

The Indian Spiny Turbot (*Psettodes erumei*)

Alleged Extinction status along Kerala coast Needs Probe

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With increasing mechanisation of fishing vessels in capture fisheries sector, almost half of the fish stocks of the world are fully exploited and about one-quarter of stocks are overexploited, depleted or recovering from depletion, thus yielding less than their maximum potential (FAO, 2007). Notwithstanding the fact that predatory fishes have long played an important role in marine ecosystems and fisheries, the increasing fishing efforts have depleted large predatory fish communities worldwide by 90% over the last 50-100 years (Myers and Worm, 2005). Among the Indian marine fishes, the Indian Spiny Turbot *Psettodes erumei*, a demersal flatfish species representing the order Pleuronectiformes is the fish with the highest trophic level (4.40), compared to larger predatory fish communities such as sharks, rays, tunas and billfishes (Froese and Pauly, 2007).

Flatfishes, represented by 91 species from Indian waters, contribute to minor or major fisheries along the Indian coast; almost all the flatfish landing in southwest coast of India is the contribution of bottom trawlers (Vivekanandan *et al.*, 2003). Large species of flatfishes, particularly the Indian spiny turbot *Psettodes erumei*, are a cherished dish of the west coast of India, with high nutritive value. A biodiversity survey of trawl by-catch and discards along the Kerala coast of India during 2004-2007 recorded 34 species of flatfishes belonging to 17 genera, classified under families Bothidae, Cynoglossidae, Pleuronectidae, and Soleidae. While comparing the current

availability of flatfishes along the southwest coast of India with that of earlier reports (Radhamanyamma, 1988; Vivekanandan *et al.*, 2003), the noticeable feature was the absence of the Indian spiny turbot *P. erumei* in any of the collections from the by-catch of trawlers and in the discards along Kerala coast. Subsequent extensive questionnaire survey among the crew of trawlers along the Kerala coast of India also corroborate the absence of *P. erumei* (locally known as *aayiram palli* in Malayalam, *Bhakas* and *Zhipali* in Marathi, *Dataro* in Gujarati, *Erumeinaku* in Tamil, *Noree-nalaka* in Telugu) in fish landings for the last few years.

Growing to a maximum of 60 cm in total length, and inhabiting the sand and mud bottoms of coastal waters up to a depth of 100 m, *P. erumei* (Fig. 1) is commercially the most valuable flatfish of India. This species is distributed in the tropical belt between 26°N to 21°S, and 43°E - 156°E in the Indo-West Pacific from Red Sea and East Africa to Japan and Australia (Fig. 2). The recent occurrence records in fish base (www.fishbase.org) also reiterate the collection of *P. erumei* along Kerala coast of India.

The flatfishes along Kerala coast are mid-level carnivores (trophic level 3.0-3.99) or top-level carnivores (trophic level 4.0-4.5), showing medium or high level of resilience. Elimination of predatory fish communities has been reported from oceans around the globe due to rampant fishing activities, with potentially serious consequences for ecosystems (Myers and Worm, 2003, 2005).

Considering the fact that almost all the flatfish landings on Kerala coast is the contribution of trawlers, increase in trawling efforts could be the possible reason for the local extinction of *P. erumei* in the coastal waters of Kerala. The larger size of Indian spiny turbot also makes them vulnerable to fishing than other species of flatfishes.

Pauly (1994) recorded heavy depletion of flatfishes, including *P. erumei* in the Gulf of Thailand since the introduction of trawling, and hypothesised that the tropical flatfish maintain low biomass when their environment is undisturbed, but may increase in their recruitment if external disturbance such as fishing removes their competitors. The flatfishes in the Gulf of Thailand increased in abundance despite intensification of trawling. The flatfish landings in India recorded an increase from 7,879 t in 1961 to 17,763 t in 2005-06 and contributed to about 2 per cent of the total marine fish landings in India (Vivekanandan *et al.*, 2003; Pillai *et al.*, 2007). The increase in landings is primarily due to sharp increase in the number of trawlers and fishing efforts. The increase in fishing efforts, though resulted in larger biomass and diversity of flatfish landings, may have resulted in the local extinction of top-level carnivores such as *P. erumei* from the coastal waters.

Long-lived demersal (bottom) species tend to decline faster than the short-lived pelagic (open water) species (Pauly *et al.*, 2002). Pauly (1994) hypothesised that flatfishes in general are over-adapted to and too small for the niche they occupy. Since *P. erumei* is a strict carnivore and a fish occupying a higher trophic level than sharks and rays in Indian coastal waters, any possible local extinction may create serious repercussions on the delicate food web of the Indian coastal waters which already indicate a gradual transition in landings from long-lived, late maturing high trophic level, piscivorous demersal fish towards short-lived early maturing low trophic level planktivorous pelagic fish (Vivekanandan *et al.*, 2005; Bhathal and Pauly, 2008). The non-availability of *P. erumei* is often masked by the presence of other species lower in

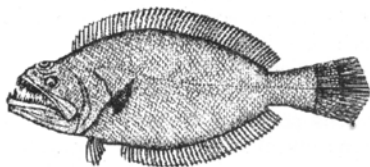


Fig.1. The Indian spiny turbot, *Psettodes erumei* (Bloch & Schneider)



Fig.2. Distribution of *Psettodes erumei*

the food chain and other mid-level carnivores, including other species of flatfishes.

Since there is no targeted fishing for flatfishes along Indian coasts, they are landed mainly as by-catch of shrimp trawlers. Since all fishery management studies concentrate on target species, the disappearance of even commercially valuable species may go unnoticed. The local extinction of *P. erumei* along Kerala coast warrants the need for fresh surveys to locate the stocks along Indian coasts and adoption of precautionary approach towards the sustainable management of demersal fish resources, particularly the predatory fishes. The findings of the study warrants detailed collection of species-specific statistical data on the recruitment of flatfishes and other benthic/demersal species of southwest coast of India, and evaluation of the ecological impacts of bottom trawling. Further, detailed studies are needed on the distribution of predator diversity and its relation to regional

oceanography, biology of predatory fishes, and on their fishery or their availability over space and time. Ecosystem management measures are possible only after identifying stocks left along the Indian coast.

References

- BHATHAL, B. AND PAULY, D. 2008. Fishing down marine food webs' and spatial expansion of coastal fisheries in India, 1950-2000. *Fish. Res.*, **91**: 26-34.
- FAO, 2007. The State of World Fisheries and Aquaculture. Food and Agriculture Organisation of the United Nations, Rome, 162 pp.
- FROESE, R. AND PAULY, D. (Eds.) 2007. Fish Base. World Wide Web electronic publication. www.fishbase.org, version 09/2007.
- MYERS, R. A. AND WORM, B. 2003. Rapid worldwide depletion of predatory fish communities. *Nature* **423**: 280-283.
- MYERS, R. A. AND WORM, B., 2005. Extinction, survival or recovery of large predatory fishes. *Phil. Trans. R. Soc. B.*, **360**: 13-20.

PAULY, D. 1994. A framework for latitudinal comparisons of flatfish recruitment. *Neth. J. Sea Res.*, **32**: 107-118.

PAULY, D., CHRISTENSEN, V., GUENETTE, S., PITCHER, T. J., SUMALIA, U. R., WATLERS, C. J., WATSON, R. AND ZELLER, D. 2002. Towards sustainability in world fisheries. *Nature*, **418**: 689-695.

PILLAI *et al.* 2007. Appraisal of marine fisheries of Kerala. *Mar. Fish. Infor. Serv. T & E Ser.* No. 194, pp. 1-10.

RADHAMANYAMMA, P. 1988. Studies on Pleuronectiformes occurring along the south-west coast of India. Ph.D. Thesis, University of Kerala.

VIVEKANANDAN, E., ZACHARIA, P. U., FERAZ KHAN, M. AND REKHA J. NAIR, 2003. Flatfishes. In: *Status of Exploited Marine Fishery Resources of India* (ed. Mohan Joseph, M., Jayaprakash, A. A.), Central Marine Fisheries Research Institute, Cochin, India, pp. 164-170.

VIVEKANANDAN, E., SRINATH, M. AND KURIAKOSE, S. 2005. Fishing the marine food web along the Indian coast., *Fish. Res.*, **72**: 241-252. 