



Additions to the reef fish fauna of Andaman and Nicobar Islands

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Short communication

Abstract

The present study records the occurrence of two Tetraodontiformes fishes, *Thamnaconus multilineatus* (Tanaka, 1918), *Torquigener brevipinnis* (Regan, 1903) and a blue banded wrasse, *Choerodon typus* (Bleeker 1856), new to Andaman and Nicobar Islands (A and N Islands). A single specimen of the monacanthid *T. multilineatus* of total length (TL) 181 mm was caught by a trawler operated off Mayabunder, Middle Andaman from a depth range of 30–50 m. *T. brevipinnis* of 81.5 mm TL was caught as bycatch by a gill netter targeting anchovies off Netaji Subhash Chandra Bose Island, South Andaman, from a depth of 25 m. *C. typus* of length range 113–120 mm was caught off Swaraj Island, South Andaman from a depth range of 30–50 m. This study represents the first distribution record of *T. multilineatus* in Indian waters.

Keywords: Monacanthidae, puffer fish, first record, tetraodontidae, Eastern Indian Ocean

Introduction

Andaman and Nicobar Islands situated in the Bay of Bengal consist of 572 islands and islets with a coastline of 1962 km (Venkataraman *et al.*, 2003). As a result of diverse marine habitats, including coral reefs and sea grass beds, these islands are rich in ichthyofauna. Legendary ichthyologist Day (1870), prepared the first checklist of fishes of Andaman and Nicobar Islands. Over the years, the checklist for marine fish has been updated with additions of new records. Some of the noteworthy works include Herre (1941), Koumans (1940), Menon and Talwar (1972), Talwar (1990), Rao (2009) and Rajan *et al.* (2013). The present marine fish fauna of Andaman and Nicobar Islands comprise 1542

species under 621 genera belonging to 37 orders and 189 families (Rajendra, 2018).

The order Tetraodontiformes comprise a diverse group of reef-associated fishes belonging to 10 families and play a vital role in the reef ecosystem as herbivores, piscivores, macro-invertivores, zooplanktivores, and corallivores. The family Tetraodontidae is the most diverse with 195 species under 28 genera and is popularly known as pufferfish, toadfish and bubble fish as a result of their ability to inflate themselves when threatened (Hardy, 1984). It was followed by the family Monacanthidae, popularly known as leatherjackets or shingles with 108 species under 27 genera (Fricke *et al.*, 2022). The Andaman and Nicobar Islands have 73 species of tetraodontiform fishes under 8 families (Rajendra, 2018).

Similarly, fishes of the family Labridae, the wrasses are also a prominent group of reef fishes with 567 valid species under 67 genera worldwide (Fricke *et al.*, 2022); they show diverse body size, shape and colouration. Also occupy diverse habitats like sandy patch reefs, seagrass beds, coral reefs, plain sand bottom and rock flats (Westneat, 2001). The Andaman and Nicobar Islands have 69 species of wrasses belonging to 24 genera (Rajendra, 2018). Despite their ecological roles in the reef ecosystem, studies on these groups of fishes from the Andaman and Nicobar Islands were limited to occasional taxonomic reports and biology. The present study adds two more species of tetraodontiform fishes, *Thamnaconus multilineatus* (Tanaka, 1918), *Torquigener brevipinnis* (Regan, 1903) and one species of wrasse, *Choerodon typus* Bleeker (1856) to the faunal diversity of Andaman and Nicobar Islands.

Material and methods

Three specimens of *C. typus* and single specimen of *T. multilineatus* were obtained as trawl bycatch in commercial trawlers operating between 30 to 50 m depths off Swaraj Island, South Andaman and Mayabunder, Middle Andaman respectively. Similarly, a single specimen of *T. brevipinnis* was caught as bycatch in gill netter targeting anchovies off Netaji Subhash Chandra Bose Island, South Andaman from a depth of 25 m (Fig. 1). Identification of species was based on *C. typus* (Westneat, 2001), *T. multilineatus* (Motomura *et al.*, 2017) and *T. brevipinnis* (Matsuura, 2001). Morphometric measurements of formalin (5%) preserved specimens were taken following Hubbs and Lagler (1964). Measurements were made to the nearest 0.1 mm using dial callipers. Measurements are expressed as a percentage of standard length (SL) or head length (HL). Specimens were deposited in the Zonal Base of Fishery Survey of India, Port Blair and National collections of Zoological Survey of India, Andaman and Nicobar Regional Centre (ANRC) with the following voucher numbers, *C. typus*, FSI/PB/T/01/2020, 113 mm TL, FSI/PB/T/02/2020, 114.8 mm TL, ZSI/ANRC/M/25102 118 mm TL. *T. multilineatus*, ZSI/ANRC/M/25120, 181 mm TL, *T. brevipinnis*, ZSI/ANRC/M/25126, 81.5 mm TL.

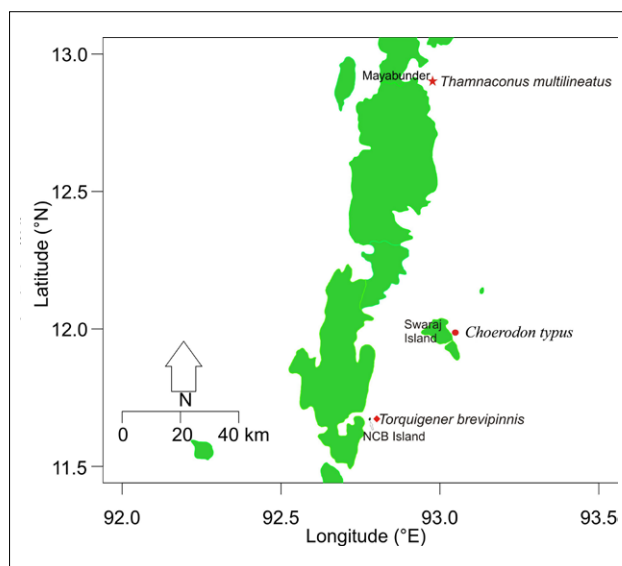


Fig. 1. Map showing collection localities of fishes

Results

T. multilineatus (Tanaka, 1918) (Fig. 2)

Order : Tetraodontiformes
Family : Monacanthidae Nardo, 1843
Genus : *Thamnaconus* Smith, 1949



Fig. 2. *T. multilineatus* (Tanaka, 1918), ZSI/ANRC/M/25120, 181 mm TL

Diagnosis: Dorsal spines II, fin rays 33; Anal fin rays 32; Pectoral fin rays 12; Caudal fin rays 12. Body ovate and compressed; body depth at first dorsal 2.3 times in SL. Mouth small, terminal; mouth width 4.5 times in HL. Eyes prominent and placed anteriorly, eye diameter 3.1 in HL; pre orbital length 3.5 times in SL. The gill opening is a short oblique slit in front of the pectoral-fin base. First dorsal spine stout and origin over eye; spine length 3.5 times in SL; armed with small-sized barbs. Pectoral fin origin behind first dorsal; pre pectoral length 2.7 times in SL. Pelvic fin rudimentary projecting backwards of the ventral flap; rudimentary pelvic spine fixed. Soft dorsal and anal fins are noticeably higher anteriorly; dorsal height is 3.4 times in dorsal base length. Caudal peduncle devoid of bristles and spines; caudal peduncle length 2.3 times and caudal depth 3.2 in HL respectively. Body brownish grey, with many wavy horizontal brown lines in the mid portion extending up to caudal peduncle; head with brown oblique lines; dorsal region darker than middle and devoid of wavy lines.

Distribution: Restricted to Indo- West Pacific: From Myanmar to Bôso Peninsula, Japan (Motomura *et al.*, 2017; Psomadakis *et al.*, 2019). The present record extends its geographic distribution to the Andaman Sea.

T. brevipinnis (Regan, 1903) (Fig.3)

Order : Tetraodontiformes
Family : Tetraodontidae Bonaparte, 1831
Genus : *Torquigener* Whitley, 1930

Diagnosis: Dorsal fin rays, 8; anal fin rays, 7; pectoral fin rays, 15, caudal fin rays, 11. Moderate-sized body tapering posteriorly; flattened ventrally. Mouth small, terminal; lips covered with many papillae; width of mouth 4.3 in HL. Head length is 2.62 in SL; eyes prominent and slightly stretched; eye length is 7.8 in SL and 2.97 in HL. Inter orbital width is 6.0 in HL and 16 times in SL. Nasal organ covered by small



Fig. 3. *T. brevipinnis* (Regan, 1903), ZSI/ANRC/M/25126, 81.5 mm TL

sac with two separate openings of sub-equal size; pre-nasal distance is 9.2 times in SL and 3.5 in HL; snout to anterior of vent 1.4 in SL. Dorsal and anal fins are slightly pointed with a short base; dorsal and anal fin bases are 5% and 3.8% of SL respectively. Dorsal fin height is 17.2% of SL, while anal fin height is 14.7% of SL. Distance between posterior edges of eye to gill opening is 3.0 times in HL. Caudal fin truncate, caudal peduncle slender; length of caudal peduncle is 4.0 times in SL and caudal peduncle depth 13.6 times in SL. The body possesses minute spines mostly on the ventral part; 18 spines are present in the belly region under the pectoral fin bases. Small yellowish oval or round spots present dorsally on the body; a prominent yellowish-brown band present laterally below the level of eyes from the pectoral fin to the caudal fin base; three transverse creamy-white bands on the cheek. A creamy-white U-shaped inverted band is present below the posterior part of the eye; all the fins are hyaline. The caudal fin possesses dark blotches on rays, which resemble six vertical bands on the tail.

Distribution: *T. brevipinnis* have been recorded from India, Myanmar, Japan, Indonesia, Philippines, China, Taiwan, Papua New Guinea, and Australia up to New Caledonia (Gloerfelt-Tarp and Kailola, 1984; Hardy, 1984; Alcalá and Cabanban, 1986; Kailola *et al.*, 1991; Matsuura and Tyler, 1997; Biswas *et al.*, 2010; Psomadakis *et al.*, 2019).

C. typus (Bleeker 1856) (Fig. 4)

Order : Perciformes
Family : Labridae Cuvier, 1816
Genus : *Choerodon* (Bleeker, 1857)



Fig. 4. *Choerodon typus* Bleeker 1856 FSI/PB/T/01/2020, 113 mm TL

Diagnosis: Dorsal spines XII, fin rays 8; Anal spines III, fin rays 10; Pectoral fin rays 15–16; Caudal fin rays 11–12. Body laterally compressed. Body depth 3.3–3.4 times in SL and 1.1 times in HL. Head convex and head length 2.9–3.0 times in SL. The mouth is in the centre with prominent jaws. Upper jaw with four canines, two widely separated anterior canines; two curved canines at the posterior part of the upper jaw. The lower jaw is also with two curved anterior canines and a row of minute teeth follows. Eyes are comparatively large, placed just above the midline; inter orbital distance 4.6–4.8 in HL. Opercle has a membranous conical extension reaching beyond pectoral origin. Pelvic fins short, not reaching anus, caudal fin truncate. Lateral line uninterrupted with 28–29 pored scales. Belly white with anus situated more towards the anal fin than the ventral. Body greyish with evenly spaced oblique white bands and pale ventrally; a pair of narrow white bands on the pale yellow snout and a narrow white band from the posterior end of lower jaw to nape through the opercle; narrow white bands throughout the body between scale rows. The dorsal fin is blue with 3 narrow orange stripes at the end; the anal fin is yellow-orange with numerous blue bands. The caudal fin is yellowish with 6–8 narrow blue bands along with a dark bluish blotch centrally.

Distribution: Restricted to Indo-west Pacific from the east coast of India to north-western Australia and northward to Taiwan (Allen and Swainston, 1988; Westneat, 2001; Broad, 2003; Mishra and Saren, 2016).

Discussion

Most of the filefishes of the family Monacanthidae are inhabitants of the shallow rocky coral reefs and sea grass beds, but some species are adapted to live in deeper waters up to 300 m (Hutchins, 2001). Of the 108 species of Monacanthids in the world (Fricke *et al.*, 2022), 16 species under 8 genera have been recorded from the Andaman and Nicobar Islands (Rajendra, 2018). With the record of *T. multilineatus* from Mayabunder, North Andaman, the list becomes 17 species under 9 genera. They are characterised by a deep and compressed body, skin smooth to rough with minute scales, vertical to oblique gill slit, prominent spine on the first dorsal fin; which can be locked upright by a tiny second dorsal spine, pelvic fins rudimentary or absent (Hutchins, 2001; Matsuura, 2003).

Taxonomy and classification of filefishes are confusing, in several genera such as *Acreichthys* Fraser-Brunner 1941, *Thamnaconus* and *Pseudomonacanthus* (Bleeker, 1865) (Matsuura, 2015). Several earlier studies (Kyushin *et al.*, 1977; Yamada *et al.*, 2009; Peristiwady *et al.*, 2010; Myoung *et al.*, 2018) identified *T. multilineatus* as *Cantherhines multilineatus* (Tanaka, 1918) even though Hutchins and Randall (1982) reviewed the *Cantherhines fronticinctus* complex and expressed that *C. multilineatus* should

be placed under the genus *Thamnaconus*. *T. multilineatus* can be distinguished from its close congener *Thamnaconus striatus* (Kotthaus, 1979) by its greenish-violet colouration in the upper part of the body and head, and the abdomen is light green (vs. brownish body); lines on the body thicker and fewer than the *T. multilineatus*. Further *T. striatus* is a deep water filefish with a depth range of 175–337 m with restricted distribution to Indonesia and northwestern Australia (Sainsbury *et al.*, 1985). *T. multilineatus* can be distinguished from *Cantherhines dumerilii* (Hollard, 1854) by the absence of spines on the caudal peduncle (vs. two pairs of spines on the caudal peduncle in *C. dumerilii*). The genus *Thamnaconus* has 16 species (Fricke *et al.*, 2022) and most of them were restricted to Western Central Pacific. *Thamnaconus arenaceus* (Barnard, 1927) is the only species having distribution in the Western Indian Ocean, present study extends the geographic distribution of *T. multilineatus* to the Andaman Sea.

The genera *Torquigener* (Whitley, 1930) of the family Tetraodontidae comprises 20 species of puffer fishes inhabiting the tropical waters of 20–100 m (Matsuura and Tyler, 1997; Matsuura, 2015). However only two species have an authentic record in Indian waters; *T. brevipinnis* has been recorded from the Kalpakkam coast of Tamil Nadu, India (Biswas *et al.*, 2010) and *T. hypselogeneion* (Bleeker, 1852) from Andaman and Nicobar Islands (Talwar, 1991; Rajan *et al.*, 2013). The Andaman and Nicobar Islands have 22 species of puffer fish belonging to 06 genera including the new record of *T. brevipinnis* (Patankar *et al.*, 2018; Rajendra, 2018).

T. brevipinnis is very similar to *T. flavimaculosus* described from the Red Sea and adjacent waters by Hardy and Randall (1983) and *T. hypselogeneion*, which may result in misidentification and further records from Indian waters need to be treated with caution. The *T. brevipinnis* can be distinguished from its close congener *T. hypselogeneion* by the number of spines on the belly, 18 to 19 (vs. 14 to 17 spines), longer caudal peduncle; caudal peduncle length in standard length of 4.0 (vs. shorter caudal peduncle of 4.4 to 4.7 in SL); larger eye; orbit length in HL 2.9 (vs. 4.3 to 5.8 in HL); elongated snout (vs. shorter snout). Further, *T. hypselogeneion* has a wider space between the posterior ends of the eye to the dorsal corner of the gill opening. Another congener *T. florealis* differs from *T. brevipinnis* by the following combination of characteristics: more number of spines on the belly (20 to 23), broad lateral comprising about 14 brownish-orange blotches, absence of an inverted U-shaped creamy-white band below the eye (Hardy, 1984).

The family Labridae comprises 567 valid species under 67 genera (Westneat and Alfaro, 2005; Fricke *et al.*, 2022), of which 69 species under 24 genera have been reported from the Andaman and Nicobar Islands (Rajendra, 2018). Most of the

species of wrasses have brightly coloured bodies with stripes, bars, blotches, spots and ocelli (Parenti and Randall, 2000). With the record of *Choerodon typus* from Swaraj Island, South Andaman, the Andaman and Nicobar Islands have four species under the genus *Choerodon* namely, Orange-dotted tusk fish *Choerodon anchorago* (Bloch, 1791), *Choerodon melanostigma* Fowler and Bean, 1928 and Robust tusk fish *Choerodon robustus* (Gunther, 1862). The *C. typus* can be easily distinguished from its close congeners by its characteristic colour of the body bands, twelve dorsal spines, no scaly sheath extending onto dorsal and anal fins and dentition (Westneat, 2001). *C. anchorago* has a wedge-shaped white band extending upward onto the back behind the pectoral fin and a rectangular white spot dorsally on the caudal peduncle, *C. robustus* has a diagonal brown line connecting the pectoral fin base and posterior end of the dorsal fin base, whereas *C. melanostigma* has a dark oblique band on the dorsal half of body directed anteroventrally from below posterior third of dorsal fin (Parenti and Randall, 2000; Westneat, 2001).

Blue-banded wrasse is the inhabitant of coral reefs at depths of 35 to 85 m and confined its distribution in the tropical western Pacific, extending to the west of the Malay Peninsula (Westneat, 2001). Even though *C. typus* has a distribution range in Indian waters, its occurrence in Indian waters was affirmed based on the photograph of Dr J. E. Randall (Allen and Erdmann, 2012), recently Mishra and Saren (2016) identified the preserved specimens of *C. typus* in the Marine Fish Section of the Zoological Survey of India, Kolkata. This has provided the first substantial record of *C. typus* for Indian waters along with details of three additional specimens from the east coast of India. The present study fills the distribution gap of *C. typus* between the eastern Indian Ocean and the Malay Peninsula, i.e. the Andaman Sea.

The coral reef ecosystem of the Andaman and Nicobar Islands is underexploited, knowledge and information on the diversity of reef-associated fishes in these Islands need to be studied in detail to form comprehensive data. Globally reef-associated fishes are vulnerable due to habitat degradation, coral bleaching, pollution and other anthropogenic activities (Hughes *et al.*, 2007; Hoegh-Guldberg, 2012) and require immediate attention for their conservation. The coral reef ecosystem of the Andaman and Nicobar Islands was also facing similar threats and resulting in a decline of live corals over the years (Ramachandran *et al.*, 2005). Recent advances in the tourism sector also cause threats in the form of infrastructure development and associated dredging and siltation which will reduce the fish assemblages and diversity. In this regard, we recommend immediate exploration of the reef diversity and documentation of the fish fauna which can be used as baseline data for the formulation of conservation strategies.

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