

By Catch Exploitation of Ornamental Fishes in Tuticorin Coast of Gulf of Mannar, India

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Abstract: Coral reef fishes comprise the most specious assemblages of vertebrates on the earth. The variety of shapes, sizes, colors, behavior and ecology exhibited by reef fishes is amazing. The total landings of Ornamental fishery were 3890.48 t in the year of January 2009 to December 2011 for the Tuticorin fishing harbor in the Gulf of Mannar, southeast coast of India. Among the three years 1829.395 t were landed dominant and levels were noted during the period of 2009 and it followed by 1790.582 t landed in the period of 2010 and thirdly 270.5033 t landed in the period of 2011. Hence, a visible gradual decrease in the fish catches was recorded during the 3 years study. The plenty of marine ornamental fishes were exploited by destructive fishing methods like, trawl net fishing. Hence the assessment of fish species and to implement the sea ranging techniques is necessary to conserve the diversity of fishes of Gulf of Mannar in southeast coast of India.

Key words: Ornamental Fishes • Bottom Trawlers • Marine Ecosystem • Over-Exploitation and Gulf of Mannar

INTRODUCTION

The world ornamental fish trade is about 4.5 billion US\$ and India's export earnings through ornamental fish is about 0.5 million US\$. The marine ornamental fishes show tremendous amount of variation in color pattern. In Gulf of Mannar, a total of 113 marine ornamental finfish species, have been recorded and their biodiversity and standing stock biomass were also assessed [1]. The recorded species have exclusive ornamental value and are not considered as food fishes unlike other coral loving species, such as nemipterids, lutjanids, serranids, carangids, etc., the recorded 113 marine ornamental fishes come under 24 families of which the family Acanthuridae, Balistidae, Chaetodontidae, Haemulidae, Labridae, Pomacanthidae, Pomacentridae, Scaridae and Syngnathidae have a very rich biodiversity perspective in Gulf of Mannar. The biodiversity and biology of these families have been studied in detail in the Gulf of Mannar province [2].

This is mainly due to the introduction of bottom trawlers, which was introduced in the Indian waters in the early 1960s. Several types of net fishing have also been responsible for over-exploitation of marine resources. Fishing operations with latest technologies are

causing damage to the marine living resources. Along with increase in the targeted catch, a number of untargeted fish and other biota are removed from their habitat and discarded as waste. Shrimp trawlers probably have the highest rate of by catch bringing in up to 90% or more of "trash fish". Random capture techniques destroy immature fish and other non-targeted marine species in Gulf of Mannar [3].

The indiscriminate exploitation of these is as for the collection of ornamental fishes can cause severe damage to the delicate coral reef ecosystem. Hence it is evident that the exploitation of marine ornamental fishes from the wild should be done rationally purely on the basis of scientific management regime without inflicting any damage to the ecosystem. The clown fishes belonging to the family Pomacentridae are among the most popular tropical marine ornamental fishes due to their generally small and hardy nature, attractive colors and interesting display of behaviors with sea anemones [4]. Marine ornamental fishes were giving attractive nature for Ocean. Since operation of bottom trawlers, it was made destroying marine ecosystem and very plenty of marine ornamental fishes have been exploited by catch. So the present study deals with survey conducted during the years of 2009 to 2011.

MATERIALS AND METHODS

Weekly observations were made at Tuticorin fishing harbor in Gulf of Mannar southeast coast of India. Data on catch and species composition were collected during 2009 to 2011. Subsequently, the monthly catch and effort estimates were obtained by raising the sampling days catch and effort to the total number of fishing days in that respective month.

RESULT

The total landings of Ornamental fishery were 3890.48 t in the years of January 2009 to December 2011 for the Tuticorin fishing harbor in the Gulf of Mannar, southeast coast of India. Among the three years 1829.395 t were landed dominant and levels were noted during the period

of 2009 and it followed by 1790.582 t landed in the period of 2010 and thirdly 270.5033 t landed in the period of 2011. (Fig: 1, 2 and 3) Hence, a visible gradual decrease in the fish catches was recorded during the 3 years of study conducted (Table 1 and 2).

Among the all months, January, February, July and August was peak season for landing ornamental fishes. Compare with all fishes Balistidae landed highly and others were landed very small amount but in the year of 2011 which was decreased when compare with previous year. Balistidae landed highly (91.30%) and it's followed by Caesionidae (3.653%), Chaetodontidae (1.087%), Pomacanthidae (0.107%), Pempheridae (0.989%), Apogonidae (0.173%), Scorpaenidae (0.161%), Syngnathidae (0.621%), Holocentridae (0.447%), Priacanthidae (0.284%), Labridae (0.527%), Acanthuridae (0.4167%) and Pomacentridae (0.226%).

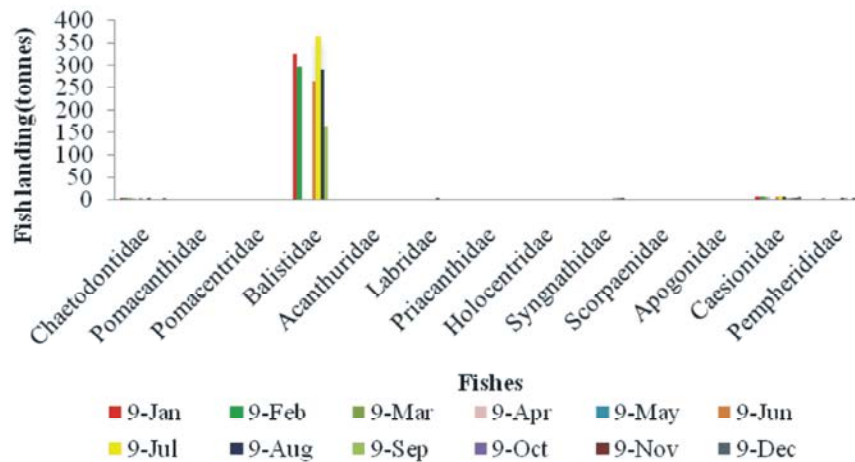


Fig. 1: Ornamental fishery were landed during January to December 2009

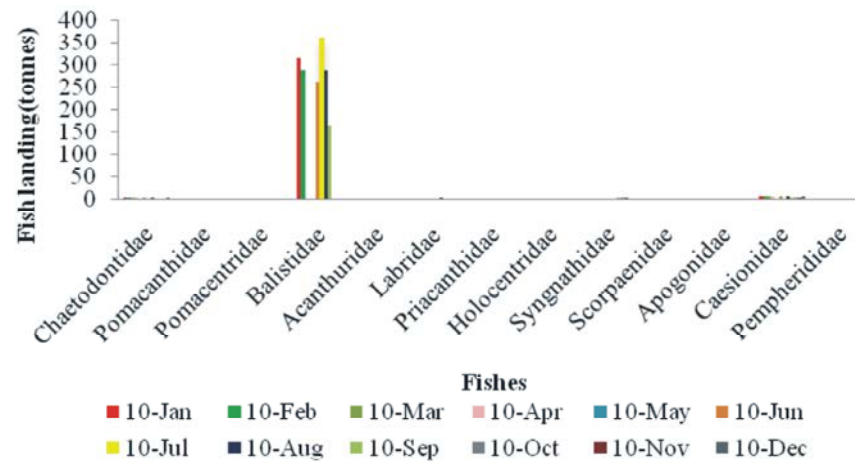


Fig. 2: Ornamental fishery were landed during January to December 2010

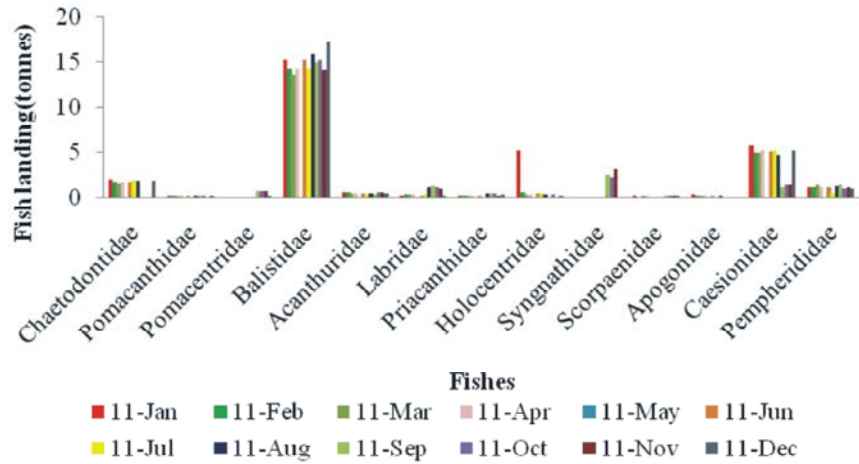


Fig. 3: Ornamental fishery were landed during January to December 2011

Table 1: Ornamental fishery were annually landed during January 2009 to December 2011

Family	2009	2010	2011
Chaetodontidae	14.885	14.115	13.3243
Pomacanthidae	1.473	1.394	1.327
Pomacentridae	3.2791	2.8508	2.6847
Balistidae	1707.15	1680.32	164.614
Acanthuridae	5.857	5.415	4.941
Labridae	7.54	7.074	5.92
Priacanthidae	4.232	4.063	2.7591
Holocentridae	4.81	4.642	7.97
Syngnathidae	9.44	6.9951	7.7532
Scorpaenidae	2.647	2.3901	1.244
Apogonidae	2.886	2.455	1.397
Caesionidae	50.31	47.05	44.76
Pempheridae	14.886	11.818	11.809
Total	1829.395	1790.582	270.5033

Table 2: Ornamental fishes

Family	Scientific name
Chaetodontidae	<i>Chaetodon auriga</i>
	<i>Chaetodon collare</i>
	<i>Chaetodon decussatus</i>
	<i>Chaetodon melannotus</i>
	<i>Chaetodon octofasciatus</i>
	<i>Chaetodon oxycephalus</i>
	<i>Chaetodon plebeius</i>
	<i>Chaetodon trifascialis</i>
	<i>Chaetodon vagabundus</i>
	<i>Heniochus acuminatus</i>
Balistidae	<i>Balistoides viridescens</i>
	<i>Odonus niger</i>
Acanthuridae	<i>Acanthurus mata</i>
	<i>Acanthurus bleekeri</i>
	<i>Acanthurus dussumieri</i>
	<i>Acanthurus lineatus</i>

Table 2: Continued

Labridae	<i>Anampses lineatus</i>	
	<i>Coris formosa</i>	
	<i>Halichoeres centriquadrus</i>	
	<i>Halichoeres zeylonicus</i>	
	<i>Halichoeres fasciatus</i>	
	<i>Thalassoma purpurum</i>	
	<i>Iniistius pavo</i>	
Pomacentridae	<i>Abudefduf vaigiensis</i>	
	<i>Abudefduf septem fasciatus</i>	
	<i>Amphiprion sebae</i>	
	<i>Amphiprion clarkii</i>	
	<i>Sascyllus trimaculatus</i>	
	<i>Pomacentrus coeruleus</i>	
	Pempheridae	<i>Pempheris vanicolensis</i>
	Pomacanthidae	<i>Apolemichthys xanthurus</i>
		<i>Pomacanthus annularis</i>
		<i>Pomacanthus imperator</i>
<i>Pomacanthus semicirculatus</i>		
Apogonidae	<i>Apogon aureus</i>	
Halocentridae	<i>Sargocentron rubrum</i>	
	<i>Myripristis botche</i>	
	<i>Myripristis murdjan</i>	
Caesionidae	<i>Pterocaesio chrysozona</i>	
Scorpaenidae	<i>Scorpaenopsis venosa</i>	
	<i>Scorpaenopsis neglecta</i>	
	<i>Pterois volitans</i>	
Syngnathidae	<i>Brachypterois serrulata</i>	
	<i>Hippocampus kuda</i>	
	<i>Hippocampus trimaculatus</i>	
Priacanthidae	<i>Syngnathoides biaculeatus</i>	
	<i>Cookeolus japonicus</i>	

Two way anova: Total landing data for Ornamental fishery from January 2009 to December 2011

Source of Variation	SS	df	ANOVA			Remarks
			MS	F	P-value	
Between years	3826118	12	318843.2	5.322891	0.000251	P>0.005
Between fishes	121597.2	2	60798.58	1.014995	0.377439	P>0.005
Total	5385324	38				

Two way anova for analysis among different years and among fishes, showing statistically non significant (P>0.005)

DISCUSSION

In India the marine ornamental fishes are known to be abundant in coral reef areas in shallow waters in the Gulf of Mannar and Palk Bay, Hence, the exploitation on a commercial scale is likely to result not only in quick overexploitation of the fish species but also in the destruction of coral environment [5].

About 100 species of ornamental fishes belonging to 30 families are known from Gulf of Mannar region [6] and butterfly fish, wrasses, damsel fish, rabbit fish, scorpion fish and puffer fish are among the dominant ones (7, 8 and 9) and further 113 ornamental fin fish species have been recorded and their biodiversity and standing stock biomass were also assessed by [1] and in the present study only 13 family were only caught by catch and then rabbit, puffer fishes were used for human consumption but butterfly fish, angel fish, scorpion fish, damsel and wrasses were used to chicken feed. Mainly ornamental fishes exploited two ways one is using for aquarium traders and another caught by catch.

In the context of increasing popularity of keeping ornamental fishes in home aquaria in several countries, the demand for them has been increasing and substantial trade for these fishes has developed in several parts of the world. It has been estimated that the world trade on ornamental fishes is around US \$ 4.5 billion [10].

Edwards and Shepherd [11] dealt with the environmental implications of aquarium fish exploitation in the neighboring Maldives and suggested certain measures of regulation, as the trade which started around 1980 lead to near over-exploitation of 27 species of a total of about 65 species by 1989. By catch of ornamental fishes and export of ornamental fish from marine environments, these two main issues will continue and finally lead to over exploitation, destruction of coral environment. So need to implement ornamental fish culture techniques.

CONCLUSION

In most of developing countries the focus is cultivation of ornamental fish's production and on economic growth rather than on the conservation of biodiversity. Therefore, there is a need to explore the economic value and other practical benefits of conservation of diversity. It is essential to create awareness amongst inhabitants about the need for the sustainable use of biodiversity.

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