

First report of two species of the genus *Minous* Cuvier, 1829 (Scorpaeniformes: Synanceiidae) from Indian coast, with a key for the identification of Indian species

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Abstract

Only four species of stonefish or stingfish of the genus *Minous* were known from India till date. The present paper reports range extension of three species to east coast of India, Bay of Bengal. *Minous pictus* Gunther, 1880 forms first record from Indian Ocean and *Minous trachicephalus* (Bleeker, 1855), first report from Indian waters. Further, occurrence of *M. dempsterae* Eschmeyer *et al.*, 1979 is also recorded for the first time from the Bay of Bengal, extending its known distributional range from north-west coast of India to northern Bay of Bengal. A working key for identification of all species of the genus *Minous* from Indian waters is also provided for easy identification.

Keywords: Bay of Bengal, Indian Ocean, *M. dempsterae*, *M. pictus*, *M. trachicephalus*

Introduction

Members of the stonefishes of the genus *Minous* Cuvier, 1829 are small size fish with body devoid of scales and lower most pectoral fin ray free from rest of the pectoral fin. Most of them are distributed at depth between 10-420 meters on muddy and sandy bottom of coastal marine waters. The genus was first revised by Eschmeyer *et al.*, (1979) and total 9 species were reported under the genus *Minous*. Amaoka and Kanayama (1981) established *M. longimanus* as a valid species, distinct from *M. inermis*. Mandrytsa (1990, 1993) described two more species of this genus from western Indian Ocean (north of Madagascar and Gulf of Aden). At present, a total of 12 species are recognized worldwide in the genus *Minous* and all are restricted to Indo-West Pacific region (Froese & Pauly, 2017).

Day (1875) reported only one widespread species, *Minous monodactylus*, from Indian waters. Alcock (1889, 1890) described two species, *M. inermis* and *M. coccineus*, from Ganjam coast and Godavari coast (Bay of Bengal)

respectively. Eschmeyer *et al.*, (1979) revealed occurrence the fourth species, *M. dempsterae*, from north-west coast of India and provided information on distribution of all these species. However, Eschmeyer *et al.*, (1979) also reported presence of *M. trachycephalus* in the Gulf of Mannar, west coast of Sri Lanka, but not from Indian waters.

During the collection of fishes along the east coast of India the authors came across some specimens of the genus *Minous* which were later identified as *M. pictus* Gunther 1880 and *M. trachycephalus* (Bleeker 1855), hitherto unknown from Indian coast. Both the species are reported herein for the first time from Indian waters and range extension of *M. dempsterae* Eschmeyer *et al.*, (1979), from Arabian Sea to northern Bay of Bengal is recorded. Apart from the new distributional records and range extension, efforts also made to compare all Indian species of the genus *Minous* that resulted in preparing a working key for identification of all species of the genus from Indian waters.

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Materials and Methods

Thirty one specimens of the genus *Minous* were collected from Digha Mohona and Shaktarpur, major fishing market and major fish landing centre, of West Bengal as well as Northern part of the east coast of India and three specimens were collected from Chennai fishing harbor during 2011 – 2014. After collection fresh photographs were taken, especially for inner surface of pectoral fin. Measurements follow Eschmeyer (1969). Measurements were made by digital caliper. Vertebrae counted with the help of digital X-ray. Species determination was following Eschmeyer *et al.*, (1979) and related literature. The studied specimens were deposited in the museum at Marine Aquarium and Regional Centre, Zoological Survey of India, Digha, West Bengal. The registration numbers with numbers of example studied and their morphometric measurements are given in Table 1.

Result

A total of 31 numbers of specimens were collected from the Shankarpur Fishing harbour, West Bengal and three specimens from the Chennai fishing Harbour, Tamil Nadu along the East coast of India. All the specimens were identified into 6 species as listed below.

1. *Minous coccineus* Alcock 1890
2. *Minous dempsterae* Eschmeyer, Hallacher & Rama-Rao 1979

3. *Minous inermis* Alcock 1889
4. *Minous monodactylus* (Bloch & Schneider 1801)
5. *Minous pictus* Gunther 1880
6. *Minous trachycephalus* (Bleeker 1855)

All these 6 species were recorded from the Shankarpur fishing harbour and the three specimens collected from Chennai fishing harbour (MARC/ZSI/F3836) were identified as *M. trachicephalus*. Earlier from India only 4 species of fishes of the *Minous* genus were reported and here two more species *Minous pictus* Gunther, 1880 and *Minous trachycephalus* (Bleeker, 1855) are reported from the India for the first time and *M. dempsterae* Eschmeyer *et al.*, (1979) was reported earlier from the West Coast of India and here we report the species from the east coast of India along the Bay of Bengal coast for the first time. Diagnostic characters of both the new records are described hereunder.

Minous pictus Gunther, 1880

Small sized fishes with a compressed and scale less body (except lateral line tube), head compressed, possess many bony ridges and well developed spines (Figure 1). Snout slightly longer than eyes, Mouth small, jaw teeth in a small band, palatine teeth absent, and vomerine teeth present. Preopercular spines 5, first one largest and other four are small, First lacrimal spine forward and downwardly directed, second spine is more or less twice of first spine. Maxilla reaches vertically below anterior

Table 1. Morphometric measurements of 6 species of the genus *Minous* from the Indian waters along Bay of Bengal

Characters	<i>M. coccineus</i>	<i>M. dempsterae</i>	<i>M. inermis</i>	<i>M. monodactylus</i>	<i>M. pictus</i>	<i>M. trachicephalus</i>
Registration numbers	MARC/ZSI/F3334	MARC/ZSI/F4722	MARC/ZSI/F4723	MARC/ZSI/F3324	MARC/ZSI/F3336	MARC/ZSI/F3477 MARC/ZSI/F3836
Numbers of specimens examined	4	4	2	12	6	6 (3+3)
SL	73-94	65-80	71.6	72-90	67-81	60-62
Dorsal fin	XI, 12	XI, 12	IX, 13	X, 11	XI, 12	XI, 10
Anal fin	II, 10	II, 10	II, 10	II, 9	II, 10	II, 8
HL	38-41	41.5-47.1	45	39-41.6	42.5-46.4	46.6-49.1
BD	35-38	32.5-34.2	35.2	37.5-41.1	29.5-34.3	33.3-37
Pectoral fin	31.5-34	40-45.3	50.05	35.2-37.5	42.2-44.7	39.3-42.5
Snout	11.9-13.2	14.2-15.5	14.6	12.5-14.5	12.67-13.8	13.6-15.9
IOS	8.7-9.2	8.5-9.8	5.85	6.9-8.33	8.8-10	7.5-9.6
Eye diameter	11.7-13.4	12.2-12.4	10.47	9.8-12.5	13.4-14.2	11.6-11.9
Postorbital	18.2-18.8	19.3-21.6	21.6	17.2-19.3	18.5-19.2	16.9-17.4

margin of eyes, cirri present on lower jaw. Dorsal fin spines thin and flexible, with XI spines, and 12 soft rays, and 1st dorsal spine much shorter than 2nd dorsal spine. Anal fin is with II spines and 10 soft rays. Pectoral fin reaches middle of anal fin; lower most pectoral ray free from other parts of pectoral fin. Gill rakers 16-17: 5+11-12. Vertebrae: 26; lateral line pores: 19-20.



Figure 1. *Minous pictus* Gunther, 1880.

Colour: Upper part of body light brown with alternating pale and dark bands; lower part of body pale. Posterior part of dorsal rays and soft dorsal spine are with pale and dark bands. Anal fin pale with dark margin. Pectoral fin blackish with light brown base; inner surface of pectoral fin pale brown with small whitish spots radiating outward along pectoral fin rays. Ventral fin pale brown with dark irregular stripes, and caudal fin pale with dark margin.

Distribution: The species was reported from Arafura Sea, Philippines, Taiwan, Hong Kong and Viet Nam (Eschmeyer *et al.*, 1979). Now this report extends the range of the species to the east coast of India.

***Minous trachycephalus* (Bleeker, 1855)**

Small sized fishes with compressed and scale less body (except lateral line tube), head compressed with numerous bony ridges and weakly developed spines; snout blunt and longer than eye diameter (Figure 2). Mouth small, jaw teeth in small band, palatine teeth absent but vomerine teeth present; 3 cirri present on lower jaw. Preopercular spine 5, upper most large and backwardly directed, rest of four small; lacrimal bone with 2 spines, first one small, points down and forwardly directed, second one is large and backwardly directed; maxilla reaching just anterior margin of eyes. Dorsal fin with XI spines and 10 soft rays, originates vertically above preopercular margin; first dorsal spine much shorter than second dorsal spine and close to base of second dorsal spine; dorsal spines thin and flexible, Anal fin with II spines, and 8 soft rays. Pectoral

fin reaching upto middle of anal fin; lower most pectoral ray single and free from rest of the pectoral fin. Gill rakers 11: 3+8. Vertebrae: 25; lateral line pores: 16.



Figure 2. *Minous trachycephalus* (Bleeker, 1855).

Colour: Upper part of body grayish brown and lower part pale brown. Head, body, and fins with numerous dark spots. Dorsal fin anteriorly pale and darker posteriorly; anal fin base pale but tip darker; pectoral fin base pale, pectoral fin blackish. Inner side of pectoral fin grey with many white spots forming hexagonal boxes and the terminal part is dark with yellow margin. Ventral fins pale brown with irregular dark bands, and caudal fin with alternate grey and pale colour with black spots.

Distribution: West Pacific: South China Sea, Northern Indonesia and Ceylon (Sri Lanka) in Indian Ocean (Eschmeyer *et al.* 1979). The present study extends the range of the species to the east coast of India. Eschmeyer *et al.*, (1979) also given hint about possibility of this species widely distributed in shallow waters.

Discussion

The genus *Minous* is mainly restricted to the Indo-West Pacific region, from Japan to Red Sea. The genus contains only 12 species. In Indian coastal waters previously four species under the genus *Minous* were reported, *M. coccineus* Alcock 1890; *M. dempsterae* Eschmeyer *et al.* 1979; *M. inermis* Alcock 1889 and *M. monodactylus* (Bloch and Schneider, 1801). This study reports *M. pictus* Gunther, 1880 and *M. trachicephalus* (Bleeker, 1845) first time from Indian coast and *M. dempsterae* Eschmeyer *et al.*, 1979 reported from east coast of India as well as Bay of Bengal.

Minous pictus and *M. trachicephalus* are easily distinguished from other Indian species of the genus *Minous* by having following distinguished characters:

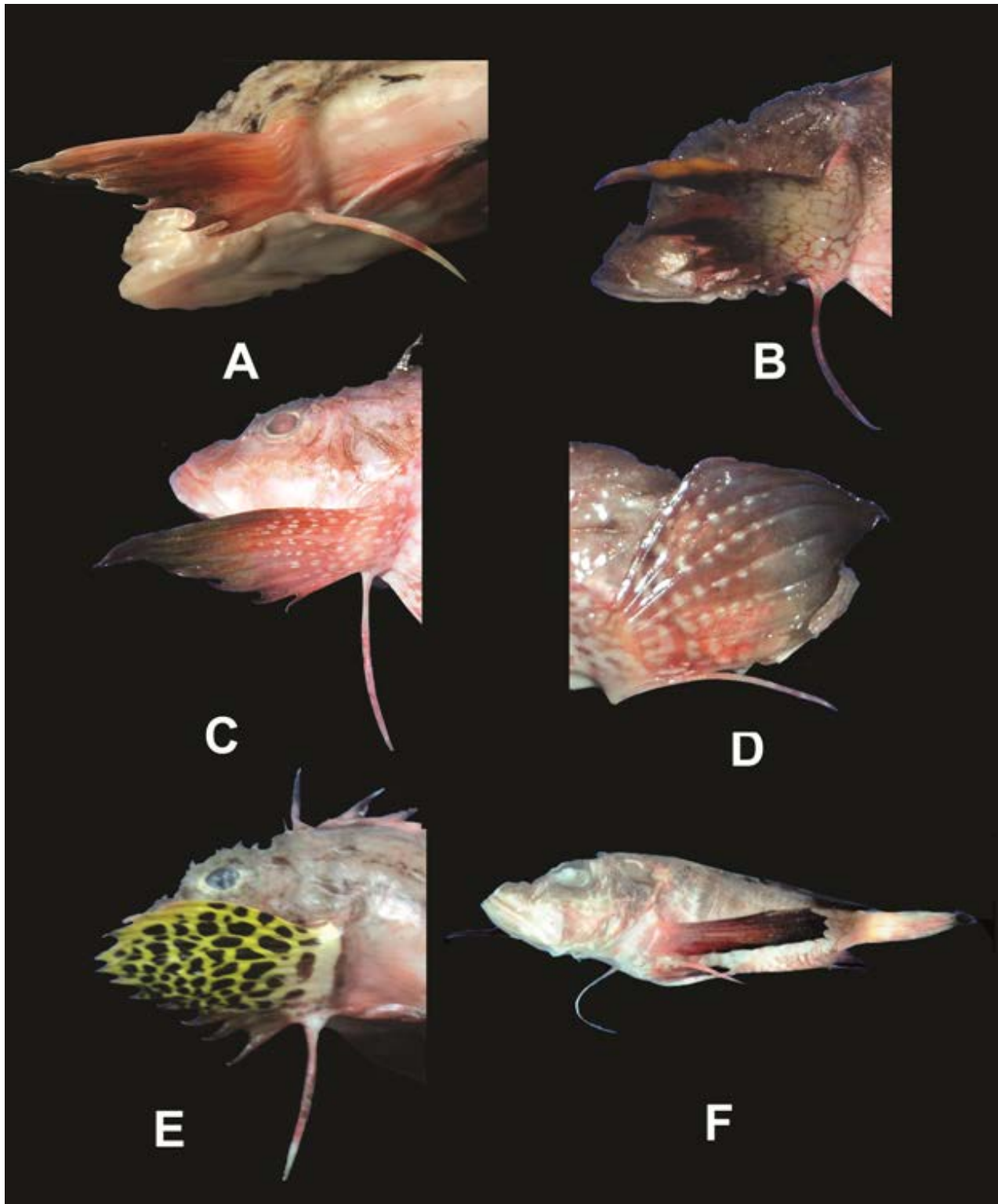


Figure 3. Pattern of inner surface of pectoral fin in different species of Genus *Minous* from Indian waters. A. *Minous monodactylus* (Bleeker, 1855); B. *Minous trachycephalus* (Bleeker, 1855); C. *Minous dempsterae* Eschmeyer, Hallacher & Rama-Rao, 1979; D. *Minous pictus* Gunther, 1880; E. *Minous coccineus* Alcock, 1890; F: *Minous inermis* Alcock, 1884.

in both species, 1st dorsal spine much shorter than 2nd dorsal spine and close to base of 2nd dorsal spine (in *M. monodactylus* 1st and 2nd dorsal spine equal, both spines are well separated) and pectoral fin reaches at least middle of anal fin (in *M. inermis* pectoral fin reaching beyond or at least end of anal fin). In *M. pictus* inner surface of pectoral fin with pale spots forming stripes which are radiating distally along pectoral fin rays; while in *M. trachicephalus* inner side of pectoral fin grey with many white spots forming hexagonal boxes (in *M. coccineus* inner surface of pectoral fin with dark spots; in *M. dempsterae* inner surface of pectoral fin with irregular whitish spot on light reddish background).

Minous pictus differs from *M. trachicephalus* by having more dorsal fin soft rays (11-13: present study 12 vs 8-10: present study 10), more anal soft rays (10 vs 8) and 2nd lacrimal spine much longer than 1st lacrimal spine (2nd lacrimal spine slightly longer than first in *M. trachicephalus*). *Minous dempsterae* is distinguished from *M. pictus* in the color pattern on inner surface of pectoral fin as given in the identification key below (Figure 3).

Apart from these six species, three other species of the genus *Minous* are known from Indian Ocean, *M. andriashevi*, *M. longimanus* and *M. usachevi*. The first species is known only from the type locality (11°41'07"S, 51°23'02"E) by a single specimen. *M. longimanus*, closely resemble *M. inermis*, but distinguished in having lower anal fin ray count (8-9 vs 10-14 in *M. inermis*) and shorter free pectoral fin ray, not reaching pelvic fin (Amaoka & Kanayama 1981). *M. usachevi*, recorded from the Gulf of Aden, is distinct in having inner side of pectoral fin dark, with a large faint light spot along the central part; first dorsal spine longer than second spine; posterior lachrymal spine about 3 times of the first (Mandrytsa 1993). Among the other three western Pacific species of this genus, *M. pusilus* have weak and hair-like dorsal-fin

spines with first spine short, while *M. quincarinatus* and *M. versicolor* are closely similar to *M. monodactylus* in having first dorsal spine equal to or longer than 2nd spine (Poss 1999).

Thus, after the range extension of these two species *M. pictus* and *M. trachicephalus* reported in this paper, the total numbers of species under the genus *Minous* have increased to six in Indian waters. A working key is provided hereunder for all the 6 species now known from India with pictures of pectoral fin (Figure 3) for easy distinction and identification of the species in field itself.

Key to species occurring in Indian Waters

- 1a. Pectoral fin long, reaching beyond or at least end of anal fin *Minous inermis*
- 1b. Pectoral fin reaching to middle of anal fin..... 2
- 2a. First dorsal spine well separated from 2nd dorsal spine and more or less equal to 2nd dorsal spine *Minous monodactylus*
- 2b. First dorsal spine closely placed with 2nd dorsal spine and much shorter than 2nd dorsal spine..... 3
- 3a. Soft dorsal fin rays not more than 10 *Minous trachycephalus*
- 3b. Soft dorsal fin rays more than 10 4
- 4a. Inner surface of pectoral fin with dark spots *Minous coccineus*
- 4b. Inner surface of pectoral fin without dark spots..... 5
- 5a. Inner surface of pectoral fin with whitish spot on light reddish background *Minous dempsterae*
- 5b. Inner surface of pectoral fin with whitish spots forming stripes which are radiating distally *Minous pictus*

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