Identification Guide to Pufferfishes (Tetraodontidae, Tetraodontiformes) of the South China Sea

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of the South China Sea

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Cover image: Eye of Canthigaster axiologus, off Yaku-shima Island, Kagoshima Prefecture, Japan,
photo by S. Harazaki.
Inside cover image: Arothron manilensis, off Okinoerabu-jima Island, Kagoshima Prefecture, Japan,
photo by K. Uehara.
Back cover image: same as Fig. 1b.
Introduction

Pufferfishes of the family Tetraodontidae differ externally from other families of the order Tetraodontiformes by the following combination of characters: head large and blunt; jaws modified to form a beak of four heavy, powerful teeth, two above and two below; eyes high on head; gill opening, a simple slit in front of pectoral fins; dorsal and anal fins located far posteriorly, containing seven to 15 soft rays; caudal fin truncate, rounded, or emarginate to somewhat lunate; pelvic fins absent; lateral line (when present) often indistinct, forming an interconnected pattern on sides of the head and body, but quite distinct in some genera (e.g., Lagocephalus and Torquigener); typical scales absent, but many spinules often present on back and/or belly, and sometimes on sides (Matsuura 2001).

The Tetraodontidae is the most speciose family in the Tetraodontiformes, including about 190 species. Because pufferfishes possess very few external characters useful for taxonomy and specimens are easily distorted when they are fixed in formalin and preserved in ethanol, it is often not easy for ichthyologists to identify them to species. The taxonomy of pufferfishes in the South China Sea is important not only for the understanding of fish diversity of the region, but also for the welfare and food management for humans. Dao et al. (2012) reported that the number of victims of food poisoning from eating pufferfishes reached 737, with 127 mortalities from 1999 to 2003. Due to the lack of knowledge about pufferfishes and their toxicity, poisonous pufferfishes have been frequently found at fish landing places and fish markets in countries around the South China Sea (Fig. 1), although local and state governments in these countries have announced that eating pufferfishes are quite dangerous for humans. The main purpose of this identification guide is to provide distinguishing characters of pufferfishes of the South China Sea, which would be helpful for local ichthyologists and food security people to identify pufferfishes and prevent food poisoning in their countries.

Fig. 1. Pufferfishes found at a fish landing place 60 km north of Nha Trang in southern Vietnam (a) and a fish market in Malaysia (b). Photos by K. Matsuura.
Counts and measurements follow Dekkers (1975). Standard length and total length are abbreviated as SL and TL, respectively. Institutional abbreviations are as follows: BPBM (Bernice Pauahi Bishop Museum, Honolulu), BSKU (Department of Natural Science, Kochi University, Kochi), CSIRO (Commonwealth Scientific and Industrial Research Organisation, Hobart), FAKU (Maizuru Fisheries Research Station, Kyoto University, Maizuru), FRLM (Fisheries Research Laboratory, Mie University), HUMZ (Hokkaido University Museum, Hakodate), KAUM (The Kagoshima University Museum, Kagoshima), KPM (Kanagawa Prefectural Museum of Natural History, Odawara), MUFS (Miyazaki University, Miyazaki), NMMB (National Museum of Marine Biology and Aquarium, Pingtung), NRF-SAIAB (National Research Foundation - South African Institute for Aquatic Biodiversity), NSMT (National Museum of Nature and Science, Tsukuba), SMSM (Shimonoseki Marine Science Museum, Shimonoseki), and USNM (National Museum of Natural History, Washington, D. C.). Credit of photographs taken by H. Senou belongs to the Kanagawa Prefectural Museum of Natural History, Odawara. Illustrations of *Amblyrynchote honckenii* drawn by E. Heemstra were provided by the South African Institute for Aquatic Biodiversity.
Identification Guide to Pufferfishes of the South China Sea

Key to Genera

1a. Snout long, its length 55–77% of head length; nasal organ barely visible without aid of magnification; dorsal surface posterior to the eye distinctly keeled (Fig. 2a, b) ................. Canthigaster

1b. Snout short, its length 32–55% of head length; nasal organ easily visible without magnification; dorsal surface posterior to the eye more or less smooth, without a distinct keel (Fig. 2c, d) ............... 2

Fig. 2. Typical body shapes of pufferfishes. Top, Canthigaster (a, front view; b, lateral view); bottom, Arothron (c, front view; d, lateral view). Fins are not shown in front views.

2a. Nasal organ covered by a small sac with 2 nostrils (Fig. 3a) ....... 3

2b. Nasal organ not covered by a small sac with 2 nostrils (Fig. 3b–d) ..
............................................................................................................... 8

Fig. 3. Nasal organs of pufferfishes. a, Lagocephalus; b, Arothron; c, Chelonodontops; d, Canthigaster.
3a. No raised skin fold along the ventral side of the caudal peduncle...
3b. A raised skin fold along the ventral side of the caudal peduncle)

4a. No spinules on head and body ......................................... *Sphoeroides*
4b. Spinules all over the head and body except for the caudal peduncle ................................................................. *Tylerius*

5a. Mouth supraterminal (Fig. 4a) ........................................ *Amblyrhynchote*
5b. Mouth terminal (Fig. 4b–d) ............................................... 6

6a. Chin distinct (Fig. 4a, b) ................................................... *Torquigener*
6b. Chin indistinct (Fig. 4c, d) ................................................ 7

7a. A longitudinal wide silver-white stripe running from chin to caudal-fin base on ventro-lateral part of head and body .......... *Lagocephalus*
7b. Body variously colored, but no longitudinal silver-white stripe on ventro-lateral part of body ................................................ *Takifugu*

8a. A single lateral line on the side of the body (Fig. 5a); nasal organ with 2 bifid tentacles (Fig. 3b) ................................. *Arothron*
8b. Two lateral lines, the upper joining the lower in the region above or behind anal fin (Fig. 5b); nasal organ in the form of a depression with slightly raised margin expanded before and behind into a pair of elongate flaps (Fig. 5c) ................................................. *Chelonodontops*

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**Fig. 4.** Mouth positions and chin shapes of pufferfishes. a, *Amblyrhynchote honckenii*; b, *Torquigener brevipinnis*; c, *Arothron stellatus*; d, *Takifugu flavipterus*.

**Fig. 5.** Lateral line system of *Arothron* (a) and *Chelonodontops* (b).
Genus Amblyrhynchote Bibron in Duméril 1855

Mouth supraterminal situated above dorsal end of pectoral-fin base; chin prominent; nasal organ covered by a small sac with 2 nostrils; ventrolateral skin fold prominent on area between caudal-fin base and anus; small spinules on back and belly. Monotypic. Although previous authors used the spelling Amblyrhynchotes for this genus (e.g., Hardy 1984, 1988), we follow Kottelat (2001) in using Amblyrhynchote because Kottelat (2001) showed that Amblyrhynchotes is an incorrect spelling.

Amblyrhynchote honckenii (Bloch 1785)
Evileye Pufferfish

Dorsal-fin rays 9–10; anal-fin rays 8; pectoral-fin rays 14–16; caudal peduncle short, its length 22–28 % of SL; bony interorbital width 13–26% of head length. Body somewhat squarish in cross section. Dorsal surface of body blackish brown with yellowish white spots; lateral side yellow; ventral surface whitish; dorsal, pectoral and caudal fins dusky with yellow tinge; anal fin in breeding females yellow, in males white. Attains 30 cm TL. Collected at depths shallower than 400 m. Indo-West Pacific from East Africa to China.
Genus Arothron Müller 1841

Body ovoid, heavy; single lateral line on lateral side of body; no skin fold on lower side of body; nasal organ with 2 bifid tentacles; spinules present on body. Most members of Arothron solitary but young of A. firmamentum form schools. Fourteen species in the world, 12 species in South China Sea.

Key to Species of Arothron

1a. Body lacking markings; caudal fin dusky yellow with prominent black margin .............................................................. A. immaculatus
1b. Body with various color markings; caudal fin without black margin .............................................................. 2

2a. Dorsal-fin rays 13–15 (usually 14); anal-fin rays 13–15 (usually 14); dorsal and anal fins bluntly pointed .............................................................. A. firmamentum
2b. Dorsal-fin rays 9–13; anal-fin rays 9–13; dorsal and anal fins rounded .............................................................. 3

3a. Eye encircled by alternating dark brown and pale blue lines ......... A. caeruleopunctatus
3b. Eye not encircled by lines .............................................................. 4

4a. Many dark brown lines radiating from eye ................................................ A. mappa
4b. No radiating lines from eye .............................................................. 5

5a. Wide dark vertical bars on side of head and ventrolateral side of body; dorsal part of body greenish brown with many white spots .............................................................. A. hispidus
5b. No dark vertical bars on head or body .............................................................. 6

6a. Dorsal part of body white .............................................................. 7
6b. Dorsal part of body greenish brown, dark brown, dark gray, light gray, yellow or black .. 8

7a. Body white with many black spots, forming a network pattern; ventral surface of head and body white without black spots (in juveniles many dark bands on belly) .............................................................. A. stellatus
7b. Dorsal and lateral sides of body white with many longitudinal black lines ..... A. carduus

8a. Many longitudinal lines on body .............................................................. 9
8b. No longitudinal lines on body .............................................................. 10

9a. Several longitudinal brown lines on light gray or light brown body ........ A. manilensis
9b. Many longitudinal white lines on dark brown or greenish-dark brown body .............................................................. A. multilineatus

10a. Several curved white lines on side of head ........................................ A. reticularis
10b. No curved lines on side of head .............................................................. 11

11a. Body dark brown or brownish gray with black spots .......... A. nigropunctatus
11b. Body and fins black with many white spots or body yellow with many black or dark brown speckles .............................................................. A. meleagris
**Arothron caeruleopunctatus** Matsuura 1994

*Blue-spotted Pufferfish*

Dorsal-fin rays 11–12, anal-fin rays 10–12, pectoral-fin rays 18–19. A large pufferfish attaining 80 cm TL; head and body brown dorsally, 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. Occurs solitarily on coral reefs. Indo-West Pacific, from Réunion eastward through Indonesia to Coral Sea and northward to Japan.

![Arothron caeruleopunctatus](image1)

**Arothron carduus** (Cantor 1849)

*Black-lined Pufferfish*

Dorsal fin ray 10–11, anal-fin rays 9–10, pectoral-fin rays 18–19. Head and body white with many black lines, some encircling eye and gill opening; side of body behind dorsal fin with longitudinal black lines; ventral surface of body yellowish; dorsal and anal fins yellowish brown; pectoral fin dusky yellow; caudal fin white with many longitudinal black lines. Attains 43 cm TL. Collected at depths shallower than 30 m. Known only from Ryukyu Islands and Penang Island, Malaysia.

![Arothron carduus](image2)
**Arothron firmamentum** (Temminck & Schlegel 1850)
**Starry Pufferfish**

Dorsal-fin rays 13–15 (usually 14), anal-fin rays 13–15 (usually 14), pectoral-fin rays 15–17 (usually 16). Body relatively oblong compared to other congers; head and body bluish black, covered with many white spots. Attains 45 cm TL. Collected at depths of 100–140 m. Antitropical in West Pacific, Japan to Taiwan, south-eastern Australia and northern New Zealand; recorded also from South Africa and Argentina.

**Arothron hispidus** (Linnaeus 1758)
**White-spotted Pufferfish**

Dorsal-fin rays 10–11, anal-fin rays 10–11, pectoral-fin rays 17–19. Head and body greenish brown with small white spots dorsally, becoming white ventrally with curved dark stripes; wide dark bars on side of head and body; pectoral-fin base and gill opening encircled with alternating white and black lines. Attains 45 cm TL. Inhabits coral reefs, but juveniles frequently occur in estuaries. Indian and Pacific oceans, from East Africa eastward to tropical eastern Pacific.
**Arothron immaculatus** (Bloch & Schneider 1801)

*Black-edged Pufferfish*


**Arothron manilensis** (Marion de Procé 1852)

*Striped Pufferfish*

Dorsal-fin rays 9–11 (usually 10), anal-fin rays 9–10 (usually 10), pectoral-fin rays 16–19. Body light gray or light brown with greenish tinge; ventral side of body whitish or light yellowish; several longitudinal dark brown lines on body; caudal fin light yellow or brownish yellow with black margins. Occurs in mangroves, sea grass beds, and sandy-muddy bottoms in depths shallower than 20 m. Tropical western Pacific eastward to Samoa and northward to Japan.
**Arothron mappa** (Linnaeus 1758)

**Map Pufferfish**

Dorsal-fin rays 11–12, anal-fin rays 10–11 (usually 11), pectoral-fin rays 17–19. A large pufferfish, attaining 60 cm TL; head and body brownish gray with many irregular dark lines dorsally, appearing as numerous reticulations; ventral parts of head and body white, except for black anus; reticulated lines developing with growth of fish, making color patterns of juveniles and adults different, but with dark lines radiating from the eye at every stage of growth. Coral reef inhabitant but juveniles occasionally occur in estuaries. Indo-West Pacific from East Africa eastward to Marshall Islands and northward to Japan.

**Arothron meleagris** (Bloch & Schneider 1801)

**Guineafowl Pufferfish**

Dorsal-fin rays 10–13 (usually 11–12), anal-fin rays 11–13 (usually 12), pectoral-fin rays 18–21 (usually 19–20). Entire body usually black with many white spots; fins also black with white spots; also a yellow form with many dark brown spots on body; mouth not surrounded by dark area. Attains 35 cm TL. Inhabits coral reefs. Tropical Indian and Pacific oceans from East Africa eastward through Indonesia to tropical eastern Pacific.
**Arothron multilineatus** Matsuura 2016

**Many-lined Pufferfish**

Dorsal-fin rays 9–11, anal-fin rays 9–11, pectoral-fin rays 18–19. Lateral and dorsal surfaces of head and body dark brown or greenish-dark brown covered with many longitudinal white lines; ventral surface of head and body white with light yellowish tinge; many spinules on head and body except on the lateral surface of the caudal peduncle, around mouth, eye, gill opening, and on dorsal- and anal-fin bases. Attains 25 cm TL. Occurs in coral reefs. Indo-West Pacific from East Africa eastward to Samoa and northward to Ryukyu Islands.
Arothron nigropunctatus (Bloch & Schneider 1801)
Blackspotted Pufferfish

Dorsal-fin rays 9–11 (usually 10); anal-fin rays 10–11 (usually 11); pectoral-fin rays 17–20 (usually 18–19). Body dark brown or dark gray dorsally, paler ventrally, with many dark brown or black spots; also a yellow form similar to A. meleagris but distinguished from it by the presence of a dark area around mouth. Attains 25 cm TL. Occurs in coral reefs; Indo-West Pacific from East Africa eastward to Samoa and northward to Japan.
Arothron reticularis (Bloch & Schneider 1801)
Reticulated Pufferfish

Dorsal-fin rays 10–11; anal-fin rays 9–11; pectoral-fin rays 17–19. Body greenish brown dorsally, white ventrally; many white spots on side and back behind eye; several curved white lines on side of head and around gill opening; dorsal, anal, and pectoral fins pale yellow; caudal fin greenish brown with many white spots. Attains 43 cm TL. Occurs around mangroves and sandy or muddy bottoms of sheltered bays at depths shallower than 20 m; India eastward to Fiji and northward to Japan. Similar to Arothron hispidus but distinguishable by having several curved white lines on side of head and lacking vertical dark bars on ventral side of body.

Arothron stellatus (Bloch & Schneider 1801)
Star Pufferfish

Dorsal-fin rays 11–12, anal-fin rays 11, pectoral-fin rays 17–20 (usually 18). A large pufferfish, attaining 100 cm TL; body white with many black spots dorsally forming a network pattern; small black spots also covering vertical fins; pectoral-fin base and gill opening with black spots larger than those elsewhere on of the body; ventral side of head and body white with black anus; juveniles orange with many black spots dorsally and many irregular oblique lines on belly. Occurs in coral reefs; Indo-West Pacific, from East Africa eastward through Indonesia to Tuamotu Islands and northward to Japan.
**Genus Canthigaster Swainson 1839**

Body and head somewhat compressed; a single inconspicuous nostril; lateral lines usually not apparent; back with a skin ridge on dorsal midline; caudal fin truncate or slightly rounded; head and body with scattered tiny spinules. Thirty-two species in the world, 13 species in the South China Sea.

### Key to Species of Canthigaster

<table>
<thead>
<tr>
<th>1a. Dorsal-fin rays 11–12, anal-fin rays 10–11</th>
<th>C. amboinensis</th>
</tr>
</thead>
<tbody>
<tr>
<td>1b. Dorsal-fin rays 8–10, anal-fin rays 8–10</td>
<td></td>
</tr>
</tbody>
</table>

| 2a. Dorsal part of head and body with 2 or 4 dark brown or black saddle-like bars | 3 |
| 2b. Dorsal part of head and body without dark saddle-like bars | 4 |

| 3a. Dorsal part of caudal peduncle covered with a dark saddle-like bar | 5 |
| 3b. Dorsal part of caudal peduncle without a dark saddle-like bar | C. ocellicincta |

| 4a. A rounded black blotch with a diameter subequal to eye on ventral side of body between pectoral-fin base and anal-fin origin | C. inframacula |
| 4b. No rounded black blotch on ventral side of body | 6 |

| 5a. Second and third dark saddle-like bars extending ventrally to belly | C. valentini |
| 5b. Second and third dark saddle-like bars extending ventrally to level of ventral end of pectoral-fin origin, not extending to belly | C. axiologus |

| 6a. Side of body with 1 or 2 longitudinal stripes (sometimes fragmented) from pectoral-fin region to caudal peduncle | 7 |
| 6b. Side of body without longitudinal stripes | 8 |

| 7a. Side of body with 2 parallel, longitudinal stripes joining to form an arch in front of gill opening | 9 |
| 7b. Side of body with 1 dark longitudinal stripe, equal to, or slightly wider than eye diameter, running from upper gill opening to caudal peduncle | C. bennetti |

| 8a. Side of body pale brown with clusters of dark brown spots | C. leoparda |
| 8b. No clusters of dark brown spots on side of body | 10 |

| 9a. Dorsal part of body brown with many wavy dark blue lines; 2 parallel yellow stripes on body much narrower than diameter of pupil; caudal fin yellow with longitudinal dark blue lines | C. rivulata |
| 9b. Dorsal part of body light brown with many blue spots; 2 parallel, narrow yellow stripes on body; caudal fin light yellow with several transverse light blue lines | C. punctata |

| 10a. Body dark brown dorsally and white ventrally without white spots; caudal fin yellow | C. epilampra |
| 10b. Body brown or reddish brown with many white spots | 11 |

| 11a. No longitudinal pale blue to white lines on back | C. janthinoptera |
| 11b. Longitudinal blue to white lines on back | 12 |

| 12a. Body brown with combination of pale blue to white wavy lines and white spots; pale blue-edged, black ocellus on dorsal-fin base; caudal fin reddish brown with many transverse pale blue lines | C. compressa |
| 12b. Body reddish brown with many small blue-white spots and short wavy lines on back; pale blue-edged, black ocellus on dorsal-fin base; several blue-white lines on snout; caudal fin orange with many small blue-white spots | C. papua |
Canthigaster amboinensis (Bleeker 1864)
Spotted Toby

Dorsal-fin rays 10–12 (usually 12); anal-fin rays 10–11 (usually 11); pectoral-fin rays 16–17 (usually 17). Body brown with numerous white spots; several white lines radiating from eye; cheek with many pale blue spots or lines; snout with several narrow pale blue lines; dorsal, anal, and pectoral fins pale with brown base; caudal fin brown with pale blue spots proximally. Attains 15 cm TL. Inhabits very shallow water, frequently in lower reaches of surge zone; eats mostly small invertebrates. Indo-Pacific from East Africa eastward through Indonesia to Fiji and northward to Japan.

Canthigaster axiologus (Whitley 1931)
Saddle Toby

Dorsal-fin rays 9–10 (usually 10); anal-fin rays 9–10 (usually 9); pectoral-fin rays 16–17 (usually 17). Head and body with 4 black, saddle-like bars, first on top of head, second between pectoral-fin bases, third on middle of body, and fourth on caudal peduncle, the two middle bars extending ventrally to level of pectoral-fin base, not reaching belly; ventral half of body white with many orange spots; eye with several radiating pale blue lines; dorsal, anal, and pectoral fins pale; caudal fin pale with a black spot at top and bottom of base. Attains 14 cm TL. Found in depths of 10–80 m, but usually in shallow depths. Feeds primarily on invertebrates, especially mollusks. West Pacific southward to New South Wales in Australia and northward to Japan.
**Canthigaster bennetti** (Bleeker 1854)

**Exquisite Toby**

Dorsal-fin rays 9–11 (usually 9–10); anal-fin rays 8–10 (usually 9); pectoral-fin rays 14–16 (usually 15–16). Greenish brown dorsally, with irregular orange lines and spots on back; white spots on side and back posterior to pectoral fin; side of body with a dark brown longitudinal stripe from gill opening to caudal peduncle; ventral half of body white with many pale blue spots; eye with several radiating blue lines; several vertical blue lines just posterior to mouth; dorsal-fin base with black ocellus and irregular blue lines; dorsal, anal, and pectoral fins pale; caudal fin greenish brown. Attains 10 cm TL. Inhabits inner reef flats and sheltered lagoons, often on algal or silty reefs and among attached Sargassum on shallow rubble flats. Feeds mainly on filamentous green algae, sponges and other benthic invertebrates. Indo-Pacific from East Africa eastward through Indonesia to Tuamotu Islands and northward to Japan.

**Canthigaster compressa** (Marion de Procé 1822)

**Compressed Toby**

Dorsal-fin rays 8–10 (usually 9); anal-fin rays 8–9 (usually 9); pectoral-fin rays 15–18. Body brown with combination of pale blue to white wavy lines and white spots; pale blue-edged black ocellus on dorsal-fin base; caudal fin reddish brown with pale blue spots forming vertical pale blue lines. Attains 11 cm TL. Usually found in depths shallower than 25 m at silty bays and harbors. Western Pacific from Indonesia eastward to Vanuatu and northward to Japan.
**Canthigaster epilampra** (Jenkins 1903)

*Lantern Toby*

Dorsal-fin rays 9–10 (usually 10); anal-fin rays 9–10 (usually 9); pectoral-fin rays 16–17 (usually 17). Ventral half of body creamy white covered with many blue-white spots and short lines, dorsal half dark brown; several blue lines radiating from eye; several blue lines on snout; dorsal, anal, and pectoral fins pale; caudal fin yellow with longitudinal blue lines. Attains 11 cm TL. Usually occurs on steep outer reef slopes below 25 m. Western Pacific from Indonesia eastward to Society Islands and northward to Japan; also recorded from Christmas Island in eastern Indian Ocean.

**Canthigaster inframacula** Allen & Randall 1977

*Bellyspot Toby*

Dorsal-fin rays 10–11; anal-fin rays 10–11; pectoral-fin rays 17–18. Body light brown dorsally, becoming whitish ventrally; a longitudinal dark brown stripe running from eye to upper base of caudal fin; a round dark brown spot with diameter about equal to eye, on lower side of body between lower base of pectoral fin and origin of anal fin; dark brown lines radiating from eye; short, irregular, dark brown lines on dorsal half of body; dorsal, anal, and pectoral fins pale; caudal fin pale with several dark yellowish spots in transverse rows on rays. Attains 9.5 cm TL. Collected at depths of 124–247 m. Known only from Hawaiian Islands, Tori-shima Island, Japan, and central Vietnam.
**Canthigaster janthinoptera** (Bleeker 1855)

*Honeycomb Toby*

Dorsal-fin rays 8–10 (usually 9); anal-fin rays 8–10 (usually 9); pectoral-fin rays 15–18 (usually 16–17). Body reddish brown with many white spots on sides of head and body forming reddish brown reticulations; eye with several radiating reddish brown lines; a dark ocellus at dorsal-fin base sometimes present; dorsal, anal, and pectoral fins pale; caudal fin reddish brown or brown. Attains 9 cm TL. Occurs in clear lagoon and on seaward reefs, solitary or paired. Feeds on sponges, polychaetes, other invertebrates and filamentous algae. Indo-Pacific from East Africa eastward through Indonesia to Society Islands and northward to Japan.

**Canthigaster leoparda** Lubbock & Allen 1979

*Leopard Toby*

Dorsal-fin rays 8–9; anal-fin rays 9; pectoral-fin rays 16. Body light brown with clusters of irregular brown spots on side and blue lines across dorsal side of snout; many light blue spots on ventral side of head and body; many alternating light blue and orange lines radiating from eye; pectoral fin pale; dorsal and anal fins light bluish; caudal fin light bluish with yellow upper and lower rays. Attains 7 cm TL. Inhabits depths of 30–50 m; solitary or in pairs. Christmas Island (Indian Ocean), Indonesia, Philippines, and Mariana Islands.
**Canthigaster ocellicincta** Allen & Randall 1977

*Shy Toby*

Dorsal-fin rays 9; anal-fin rays 9; pectoral-fin rays 16. Body light brown with gray lines on head and light bluish gray spots on posterior part of body; two vertical dark brown bars between eye and dorsal-fin origin separated by white lines; a black spot on dorsal-fin base; fins pale. Attains 9 cm TL. Inhabits seaward reef slopes at depths of 20–53 m. Western Pacific from Indonesia eastward to New Caledonia and northward to Japan.

**Canthigaster papua** (Bleeker 1848)

*Papuan Toby*

Dorsal-fin rays 8–10 (usually 9); anal-fin rays 8–10 (usually 9); pectoral-fin rays 15–18 (usually 17). Body reddish brown with many small blue-white spots and short wavy lines on back; pale blue-edged black ocellus on dorsal-fin base; several blue-white lines on snout; caudal fin orange with many small blue-white spots; dorsal, anal, and pectoral fins pale; caudal fin light reddish brown with blue-white spots. Attains 9 cm TL. Occurs in depths shallower than 35 m in coral reefs. Eastern Indian Ocean eastward through Indonesia to New Caledonia and northward to Japan.
Canthigaster punctata Matsuura 1992
Yellow-lined Toby

Dorsal-fin rays 10; anal-fin rays 9–10; pectoral-fin rays 16. Dorsal sides of head and body light brownish gray with many blue spots; side and belly white; two parallel longitudinal yellow lines running from pectoral-fin base to caudal peduncle, joining each other just in front of gill opening; alternating yellow and light blue lines radiating from eye; dorsal, anal, and pectoral fins pale; caudal fin light yellow with wavy, light blue vertical lines. Attains 12 cm TL. Type specimens collected at a depth of 92 m. Known only from Mascarene Submarine Ridge, western Indian Ocean and Taiwan.

Canthigaster rivulata Temminck & Schlegel 1850
Brown-lined Toby

Dorsal-fin rays 9–10 (usually 10); anal-fin rays 9–10 (usually 9); pectoral-fin rays 16–18 (usually 17). Dorsal half of head and body brownish gray with many wavy dark blue lines forming a vermiculated pattern; ventral half of body white; side of body with 2 parallel, dark longitudinal bands, joining each other just in front of gill opening; a dark blotch at dorsal-fin base; dorsal, anal, and pectoral fins pale; caudal fin with yellowish brown rays. Attains 20 cm TL. Collected at depths around 100 m in Hawaii, though commonly found in shallow reefs. Indo-West Pacific from East Africa eastward to Western Australia and northward to Japan.
Dorsal-fin rays 9; anal-fin rays 9; pectoral-fin rays 16–17 (usually 17). Body white with 4 blackish saddle-like bars on back; first on top of head connecting eyes, second and third bars extending ventrally to belly region, and fourth on caudal peduncle; belly white; side of body behind pectoral-fin base with dark yellow spots; interorbital region with several dark yellow longitudinal lines; 5–7 transverse dark yellow lines on snout; dorsal, anal, and pectoral fins pale with yellowish orange base; caudal fin yellowish orange. Attains 11 cm TL. Found in coastal reefs at various depths. Indo-Pacific from East Africa eastward through Indonesia to Tuamotu Islands and northward to Japan.
Mouth below a horizontal line through dorsal end of gill opening; nasal organ in the form of a depression with slightly raised margin expanded before and behind into a pair of elongate flaps; 2 lateral lines on body, upper lateral line joining lower behind anal fin, and lower extending forward above anal fin; no lateral skin fold along ventrolateral part of body and caudal peduncle. Four species in the world, 1 species in South China Sea.

**Genus *Chelonodontops* Smith 1958**

*Dorsal-fin rays 9–11 (usually 10); anal-fin rays 8–10 (usually 8); pectoral-fin rays 16–19 (usually 17). Dorsal surface of body covered with spinules from posterior part of interorbital region to just dorsal to pectoral fin; ventral surface of body covered with spinules from throat to just before anus; body brownish gray with many round white spots; 5–6 dark relatively wide bars on body, first across eye and last on caudal peduncle; a longitudinal yellow line running along ventrolateral corner of body from below mouth to caudal peduncle; dorsal, anal, and pectoral fins pale; caudal fin dusky yellow. Attains 33 cm TL. Occurs in shallow water at depths of 1–22 m, frequently found in mangroves at depths of 1–5 m. Tropical eastern Indian Ocean eastward to eastern Australia and northward to Japan.**

*Chelonodontops patoca* (Hamilton 1822)

*Milkspotted Pufferfish*

*Chelonodontops patoca*, KAUM–I. 39848, 4 cm SL, Yoron-jima Island, Kagoshima Prefecture, photo courtesy of KAUM.

*Chelonodontops patoca*, KAUM–I. 66503, 4.3 cm SL, Tokuno-shima Island, Kagoshima Prefecture, photo courtesy of KAUM.
**Genus Lagocephalus Swainson 1839**

Body oblong; a longitudinal skin fold running along ventrolateral part of body; dorsal and anal fins pointed; caudal fin emarginate or truncate; two lateral lines on head and body, ventral element on skin fold and lateral element on lateral midline of side from above gill opening to caudal-fin base with an anterior extension from below eye to the snout region; nasal organs covered by a small sac with 2 nostrils; ventral lateral side of body silver. Nine species in the world, 7 species in South China Sea. Although muscles of *L. inermis*, *L. cheesemanii*, and *L. spadiceus* in seas around Japan and East China Sea are edible, individuals of the same species are poisonous in the South China Sea.

**Key to Species of Lagocephalus**

1. Dorsal surface of body smooth, not covered with spinules ........................................... 2
2. Dorsal surface of body covered with spinules .............................................................. 3

2a. Lower one-fourth to one-third of pectoral fin white, in contrast to the remaining black upper section; lower caudal-fin lobe longer than the upper .................................. *L. lagocephalus*
2b. Lower section of pectoral fin not white; caudal fin truncate, slightly rounded or slightly lunate; upper and lower lobes of caudal fin equal in length .................................. *L. inermis*

3a. Body oblong; caudal peduncle depressed, wider than deep .................................... 4
3b. Body not oblong; caudal peduncle laterally compressed, deeper than wide ............. 5

4a. Dorsal surface of head and body brown with many black spots; dorsal-fin rays 12–13 (usually 12), anal-fin rays 10–11 (usually 11), pectoral-fin rays 16–17 (usually 17) .............. *L. sceleratus*
4b. Dorsal surface of head and body light brown with irregular dark brown markings and short dark brown lines; dorsal-fin rays 10–12 (usually 11), anal-fin rays 8–10, pectoral-fin rays 14–16 (usually 15) .................. *L. suezensis*

5a. Middle part of caudal fin slightly produced posteriorly; caudal fin black with upper and lower white tips ................................................................. *L. cheesemanii*
5b. Caudal fin slightly lunate or truncate; caudal fin not black, dusky yellow or light brown .. 6

6a. Spinules on dorsal surface reaching to or beyond dorsal-fin origin ............... *L. lunaris*
6b. Spinules on dorsal surface not reaching to dorsal-fin origin, ending only halfway from interorbital region to dorsal-fin origin ........................................ *L. spadiceus*
**Genus Lagocephalus**

**Lagocephalus cheesemanii** (Clarke 1897)

*Black-tail Pufferfish*

Dorsal-fin rays 11–15 (usually 13–14), anal-fin rays 11–14 (usually 12–13), pectoral-fin rays 15–18 (usually 17). Spinules on back in a rhomboidal patch, starting anteriorly between nasal organ and eye with widest expanse above midpoint between eye and gill opening, tapering posteriorly and ending above posterior part of pectoral fin; caudal fin double emarginate with middle rays produced posteriorly; dorsal half of body dark brown to brownish black; side of head silver with deep yellowish tinge; ventral side of body between gill opening and caudal-fin base silver; dorsal and pectoral fins dark; caudal fin dark brown to black with dorsal and ventral white tips. Attains 40 cm TL. Occurs at depths of 15–200 m. Eastern Indian Ocean eastward through South China Sea to Japan and southward to eastern Australia and New Zealand. Individuals in South China Sea are toxic.

![Lagocephalus cheesemanii](image_url)

**Lagocephalus inermis** (Temminck & Schlegel 1850)

*Smooth Pufferfish*

Dorsal-fin rays 12–13, anal-fin rays 11–13, pectoral-fin rays 15–17. A large pufferfish, attaining 56 cm. Body smooth without spinules; caudal fin slightly rounded or truncate; body greenish brown or dark brown above; silvery white on side; belly white; gill opening black internally. Attains 63 cm TL. Occurs at depths of 35–130 m. Indo-West Pacific from East Africa eastward through Indonesia to eastern Australia and northward to Japan. Individuals in South China Sea are toxic.

![Lagocephalus inermis](image_url)
**Lagocephalus lagocephalus** (Linnaeus 1758)

*Oceanic Pufferfish*

Dorsal-fin rays 13–15, anal-fin rays 12–13, pectoral-fin rays 13–16. Blackish-gray to dark bluish-gray above, with transverse darker bands in juveniles; sides silver between level of upper margin of orbits and ventrolateral angles of body; belly white with dark brown or black spots near pectoral-fin bases continuing onto underside of body; all fins dark, with lower one-third of pectoral fin white. Attains 70 cm TL. Occurs at depths of 40–400 m. Circumglobal in warm waters.

*Lagocephalus lagocephalus*, KPM-NI 4372, 23.8 cm SL, Sagami Bay, Kanagawa Prefecture, photo (KPM-NR 53375A) by H. Senou.

*Lagocephalus lagocephalus*, KAUM–I. 77800, 18 cm SL, Satsuma Peninsula, Kagoshima Prefecture, photo courtesy of KAUM.

*Lagocephalus lagocephalus*, KAUM–I. 9491, 5.3 cm SL, Satsuma Peninsula, Kagoshima Prefecture, photo courtesy of KAUM.

Dorsal-fin rays 13–15, anal-fin rays 12–13, pectoral-fin rays 13–16. Blackish-gray to dark bluish-gray above, with transverse darker bands in juveniles; sides silver between level of upper margin of orbits and ventrolateral angles of body; belly white with dark brown or black spots near pectoral-fin bases continuing onto underside of body; all fins dark, with lower one-third of pectoral fin white. Attains 70 cm TL. Occurs at depths of 40–400 m. Circumglobal in warm waters.
Lagocephalus lunaris (Bloch & Schneider 1801)
Lunartail Pufferfish

Dorsal-fin rays 16–17, anal-fin rays 11–12, pectoral-fin rays 16–17. Dorsal surface of body covered with spinules from posterior edge of nostrils to origin of dorsal fin; caudal fin deeply concave; dorsal half of head and body brownish gray; silver on sides; belly white; pectoral, dorsal, and anal fins pale; dorsal half of caudal fin yellowish gray and lower half of caudal fin bluish white. Attains 30 cm TL. Occurs at depths of 1–150 m. Indo-West Pacific from East Africa eastward through Indonesia to eastern Australia, northward to Japan. Every part of body is strongly toxic.

Lagocephalus sceleratus (Gmelin 1789)
Silver-cheeked Toadfish

Dorsal-fin rays 12–13 (usually 12), anal-fin rays 10–11 (usually 11), pectoral-fin rays 16–17 (usually 17). Dark greenish-gray above, with moderately dense array of irregularly scattered black spots extending from snout to end of caudal peduncle; sides bluish-gray, each with broad silver stripe extending from corner of mouth, becoming thinner and descending under eye, then broadening considerably and passing through pectoral-fin base, tapering along lateral surface of body and terminating near posterior end of caudal peduncle; ventral side of body grayish-white; dorsal and pectoral fins grayish; caudal fin yellowish-gray; anal fin pale. Attains 97 cm TL. Occurs at depths of 10–180 m. Indo-Pacific from East Africa eastward through Indonesia to Samoa and northward to Japan. Every part of body is strongly toxic.
Lagocephalus spadiceus (Richardson 1845)
Half-smooth Golden Pufferfish

Dorsal-fin rays 11–14 (usually 12–13); anal-fin rays 10–12 (usually 11); pectoral-fin rays 14-17 (usually 15–16). Dorsal surface of body covered with spinules from interorbital region to above pectoral fin, but never reaching dorsal-fin origin; caudal fin truncate or slightly concave; dorsal half of head and body brownish gray; silver on sides; belly white; dorsal, anal, and pectoral fins pale; dorsal half of caudal fin yellowish gray and ventral half dusky white. Attains 30 cm TL. Occurs at depths of 4–190 m. Indo-West Pacific from East Africa eastward through Indonesia to eastern Australia. Many individuals in South China Sea are toxic.

Lagocephalus suezensis Clark & Gohar 1953
Suez Pufferfish

Dorsal-fin rays 10–12 (usually 11); anal-fin rays 9–10; pectoral-fin rays 14-16 (usually 15). Dark brownish-gray above, with many brown dots and spots; side with broad silver stripe extending from corner of mouth, becoming thinner and descending under eye, then broadening considerably and passing through pectoral-fin base, tapering along lateral surface of body and reaching caudal-fin base; ventral side of body grayish-white; dorsal and pectoral fins grayish; caudal fin yellowish-gray; anal fin pale. Attains at least 18 cm TL but probably reaches more than 20 cm TL. Occurs at depths of 2–60 m. Because this species has frequently been confused with L. sceleratus, much of the literature cannot be relied upon for distribution records. The examination of specimens and photographs in publications revealed it to occur in the Indo-West Pacific from East Africa and Red Sea eastward to Australia, and northward to Japan. It is probably toxic.
Genus *Sphoeroides* Anonymous 1798

Only one lateral line; no raised skin fold along ventrolateral part of body and caudal peduncle; nasal organ covered by a small sac with 2 nostrils; caudal fin truncate; anal-fin origin at or behind vertical from last dorsal-fin ray; vertebrae 17–20. About 20 species in the world (most species in Atlantic and eastern Pacific), 1 species in South China Sea.

*Sphoeroides pachygaster* (Müller & Troschel 1848)  
Blunthead Pufferfish

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*Dorsal-fin rays 8–9; anal-fin rays 8–9; pectoral-fin rays 14–17. Body smooth without spinules; caudal fin truncate; greenish gray on dorsal half of body, white ventrally; several dark spots occasionally on flanks. Fins pale but caudal fin dusky with a ventral white tip. Attains 48 cm. Inhabits the continental shelf and slope at depths of 25–480 m and frequently collected below 200 m. Circumglobal in warm waters.*

*Sphoeroides pachygaster*, KPM-NI 40071, 30.5 cm SL, Suruga Bay, Shizuoka Prefecture, photo (KPM-NR 109141B) by H. Senou.

*Sphoeroides pachygaster*, KAUM–I. 22572, 24 cm SL, East China Sea, photo courtesy of KAUM.

*Sphoeroides pachygaster*, KAUM–I. 86292, 6.5 cm SL, East China Sea, photo courtesy of KAUM.
Body oblong; a longitudinal skin fold running along ventrolateral part of body; caudal fin rounded or truncate; nasal organs covered by a small sac with 2 nostrils; two lateral lines, lower along ventrolateral part of caudal peduncle on skin fold; caudal fin truncate to rounded; nasal organs covered by a small sac with 2 nostrils. About 24 species in the world; most species in seas around China and Japan; 5 species in South China Sea.

**Key to Species of *Takifugu***

1a. Many alternating brown and white vertical bands on head and body, beginning from snout and ending on caudal peduncle ........................................... *T. oblongus*

1b. No vertical bands on head and body ...................................................... 2

2a. Dorsal side of body light gray covered with 7–8 oblique dark blue bands; a large black blotch behind gill opening .................................................. *T. bimaculatus*

2b. No oblique dark bands on head and body .................................................. 3

3a. Dorsal side of head and body light brown covered with many rounded white spots; no large black blotch on dorsal-fin base ........................................ *T. flavipterus*

3b. Dorsal side of body dark brown or greenish brown without many white spots; large black blotch sometimes on dorsal-fin base ........................................ 4

4a. Dorsal and ventral surfaces of body covered continuously with spinules, not interrupted by naked space in front of gill opening; dorsal side of head and body dark brown; a large rounded black blotch behind gill opening and another large rounded black blotch on dorsal-fin base ........................................... *T. obscurus*

4b. Dorsal and ventral spinule covered area separated by naked area in front of gill opening; dorsal side of body greenish brown; a wide transverse black band edged with an orange line on dorsal side of body just behind gill opening; another large black blotch edged with an orange line on dorsal-fin base ........................................ *T. ocellatus*

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**Takifugu bimaculatus (Richardson 1845)**

**Two-blotch Pufferfish**

Dorsal-fin rays 13–14; anal-fin rays 12–13; pectoral-fin rays 15–18. Dorsal surface of body covered by spinules from interorbital region to area in front of dorsal-fin origin; ventral surface of body also covered by spinules; dorsal and ventral spinule covered areas separated by naked space on sides; dorsal side of body above ventral edge of gill opening light gray, covered with 7–8 oblique blackish blue bands; a large rounded black blotch behind gill opening; a small black blotch on pectoral-fin base; ventral side of body white; dorsal, anal, and pectoral fins dusky; caudal fin dusky yellow. Attains 36 cm TL. Collected on continental shelves but no depth records available. From northern Vietnam northward through East China Sea to Japan.
Takifugu flavipterus Matsuura 2017
Fine-patterned Pufferfish

Dorsal-fin rays 11–15; anal-fin rays 10–13; pectoral-fin rays 14–17. Dorsal and ventral surfaces of body covered with spinules, spinules continuous across side in front of gill opening; dorsal side of head and body light brown, covered with many rounded white spots; a longitudinal yellow stripe running along fin fold from chin to caudal-fin base; ventral side of body white; dorsal, anal, and pectoral fins light yellow; caudal fin dusky yellow. Attains 25 cm TL. Occurs in coastal waters shallower than 100 m. Widely distributed along eastern coasts of Asian Continent from northern Vietnam northward through Korea and Japan to southern Sakhalin Island.

Takifugu oblongus (Bloch 1786)
Lattice Pufferfish

Dorsal-fin rays 12–14; anal-fin rays 10–12; pectoral-fin rays 14–16. Dorsal and ventral surfaces of body covered with spinules, spinules continuous across side in front of gill opening; many alternating transverse brown and white bands on head and body, beginning on snout and ending on caudal peduncle; ventral side of head and body white; dorsal and pectoral fins dusky yellow; anal fin white; dorsal three-fourths of caudal fin dusky yellow, ventral one fourth white. Attains 40 cm TL. Occurs at depths of 1–73 m. Indo-West Pacific from East Africa eastward through Indonesia to Australia and northward to Japan.
Takifugu obscurus (Abe 1949)

Obscure Pufferfish

Dorsal-fin rays 15–19; anal-fin rays 13–16; pectoral-fin rays 16–18. Dorsal and ventral spinule covered areas separated by naked area on side in front of gill opening; dorsal side of body dark brown without white spots; a large white-edged black rounded blotch behind gill opening and another on dorsal-fin base; short irregular white lines frequently observed on dorsal part of head; a longitudinal wide yellow band running just above fin fold from chin to caudal-fin base; ventral side of body white. Attains 50 cm TL. Inhabits coastal areas, frequently entering rivers. Northern South China Sea and East China Sea.

Takifugu ocellatus (Linnaeus 1758)

Ocellated Pufferfish

Dorsal-fin rays 13–15; anal-fin rays 12–13; pectoral-fin rays 16–18. Dorsal and ventral spinule covered areas separated on side by naked area in front of gill opening; dorsal side of body greenish brown; a wide orange-edged black transverse band on dorsal side of body just behind gill opening and another on dorsal-fin base; fins pale. Attains 15 cm TL. Inhabits coastal areas, frequently entering rivers. From northern Vietnam northward through East China Sea to Yellow Sea.
Genus *Torquigener* Whitley 1930

Two lateral lines, lower on low skin ridge ventrolaterally on caudal peduncle; anal-fin origin below middle of dorsal fin; caudal fin truncate to rounded; nasal organs covered by a small sac with 2 nostrils; eyes adnate dorsally only; chin strongly developed. Twenty species in the world, 5 species in South China Sea.

Key to Species of *Torquigener*

1a. A solid, dark brown, longitudinal stripe or distinct longitudinal row of spots or blotches on mid-laterally on body from pectoral-fin base to caudal-fin base ........................................2
1b. No solid longitudinal stripe nor longitudinal row of spots on side of body ........................................4

2a. Dorsal-fin rays 9–11 (usually 10); anal-fin rays 8–9 (usually 8); pectoral-fin rays 16–17; no vertical bands on side of head ..................................................*T. florealis*
2b. Dorsal-fin rays 8–9; anal-fin rays 7–8; pectoral-fin rays 13–16; several vertical bands on side of head below eye .................................................................................................3

3a. Vertical dark yellowish-brown bars on side of head; eye diameter smaller than 24% of head length; a solid, dark brown, longitudinal stripe on side of body ..........*T. brevipinnis*
3b. Vertical dark brown bars on side of head; eye diameter larger than 4.1 times in head length; a distinct longitudinal row of yellowish-brown spots on side of body ..................................................*T. hypselogeneion*

4a. Spinules on head and body well developed and distinct; dorsal side of head and body above level through ventral end of gill opening light brown with many small white spots ..................................................*T. purcaspinus*
4b. Spinules on head and body small; dorsal side of head and body above level through ventral end of gill opening pale yellowish white covered with many small rounded brown blotches and spots ..................................................*T. gloerfelti*

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*Torquigener brevipinnis* (Regan 1902)

Yellow-lined Pufferfish

Dorsal-fin rays 8–9; anal-fin rays 7–8; pectoral-fin rays 15–16. Dorsal side of body light brown with many round white spots; a solid distinct longitudinal row of yellowish-brown spots (frequently coalesced to form a solid stripe) running from pectoral-fin region to caudal-fin base; side of head white with 5 vertical yellowish-brown bars; ventral side of head and body white; dorsal, anal, and pectoral fins pale; caudal fin membrane pale but rays white with many small brown spots, forming several vertical rows. Attains 11 cm TL. Inhabits shallow waters at depths of 2–100 m. Eastern Indian Ocean eastward to New Caledonia and northward to Japan.

Torquigener brevipinnis, KAUM–I. 162, 8.3 cm SL, Satsuma Peninsula, Kagoshima Prefecture, photo courtesy of KAUM.
**Torquigener florealis** (Cope 1871)

Floral Pufferfish

Dorsal-fin rays 9–11 (usually 10); anal-fin rays 8–9; (usually 8); pectoral-fin rays 16–17. A distinct longitudinal row of brownish yellow spots mid-laterally on side from pectoral-fin base to caudal-fin base; dorsal side of body above level through ventral end of gill opening covered with many small, irregularly sized, white spots, delineated by a rosette of smaller brown spots; about 10 rounded yellowish brown spots just below a longitudinal row of yellowish brown spots; side of head white with many small brown spots; ventral side of body white; dorsal, anal, and pectoral fins pale; caudal fin with several vertical light brown bands. Attains 19 cm TL. Inhabits shallow waters but collected from depths exceeding 100 m. South China Sea, East China Sea, and Hawaiian Islands.

**Torquigener gloerfelti** Hardy 1984

Gloerfelt’s Pufferfish

Dorsal-fin rays 8–9; anal-fin rays 6–7; pectoral-fin rays 15–16. Dorsal side of head and body above level through ventral end of gill opening pale yellowish white covered with many small rounded brown blotches and spots; dorsal, anal, and pectoral fins pale; caudal-fin rays yellowish with dark brown margins. Attains 20 cm TL. Usually collected at depths of 50–60 m. Java Sea and South China Sea.
**Torquigener hypselogeneion (Bleeker 1852)**

**Dark-striped Pufferfish**

Dorsal-fin rays 8–9; anal-fin rays 7–8; pectoral-fin rays 13–15. Dark brown reticulations on dorsal surface of body; a solid, dark brown curved stripe on side of body angled from above gill opening to mid-lateral center of body and continuing horizontally to caudal-fin base; many small dark brown spots on cheek, forming broad vertical bands, separated by narrow, irregular white bands; belly white. Attains 10 cm TL. Occurs at depths shallower than 22 m. Indo-West Pacific, from East Africa eastward through Indonesia to Samoa and northward to Japan.

**Torquigener parcuspinus Hardy 1983**

**Yellow-eyed Toadfish**

Dorsal-fin rays 9; anal-fin rays 6; pectoral-fin rays 16. Spinules on head and body well developed and distinct; dorsal side of head body above level through dorsal end of gill opening light brown with many small white spots; no markings on side of head; ventral side of head and body white; fins pale. Attains 10 cm TL. Collected at depths shallower than 400 m. Tropical eastern Indian Ocean eastward to western Australia and northward to Philippines.
Genus *Tylerius* Hardy 1984

Chin not prominent; well-developed spinules covering head and body except for posterior part of caudal peduncle and fin bases; nasal organ a short flattened papilla with two openings; no ventrolateral skin fold; body width at pectoral-fin base greater than body depth at end of dorsal-fin base; lips papillose. Monotypic.

*Tylerius spinosissimus* (Regan 1908)

**Fine-spined Pufferfish**

Dorsal-fin rays 8–9; anal-fin rays 6–7; pectoral-fin rays 14–15. Body short; body width greater than depth; caudal fin longer than distance between anal-fin origin and caudal-fin base; dorsal part of body above level through ventral edge of pectoral-fin base yellowish-brown with many white spots; fins pale; posterior margin of caudal fin whitish with dark brown posterior margin; belly white, speckled with black. Attains 12 cm TL. Inhabits shallow waters, frequently collected from depths less than 100 m. Indo-West Pacific, from East Africa eastward through South China Sea to western Australia and northward to Ryukyu Islands.
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*Arothron stellatus* found at a fish market in Malaysia. Photo by K. Matsuura.
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2009 (March)

2011 (November)

2013 (September)

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2014 (March)

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Most publications listed above can be downloaded from http://www.museum.kagoshima-u.ac.jp/staff/motomura/dl.html
Ichthyological Publications by the Kagoshima University Museum

2016 (August)
Matsumura, M., Y. Fukui and H. Motomura (eds.). Freshwater fishes of Kagoshima City, southern Kyushu, Japan. Kagoshima University Museum, Kagoshima. 86 pp., 221 figs.

2016 (September)

2017 (January)

2017 (February)

2017 (October)
Iwatsubo, H. and H. Motomura (eds.). Field guide to fishes of Kagoshima Bay in southern Kyushu, Japan. Kagoshima Museum of Aquatic Biodiversity, Kagoshima and the Kagoshima University Museum, Kagoshima. 302 pp., 618 figs.

2017 (December)

2018 (March)

2018 (April)

Most publications listed above can be downloaded from http://www.museum.kagoshima-u.ac.jp/staff/motomura/dl_en.html
Ichthyological Publications by the Kagoshima University Museum

2019 (February)

2018 (September)

2020 (February)

2018 (September)

2020 (May)

2020 (March)

2020 (November)

2020 (December)

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Ichthyological Publications by the Kagoshima University Museum

2021 (January)

2021 (October)

2022 (February)

2022 (February)

Arothron stellatus (top two individuals) and A. hispidus (bottom) found at a fish market in Malaysia.
Photo taken by K. Matsuura on 23 May 2011.