VOL.66 NO.01 JANUARY-JUNE 2024 • PRINT ISSN 0025-3146 • ONLINE ISSN 2321-7898

JMBAI

JOURNAL OF THE MARINE BIOLOGICAL ASSOCIATION OF INDIA

MBAI
Marine Biological Association of India
ESTD.1958

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Available online at: www.mbai.org.in doi:10.6024/jmbai.2024.66.1.2462-18

Range expansion shift of the goby, *Egglestonichthys melanoptera* (Rao, 1971) (Gobiiformes: Gobiidae), from the south-eastern coast of India

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Received: 11 Dec 2023 Revised: 04 Apr 2024
Accepted: 08 Apr 2024 Published: 29 Apr 2024

Short communication

Abstract

This article documents the new record of *Egglestonichthys melanoptera* from Mudasal Odai and Pazhayar fish landing centre, south-eastern coast of India. During June 2023, three specimens of 53.9-80.8 mm standard length (SL) were collected as trawl bycatch from Mudasal Odai. Additionally, two specimens (77.8 and 84.0 mm SL) collected from Pazhayar during August 2012 and 2018 were also examined. The current record of this species from the southeastern coast of India extends and confirms the known distribution of this species.

Keywords: *Bycatch, gobiid, Egglestonichthys melanoptera, new record, Tamil Nadu*

Introduction

Gobiids are small-sized fishes with diverse taxonomical features among marine teleost fishes. The genus *Egglestonichthys* is similar to *Callogobius*, whereas the genus could be differentiated mainly based on the size of the eyes (Larson and Hoese, 1997). The genus *Egglestonichthys* (Miller and Wongrat, 1979), currently includes six valid species, which are *Egglestonichthys bombylios*; *E. fulmen*; *E. melanoptera*; *E. patriciae*; *E. rubidus* and *E. ulbubunitj.* Hitherto, only two known species belonging to the genus *Egglestonichthys* have been reported from Indian waters, which are *E. bombylios* (Larson and Hoese, 1997) off Bombay, West Coast of India; and *E. melanoptera* described as *Callogobius melanoptera* by Rao (1971) from shallow creeks of Godavari estuary, Andhra Pradesh. Subsequently, Larson and Hoese (1997) redescribed and placed the species *C. melanoptera* in the genus *Egglestonichthys* Miller and Wongrat, 1979. Based on the five specimens of *E. melanoptera* collected from the coastal waters of Parangipettai and Pazhayar on the Coromandel coast, the description of the species has been undertaken. Even though the species was recorded from Godavari estuaries, its occurrence and population spillover information are been limited. However, recent observations suggest that *E. melanoptera* has been inhabiting marine waters. The present work provides a geographical extension of its territory towards the southeastern coast of India and presents detailed morphometric measurements, meristic characteristics, and colour patterns of the species.

Material and methods

Specimens (53.9-80.8 mm SL) were collected from the bycatch of bottom trawlers (mesh size range: 20-40 mm), mostly targeted on *Acetes* spp. on the Coromandel coast, which was landed at Mudasal Odai (11° 29' 06" N 79° 46' 28" E) landing centre from June 2022 to August 2023 while documenting the trawl bycatch species assemblage (Ragul *et al.,* 2021, 2024). Hauling was conducted on nearshore and offshore fishing grounds at a depth range of 10 to 100 m and a distance of about 1 to 30 km from shore. Additionally, two specimens (77.8 and 84.0 mm SL) collected from Pazhayar during August 2012 and 2018 were also examined.

After an assortment of gobiid specimens from the bycatch at the landing centre, the samples were further examined in the laboratory for identification. After cleaning, fresh photographs were taken immediately after reaching the laboratory. Subsequently, the specimens were preserved in 10% formaldehyde and later preserved in 70% ethanol for

further analysis. Both morphometric and meristic characters of the specimens were measured as per Hubbs and Lagler (1970) and further confirmation of species was undertaken. The collected specimens were identified using standard identification keys provided by Miller and Wongrat (1979) and Larson and Hoese (1997). The morphometric measurements were recorded using Mitutoyo CD-6" ASX® digital Vernier calliper with 0.1 mm accuracy. Since the species had not been reported from this location earlier, the specimens were deposited in the museum repository of the Centre of Advanced Study in Marine Biology, Annamalai University, Reference Museum (CASMBAURM), Parangipettai, India, for future reference.

Results

The collected specimens were identified as *Egglestonichthys melanoptera* based on the meristic and morphological characteristics (Tables 1 and 2).

Systematics

Family : Gobiidae Cuvier, 1816
Subfamily : Gobiinae Cuvier, 1816
Genus : *Egglestonichthys* Miller and Wongrat, 1979

Table 1. Meristic data for *E. melanoptera* (Rao, 1971) specimens from the South-eastern coast of India

Parameters	Holotype ZSI 7919/2	Type specimens from Larson and Hoese, 1967	Present specimens (CASMBAURM/2312811-15)
Standard length (mm)	65	68-88	53.9-80.8
I Dorsal-fin elements (No.)	VI	VI	VI
II Dorsal-fin elements (No.)	I,10	I,10	I,10
Anal-fin elements (No.)	I,9	I,8-9	I,9
Pectoral-fin rays (No.)	22/-	20-22/21-22	19-20/20-22
Pelvic-fin rays (No.)	5/5	5/5	5/5
Segmented Caudal-fin rays (No.)	17	9/8	9/8
Longitudinal series scales (No.)	35	35-45	35-41
Pre-dorsal scales (No.)	-	29-37	30-32
Circumpeduncular Scales (No.)	-	14-18	15-16

Table 2. Morphometric data for *E. melanoptera* (Rao, 1971) specimens from the southeastern coast of India

Parameters	Present specimens (CASMBAURM/2312811-15)	Parameters	Present specimens (CASMBAURM/2312811-15)
Total length (mm)	81-129	Length of first dorsal-fin base	12.1-13.2
Standard length (mm)	53.9-83.9	Length of second dorsal fin base	20.6-21.6
Measurements in % of SL		Length of anal fin base	14.3-15.4
Head length	27.0-29.1	Pectoral-fin length	29.0-37.7
Pre-first dorsal length	36.9-37.5	Pelvic-fin length	23.4-25.1
Pre-second dorsal length	55.2-56.9	Caudal-fin length	49.8-53.9
Pre- pectoral length	33.2-35.2	Measurements in % of head length	
Pre- pelvic-fin length	31.6-33.1	Eye diameter	18.1-19.8
Pre-anal fin length	63.0-66.1	Orbital diameter	20.9-24.8
Body depth at dorsal-fin origin	16.6-23.6	Interorbital width	23.2-26.7
Body depth at anal-fin origin	17.0-18.9	Snout length	19.5-24.1
Body width at anal fin origin	8.9-10.1	Upper Jaw length	42.9-45.4
Length of caudal peduncle	21.1-25.5	Lower Jaw length	34.5-43.2
Depth of caudal peduncle	9.9-11.1	Head depth	52.1-71.4
Width of caudal peduncle	4.8-6.2	Head width	63.7-71.4

Type species

Egglestonichthys patriciae Miller and Wongrat, 1979: 239-257, by original designation and monotypy. Gender: Feminine. *Egglestonichthys melanoptera* (Rao, 1971); Fig. 2A-E, Table 1 and 2. *Callogobius melanoptera:* Rao, 1971: 39-54; Larson and Hoese, 1997: 45-52; Larson, 2013: 147-154. Type locality: Godavari estuary. *Egglestonichthys melanoptera* Larson & Hoese, 1997: 45-52, Fig. 4 and 5, Table 2; Larson, 2013: 147-154; Allen *et al.,* 2020: 41-42, table I & II; Fujiwara *et al.,* 2020: 91- 98.

Material examined

1 ex., CASMBAURM/2312811, 84.0 mm SL, August 2012 and 1 ex., CASMBAURM/2312812, 77.8 mm SL, August 2018, Coll. A. Murugan, from trash (bycatch) heaped at Pazhayar fishing harbour (11° 21′ 32″ N 79° 49′ 22″ E). 3 ex., CASMBAURM/2312813-15, 53.9-80.8 mm SL, June 2023, Coll. S. Ragul, from trash heaped at Mudasal Odai fish landing centre (11° 29′ 06″ N 79° 46′ 28″ E), India: Tamil Nadu.

Diagnosis

First dorsal fin elements VI; second dorsal fin elements I, 10; anal fin elements I, 9; pectoral-fin rays 19-20/20-22; pelvic fin rays 5/5; segmented caudal fin rays 9/8; longitudinal series scales 35-41; pre-dorsal scales 30-32; circumpeduncular scales 15-16.

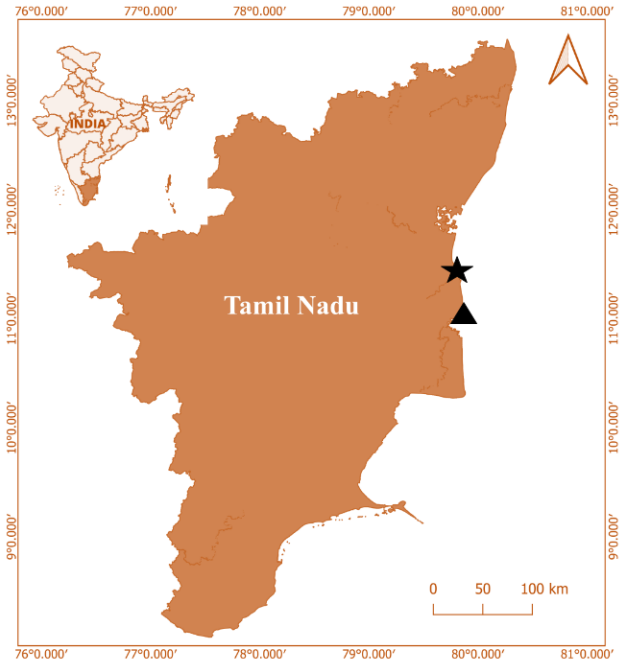

Fig. 1. Map showing fish landing centres in southeast India from where specimens of *E.melanoptera* were recorded: Mudasal Odai (star) and Pazhayar (triangle)

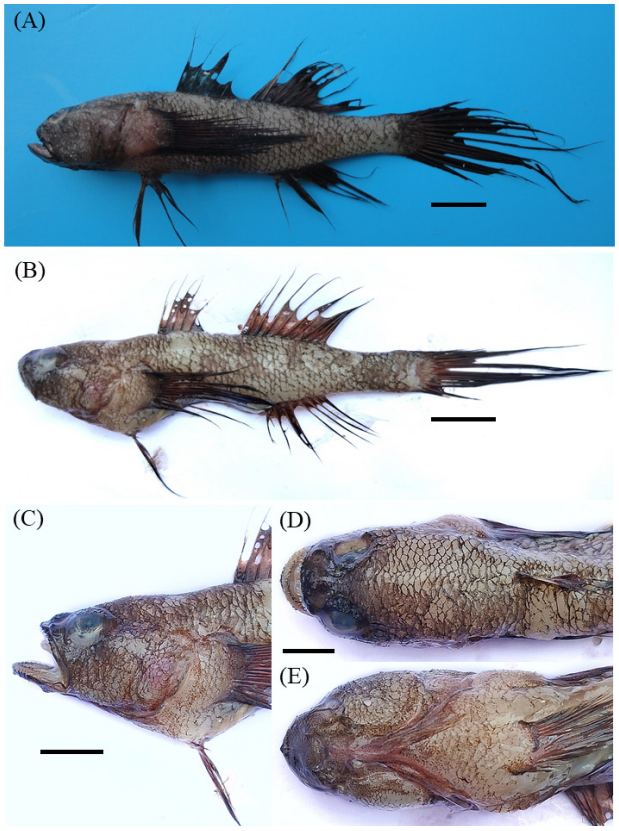

Fig. 2. Live colouration of *E. melanoptera* (Rao, 1971). (A) Pazhayar (B) Mudasal Odai fish landing centre. (C-E) Head: (C) lateral, (D) dorsal, (E) ventral view. Scale: A&B= 10 mm, C-E= 5 mm

Description

A large, moderately elongated-bodied goby fish with a rounded head (17.2-19.3% in SL) and compressed tail (4.8-6.2% in SL) region (Fig. 2 A, B). Dorso-lateral eyes with a broad interorbital (6.3-7.7% in SL), which is slightly more than the eye diameter (Fig. 2 C, D). Supraterminal mouth: upper jaw reaches vertically straight below the mid-eye (11.6-12.7% in SL) and lower jaw about the length of 9.3-12.2% in SL. Similarly, both upper and lower jaws are smoother and narrower with enlarged, sharp pointed canine teeth that are protruding outward in a wide-spaced pattern (Fig. 2 C). Fine scales are observed in the head, snout region, and blunted tongue. Mental (pelvic) frenum absent. A broad pair of anterior nostrils, like a short tube, is above the upper lip, and another pair of broad posterior nostrils is just below the eye orbit. Wide gill opening, ranging from frontward to vertically straight below the mid-eye (Fig. 2 E). As the scales of the collected specimens have been washed off due to trawling, the body has a few ctenoid scales, and more equally larger ctenoid predorsal scales, which reach towards the nostril up to the distal upper lip with a few cycloid scales over the posterior nostril. The cheek, opercular, pectoral fin base, pre-pelvic region, and belly are covered with ctenoid

scales. Four prominent vertical sensory papillae run just below the eye orbit. High-pointed dorsal, anal, and caudal fins. First dorsal with II-III longest spines, which reach up to the fourth ray of the second dorsal fin (when depressed). Pointed pectoral (29.0-37.7% in SL), pelvic (23.4-25.1% in SL) with frenum absent and longest caudal fin (49.8-53.9% in SL). The colour of the fresh specimen (Fig. 2 A) is of grey body (as scales fallen), the head darker than the body and the fins dark black (Fig. 2 C-E), in a few specimens brown (Fig. 2 B). The base of the pectoral and pelvic fin (thoracic region) is lighter brown than other parts of the body. The colour of the preserved specimen is pale brown and fins turn to pale black.

Habitat

Rao (1971) described *E. melanoptera* based on the specimens collected from the creeks of Godavari estuary, Andhra Pradesh, Northeast coast India. Present specimens were collected from the muddy bottom of the marine environment (depth 50-100 m) off Parangipettai waters, Coromandel coast.

Distribution

According to Larson and Hoese (1997), *E. melanoptera* has been recorded from a few known localities along the West Pacific Ocean: Papua New Guinea (Orokolo Bay, Gulf of Papua), the Philippines (Carigara Bay, Samar Sea) and Vietnam (Prokofiev, 2016). In India, it is known only from the type locality in the Godavari estuary.

Discussion

The gobioid genus *Egglestonichthys* consists of six species with a complex transverse papillae pattern like in some eleotrids (Family: Eleotridae), wide gill opening bellow pre-operculum and absence of lateral line sensory pores (Miller and Wongrat, 1979). Larson and Hoese (1997) redescribed *E. melanoptera,* previously known as *Callogobius melanoptera* based on the above characteristics. *E. melanoptera* can be distinguished from other congeneric species based on the morphological characteristics such as pelvic frenum, longitudinal series scales, pre-dorsal and transverse scales (Larson and Hoese, 1997; Larson, 2013; Allen *et al.,* 2020; Fujiwara *et al.,* 2020): Absence of pelvic frenum in *E. melanoptera vs.* presence of deep pelvic frenum in *E. ulbubunitj vs.* a distinct pelvic frenum in *E. patriciae vs.* a very thin pelvic frenum in *E. bombylios*. Although both *E. melanoptera* and *E. fulmen* lack a pelvic frenum, *E. melanoptera* differs by the number of scale series: 35-41 longitudinal series scales; 30-32 pre-dorsal scales; 15-16 transverse scales *vs.* 25, 8, 8 in *E. fulmen* respectively. Whereas, *E. rubidus* have 27-28 longitudinal series scales; 13-18 pre-dorsal scales; 7 transverse scales. The specimens of *E. melanoptera* are known from shallow creeks and estuaries, and the average depth range in the Philippines is only about 50-70 m (Larson and Hoese, 1997). In the current study, the specimens were collected at a maximum depth range of 10-100 m (personal communication with fishers), which expands the new depth range of this species on the southeast coast of India. The present finding forms a primary baseline for future studies related to the distribution pattern, assemblage, and ecology of this cryptic gobiid species.

Conclusion

The current record of *E. melanoptera* from the southeastern coast of India indicates that this rare species is apparently much more widespread than previously known, and is also expected to occur in the intermediate regions. Additional studies of silty or muddy sediments on the eastern coast of India are needed to assess the full distribution range of *E. melanoptera*.

Acknowledgements

The authors are thankful to the Director and Dean of the Faculty of Marine Sciences, Annamalai University, for providing the necessary facilities. Authors are obliged to Dr Helen K Larson, Museum and Art Gallery of the Northern Territory, Australia for her help in confirming the identification of this species. The authors wish to thank two anonymous reviewers for their useful comments.

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