

# Redescription of the Indo-Pacific Scorpionfish *Scorpaenopsis fowleri* and Reallocation to the Genus *Sebastapistes*<sup>1</sup>

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**Abstract:** The wide-ranging Indo-Pacific scorpionfish *Scorpaenodes fowleri* (Pietschmann), long placed in the genus *Scorpaenopsis* (largely because it lacks palatine teeth), is reclassified in the genus *Sebastapistes*. It is distinct from the species of *Scorpaenopsis* in several features: eye not extending above the dorsal profile of the head, large pores of the cephalic lateralis system, nasal pore above and adjacent to posterior nostril with a very small retrorse nasal spine (may be absent) on its upper edge, low ridgelike spines dorsally on the head, preocular spine usually embedded, sphenotic and postorbital spines absent or embedded; posterior lacrimal spine projecting slightly anteriorly, and a single spine posteriorly on the suborbital ridge with a pore-associated spine just below the ridge under the posterior third of the eye. Also significant is its very small size, the smallest of the Scorpaenidae (largest specimen, 37 mm SL; smallest mature female, 18 mm SL). The loss of palatine teeth appears to have occurred independently from the species of *Scorpaenopsis*. *Sebastapistes fowleri* is closest to *S. strongia*, the type species of the genus. In addition to having palatine teeth, *S. strongia* differs in the strongly retrorse posterior lacrimal spine and in having two spines on the suborbital ridge. The limits of *Sebastapistes* need reevaluation.

PIETSCHMANN (1934:99) described a diminutive scorpionfish from O'ahu, Hawaiian Islands, as *Scorpaena fowleri* from three specimens that were deposited in the Naturhistorisches Museum in Vienna as NMW 6341–6343. Pietschmann (1938:5, 30, pl. 9) changed the generic allocation to *Scorpaenodes* and provided a redescription and illustration of the species.

Herre (1935:409; 1936:262, fig. 12) created the first synonym of *fowleri* with the description of *Sebastapistes badiorufus*, based on a single 22-mm specimen from Takaroa, Tuamotu Archipelago.

Fowler (1949:107) retained *fowleri* in the genus *Scorpaenodes*. He provided a basis for its separation from *Scorpaenodes kelloggi* (Jenkins),

but suggested a closer affiliation with *Sebastapistes asperella* (Bennett).

Gosline and Brock (1960:342) regarded *Scorpaena fowleri* as a synonym of *Scorpaena ballieui* Sauvage (now classified in *Sebastapistes*), but with a question mark.

Klauswitz (1970:73, fig. 1) described *Sebastapistes bassi* from one specimen, 23.4 mm SL, from 38 m off Addu Atoll, Maldives, the second junior synonym of *fowleri*.

Randall (1973:185) included *fowleri* as a species of *Scorpaenopsis* in a checklist of fishes of the Society Islands.

Eschmeyer and Randall (1975:297, fig. 13) designated NMW 6341 as the lectotype of *Scorpaena fowleri* and also reclassified it in *Scorpaenopsis*. They added, "Most of the species usually referred to *Scorpaenopsis* seem more closely related to each other than to the species in various subgroups of *Scorpaena*, but there are a few species which stand apart. They are usually placed in *Scorpaenopsis* because they lack palatine teeth. Among these are *S. fowleri*..."

Eschmeyer and Randall separated *fowleri* from other species of *Scorpaenopsis* by its possession of 16 pectoral rays instead of 17 or

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more, and by the posterior lacrimal spine that angles anteriorly. They extended the range of the species to the Tuamotu Archipelago (then unaware of *Sebastapistes badiorufus* from the Tuamotus), American Samoa, and the Marshall Islands and illustrated a specimen from the Society Islands.

Myers (1988:137) listed *Scorpaenopsis fowleri* as a first record from Guam, Mariana Islands.

Winterbottom et al. (1989:21) reported the species from the Chagos Archipelago, Indian Ocean.

Kosaki et al. (1991:189, fig. 6) provided the record from Johnston Island. They wrote, "This small species is placed in *Scorpaenopsis* primarily on the lack of palatine teeth; further study may result in its placement in a new genus."

Randall and Anderson (1993:11) reported an additional specimen of *Scorpaenopsis fowleri* from the Maldives and listed *Sebastapistes bassi* Klausewitz as a synonym. They also indicated that *fowleri* does not fit well in *Scorpaenopsis*.

Kulbicki et al. (1994:17) recorded *Scorpaenopsis fowleri* from the Chesterfield Islands, Coral Sea; they enclosed *Scorpaenopsis* in quotation marks.

Randall (1996:62) illustrated *Scorpaenopsis fowleri* in color and proposed the common name Dwarf Scorpionfish. He also indicated that a new genus may be needed for the species.

Randall (1999:10) recorded the species from Oeno Atoll, Pitcairn Islands.

Myers (1999:98, pl. 26 G) illustrated *Scorpaenopsis fowleri* in color and gave the distribution as Comoro Islands to Oeno, north to the Philippines and Hawaiian Islands, and throughout Micronesia based on new localities from the fish collection of the California Academy of Sciences.

*Scorpaenopsis* Heckel, 1837, contains at least three distinct lineages, apart from *S. fowleri*. One is the humpback species, *S. gibbosa*, *S. diabolus*, *S. neglecta*, and *S. macrochir*. A second consists of large, more elongate, long-snouted species with a single upper opercular spine, such as *S. cacopsis*, *S. cirrosa*, *S. oxycephala*, and *S. papuensis*. The third includes small species with short snouts and the upper opercular

spine divided into two or more points. Examples are *S. altirostris*, *S. cotticeps*, and *S. gilchristi*, all based on limited material. There are a few species that are allied with one of these lineages but differ enough to make their inclusion questionable, such as *S. venosa* in the second lineage and *S. brevifrons* in the third.

*Scorpaenopsis fowleri* has so many morphological differences from the above lineages of the genus that it clearly cannot be grouped with any of them. As is discussed in the following section, its closest affinity is with the genus *Sebastapistes*, of which the type species is *S. strongia* (Cuvier). We conclude that the loss of palatine teeth has occurred independently in *fowleri* and in the species of *Scorpaenopsis*.

#### MATERIALS AND METHODS

Specimens were examined at the Bernice P. Bishop Museum, Honolulu (BPBM); California Academy of Sciences, San Francisco (CAS); Gulf Coast Research Laboratory Museum, Ocean Springs, Mississippi (GCRL); and National Museum of Natural History, Washington, D.C. (USNM).

Methods of taking measurements and the terminology of head spines follow Eschmeyer (1969) except that lacrimal is used instead of preorbital.

*Sebastapistes fowleri* (Pietschmann) Dwarf scorpionfish  
Figures 1, 2

*Scorpaena fowleri* Pietschmann, 1934:99 (type locality, Makua, O'ahu, Hawaiian Islands).

*Scorpaenodes fowleri* Pietschmann, 1938:5, pl. 9 (redescription).

*Sebastapistes badio-rufus* Herre, 1935:409 (type locality, Takaroa Atoll, Tuamotu Archipelago); Herre, 1936:262, fig. 12.

*Sebastapistes bassi* Klausewitz, 1970:73–75, fig. 1 (type locality, Addu Atoll, Maldives Islands).

*Scorpaena ballieui* (non Sauvage) Gosline & Brock, 1960:342 (Hawaiian Islands).

*Scorpaenopsis fowleri*: Eschmeyer and Randall, 1975:297, fig. 13 (Hawaiian Islands, Tuamotu Archipelago).

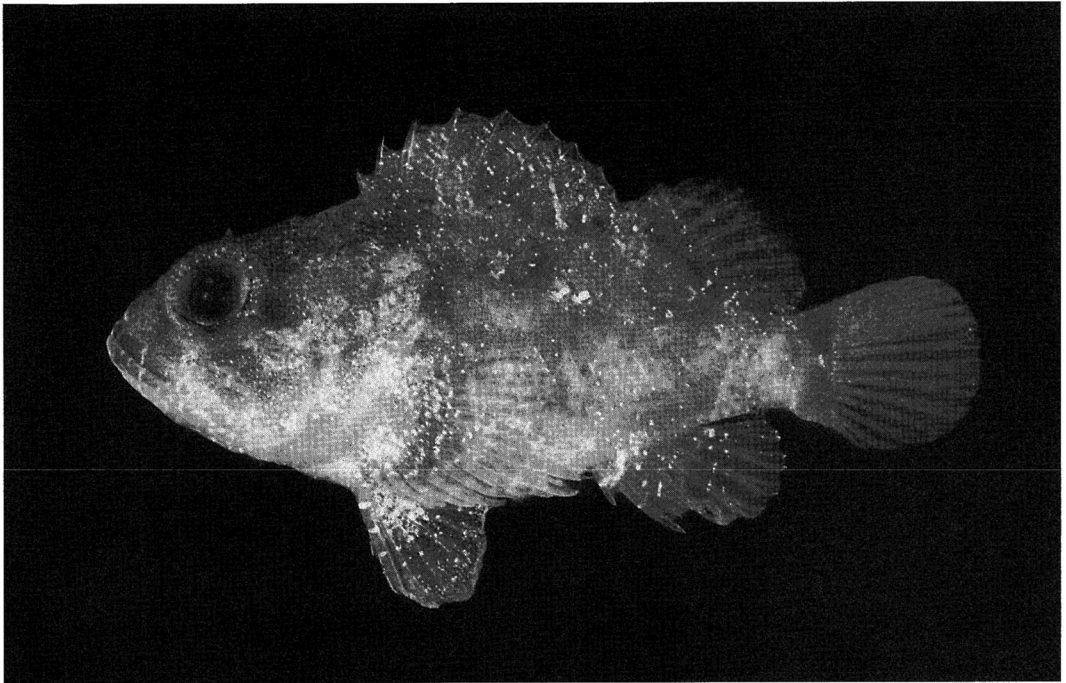


FIGURE 1. *Sebastapistes fowleri*, CAS 30738, 27 mm SL, Kona coast of Hawai'i.

motu Archipelago, Society Islands, American Samoa, and Marshall Islands).

**DESCRIPTION:** Dorsal-fin rays XII,9 (last ray branched to base); anal-fin rays III,5 (last ray branched to base); principal caudal rays 13, the median 11 branched; pectoral rays 16 (all simple except branched tips found in upper rays of two specimens); pelvic-fin rays I,5; longitudinal scale series (in near-vertical rows) 32–34; lateral-line (pored) scales 21; 6 scales above front of lateral line to base of third dorsal spine; scales below lateral line to origin of anal fin 8–9; median predorsal scales 3; gill rakers 4–6 + 7–11.

Body moderately deep, the depth 2.6–2.8 in SL; head length 2.15–2.4 in SL (head relatively shorter, in general, in larger specimens); snout very short, 3.7–4.2 in head length; eye not extending above dorsal profile of head (only the supraorbital ridge slightly above profile); orbit diameter 2.75–3.65 in head length; interorbital width 4.4–6.6 in head length; caudal-peduncle depth 7.2–7.8 in SL.

Mouth large, terminal or with lower jaw slightly projecting, the gape strongly oblique, the maxilla reaching posterior to a vertical at rear edge of pupil (usually to or slightly posterior to a vertical at rear edge of orbit); a villiform band of slender inwardly depressible teeth in jaws, the inner teeth longest (teeth in a maximum of about 5 irregular rows anteriorly in jaws); small slender teeth in two rows forming a V-shaped patch on vomer; no palatine teeth. Tongue triangular, the upper surface with small papillae. Gill rakers small, the longest a little shorter than longest gill filaments.

No occipital or suborbital pit. Spines dorsally on head ridgelike and retrorse; parietal spine about twice as long as tympanic and nuchal spines; nasal spine small (sometimes absent), over posterior nostril; preocular spine usually embedded; no coronal spines; sphenotic spines absent or embedded; no post-orbital spines; cleithral spine short and nearly flat, forming an angle of nearly 45° to horizontal axis of head and body; lacrimal with

two spines that project ventrally over maxilla when mouth closed, the posterior one angling slightly anteriorly; suborbital ridge with a single flat spine at posterior end; an isolated flat spine just below suborbital ridge beneath posterior third of eye; upper preopercular spine without a supplemental spine or with only a protuberance or small spine on its anterior edge; two low ridges with pointed tips between posterior end of parietal spine and posttemporal spines; upper opercular spine single; lower opercular spine preceded by a ridge.

Nostrils at level of upper edge of pupil, the anterior in a short flaring membranous tube with a slender dorsoposterior flap that reaches a little beyond posterior nostril when laid back; posterior nostril large, at edge of orbit directly behind anterior nostril, with a low rim at front.

Prominent sensory pores of cephalic lateralis system as follows: nasal pore dorsoanterior to posterior nostril and separated from it by a narrow septum, usually with the small nasal spine just above; a transverse pair of interorbital pores; a pore beneath slightly elevated tympanic spine, and one beneath tip of lower posttemporal spine; three in channel below nuchal spine, one above and another below embedded sphenotic spine or spines; eight along edge of preopercle, and four on mandible; four large pores in lacrimal and three in suborbital ridge (one associated with small spine below posterior part of eye and one at each bifurcating tip of channel at posterior end of ridge).

Cirri and tentacles typically few and small; supraocular tentacle present (may be very small).

Scales ctenoid on most of body, becoming cycloid on abdomen, chest, and prepectoral region; scales on head only on nape posterior to nuchal spines and dorsally on opercle; small scales basally on caudal fin and soft portions of dorsal and anal fins; lateral line complete, the anterior scales with a small spine at end of sensory tube.

First dorsal spine about half length of second spine; second dorsal spine half to two-thirds length of third spine; fourth or fifth dorsal spines longest, 5.2–6.3 in SL; eleventh

dorsal spine about half length of twelfth spine; longest dorsal soft ray 4.5–5.7 in SL; three-fourths or more of last dorsal ray joined by membrane (when intact) to caudal peduncle; second anal spine usually longest (sometimes about equal to third spine), its length 5.1–5.8 in SL; caudal fin small and rounded, 3.4–4.25 in SL (relatively longer in smaller specimens); pectoral fins rounded, the middle rays longest, 3.1–3.9 in SL; lower 7 or 8 pectoral rays thicker than upper rays; second or third pelvic soft ray longest, its length 3.2–3.95 in SL; three-fourths or more of last pelvic ray joined by membrane to abdomen.

Color in alcohol usually entirely pale yellowish except for dusky basal three-fifths of pelvic fins. Occasional specimens with dark markings as follows: an irregular dusky oblique bar extending below middle of spinous portion of dorsal fin, and a broad one between soft portions of dorsal and anal fins, extending onto anal fin; several small dark spots sometimes present along base of dorsal fin; an irregular dark bar passing ventrally from eye, and an oblique band across part of cheek from posteroventral part of eye; scaled basal part of caudal fin dusky; outer part of fin broadly dusky or with narrow vertical bars that are darker on rays than membranes; pectoral fins with two irregular transverse bands; basal three-fifths of pelvic fins dusky to dark brown (darkest of all the markings).

Color in life red to reddish orange, finely mottled with white, often with dark markings as described above.

REMARKS: Proportional measurements of *Sebastapistes fowleri* are based on 12 specimens, 16–36 mm SL.

Only two specimens were found with branched pectoral rays, a 28-mm one from Oeno Atoll, Pitcairn Islands, with the tips of three of the upper rays branched, and a 36-mm one from O'ahu, Hawaiian Islands, with the tip of the fifth ray branched on one side.

The most important characters that separate *fowleri* from the species of *Scorpaenopsis* are the following: eye not extending above dorsal profile of head; pores of cephalic lateralis system large (those of *Scorpaenopsis* numerous and minute except for mandibular

pores); spines dorsally on head low and ridge-like (spines prominent and project obliquely upward in *Scorpaenopsis*); posterior lacrimal spine retrorse, suborbital ridge with a single posterior spine (three to five in *Scorpaenopsis*); preocular spine embedded; sphenotic spines absent or embedded; and postorbital spines absent.

The small size of *Scorpaenopsis fowleri* prompted a comparison with the Indo-Pacific genus *Sebastapistes* Gill, of which 11 species are currently known, including four that are undescribed. These species are small with a short snout, the eye not elevated, and they have low modal pectoral-ray counts of 15 or 16. *Sebastapistes strongia* is the most similar to *fowleri*. The spines dorsally on the head of that species are low, though not as ridgelike as in *fowleri*. It has prominent cephalic sensory pores like *fowleri*. The nasal spine is small, retrorse, and over the posterior nostril, with the small nasal pore between (the spine is not as small and not as close to the nasal pore as in *fowleri*). There is a spine just below the suborbital ridge associated with a pore, and there are two lacrimal spines that project over the maxilla. *Sebastapistes strongia* differs in having palatine teeth, the second lacrimal spine projecting strongly posteriorly, and two spines on the suborbital ridge, in addition to the one just below. Lesser differences of *strongia* include modally 15 pectoral rays, about 44 scales in longitudinal series, usually well-developed tentacles, especially the supraocular, and transverse dark bands ventrally on the head.

*Sebastapistes strongia* and *S. fowleri* share the large pores of the cephalic lateralis system, the low spines dorsally on the head, the long parietal spine, and the isolated spine below the suborbital ridge with *S. galactacma* Jenkins and the four undescribed species of the genus (three of which, like *galactacma*, have cycloid scales). The four other species currently placed in *Sebastapistes* lack large cephalic sensory pores, have more strongly developed and more erect spines on the head, and the parietal spine is about equal in length to the tympanic and nuchal spines. *Sebastapistes bahiei* (Sauvage) and *S. mauritiana* (Cuvier) differ further in having prominent coronal

spines, and *S. conioarta* (Jenkins) and *S. tinkhami* (Fowler) have three to five lacrimal spines instead of two, and the lower opercular spine is preceded by a scaled area without a distinct ridge. Therefore, there seems to be three lineages within the genus *Sebastapistes*. Further study is needed to determine if all should remain in *Sebastapistes*.

*Sebastapistes fowleri* is wide-ranging in the Indo-Pacific region, from the Pitcairn Islands and Hawaiian Islands to Mauritius and the Comoro Islands. It generally occurs on rubble or rubble and sand substrata within or near coral reefs. Of the 20 lots in the Bishop Museum for which there are data on the depth of capture, all but one were taken in more than 10 m. The specimen from a shallower station was collected from 4.5–6 m. The deepest collection was from 61 m at Tetiaroa Atoll, Society Islands. Of 33 lots of this species from CAS and USNM collections with depth data, 23 were from 10–43 m, six from 6–9 m, and four from about 3 m.

The largest of 42 specimen examined, 37 mm SL, was taken at Oeno Atoll, Pitcairn Islands; the second largest, 36 mm, at O'ahu. Both localities are subtropical.

Eschmeyer and Randall (1975:298) wrote, "This species almost certainly matures at the smallest size (about 25 mm. S. L.) of any scorpaenid now known." We have found a fully mature female even smaller, BPBM 21836, 18 mm SL, from Mauritius.

MATERIAL EXAMINED: HAWAIIAN ISLANDS: Hawai'i, CAS 30738, 27 mm; GCRL 31910, 2: 18–24 mm. O'ahu, BPBM 7853, 25 mm; BPBM 7854, 27 mm; BPBM 17812, 2: 20–26 mm; BPBM 28138, 5: 26–36 mm; BPBM 28141, 3: 27–34 mm; CAS 30738, 25.5 mm; CAS 54091, 2: 22–25.5 mm; GCRL 31911, 11: 21.5–34 mm. JOHNSTON ISLAND: BPBM 33999, 20 mm. PITCAIRN ISLANDS: Oeno Atoll, BPBM 11181, 7: 24–37 mm. TUAMOTU ARCHIPELAGO: Mangareva, BPBM 13576, 2: 16–24 mm; BPBM 29328, 2: 16–16.5 mm. ANAA ATOLL, BPBM 16434, 22 mm. TAKAROA ATOLL, BPBM 11159, 22.5 mm. MALREMO, USNM 66026, 19.5 mm. SOCIETY ISLANDS: Tetiaroa Atoll, BPBM 14968, 23 mm. Tahiti, BPBM 5865, 19.5 mm; BPBM 6938, 20.5 mm; BPBM 8367, 22.5

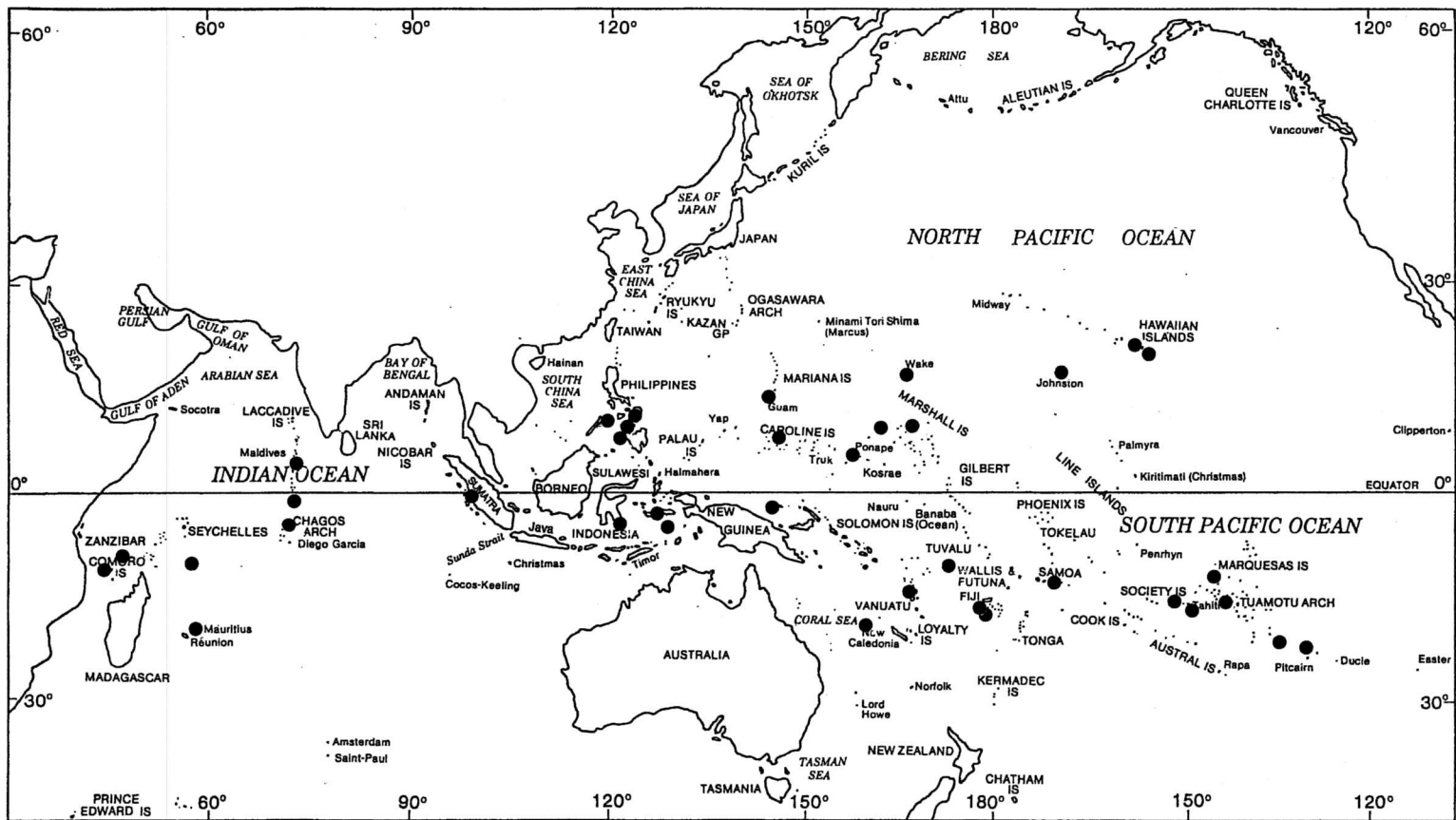


FIGURE 2. Distribution of *Sebastapistes fowleri*.

mm. Raiatea, CAS 54093, 19.5 mm. AMERICAN SAMOA: Tutuila, BPBM 17246, 21.5 mm; BPBM 18720, 3: 13–23 mm; GCRL 23540, 18.8 mm. FIJI: USNM 26652, 10: 12.5–24.5 mm; USNM 266254, 6: 15–24 mm; USNM 26656–26657, 5: 15.5–24 mm. Matuku Island, CAS 54094, 21: 14–25 mm; CAS 54102, 4: 16–25 mm; USNM 266254, 6: 17.5–24 mm. Kandavu, CAS 54095, 3: 15–18 mm. Ono-ilau, CAS 54096, 21 mm; CAS 54099, 13 mm. Navatu Ira Island, CAS 54097, 2: 15–21 mm; CAS 54100, 11 mm. Toyoda, USNM 266357, 4: 16–24 mm. Lau Group, Yangasa Cluster, CAS 54098, 17 mm. Viti Levu, BPBM 28656, 21.5 mm; CAS 54101, 7: 12–27 mm; USNM 266256, 22.5 mm. Malolo, CAS 54103, 15 mm. ROTUMA: CAS 60221, 13 mm. MARSHALL ISLANDS: Enewetak Atoll, BPBM 8287, 2: 24–25 mm; BPBM 18420, 20 mm; CAS 31807, 23.5 mm; CAS 31808, 24.5 mm. Rongelap Atoll, CAS 43013, 26.5 mm; CAS 54092, 21.5 mm; USNM 140184, 23.5 mm. CAROLINE ISLANDS: Pohnpei (Ponape), USNM 224486, 4: 11–20.5 mm; USNM 224487, 2: 16–20 mm; USNM 224489, 5: 8–17 mm. Ifaluk Atoll, CAS 54089, 22 mm; CAS 54090, 19 mm. WAKE ISLAND: BPBM 38593, 23 mm. CORAL SEA: Chesterfield Islands, BPBM 33810, 4: 23–26.5 mm. VANUATU: Espiritu Santo, USNM 285932, 28 mm. MARIANA ISLANDS: Guam, BPBM 8446, 21 mm; GCRL 31909, 3: 17–21.5 mm. PAPUA NEW GUINEA: Ninigo Islands, USNM 266261, 2: 21.5–24.5 mm. INDONESIA: Banda, USNM 266113, 16.5 mm. Saparua, USNM 266114, 6: 13–25 mm. Ambon, USNM 265922, 21 mm. Kabaena, USNM 266115, 20.5 mm. Sumatra, off Padang, BPBM 37628, 20 mm. PHILIPPINES: Mindanao, Zamboanga del Norte, CAS 54084, 3: 21–24 mm; CAS 54088, 22 mm. Siquijor, USNM 266251, 4: 21.5–22.5 mm. Negros, USNM 266250, 24 mm; USNM 266255, 28–29.5 mm; USNM 266260, 21.5 mm. Cebu, CAS 54086, 23 mm. Palawan, Cuyo Islands, USNM 266249, 23.5 mm. Samar, CAS 54085, 23 mm. MALDIVE ISLANDS: Addu Atoll, SMF 9860, 22.4 mm (holotype of *Sebastapistes bassi*). North Malé Atoll, BPBM 32988, 21.5 mm. MAURITIUS: BPBM 21836, 18 mm. AGALEGA ISLANDS: USNM 266021, 19.5 mm; USNM 266332, 18.5 mm; USNM 266253,

15 mm. SEYCHELLES: Aldabra, USNM 264191, 12 mm. COMORO ISLANDS: Grande Comore, CAS 34887, 3: 13–19 mm.

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