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Ophidiidae) from the Andaman Sea, North
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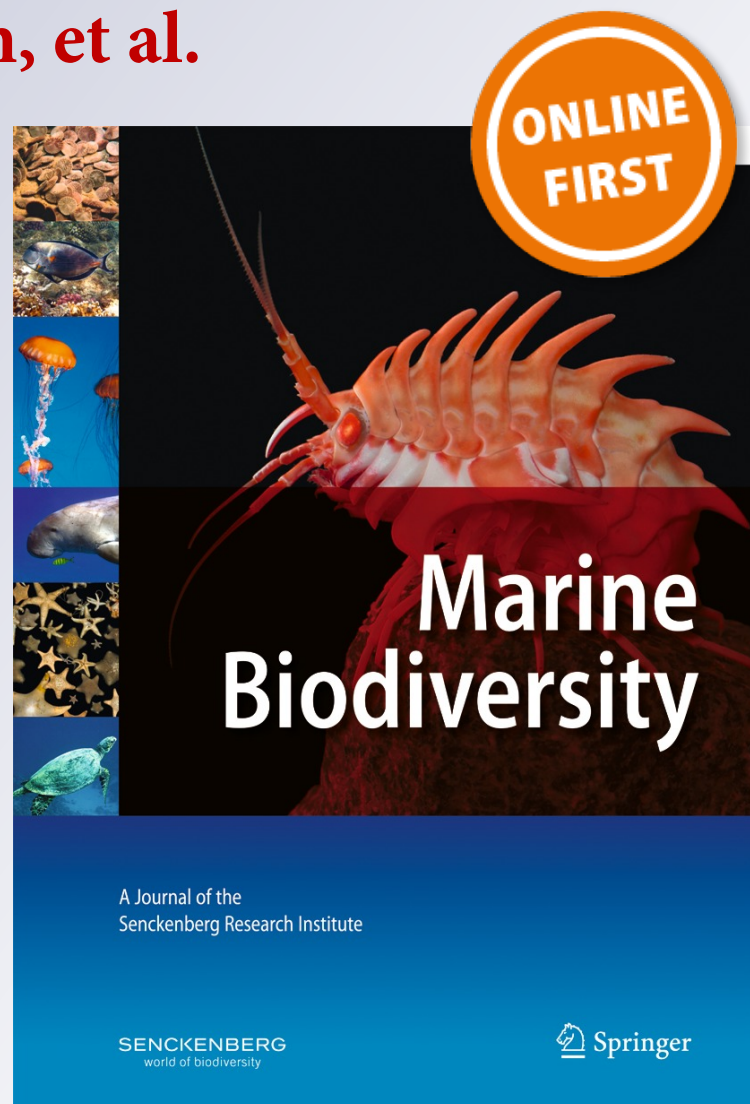
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A new record of *Neobythites multistriatus* Nielsen & Quéro, 1991 (Ophidiiformes: Ophidiidae) from the Andaman Sea, North Indian Ocean

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Abstract The occurrence of *Neobythites multistriatus* Nielsen & Quéro, 1991 which hitherto has not been recorded from the Andaman Sea is reported here. Three specimens measuring 175 mm, 153 mm and 136 mm (total length) were collected from Andaman Sea (13°10'903"N, 93°08'162"E) from a depth range of 320–410 m. The results of the comparison of meristic and morphometric characters with the holotype and paratypes of the species are presented. *N. multistriatus* is closely related to *N. fasciatus* in terms of two opercular spines and several vertical bars on the body ending as ocelli or dark blotches on the dorsal and anal fins, versus posterior to the line. The occurrence of this little-known benthopelagic fish in Andaman waters for the first time further adds to and strengthens the rich deep-sea ichthyofaunal biodiversity of the Exclusive Economic Zone (EEZ) of India, which is hitherto not fully known.

Keywords New record · Ophidiidae · *Neobythites multistriatus* · Benthopelagic fish · Andaman Sea

Introduction

Deep-sea fishes of the family Ophidiidae are dominant members of the demersal ichthyofauna from the continental slope to

the abyssal plain (Haedrich and Merrett 1988). The first catalogue of Ophidiiform fishes was published by Cohen and Nielsen (1978), and mainly focused on the genus level, while species level classifications were not complete. Subsequently, Nielsen et al. 1999 published a world catalogue of fishes belonging to the order Ophidiiformes which included 48 genera and 218 species of deep-sea fishes in the family Ophidiidae. The genus *Neobythites* Goode and Bean, 1885 is characterized by having a strong opercular spine, a hind margin of the preopercle with 0–2 spines (rarely 3), two median basibranchial tooth patches, and two rays in each pelvic fin. The genus consists of 51 species and is the largest in the family Ophidiidae (Nielsen 2002; Nielsen et al. 2009; Ohashi et al. 2012).

The genus *Neobythites* Goode & Bean, 1885 (Ophidiiformes: Ophidiidae) is composed of deep-sea benthopelagic fishes (Uiblein and Nielsen 2005) distributed mostly along the lower shelf and upper slope of subtropical and tropical waters, except in the East Atlantic (Nielsen 2002). These fishes are mainly landed as by-catch along with other benthic organisms in deep-sea fishery trawl catches. The presence of a swim bladder helps with pressure adjustments and dwelling close to the bottom (Nielsen 2002). Of the 12 species of *Neobythites* reported from the western Indian Ocean (Nielsen 1995), only 3 are known to occur in Indian waters, namely *N. steatiticus* from the Bay of Bengal (Alcock 1893), *N. alcocki* off the Andaman coast and *N. multistriatus* from the Arabian Sea (Kurup et al. 2010) and Bay of Bengal (Kannan et al. 2013). Though *N. andamanensis* has been reported from the Andaman Sea (Nielsen 2002), the record falls outside the Indian Exclusive Economic Zone (EEZ).

In the present paper, specimens of *N. multistriatus* collected by the Fishery Oceanographic Research Vessel *Sagar*

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Sampada (FORV SS) were analysed to confirm the presence (uncertainty) of *N. multistriatus* in the north Indian Ocean (Nielsen et al. 1999). Morphometric and meristic comparisons with specimens reported earlier were undertaken to confirm the species without any ambiguity.

Materials and methods

Samples were collected during FORV SS Cruise No. 292 from Andaman Sea (Fig. 1) using a High-Speed Demersal Trawl-Fish Version (HSDT-FV) net. The specimens were identified as *Neobythites multistriatus* Nielsen & Quéro, 1991 (Nielsen and Quéro 1991) based on morphometric and meristic characters following Nielsen (1995), Kurup et al. (2010) and Kannan et al. (2013). Morphometric measurements were taken to the nearest millimetre (mm) using a digital Vernier calliper (Nielsen et al. 1999). Body proportions are expressed in terms of standard length (SL: length from snout tip to base of caudal fin). Meristic counts were made following Nielsen and Machida (1988). Meristic counts and proportional measurements of *N. multistriatus* from the Andaman Sea are compared with other specimens collected from different regions of the Indian Ocean. The samples have been deposited at the FORV Referral Centre (Accession number: IO/SS/FIS/00436) of Centre

for Marine Living Resources & Ecology (CMLRE), Kochi.

Systematics

Order Ophidiiformes Berg, 1937

Suborder Ophidioidei Berg, 1937

Family Ophidiidae Rafinesque, 1810

Subfamily Neobythitinae Radcliffe, 1913

Genus *Neobythites* Goode & Bean, 1885

Neobythites multistriatus Nielsen & Quéro, 1991

(Fig. 2)

Neobythites multistriatus Nielsen & Quéro, 1991: 194

Neobythites multistriatus Schwarzhans, 1994: 74

Neobythites multistriatus Nielsen, 1995: 8

Neobythites multistriatus Kurup et al. 2010: 3

Neobythites multistriatus Kannan et al. 2013: 1

Material examined

FORV Referral Centre, Accession No. IO/SS/FIS/00436, FORV *Sagar Sampada* Cruise 292, Andaman Sea, Station 34; 13°10'903"N, 93°08'162"E, 320–410 m; coll. 27 November 2011, High-Speed Demersal Trawl Fish-Version (HSDT-FV), 03 individuals.

Fig. 1 The sampling area in the Andaman Sea

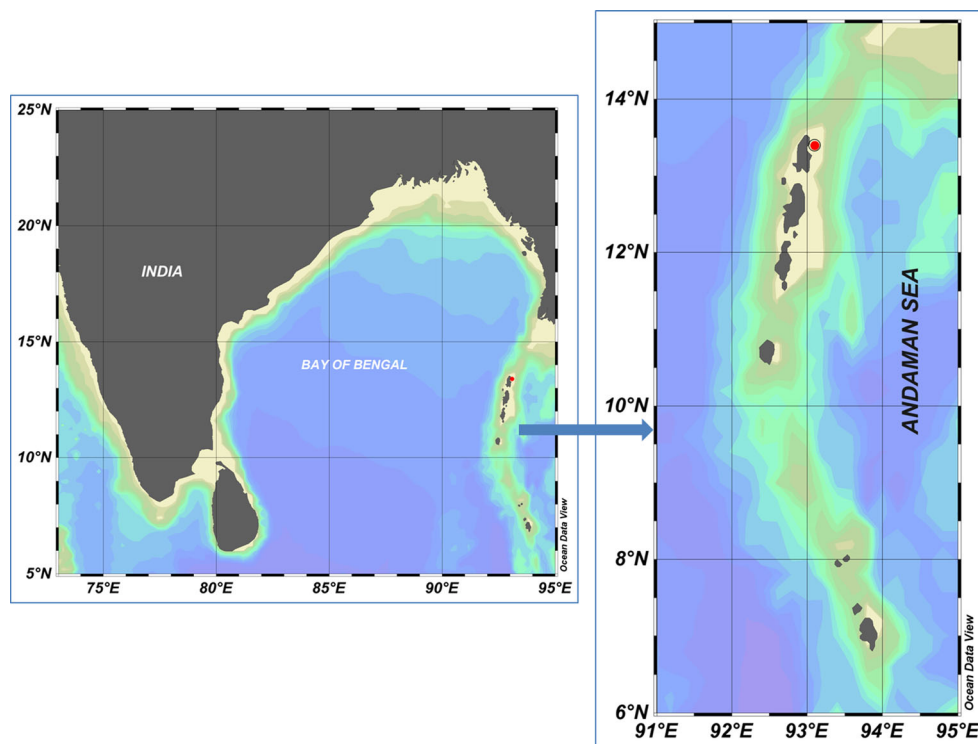




Fig. 2 Lateral view of *Neobythites multistriatus* Nielsen & Quéro, 1991 from Andaman Sea

Description

Elongate body with indistinct lateral line; snout blunt or rounded, slightly longer than eye, maxilla ends well behind eye; teeth granular; vomer tooth patch varies in shape apparently due to age, anterior basibranchial tooth patch broad in front, anterior nostril with flap or low tube and larger posterior nostril a mere hole; hind margin of preopercle with two spines; ventral fin reaches halfway from its base to anal fin; anterior gill arch with 2–3 short and 3 long rakers on upper branch, 1 long raker in angle and lower branch with 8–10 long and 4–6 short rakers; 3–5 (developed gill rakers 14), pseudobranchial rays 5, dorsal-fin rays 107–109; number of anal fin rays 92–93, pectoral fin rays 30, pelvic fin rays 2, body yellowish, 9 black blotches on dorsal fin, branchiostegal rays 8. Eye lens bluish. Diffuse brown line from front of snout to eye.

Neobythites multistriatus shows similar characters to *N. fasciatus* because of the presence of 2 pre-opercular spines and several vertical bars on the body ending as ocelli (dark blotches). *N. multistriatus* differs from *N. fasciatus* in the number of developed gill rakers (14 for *N. multistriatus* and 8–10 for *N. fasciatus*), number of anal fin rays (92–93 for

N. multistriatus and 84–88 for *N. fasciatus*), number of dorsal fin rays (107–109 for *N. multistriatus* and 99–106 for *N. fasciatus*) and number of anal fin dark blotches (9 for *N. multistriatus* and 6 for *N. fasciatus*).

Distribution

Neobythites multistriatus is a mesopelagic species, which appears to have discontinuous distribution in the Indian Ocean (Fig. 3). The bibliography of distribution of *N. multistriatus* recorded so far is listed in Table 1.

Discussion

Generic diagnosis of *Neobythites* based on Nielsen and Quéro (1991) followed the diagnostic characters such as: strong opercular spine, hind margin of preopercle with two spines, posterior part of maxilla sheathed, ventral fin rays two, median basibranchial tooth patches two, anterior gill arch with 6–34 developed rakers, pectoral fin entire with 22–34 rays and vertical or horizontal dark bands on body and fins. The meristic counts of anal, caudal, pectoral and pelvic fin rays, pseudobranchial rays and anterior anal fin rays below dorsal fin rays of the present Andaman specimen studied are almost in accord with the holotype (Nielsen and Quéro 1991; Table 2). The range of characters such as depth at dorsal fin, pre-anal length and predorsal length are found to be in agreement with the holotype. Upper jaw length and eye length are also in the range of the type specimens. Although

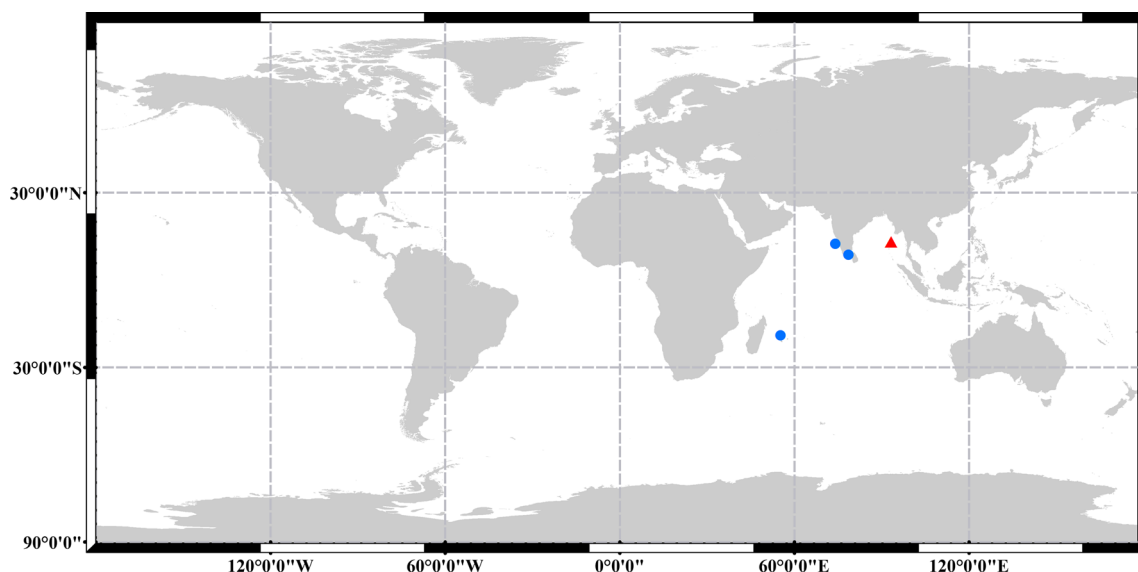


Fig. 3 Worldwide distribution of *Neobythites multistriatus* Nielsen & Quéro, 1991. ● Previous records based on all known material. ▲ Present study location

Table 1 Bibliography of distribution of *Neobythites multistriatus* Nielsen & Quéro, 1991 in the world

Region	Locality	Reference	Depth (m)
Southwestern Indian Ocean	Off Reunion	Nielsen and Quéro (1991)	335–500
Northwestern Indian Ocean	Southeastern Arabian sea	Kurup et al. 2010	415
Northeastern Indian Ocean	Gulf of Mannar	Kannan et al. 2013	200–250
Northeastern Indian Ocean	Andaman Sea	Present study	320–410

Nielsen and Quéro (1991) have suggested that morphometrics and meristic characters could vary with specimen size and geographical localities, specimens examined in the present study were almost in agreement with that of the holotype

and other type specimens so far recorded (Table 2). Therefore, the description of this species will be useful in future for easy identification and confirmation of *N. multistriatus*.

Table 2 Comparison of morphometric characters (mm) and meristic counts of *Neobythites multistriatus* Nielsen & Quéro, 1991 from the Andaman Sea and other regions of the Indian Ocean

Characters	Andaman Sea (present study) <i>n</i> = 3	Holotype (off Reunion) (Nielsen and Quéro (1991) <i>n</i> = 3	Off Tuticorin (Kannan et al. 2013) <i>n</i> = 2	Off Mangalore (Kurup et al. 2010) <i>n</i> = 5
Depth (m)	320–410	335–500	200–250	415
Total length (TL) (mm)	13.6–17.5	NA	NA	140.5–216.8
Standard length (SL) (mm)	12.8–16.8	149(+)-178	178	127.1–212.36
Morphometric characters in % of SL (range)				
Head length	23.8	21.0–23.0	23.0–25.6	24.9–28.0
Head depth	19.2	NA	18.0–20.0	NA
Depth at dorsal fin origin	17.6–18.3	NA	NA	17.9–19.4
Depth at anal fin origin	15.7–16.0	15.6–16.5	NA	15.5–17.8
Body depth	18.0–18.6		18.0–20.0	17.9–19.9
Dorsal length	70.0–70.5	NA	NA	67.6–75.2
Pectoral length	12.0–12.3	NA	NA	11.7–14.8
Pelvic length	17.0–17.3	NA	NA	16.4–18.5
Anal length	59.2–59.8	NA	NA	53.4–61.8
Predorsal length	24.0	24.0–25.5	26.0–27.5	24.1–28.3
Pre pectoral length	24.5	NA	26.0–26.5	24.8–27.6
Pre pelvic length	16.5–16.8	NA	16.8–17.5	16.4–18.5
Pre anal length	42.0	41.5–43	42.0–44.0	39.9–44.8
Pre orbital length	3.8	NA	3.9–4.0	NA
Post orbital length	12.0	11.0–12.5	12.0–12.5	9.6–11.0
Upper jaw length	11.5–12.0	9.7–10.5	12.9–13.0	12.1–13.11
Meristic counts				
Dorsal fin rays	107–109	106–109	108–109	108–109
Pectoral fin rays	30	28–30	30	28–30
Anal fin rays	92–93	91–93	92	91–93
No. of anterior anal rays below dorsal ray	21	21	NA	NA
Pelvic fin ray	2	NA	2	2
Caudal fin ray	8	8	8	8
Gill rakers	19–20	NA	19	18–20
Developed gill rakers	14	13–15	13	11–13
Branchiostegal rays	8	NA	NA	8
Pseudobranchial rays	5	5	5	5

n Number of specimens, NA no data available

The depth of occurrence of *N. multistriatus* was also verified. *N. multistriatus* was first recorded from off Réunion waters at a depth of 300–490 m (Scherbachev et al. 1986; Nielsen and Quéro 1991; Schwarzhans 1994; Nielsen 1995). Kurup et al. 2010 reported the occurrence of *N. multistriatus* from the Arabian Sea at a depth of 415 m. It is also reported from the Gulf of Mannar at the east coast of India, at a depth range of 200–250 m (Kannan et al. 2013), which is the shallowest record for this species. The current record of *N. multistriatus* from the Andaman waters, from a depth range of 320–410 m, corresponds to a similar depth range of previous reports. Thus, from the available literature, it could be inferred that the species is benthopelagic and capable of adapting within the depth range of 200–500 m. More surveys on the composition of deep-sea fishes, especially the little-known species of family Ophidiidae, are required for the better understanding of the benthopelagic biota as well as the species diversity of the ecosystem.

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