along outer edges of free neuromasts; articular pore slightly larger, about 5 pores along edge of preopercle with small pores near preopercular ridge (Fig. 2E); three large pores at anterior end of lachrymal, small pores posteriorly near ventral and dorsal edges of lachrymal; small infraorbital pores along ventral edge of eye extending to near dorsal side of eye; three large supraorbital pores, one near edge of snout, one adjacent to posterior naris, one on orbit, more numerous small supraorbital pores near center line posterior to rostral region to midorbital area, followed by pores outlining 3 orbital flutes; pores partially outlining 5 supratemporal flutes (Fig. 2D).

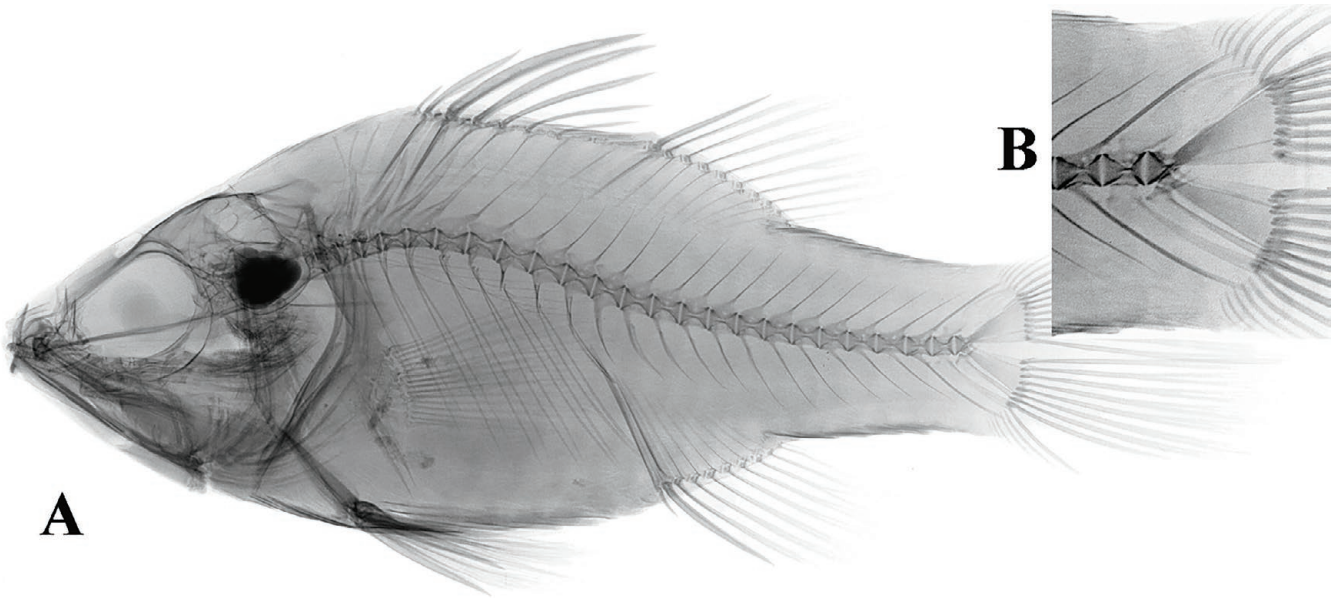

Figure 3. *Foa winterbottomi*, A) positive radiograph, holotype, USNM 344872, 35.0 mm SL, Chagos Archipelago; B) caudal skeleton showing 5 hypurals (courtesy Sandra Raredon, USNM).

Color in alcohol. (Fig. 1A) Head and body a tan ground color with light to dark-brown melanophores. Head with upper and lower jaws with alternating pale bands separating brown bands; brown band behind eye extending up across preopercle and upper opercle to near posttemporal; cheek with clusters of melanophores near end of premaxilla and below mid-line of eye; lower half of opercle with a cluster of melanophores. Body generally dusky without dark bars or spots, becoming darker dorsally on body and caudal peduncle, with at most pale irregular areas; abdomen between pectoral and pelvic rays with narrow dark outline of scales. First dorsal fin dark from third spine to near proximal membrane of seventh spine, pale area on mid-distal membrane between sixth and seventh spines extending dorsally between dark areas of fourth through sixth membranes; second dorsal fin with proximal dark band; anal fin with proximal scattering of melanophores; pectoral fin pale; pelvic fin with scattered melanophores across soft rays; base of caudal fin with three pale areas, upper, mid, and lower, separated by two brown spots; caudal fin with irregular light brownish markings. Peritoneum, stomach, and intestine pale.

Color when fresh. (Fig. 1B) Head and body pale brown, grading to whitish ventrally; upper and lower jaws with some brown and pale bars; indistinct dark bands from eye forward to snout and obliquely back from rear margin of eye; dusky area on cheek. Body with dark shading concentrated around scale margins forming a network of darker blotches with no bars or discrete dark spots; first two dorsal-fin membranes with brownish reticulations, following membranes dark; second dorsal fin, caudal fin and anal fin mostly clear with alternating brown and pale bands, mainly along rays; pectoral fins translucent.

Etymology. The new species is named for Richard Winterbottom who has collected and photographed many species of apogonids and is one of the authors of extensive checklists of fishes from Chagos Archipelago.

Distribution. The species is currently known from the British Indian Ocean Territory and the Maldives; it may occur at Minicoy and other islands in the Lakshadweep Archipelago, India.

Comparisons. Species of *Foa* all share very similar body proportions and morphometrics have not been useful for species identification (Table 1 & Fraser & Randall 2011). The new species does not share the diagnostic markings for *Foa fo*, i.e. indistinct, irregular dark bars on the midbody and caudal peduncle, or the discrete, small, intense dark spots on *F. madagascariensis*. Dark markings on the body of fresh specimens (Fig. 1B) are diffuse connected blotches.

Winterbottom & Anderson (1977) considered this cardinalfish from Chagos to be *F. brachygramm*a, but that species is now determined to be a Hawaiian endemic. The new species can be further distinguished from the two sympatric species by having 10 dentary pores on the lower jaw between the mandibular and articular pores vs. 30–35. The low count of dentary pores is similar to three Pacific Ocean species: *Foa brachygramma* with 14, *Foa leisi* Fraser & Randall, 2011 with 16, and *Foa nivosa* Fraser & Randall, 2011 with 9 (Fraser & Randall 2011: figs 7C, 10C & 11C). The single line of free neuromasts along the dentary also separates *F. winterbottomi* from the sympatric congeners.

Foa madagascariensis Petit, 1931

Figures 2A, B, C, 4 & 5: Table 1

Types. The type specimens are presumed lost (see Bauchot & Desoutter 1987).

Material examined. USNM 203771, (43) 19.0–38.2 mm SL, Madagascar, Atsimo-Andrefana, Toliara, harbor, -23.36º, 43.65º, *Anton Bruun* cruise 7, 11 Aug 1964 (one cleared & stained, missing neurocranium); USNM 346997, (9) 18.9–29.5 mm SL, Mauritius, southeast coast, ca. 500 m east of Pointe Bambou, -20.43º, 57.73º, 11–13 m, PCH 95-M31, 19 May 1995; USNM 346998, (80) 10.0–42.7 mm SL, Baie de la Petite Riviere, around and off rocks at north end of public beach at Albion, just south of Pointe Petite Riviere, -20.20º, 57.40º, 1.5 m, PCH 95-M5, April & May 1995 (photograph & radiograph); USNM 397918, (4) 27.8–36.1 mm SL, same data as USNM 346998; USNM 344874, (11) 26.0–41.9 mm SL, Tanzania, Zanzibar, -6º, 39º, 2–7 m, June 1965 (photograph).

Diagnosis. A species of *Foa* with scattered discrete, small, intense dark spots on body; no dark bars (except some juveniles) (Fig. 4); more than 30 dentary pores between mandibular and articular pores; multiple lines of free neuromasts along dentary (Figs. 2 A, B & C).

Description. Dorsal-fin elements VII(I)-I,9 (IX spines total), third spine longest and stoutest, hidden nubbin represents eighth spine; anal-fin elements II,8; pectoral-fin rays 12; pelvic-fin rays I,5; principal caudal-fin rays 9+8, uppermost and lowermost unbranched; lateral-line scales about 22, 9–11 pored after pitted; transverse scale rows above lateral line 1; median predorsal scales 4; circumpeduncular scale rows 12, as 5+2+5; well-developed gill rakers 7, upper arch with 1 raker and 2 rudiments, lower arch with 6 rakers and 2–4 rudiments.

Vertebrae 10+14; 5 free hypurals (Fig. 5), one pair of short slender uroneurals, three epurals with first two expanded, a free parhypural, three supraneurals with no procumbent spines (spurs), two supernumerary spines on first dorsal pterygiophore with no procumbent spines (spurs); posttemporal smooth; preopercle smooth on vertical and horizontal edges, ridge smooth; infraorbitals smooth, infraorbital shelf present on third bone; interhemal gap 2+4.

Scales ctenoid on nape, cheek, and body.

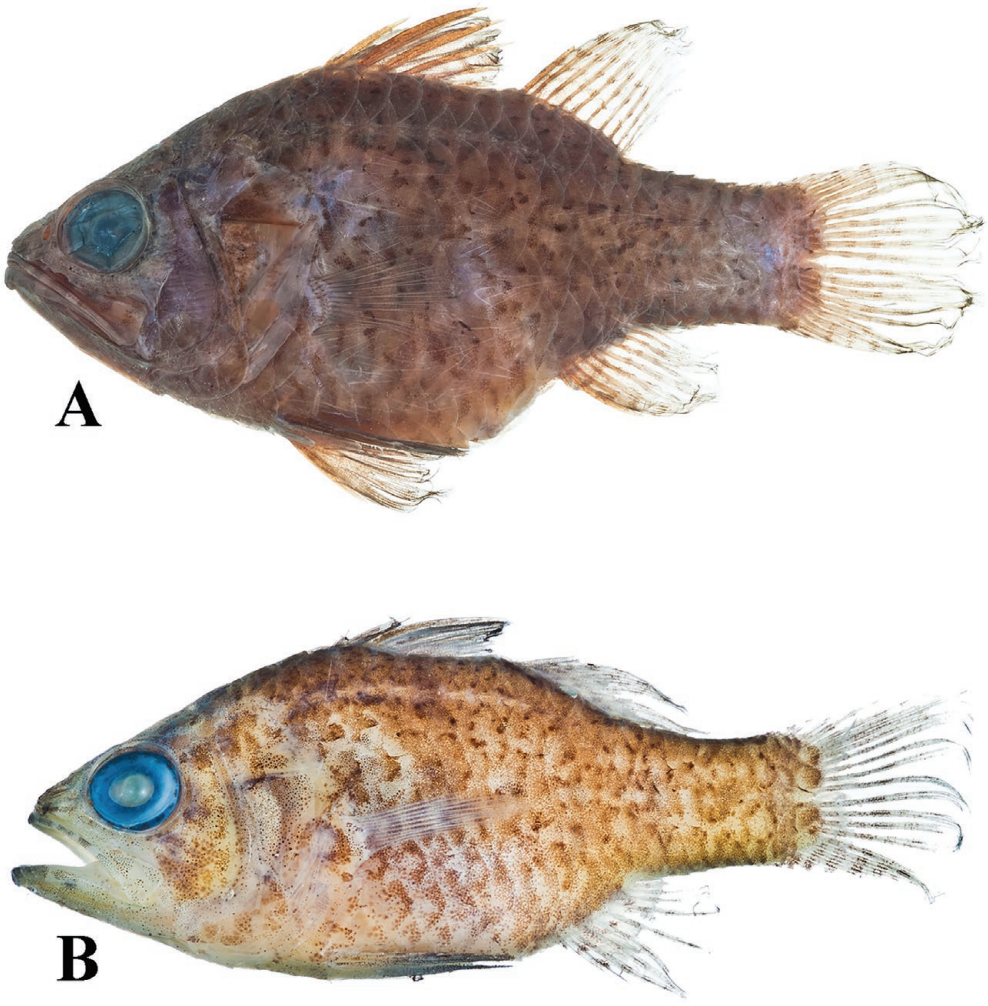

Figure 4. *Foa madagascariensis*, preserved A) USNM 344874, 42.7 mm SL, Zanzibar (courtesy Sandra Raredon, USNM); B) USNM 346998, 39.3 mm SL, Mauritius (T. Fraser).

Anterior nares tubular, posterior nares with flat rim. Teeth villiform in a band on premaxilla and dentary; 3–4 rows on vomer; two rows on palatine; none on ectopterygoid, endopterygoid, or basihyal. Free neuromasts present along dentary on lower jaw in multiple lines. About 34 dentary pores between mandibular and articular pores.

Color in alcohol. (Figs. 4A & B) On juveniles, head with dark marks on cheek, mid-opercle, and from eye to posttemporal; nape and interorbital shaded with fine melanophores; jaws with fine-melanophore bands (some juveniles have a darker caudal-peduncle bar and a bar on body below mid-soft-dorsal fin, not present on adults). Body shaded with fine melanophores, denser above, with lateral-line scales with unconnected dark lines. First dorsal fin shaded with dense small melanophores, dark markings on third to fifth dorsal-fin membranes; base of second dorsal fin with dense small melanophores, melanophores along distal edges of soft rays; anal fin with three proximal dark stripes and two or three irregular bands; pectoral fin pale; base of caudal fin with three roundish pale areas, dorsal, middle and ventral; caudal-fin rays with interrupted bands of melanophores along the upper and lower rays. Adults similar to juveniles but with discrete, small, intense dark spots covering the body; second dorsal, anal, and caudal fins with dark bands.

Distribution. Known from tidal estuaries and shallow shores of Tanzania, Madagascar, and Mauritius; should be expected elsewhere along the coast of East Africa.

Remarks. Species of *Foa* all share very similar body proportions and morphometrics; radiographs also show that there are no apparent osteological characters to differentiate species. Apparently, the only reliable features to distinguish these species are marking patterns and the pores and neuromast patterns on the lower jaw. Unfortunately, live color patterns have not been recorded for specimens confidently identified as this species.

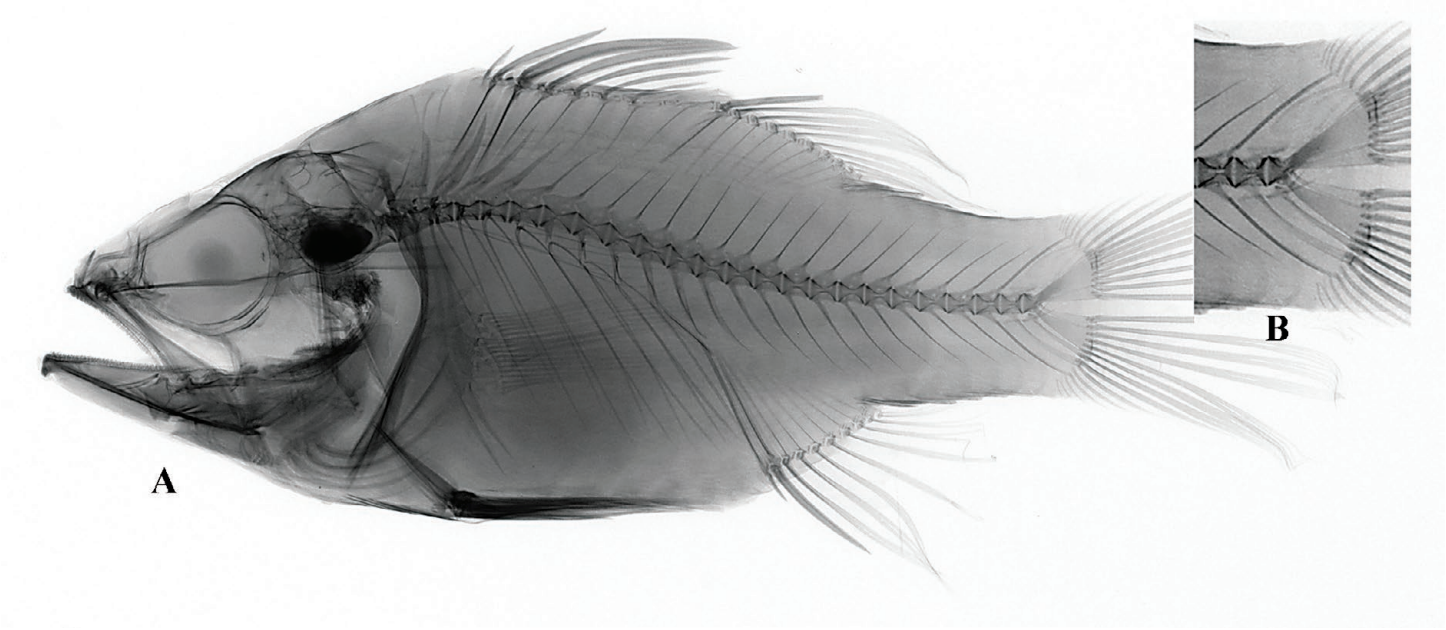

Figure 5. *Foa madagascariensis*, A) positive radiograph, USNM 46998, 39.3 mm SL; B) caudal skeleton showing 5 hypurals (courtesy Sandra Raredon, USNM).

Foa fo Jordan & Seale, 1905

Figures 6–8; Table 1

Apogonichthys zuluensis Fowler 1934: 421 (fig.), 424 & 427 (description) (South Africa).

Lectotype. CAS-SU 9672, Philippines, Luzon, Manila Bay, Bacoor Bay, Cavite, 14.4668°, 120.890°, G.A. Lung.

Material examined. South Africa: ANSP 53447 (holotype of *Apogonichthys zuluensis*), 35.7 mm SL, South Africa, KwaZulu-Natal, St. Lucia Lake, 20 miles upstream, -28.1º, 32.45º, H.W. Bell-Marley, 1931 (x-ray & photograph); SAIAB 69122, (7) 12.0–26.9 mm SL, South Africa, KwaZulu-Natal, Kosi Bay Estuary, -26.898°, 32.877°, SW04-03, 4 Apr 2003; **Mozambique:** SAIAB 56400, (5) 29.4–37.0 mm SL, Mozambique, Maputo Bay, Inhaca Island, -26.017°, 32.96°, PCH I-02, July 1997; **Kenya:** BPBM 28025, (21) 13–38 mm SL, Kenya, off Lamu, Manda Island, -2.244°, 40.99°, 0.1–1.5 m, J.E. Randall,1 Mar 1980 (photograph); USNM 347192, 34.3 mm SL, Kenya, Mombasa, Kilindini Harbor, -4.07°, 39.65°, 29 June 1965; BPBM 28025, (21) 17.3–37.0 mm SL, Kenya, off Lamu; Manda Island, west side, mangrove slough, -2.272°, 40.916°, silt, one place at shore with oyster-covered rock, 0–1.5 m, J.E. Randall, 9 March 1980 (color photograph); SAIAB 191125, (9) 14.0-35.5 mm SL, Kenya, Ghazi Bay, Kinondo Creek, -4.422°, 39.525°, KNY2011-02, 0.2–0.7 m, 1 November 2011; **Mauritius:** BPBM 16353, 32.0 mm SL, Rivière Noire, -20.4°, 57.35°, 0–1.5 m, 24 November 1973 (photographs); BPBM 16282, 28.2 mm SL, Ile aux Cerfs, -20.28°, 57.81°, 6 m, 27 October 1973 (photograph); SAIAB 62375, 31.6 mm SL, Mauritius, southeast coast, ca. 500 m east of Pointe Bambou, -20.43º, 57.73º, 11–13 m, PCH 95-M31, 19 May 1995; SAIAB 68893, (3) 29.3–35.0 mm SL, Republic of Mauritius, Rodrigues, Grand Baie, -19.6669°, 63.4528°, ROD-11a, 0.3 m, 22 Sep 2001.

Diagnosis. A species of *Foa* with irregular indistinct dark bars midbody and on caudal peduncle; no scattered discrete small intense dark spots; about 30 dentary pores between mandibular and articular pores; multiple lines of free neuromasts along dentary.

Description. (based on holotype of *Apogonichthys zuluensis*, ANSP 53447) Dorsal-fin elements VII(I)-I,9 (IX spines total), third spine longest and stoutest, hidden nubbin represents eighth spine; anal-fin elements II,8;

Figure 6. *Foa fo*, underwater photograph, Sharm el Sheikh, Egypt (Jean-Louis Rose).

pectoral-fin rays 12; pelvic-fin rays I,5; principal caudal-fin rays 9+8, uppermost and lowermost unbranched; lateral-line scales about 22, 10 pored after about 11 pitted; transverse scale rows above lateral line 1; median predorsal scales 4; circumpeduncular scale rows 12, as 5+2+5; well-developed gill rakers 7, upper arch with 1 raker and 2 rudiments, lower arch with 6 rakers and 4 rudiments.

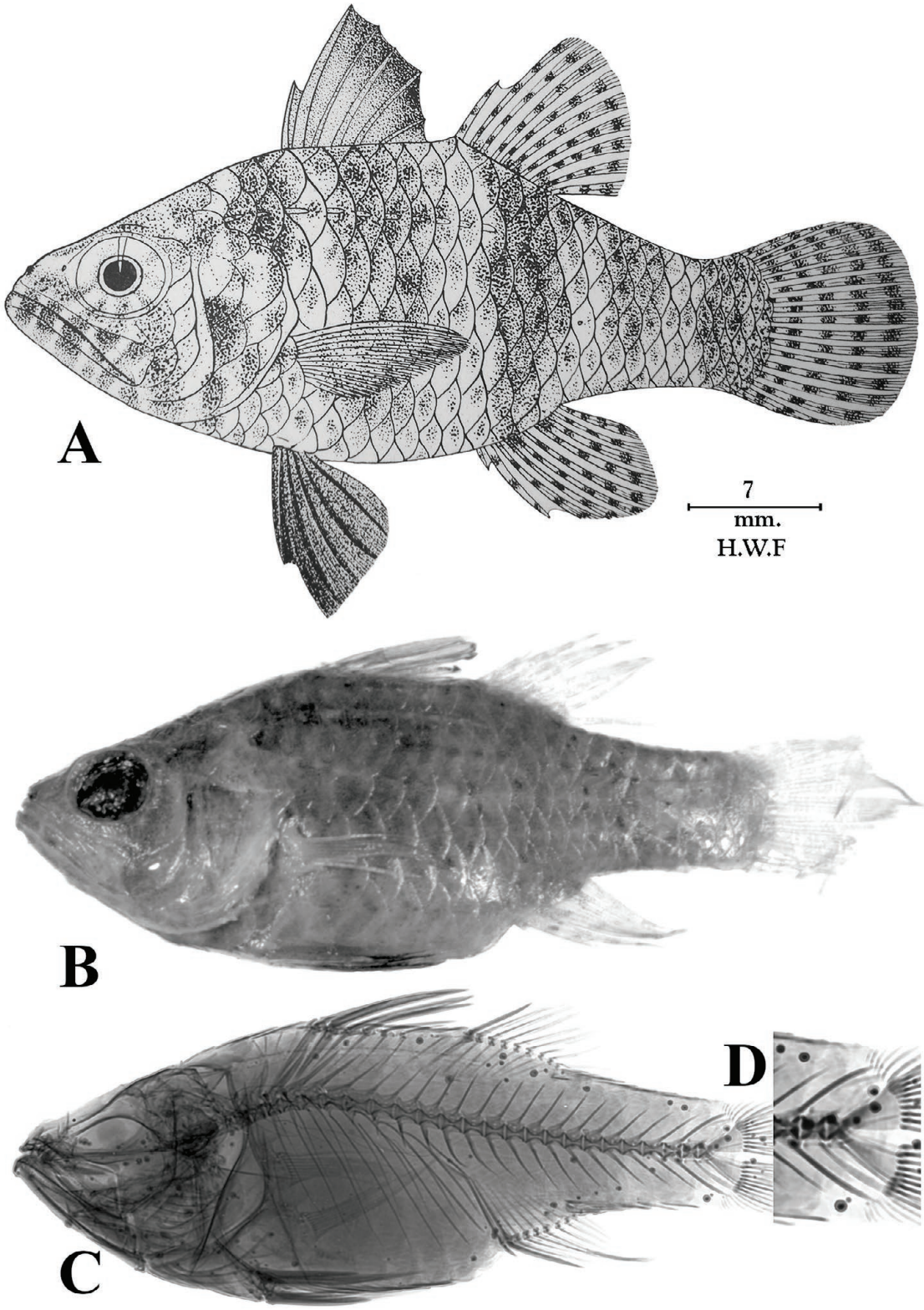

Figure 7. *Foa fo*, A) holotype illustration by Fowler (1934: Fig. 10), modified from photograph by O. Gon; B) preserved holotype of *Apogonichthys zuluensis*, ANSP 53447, 35.7 mm SL, taken in 1973 (T. Fraser); C) positive radiograph of holotype of *Apogonichthys zuluensis* (courtesy Sandra Raredon, USNM).

Vertebrae 10+14; 5 free hypurals (Fig. 1B), one pair of short slender uroneurals, three epurals with first two expanded, a free parhypural, three supraneurals with no procumbent spines (spurs), two supernumerary spines on first dorsal pterygiophore with no procumbent spines (spurs); posttemporal smooth; preopercle smooth on vertical and horizontal edges, ridge smooth; infraorbitals smooth, infraorbital shelf present on third bone; interhemal gap 2+4.

Scales ctenoid on nape, cheek, and body.

Anterior nares tubular, posterior nares with flat rim. Teeth villiform in a band on premaxilla and dentary; 3–4 rows on vomer; two rows on palatine; none on ectopterygoid, endopterygoid, or basihyal. Free neuromasts present along dentary on lower jaw in multiple lines. About 30 dentary pores between mandibular and articular pores.

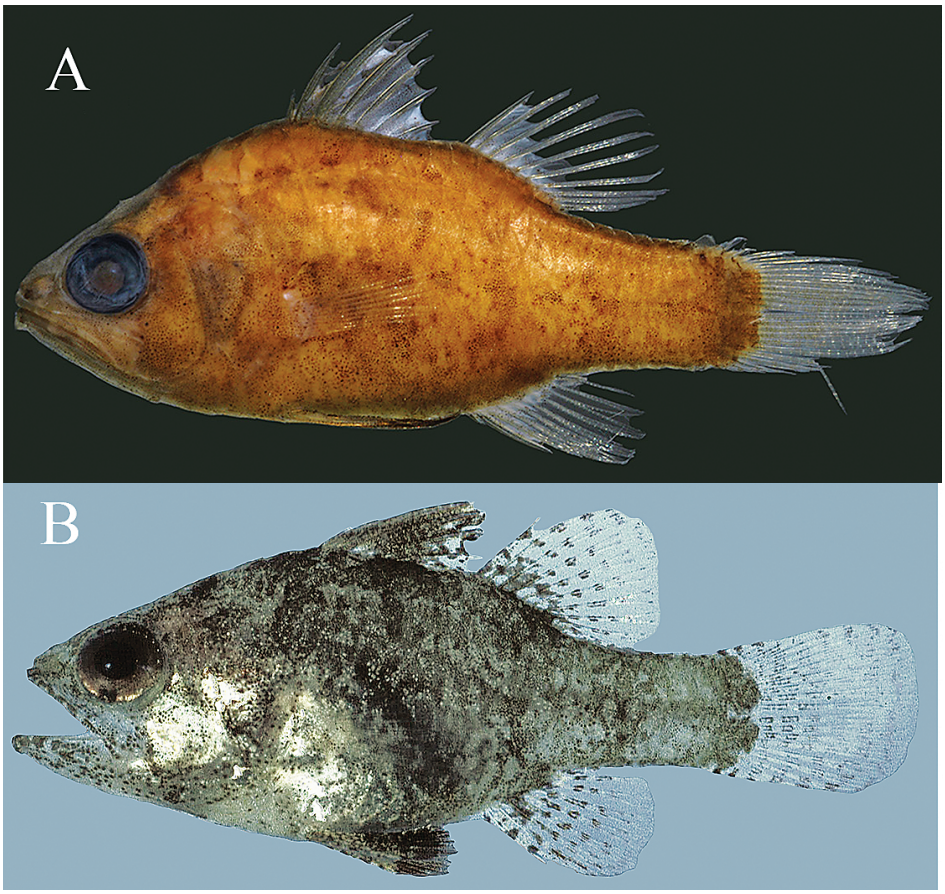

Figure 8. *Foa fo*, A) preserved, BPBM 28025, 35.3 mm SL, Kenya; B) post-mortem photograph by P. Heemstra, SAIAB 62375, 32 mm SL, Mauritius (T. Fraser).

Color in alcohol. (Figs. 7B & 8A) Fowler (1934) described as "Back brown, slightly paler on belly. Five indistinct, transverse, slightly darker bands on back and sides. Body everywhere more or less variegated with darker, under a lens seen to be aggregations of dark dots, with a few scattered dark to blackish brown small spots. Iris slate. Opercle with dark blotch forward and mostly below obscure dark bar from front of eye, another forward crosses jaws, third posterior over cheeks and fourth on postocular. Lower surface of head with several obscurely defined brownish transverse bars. Spinous dorsal dark brown, other vertical fins whitish with grey cross-bars, mostly as blotches on rays. Pectoral pale. Ventrals neutral black.". A photograph of the holotype does not add anything, while Fowler's drawing is consistent with the description.

Distribution. Widespread in the Indo-Pacific Ocean: known from the Red Sea (Fig. 6), Kenya (Fig, 8A), South Africa, and Mauritius (Fig. 8B), and likely to be found thoughout the Indian Ocean in coastal freshwater, brackish and marine coastal shallows (Fraser & Randall 2011).

Remarks. Species of *Foa* all share very similar body proportions and morphometrics; radiographs also show that there are no distinctive osteological characters to differentiate species. Apparently, the only reliable features to distinguish these species are marking patterns and the pores and neuromast patterns on the lower jaw. The presence of irregular indistinct bars on the body and caudal peduncle are diagnostic, but typically are not present on old bleached museum specimens, which often cannot be assigned to species.

The holotype of *Apogonichthys zuluensis* belongs to the genus *Foa* based on having 10 pored lateral-line scales and palatine teeth. There are 7 visible first-dorsal-fin spines, not 6 as described by Fowler who missed the broken first spine. It is presently bleached, but the original illustration in Fowler (1934) shows the dark bars midbody and on the caudal peduncle (Fig. 7A), consistent with *Foa fo*. Thus *Apogonichthys zuluensis* should be treated as a junior synonym of *Foa fo.*

TABLE 1

Proportions as percent of standard length for species of *Foa* (holotype, paratypes in parentheses for *F. winterbottomi*). Values listed for the holotype of *Apogonichthys zuluensis*, a synonym of *Foa fo*.

	Foa winterbottomi	*Foa fo*	*A. zuluensis*	*Foa madagascariensis*
number	6	10	1	10
Standard Length (mm)	35.0 (24.6–30.5)	23.7–45.5	35.7	24.0–39.3
greatest body depth	39.1 (38.5–41.0)	39.1–44.4	42.9	39.5–44.1
head length	39.7 (38.2–41.4)	39.1–44.3	39.2	41.1–45.3
eye diameter	11.7 (11.2–13.4)	10.3–13.1	11.2	10.3–13.3
snout length	8.6 (8.2–9.8)	7.9–9.8	8.1	7.6–10.5
bony interorbital width	6.3 (7.3–8.5)	5.9–7.6	7.8	6.3–7.9
upper-jaw length	20.0 (18.8–22.5)	19.8–20.5	19.6	19.0–21.7
caudal-peduncle depth	17.4 (14.5–17.4)	16.4–18.5	16.0	16.2–17.7
caudal-peduncle length	24.3 (22.3–26.0)	19.5–23.7	20.7	18.6–25.7
1st dorsal-fin spine length	2.6 (1.6–4.8)	1.9–4.6	—	2.7–4.6
2nd dorsal-fin spine length	10.6 (9.2–14.2)	8.3–12.6	10.9	7.5–12.5
3rd dorsal-fin spine length	20.0 (19.0–22.8)	18.3–20.5	20.2	17.5–23.3
4th dorsal-fin spine length	18.6 (16.9–19.1)	16.6–19.2	18.2	12.9–19.7
2nd dorsal-fin spine length	11.4 (10.2–12.1)	9.5–11.6	9.2	10.2–11.4
1st anal-fin spine length	2.0 (1.0–2.1)	1.9–2.9	2.5	1.3–2.7
2nd anal-fin spine length	12.0 (10.2–12.8)	10.0–12.2	12.0	9.9–12.0
pectoral-fin length	26.0 (22.6–23.8)	22.6–27.6	23.2	23.4–28.3
pelvic-fin length	23.4 (22.0–26.0)	22.5–23.9	24.9	17.9–26.9

Acknowledgments

D. Smith, J. Williams, K. Murphy, L. Palmer, D. Pitassy, and S. Raredon all provided assistance (loans of material and examination of illustrations) during multiple visits to the National Museum of Natural History, Washington, D.C. Some radiographs and photographs were provided by S. Raredon. The late J.E. Böhlke provided space to examine cardinalfish at the Academy of Natural Sciences, Philadelphia and allowed the loan of the type of *A. zuluensis*. It was examined at the USNM where radiographs and photographs were taken. L. Page, R. Robins, and R. Singer all provided assistance during visits to the Florida Museum of Natural History. A. Suzumoto provided assistance during visits and with loans of material from the Bernice P. Bishop Museum, Honolulu, HI. J.E. Randall provided the photograph of a specimen from the Maldives and information from the coauthored Maldive checklist, J.-L. Rose provided a digital photograph of *Foa fo* from Egypt, and O. Gon of the South African Institute for Aquatic Biodiversity provided a historical perspective of the Smith's use of materials of *Foa* and contributed the digital illustration from W.E. Fowler's original description of *A. zuluensis*. The manuscript was reviewed by two anonymous reviewers.

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