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First record of new *Bembrops* fish species with unique fluorescence from Arabian Sea

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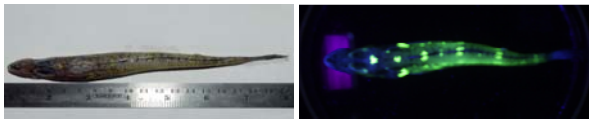
Abstract
A fish species belongs to *Bembrops* family (Perciforms: Perchophidae) with unique fluorescence is reported for the first time from Arabian Sea, India. DNA barcoding performed using NCBI database has confirmed that it is a new species in *Bembrops* genus. This species may be considered as new introduction to the Arabian Sea. This record explains the exclusivity of the species.

Keywords: Fluorescence, Deep-sea fishes, Arabian Sea, *Bembrops sp*

1. Introduction
Plenty of by-catch deep sea fishes are usually obtained during deep sea shrimp trawling from the Southwest regions of Arabian Sea. A new by-catch fish, morphologically resemble the members of *Bembrops* genus, was noticed during deep sea shrimp trawling in Southwest region of Arabian Sea. *Bembrops sp* are found primarily on soft mud bottoms of the continental shelf to the upper slope and their juveniles tend to be found at shallower depths. These species of fishes mainly feeds on small fishes and shrimps [1]. According to Sudhakar *et al* [2]. *Bembrops sp* is abundantly distributed along the south-west coast of India. Ramos *et al* [3] also reported that species of *Bembrops* were found in deep shelf of around 100-700 m depth of the coasts of Liberia, Sierra Leone, Ghana and Ivory Coast. During Nansen Surveys off West Africa, *Bembrops* fish species were captured between 200-300 m depth in very small groups. The presence of mature female *Bembrops* fish species were also reported from the Gulf of Guinea regions [4]. As a trawl by-catch, this fish species has been usually caught in deep sea waters and discarded due to non-commercial value [5]. There is little documentary evidence available regarding the genetic biodiversity, biochemical composition and economic utilization of these by-catches available in Indian waters.

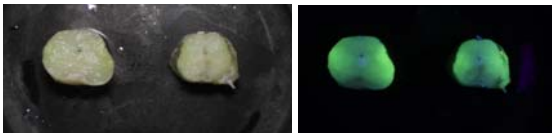
2. Materials and Methods
The new by-catch fish of *Bembrops* genus was obtained from fish landing center at Quilon (GPS) at 9^0 02.00'N-75^0 55.000'E, Kerala, India and transported to the laboratory under refrigerated conditions. The DNA extraction and purification from the *Bembrops sp*. conserved in 95% ethanol were performed using Qiagen DNeasy Blood and Tissue kit. The raw DNA sequences were edited and aligned using Bio Edit sequence alignment editor 7.0.5.2 [6].

3. Results and Discussion
The new fish species caught is having an elongated, sub cylindrical body with compressed posterior and the head depressed anterior. It has 6 spines on the first dorsal fins and 15 -16 branched rays on the second; 16 -17 rays on the anal fin, 6 branched rays on the pelvic fin and 25 – 26 branched rays on the pectoral fin; 18 – 19 gill rakers (Table 1). The scales appear to be margined in black with vague dusky spots throughout the body (Figure 1a). It is interesting to note that the new species contain continuous presence of gradient fluorescent spots throughout body (Figure 1b) and muscle (Figure 2). It is the first report on a fish from *Bembrops* genus to be identified with unique fluorescence pattern throughout body parts including muscle. DNA barcoding performed using NCBI database has also confirmed that it is a new species in *Bembrops* family. Notably, only 91% of the genomic sequence was matching with other members of *Bembrops sp* [7] available in Indian waters (Chart 2). Hence, the fish caught could be a new member of the *Bembrops* family, which is not yet reported.



(a) (b)

Fig 1: Morphological analysis of new fish a) under normal light b) Under UV light



(a) (b)

Fig 2: Fluorescence analysis of *Bembrops* fish muscle a) Under normal light b) Under UV light

Table 1: Morphological characteristics of the new fish

Sl No.	Characters	Measurement
1	Body depth	19.1 mm
2	Caudal fin length	30.6 mm
3	Caudal peduncle depth	10.0 mm
4	Eye orbit diameter	18.5 mm
5	Fork length	186.0 mm
6	Head length	76.0 mm
7	Pectoral fin length	37.0 mm
8	Standard length	179.0 mm
9	Snout length	18.8 mm
10	Total length	213.0 mm
11	Upper jaw length	27.6 mm
12	Pelvic fin length	27.1 mm
13	1st Dorsal fin spine	6
14	2nd Dorsal fin rays	15 – 16
15	Anal fin rays	16 – 17
16	Pelvic fin rays	6
17	Pectoral fin rays	25 – 26
18	Gill rackers	18 – 19

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ACTCAGCCAACCAGGCGCCCTACTGGGAGACGACCAAATTTACAACGTTAT
CGTCACAGCACATGCCTTCGTAATAATTTTCTTTATAGTAATGCCAATAATAATTGGAGG
ATTCGGAAACTGACTAATCCCCTTAATAATCGGGGCCCCTGATATGGCATTTCCACGAAT
AAACAACATAAGCTTTTGGCTACTCCCTCCCTCACTCCTCCTTCTACTTGCCTCCTCAGG
AGTTGAGGCCGGGGCAGGAACAGGCTGAACTGTGTACCCCCCCTTAGCCAGCAACCTAGC
CCATGCTGGAGCCTCCGTAGAACTAGCAATCTTCTCCCTTCACTTGGCAGGGGTCTCCTC
GATCCTCGGGGCAATTAACTTTATTACAACCATTATTAAAATAAAACCCCCCGCAATCAC
GCAATAACAGAAGCCCCTATTCATTTGAGCCGTACTAATCACAGCCGTCCTACTCCTCCT
TTCCCTGCCCGTCTTAGCTGCTGGTATTACAATACTTTTAACAGACCGAAACTTAAACAC
CACATTCTTCGATCCTGCAGGAGGAGGAGACCC
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Chart 2: Genomic sequences of newly caught *Bembrops* fish species.

Bembrops fishes are commonly known as duckbill flathead, belonging to Percophidae family. These deep sea fishes are usually spotted at 100-400 m deep in Western Atlantic Ocean [1] [8]. They are generally evaluated as harmless to human. They can grow up to 35 cm long [4].The taxonomy of the species is as follows:

Kingdom: Animalia
Phylum: Chordata
Class: Actinopterygii
Order: Perciformes
Family: Percophidae
Genus: Bembrops
Species: Not confirmed (it may be designated as *"ciftica"*)

Further studies have to be carried out to confirm the genomic biodiversity of the new *Bembrops sp*. Since, this fish is abundantly available as by catch in the Arabian Sea, generation of complete database on the biochemical composition, amino acid & fatty acid profiling, mineral status etc. will be useful to effectively utilize this new *Bemprops sp* for human consumption.

4. Acknowledgements

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