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***Short Communication***

# First report of three eel species (Order: Anguilliformes) from Andhra Pradesh coast, India

Anil Mohapatra*[,a], P C Tudu[b], S R Mohanty[a] & S S Mishra[c]

[a]Estuarine Biology Regional Centre, Zoological Survey of India, Gopalpur-on-Sea, Odisha – 761 002, India

[b]Marine Aquarium and Regional Centre, Zoological Survey of India, Digha – 721 428, India

[c]Marine Fish Section, Zoological Survey of India, Kolkata – 700 016, India

*[E-mail: anil2k7@gmail.com]

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Three eel species collected from the thrown out trashes from Visakhapatnam fishing harbour and were subsequently identified as *Gymnothorax prolatus*, *Strophidon dorsalis* and *Neenchelys cheni* are reported here for the first time from the Andhra Pradesh coast. The present report extends the range of all these three species southwards to Andhra Pradesh coast from the northern parts of the east coast of India.

[**Keywords**: *Gymnothorax*, *Neenchelys*, New record, *Strophidon*, Trash fish]

## Introduction

Various publications on the Anguilliform fauna of Andhra Pradesh reported a total of 30 species from the order Anguilliformes[1–6]. During the surveys along the east coast of India, several specimens of eels of order Anguilliformes were collected from the Andhra Pradesh coast. While working out on these Anguilliform specimens thus collected, the authors came across three additional species of eels, such as *Gymnothorax prolatus* Sasaki & Amaoka, 1991, *Strophidon dorsalis* (Seale, 1917) and *Neenchelys cheni* (Chen and Weng, 1967), which were hitherto not reported along the state coastline. All these three species, *G. prolatus*, *S. dorsalis* and *N. cheni* were reported in recent years only from the West Bengal coast, India[7–9]. The present report extends the range of all these three species further southwards to Andhra Pradesh coast.

## Materials and Methods

Total 7 specimens of *G. prolatus*; 17 specimens of *S. dorsalis* and 10 specimens of *N. cheni* were collected from the Visakhapatnam fishing harbour during 2015 – 2017. The specimens were photographed and preserved after identification on field. Taxonomic key, terminology, counts and measurements followed Böhlke[10–12] for identification of *G. prolatus* and *S. dorsalis* & Ho *et al.*[13] for *N. cheni.* All the measurements were to nearest mm and the vertebrae were counted from the digital X-ray.

## Results

The three species collected from Andhra Pradesh coast for the first time is discussed below with the details of morphology of the specimens.

### 1. *Gymnothorax prolatus* Sasaki & Amaoka, 1991

Family: Muraenidae Rafinesque, 1810

Genus: *Gymnothorax* Bloch, 1795

*Gymnothorax prolatus* Sasaki & Amaoka, 1991 (Fig. 1)

*Materials examined:* MARC/ZSI/F4657, 5 specimens (305 – 390 mm TL), collected on 06/12/2016; MARC/ZSI/F4456, 2 specimens (294 – 304 mm TL), collected on 06/04/2016.

*Characters:* Body elongate, cylindrical, compressed posteriorly. Head pointed and slightly compressed, 8.3 – 9.2 times in total length (TL). Anus located almost at the mid body with preanal length 2.0 – 2.1 times in TL. Snout blunt and rounded, 9.6 – 12.3 times in head length (HL). Upper jaw slightly longer than lower jaw, mouth large and closes completely. Short tubular anterior nostril almost at the tip of the snout; posterior nostril oval and located almost above the anterior margin of eye. Dorsal and anal fins continuous with tail. Head with 3 supra orbital pores, 4 infra orbital pores, 7 mandibular pores and 2 branchial pores, and the locations of head pores are just like as described in Mohapatra *et al.*[7]. Teeth slightly curved, slender, but sharp. Intermaxillary teeth in a single row, 2 – 3 large curved fang-like median teeth; maxillary teeth biserial; inner row teeth are larger and fewer in number than outer row. Vomerine teeth small and uniserial. Dentary uniserial with 4 or 5 large teeth anteriorly. Vertebrae: 6 – 8 pre-dorsal, 80 – 83 pre-anal and 182 – 185 in total. Body colour uniform brown, nostrils and gill membrane areas whitish.


Fig. 1 — *Gymnothorax prolatus* Sasaki & Amaoka, 1991

*Distribution: Gymnothorax prolatus* was known from Taiwan[11,14]. In recent past it has been reported for the first time from West Bengal coast (India) and Pakistan coast[7]. Thus from the Indian coast the species is known to be distributed only along the West Bengal coast and the present report further extends the range southward to the Andhra Pradesh coast along the east coast of India.

**2. *Strophidon dorsalis* (Seale, 1917)**

Family: Muraenidae Rafinesque, 1810

Genus: *Strophidon* McClelland, 1844

*Strophidon dorsalis* (Seale, 1917) (Fig. 2)

*Materials examined:* MARC/ZSI/ F4457, 1 specimen (596 mm TL), collected on 23/08/2015; MARC/ZSI/ F4448, 10 specimen (245 – 605 mm TL), collected on 06/04/2016; MARC/ZSI/ F4661, 1 specimen (1537 mm TL), collected on 02/08/2016; MARC/ZSI/ F4655, 5 specimens (416 – 835 mm TL), collected on 06/12/2016.

*Characters:* Elongated cylindrical body with slightly compressed elongated head. Hind part of tail and body compressed. Pre-anal length 2.2 – 2.5 times in TL, head 7.7 – 9.9 times in TL. Dorsal-fin originates before gill opening, anal-fin originates from anus. Dorsal and anal fin low and continuous with caudal fin. Depth at gill opening 21.9 – 32.7 times in TL and depth at anus 23.1 – 32.0 times in TL. Snout short and broad, 6.3 – 10.4 times in HL, mouth large and closes completely, upper jaw slightly larger than lower jaw. Eye closer to snout than rictus and diameter is 16.0 – 26.0 times in HL. Teeth and pore pattern is exactly same as described in Ray & Mohapatra[8]. Body colour uniform brown with ventral part lighter than dorsal part. Fin colour is dark and black posteriorly. All the examined specimens show 8 pre-dorsal, 62 – 64 pre-anal, and 156 – 159 total vertebrae count.

*Distribution:* The species is widely distributed in the Western Pacific[15]. In the Indian Ocean it is recorded from Pakistan[16] and India. The species is reported in Indian waters only from the West Bengal coast[8] as *Gymnothorax dorsalis*. The present report extends the range of the species further southward to the Andhra Pradesh coast.


Fig. 2 — *Strophidon dorsalis* (Seale, 1917)

**3. *Neenchelys cheni* (Chen and Weng, 1967)**

Family: Ophichthidae Günther, 1870

Genus: *Neenchelys* Bamber, 1915

*Neenchelys cheni* (Chen and Weng, 1967) (Fig. 3)

*Materials examined:* MARC/ZSI /F4449, 8 specimens (319 – 372 mm TL), collected on 06/04/2016; MARC/ZSI/ F4716, 2 specimens (304 – 375 mm TL), collected on 07/04/2016.

*Characters:* Moderately elongated body, tail longer, pre-anal 2.6 – 2.7 times in TL, dorsal-fin originates behind the anus and pre-dorsal is 2.4 – 2.5 times in TL. Pectoral-fin present. Caudal-fin continuous with dorsal and anal fins. Head 9.1 – 10.6 times in TL, upper jaw slightly larger than lower jaw and lips having no barbels, eyes small, 12.0 – 16.0 times in HL, uniserial teeth. Head pores as described in Ray & Mohapatra[9]. Total vertebrae 180 – 183. Colour when fresh whitish brown and head reddish white, posterior part of dorsal and anal fins margin black.

*Distribution:* Southern Taiwan, Vietnam, Australia, Gulf of Oman[13]. The species was first reported from West Bengal[9] and the present report extends its range further southwards to Andhra Pradesh coast.


Fig. 3 — *Neenchelys cheni* (Chen and Weng, 1967)

## Discussion

All these species, *Gymnothorax prolatus*, *Strophidon dorsalis* and *Neenchelys cheni* were mostly collected from the thrown-out trashes from the Visakhapatnam fishing harbour. Thus, they are of almost no economic importance, but certainly significant from a biodiversity point of view. Now the present report confirms the occurrence of 33 species of eels along the Andhra Pradesh coast.

Until 2015, only one brown unpatterned moray eel, *i.e*. *Strophidon sathete* (Hamilton, 1822), was known to occur in Indian waters, and recently the number of brown unpatterned eels in India had been increased to seven species by various recent discoveries[17]. Possibilities are more for treating most of them as *S. sathete* (or *Thyrsoidea macrura* synonym of the former) due to their similar brown coloration without any distinct marking. With the report of *G. prolatus* and *S. dorsalis*, the number of brown unpatterned moray eel species of Andhra Pradesh coast is increased to four, including *Gymnothorax visakhaensis* described from Visakhapatnam[5]. Thus, a total of 11 species of moray eels (Muraenidae) are now known to occur along the Andhra Pradesh coast (*Echidna nebulosa*, *Enchelycore propinqua*, *Gymnomuraena zebra*, *Gymnothorax fimbriatus*, *G. prolatus*, *G. punctatus*, *G. reticularis*, *G. tile*, *G. visakhaensis*, *Strophidon dorsalis* and *S. sathete*).

The snake eel family Ophichthidae is represented by 12 species in the coastal waters of Andhra Pradesh (*Bascanichthys deraniyagalai*, *Cirrhimuraena playfairii*, *Lamnostoma orientale*, *Muraenichthys schultzei*, *Myrophis lepturus*, *Neenchelys buitendijki*, *Ophichthus apicalis*, *O. microcephalus*, *Pisodonophis boro*, *P. cancrivorus*, *Scolecenchelys gymnota* and *S. macroptera*). The present record of *Neenchelys cheni* adds another species to the list raising the number to 13 species.

These eel species were also probably not studied or reported earlier by others due to their lesser economic importance though these are frequently available in the trashes. It has been estimated that the bycatch discard was 21 % during 2011 at Visakhapatnam[18], and 228 species of fishes belonging to 68 families have been identified from low value bycatch landed by small trawlers at Visakhapatnam[19] at one time. At present almost no bycatch is brought to the fishing harbour to keep up sanitation and cleanliness and is discarded in the sea itself. Study of such discards will definitely give us more information about the existing fish faunal diversity. An assessment on loss of biodiversity in trash or bycatch discard is essential to have a better picture of the current status of biodiversity in this region.

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## Conflict of Interest

Authors don't have any conflict of interest.

## Author Contributions

AM, PCT: collection, preservation, identification, manuscript preparation and critical analysis. SR and

SSM: identification, manuscript preparation and critical analysis.

## References


1 Krishnan S & Mishra S S, Fishes: Fauna of Godavari Estuary, *Estuarine ecosystem Series*, 4 (2001) 85–166.

2 Barman R P, Kar S & Mukharjee P, Marine and estuarine fishes, *State Fauna Series 5: Fauna of Andhra Pradesh, Part-2 (Mammals and marine & estuarine fishes)*, edited by director, (Director, ZSI, Kolkata), 2004, pp. 97–311.

3 Mishra S S, Fishes: Fauna of Krishna Estuary, *Estuarine Ecosystem Series*, 5 (2008) 1–298.

4 Devarapalli P, Finfish Atlas of Egree; Egree Foundation, an initiative of Gol-UNDP-GEFGoAP (EGREE) Project, Kakinada, Andhra Pradesh, India, 2017, pp. 89–112.

5 Mohapatra A, Smith D G, Mohanty S R, Mishra S S & Tudu P C, *Gymnothorax visakhaensis* sp. nov., a new species of elongate unpatterned moray eel (Muraenidae: Muraeninae) from the Indian Coast, *Zootaxa*, 4300 (2) (2017a) 279–286.

6 Mohapatra A, Smith D G, Mohanty S R, Mishra S S & Tudu P C, *Enchelycore propinqua* sp. nov., a new moray eel (Anguilliformes: Muraenidae: Muraeninae) from the Indian Coast, *Zootaxa*, 4319 (3) (2017b) 595–599.

7 Mohapatra A, Ray D & Smith D G, First occurrence of the moray eel *Gymnothorax prolatus* Sasaki & Amaoka, 1991 (Teleostei: Anguilliformes: Muraenidae) from the Northern Indian Ocean, *Mar Biodivers Rec*, 8 (2015) 1–3.

8 Ray D & Mohapatra A, First record of the moray eel *Gymnothorax dorsalis* Seale, 1917 (Angulliformes: Muraenidae) from Indian waters, *Indian J Fish*, 62 (4) (2015) 132–134.

9 Ray D & Mohapatra A, First report of the Snake Eel *Neenchelys cheni* (Chen and Weng, 1967) (Anguilliformes: Ophichthidae: Myrophinae) from Indian waters, *Indian J Geo-Mar Sci*, 45 (2) (2016) 310–312.

10 Böhlke E B, Methods and terminology, In: Fishes of the Western North Atlantic, edited by E B Böhlke, *Memoir of the Sears Foundation for Marine Research*, 1 (9) (1989) 1–7.

11 Böhlke E B, Notes on the identity of elongate unpatterned Indo-Pacific morays, with description of a new species (Muraenidae, Subfamily Muraeninae), *Proc Acad Nat Sci Philadelphia*, 147 (1997) 89–109.

12 Böhlke E B, Notes on the identity of small, brown, unpatterned Indo-Pacific moray eels, with descriptions of three new species (Anguilliformes: Muraenidae), *Pac Sci*, 54 (4) (2000) 395–416.

13 Ho H C, McCosker J E & Smith D G, Revision of the worm eel genus *Neenchelys* (Ophichthidae: Myrophinae), with descriptions of three new species from the western Pacific Ocean, *Zool Stud*, 52 (58) (2013) pp. 20.

14 Ho H C, Smith D G, McCosker J E, Hibino Y, Loh K H, *et al.*, Annotated checklist of eels (orders Anguilliformes and Saccopharyngiformes) from Taiwan, *Zootaxa*, 4060 (1) (2015) 140–189.

15 Smith D G, A checklist of the moray eels of the world (Teleostei: Anguilliformes: Muraenidae), *Zootaxa*, 3474 (2012) 1–64.

16 Psomadakis P N, Osmany H B & Moazzam M, *Field identification guide to the living marine resources of Pakistan. FAO species identification guide for fishery purposes*, (Food and Agriculture Organization of the United Nations, Rome), 2015, i– x + 1– 386, Pls. 1– 42.

17 Mohapatra A, Mohanty S R, Smith D G, Mishra S S & Roy S, *Gymnothorax odishi* sp. nov. (Muraenidae: Muraeninae), a short brown unpatterned moray eel from Bay of Bengal, India, *Zootaxa*, 4420 (1) (2018) 123–130.

18 Dineshbabu A P, Radhakrishnan E V, Thomas S, Maheswarudu G, Manojkumar P P, *et al.*, An appraisal of trawl fisheries of India with special reference on the changing trends in bycatch utilization, *J Mar Biol Assoc India*, 55 (2) (2013) 69–78.

19 Sujatha K, Finfish constituents of trawl by-catch off Visakhapatnam, *Fish Technol*, 32 (1) (1995) 56–60.