Biodiversityof Marine Ornamental Fish in West Bengal: Issues of Sustainability and Livelihood Security

B. K. Mahapatra*, **U. K. Sarkar**** and **W. S. Lakra*****

* ICAR -Central Institute of Fisheries Education, Kolkata Centre, Sector-V, Kolkata – 700 091.

** ICAR-Central Inland Fisheries Research Institute, Barrackpore, West Bengal

*** ICAR-Central Institute of Fisheries Education, Varsova, Mumbai – 400 06

E-Mail: bkmahapatra@cife.edu.in

Introduction

Fishes are the most diverse group of vertebrates, with 32,447 species (Froese and Pauly 2014).The varied forms and fascinating beauty of those fishes, which have been attracting people from time immemorial, are named as 'Ornamental Fish' or "Aquarium Fish".Ornamental fish aregenerally selected based on their body colour (preferablyattractive), body shape (unique shape compared to foodfishes), and aquarium suitability.Aquarium fish keeping which started as a hobby, centuries back in many countries, has now taken the shape of a multi-billion dollar ornamental fish industry. Presently these live items exported to 27 countries, which accounted for 2568 MT (0.86 per cent of total marine export) of quantity and US$14 million (0.50 per cent of total marine export) in terms of value (MPEDA, 2007). The current value of world trade of this industry is estimated to be about US $ 427.29 million. The Asian countries contribute more than 50% of the total export turn over. At present, India's overall trade in ornamental fish has crossed Rs.150 million.The export is mainly carried out through the International Airports at Kolkata, Chennai, Mumbai, Thiruvananthapuram and Cochin and about 50% of the total export (by value) takes place from Kolkata. It is estimated that about 1600 species including fishes and invertebrates are traded globally. Of this, 750 are from freshwater origin, with 90% contributed from aquaculture and the rest 10% from wild. Talking about the ornamental fishes in the world trade, 60% of the fishes are of freshwater origin, 30% marine and 10% brackish water origin. In India about 80% of ornamental fishes are from fresh waters and the rest from brackish and marine waters. Records are available for fresh water ornamental fish and trade in West Bengal by various author (Ghosh *et al*. 2002;Ghosh *et al*. 2003a,b; Mahapatra 1999; Mahapatra *et al.*, 2014a,b; Mahapatraand Lakra, 2012, 2014). But no such studyhas been made on marine ornamental fish diversity of West Bengal.

Study area

The state of West Bengal is situated between latitudes 21°5' N and 24°5' N and longitudes 86°E and 89°E. It is the northernmost Indian state bordering the Bay of Bengal and has to its south the Indian state of Orissa, while Bangladesh is to its north and north-east.Total coast line for Marine water resources in West Bengalis 158km. This represents approximately 1% of India's coastline. In the state there are two maritime districts *i.e.* South 24 Parganas and PurbaMidnaporewhich contains 29 and 41 marine fish landing centres respectively (Figure 1).

Marine Ornamental Fish Biodiversity in West Bengal and their trade

Out of 403 marine fish species (ZSI, 2012) available in West Bengal 63 species are ornamentally valuable (Table 1 and Plate 1). Marine ornamental fish keeping becoming popular among the hobbyists of West Bengal. Trading marine ornamental fish has been regularly observed in weekly ornamental fish market at Gallif Street, Kolkata as well as daily fish market in Dasnagar, Howrah (Plate 2). To meet the demand of the hobbyist the marine ornamental fish

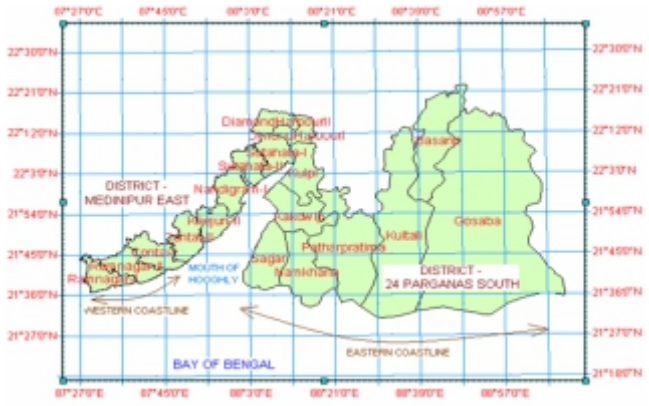

Figure 1 : Coastal area of West Bengal

are brought from Chennai or import from overseas market especially from Bankok. The price of the marine ornamental fish is quite expensive in the hobby shop of West Bengal and ranging between Rs. 350/- to 1500/- per piece. As observed there is no record for utilisation of locally available marine ornamental fish. Although the various marine ornamental fish species available in West Bengal but none of the species traded in local ornamental fish market.

Table 1 : List of Marine Ornamental fish in West Bengal

Species	Fig	Species	Fig
Congresoxtalabonoides (Bleeker, 1853)	1.	*Hyporhamphuslimbatus* (Valenciennes, 1847)	2.
Acanthurusleucosternon (Bennett, 1833)	3.	*Acanthuruslineatus* (Linnaeus, 1758)	4.
Acanthurusnigrofuscus (Forsskal, 1775)	5.	*Acanthurustriostegus* (Linnaeus, 1758)	6.
Alectisciliaris (Bloch, 1787)	7.	*Gnathanodonspeciosus* (Forsskal, 1775)	8.
Chaetodonauriga Forsskal, 1775	9.	*Chaetodoncollare* Bloch, 1787	10.
Heniochusacuminatus (Linnaeus, 1758)	11.	*Echeneisnaucrates* Linnaeus, 1758	12.
Eleotrisfusca (Forster, 1801)	13.	*Acentrogobiusviridipunctatus* (Valenciennes, 1837)	14.
Apocryptesbato (Hamilton, 1822)	15.	*Boleophthalmusboddarti* (Pallas, 1770)	16.
Gobiopsismacrostoma Steindachner, 1861	17.	*Odontamblyopusrubicundus* (Hamilton, 1822)	18.
Oligolepisacutipennis (Valenciennes, 1837)	19.	*Periophthalmusargentilineatus* Valenciennes, 1837	20.
Taenioidescirratus (Blyth, 1860)	21.	*Trypauchen vagina* (Bloch & Schneider, 1801)	22.
Anampsescaeruleopunctatus Ruppell, 1829	23.	*Cheilioinermis* (Forsskal, 1775)	24.
Pteragogusflagellifer (Valenciennes, 1839)	25.	*Stethojulisinterrupta* (Bleeker, 1851)	26.
Latescalcarifer (Bloch, 1790)	27.	*Lutjanusfulviflamma* (Forsskal, 1775)	28.
Mulloidichthysflavolineatus (Lacepède, 1801)	29.	*Parupeneusbifasciatus* (Lacepede, 1801)	30.
Parupeneusindicus (Shaw, 1803)	31.	*Parupeneusluteus* (Valenciennes, 1831)	32.
Parupeneustrifasciatus (Lacepede, 1804)	33.	*Nemipterusbipunctatus* (Valenciennes, 1830)	34.
Platycephalusindicus (Linnaeus, 1758)	35.	*Abudefdufsexfasciatus* (Lacepede, 1802)	36.
Scatophagusargus (Linnaeus, 1766)	37.	*Epinephelusmalabaricus* (Bloch & Schneider, 1801)	38.
Grammistessexlineatus (Thunberg, 1792)	39.	*Siganusargenteus* (Quoy&Gaimard, 1825)	40.
Siganuscanaliculatus (Park, 1797)	41.	*Siganusjavus* (Linnaeus, 1766)	42.
Sillaginopsispanijus (Hamilton, 1822)	43.	*Sillagosihama* (Forsskål, 1775)	44.
Acanthopagrusberda (Forsskal, 1775)	45.	*Teraponjarbua* (Forsskal, 1775)	46.
Teraponputa Cuvier, 1829	47.		

Species	Fig	Species	Fig
Cynoglossussemifasciatus Day, 1877	48.		
Pteroisantennata (Bloch, 1787)	49.	*Pteroisradiata* Cuvier, 1829	50.
Pteroisrusselii Bennett, 1831	51.	*Sciadessona* (Hamilton, 1822)	52.
Plotosuscanius Hamilton, 1822	53.	*Plotosuslineatus* (Thunberg, 1787)	54.
Pseudochromisdilectus Lubbock, 1976	55.	*Aeoliscusstrigatus* (Gunther, 1861)	56.
Hippocampus kuda Bleeker, 1852	57.	*Balistoidesviridescens* (Bloch & Schneider, 1801)	58.
Canthidermismaculata (Bloch, 1786)	59.	*Arothronstellatus* (Bloch and Schneider, 1801)	60.
Chelonodonpatoca (Hamilton, 1822)	61.	*Pseudotricanthusstrigilifer* (Cantor, 1849)	62.
Triacanthusbiaculeatus (Bloch, 1786)	63.		

Sustainable utilisation of marine ornamental fish and livelihood security

West Bengal produce bulk of the India's ornamental fish exports but still the diversified marine ornamental fish resources remains totally untapped. Local people were totally unaware of this uncustomary marine bioresources. Presently, ornamental fish trade in West Bengal involves the collection and selling of native fresh water ornamental fish (wild catch) as well as rearing exotic ornamental fish species (captive breeding). But varied agribusiness opportunities can be explored based marine ornamental fish species. The agribusiness opportunities of marine ornamental fish farming can be realized at every stage of activities, namely, at production, marketing and also taking active participation in conservation of ornamental fishes. With the initiatives by the Govt. such as providing incentive to establish ornamental fish production unit, considerable private investment can be attracted to this industry, which would create additional employment opportunities. With the concerted efforts by the Govt. as well as key institutions for the development of fisheries can increase the ornamental fish production substantially in the region, which in turn can gradually gain a larger share in the world market. Public-private partnership can be encouraged through establishment of ornamental fish production units to make the ornamental fishery sector more vibrant and remunerative. Adequate transfer of technology to the local people on the ornamental value of uncustomary bioresources, their conservation status, their captive breeding and farming techniques are important. In this context, it is essential to take some measures to educate all the stakeholders in this field for the sustainable growth of this industry. This will also help in the conservation as well as sustainable use of biological diversity. As the ornamental fish culture is mostly indoor, there is immense scope for the involvement of women folk in this aqua-business for maintaining their livelihood security.

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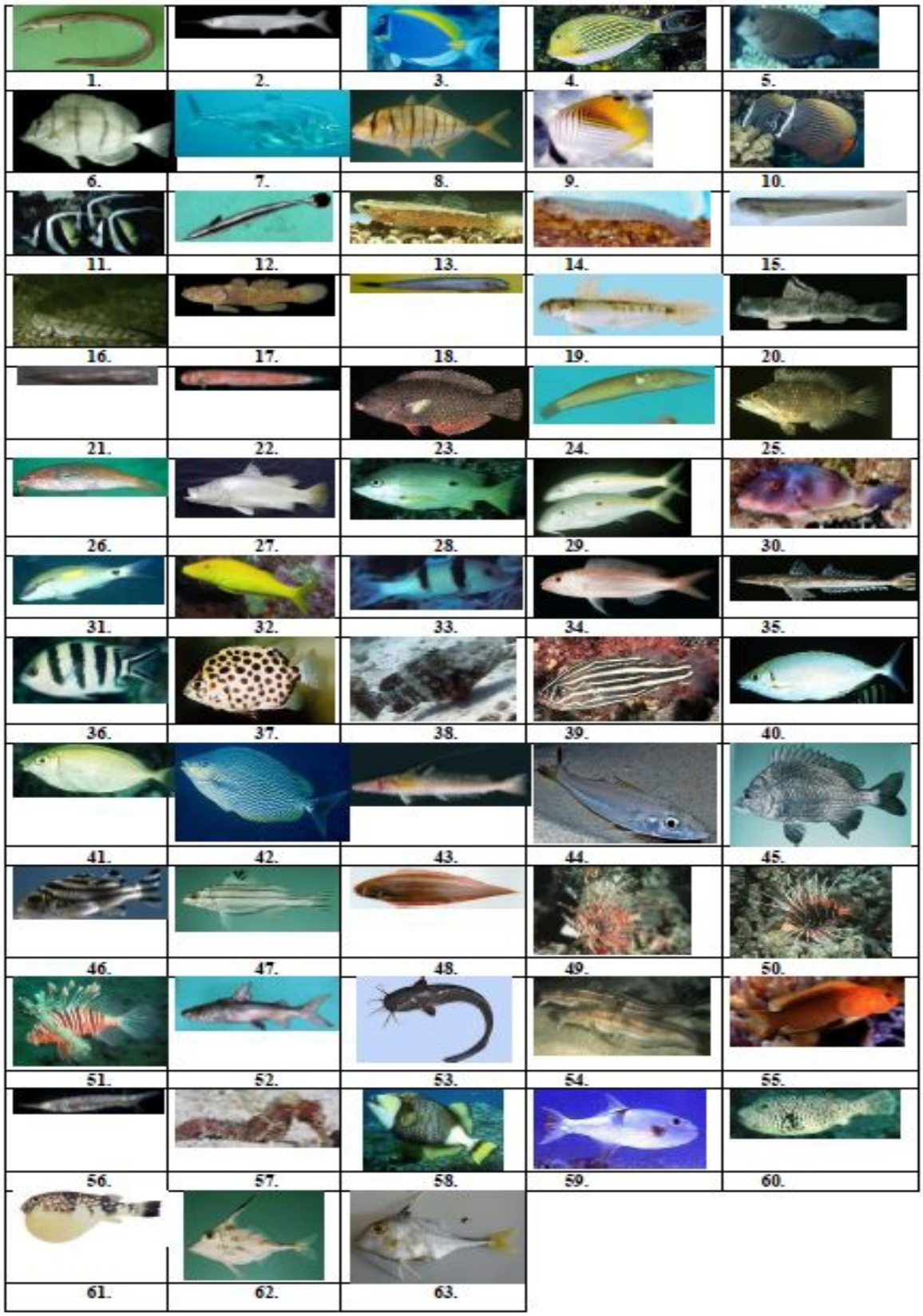

Plate 1 : Diversified Marine Ornamentals Fish of West Bengal

Plate 2 : Marine ornamental fish trade as observed in Gallif Street market and Howrah market

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