
DIVERSITY OF SOME MARINE ORNAMENTAL FISH SPECIES ALONG VISAKHAPATNAM, EAST COAST OF INDIA

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Abstract: There has been a renaissance of taxonomy and related subjects such as abundance and distribution of species as biodiversity in the last two decades. Diversity of marine ornamental fishes comprises the most specious assemblages of vertebrates on the global. The multiplicity of shapes, sizes, and brilliant colour pattern, behaviour of feeding and ecological changes, seasonal and distributional exhibited by ornamental fishes is marvellous in world oceans. Bio diversity of some ornamental fish species composition were described along Visakhapatnam coastal waters, which is situated adjacent to rocky and reef associated ecosystem, East coast of India. In the fishery ornamental fishes were caught as not only by-catch but also traditional catches. Here fisherman depends mainly on commercial food fishes, live ornamental fishes, crustaceans and molluscan fisheries for their economy. In recent years however there is an increase in landing of these species along Visakhapatnam coastal waters in the artisanal gears. Because of increase in catches and export value of ornamental fish resources there is an urgent need to have proper information on these fishery resources for sustainable development and management. The intertidal belt of Visakhapatnam coasts supports abundant rich ornamental fish fauna. Ornamental fish resource appraisal was made every month over a period one year. Taxonomic composition and abundance of the ornamental fish diversity off Visakhapatnam waters, north east coast of India was recorded during Jan 2013 to Jan 2014. During the present study investigated, a total number of 20 ornamental fish species were identified belonging to 18 families and 4 orders. Tetradontidae family represented (2 species); Triacanthidae (1species); Canthigastridae (1species); Balistidae (1 species) Diodontidae(1 species); followed by the family Scorpaenidae (2 species), Serranidae (2 species), Holocentridae (2species) Lutjanidae (1 species), Scathophagidae (1 species) and Apogonidae (1 species) Chaetodontidae (1 species each), Mullidae (1 species), Acanthuridae (1species), Theraponidae (1 species), Pempheridae (1 species), Plotosidae (1 species).

Introduction: Biodiversity reflecting a growing recognition that the welfare of mankind is inextricably linked to the welfare of the oceans. The marine ornamental fishes are one of the most popular attractions in worldwide due to their adaptability to live in confinement.(Rajeswari et al., 2014). Rational management of man's use of the oceans requires reliable information and sound understanding of biodiversity and the processes controlling it to make effective decisions. (Zwanenburg *et al.*, 2003). Taxonomy is an on-going endeavour. The basic knowledge of diversity through species discovery and description is mostly comprised for some areas of the world and for many families, but important gaps remain. (Eschmeyer *et al.*, 2010). Marine biodiversity is also essential for stabilization of ecosystems, protection of overall environmental quality, for understanding intrinsic worth of all species on the earth. (Ehrlich and Wilson, 1991). Diversity of fishes known from the fresh and marine waters of India constitute 9.7 percent of the total number of about 33,059 species of fish known from the world (Eschmeyer and Fongm, 2014), and of these the marine ornamental fishes alone count for 7.4 percent. An authentic assessment of species diversity of fishes of India recognizes an estimated 3231 valid species of both freshwater and marine fishes of this total fish

diversity, marine fishes constitute 75.6%, comprising of 244. Ichthyodiversity refers to variety of fish species; depending on context and scale, it could refer to alleles or genotypes within piscian population, to species of life forms within a fish community, and to species or life forms across aquaregimes (Burton *et al.*, 1992).

These living jewels (ornamental fishes) cultured in the aquarium are of high commercial value due to aesthetic pleasure. In less than a decade, the ornamental fishes have rapidly spread throughout the Indian Ocean. To improve understanding of the ornamental fish invasion, there is a pressing need for comparative knowledge on ornamental fish's form their native ranges. Indian waters possess a rich diversity of ornamental fishes, with over 300 varieties of indigenous species. Ornamental fish keeping is becoming popular as an easy and stress relieving hobby. Asia is the major exporting region accounting for 56% of the global exports. India has joined the led 10 Asian exporting countries recently, contributing only 2% of the Asian export. Kutty (2008).

Indigenous ornamental fish export and import from India is from two biodiversity hot spots the east and west coast of India. India is one of the hot spots of ornamental fish biodiversity in the world. Valuable information of ornamental fishes, which includes

associated fish species, from the rocky grounds off East and West coast of India. While regional works on the ornamental fishes from Indian waters Sriramachandra murty (2001); Murthy (2002); Murty *et al.*, 1989; Munro (1983) and Prabhakaran *et al.*, 2013, 197 specimens recorded from Lakshadweep Island. Several expertises reported various marine ornamental fish species from this region.

Material and Methods:

Study Area: Visakhapatnam coast (Lat.17°44' N, Long 83° 23' E) lies on the east coast of India. Hilly range around the coasts is to be seen jutting into the sea and its rock habitats and associated fish species. Visakhapatnam has been a recent increase in landings of economical importance ornamental fish species by artisanal fishermen using hook and line and trawl catches in the north Andhra region. Because of the increase in catches and the export value of ornamental fishes, there is a need for proper information on these ornamental fish resources to ensure sustainable advance and management. The rock out crops of the eastern ghat hill rocks appear as promontories on the coast. With the stretches of sand interspersed with shingly shores, the coast of Visakhapatnam is unique in its own way. The intertidal zone is a narrow belt with a maximum width of 10-25 m depending upon the tide. In the shingly regions, this extends to a width of 75m. Visakhapatnam has rich ornamental resources of coastal water bodies. The coastline of this locality, running north-east to south west (from Dolphins's Nose near the entrance channel of Visakhapatnam harbour in the south to Bheemili in the north. There is no river opening into the sea in the immediate vicinity of this place. Much of this coastline is sandy with outcrops of rocky boulders of various sizes protruding through sand. The principal rock types of these formations are Archaean khondalites and leptynites. For detailed study, taking the physical nature of the substratum into consideration, the following four to five stations were selected.

Collection and identification: The present study is based on ornamental specimens collected from the different landing centres at the Visakhapatnam coastal region (where the catches from nearby fishing villages are also brought) during the period 2013-2014. Ornamental fishes were caught using traditional fishing gear along with commercially important fishes by hand line, trammel nets in shallow waters with non-motorized boats. A preliminary study revealed that a variety of ornamental fishes were landed along with the trawl catches and most of them discarded due to small size, fewer numbers and low food value. For fishing on rocky and coral reef areas an additional rope with rollers or bobbins is fastened to the ground rope of the trawl net to protect the net. The

ornamental fishes were identified using the taxonomic keys provided by; Jones and Kumaran (1980); Fischer and Bianchi (1984), Smith and Heemstra (1986), Nelson (2006) and Fish base (2013). The list of ornamental fishes was prepared based on the reports of Adams (1997) from Maldives and Anon (1999) from queens land.

Results: During the present study investigated, a total number of 24 ornamental fish species were identified belonging to 18 families and 4 orders. Tetradontidae family represented maximum number of fish species 6: Balistidae (1 species) Diodontidae(1 species); followed by the family Scorpaenidae (2 species), Serranidae (2 species), Holocentridae (2species) Lutjanidae (1 species), Scathophagidae (1 species) and Apogonidae (1 species) and Plotosidae (1 Species). Apongon tenaetius, *Pterois russellii*, *Lagocephalus lagocephalus* and *Epinephelus areolatus* showed preodinance. A variation was discernible in the occurrence of different species with respect to trawling depths (Table1).

Discussion: The findings of this study supports Earlier workers in Indian waters (Pillai *et al.*, 1992; Vijayanad and Varghese, 1990; Adams, 1997); Venkataramani and Jawahar (2004) recorded about 113 marine ornamental finfish species in Gulf of Mannar and also claimed that this region could be exploited more for ornamental fish trade in India. Prabhakaran *et al.*, (2013) recorded 197 species from Lakshadweep. The seagrasses are less in species level, their role in increasing the faunal diversity are well known, and dense communities increase the species richness and diversity of fishes, which utilize meadow as the source of food, shelter and nursery ground. (Prabhakaran *et al.*, 2013) and confirm that coral reef regions, near shore regions are important nurseries for ornamental fish and macrofauna. In all marine ornamental fish species (23) were recorded during the period one year. (Table: 1). Most of the ornamental fish species, which are being discarded are presently marketed in international markets (Anon, 1999).

The dominance of juveniles of commercially important marine species found in the beach seine catches in this region (Ansari *et al.*, 1995). Many fish species in near shore areas worldwide exhibit predictable seasonal changes in abundance, biomass and species occurrence (Gunther, 1983; Ansari *et al.*, 1995). While these studies demonstrated the high levels of species richness in near shore waters, the findings also imply that the duration of sampling is likely an important factor in investigating ornamental fish species diversity in Visakhapatnam coastal waters. The abundance and distribution of fishes is dependent on several distinct factors such as recruitment, habitat structure, food availability, and environmental factors (Jones, 1991; Williams, 1991).

Table 1 Provides scientific names, common names and vernacular names and conservation status of the recorded marine ornamental fishes.				
Order and Family	Species name	Common name	Vernacular name	IUCN Red list status
Order: Perciformes Family: Apogonidae	<i>Apogon tenaetius</i> (Cuvier, 1828)	Two belt cardinal fish		NE
Family: Lutjanidae	<i>Lutjanus russelli</i> (Bleeker, 1849)	Russells snapper	Dondaavah	NE
Family: Teraponidae	<i>Terapon jarbua</i> (Forsskal, 1775)	Jarbua terapon	Keelupotu	LC
Family: Serranidae	<i>Cephalopis formosa</i> (Shaw, 1812)	Bluelined hind	Ratibontu	LC
	<i>Epinephelus areolatus</i> (Forsskal, 1775)	Areolate grouper	Rati bonthu	LC
Family: Scathophagidae	<i>Scatophagus argus</i> (Linnaeus, 1766)	Spotted scat	Eesputti	LC
Family: Chaetodontidae	<i>Chaetodon decussates</i> (Cuvier, 1829)	Indian vagabond butterfly fish	Painah	LC
Family: Mullidae	<i>Paraupeneus indicus</i> (Shaw, 1803)	Indian goat fish	Rahtee goolivinda	NE
Family: Acanthuridae	<i>Acanthurus mata</i> (Cuvier, 1829)	Elongate surgeonfish	Mata	LC
Order: Scorpaeniformes Family: Scorpaenidae	<i>Pterois russelii</i> Bennett, 1831	Plaintail turkeyfish	Kodipunju	NE
	<i>Pterois mombasae</i> (Smith, 1957)	Frillfin turkeyfish	Yerra kodipujulu	NE
Family: Pempheridae	<i>Pempheris vanicolensis</i> Cuvier, 1831	Vaniloru sweeper		NE
Order: Beryciformes Family: Holocentridae	<i>Sargocentron rubrum</i> (Forsskal, 1775)	Red coat	Kuntee	NE
	<i>Myripristis murjdan</i> (Forsskal, 1775)	Pinecone soldierfish	Yerra botchulu	NE
Order: Tetrodontiformes Family: Balistidae	<i>Abalistes stellaris</i> (Bloch and Schneider, 1801)	Starry triggerfish	Yellakah	NE
Family: Triacanthidae	<i>Tricanthus brevisrostris</i> (Bloch, 1786)	Short-nosed tripodfish	Bowree kappa	NE
Family: Diodontidae	<i>Diodon hystrix</i> Linnaeus, 1758	Spot-fin porcupinefish	Kappa	NE
Family: Tetrodontidae	<i>Arothron immaculatus</i> (Bloch and Schneider, 1801)	Immaculate puffer	Kappa	NE
	<i>Lagocephalous lagocephalus</i> (Linnaeus, 1758)	Oceanic puffer	Kappa	NE
Family: Canthigasteridae	<i>Canthigaster solandri</i> (Richardson, 1845)	Spotted sharpnose	Kappa	NE
Order: Siluriformes Family: Plotosidae	<i>Plotosus lineatus</i> (Thunberg, 1787)	Striped eel catfish	Salithiri	NE

LC: Least concern, NE: Not evaluated.

Roberts and Ormond (1987) stated that most of the coral reef fishes tend to increase in both abundance and number of species with increasing depth on fringing reefs.

Conclusion and Recommendation: It is evident from the research carried out that marine ornamental fishes exist side-by-side with other marine fishes/organisms. This explains why they are found in trawl nets as by-catch. The types available have also been shown but the problem of not being able to get

to the habitat of some of the more exotic species by the trawl net has made it difficult to really get the different types of available within the continental shelf. The knowledge of occurrence and abundance of various tropical marine ornamental fishes within the Indian continental shelf would open more way for further research on the biology, habitat, food and feeding breeding Pattern, exploitation, packaging and exportation of tropical marine ornamental fishes.

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