FishTaxa (2020) 18: 23-29
Journal homepage: www.fishtaxa.com

New record of two Combtooth blennies, *Omobranchus zebra* (Bleeker 1868) and *Omobranchus smithi* (Rao 1974) (Blenniiformes: Blenniidae) from West Bengal, India with a key to species of *Omobranchus* from India

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Abstract
Herein, we recorded *Omobranchus zebra* and *O. smithi* for the first time from West Bengal, India based on six individuals of *O. zebra* (33.66–53.37 mm SL) and five individuals of *O. smithi* (35.76–49.82 mm SL) collected from the brackish waters of the mangrove islands in the Indian Sundarbans. *Omobranchus zebra* is characterized by having XII, 18–20 dorsal fin rays, II, 20–22 anal fin rays, and a conspicuous colour pattern on the head and body. *Omobranchus smithi* is distinguished by having XII, 18–19 dorsal fin rays, II, 21 anal fin rays, a conspicuous dark spot on the anterior portion of the dorsal fin membrane, a crescentic mark posterior to the dorsal part of the orbit along with a slender crest on the head of males.
Keywords: Biodiversity, Blenniinae, Lateral line tubes, Salinity.
Zoobank: urn:lsid:zoobank.org:pub:C361A234-56E7-4FCC-9D51-25557DF38A47
Citation: Chakraborty P., Yardi K., Sindha P. 2020. New record of two Combtooth blennies, *Omobranchus zebra* (Bleeker 1868) and *Omobranchus smithi* (Rao 1974) (Blenniiformes: Blenniidae) from West Bengal, India with a key to species of *Omobranchus* from India. FishTaxa 18: 22-29.

Introduction

The family Blenniidae is among the 12 families of marine fishes in India that shows a high level of diversity, comprising 65 species in 26 genera (Gopi and Mishra 2015). The genus *Omobranchus* Valenciennes 1836, commonly referred to as Combtooth blennies, consist of around 20 species found in nearshore and estuarine waters across the Indo-West Pacific (Springer and Gomon 1975). At least one species: *O. punctatus,* has been introduced in the Atlantic (Gerhardinger et al. 2006). Reports of seven species of *Omobranchus* viz. *O. elongatus, O. fasciolatus, O. ferox, O. obliquus, O. punctatus, O. smithi* and *O. zebra* exist from marine and estuarine waters of India (Froese and Pauly 2019).

A fish supplier collected 11 individuals of blennies with fishes of the family Gobiidae, from the intertidal zone of the Indian Sundarbans and provided them to the first author. The collections were done from the Matla River at Jharkhali in West Bengal, India at 22°03’27.0”N, 88°39’25.1”E (Fig. 1). Subsequently, we identified the blennies as *O. zebra* (Bleeker 1868) and *O. smithi* (Rao 1974).

The Chilika lagoon in the neighboring state of Odisha and the mangroves of Andhra Pradesh are known to harbour *O. zebra* (Gopi and Mishra 2015; Mishra et al. 2019). Formerly, the only blenny recorded from West Bengal was the Variable sabretooth blenny (*Petroscirtes variabilis* Cantor 1849) from the Digha coast in the south of West Bengal (Mitra et al. 1997). We herein describe the two species as the first record from West Bengal, India, based on the collected specimens. We have also given a key to the species of *Omobranchus* found in Indian waters.

Material and Methods

We used a mixture of clove oil, ethanol and water to euthanize the individual fish. We then proceeded with the photography of the fresh specimens and collecting the data of the bilateral counts and measurements, done on the left side. Vertical fin rays and vertebrae are enumerated from X-ray radiographs. All counts follow Springer and Gomon (1975). The specimens were deposited in the fish collection of Bharati Vidyapeeth Institute of

Accepted: 25 October 2020; Published: 30 December 2020

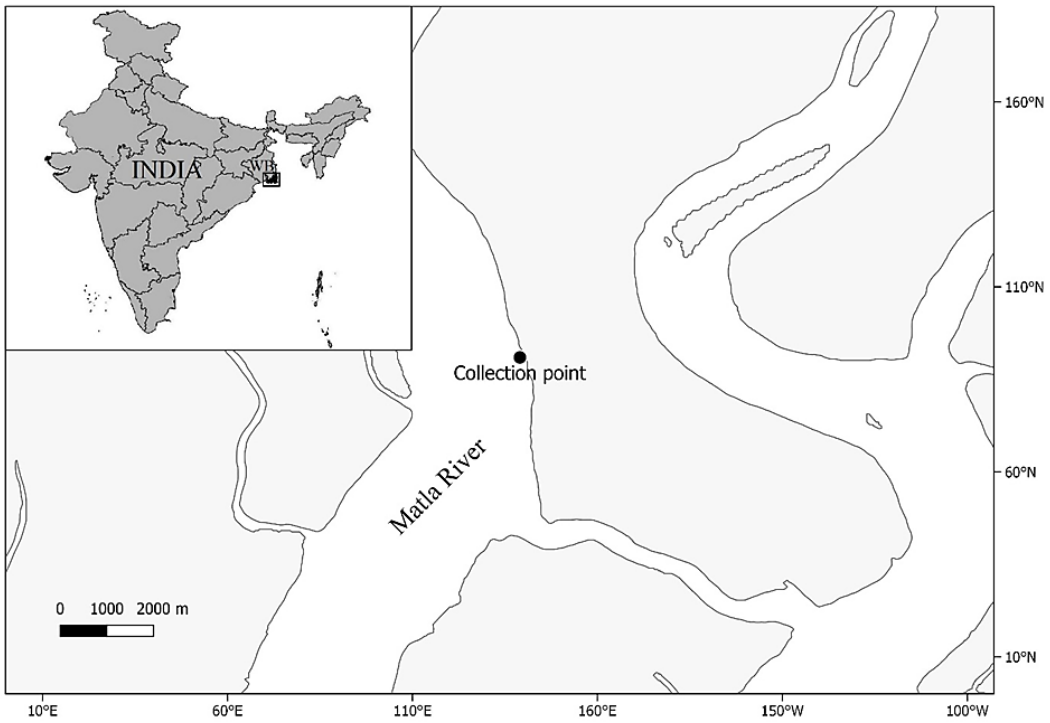

Figure 1. Map showing the collection point of the two blennies on the Matla River from the Indian Sundarbans. Inset map: The location (black square box) of the Indian Sundarbans in the state of West Bengal (WB), eastern India.

Environment Education and Research (BVIEER/FC) in Pune, India.
Abbreviations: D, dorsal fin; A, anal fin; P, pectoral fins; V, ventral/pelvic fins; C, caudal fin.

Results

Omobranchus zebra (Bleeker 1868)
(Figs. 2–3, Table 1)
Petroskirtes zebra Bleeker 1868: 279 (type locality: Singapore).
Omobranchus zebra Springer 1972: 15 (Indian Ocean).
Materials examined: BVIEER/FC 011–016, 6, 33.7–53.4 mm, (22°03'27.0"N, 88°39'25.1"E) Matla River, Jharkhali, Sundarbans, South 24 Paraganas, West Bengal, India, 22 February 2020.
Species description: D XII, 18–20; A II, 20–22; P 14–15; V 2; C 13. Body elongated, compressed and scaleless; body depth 5.6–6 times of SL. Head moderate and slightly compressed; head length (HL) 4–4.4 times of SL; anterodorsally, head steep; no fleshy bladelike crest on top of head in either sex. Snout length 2.8–3.1 times of head length. Eyes moderate, eye diameter 3.4–3.6 times of HL; interorbital region slightly convex, interorbital width 3.8–4.1 times of HL. Nostrils two, anterior nostril simple tube and posterior one simple pore; prenasal pores present. Mouth small; small comb-like teeth in a single row and an enlarged and curved canine posteriorly on each side of each jaw; lower lip flap present. Opening of gills small and restricted to area dorsal of the dorsal most pectoral fin-ray. Lateral line tubes present 2–4, extending posteriorly to below level of dorsal fin spines 2–7. Dorsal fin continuous, it's base long, predorsal length 3.9–4.5 of SL. Anal fin spines of males visible externally, preanal length 2–2.1 of SL. Pectoral fin moderate and round, its posterior tip, reaching a vertical at 7th to 8th dorsal spines. Caudal fin truncate, caudal peduncle depth 12.4–12.7 times of SL. We provide other diagnostic characters in Table 1.
Colour when fresh: Four broad, dark bands present on the head; anterior most band running from anterior

Table 1. Comparison of counts and measurements of both *Omobranchus* species recorded in this study.

Characters	*Omobranchus zebra* n=6	*Omobranchus smithi* n=5
Standard length (in mm)	33.66–53.37	35.76–49.87
Vertebrae	37–38	36–37
Epiplueral ribs	13–15	11–12
Interorbital pores	3	3
Circumorbital pores	8	8
Lateral line tubes	2–4	absent
Upper jaw teeth	17–22	20–21
Lower jaw teeth	18–22	22–24
Body depth (in SL)	5.6–6	5.7–6.5
Head length (in SL)	4	3.2–3.8
Snout length (in HL)	3–3.2	3.1–3.7
Eye diameter (in HL)	3.4–3.7	2.5–3.1
Interorbital width (in HL)	3.9–4.6	3.3–3.9
Pre-dorsal length (in SL)	3.9–4.5	4
Pre-anal length (in SL)	2.0–2.1	2–2.1
Caudal peduncle depth (in SL)	12.4–12.7	14.8–15.7

Figure 2. *Omobranchus zebra*, male, BVIEER/FC 015 (51.9 mm SL) from the Indian Sundarbans (Photograph by Priyankar Chakraborty).

Figure 3. Head of an *Omobranchus zebra* showing the four broad bands which are characteristic of the species (Photograph by Priyankar Chakraborty).

margin of orbit across the mouth, midway between corners of jaws. All four bands join on the underside of the head with bands from the opposite side. Body-colour dusky with a slightly darker dorsum with markings; 2–4 faint bands on anterior portion. A series of large, circular dark spots (usually 4–5) in lateral body midline. Dorsal fin pale with fine specks of dark brownish pigment; series of dark stripes/blotches on the anterior dorsal fin base. Anal fin dusky. Pectoral fin pale with faint specks and a black blotch on base. Pelvic fins light yellowish. Caudal fin pale.

Colour of the preserved specimens: Head dusky, four dark bands connected on underside of head; body pale, approximately with 4–5 distinct dark spots on midline laterally; dorsal is dusky with dorso-anteriorly oblique stripes on base; pectoral fin pale distally; pelvic fins pale; anal fin dusky; caudal fin pale.

Ecological notes: The Matla River is a major riverine system of the Indian Sundarbans estuary. All specimens

Figure 4. *Omobranchus smithi* (male-top, female-below) BVIEER/FC 021, 49.82 mm SL (male) and BVIEER/FC 018, 37.39 mm SL (female) from the Indian Sundarbans (Photograph by Priyankar Chakraborty).

Figure 5. Head of an *Omobranchus smithi* showing the crescentic marking, characteristic of the species (Photograph by Priyankar Chakraborty).

of *O. zebra* in this study were collected, from shallow brackish waters of the river. The fish caught were from a part of the river, close to the mudflats (pH: 7.8 and salinity: 1.013 ppm).

Distribution: *Omobranchus zebra* is known from India to the Philippines and Malaysia (Beaufort and Chapman 1951; Talwar and Jhingran 1991; Kottelat et al. 1993).

Omobranchus smithi (Rao 1974)

Fig. 4–5, Table-1

Cruantus smithi Rao 1974: 483 (type locality: Godavari estuary, India, about 16.5°N, 82°E).

Omobranchus smithi Kottelat 2013: 384 (Thailand: mouth of the river Chantaburi).

Materials examined: BVIEER/FC 017–021, 5, 35.76–49.87 mm, (22°03'27.0"N, 88°39'25.1"E) Matla River, Jharkhali, Sundarbans, South 24 Paraganas, West Bengal, India, 22 February 2020.

Species description: D XII, 18–19; A II, 21; P 14–15; V 2; C 13. Body elongated, compressed and scaleless; body depth 5.6–6.5 times of SL. Head moderately narrow; head length 3.2–3.8 times of SL; fleshy bladelike crest on top of head of males, females lack any such crest. Snout length 2.8–3.1 times of HL. Eyes moderate, eye diameter 3.1–3.7 times of HL; interorbital region convex, interorbital width 2.5–3.1 times of HL. Nostrils two, anterior nostril simple tube and posterior one simple pore; prenasal pores present. Mouth small; small comb-like teeth in a single row and an enlarged and curved canine posteriorly on each side of each jaw; lower lip flap present. Gill openings small and extending ventrally to opposite 3rd pectoral fin ray. Lateral line tubes

absent. Dorsal fin continuous with long base, predorsal length 3.9–4.0 of SL. Both anal fin spines of males visible externally, pre-anal length 2–2.1 of SL. Pectoral fin moderate and round. Caudal fin truncate, caudal peduncle depth 14.8–15.7 times of SL. We provide other diagnostic characters in Table 1.

Colour when fresh: Several moderately broad, dusky bands extending laterally from head to caudal peduncle, more prominent near head than posteriorly. A crescentic mark, curving dorsally from posterior margin of orbit almost reaching to base of fleshy head crest (only in males), and vermiculations below orbit and on operculum. Sensory pores and nostrils distinctly pale. Dorsal fin pale dusky anteriorly, transparent posteriorly; anterior portion with a dark stripe/blotch. Anal fin pale. Pectoral and pelvic fin pale with faint specks of pigments. Caudal fin pale.

Colour of the preserved specimens: Head dusky, a distinct crescentic mark above, dorsoposterior to orbit. Body pale with several discrete dusky bands on midline laterally (not present or very faint in females). Dorsal fin dusky with a dark blotch on anterior portion. Pectoral fin pale and transparent distally. Pelvic fins pale. Anal fin pale with dark tips of rays. Caudal fin pale.

Ecological notes: They were collected close to the mudflats (pH: 7.8 and salinity: 1.013 ppm). Conspecific aggression is less, unlike *O. zebra,* which is highly aggressive towards conspecifics (PC, unpublished information).

Distribution: Known from the Indo-West Pacific. From India to Singapore and Vietnam (Visweswara Rao 1970; Kottelat and Whitten 1996; Nguyen and Nguyen 2006).

Discussion

We identified the collected specimens as a member of the genus *Omobranchus* Valenciennes 1836, based on the observation of characteristics, mentioned by Springer (2001). It included the body not being eel-like, gill opening located on the side of the head, absence of cirri from both nostrils, a narrow interorbital width (much narrower than eye diameter), simple, segmented caudal fin rays (usually 13), segmented pelvic fin rays two, interorbital pores 3–4, mandibular pores three, as well as lower margin of gill opening varying between dorsal and pectoral fin bases. Successively, we identified the species as *O. zebra* and *O. smithi,* following the original description of the two species by having a typical body colour and spots as well as morphological and meristic characters (Table 1).

Diagnostic characters: *Omobranchus zebra* (Figs. 2–3) is similar to *O. ferox* (Herre, 1927), distributed from the Philippines to Mozambique. They are thought to be introduced in Mozambique through ship ballast water exchange or fouling (Springer and Gomon 1975). The former is distinguishable from the latter by possessing well-defined bands on the head, a longer head (>23.5% of SL), and having gill openings, dorsal to the dorsal most pectoral fin ray (vs. opposite the 3rd or 6th pectoral fin ray in *O. ferox*). *Omobranchus zebra* differs from *O. smithi,* in lacking a fleshy crest in both sexes (vs. present distinctly in males) and having lateral line tubes (vs. absent). From species, already known from Indian waters; *O. punctatus, O. elongatus, O. fasciolatus* and *O. obliquus*; it differs in having a longer head length (>23.5% of SL) and having four circumorbital bones.

Omobranchus smithi (Figs. 4–5) distinguishes itself from all *Omobranchus* species reported from India in having a distinct fleshy crest (males only) and a dark crescentic marking extending dorsally from the orbit in both sexes.

It is interesting to note that Talwar and Jhingran (1991) recognized *O. smithi* (as *Cruantus smithi*), a synonym for *O. ferox.* The description they presented was not that of *O. smithi* as they mention “Bi-pored lateral lines 0–4” which is absent in *O. smithi*. Also, males of *O. smithi* as we know possess a crest on the head which they do not mention. Previous workers seem to have missed out on these fishes from the Sundarbans due to their diminutive nature and cryptic colouration. This fish bears no value to the commercial fisheries operating in the

area and is used sometimes as baitfish. We provide an identification key for the seven species that are known to occur in Indian waters.

Key to species of *Omobranchus* occurring in Indian waters

1a. Two interorbital pores ..... *Omobranchus fasciolatus*
1b. Three interorbital pores 2
2a. Total dorsal fin elements 32–35; no distinct markings on the ventral side of the head ..... *Omobranchus ferox*
2b. Total dorsal fin elements 30–33 (usually 31); distinct markings, bands and spots on the ventral side of the head 3
3a. A large head (greater than 23.5–24% of SL) 4
3b. A shorter head (less than 23.5–24% of SL) 5
4a. Lateral line tubes absent; a crescentic marking, extending dorsally from the posterior region of the orbit ..... ***Omobranchus smithi***
4b. Lateral line tubes present, absence of crescentic marking ..... ***Omobranchus zebra***
5a. Gill opening never below level of dorsal most pectoral fin ray ..... *Omobranchus punctatus*
5b. Gill opening extended farther ventrally..... 6
6a. Dorsal fin spines 12 (rarely 13); prominent dark spots absent or present on the head posterior to the eye, slightly closer to circumorbital series of pores; distinct dusky to dark spots or dark chevrons and vermiculations on the underside of the head ..... *Omobranchus elongatus*
6b. Dorsal fin spines 13 (rarely 12 or 14); prominent dark spots always presenton the head posterior to the eye, closer to preopercular series of pores; underside of the head being plain dusky or having dark chevrons (never spots or vermiculations) ..... *Omobranchus obliquus*

The present study records *O. zebra* and *O. smithi* for the first time from the Indian Sundarbans mangrove delta and West Bengal. This study also documents the first representation of the family Blenniidae from the Indian Sundarbans.

Acknowledgements

We thank E. Bharucha, director of BVIEER, Pune for providing the necessary working facilities. We also express our gratitude to A.A. Rao of Malabar tropicals, Kolkata for collecting the specimens and providing water parameter values.

Conflict of Interest Statement: Authors declare no competing or conflict of interest.

Author(s) Contribution: All authors contributed equally in specimen identification and the preparation of the manuscript.

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