

A New Boxfish of the Genus *Kentrocapros* Collected from New Zealand (Acanthopterygii, Tetraodontiformes, Aracanidae)

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Abstract A new boxfish, *Kentrocapros flavimaculatus*, is described on the basis of two specimens collected from New Zealand. The new species is distinguished from all other species of *Kentrocapros* by the following combination of characters: many yellow spots on the lateral sides of the body, a distinct spine on the middle of each dorsolateral ridge of the carapace, no spines on the lateral and ventrolateral ridges, and the gill opening located below the posterior half of the eye.

Key words: boxfish, taxonomy, *Kentrocapros flavimaculatus*, distribution.

Introduction

Boxfishes of the genus *Kentrocapros* are distinguished from other genera of the Aracanidae by the following combination of characters (Matsuura and Tyler, 1997; Matsuura, 2006, 2015): the body hexagonal in cross section and the carapace with six longitudinal ridges, three on each side—dorsolateral, lateral and ventrolateral. *Kentrocapros* is currently represented by five species, *Kentrocapros aculeatus* (Houttuyn, 1782), *Kentrocapros eco* (Philipps, 1932), *K. flavofasciatus* (Kamohara, 1938), *K. rosapinto* (Smith, 1949), and *K. spilonotus* (Gilbert, 1905).

Two specimens of *Kentrocapros* were collected from New Zealand: one from 144–147 m depth around the Rangitāhua Kermadec Islands and the other from 145–172 m depth 700 km north-east of Cape Reinga of North Island. The two specimens differ from the five known species by the following combination of characters: many yellow spots on the lateral sides of the

body, a distinct spine on the middle of the dorsolateral ridge of the carapace, no spines on the lateral and ventrolateral ridges of the carapace, and the gill opening located below the posterior half of the eye. They are herein described as a new species under the name of *Kentrocapros flavimaculatus*.

Methods

Measurements were made in accordance with the manner of Hubbs and Lagler (1958), except for the following: head length (HL), the distance from the tip of the snout to the dorsal end of the gill opening; body depth, the vertical measurement from the ventral edge of the ventrolateral ridge to the dorsalmost portion of the carapace vertically above the pectoral-fin base; body width, the distance between the left and right dorsolateral ridges vertically above the pectoral-fin base; greatest body width, the distance between the left and right ventrolateral ridges at the middle of the ridges; gill opening length, the distance

between the dorsal and ventral extents of the gill opening; postorbital length, the least distance from the dorsal end of the gill opening to the orbit; eye diameter, the greatest width of the orbit (not the eye); interorbital width, the least bony interorbital width, measured at the anterior edges of the orbits; caudal peduncle length, the distance from the posterior edge of the structural base of the last anal ray to the middle of the caudal-fin base; caudal-fin length, the distance from the middle of the caudal-fin base to the tip of the longest ray; tail length, the distance from the posterior edge of the lateral ridge of the carapace to the middle of the caudal-fin base; tail depth, the vertical distance between the posterior edges of the structural bases of the last dorsal and anal rays.

Fin ray counts were taken as the total number of elements, regardless of whether the rays are branched or unbranched. Paratype data are shown in parentheses when different from those of the holotype.

Institutional abbreviations are as follows: AIM, Auckland Institute and Museum, Auckland; BSKU, Department of Biological Science, Faculty of Science and Technology, Kochi University, Kochi; NMNZ, Museum of New Zealand, Te Papa Tongarewa, Wellington; and NSMT, National Museum of Nature and Science, Tsukuba.

***Kentrocopros flavimaculatus* n. sp.**

(New English name: Yellow-spotted Boxfish;

Japanese name: Kimadara-itomaki-fugu)

(Fig. 1)

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Kentrocopros eco: Matsuura, 1990, p. 332.

Material examined. Holotype, AIM MA180380, 62.7 mm SL, 30°14'38.4"S, 178°20'3"W, Macaulley Island, Rangitāhua Kermadec Islands, 144–147 m depth, 31 Oct. 2016; paratype NSMT-P 43344, 114 mm SL, 32°43'S, 167°30'E, Tasman Sea, 700 km north-east of Cape Reinga of North Island, New Zealand, 145–172 m depth, 21 Dec.

1983.

Diagnosis. Many yellow spots on the lateral sides of the body, a distinct spine on the middle of each dorsolateral ridge of the carapace, no spines on the lateral and ventrolateral ridges of the carapace, and the gill opening located below the posterior half of the eye.

Description. Dorsal-fin rays 10, anal-fin rays 9, pectoral-fin rays 12. Body covered with rigid carapace except for caudal peduncle, pectoral-, dorsal-, and anal-fin bases, and around anus. Carapace with six ridges, three on each side: dorsolateral, lateral, and ventrolateral ridges; dorsolateral ridge starts dorsal to eye and extends posteriorly to below dorsal-fin origin; lateral ridge originates behind pectoral-fin base and runs posteriorly to end of carapace; ventrolateral ridge begins below pectoral-fin base and runs posteriorly to end of carapace; middle of dorsolateral ridge with pair of compressed spines; posterior half of ventrolateral ridge with series of tiny processes.

Most plates on dorsal and lateral sides of carapace hexagonal and sutured firmly to one another; each plate with central bony tubercle from which six (typically) low crests radiate out to edges of plates. Plates on snout and ventral surface of carapace variously shaped and articulating with one another. Most parts of caudal peduncle naked but anterior region covered by several small isolated plates.

Dorsal surface of carapace flat; interorbital space concave; dorsal profile of snout slightly concave. Ventral side of carapace slightly convex.

Mouth small, terminal; lips fleshy and plicate. Eight incisiform teeth in single row on each jaw. Two nostrils close together, just anterior to eye. Eye large, situated posterodorsally on head. Gill opening small, slit-like, slightly oblique, ventral to posterior half of eye. Dorsal and anal fins positioned opposite each other, slightly rounded. Pectoral fin slightly rounded; upper two rays unbranched; uppermost very short and lowermost unbranched. Caudal fin slightly rounded; dorsalmost and ventralmost rays unbranched.

Proportional measurements. HL 31.1% (26.5%) SL, snout length 25.0% (23.5%) SL, eye diameter

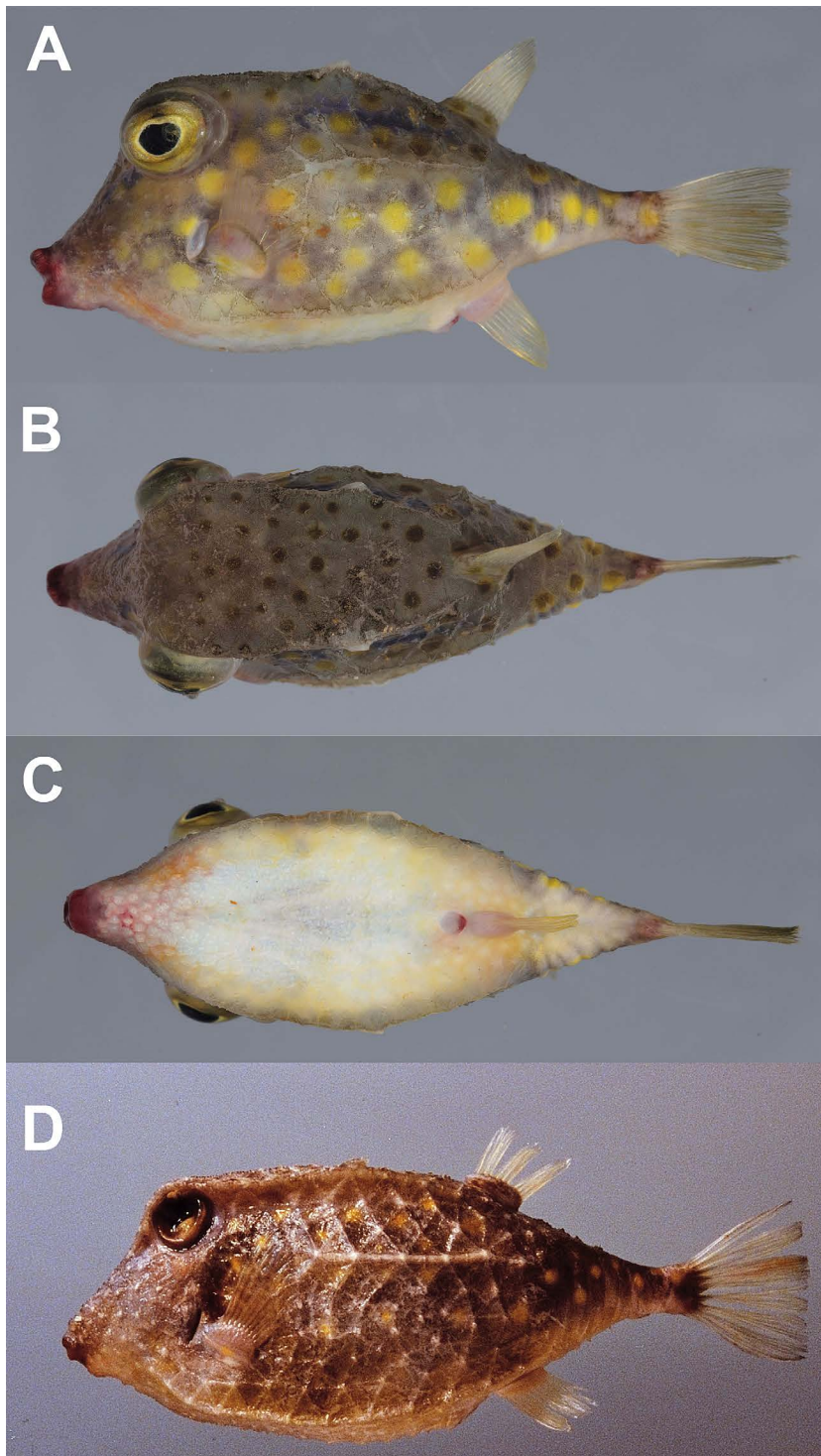


Fig. 1. Holotype (A–C) and paratype (D) of *Kentrocapros flavimaculatus* n. sp. Lateral (A), dorsal (B), and ventral (C) views of holotype (AIM MA180380, 62.7 mm SL), and lateral view of paratype (NSMT-P 43344, 114 mm SL). Photographs of A–C, courtesy of AIM.

16.6% (13.7%) SL, interorbital width 15.0% (12.8%) SL, postorbital length 10.0% (9.0%) SL, gill opening length 8.6% (6.7%) SL, snout to dorsal fin 73.2% (69.6%) SL, snout to anal fin 68.9% (69.7%) SL, body depth 44.0% (39.6%) SL, body width 31.6% (25.0%) SL, greatest body width 37.2% (29.4%), dorsal-fin height 20.6% (17.0%) SL, anal-fin height 16.9% (18.5%) SL, length of dorsal-fin base 10.7% (9.5%) SL, length of anal-fin base 8.3% (7.7%) SL, pectoral-fin length 24.7% (19.6%) SL, caudal-fin length 27.9% (24.5%) SL, caudal peduncle depth 7.2% (7.0%) SL, caudal peduncle length 24.9% (25.3%), tail depth 22.3% (24.0%) SL, tail length 22.3% (25.0%) SL.

Color of fresh specimens. Lateral and dorsal sides of carapace dark gray; ventral side of carapace white; many yellow spots on lateral sides of carapace; many small dark brown spots on dorsal and dorsolateral sides of carapace; lateral and dorsal sides of caudal peduncle dark gray with several yellow spots, ventral side of caudal peduncle white; fin rays light brownish gray with yellow tinge; and lips red.

Color of preserved specimens. Lateral and dorsal sides of carapace dark gray; many dark brown spots on dorsal surface of carapace and many light gray spots on lateral sides of body; ventral surface of carapace white; lateral and dorsal sides of caudal peduncle dark brown with several light gray spots, ventral side of caudal peduncle white; fin rays dark yellow.

Etymology. The specific name, *flavimaculatus*, derived from Latin “flavi” (yellow) and “macula” (spot), refers to the many yellow spots on the body of the new species.

Remarks. *Kentrocapros flaviamculatus* is similar to *K. aculeatus* and *K. spilonotus* in having a sharp spine on the middle of the dorsolateral ridge, which is absent in *K. eco*, *K. flavofasciatus*, and *K. rosapinto*, and is distinguishable from *K. aculeatus* and *K. spilonotus* in lacking spines on the ventrolateral ridges.

Although Philipps (1927) described *Ostracion hexagonus*, based on a single specimen washed up on a beach in the Bay of Islands, New Zealand, he

later gave the replacement name, *O. eco*, to the species because *O. hexagonus* was preoccupied. Matsuura (1990) provided brief accounts and a color photograph of a species of *Kentrocapros* collected from the northern Tasman Sea under the name of *K. eco*. However, a subsequent examination of the holotype of *K. eco* revealed the Tasman Sea specimen differs from *K. eco* in having a spine on the middle of dorsolateral ridge, implying it could be an undescribed species (Matsuura, 2015). Although Stewart (2015) suggested *K. eco* may be a senior synonym of *K. flavofasciatus* the holotype of *K. eco* is in too poor a condition (Fig. 2) to determine its taxonomic identity. I conclude that *K. eco* must be regarded as a nomen dubium.

Kamohara (1938) described *Aracana flavofasciata* based on a single specimen collected from the sea off Kochi, Japan. Because this species differs from typical *Aracana* members in having no spines on the carapace, and resembles *Kentrocapros* in having six ridges on the carapace, Matsubara (1955) transferred the species from *Aracana* to *Kentrocapros*. The holotype of *K. flavofasciatus* and other type specimens of many species described by Kamohara were deposited at Kochi University in Kochi City. All these type specimens and other fish collections were unfortunately destroyed by a war-caused fire in 1945 (Kamohara, 1961). After World War II, Kamohara began collecting fish specimens in the sea around Shikoku Island, and was fortunate in obtaining specimens of the species he described before the war. He published a paper to designate neotypes for the many species he described (Kamohara, 1961), but his designations do not satisfy article 75 of the ICZN, because his paper was not published as a revisory work. Considering the taxonomic problems existing with species of *Kentrocapros*, I here designate BSKU 3692 as a neotype of *K. flavofasciatus* to clarify its taxonomic identity.

Gosline and Brock (1960) regarded *Aracana spilonota* Gilbert, 1905 (= *Kentrocapros spilonotus*) as a synonym of *Ostracion aculeatus* Houttuyn, 1782 (= *K. aculeatus*). Mundy (2005) followed Gosline and Brock (1960) placing *K. spilonotus* in synonymy with *K. aculeatus*. The



Fig. 2. *Kentrocapros eco*, holotype, NMNZ P.000903, 116 mm SL, north of Pahia Bay, Bay of Islands, New Zealand. Photograph, courtesy of NMNZ.

decision is incorrect as *K. spilonotus* is clearly distinguishable from *K. aculeatus* in having the greatest body width much greater than the body depth, while the greatest body width is much less

than the body depth in *K. aculeatus*, and *K. spilonotus* lacks the black spots on the sides of the body that are present on the sides of the body of *K. aculeatus*.

Key to the Species of *Kentrocapros* (*K. eco* is excluded as a nomen dubium)

- 1a. Distinct spine on the middle of dorsolateral ridge2
- 1b. No spine on the dorsolateral ridge3
- 2a. Several spines on lateral and ventrolateral ridges4
- 2b. No spines on lateral and ventrolateral ridges *K. flavimaculatus* (New Zealand)
- 3a. Gill opening slightly oblique, located below posterior half of eye; anterior end of gill opening reaching below center of eye
.....*K. flavofasiatus* (Japan, South China Sea, eastern Australia, and New Caledonia)
- 3b. Gill opening almost vertical or very slightly oblique, located below posterior edge of eye; anterior end of gill opening not reaching below center of eye
.....*K. rosapinto* (western Indian Ocean and Vema Seamount in eastern South Atlantic)
- 4a. Greatest body width less than body depth; many black spots on lateral side of body
.....*K. aculeatus* (East China Sea, Sea of Japan, and Pacific coast of Japan)
- 4b. Greatest body width greater than body depth; no black spots on lateral side of body
.....*K. spilonotus* (Hawaiian Islands and Laysan Island)

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