

First record of Triacanthidae Bleeker, 1859 (Actinopterygii: Tetraodontiformes) from the Red Sea

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Abstract

The Tetraodontiform family Triacanthidae Bleeker, 1859 is recorded for the first time from the Red Sea. Fishing experiments employing a commercial shrimp trawler off Jizan, Saudi Arabia, revealed species occurrences of short-nosed tripodfish, *Triacanthus biaculeatus* (Bloch, 1786) at depths ranging from about 11 to 34 m. Currently, this species has only been found in shallow sandy/muddy habitats in the southern Red Sea. Further surveys are imperative to demonstrate the actual distribution of short-nosed tripodfish across a wider range of environmental gradients along the Red Sea.

Keywords

marine record, Saudi Arabia, short-nosed tripodfish, trawl, *Triacanthus biaculeatus*

Introduction

The Tetraodontiform fish family Triacanthidae Bleeker, 1859, commonly known as triplespines or tripodfishes, are found on continental shelves in the Indo–West Pacific, usually just below the sea surface down to the depth of 60 m (Tyler 1968). These small-sized fishes (>30 cm TL) are benthic, usually inhabiting sandy or weed-covered bottoms in shallow coastal waters (Heemstra et al. 2022). Seven species in four genera viz., *Pseudotriacanthus* Fraser-Brunner, 1941 (one species), *Triacanthus* Oken, 1817 (two species), *Tripodichthys* Tyler, 1968 (three species), and *Trixiphichthys* Fraser-Brunner, 1941 (one species) are recognized globally (Tyler 1968; Matsuura 2015; Heemstra et al. 2022). Recent fishing experiments off Jizan, Saudi Arabia, revealed occurrences of the short-nosed tripodfish, *Triacanthus biaculeatus* (Bloch, 1786) at depths ranging

from about 11 to 34 m, constituting the first documented record of the family Triacanthidae from the Red Sea.

Materials and methods

Fishing experiments employing a commercial shrimp trawler were carried out as part of stock assessment and selectivity studies during May–August 2023 off Jizan in the southern Red Sea coast of Saudi Arabia. Species occurrences of short-nosed tripodfish ($n = 19$) were recorded from seven hauls at depths ranging from about 11 to 34 m (Table 1; Fig. 1). Three voucher specimens were collected as part of faunal surveys, fixed in 10% formalin and then later transferred to 70% ethanol for further analysis. Fishing experiments were conducted employing an authorized fishing vessel operating along the southern

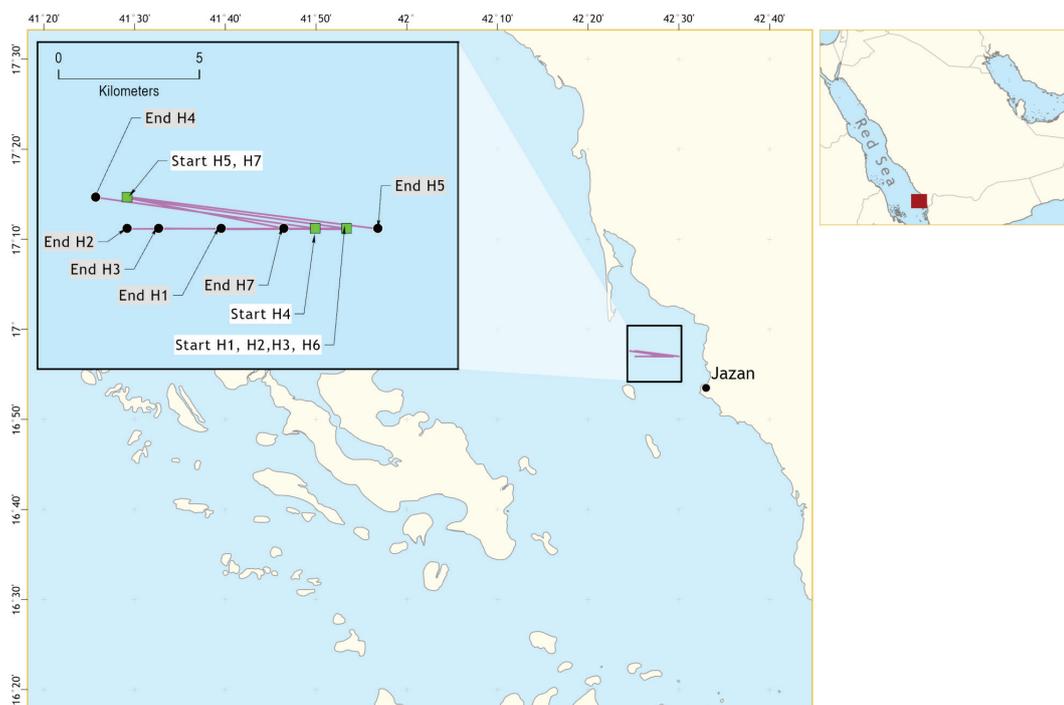


Figure 1. Map of the Red Sea showing experimental fishing hauls ($n = 7$) where species occurrences of *Triacanthus biaculeatus* (Bloch, 1786) were recorded.

Table 1. Geographic coordinates of the experimental fishing hauls ($n = 7$) where species occurrences of *Triacanthus biaculeatus* (Bloch, 1786) were recorded (southern Red Sea coast of Saudi Arabia; 2023).

Haul No.	Date	GPS coordinates		Depth [m]		N
		Start	End	Start	End	
H1	31 May	16°57.013'N, 042°29.248'E	16°56.908'N, 042°27.058'E	23.4	26.7	1
H2	20 Jun	16°56.968'N, 042°29.447'E	16°56.880'N, 042°25.405'E	24.3	34	1
H3	20 Jun	16°56.921'N, 042°29.409'E	16°56.763'N, 042°26.010'E	23.7	34	1
H4	15 Aug	16°56.922'N, 042°29.091'E	16°57.480'N, 042°24.689'E	13.3	20.9	3
H5	15 Aug	16°57.340'N, 042°25.119'E	16°57.003'N, 042°29.740'E	20.9	11.4	4
H6	15 Aug	16°57.022'N, 042°29.561'E	16°57.456'N, 042°24.939'E	20.9	20.9	4
H7	15 Aug	16°57.730'N, 042°25.122'E	16°56.845'N, 042°28.363'E	19	13.3	5

N = number of specimens recorded.

Red Sea coast of Saudi Arabia. All three specimens were already dead when collected. *Triacanthus biaculeatus* is currently not listed as threatened according to the IUCN Red List of Threatened Species (Matsuura and Motomura 2015).

Species identification followed Carpenter et al. (1997), Matsuura (2001), and Heemstra et al. (2022). Genus and species classifications followed Fricke et al. (2023a); family authorship followed van der Laan et al. (2014). Morphometrics were measured to the nearest 1 mm using a fish ruler and a digital Vernier caliper to the nearest 0.1 mm. The specimens were deposited to the faunal collections of Beacon Development—King Abdullah

University of Science and Technology, Saudi Arabia. A short taxonomic description is provided based on the voucher specimens from the Red Sea along with a note on their geographical distribution in the Indo–Pacific. Data on the distribution of *T. biaculeatus* (map was generated using SimpleMapp; Shorthouse 2010) is based on published literature and it does not represent exhaustive inventories. Abbreviated synonymies include original descriptions and key references.

Results

Family Triacanthidae Bleeker, 1859 Genus *Triacanthus* Oken, 1817

Triacanthus biaculeatus (Bloch, 1786)

English vernacular name: short-nosed tripodfish

(Fig. 2; Table 2)

Balistes biaculeatus Bloch, 1786.—Bloch (1786): 17, pl. 148 (2) [type locality: “Ostindien” (Indonesia)].

Triacanthus biaculeatus (Bloch, 1786).—Carpenter et al. (1997): 235.—Matsuura (2001): 3908.—Heemstra et al. (2022): 414, pl. 105, 106.

Material examined. SAUDI ARABIA, southern Red Sea, Jizan; three specimens were trawled from a sandy/muddy habitat between 16°56.922'N, 042°29.091'E and 16°57.480'N, 042°24.689'E; 15 Aug. 2023; M.P. Goutham-Bharathi leg., BD/KAUST-0823-003 (155 mm TL); BD/KAUST-0823-004 (180 mm TL); BD/KAUST-0823-005 (200 mm TL); 13.3–20.9 m.



Figure 2. *Triacanthus biaculeatus* (Bloch, 1786) [BD/KAUST-0823-004]; 180 mm TL; Jizan, southern Red Sea, Saudi Arabia.

Table 2. Morphometric and meristic data of *Triacanthus biaculeatus* (Bloch, 1786) collected from the southern Red Sea coast of Saudi Arabia in 2023.

Character	Specimen number		
	BD/KAUST-0823-003	BD/KAUST-0823-004	BD/KAUST-0823-005
Morphometrics			
Total length [mm]	155	180	200
Standard length (SL) [mm]	120	137	154
Head length [mm]	33.9	39.9	43.7
Pre-dorsal length [mm]	45.5	52.3	59.1
Body depth [mm]	42.9	50.7	55.0
Snout length [%SL]	16.1	18.8	16.2
Second spine of dorsal fin [%SL]	7.0	7.8	5.6
Post orbital length [%SL]	6.9	8.1	7.1
Meristics			
Dorsal fin spines	5	5	5
Dorsal fin rays	24	24	25
Anal fin rays	21	20	20
Pectoral fin rays	16	14	15

Description. Body moderately elongated, strongly compressed, head profile from above eye to first dorsal-fin spine base slightly convex to straight; skin moderately thick with minute scales, upright spinules on each scale producing rough shagreen-like appearance; mouth small, terminal, snout moderately acute; five dorsal spines; anterior dorsal fin membrane black, spiny dorsal-fin membrane very dark between first and third spines, equally dark between third and fifth spines; caudal peduncle tapering distinctly, wider than deep.

Color. The coloration of the freshly collected specimens was silvery, upper half of body dusky and pale below with indistinct pale mid-lateral stripe; large dark blotch on dorsum beneath spiny dorsal fins; soft dorsal, anal and pectoral fins yellowish; caudal fin dark yellow.

Discussion

Triacanthus biaculeatus is differentiated from its congener, *Triacanthus nieuhofii* Bleeker, 1852 by the first dor-

sal fin coloration (spiny dorsal-fin membrane very dark between first and third spines, and usually equally dark between third and fifth spines vs. very dark between first and second spines, slightly to less dark between second and third spines, and pale between third and fifth spines) and the outline of head from base of first dorsal-fin spine to above eye (slightly convex or almost a straight line vs. convex in front of spine and then straight or slightly concave over eye) (Matsuura 2015; Mohanty et al. 2018).

Triacanthus biaculeatus is widespread across the whole Indo–West Pacific (Matsuura 2001; Santini and Tyler 2002; Fricke et al. 2023a), ranging from the Persian/Arabian Gulf to South Africa (Eastern Cape) and India and Sri Lanka, and Mauritius; elsewhere to Bay of Bengal (India), Indonesia, Taiwan, Philippines, China, Korea, central Japan, Western Australia and Queensland (Australia) (Bishop 2003; Heemstra et al. 2022; Fricke et al. 2023a). *Triacanthus biaculeatus* is hitherto unknown from the Arabian coasts and Madagascar (Santini and Tyler 2002; Fricke et al. 2018); the presently reported study constitutes the first documented record of this species for the Red Sea from Jizan, Saudi Arabia (Fig. 3).

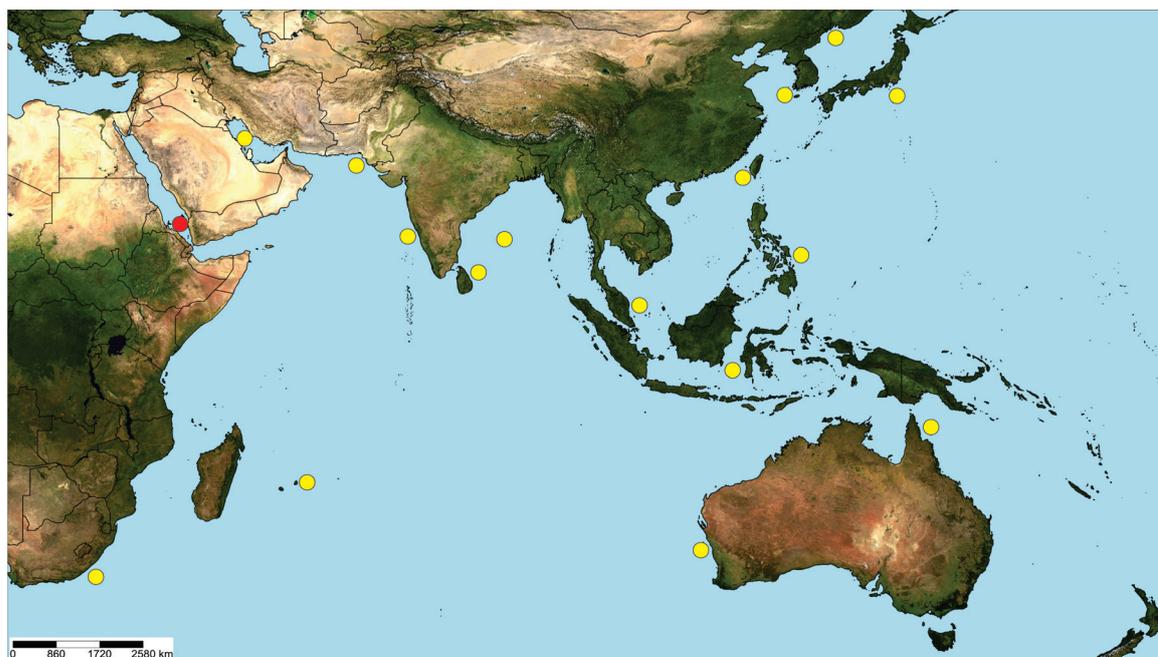


Figure 3. Distribution of *Triacanthus biaculeatus* (Bloch, 1786) in the Indo–West Pacific. Yellow closed circles = previous records; red closed circle = presently reported record (the map was generated using SimpleMapppr; Shorthouse 2010).

A total of ten extant Tetraodontiform fish families are recognized globally (Matsuura 2015; Fricke et al. 2023b) of which, six are known from the Red Sea: Balistidae Rafinesque, 1810, Diodontidae Bonaparte, 1835, Molidae Bonaparte, 1835, Monacanthidae Nardo, 1843, Ostraciidae Rafinesque, 1810, and Tetraodontidae Bonaparte, 1831 (see Golani and Bogorodsky 2010; Golani and Fricke 2018). Including the presently reported new record, the Tetraodontiform fish fauna of the Red Sea now comprises 48 species distributed among seven families (Golani and Bogorodsky 2010; Golani and Fricke 2018; Matsuura et al. 2020).

Currently, *T. biaculeatus* seems restricted to shallow sandy/muddy habitats in the southern Red Sea. According to Bogorodsky et al. (2014), the increased number of new records from the southern Red Sea could be attributable to the recent expansion of fish populations from the Gulf of Aden or other parts of the northwestern Indian Ocean. Based on its wider geographic distribution in the Indo–Pacific (Matsuura 2001) and its abundance in the trawling grounds along the Persian/Arabian Gulf (Carpenter

et al. 1997), it is highly likely that *T. biaculeatus* could have naturally expanded its distribution and a breeding population already exists regionally in the southern Red Sea. Further surveys are imperative to demonstrate the actual distribution of this species across a wide range of environmental gradients along the Red Sea.

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