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# A New Triggerfish of the Genus *Abalistes* (Tetraodontiformes: Balistidae) from the Western Pacific

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ABSTRACT. A new species of triggerfish, *Abalistes filamentosus* is described on the basis of 17 specimens collected at depths from 61 to 180 m in Japan, the Northwest Shelf of Australia, and the Timor Sea. It differs from the congener, *A. stellatus* (Anonymous, 1798), by having filamentous upper and lower caudal-fin rays, 3–4 longitudinal grooves on the cheek, and by lacking yellow/pale blue spots and yellow reticulations on the body. The new species is not sexually dimorphic. The authorship of *Abalistes stellatus* is clarified.

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Triggerfishes of the genus *Abalistes* Jordan & Seale, 1906, are widely distributed in shallow waters in tropical and subtropical regions of the Indo-west Pacific and are commercially important in countries in southeast Asia (Matsuura, 2001). *Abalistes* is clearly separated from other members of the family Balistidae by the following combination of characters: enlarged osseous scales behind gill opening; a deep groove before eye; caudal peduncle depressed, wider than deep; first dorsal fin with 3 prominent spines; frontal greatly expanded posteriorly beyond level of posterior edge of posttemporal, forming round posterodorsal surface of cranium (Matsuura, 1979, 1980). The genus has long been considered to include only one species, *Abalistes stellatus* (Anonymous, 1798). While examining triggerfish specimens collected from the Ryukyu Islands, we found two forms of *Abalistes*: one having filamentous caudal-fin rays and 3–4 longitudinal grooves on the cheek but lacking prominent yellow/pale blue spots and yellow reticulations on the body, and the other lacking filamentous caudal-fin rays and longitudinal grooves on the cheek, but having a colourful body with many yellow/pale blue spots and yellow reticulations. Careful examination of many *Abalistes* specimens led us to conclude that the former is a new species and the latter is *A. stellatus*. We herein describe the new species as *A. filamentosus*.

## Materials and methods

The methods of counting and measuring primarily follow those of Matsuura (1980). The body width was measured between the pectoral-fin bases; the length of the middle caudal-fin ray was the distance between the caudal-fin base to the tip of middle caudal-fin ray; and, the postorbital length was measured from the upper end of the gill opening to the nearest point of the orbital edge. The pectoral-fin ray count excludes the uppermost rudimentary ray. Standard length and head length are abbreviated as SL and HL, respectively. In the following description, data in parentheses refer to

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**Table 1**. Frequency distributions of fin-ray counts and scale-rows in two species of *Abalistes*.

| species | dorsal-fin rays | | | anal-fin rays | | | | | pectoral-fin rays | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 25 | 26 | 27 | 22 | 23 | 24 | 25 | 26 | 14 | 15 |
| *A. filamentosus* n.sp. | 4 | 10 | 3 | 1 | 3 | 9 | 4 | 0 | 16 | 1 |
| *A. stellatus* | 0 | 12 | 11 | 0 | 0 | 14 | 8 | 1 | 22 | 1 |

| | body scale-rows | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 |
| *A. filamentosus* n.sp. | 1 | 3 | 5 | 3 | 1 | 3 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| *A. stellatus* | 0 | 0 | 4 | 4 | 1 | 3 | 2 | 4 | 2 | 0 | 0 | 0 | 1 |

| | head scale-rows | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 |
| *A. filamentosus* n.sp. | 1 | 0 | 6 | 3 | 2 | 3 | 1 | 1 | 0 |
| *A. stellatus* | 0 | 2 | 5 | 4 | 5 | 3 | 2 | 1 | 1 |

the paratypes when they differ from the holotype. Institutional abbreviations follow Leviton *et al*. (1985).

**Comparative material examined**. *Abalistes stellatus*, 46 specimens, 57–395 mm SL. Japan, Ryukyu Islands: HUMZ 46138, NSMT-P 65598, URM-P 3304, 3326; South China Sea: HUMZ 37979, 38206, 38252, 38353, 38292, 38304, 38306, 38307, 50109, 50123; Indonesia, Ambon: BPBM 19459; Australia: BMNH unregistered 57 mm (holotype of *Balistes phalreatus*), AMS I.16218-001, AMS I.15557-266; Indian Ocean: BMNH 1865.3.18.2, HUMZ 6517–6526, (10), 6803, 6805, 89452, 89453, NSMT-P 45065 (4), RUSI 2870 (5), RUSI 38483, RUSI 48248, SAM 33694, ZRC 38091.

### *Abalistes filamentosus* n.sp.

Fig. 1a

*Abalistes stellatus*.—Matsuura, 1980, p. 39 (in part); Matsuura, 1984 (in part), pl. 322–I.
*Abalistes stellaris*.—Matsuura, 1985, pp. 626, 627, 743.

**Type material**. HOLOTYPE: NSMT-P 65579, 243 mm SL, female, Ryukyu Islands, south coast of Okinawa-jima Island, off Itoman, 17 June 1982, hook and line, T. Yoshino (obtained from local fisherman). PARATYPES: AMS I.37974-001, 283 mm SL, Timor Sea, 09°57.15'S 129°31.96'E, 65 m depth, trawl, 30–31 March 1995, J. Lloyd (NT Fisheries); CSIRO H.1075-02, 216 mm SL, Western Australia, north of Monte Bello Islands, 19°56.2'–19°57.6'S 115°35.5'–115°36.8'E, 66–68 m depth, 8 October 1987, demersal trawl, FRV Soela; CSIRO H.2455-04, 245 mm SL, Western Australia, north of Dampier Archipelago, 19°10.1'–19°11.8'S 116°47.1'–116°46.5'E, 180–166 m depth, 3 October 1989, demersal trawl, W. Whitelaw (CSIRO); CSIRO H.3223-03, 227 mm SL, Western Australia, north of Barrow Island, 20°10.2'–20°08.7'S 115°15.6'–115°15.1'E, 10 October 1990, demersal trawl, FRV Southern Surveyor; HUMZ 38667, 277 mm SL, Ryukyu Islands, south coast of Okinawa-jima Island, off Itoman, 9 March 1974, hook and line, K. Matsuura (obtained from local fisherman); HUMZ 38705, 228 mm SL, Ryukyu Islands, south coast of Okinawa-jima Island, off Ohjima, 15 April 1974, hook and line, T. Shimizu (obtained from local fisherman); HUMZ 38706, 282 mm SL, Ryukyu Islands, west coast of Okinawa-jima Island, off Naha, 5 April 1974, hook and line, T. Shimizu (obtained from local fisherman); HUMZ 68923, 325 mm SL, Ryukyu Islands, south coast of Okinawa-jima Island, off Itoman, 9 March 1974, K. Matsuura (obtained from local fisherman); HUMZ 68924, 281 mm SL, data same as preceding paratype; HUMZ 68925, 267 mm SL, data same as preceding paratype; HUMZ 68926, 296 mm SL, data same as preceding paratype; NSMT-P 49363, 233 mm SL, Ryukyu Islands, Yaeyama Group, Nakano-ogan-jima Island, 24°07.2'N 123°40.1'E, 152 m depth, 14 August 1996, hook and line, K. Yano; NSMT-P 65580, 317 mm SL, Ryukyu Islands, south coast of Okinawa-jima Island, off Itoman, 18 June 1982, long line, T. Yoshino (obtained from local fisherman); URM-P 3320, 295 mm SL, male, data same as holotype; URM-P 3321, 253 mm SL, !, data same as holotype; URM-P 3334, 274 mm SL, Ryukyu Islands, south coast of Okinawa-jima Island, off Itoman, 18 June 1982, long line, T. Yoshino (obtained from local fisherman).

**Diagnosis**. Dorsal rays III+25–27; anal rays 22–25; pectoral rays 14–15 (usually 14); body scale rows 33–39; head scale rows 25–32 (Table 1). Upper and lower rays of caudal fin greatly produced in filaments. Cheek with 3 or 4 longitudinal grooves. Proximal part of spinous dorsal fin dark brown; no yellow/pale blue spots or yellow reticulations on the body; ground colour of body dark brown dorsally, mottled with irregular pale markings, becoming white ventrally; cheek brown with greenish tinge.

**Description**. Body depth 2.7 (2.6–3.2) in SL, head length 2.9 (2.8–3.0) in SL, snout length 4.1 (3.9–4.3) in SL, snout to origin of first dorsal spine 2.6 (2.5–2.7) in SL, snout to origin of anal fin 1.5 (1.5–1.6) in SL, base of soft dorsal fin 3.3 (3.0–3.3) in SL, base of anal fin 3.5 (3.4–3.8) in SL. Body width 1.7 (1.7–2.2) in HL, eye diameter 4.3 (3.5–5.3) in HL, interorbital width 3.3 (2.9–3.5) in HL, length of gill opening 3.4 (3.2–4.2) in HL, postorbital length 5.3 (4.5–5.1) in HL, depth of caudal peduncle 8.5 (7.4–10.8) in HL, length of caudal peduncle 2.4 (2.0–2.7) in HL, length of first dorsal-fin spine 1.7 (1.5–2.0) in HL, length of longest soft dorsal-fin ray 2.9 (2.5–3.4) in HL, length of longest anal-fin ray 2.8 (2.8–4.3) in HL, length of middle caudal-fin ray 2.3 (2.2–2.6) in HL, length of pectoral fin 3.0 (2.8–3.5) in HL.

Body relatively elongate, compressed, covered with rhomboidal, plate-like scales as in other balistids; several longitudinal rows of small tubercles on posterior part of body extending forward from caudal-fin base to below posterior part of soft dorsal fin. Dorsal and ventral profiles of head convex. Scales on cheek forming several longitudinal rows, having 3–4 longitudinal grooves between scale rows. Mouth small, terminal, with thin fleshy lips; teeth incisiform, notched on edges; each upper jaw with 4 teeth in outer series and 3 teeth in inner series; each lower jaw with 4 teeth in a single series. Gill opening small, slit-like, slightly oblique, located behind and below eye; a patch of enlarged osseous scales just behind upper end of gill opening. Origin of spinous dorsal fin above pectoral-fin base; first dorsal spine very long and stout, covered

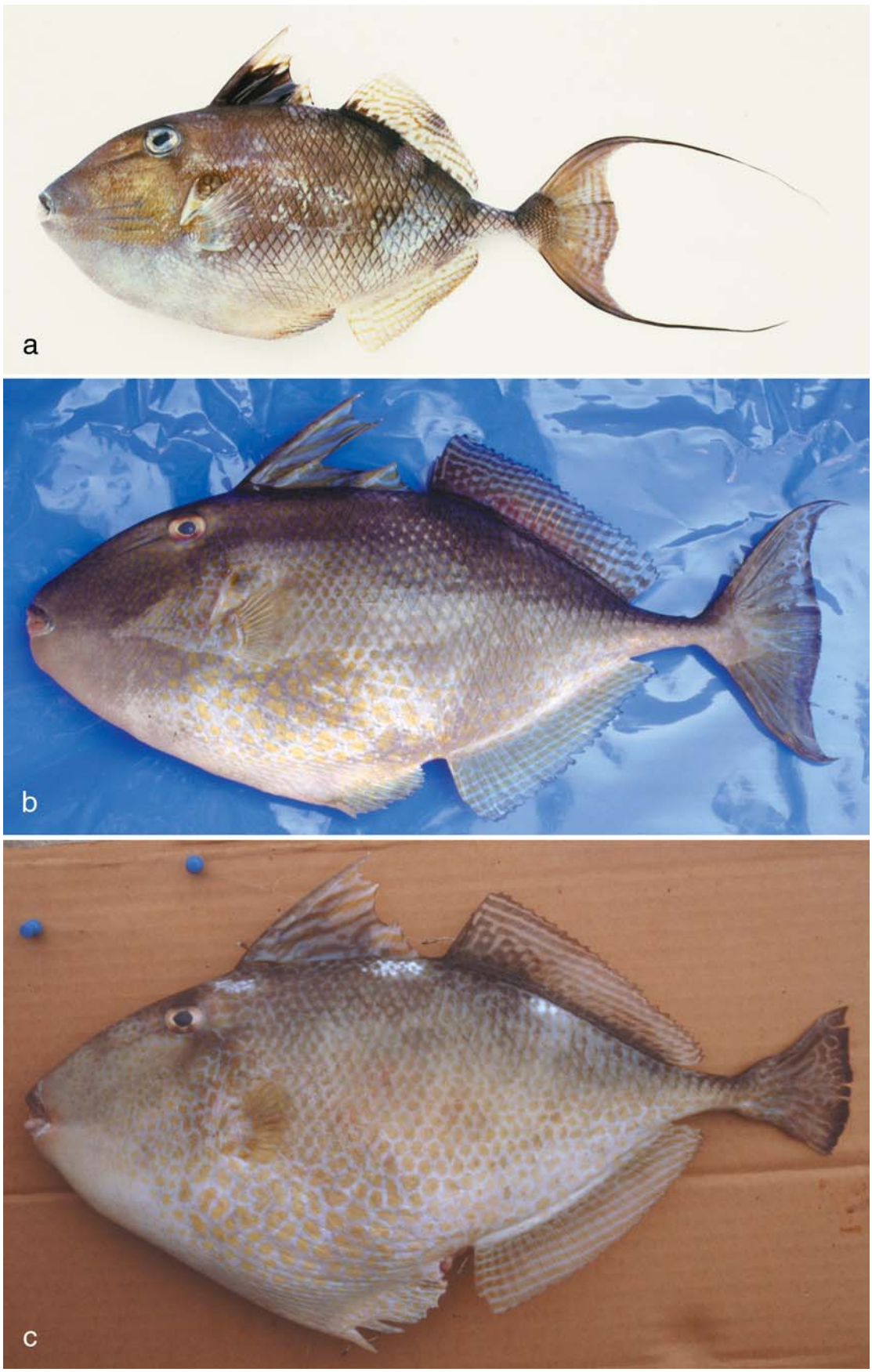


Fig. 1. *Abalistes filamentosus* n.sp. and *A. stellatus*. (*a*) *Abalistes filamentosus* n.sp., NSMT-P 65579, holotype, 243 mm SL, Ryukyu Islands, Japan; (*b*) *A. stellatus* NSMT-P 65598, 354 mm SL, Ryukyu Islands, Japan; (*c*) *A. stellatus* URM-P 3304, 395 mm, Ryukyu Islands, Japan.

**Table 2**. Measurements of type specimens of *Abalistes filamentosus* expressed as percentages of standard length with comparisons to *A. stellatus*.

| | ***Abalistes filamentosus*** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | holotype | paratypes (continued on facing page) | | | | | | | |
| collection | NSMT-P | AMS I. | CSIRO | CSIRO | CSIRO | NSMT-P | NSMT-P | HUMZ | HUMZ |
| registration number | 65579 | 37974-001 | H1075-02 | H2455-04 | H3223-03 | 49363 | 65580 | 38667 | 38705 |
| standard length (mm) | 243 | 283 | 216 | 245 | 227 | 231 | 317 | 277 | 228 |
| body depth | 37.4 | 34.6 | 37.0 | 35.5 | 37.4 | 38.5 | 30.9 | 34.3 | 36.8 |
| body width | 21.0 | 17.7 | 17.6 | 18.0 | 18.5 | 18.2 | 16.4 | 16.2 | 18.9 |
| head length | 35.0 | 35.0 | 33.3 | 33.1 | 33.5 | 35.1 | 34.1 | 34.3 | 35.5 |
| snout length | 24.7 | 25.8 | 24.5 | 25.3 | 24.2 | 25.1 | 25.2 | 23.5 | 25.4 |
| snout to origin of first-dorsal spine | 38.3 | 38.9 | 39.4 | 40.4 | 38.8 | 39.0 | 37.5 | 36.8 | 39.0 |
| snout to origin of anal fin | 66.7 | 63.6 | 63.0 | 64.1 | 65.6 | 63.6 | 63.4 | 65.7 | 64.5 |
| interdorsal space | 21.4 | 19.1 | 23.6 | 21.2 | 23.3 | 21.6 | 22.4 | 22.7 | 23.2 |
| postorbital length | 6.6 | 7.8 | 6.9 | 6.9 | 6.6 | 7.4 | 6.9 | 7.2 | 7.5 |
| eye diameter | 8.2 | 7.4 | 7.4 | 9.4 | 8.8 | 8.2 | 6.9 | 7.9 | 7.5 |
| interorbital width | 10.7 | 10.6 | 11.1 | 10.2 | 11.0 | 11.7 | 9.8 | 11.2 | 11.4 |
| length of gill opening | 10.3 | 8.8 | 8.8 | 9.4 | 7.9 | 10.0 | 9.8 | 10.5 | 9.6 |
| length of first-dorsal spine | 21.0 | 19.4 | — | 20.4 | — | 22.9 | 16.7 | 19.5 | 21.1 |
| length of longest doral-fin ray | 11.9 | 11.0 | 11.6 | 10.6 | 10.6 | 10.4 | 11.0 | 11.2 | 14.0 |
| length of longests anal-fin ray | 12.3 | 8.5 | 10.2 | 9.8 | 8.8 | 8.2 | 10.4 | 10.1 | 12.3 |
| length of pectoral fin | 11.5 | 10.2 | 10.6 | 11.4 | 11.0 | 10.8 | 11.4 | 10.1 | 11.8 |
| length of mid-caudal-fin ray | 15.2 | 14.5 | 14.4 | 14.7 | 13.7 | 16.0 | 13.9 | 13.4 | 15.4 |
| depth of caudal peduncle | 4.1 | 3.9 | 4.2 | 4.1 | 4.0 | 4.3 | 3.2 | 4.0 | 3.9 |
| length of caudal peduncle | 14.4 | 13.1 | 16.2 | 14.3 | 14.1 | 14.3 | 13.9 | 15.2 | 14.5 |
| length of soft dorsal-fin base | 30.5 | 31.8 | 30.6 | 32.7 | 30.8 | 32.0 | 31.5 | 31.4 | 31.6 |
| length of anal-fin base | 28.4 | 29.0 | 27.8 | 28.2 | 28.6 | 28.6 | 28.4 | 27.4 | 28.5 |

anteriorly with tubercles; second dorsal spine about three-fourths of first spine; third dorsal spine shorter and more slender than second spine, but prominently projecting above dorsal contour. Soft dorsal and anal fins similar to each other in shape, gently rounded. Pelvic dewlap not developed; encasing scales movable dorsoventrally, attached to posterior end of pelvis. Caudal fin double emarginated, upper and lower rays greatly produced posteriorly into filaments, usually much longer than head length. Caudal peduncle depressed, wider than deep.

**Live coloration**. Dorsal half of body dark brown mottled with irregular pale markings; 3 white blotches on back, first below base of first dorsal-fin spine, second immediately behind third dorsal-fin spine, and third below middle of soft dorsal fin; cheek greenish brown with 3–4 longitudinal dark brown grooves; ventral half of body pale or white; dorsal half of snout brown; first dorsal fin with large dark brown area on proximal part, pale distally with brown lines; soft dorsal and anal fins pale with 4–5 horizontal wavy brown lines; base of soft dorsal fin dark brown but base of anal fin white; base of caudal fin dark brown dorsally, white ventrally; caudal fin brown or yellowish brown proximally, paler distally with 3–4 vertical wavy brown lines; upper and lower filamentous rays dark brown.

**Sexual dimorphism**. The holotype and two paratypes (URM-P 3320 and 3321) were dissected to examine gonads; the holotype and URM-P 3321 are females and URM-P 3320 is male. These specimens do not show sexual dimorphism in shape and colour.

**Etymology**. The new species is named *filamentosus* after the filamentous rays in its caudal fin.

**Distribution**. *Abalistes filamentosus* is known from the Ryukyu Islands in Japan, the North West Shelf of Australia, and the Timor Sea. The capture records of the type specimens range from 61 to 180 m.

**Remarks**. The type specimens of *A. filamentosus* were compared with 46 specimens of *A. stellatus*. As shown in the Diagnosis, *A. filamentosus* differs from *A. stellatus* (Fig. 1b,c) in having filamentous caudal-fin rays, 3–4 longitudinal grooves on the cheek, and the body without colourful markings. The soft rays of the dorsal and anal fins of *A. filamentosus* have relatively lower counts with wider ranges than those of *A. stellatus* (Table 1). No clear differences are found between two species in proportional measurements (Table 2).

Richardson (1845) described *Balistes vachellii* on the basis of a specimen (3.75 inches = 9.5 cm in length) collected from Canton, China, by Rev. George Vachell. Although the type specimen was apparently lost, Richardson stated "No naked spaces exist on the cheek" and "The end of the caudal is even, but the second ray above and below forms a little projecting point". These characters show that *Balistes vachellii* is a junior synonym of *Abalistes stellatus* (Anonymous, 1798). Richardson (1846) described *Balistes phalreatus* from a single specimen (2.25 inches = 5.7 cm SL) collected from the western coasts of Australia (no detailed locality given). His description and the plate (plate 1, figs. 4–5) show that *Balistes phalreatus* is *Abalistes stellatus*. Examination of the type specimen confirms that it does not have any grooves on the cheek.

There are complicated nomenclatural problems with the name *Abalistes stellatus*. Two similar specific names, *stellaris* and *stellatus*, have been used for this triggerfish by many authors. The specific name, *stellaris*, was first given to the species by Bloch & Schneider (1801) based on Lacepède's

**Table 2**. (Continued from facing page). Measurements of type specimens of *Abalistes filamentosus* expressed as percentages of standard length with comparisons to *A. stellatus*.

| ***Abalistes filamentosus*** paratypes (continued from facing page) | | | | | | | | | | ***Abalistes stellatus*** | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| HUMZ 38706 | HUMZ 68923 | HUMZ 68924 | HUMZ 68925 | HUMZ 68926 | URM-P 3320 | URM-P 3321 | URM-P 3334 | range | (mean) | range | (mean) |
| 282 | 325 | 281 | 267 | 296 | 295 | 253 | 274 | 216–325 | (267) | 110–395 | (244) |
| 34.4 | 31.4 | 32.0 | 32.6 | 35.5 | 34.2 | 35.2 | 35.4 | 30.9–38.5 | (34.9) | 27.8–37.9 | (34.3) |
| 15.2 | 18.2 | 16.4 | 17.2 | 16.6 | 18.6 | 19.8 | 20.4 | 15.2–21.0 | (17.9) | 12.8–19.9 | (17.2) |
| 33.3 | 33.8 | 33.8 | 34.5 | 34.1 | 34.2 | 34.0 | 34.3 | 33.1–35.5 | (34.2) | 27.8–37.1 | (32.9) |
| 24.5 | 24.3 | 24.9 | 25.5 | 25.0 | 25.1 | 24.5 | 24.5 | 23.5–25.8 | (24.8) | 19.7–25.2 | (22.9) |
| 36.9 | 36.9 | 36.7 | 38.2 | 38.2 | 36.9 | 37.9 | 38.0 | 36.7–40.4 | (38.1) | 29.4–36.2 | (40.9) |
| 61.7 | 63.1 | 63.0 | 62.9 | 62.5 | 61.0 | 65.2 | 63.9 | 61.0–66.7 | (63.7) | 50.0–68.0 | (61.3) |
| 22.3 | 23.1 | 22.4 | 22.5 | 23.0 | 21.0 | 22.9 | 21.2 | 19.1–23.6 | (22.2) | 19.8–25.6 | (22.9) |
| 7.1 | 7.1 | 6.8 | 7.5 | 7.1 | 7.5 | 7.1 | 7.3 | 6.6–7.8 | (7.1) | 6.1–8.5 | (7.2) |
| 6.7 | 7.4 | 6.8 | 7.1 | 7.8 | 6.4 | 8.3 | 7.3 | 6.4–9.4 | (7.6) | 5.1–11.4 | (7.8) |
| 9.9 | 9.8 | 11.0 | 10.1 | 10.8 | 10.2 | 11.9 | 10.9 | 9.8–11.9 | (10.7) | 8.0–13.3 | (10.7) |
| 9.2 | 10.2 | 10.0 | 10.1 | 10.5 | 8.8 | 10.7 | 9.9 | 7.9–10.7 | (9.7) | 6.1–11.2 | (9.2) |
| 19.1 | 19.1 | 19.9 | 21.3 | 19.9 | 21.0 | 18.2 | 19.7 | 16.7–22.9 | (17.6) | 13.9–25.6 | (20.5) |
| 10.3 | 10.8 | 10.3 | 10.9 | 10.8 | 12.2 | 12.6 | 13.1 | 13.0–14.0 | (11.4) | 8.5–14.4 | (12.0) |
| 8.9 | 9.5 | 8.9 | 9.7 | 9.5 | 11.2 | 11.5 | 10.9 | 8.2–12.3 | (10.0) | 7.0–13.7 | (11.1) |
| 10.6 | 11.4 | 9.6 | 10.5 | 10.5 | 11.9 | 11.9 | 12.0 | 9.6–12.0 | (11.0) | 7.8–12.3 | (10.4) |
| 13.5 | 12.9 | 13.5 | 14.2 | 14.5 | 14.6 | 15.4 | 14.6 | 12.9–16.0 | (14.4) | 11.9–18.2 | (14.5) |
| 3.9 | 4.0 | 3.9 | 3.7 | 4.1 | 4.1 | 4.0 | 4.0 | 3.2–4.3 | (4.0) | 3.2–5.1 | (4.0) |
| 16.3 | 16.6 | 15.7 | 14.2 | 14.2 | 15.3 | 16.2 | 15.7 | 13.1–16.6 | (14.9) | 11.2–17.1 | (14.7) |
| 30.9 | 31.7 | 31.0 | 31.8 | 30.7 | 32.9 | 30.0 | 32.1 | 30.3–32.9 | (31.4) | 24.5–33.2 | (30.6) |
| 28.4 | 28.9 | 28.8 | 28.5 | 28.0 | 29.2 | 26.1 | 27.4 | 26.1–29.2 | (28.2) | 23.6–31.6 | (28.6) |

(1798) publication. The name *stellaris* has been applied to this triggerfish by authors such as Herre (1924), Fowler (1928), McCulloch (1929), Smith (1949), Munro (1955), Kyushin *et al*. (1977), Dor (1984), Matsuura (1984, 1985, 2001), Winterbottom *et al*. (1989), and Hayashi (2002). The name *stellatus* has also been applied to this species by authors such as Rüppell (1828), Bleeker (1865–1869), Günther (1870, 1910), Day (1875), Macleay (1881), Barnard (1927), Whitley (1941), de Beaufort & Briggs (1962), Matsuura (1980), Smith & Heemstra (1986), Allen & Swainston (1988), Randall *et al*. (1990), Kuiter (1993, 1997), Randall (1995), Myers (1999), and Iwatsuki *et al*. (2000). Whitley (1941), de Beaufort & Briggs (1962) and Matsuura (1980) showed that Anonymous (1798) first used the Latinized specific name, *stellatus*, for this species, although the description by Anonymous was based on Lacepède's (1798) publication. Other authors attribute the authorship to Lacepède (1798). Allen & Swainston (1988) provided an excellent illustration and short account of this species but added to the confusion by applying the authorship of Bloch & Schneider to *stellatus*. Matsuura (2001) stated that *Abalistes stellatus* (Lacepède, 1798) is invalid because Lacepède did not describe the species using a scientific name but only the French vernacular name.

As shown by Matsuura (2001), this taxon was described by Lacepède (1798: 333, 350, pl. 1, fig. 1) under the French vernacular name, Baliste étoilé. Lacepède's publication was briefly reviewed in the same year by Anonymous in an article in the Allgemeine Literatur-Zeitung (general literature newspaper). Anonymous gave brief descriptions of triggerfishes and filefishes on pages 681 and 682.

Hannelore Paxton kindly provided comments about problems in the article: Anonymous sometimes confused pectoral and pelvic fins, and in most places he did not distinguish between the first (spinous) and second dorsal fins, but he sometimes did. Her translation is given below with our interpretation in square brackets.

> …(6) *Balistes*. This genus has been brought under four subdivisions. a) *Balistes* with more than one ray in the pectoral [lapsus for pelvic] and dorsal fins.—*Vetula*; this species has remarkably beautiful colours. …—*Stellatus* (*etoile*) [with no accent] from Commerson's papers/manuscripts, is a new species, which he has caught around the Isle de France [Mauritius]. Small spots are distributed over the whole body, 8 or 10 rays [lapsus for spiny elements along the edge of the ventral flap] are in the pelvic fin, without spines on the side of the tail.—*Echarpe* [with no accent], taken from the same paper/manuscript, characterized particularly by its broad black stripe, running obliquely from the eye to the anal fin, giving it the species name, with 8 to 10 stripes [lapsus for spiny elements along the edge of the pelvic dewlap] in the pelvic fin, 4 rows of spines on the side of the tail; from the seas around the Isle de France. This subdivision includes biaculeatus [neither capitalized nor italicised] L. b) *Balistes* with more than one ray in the pectoral fin [lapsus for pelvic] and in the dorsal fin [lapsus, not including "first"]. Here we find only the species sinensis [neither capitalized nor italicised] L. c) *Balistes* with 1 single ray in the pectoral fin [lapsus for pelvic] and more than 1 in the dorsal fin [lapsus not including "first"]. —*tomentosus*, —*papillosus*, etc. d) *Balistes* with a single ray in the first pectoral and dorsal fins [lapsus, as first presumably should only go with dorsal]. Here are the species *monoceros* and *hispidus* of Linne.

It is clear that Anonymous intended to state that *Balistes* has four subdivisions including *Vetula, Stellatus* (*etoile*) and *Echarpe*, and this shows that the idea of binominal nomenclature was used by Anonymous. Thus, we conclude that *Balistes stellatus* was proposed and available by Anonymous.

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## References

Anonymous, 1798. Review of "Histoire naturelle des poissons" by Lacepède (1798). *Allgemeine Literatur-Zeitung* 288: 681–682.

Allen, G.R., & R. Swainston, 1988. *The Marine Fishes of North-western Australia. A Field Guide for Anglers and Divers*. Perth: Western Australian Museum, 201 pp.

Barnard, K.H., 1927. A monograph of the marine fishes of South Africa. Part II. (Teleostei—Discocephali to end. Appendix). *Annals of the South African Museum* 21(2): 419–1065, pls. 18–37.

Bleeker, P., 1865–1869. *Atlas Ichthyologique des Indes Orientales Néêrlandaises, Publié sous le Auspices du Gouvernement Colonial Néêrlandaises. Tom V. Bauroies, Ostracions, Gymnodontes, Balistes*. Amsterdam: Frédéric Muller.

Bloch, M.E., & J.G. Schneider, 1801. *Systema Ichthyologiae Iconibus CX Illustratum. Post Obitum Auctoris Opus Inchoatum Absolvit, Correxit, Interpolavit Jo. Gottlob Schneider, Saxo*. Berolini, Sumtibus Austoris Impressum et Bibliopolio Sanderiano Commissum.

Day, F., 1875. *The Fishes of India; Being a Natural History of the Fishes Known to Inhabit the Seas and Fresh Waters of India, Burma, and Ceylon*. London.

de Beaufort, L.F., & J.C. Briggs, 1962. Scleroparei, Hypostomides, Pediculati, Plectognathi, Opisthomi, Discocephali, Xenopterygii. In *The Fishes of the Indo-Australian Archipelago*, vol. 11, ed. M. Weber & L.F. de Beaufort. Leiden: E.J. Brill.

Dor, M., 1984. *CLOFRES. Checklist of the Fishes of the Red Sea*. Israel Academy of Sciences and Humanities.

Fowler, H.W., 1928. The fishes of Oceania. *Memoirs of the Bernice P. Bishop Museum* 10.

Günther, A., 1870. *Catalogue of the Fishes in the British Museum*. Vol. 8. London.

Günther, A., 1910. *Andrew Garrett's Fische der Südsee. Band III, Heft IX. Journal des Museum Godeffroy, Band VI, Heft XVII*. Hamburg: J. Friederichsen & Co.

Hayashi, M., 2002. Balistidae. In *Fishes of Japan with Pictorial Keys to the Species, English edition*, ed. T. Nakabo, pp. 1396–1402. Tokyo: Tokai University Press.

Herre, A.W.C.T., 1924. Poisonous and worthless fishes. An account of the Philippine Plectognaths. *Philippine Journal of Science* 25(4): 415–510, pls. 1–2.

Iwatsuki, Y., M.I. Djawad, A.I. Burhanuddin, H. Motomura & K. Hidaka, 2000. A preliminary list of the epipelagic and inshore fishes of Makassar (= Ujung Panang), South Sulawesi, Indonesia, collected mainly from fish markets between 23–27 January 2000, with notes on fishery catch statistics. *Bulletin of the Faculty of Agriculture, Miyazaki University* 47(1/2): 95–114.

Jordan, D.S., & A. Seale, 1906. *The Fishes of Samoa. Description of the Species found in the Archipelago, with a Provisional Check-list of the Fishes of Oceania*. Bulletin of the Bureau of Fisheries 25: 173–455+index i–xxx, pls. 33–53.

Kuiter, R.H., 1993. *Coastal Fishes of South-eastern Australia*. Bathurst: Crawford House Press.

Kuiter, R.H., 1997. *Guide to Sea Fishes of Australia. A Comprehensive Reference for Divers and Fishermen*. London: New Holland Publishers Ltd.

Kyushin, K., K. Amaoka, K. Nakaya & H. Ida, 1977. *Fishes of Indian Ocean*. Tokyo: Japan Marine Fishery Resource Research Center.

Lacepède, B.G.E., 1798. *Histoire Naturelle des Poissons*. Vol. 1. Paris: Plassan.

Leviton, A.E., R.H. Gibbs Jr., E. Heal & C.E. Dawson, 1985. Standards in herpetology and ichthyology: part I. Standard symbolic codes for institutional resource collections in herpetology and ichthyology. *Copeia* 1985(3): 802–832.

Macleay, W., 1881. A descriptive catalogue of Australian fishes. Part IV. *Proceedings of the Linnean Society of New South Wales* 6(2): 202–387.

Matsuura, K., 1979. Phylogeny of the superfamily Balistoidea (Pisces: Tetraodontiformes). *Memoirs of the Faculty of Fisheries, Hokkaido University* 26(1/2): 49–169.

Matsuura, K., 1980. A revision of Japanese balistoid fishes. I. Family Balistidae. *Bulletin of the National Science Museum* Series A, 6(1): 27–69.

Matsuura, K., 1984. Balistidae. In *The Fishes of the Japanese Archipelago*, ed. H. Masuda, K. Amaoka, C. Araga, T. Uyeno & T. Yoshino, pp. 357–359, pls. 321–324. Tokyo: Tokai University Press.

Matsuura, K., 1985. Balistidae. In *Fishes of the Okinawa Trough and the Adjacent Waters. Vol. 2. The Intensive Research of Unexploited Fishery Resources on Continental Slopes*, ed. O. Okamura, pp. 626, 627, 743. Tokyo: Japan Fisheries Resource Conservation Association.

Matsuura, K., 2001. Balistidae—Triggerfishes. In *FAO Species Identification Guide for Fishery Purposes. The Living Marine Resources of the Western Central Pacific. Vol. 6. Bony Fishes, part 4 (Labridae to Latimeriidae), Estuarine Crocodiles, Sea Turtles, Sea Snakes and Marine Mammals*, ed. K.E. Carpenter and V.H. Niem, pp. 3911–3928. Rome: FAO.

McCulloch, A.R., 1929. A check-list of the fishes recorded from Australia. Part III. *Australian Museum Memoir* 5: 329–436.

Munro, I.S.R., 1955. *The Marine and Fresh Water Fishes of Ceylon*. Canberra: Department of External Affairs.

Myers, R.R., 1999. *Micronesian Reef Fishes: A Comprehensive Guide to the Coral Reef Fishes of Micronesia, ed 3*. Guam: Coral Graphics.

Randall, J.E., 1995. *Coastal Fishes of Oman*. Bathurst: Crawford House Publishing Pty Ltd.

Randall, J.E., G.R. Allen & R.C. Steene, 1990. *Fishes of the Great Barrier Reef and Coral Sea*. Bathurst: Crawford House Press.

Richardson, J., 1845. Ichthyology.—Part 3. In *The Zoology of the Voyage of H.M.S. Sulphur, under the Command of Captain Sir Edward Belcher, R.N., C.B., F.R.G.S., etc., during the Years 1836–42, No. 10*, ed. R.B. Hinds, pp. 99–150, pls. 55–64. London: Smith, Elder & Co.

Richardson, J., 1846. Descriptions of six fish. In *Discoveries in Australia… Surveyed during the Voyage of H.M.S. Beagle, between the Years 1837 and 1843. Also a Narrative… Islands of the Arafura Sea, Vol.1*, J.L. Stokes, pp. 484–497, pls. 1–4. London.

Rüppell, W.P.E.S., 1828. *Atlas zu der Reise im nördlichen Afrika. Fische des Rothen Meers*. Frankfurt am Main.

Smith, J.L.B., 1949. *The Sea Fishes of Southern Africa*. Cape Town: Central News Agency, Ltd.

Smith, M.M., & P.C. Heemstra, 1986. Balistidae. In *Smiths' Sea Fishes*, ed. M.M. Smith and P.C. Heemstra, pp. 876–882, pls. 136–139. Johannesburg: Macmillan South Africa.

Whitley, G.P., 1941. Ichthyological notes and illustrations. *Australian Zoologist* 10(1): 1–50, pls. 1–2.

Winterbottom, R., A.R. Emery & E. Holm, 1989. An annotated checklist of the fishes of the Chagos Archipelago, Central Indian Ocean. *Royal Ontario Museum, Life Science Contributions* 145: 1–226.

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