

FIRST REPORT OF *OPHICHTHUS MACHIDAI* (ACTINOPTERYGII: ANGUILLIFORMES: OPHICHTHIDAE) FROM THE INDIAN OCEAN

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Abstract. The Machida's snake eel, *Ophichthus machidai* McCosker, Ide et Endo, 2012, is reported for the first time from the coasts of Bay of Bengal, India. Four specimens (396–457 mm total length) were collected from the Shankarpur fishing harbour, Digha, West Bengal. Principal morphological characters were determined and the specimen was illustrated and described. The species was previously restricted to the northern Pacific Ocean and now is reported for the first time from the Indian coast of the Indian Ocean.

Keywords: east coast of India, fish, new record, morphology, snake eel, Ophichthinae

INTRODUCTION

The family Ophichthidae is represented by 339 valid species worldwide and comprises two subfamilies, the Myrophinae (69 valid species) and the Ophichthinae (270 valid species) (Fricke et al. 2018). In Indian waters, the family Ophichthidae is represented by 17 genera and 24 species (Gopi and Mishra 2015). Among the eels of the subfamily Ophichthinae the genus *Ophichthus* contains the highest numbers of species of the 47 currently recognized genera. The genus *Ophichthus* is represented by five species in the Indian coastal waters (Talwar and Kacker 1984, Ray et al. 2015), i.e., *Ophichthus altipennis* (Kaup, 1856), *Ophichthus apicalis* (Anonymous [Bennett], 1830), *Ophichthus cephalozona* Bleeker, 1864, *Ophichthus lithinus* (Jordan et Richardson, 1908), and *Ophichthus microcephalus* (Day, 1878).

The Machida's snake eel, *Ophichthus machidai* McCosker, Ide et Endo, 2012 was described from Japan (McCosker et al. 2012). In 2013 it was reported from Yi-lan, Taiwan (Chiu et al. 2013), indicating that the presence of the species along the north-western Pacific region may be wider. While working on some eel specimens from Bay of Bengal along Indian coast, we came across four specimens of the genus *Ophichthus*, which were identified as *Ophichthus machidai*. This paper constitutes the first report of the Machida's snake eel from Indian waters and the first record from the Indian Ocean. The details of the morphometric and meristic characters of *O. machidai* from Indian waters are given below.

MATERIAL AND METHODS

Four specimens of *Ophichthus machidai* (396–457 mm total length) were collected from the Shankarpur fishing harbour, Digha, West Bengal. The fishermen, landing their catch in Digha, usually operate within the Exclusive Economic Zone of India. Abbreviations used in the description are DFO (dorsal-fin origin), HL (head length), and TL (total length). The measurements and head pore terminology follow McCosker et al. (1989). The generic allocation follows Smith and McCosker (1999). All measurements (except the total length, measured to the nearest 1 mm) were recorded to the nearest 0.1 mm and taken using digital callipers. Head pores and teeth were counted using a Leica EZ4 microscope. Vertebrae were counted by digital radiographs and expressed as in Böhlke (1982). The specimens are deposited in the Estuarine Biology Regional Centre, Zoological Survey of India, Gopalpur-on-Sea, Odisha, India.

RESULTS

Family OPHICHTHIDAE

Ophichthus machidai McCosker, Ide et Endo, 2012
(Figs. 1, 2; Table 1)

Description. Body moderately elongated with preanal length of 2.2–2.3 in TL, dorsal fin origin slightly behind pectoral fin tip in 3 specimens, where as in one specimen it is above pectoral fin. Pre-dorsal length 7.9–8.5 in TL, pectoral fin well developed and elongated, longer than jaw. Snout pointed and 5.4–5.7 in HL, upper jaw larger than lower jaw, anterior nostril small, tubular and not reaching tip of snout. Posterior nostril elongate slit, opening towards mouth, not

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visible along margin of lip. Single barbel between anterior and posterior nostrils. Underside of snout with numerous minute fleshy bristles in ethmoidal region. Head 10.1–10.6 in TL. Rictus beneath rear margin of eye. Eye diameter 8.6–9.8 in HL. Head pores small, inconspicuous (Fig. 2). Single interorbital and temporal pores, supraorbital pores (SOP) 1 + 4, infraorbital pores (IOP) 2 + 4, mandibular pores 5, preopercular pores 3 (both mandibular pores and preopercular pores together termed as preoperculo mandibular pore or POM) in all specimens. Lateral-line (LL) pores very minute, 9 before gill opening (GO). Teeth conical, small, (Fig. 3). Five intermaxillary teeth with irregularly biserial patch followed by gap. Maxillary teeth uniserial, 29–31 closely set teeth on each side becoming smaller posteriorly. Vomerine teeth uniserial up to 5–7 teeth followed by 6 pairs of biserial teeth followed by uniserial 5–6 teeth. Mandibular teeth clearly uniserial with 36–39 teeth on each side. Predorsal vertebrae 12–13, preanal vertebrae 58–59, and total vertebrae 153–156.

Colour of the specimen is brown above lateral midline and pale ventrally in formalin preserved specimens. Lower lip anterior chin region and anterior nostril dark.

DISCUSSION

In having uniform (brown tan) body colour, the dorsal fin origin above or slightly behind the pectoral-fin tip

and uniserial lower jaw teeth, *Ophichthus machidai* can be placed in a group of 11 species. Of these, *Ophichthus aniptocheilos* McCosker, 2010, *Ophichthus grandoculis* (Cantor, 1849), *Ophichthus longipenis* McCosker et Rosenblatt, 1998, *Ophichthus manilensis* Herre, 1923, *Ophichthus mecopterus* McCosker et Rosenblatt, 1998, and *Ophichthus tsuchidae* Jordan et Snyder, 1901 differ by having biserial maxillary teeth, at least posteriorly. Further, *O. aniptocheilos* and *O. mecopterus* have fewer vertebrae (139–146) and *O. longipenis* has more vertebrae (176–184). *Ophichthus ishiyamorum* McCosker, 2010 and *O. apicalis* also have fewer vertebrae (130–132 and 136–139). Like *O. apicalis*, *Ophichthus obtusus* McCosker, Ide et Endo, 2012 has a second labial barbel below the orbit (total two labial barbels), though the vomerine teeth pattern and rictus position (below posterior margin of eye or slightly behind) is similar to that of *O. machidai* specimens (McCosker et al. 2012). As observed in McCosker et al. (2012), *Ophichthus habereri* Franz, 1910 is distinct from *O. obtusus* in having its eye position slightly more anterior and the length of its jaw is considerably longer, which clearly differentiated from *O. machidai* too.

Ophichthus machidai was described on the basis of 23 specimens from Japan (McCosker et al. 2012) and later, it was reported from Taiwan (Chiu et al. 2013) on the basis



Fig. 1. *Ophichthus machidai* from Bay of Bengal, India (Reg. No. EBRC/ZSI/F 10205; TL – 457 mm)

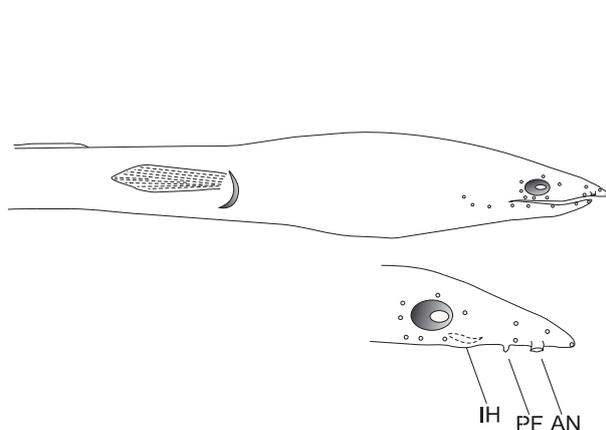


Fig. 2. Head pores, nostril and dorsal fin origin of *Ophichthus machidai*; IH = inner hole of posterior nostril, PF = projected flap, AN = anterior nostril

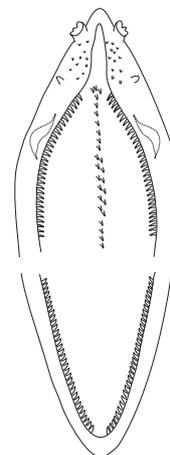


Fig. 3. Teeth pattern in *Ophichthus machidai*, collected from Bay of Bengal, India

Table 1
Comparative characters in *Ophichthus machidai* from Pacific Ocean and Indian Ocean

Character	Presently reported study	McCosker et al. 2012	Chiu et al. 2013
Depth at GO in TL	32.1–38.1	27–40	—
Preanal length in TL	2.2–2.3	2.1–2.6	—
Head length in TL	10.1–10.6	10–12	—
Eye in HL	8.6–9.8	7.3–11.3	—
Predorsal vertebrae	12–13	11–16	13
Preanal vertebrae	58–59	52–59	58
Total vertebrae	153–156	150–161	162
SOP	1 + 4	1 + 4	1 + 4
IOP	4 + 2	4 + 2	4 + 2
POM	5 + 3	5 + 2 or 3	5 + 2
LL before GO	9	9	9

TL = total length, GO = gill opening, HL = head length, SOP = number of supraorbital pores, IOP = number of infraorbital pores, POM = number of preoperculo mandibular pores, LL = number of lateral-line pores.

of five specimens. However, Taiwanese specimens were described as having the dorsal-fin origin behind or slightly behind the middle of the pectoral fin and vomerine teeth biserial anteriorly, becoming uniserial posteriorly (Chiu et al. 2013), deviating from the original description of the Japanese specimens. A detail of comparative characters of the specimens from Japan and Taiwan with Indian Ocean species is given in Table 1. Until now, the species was known from northwest Pacific region and the present report extends its range. The preopercular pores of the Japanese specimens were two and rarely three McCosker et al. (2012), but all currently examined specimens from India have three preopercular pores. The majority of the morphometric ratios, teeth pattern, and other characters almost match the description of them in McCosker et al. (2012).

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