



Short Communication

Occurrence of two ornamental fish species of the order Tetraodontiformes from Odisha coast, India

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The present article discusses the morphological characteristics, meristics, distribution and systematics of two ornamental fish species *Torquigener brevipinnis* (Regan, 1903) (Family: Tetraodontidae) and *Sufflamen fraenatum* (Latreille, 1804) (Family: Balistidae) belonging to order Tetraodontiformes which were previously not observed from the coastal waters of Odisha state. These two species are mostly coral reef-associated fish species; thus, their occurrence along the Odisha coast is of great importance from a habitat point of view. The current study reports the distribution and their first occurrence in the coastal state of Odisha.

[Keywords: Distribution, First report, Masked triggerfish, *Sufflamen fraenatum*, *Torquigener brevipinnis*, Yellow-stripe toadfish]

Introduction

The order Tetraodontiformes shows heterogeneity in shape, size, and feeding behaviour and are distributed in tropical to temperate seas and freshwaters of the world¹. This order comprises 10 families with a total of 433 valid species, with the highest diversity belonging to the Puffer fish family Tetraodontidae comprising 193 valid species under 27 genera. In contrast, the Triggerfish family Balistidae consists of 12 genera with 39 valid species². The family Tetraodontidae is distinguished morphologically from other families of the order by a large and blunt head, jaws forming a beak of four teeth (two on each jaws), eyes high on head, gill opening in front of pectoral fins, dorsal and anal fins located far posteriorly with 7 to 15 soft rays, and pelvic fins absent¹. Members of the family Balistidae differ morphologically from other families of the

order by having a deep, moderately compressed, thick-skinned body covered with large scales, and triangular head; scales above the pectoral fin base enlarged to form a flexible tympanum; mouth relatively small and terminal with 8 pairs of strong teeth on outer series of both jaws; small slit-like gill opening in front of pectoral fin base; and dorsal fin with 3 long hard spines which are well separated from branched dorsal fin rays^{1,3}.

Tetraodontidae is currently represented by 8 genera and 32 species in India (including Andaman Islands), while the family Balistidae comprise of 11 genera and 22 species⁴. An updated list (excluding Andamans) was published by Mohapatra *et al.*⁵, with a total of 29 species in Tetraodontidae and 20 species in the family Balistidae from the Indian waters. The genus *Torquigener* Whitley, 1930 is represented by only two species, *viz. T. hypselogeneion* (Bleeker, 1852) and *T. brevipinnis* (Regan, 1902) in Indian waters⁶⁻⁸. On the other hand, the genus *Sufflamen* Jordan, 1916 is represented by three species in India, *viz. S. bursa* (Bloch & Schneider, 1801), *S. chrysopterum* (Bloch and Schneider, 1801) and *S. fraenatum* (Latreille 1804)⁹⁻¹². The present investigation not only documents the first sighting of these two species, but it also reports the first occurrences of respective genera along the Odisha coast.

Materials and Methods

A single specimen of Masked triggerfish (TL: 310 mm) was collected on 3rd January 2019 from the Gopalpur fish landing centre (19°15'55.13" N; 84°55'4.56" E), Odisha. Further, two specimens (TL: 295.5 and 303 mm) of the same species were observed and collected again from the Gopalpur fish landing centre on 17th March 2020 and 24th December 2020. A single puffer species (TL: 129.55 mm) was collected on 25th October 2019 from Paradeep fish landing centre (20°17'25.90" N; 86°42'26.73" E), Odisha. All the specimens were photographed in fresh condition. Detailed morphometric measurements were taken by digital calliper and provided in Table 1. All specimens were preserved in 10 % formaldehyde solution. Leica S9i digital stereo microscope was used to count fin rays and verify the structure of nostrils. The collected samples were identified by following

Table 1 — Morphometric measurements of *Torquigener brevipinnis* (Regan, 1903) and *Sufflamen fraenatum* (Latreille 1804)

Characters	<i>Torquigener brevipinnis</i> EBRC/ZSI/F 11848	<i>Sufflamen fraenatum</i> (Latreille, 1804) EBRC/ZSI/ F 10970; F-11917; F-12475
Total length	129.55 mm	295.5 – 310 mm
Standard length	102 mm	260 – 275 mm
<i>Ratio to SL</i>		
Head length	2.6	3.08 – 3.37
Predorsal length	1.5	2.41 – 2.52
Preanal length	1.5	1.58 – 1.67
Prepectoral length	2.7	2.98 – 3.09
Body depth at gill opening	4.3	1.93 – 2.11
Body depth at anus	5.5	2.03 – 2.28
Body width at pectoral base	3.5	-
Caudal peduncle length	3.9	17.18 – 17.33
Caudal peduncle depth	10.2	8.59 – 8.96
Dorsal fin length	6.1	6.11 – 6.34
Anal fin length	6.8	8.33 – 8.38
Pectoral fin length	6.2	9.8 – 10
Caudal fin length	3.6	5.2 – 5.4
Gill opening length	11.4	7.9 – 8.1
<i>Ratio to HL</i>		
Mouth width	3.7	4.3 – 4.5
Eye diameter	3.8	5.5 – 5.6
Inter orbital length	2.4	3.3 – 3.4
Snout length	2.2	1.1 – 1.2

the literature of Matsuura^{1,3} for both the species; Biswas *et al.*⁸ and Hardy¹³⁻¹⁴ for the genus *Torquigener*. All specimens were registered and deposited at the National Zoological Collection (NZC), Estuarine Biology Regional Centre, Zoological Survey of India, Gopalpur-on-Sea.

Results

The collected specimens were identified as *Torquigener brevipinnis* (Regan, 1903) and *Sufflamen fraenatum* (Latreille 1804). Detailed taxonomic accounts of both the species as per the collected materials are provided hereunder to record their distribution along the Odisha coast with material evidence.

Family: Tetraodontidae Bonaparte, 1831

Genus: *Torquigener* Whitley, 1930

***Torquigener brevipinnis* (Regan, 1903)**

Materials examined

01 specimen, 102 mm SL, Reg. No.: EBRC/ZSI/F 11848, Paradeep fish landing centre, 25/10/2019.

Diagnostic characters

D 8; A 8; P 15; C 11. Body oblong, rounded dorsally, slightly flattened ventrally and becomes narrower towards the caudal peduncle. Dorsal and anal fins short with pointed tip. Head moderate, narrower towards mouth, with a prominent chin. Mouth small; lips covered with small papillae. Eyes slightly elongated with a concave shaped, wide interorbital region. Nasal organs present well before the eye in a low depression and is distinct with a small sac-like covering containing two nostrils at both ends. Gill opening well below the level of lower margin of eye and anterior margin of gill opening with seven short spines protruding from fleshy papillae. Ventral side with 18 rows of spinules between pectoral fin bases.

Colouration

Body brownish dorsally with small pale-yellow spots and whitish ventrally. Dorsal and ventral sides separated by a yellow band, originated from pectoral fin base, on lateral side. Five oblique bands present on lateral sides of head, third and fourth band joins dorsally to form an inverted U-shaped band below posterior margin of eye. Dorsal, anal and pectoral fins transparent, while caudal fin bear 7 vertical bands (Fig. 1).

Distribution

Mainly a western and central Pacific species, but in India, its occurrence was reported from Tamil Nadu coast^{8,15-16} and Andaman and Nicobar Islands¹⁷. The present report confirms its availability along the Odisha coast (North-eastern coast of India).

Family: Balistidae Rafinesque, 1810

Genus: *Sufflamen* Jordan, 1916

***Sufflamen fraenatum* (Latreille 1804)**

Materials examined

One specimen, male, 275 mm SL, EBRC/ZSI/F 10970, Gopalpur fish landing centre, 03/01/2019. One specimen, male, 260 mm SL, EBRC/ZSI/F 11917, Gopalpur fish landing centre, 17/03/2020; and EBRC/ZSI/F 12475, 01 specimen, male, 267 mm SL, same as previous locations, 24/12/2020.

Diagnostic characters

D III+29; A i, 25 – 26; P 15, LL 52 – 53. Body deep and compressed, covered with thick robust skin. Head portion triangle shaped with pointed terminal mouth. Behind gill opening, scales above pectoral-fin base much enlarged; a deep groove present below the nostril and below eye. Gill rakers short, with



Fig. 1 — *Torquigener brevipinnis* (Regan, 1903) collected from Paradeep coast, 129.55 mm TL, EBRC/ZSI/F 11848



Fig. 2 — *Sufflamen fraenatum* (Latreille, 1804) collected from Gopalpur coast, 310 mm TL, EBRC/ZSI/ F 10970

32 numbers present on 2nd gill arch. Small spines in longitudinal rows present on lateral sides extending from caudal fin up to the origin of second dorsal fin. Rudimentary pelvic fins are indicated by a series of expanded scales around the pelvic end. Soft dorsal and anal fin anteriorly elevated while caudal fin truncate.

Colouration

Body light brown with several dark bands on posterior trunk region near caudal peduncle. Belly pale in colouration. All the specimens with an oblique yellow-coloured band from the corner of mouth backwards and another under the chin (Fig. 2).

Distribution

It is widely distributed in the Indo-Pacific region¹⁸. In India, it has been reported from Tamil Nadu^{10,19}, Visakhapatnam coast of Andhra Pradesh²⁰⁻²², and West Bengal²³ east coast of India, and Karnataka²⁴ and Kerala^{19,25-26} along west coast of India. It is also been recorded from the Union Territories of Pondicherry²⁷; Andaman and Nicobar Islands^{9,28} and Lakshadweep Islands²⁹. The present study provides evidence of its availability along the Odisha coast.

Discussion

Barman *et al.*³⁰ enlisted 605 fish species under 138 families of 27 orders from marine and estuarine waters of Odisha. Since then, during the last 15 years,

various publications have added more than 50 species to that list but have not reported a single species of these two genera.

Distributional records of *T. brevipinnis* (Regan, 1903) along the Indian coast were earlier known from Kalpakkam, Parengipettai and either from Royapuram, Cuddalore, Nagapattinam, Mandapam or Kanyakumari (unspecified), all from Tamil Nadu coast^{8,15-16}. Biswas *et al.*⁸ explained differences between *T. brevipinnis*, *T. hypselogeneion* (Bleeker, 1852) and *T. florealis* (Cope, 1871) following Hardy's findings¹³⁻¹⁴. They clarified that specimens collected by Sir F. Day from Madras are not *T. hypselogeneion*, but *T. brevipinnis* and also confirmed that the report of *T. florealis* from Puducherry was based on *T. brevipinnis* specimens^{6,27}. Further, based on photographs given by Sujatha & Padmavathi²¹ and Padmavathi *et al.*²², it is strongly assumed that they have considered *T. brevipinnis* specimens as *T. hypselogeneion* which leads to the fact that *T. brevipinnis* also occur at Visakhapatnam, Andhra Pradesh²¹⁻²². Therefore, it can be mentioned that the *T. hypselogeneion* and *T. florealis* which were reported earlier from Puducherry and Andhra Pradesh, were actually based on misidentification of *T. brevipinnis* specimens.

On the other hand, *S. fraenatum* (Latreille 1804) has earlier been reported from Tamil Nadu^{10,19}, Visakhapatnam coast of Andhra Pradesh²⁰⁻²², and West Bengal²³ east coast of India, and Karnataka²⁴ and Kerala^{19,25-26} along west coast of India. It was also recorded from three Union Territories of India: Pondicherry²⁷; Andaman and Nicobar Islands^{9,28} and Lakshadweep Islands²⁹. The present record of *T. brevipinnis* forms its first report from the north-eastern coast of India, *i.e.*, Odisha coast. Extensive studies can lead to the finding of more species belonging to these families along the Odisha coast.

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Conflict of Interest

Authors declare no conflict of interest for the publication of the manuscript.

Ethical Statement

The organisms under the study are not under schedule list/protection categories, thus ethical clearance certification is not applicable.

Author Contributions

SRM & SR: Collection, identification and manuscript preparation; SSM: Manuscript preparation; AM: Manuscript preparation and preservation; and JKS, SP & AM: Critical analysis of the manuscript.

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