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Arothron caeruleopunctatus, a New Puffer from the Indo-western Pacific

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Abstract A new puffer, *Arothron caeruleopunctatus*, is described on the basis of four specimens. Although similar to *A. mappa* and *A. stellatus*, it differs from them in having alternating dark brown and pale blue lines encircling the eye, and many pale blue spots on the head and body. *A. caeruleopunctatus* is distributed in the Indo-western Pacific region, from Reunion and the Maldive Islands eastward through Indonesia and Papua New Guinea to the Coral Sea, and northward to Japan.

The puffer genus *Arothron* is characterized by having each nostril with two fleshy tentacles formed by bifurcation of a single base and a continuous lateral line without the supra-anal branch (Fraser-Brunner, 1943). Species of *Arothron* are widely distributed throughout the tropical regions of the Indo-western Pacific. They have been distinguished mostly by their distinctive color patterns because other external characters are not useful for separating species; fin-ray counts greatly overlap among all the species, except for *A. firmamentum*, and proportional measurements are not reliable because specimens are easily distorted in preservative. Although *A. meleagris* and *A. nigropunctatus* are polychromatic (Su and Tyler, 1986), the other species of *Arothron* show species-specific color patterns.

In the early days of this ongoing revisional study of the genus, I received from the late Dr. Peter Whitehead, then Curator at the British Museum (Nat. Hist.), a photograph of a large *Arothron* collected from the Indian Ocean south of the Lesser Sunda Islands. The specimen resembled *Arothron mappa* and *A. stellatus*, but differed in having many small, pale blue spots on the head and body, and several circular lines around the eye. Unfortunately, it had been disposed of owing to the malfunctioning of the ship's freezer before the end of the voyage (P. Whitehead, pers. comm.). The specimen is figured in "Trawled fishes of southern Indonesia and northwestern Australia" (Gloerfelt-Tarp and Kailola, 1984).

A long-term search for further material has resulted in four specimens: two from Japan, one from the Marshall Islands, and one discovered amongst aquarium trade specimens from an unknown locality. In addition to the above, underwater photographs of the species (specimens not collected) taken in tropical regions of the Indo-western Pacific were sent to me through the courtesy of John E. Randall, Maurice Parmantier, and Helmut Debelius. This new puffer is described below under the name *Arothron caeruleopunctatus*.

Methods

The methods for counts and measurements follow those of Dekkers (1975), with the exception that eye diameter was taken as the largest diameter of the exposed eyeball and pectoral ray counts included the uppermost rudimentary ray. Paratype data are shown in parentheses when different from the holotype. Radiographs were used to count the number of vertebrae. Institutional abbreviations follow Leviton et al. (1985).

Arothron caeruleopunctatus sp. nov.

(New Japanese name: Arare-fugu)
(Fig. 1, top two; Fig. 2)

Arothron sp. Gloerfelt-Tarp and Kailola, 1984: 294 (Lesser Sunda Islands); Anonymous, 1989, back cover (Reunion).

Arothron stellatus (non Bloch and Schneider) Masuda, 1984: 194 (Maldive Islands); Masuda and Allen, 1987: 489 (Maldive Islands); Auerbach, 1991: 229, fig. 245 (Coral Sea).

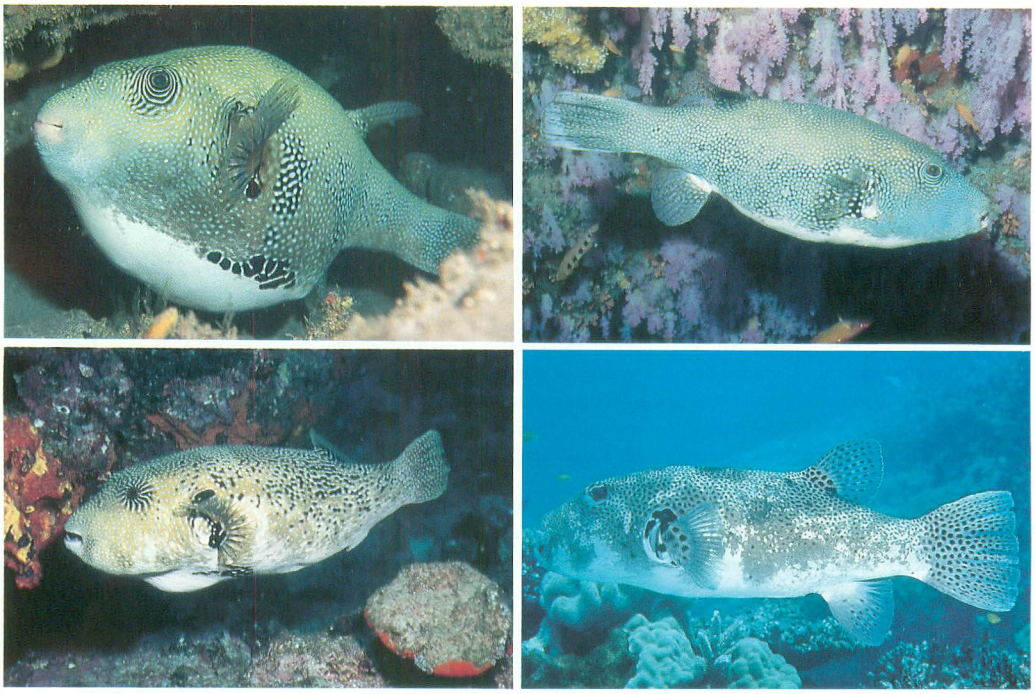

Fig. 1. *Top left*—underwater photograph of *Arothron caeruleopunctatus*, about 50 cm TL, Reunion (photo by M. Parmantier); *top right*—underwater photograph of *A. caeruleopunctatus*, about 80 cm TL, Ari Atoll, Maldive Islands (photo by H. Debelius); *bottom left*—underwater photograph of *A. mappa*, about 50 cm TL, Okinawa, Japan (photo by H. Masuda); *bottom right*—underwater photograph of *A. stellatus*, about 60 cm TL, Great Barrier Reef (photo by J. E. Randall).

Holotype. NSMT-P 45451, 42.4 cm in standard length (SL), Marshall Islands, Bikini Atoll, Bikini Island, lagoon side, 2 m depth, spear, 22 Dec. 1985, collected by H. Kishimoto.

Paratypes. NSMT-P 30925, 49.6 cm SL, Japan, Honshu, Boso Peninsula, off Choshi, 40–50 m depth, trawl, July 1989, collected by M. Taguchi; AMS I. 34603-001, 49.1 cm SL, East China Sea, Japan, Kyushu, Goto Islands, Oct. 1984, collected by T. Rikimura.

Non-type specimen. NSMT-P 33507, 49.8 cm SL, collection data unknown.

Diagnosis. Many small, pale blue spots on head and body. Eye encircled by alternating dark brown and pale blue lines.

Description. Dorsal rays 12 (11); anal rays 11 (10–12); pectoral rays 18 (19); caudal rays 11 (uppermost and lowermost rays unbranched); vertebrae 7 + 11 = 18. Body oblong, slightly compressed, otherwise almost round in cross section; dorsal profile gently arched. Head length 3.0 (2.8) in SL. Snout short, blunt, length 5.2 (4.9–5.1) in SL. Mouth terminal, surrounded by thin lips. Interorbital space flattened, bony interorbital width 2.4 (2.9) in head length (HL). Eye diameter 8.2 (8.9–11.3) in HL. Nasal organ located anteromedial to eye; two nasal tentacles divided to base on each nostril, anterior and posterior tentacles almost equal in size. Head and body covered with small spinules, except on posterior of caudal peduncle, around mouth, eye, gill opening, and on dorsal and anal fin bases. Caudal peduncle compressed, depth 2.4 (2.6) in HL, length 1.7 (1.9–2.0) in HL. Dorsal and anal fins rounded, origin of dorsal anterior to that of anal; longest dorsal-fin ray 2.2 (1.9) and longest anal-fin ray 2.0 (2.2) in HL; distance from snout to dorsal-fin origin 1.3 (1.4) in SL; distance from snout to anal-fin origin 1.3 (1.4) in SL. Pectoral fin rounded; longest ray 2.9 (2.5–3.4) in HL. Caudal fin relatively short, 4.0 (5.0) in SL. A single lateral line passing along body from caudal-fin base to above gill opening, where it branches into two lines; one crossing over nape to meet with opposite element, the other encircling eye. A separate lateral-line system just posterior to the mouth is not connected with its opposite element.

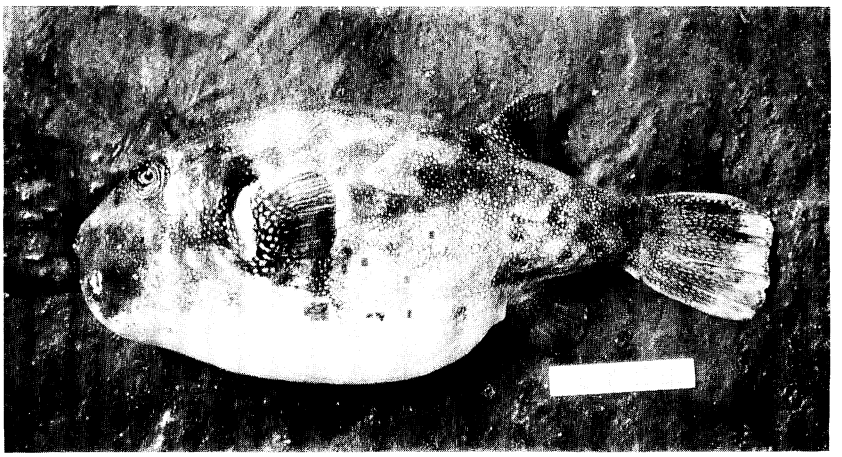

Fig. 2. *Arothron caeruleopunctatus*, holotype, 42.4 cm SL, Bikini Atoll, Marshall Islands (photo by H. Kishimoto).

Color in life.—Lateral and dorsal aspects of head and body brown, covered with many pale blue spots; ventral regions of head and body pale, with or without black blotches just below pectoral fin; eye encircled by alternating dark brown and pale blue lines; black blotches on pectoral fin base and gill opening; an encircling black line absent (or present) around anus; dorsal and anal fins covered with a fine network of dark brown and pale blue lines; membrane of pectoral fin pale, dark brown lines running lon-

Table 1. Counts and measurements expressed as percentages of standard length in *Arothron caeruleopunctatus*

Catalogue number	Holotype	Paratypes		Non-type
	NSMT-P 45451	NSMT-P 30925	AMS I.34603-001	NSMT-P33507
SL (cm)	42.4	49.6	49.1	49.8
TL (cm)	54.3	63.0	59.5	60.8
Dorsal-fin rays	12	11	11	11
Anal-fin rays	11	12	11	10
Pectoral-fin rays	18	19	18	19
Caudal-fin rays	11	11	11	11
Body depth	21.6	22.2	24.0	23.7
Body width	28.8	30.8	36.0	29.1
Head length	33.7	36.1	33.3	33.9
Snout length	19.3	20.6	19.5	18.5
Snout to dorsal origin	74.8	74.4	73.1	73.6
Snout to anal origin	75.7	77.4	80.2	78.9
Postorbital length	15.4	16.8	13.9	16.7
Eye diameter	4.1	3.2	3.7	2.8
Bony interorbital width	14.0	12.5	13.6	13.9
Longest dorsal ray	15.3	18.5	15.4	14.1
Longest anal ray	16.5	18.4	15.0	14.5
Pectoral-fin length	11.4	14.4	9.9	10.5
Caudal-fin length	24.9	24.8	22.5	19.9
Caudal peduncle depth	13.8	14.1	13.8	14.5
Caudal peduncle length	19.7	18.5	16.9	20.4
Dorsal-fin base	8.9	9.0	7.8	8.8
Anal-fin base	8.5	8.7	9.2	7.3

gitudinally on rays; proximal three-fourths (to four-fifths) of caudal fin covered with a fine network of dark brown and pale blue lines, distal one-fifth (to one-fourth) pale.

Color in alcohol.—Head and body brown with many dark brown spots, becoming pale ventrally; black blotches present or absent on ventrolateral part of body just below pectoral fin; eye encircled by alternating dark brown and pale lines; an encircling black line absent (or present) around anus; dorsal and anal fins covered with a fine network of dark brown and pale lines; membrane of pectoral fin pale, dark brown lines running longitudinally on rays; proximal three-fourths (to four-fifths) of caudal fin covered with reticulation of dark brown and pale lines, distal one-fifth (to one-fourth) pale.

Remarks. *Arothron caeruleopunctatus* is a large puffer ranging in size from 54 cm to 80 cm in total length (TL). It is similar to the two Indo-west Pacific species, *A. mappa* (Fig. 1, bottom left) and *A. stellatus* (Fig. 1, bottom right), but differs from them in having many pale blue spots on the head and body and alternating dark brown and pale blue lines which encircle the eye. *Arothron mappa* differs from *A. caeruleopunctatus* in having dark brown lines radiating from the eye. Such lines are always present in juveniles and adults of both sexes of the former. Although color patterns in *A. stellatus* change with growth, many black spots are always found on the body in juveniles and adults of both sexes. This color pattern distinguishes *A. stellatus* from *A. caeruleopunctatus.*

Arothron caeruleopunctatus seems to primarily inhabit coral reefs, although the paratypes were collected from temperate waters in Japan. They are considered to be incidental specimens, transported by the warm Kuroshio Current from the tropical western Pacific. *Arothron caeruleopunctatus* is distributed in the Indo-western Pacific from Reunion (western Indian Ocean) and the Maldive Islands (central Indian Ocean) eastward through Indonesia and Papua New Guinea to the Coral Sea, and northward to Japan. The specific epithet, *caeruleopunctatus*, refers to the many pale blue spots on the head and body.

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インド・西太平洋から得られらたモヨウフグ属の1新種

松浦啓一

モヨウフグ属の新種 *Arothron caeruleopunctatus* アラレフグ（新称）を4個体の標本に基づいて記載した．本種はケショウフグ *Arothron mappa* とモヨウフグ *A. stellatus* に似ているが，頭部と体に多数の淡青色点があること，眼の周囲に同心円状の淡青色線と褐色線があることによって識別される．本種は西部インド洋のレユニオン，中部インド洋のモルジブ，西部太平洋のインドネシア，パプアニューギニア，日本，マーシャル諸島およびサンゴ海に分布する．

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