

Taxonomical Identification and Diversity of Flat Fishes from Mudasalodai Fish Landing Centre (Trawl by Catch), South East Coast of India

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Abstract

Bycatch and discards are common and pernicious problems faced by all fisheries globally. It is recognized as unavoidable in any kind of fishing but the quantity varies according to the gear operated. In tropical countries like India, bycatch issue is more complex due to the multi-species and multi-gear nature of the fisheries. Among the different fishing gears, trawling accounts for a higher rate of bycatch, due to comparatively low selectivity of the gear. A study was conducted during June 2018 - Dec 2019 in the Mudasalodai fish landing centre, southeast coast of India. During the study period six sp. of flat fishes collected and identified taxonomically.

Keywords: Flat fish, tongue fish, sole fish, bycatch, fish landing, diversity, taxonomy

Introduction

Fish forms an important source of food and is man's important source of top quality protein, providing 16% of the animal protein consumed by the world's population [1]. Fishes are one among the important elements within the economy of the many nations as they been a stable item within the diet of several people. They comprise slightly extra than one-half of total number of roughly 54,711 recognized existing vertebrate species; there are metaphors of an estimated 27,977 valid species of fishes [2].

Flatfishes are highly specialised ray-finned fishes of the Heterosomata (Heterosomata) with about 570 extant species, recognised in approximately 123 genera and 11 families; majority of species are marine, showing higher diversification and distribution in tropical waters [3,4]. A recent records documented the presence of 716 species of flatfishes comes under 123 genera and 14 families [5]. They include left-eye flounders (Bothidae), right-eye flounders (Pleuronectidae), soles (Soleidae), tongue soles (Cynoglossidae) also as turbot (Psettoodidae), and possess a laterally compressed body with both eyes on one side of the top. Norman described 91 species of flatfishes from Indian waters and Radhamanyamma recorded 25 species of flatfishes belonging to 5 families from the south-west coast of India. Earlier studies indicated the fishery, nutritive value and aquaculture aspects of flatfishes [6-11]. The present study investigate the flat fish diversity from the by-catch collection and acknowledged the key identification characters up to species level.

Materials and methods

The by-catch Samples (flat fishes) were collected from the Mudasalodai fish landing centre, which are situated in the coastal

waters of Parangipettai. The study was conducted for a period of one and half year (June 2018 - Dec 2019), no sampling was done in the month of May, due to the fishing holiday in the coast of Tamil Nadu. The collected flat fishes were kept in ice boxes and transferred to the laboratory and washed in tap water. The fishes were identified up to the species level. FAO species identification sheets for fishery purposes (EASTERN INDIAN OCEAN fishing area 57 and WESTERN CENTRAL PACIFIC fishing area 71) were used for species level identification. For further studies specimens were preserved in 5% formalin after identification. Mechanized trawlers and mechanized boats are mainly employed for fishing. Gill nets and trawl nets are commonly used gears in the study area.

Results

A total of 3 families, including 6 species of flatfishes were recorded in Mudasalodai fish landing centre. The Bothidae family which included 1 genus and 1 species, the Cynoglossidae family which included 1 genus and 2 species and the Soleidae family which included 2 genus and 3 species were found along the Mudasalodai fish landing centre in this study (Table: 1 Fig: 1 and Fig: 2). The dominant species recorded from Soleidae family, Cynoglossidae family and Bothidae family respectively.

Table: 1 Total number of species recorded

S.No	Species list	Family
1	<i>Bothus myriaster</i>	Bothidae
2	<i>Cynoglossus dispar</i>	Cynoglossidae
3	<i>Cynoglossus puncticeps</i>	Cynoglossidae
4	<i>Synaptura albomaculata</i>	Soleidae
5	<i>Zebrias quagga</i>	Soleidae
6	<i>Zebrias synapturoides</i>	Soleidae

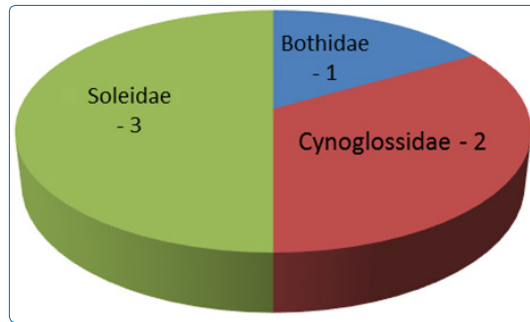


Figure 1: Number of species recorded family wise

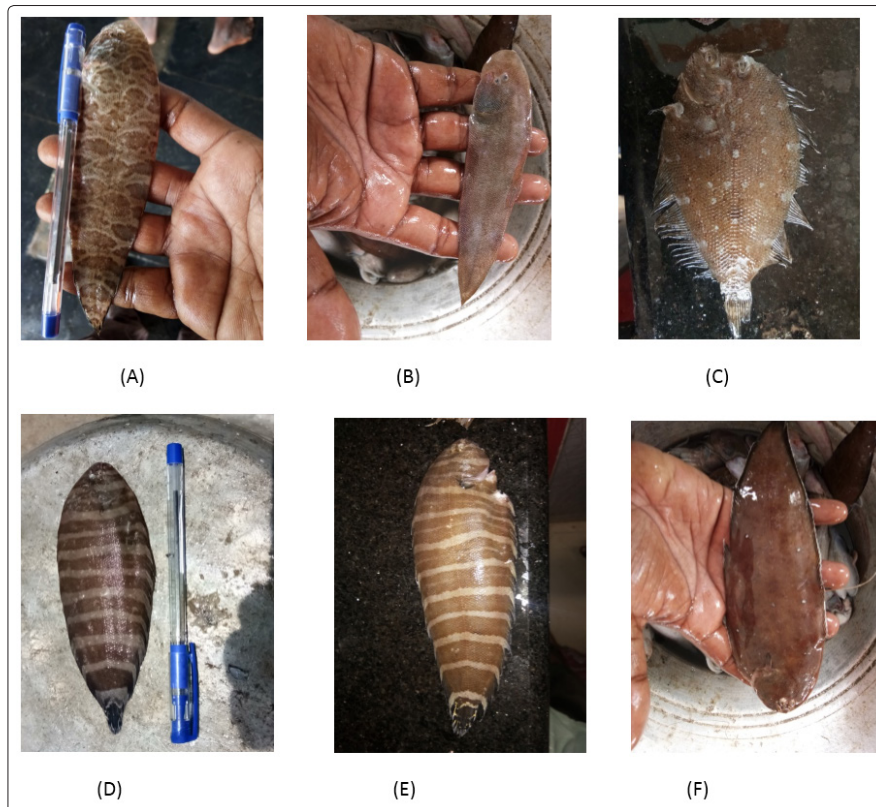


Figure 2: Show the diversity of flat fishes (A. *Cynoglossus puncticeps* B. *Cynoglossus dispar* C. *Bothus myriaster* F. *Synaptura albomaculata* E. *Zebrias quagga* D. *Zebrias synturoides*)

Taxonomical key identification characters

Bothus myriaster

Phylum: Chordata, Class: Actinopterygii, Order: Pleuronectiformes, Family: Bothidae,

Genus : *Bothus* , Species : *Bothus myriaster*

Body oval and flat. Head profile concave above snout; both eyes on left side, separated by a wide space (larger than eye diameter in males); upper jaw contained about 3 or 4 times in head length; lower limb of anterior gill arch with 6 to 8 short rakers. Pelvic fin base of blind side much shorter than that of eyed side. Scales on eyed side cycloid (smooth), except at extreme upper and lower edges of body, where they are ctenoid (rough); scales on blind side cycloid; lateral line scales 72 to 108. Dorsal soft rays: 87-97 and Anal soft rays: 61 - 73. Anal spines and dorsal spines are absent. Eyed side brownish, with numerous spots ringed with yellowish smaller spots; 2 or 3 diffuse dark blotches along lateral line.

Cynoglossus dispar

Phylum: Chordata, Class: Actinopterygii, Order: Pleuronectiformes, Family: Cynoglossidae, Genus: *Cynoglossus*, Species: *Cynoglossus dispar*

Body flat and elongate, with dorsal and anal fins joined to caudal fin. Eyes on left side of body, with a small scaly space between them; snout rounded, rostral hook short, corner of mouth extending below posterior border of lower eye, much nearer to tip of snout than to gill opening. Two lateral lines on eyed side and 2 on blind side. Scales cycloid (smooth to touch) on eyed side, ctenoid (rough) on lateral line; scales on blind side cycloid; 18 to 20 scale rows between the upper and middle lateral lines on eyed side. Upper side brownish with somewhat darker irregular blotches, lower side whitish.

Cynoglossus puncticeps

Phylum: Chordata, Class: Actinopterygii, Order: Pleuronectiformes,

Family: Cynoglossidae, Genus: Cynoglossus, Species: Cynoglossus puncticeps

Body flat and elongate, with dorsal and anal fins joined to caudal fin. Eyes on left side of body, with a narrow space between them; snout rounded, rostral hook very short, corner of mouth not reaching beyond lower eye, a little nearer to tip of snout than to gill opening. Two lateral lines on eyed side, none on blind side. Scales ctenoid (rough to touch) on both sides of body, 15 to 19 scale rows between lateral lines on eyed side. Colour: eyed side yellow/brown, with very distinct irregular dark brown blotches, often forming irregular cross bands; some rays of dorsal and anal fins dashed with dark brown.

Synaptura albomaculata

Phylum: Chordata, Class: Actinopterygii, Order: Pleuronectiformes, Family: Soleidae,

Genus: Cynoglossus, Species: Cynoglossus puncticeps

Reddish – white with small white spots widely separated in three distance rows. Vertical fins blackish with a white border. Right pectoral with a black blotch. Both nostrils on the same side with conical tubules, close together below the lower eye and a short barbell between them. Length of pectoral fins equal to that of snout.

Zebrias quagga

Phylum: Chordata, Class: Actinopterygii, Order: Pleuronectiformes, Family: Soleidae,

Genus: Zebrias, Species: Zebrias quagga

Body elongate and flat. Eyes on right side, their diameter slightly longer than snout, close together, usually with a short tentacle each; mouth small, curved, cleft reaching third of the lower eye. Dorsal and anal fins more or less completely joined to caudal fin; pectoral fins well developed, asymmetrical, that on eyed side smaller; pelvic fins short. Scales on both sides ctenoid (rough). Light brown colour with 10 or 11 darker simple or double crossbands wider than pale interspaces, continued in oblique slant on dorsal and anal fins. Caudal fin darker, brown, with a long, whitish median blotch.

Zebrias synapturoides

Phylum: Chordata, Class: Actinopterygii, Order: Pleuronectiformes, Family: Soleidae, Genus: Zebrias, Species: Zebrias synapturoides

Body elongate and flat. Eyes on right side, nearly contiguous, their diameter a little longer than snout, without tentacle; mouth small, curved, cleft reaching to below middle of eye. Posterior rays of dorsal and anal fins joined to basal half of caudal fin, which is quite distinct and rounded; pectoral fins well developed, asymmetrical; pelvic fins short, asymmetrical. Scales on both sides of body ctenoid (rough). Colour: greyish, with 12 or 13 darker crossbars, border than the interspaces, continued in an obliquely caudal direction on dorsal and anal fins; posterior part of caudal fin with a circular area of dark brown, marginated with yellowish-white, and with a number of yellowish white spots and blotches in the centre.

Discussion

Fishing is an important activity in Tamilnadu, dominated by mechanised and motorised vessels operating trawl and ring seines and flatfishes are caught as a bycatch in these gears. Flatfishes are one among the important components in several demersal communities round the world. Flatfishes also are important predators in many demersal communities. They are functioning as an important link between demersal production and human consumption [12].

Trawl operations are reconstruct the ocean bottom, which are known to be ideal habitat for flatfishes. In the intense trawling grounds, the flatfishes thrive well and therefore the landings of the flatfishes have been increased despite of declining in the landings of other demersal fishes [13]. In the present study 6 species of flatfishes were recorded in Mudasalodai fish landing centre. Similar study was overlooked by many other from Indian waters as well as in foreign waters. Although Norman described 91 species of flatfishes from Indian waters, only a couple of species contribute to the fishery [14, 6]. The best diversity of species occurs in the Indo-West Pacific region [15, 16]. In waters of China and Taiwan, approximately 25 nominal species of this genus are recorded [15, 17-22].

Wang et al., had examined the seasonal dynamics of flatfish assemblage in the coastal waters of northeastern Taiwan. In their study, the Bothidae was the foremost dominant family [23]. In the present study dominant species recorded from Soleidae family, Cynoglossidae family and Bothidae family respectively.

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