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New Record of a Rare Monacanthid, *Thamnaconus fijiensis* (Tetraodontiformes: Monacanthidae), from Northern Taiwan

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Abstract

A specimen of a rare monacanthid, *Thamnaconus fijiensis*, was recently caught off Northern Taiwan, representing the first record from the country. *T. fijiensis* can be distinguished from its congeners by the following combination of characters: small, dark-brown spots on the cheek; five longitudinal arrays of spots on the body; a blackish blotch surrounding the anus; and two semi-circular dark bands on the caudal fin.

Keywords: Ichthyology, Monacanthidae, Taxonomy, *Thamnaconus fijiensis*, New record

Introduction

Members of the family Monacanthidae are small to medium-sized tetraodontiform fish with deep and highly compressed bodies; skin often rough, shagreen-like, with minute to small scales armed with one to many fine spinules; teeth pointed and unfused, and the central pair is usually the largest. They possess two dorsal fins, the first of which consists of a prominent spine that can be locked upright by a second, very small spine; soft rays of the second dorsal fin are unbranched (Hutchins, 2001). Most monacanthids are found in shallow waters.

However, some particularly large-sized species, especially those of the genus *Thamnaconus*, may dwell off continental slopes in waters as deep as 450 m (Matsuura & Tyle, 1997). In Taiwan, five species of *Thamnaconus* have been recorded (Shen & Wu, 2012): *T. hypargyreus* (Cope, 1871), *T. modestoides* (Barnard, 1927), *T. modestus* (Günther, 1877), *T. septentrionalis* (Günther, 1874) and *T. tessellatus* (Günther, 1880). These species are common in local fish markets and are caught by trawl-nets, set-nets, or hook-and-line. Recently, an unknown monacanthid was found in a deep-water

catch bucket at the Keelung Fish Market (Northern Taiwan), and the fisherman mentioned that this fish was caught by hook-and-line 80 nautical miles off Keelung. After comparing the specimen with previous literatures, it was identified as *Thamnaconus fijiensis* Hutchins & Matsuura, 1984, a rare monacanthid that is sporadically distributed across the Western Pacific Ocean. This represents the first record of this species in Taiwan, and a detailed description has been presented herein alongside images of the collected specimen.

Methods and materials

Measurements, counts, and terminology generally follow Hutchins (1977) and Hutchins & Matsuura (1984). Length measurements were taken by digital and common calipers to the nearest 0.1 mm. Standard length (SL) and head length (HL) were used throughout, with other characters' measurements presented relative to SL or HL. Osteological characters were observed from X-rays. The lone specimen was deposited in the Pisces Collection of National Marine Museum of Biology and Aquarium (NMMB-P33671). Data used for comparison were from Hutchins & Matsuura (1984), Matsuura & Tyle (1997), and Matsuura (1999); in some cases, data from these published works were

converted/transformed to allow for direct comparisons to measurements made herein (Tab. 1).

Results

Thamnaconus fijiensis Hutchins & Matsuura, 1984

斐濟短角單棘魮

Figs. 1 & 2, Tab. 1

Material examined. NMMB-P33671 (183.7 mm SL), 80 nautical miles off Keelung, Northern Taiwan, ca. 150–200 m depth, 30 Apr. 2020.

Description. Dorsal-fin elements II, 33; anal-fin rays 33; pectoral-fin rays 13; caudal-fin rays 6+6=12; vertebrae 7 (precaudal)+12 (caudal)=19.

Body strongly compressed and moderately deep, its width 2.1 in HL and depth 2.6 in SL; head slightly elongated, its length 3.1 in SL; dorsal profile of snout straight, slightly concave at snout, snout length 3.8 in SL; orbital diameter 3.8 in HL; interorbital width 3.5; gill slit oblique, its length 2.9 in HL, centered below the middle of orbit; pelvis capable of moving vertically, producing a moderate-sized ventral flap. Mouth terminal and small; lips thin, not fleshy; the dentition pattern comprising three outer and two inner teeth on each side of the upper jaw; extremities of inner teeth projecting between outer

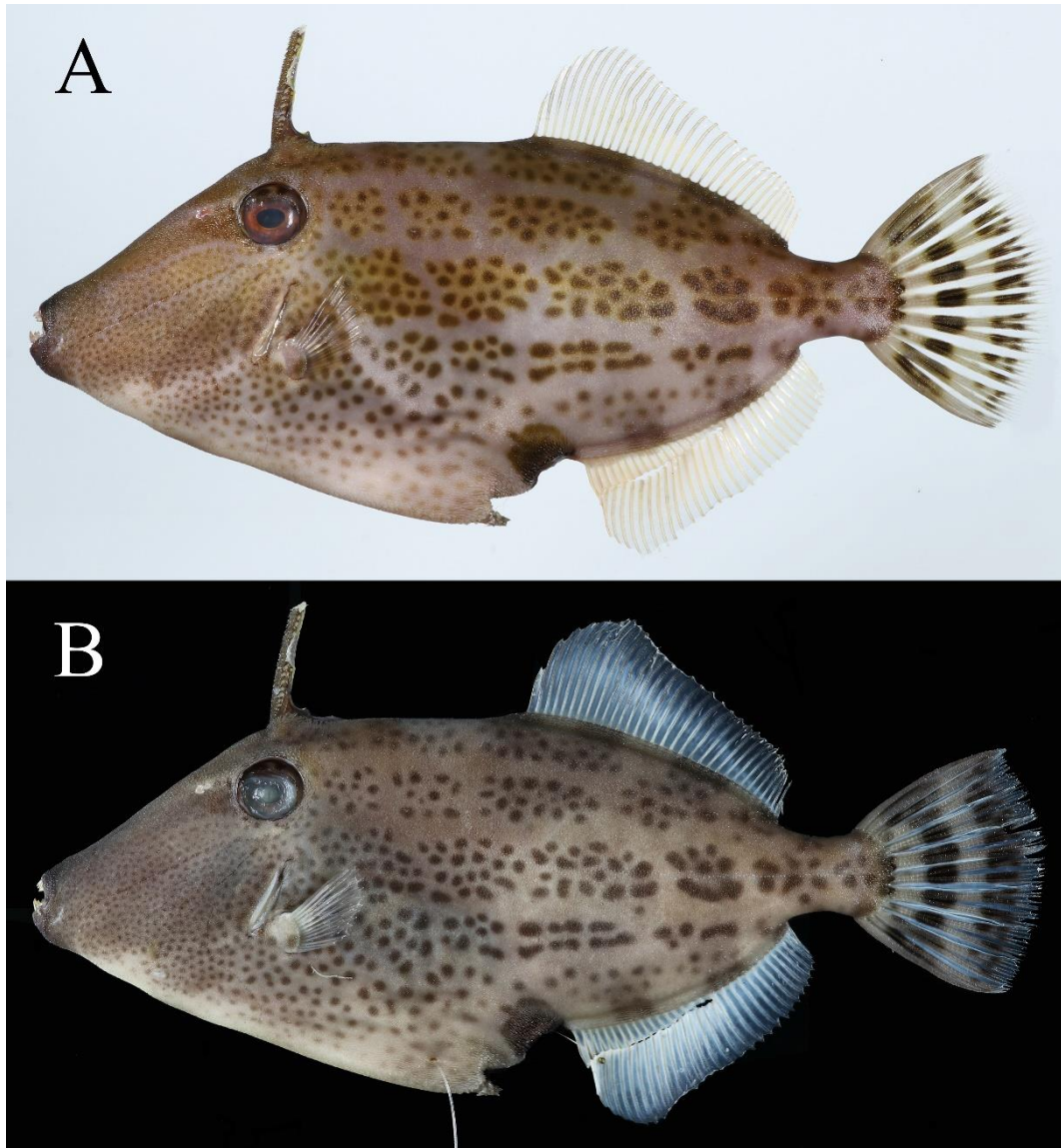


Fig. 1. Fresh (a) and preserved (b) coloration of *Thamnaconus fijiensis* (NMMB-P33671; 187.3 mm SL) from Northern Taiwan. Please note that the tip of the first dorsal-fin spine and anal fin were damaged during sampling.

teeth; three teeth on each side of the lower jaw; extremities of all external teeth in each jaw pointed except the posterior-most teeth.

First dorsal-fin spine strong, originating over the center of the orbit; the spine armed with four series of downward-directed barbs (the anterior face with adjoining rows; lateral side of first dorsal-fin spine with a row of strong barbs;

second dorsal-fin spine hidden in skin after the first spine; soft dorsal and anal-fin rays moderately elevated anteriorly (all rays segmented but unbranched); 8th dorsal-fin ray longest, 2.3 in HL; length of soft dorsal-fin and anal-fin bases 3.0 and 3.4 in SL, respectively; origin of anal fin clearly behind a vertical through origin of the soft dorsal fin. Pectoral fin small, its base slightly posterior to a vertical through the center of the orbit; length of its longest ray 2.9 in HL; caudal fin length 1.4 in HL, all

rays branched except the uppermost and lowermost one; pelvic-fin rudiment non-mobile, its length 9.8 in HL (2.6 in orbital diameter), consisting of two pairs of encasing scales fused to the posterior end of the pelvis, armed with small barbs (Fig. 2). Scales on body small, armed with slender and sharp spinules, curving slightly posteriorly at extremities; each mid-body scale with 2–3 transverse rows of spinules (sometimes arranged irregularly).

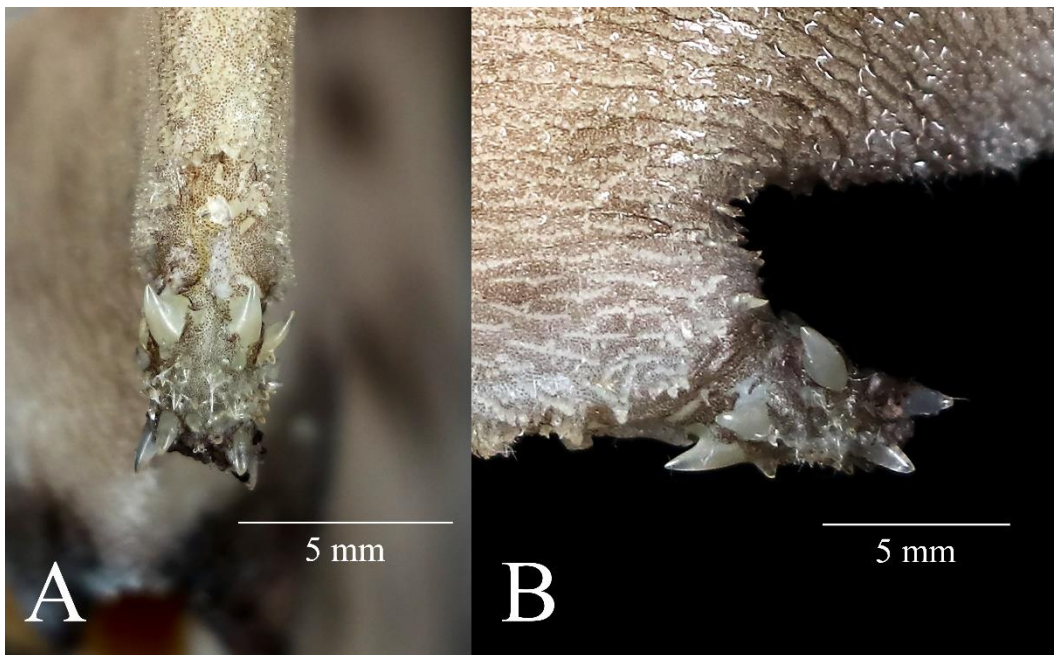


Fig. 2 Ventral (A) and lateral (B) views of the pelvic fin rudiment of *Thamnaconus fijiensis* (NMMB-P33671).

<i>Museum accession #</i>	NMMB-P33671	USP4541	MNHN1995-528	NMST-P55158
<i>Location</i>	Keelung, Taiwan	Suva, Fiji	New Caledonia	Honshu, Japan
<i>Reference</i>	This study	Hutchins & Matsuura (1984)	Matsuura & Tyle (1997)	Matsuura (1999)
<i>Standard length</i>	187.3	137 (holotype)	102	153
<i>morphometric data (% SL)</i>				
Head length	31.9	34	34.2	33
Body depth	38.5	43	41.6*	45
Body width	15.3	14	13.9	13
Snout length	26.2	29	26.6	28
Eye diameter	8.4	10	12	9.3
Interorbital width	9.0	-	11.7	11
Gill slit length	10.9	11	10	11
1 st dorsal spine length	damaged	27	27.1	21
Longest anal ray	damaged	-	12.5	9.3
Soft dorsal fin base	33.4	34	34.2	34
Longest soft dorsal fin ray	13.7	13	12.6	8.1
Anal fin base	29.2	29	31.2	28
Inter-dorsal space	29.5	27	-	28
Caudal peduncle length	8.0	-	9.8	9.3
Caudal peduncle depth	8.8	-	-	-
Caudal-fin length	22.1	27	30.6*	20
Pelvic bony structure length	3.3	-	-	-
Snout to origin of dorsal-fin spine	33.3	-	35.9	-
Lower jaw to rear of pelvic bony structure	61.2	-	-	-
Pectoral-fin length	10.9	-	13.2	-
<i>Meristic data</i>				
Dorsal-fin soft rays	33	33	34	33
Anal-fin rays	33	32	33	32
Pectoral-fin rays	13	13;14	13	13
Total caudal-fin rays	12	12	-	-
Vertebrate	7+12=19	7+12=19	-	7+12=19

Tab. 1. Morphometric and meristic data of all known specimens of *Thamnaconus fijiensis*. Data were converted from number of times in SL or HL to % SL in original description. Characters for which different measurement methods from Matsuura & Tyle (1997) were used have been denoted by asterisks (*).

Coloration. Body pale brown when fresh (Fig. 1A). Head with numerous, tiny, dark brown spots; two subtle stripes in front of eye which are spotless, lips of upper and lower jaw dark. Larger spots on body; those on abdomen are circular, gradually fainting downwards. Spots on lateral body grouped into patches, forming five longitudinal series; these areas are yellowish brown. Anus surrounded by a large, rounded, dark blotch. Dorsal and anal fins transparent and faint yellow. Caudal fin with two semi-circular dark bands. When preserved (Fig. 1B) pale overall, though spots, blotches, and bands are consistent with fresh condition. Yellowish pigment within the spots on body not evident. Dorsal and anal fin soft rays with black pigmentation.

Distribution. This species is known from scattered localities across the western Pacific Ocean but lacked of record from the tropical region: Suva Barrier Reef, Fiji (type locality; Hutchins & Matsuura, 1984), New Caledonia (Matsuura & Tyler, 1997), Shirahama, Honshu (Matsuura, 1999) and Ogasawara (Nakabo, 2012) in Japan, and northern Taiwan (this study). Although the distribution pattern is tempting to claim that this species is antiequatorial, more thorough equatorial sampling efforts are needed. This species inhabits deep-water, rocky reefs at depths 150–210 m (Matsuura, 1999) and is caught

in gill nets and traps. The Taiwanese specimen was assumed to be caught below 200 m (alongside *Odontanthias* spp. & *Bodianus* spp).

Remarks. *T. fijiensis* can be distinguished from most congeners by the numerous dark spots on the lateral sides, the exceptions being *Thamnaconus tessellatus* (Günther, 1880) and *Thamnaconus fajardoi* Smith, 1953, which also possess this feature. *T. fijiensis* presents a large, black blotch surrounding the anus and two semi-circular dark bands on the caudal fin, in contrast with *T. tessellatus*. The dark spots of *T. fijiensis* are often grouped together, forming five longitudinal series. However, this feature is also present in *T. fajardoi*, a deep-water species (130–150 m in the Western Indian Ocean. Matsuura (1999) mentioned that the main differences between the two species: 1) degree of spotting on the body and 2) relatively larger body scales in *T. fajardoi*. They also noticed that the spots on the cheeks of *T. fijiensis* are much smaller, and the two series of dark spots on the dorsum are straight (vs. curved in *T. fajardoi*). These characters are consistent with the Taiwanese specimen.

Three records of *T. fijiensis* have been documented (Tab. 1), each presenting a single specimen: Hutchins & Matsuura (1984), Matsuura & Tyler (1997), and Matsuura (1999). The Taiwanese

specimen is the largest among them (187.3 mm SL). The other three specimens (102–153 mm SL) included young and mature individuals, though the relative lengths of several morphometric characters differ (Tab. 1). Of note, the orbital diameter tends to decrease with body size (Fig. 3). However, the first dorsal-fin spine of the Taiwanese specimen was damaged, and the body depth of the New Caledonia specimen (MNHN1995-528) was measured in a different way (see Tab. 1). More specimens must be analyzed to better understand the degree of variation in the morphological characteristics assessed across individuals, gender, age, etc. That

being said, meristic counts of the four specimens did not differ greatly; dorsal-fin, anal-fin soft rays, and pectoral-fin rays ranged from 33–34, 32–33, and 13–14, respectively.

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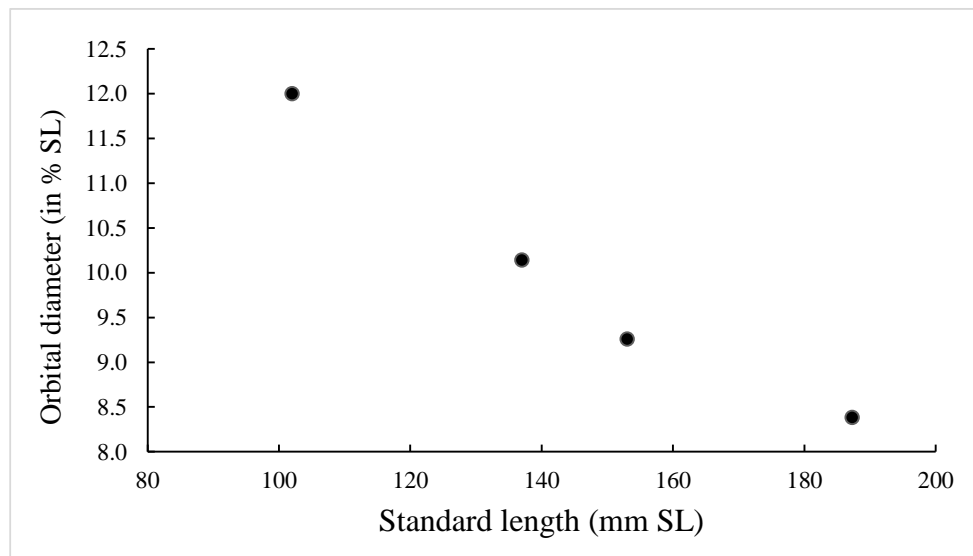


Fig. 3. Relationship between orbit diameter and standard length (SL).

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