Conclusion

It was observed that the operation of ringseines in the state started in 1986 and with the introduction of this gear there was great improvement in the fish landings which varied from 22,000 t in 1986 to 3.42 lakh t in 2008.

The major contribution in the total landings of the state during the two and a half decades starting from 1985, were from motorised sector which accounted 51% followed by the mechanised sector with 47% and the remaining 2% by the non-motorised sector. While analysing the gearwise contribution of the motorised sector, 62% of the landings were contributed by ringseines and the other 37% were by driftnet/gillnets, minitrawls, boatseines, hooks and lines and others. The contribution by driftnet/gillnets was also remarkable in the landings which varied from 22,000 t in 1985 to 80,000 t in 2007. As a whole, the contribution of ringseines dominated the motorised sector with 30% of the total landings in the state during 1985-2008.

The contribution by the mechanised trawlnets was about 92% of the total landings of the mechanised sector during 1985-2004, which varied from 97,000 t in 1985 to 2.26 lakh t in 2004. During 2005-'08, trawl contribution reduced to 57% while the ringseines contributed 38% and multigear operations (trawlnets and hooks and lines, driftnet/gillnets and hooks and lines) contributed more than 3% towards the mechanised sector. Mechanised ringseines contributed 3%, purseseines 2% and the remaining 3% was by other mechanised gears in the state.

During the seventh five year plan period, the following major development thrusts were given in the marine fisheries sector :

- New chartering policy of 1989
- Development of deepsea fishing
- Substantial growth in motorised artisanal fleet of ringseiners and
- Coastal shrimp aquaculture

Electronic gadgets and other equipments came into wide use among fishermen during the period. Many major and minor fisheries harbours were constructed at Vizhinjam, Sakthikulangara, Neendakara, Cochin, Munambam, Azheekode, Chettuva, Ponnani, Beypore, Puthiappa, Chombala, Azheekal and Cheruvathur during the period under review. Introduction of many logistic facilities like berthing, landing, auctioning, processing and transportation along with other infrastructure facilities in the harbours has resulted in enhanced fish landing, facilitating the movement of the landings in fresh condition to the end users. Besides these major developments, targeted fishing for shrimps and cuttlefishes was carried out to fetch high monetary value. Fishing grounds were extended to exploit the deepsea resources in addition to combined gear operation for increasing the yield.

New distributional record of the insular shelf beauty *Symphysanodon typus* Bleeker, 1878 (Family: Symphysanodontidae) from Indian waters

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The family Symphysanodontidae comprises of small to medium sized bony fishes commonly known as banquelovelies, slopefishes and insular shelf beauties. They are caught in trawls operating in depths from 50 to 500 m, mainly on the continental shelf and slopes. Earlier these fishes were included as a separate genus variously under Acropomatidae, Serranidae and Lutjanidae. Formanouir (1981) designated it as a separate family as it had characters which were unique and not shared by the other families under which it had so far been included. Presently the family is comprised of ten extant species, namely *Symphysanodon andersoni, S. berryi, S. katayamai, S. parini, S. mona,*

S. maunaloae, S. octoactinus, S. rhax, *S. typus* and one yet to be named species known only from the stomach contents of *Latimaria chalumnae*. Despite their attractive colouration, the insular shelf beauty is not taken as a preferred aquarium species perhaps due to its planktivorous feeding habit.

Distribution

S. typus is known with certainty from the Pacific Ocean, from Indonesia to Hawaii. Eshmeyer (2009) gives its distributional range as eastern Indian Ocean and Western Pacific. The presence of *S. typus* in the western Indian Ocean has long been suspected (Allen, 1984). The present record is the first confirmed occurrence of the species from Indian waters. The specimen (Fig. 1) was collected from trawlnet as by-catch landed at Neendakara, Kerala, on the west coast of India on 19.11.2005 from a depth zone of 60 m. It has been housed in the Designated National Repository at CMFRI, Kochi under the Accession Number GB 31.146.1.6. Subsequently, three years later one of the authors (Sijo Paul), observed large quantity of (28 kg) of *S. typus* in the same month in 2008 (24.11.2008) in the trawl catches off Cochin at the landing centre, Munabam.The holotype of the species is preserved at the Universität Hamburg Biozentrum Grindel und Zoologisches Museum, Ichthyology, Hamburg, Germany under the catalogue number ZMH H398. Two syntypes of *Propoma reum* (BMNH 1879.5.14.164-5), and the holotype of *Rhyacanthias carlsmithi* (USNM 84099), were found to be conspecific with the holotype kept in Hamburg (Anderson, 1970). The morphometric measurements given in Table 1 under Anderson (1970) are based on the examination of all the above specimens.

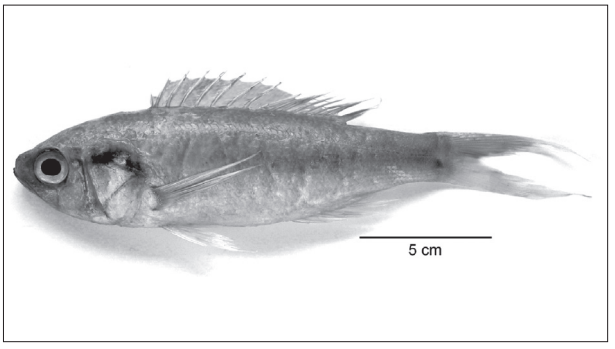

Fig. 1. *Symphysanodon typus* Bleeker, 1878 (208.6 mm TL) landed by trawler at Neendakara Fisheries Harbour, Kollam, Kerala

Taxonomic profile - familial diagnosis (monotypic genus)

Pre-maxillae incised, forming prominent symphysial notch receiving the anterior ends of dentaries. Teeth at the anterior end of dentary fits into symphysial notch when mouth closed. Two opercular spines. Dorsal fins usually with IX spines and 10 soft rays. Ctenoid scales present on head, cover maxillae and dentaries. Caudal fin deeply forked. Eyes usually large, diameter equal to or more than snout length; suborbitals very narrow. Vertebrae 25.

Species diagnosis

Species of *Symphysanodon* are mostly distinguished on the basis of the number of scales on the lateral line, number of gill rakers and pelvic and caudal fin morphology. Characters typical of *S. typus* are lateral line scales 49-55, 10-12 gill rakers including rudiments on upper limb, 25-28 on lower limb, 36 - 40 total on first gill arch. Length of anal fin base 15-21% standard length. Pelvic fins 22-26% standard length. Caudal fin lobes slightly produced. Pectoral fin rays usually 16, can be 15-18.

Colouration

Body bright fuscia or orange red with a broad mid-lateral yellow band. Dorsal fin yellowish. Upper lobe of caudal fin orangish red while lower lobe conspicuously yellow. Current specimen was photographed in fairly fresh condition. The colour fades quickly in alcohol preserved specimens with the body becoming brown and the fins acquiring transparency.

Meristic characteristics

Single continuous dorsal fin, unnotched, dorsal spines IX , 10 soft rays , anal III spines and 7 soft rays, pectoral soft rays 16, I pelvic spine and 5 soft rays, caudal rays 17, 9 upper and 8 on lower lobes.

The specimen was identified with the help of the key provided by Anderson and Springer (2005). Morphometric characters of *S. typus* prescribed by them are as follows: Length of anal-fin base 15–21% SL. Length of depressed anal fin 27–34% SL. Length of first anal-fin spine 4.8–7.2% SL. Scales 49–55. Gillrakers 36–40. Sum of scales plus gill rakers of individual specimens is 86–94. Pectoralfin rays 15–18, most frequently 16 (rarely 18). First segmented ray of pelvic fin only slightly produced,

usually not extending to the origin of anal fin. Caudal fin lobes produced, but apparently never produced into extremely long filaments. Hypurals 1 and 2 represented by a single plate. Parapophyses present on first caudal vertebra.

Morphometrics of the current specimen is largely in agreement with the above mentioned species diagnosis with minor differences which are as follows: length of anal fin base is 14.5% SL which is below the prescribed lower limit of 15% SL. Also the sum total of gill rakers including rudiments on the first gill arch and number of lateral line scales is 95 which exceed the upper limit of the prescribed 94. However, in the light of all, other characters are being compliant with the species diagnosis of the above mentioned key, the fish was confirmed as *Symphysanodon typus* Bleeker, 1878. Minor differences are also seen with regard to head depth, snout length and cheek height.

Table 1. Comparative morphometrics of *Symphysanodon typus* Bleeker, 1878 in percentage of total length (TL), standard length (SL) or head length (HL)

	Fishbase, 2009	Anderson, 1970		Naomi *et al*., 2010	
Total length (mm)	552 pixels	–	–	–	208.55 mm
Standard length (mm)	73.0 % TL	50- 80 mm	105-165 mm	156.22 mm	74.9% TL
Fork length	77.5 % TL				79.7% TL
Head length	18.7 % TL	32.2-33.5% SL	27.2-32.2% SL	34.2% SL	25.59% TL
Pre-dorsal length	22.8 % TL			35.9% SL	23.8% TL
Pre-pelvic length	21.4 % TL			39% SL	26% TL
Pre-pectoral length	19.6 % TL			33.9% SL	22.5% TL
Pre-anal length	42.0 % TL			73% SL	48.5% TL
Body depth	21.0% TL	22.1-26.5% SL	26.7-29% SL	27.5% SL	20.6% TL
Caudal peduncle depth		9.9-10.7% SL	10.6-12.1% SL	11.4% SL	8.5% TL
Caudal peduncle length				24.4% SL	18.3% TL
Anal fin base, length		14.7-20.8% SL	15.6-20.8% SL	14.5% SL	10.8% TL
Anal fin length				11.1% SL	8.3% TL
Length of depressed anal fin			27.5% SL		
Pectoral fin, length				26% SL	19.4% TL
Pelvic fin length				22.3% SL	16.7% TL
First dorsal spine length			4.9-6.3% SL	3.6% SL	2.8% TL
Third dorsal spine length			10.8-13.6% SL	10.5% SL	7.9% TL
Fourth dorsal spine length		11.2-14.6% SL	11.2-14.6% SL	11.6% SL	8.7% TL
Last dorsal spine length		11.2-13.4% SL	11.2-13.4% SL	11.1% SL	8.3% TL
Longest dorsal spine length		11.9-14.6% SL	11.9-14.6% SL	12.1% SL	9.1% TL
First anal spine length		5-6.2% SL	5-6.2% SL	3.7% SL	2.8% TL
Second anal spine length		9.5-10% SL	9.5-10% SL	6.7% SL	5.1% TL
Third anal spine length		12.3-13.1% SL	10.8-12% SL	9.2% SL	6.9% TL
Head depth		19,1-24.2% SL	21-24.2% SL	26% SL	76.15% HL
Snout length			6.1-8.2% SL	5% SL	14.54% HL
Fleshy orbit diameter	36.9% HL	11.1-12% HL	8.1-11% HL	8.4% HL	24.56% HL
Post-orbital head length	15.5 % HL			19.8% HL	57.94% HL
Sub-orbital width		0.7-1.3% HL	0.7-1.3% HL	1.1% HL	3.20% HL
Cheek height		4.2-6.2% HL	4.2-6.2% HL	3.4% HL	10% HL
Upper jaw length				14.3% HL	41.9% HL
Lower jaw length				7.4% HL	21.75% HL
Gill rakers (upper)			10-12 (11)	12	
Gill rakers (lower)			25-28 (26)	28	
Total on first gill arch			36-40 (37)	40	
Lateral line scales			52-54	55	
Gill arch + lateral line scales			89-94	95	
Fin formula			DIX,10; AIII,7; P15-17;V I,5; C 9,8	DIX,10; AIII,7; P16;V I,5; C 9,8	

TL - Total length; SL - Standard length; HL - Head length

Anderson (1970) has established that differences in morphometric characters within the species are pronounced which compelled him to segregate samples into two groups *viz.,* those within 50-80 mm SL and 105-165 mm SL. The current specimen is the largest recorded so far (208.6 mm TL). Minor differences in morphometric parameters may be taken as a function of growth.

Anderson (1970) has given the frequency distribution of number of fin rays as follows: D IX spines and 10 soft rays, 03 anal spines and 07 soft rays as the only combination in all specimens examined by him. The current specimen also shows this trait. In the case of gill rakers, maximum specimens analysed so far had 11 numbers on the upper limb, with 12 being rudiment as common. With regard to lower limb of first gill arch, maximum numbers had 26 gill rakers whereas a minority had 28. Current specimen has 28 gill rakers including rudiment on the lower limb. This specimen has totally 40 gill rakers when counts of upper and lower limb are combined which is the upper limit prescribed for this species. The specimen also has a well developed spine at the angle of pre-opercle which is representative of *S. typus* species over 80 mm SL. The present record confirms the presence of *Symphysanodon typus* Bleeker, 1878 in Indian waters and also the Western Indian Ocean.

First record of threadfin bream, *Nemipterus zysron* (Bleeker, 1857) from Andhra Pradesh Coast

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Threadfin breams, a major demersal resource of Visakhapatnam region is represented by a single genus *Nemipterus* and is fished extensively by trawlers. Five species of this genus *viz*., *Nemipterus mesoprion*, *N. japonicus*, *N. delagoae*, *N. luteus* and *N. tolu* generally contribute to the fishery of the region. A sixth species, *Nemipterus zysron* was collected and identified from the catch at Visakhapatnam Fishing Harbour on 15th July 2008. *N. zysron* is being recorded in the catch for the first time along Andhra Pradesh coast and was observed as a stray catch along with other commonly occurring threadfin breams. The species popularly known as slender threadfin bream had been misidentified and known with the following synonyms - *Synagris metopias* Gunther, 1859; *Dentex metopias* Bleeker, 1857; *Dentex zysron* Bleeker, 1857; *Heterognathodon petersi* Steindacher, 1866; *Nemipterus metopias* (Bleeker, 1857); *Nemipterus nemurus* (Bleeker, 1857) and *Nemipterus petersi* (Steindachner, 1866). However, none of these names are valid now (Fishbase). *N. zysron* was easily identified in the field by the slightly elongate body as compared to other *Nemipterus* species and the presence of yellow stripes in front of eye through nostrils and from

Fig. 1. *Nemipterus zysron*

upper lip to beneath the eye (Fig. 1). Other diagnostic features observed were the presence of a single dorsal fin with ten spines and ten rays, anal fin with three spines and seven rays. Upper lobe of caudal fin produced into a long yellow trailing filament. Body colour is reddish in the upper part, silvery below; sides below lateral line with distinct yellow stripes along the middle of each scale row. Head pinkish suffused with mauve on the snout. Dorsal fins pale yellow with a bright yellow margin. Pelvic fins hyaline with a yellow axillary area and axillary scale. Caudal fin pinkish, upper and lower