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RESEARCH ARTICLE

Checklist of Fishes from Interu Mangrove Swamp of River Krishna Estuarine Region Andhra Pradesh, India

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Abstract

Interu mangrove swamp is located in the North Eastern part of River Krishna estuary. In the present study 60 species of 47 genera, 29 families and 6 orders of fish were recorded form the swamp. Order Perciformes is the dominant whereas Gonorynchiformes, Siluriformes and Beloniformes are least representation. Of which one species each, represented to Vulnerable (VU); Near Threatened (NT); Data Deficient (DD) while 39 species Not Evaluated (NE) and 17 species Least Concern (LC) from the Interu mangrove swamp.

Introduction

River Krishna is one of the largest perennial rivers in east coast of India (next to River Godavari), originating from the Deccan plateau flowing eastwards and opening in the Bay of Bengal near Machilipatnam in Andhra Pradesh. Krishna estuarine system cover an area of 320 Km^2 of which mangrove extends over an area of 25,000 ha which representing 5.13% of India and 42.9% of Andhra Pradesh state mangrove area (Krishna and Rao, 2011). In the Krishna estuarine region, Interu mangrove swamp located in the North Eastern part and extends over an area of 1079 ha covering 560 ha mangrove vegetation (MadhusudhanaRao, 2011). It is a shallow water body with an average depth of 1-3 m and opens into Bay of Bengal with a channel of 200 m wide. During high tide period sea water enters into the swamp through this channel and leaves during low tides. The swamp receives freshwater mainly from distributaries of River Krishna irrigation drains during monsoon and surface runoff of surrounding areas. Depending upon freshwater inflow into the swamp salinity varies.

Mangrove ecosystems are important wetlands along tropical and sub tropical coasts which providing environmental, economical sustainability and also richest storehouses of biological diversity (Kathirsen, 2004; Sandilyan et al., 2010). Even though, the estimated global total mangrove area occupies only 0.1% of (137,760 Km^2) of earth's continental surface (Giri et al., 2011). Of which Mangrove of India occupies 3% of the world mangrove flora (Prabakaran et al., 2014). In the energy food web of coastal mangrove systems detritus appears to be as one of the chief sources of carbon and nitrogen which causes excellent biological productivity (Odum, 1971; Benner et al., 1986; Mohan et al., 1997). Hence mangrove forests act as good nursery grounds for near shore fish and fishery populations and 90% of all marine organisms are resident in the mangrove ecosystem during one or more parts of their life cycle (Adeel and Robert, 2002). Moreover, Indian mangroves harbor 919 floral species and 3066 faunal species. Surprisingly no other country in the world supports so many species in the mangrove ecosystem (Sandilyan et al., 2010). However, such important ecosystems are undergoing degradation due to a combination of physical, biological, anthropogenic and social factors. A variety of human induced stress and factors such as changes in water quality, soil salinity, sedimentation and diversification of freshwater in the upstream are causing mangrove degradation. On the other hand mangrove plants have been eliminated from coast because of grazing cattle/goat, cutting mangrove trees for timber and fire wood and aquaculture activities and industrial development. Upcoming

predictions suggest that 30%-40% of coastal wetlands and 100% of mangrove forests could be lost in the next 100 years if existing rate of decline continue (Duke et al., 2007; William et al., 2013).

However, very little work is known in the Krishna estuarine region and earlier studies on the fish fauna reported that 27 species of Clupeioids by Ankamma and Sharma (1987) and 18 species of gobioids by Luther Das and Sharma (2001). The present work has been taken up to access and document the current status of fish fauna of Interu mangrove swamp which helps for further studies in the conservation and management of estuarine ecosystems in the east coast of India.

MATERIALS AND METHODS

The fish collections were done fortnightly in the Interu mangrove swamp from December 2007 to November 2009 which bordered (in the downstream direction with GPS reference coordination) 16°20'58.0624" N, 81°21'49.3781" E (Figure 1). All the fish species are captured by using stake net measuring 150 cm vertical length×1500 cm total length with stretch mesh size 7.5 cm, 6.5 cm, 5 cm, 3.5 cm and 2 cm and gillnet measuring 5.7–2.3 cm were operated randomly and stake nets were soaked overnight. Then, fish were preserved in 10% formalin for proper species identification and further investigations. All the necessary data of captured fish like morphmetric meristic characters were recorded in fresh condition. Based on the standard taxonomic keys (Day, 1875-78; 1889; Koumans, 1953; Talwar and Kacker, 1984; Talwar and Jhingran, 1991). Fish were identified and the current valid name of each species and IUCN status (Figure 2) were given based on the Fish base (version 06/2014); Catalog of Fishes (CofF version 18 June 2014) and IUCN-2014 (Version 2014.1).

RESULTS AND DISCUSSION

The systematic taxonomic position of the recorded species and their details from the present study site are given in Table 1. A total number of 60 species, 47 genera, 29 families and 7 orders, of fishes were reported during the present investigations. Of which, Perciformes dominates the total fauna with thirty nine (39) species followed by eight (8) species of each by Anguilliformes and Clupeiformes. Scorpaniformes represented by two (2) species whereas Gonorhynchiformes, Siluriformes and Beloniformes were represented by one species each.

The present study reports the following 23 species as new records to the River Krishna estuary; *Moringua raitaborua* (Hamilton); *Gymnothorax meleagris* (Shaw); *Strophidon sathete* (Hamilton); *Pisodonophis boro* (Hamilton); *P.cancrivorus*(Richardson); *Muraenichthys schultzei* Bleeker*; Uroconger lepturus* (Richardson); *Muraenesox bagio* (Hamilton); *Sardinella gibbosa* (Bleeker); *Coilia reynaldi* Valenciennes; *Stolephorus baganensis* Hardenberg; *Ambasis kopsii* Bleeker; *Epinephalus maculates* (Bloch); *Promicrops lanceolatus* (Bloch); *Terapon puta* (Cuvier); *Leiognathus daura* Cuvier; *Lutjanus flaviflammus* (Forsskal); *L. russellii* (Bleeker); *Gerres limbatus* Cuvier; *Acentrogobius cyanomos* (Bleeker); *Psammogobius biocellatus* (Valenciennes); *Brachyamblyopus brachysoma* (Bleeker); *Taeniodes buchanani* (Day). Of these 2 species namely *Muraenichthys schultzei* Bleeker and *Brachyamblyopus brachysoma* (Bleeker) are reported first time from Indian estuaries. In the current study records presence of one species "*Oreochromis mossambicus*" near threatened, one species *Epinephelus lanceolatus* represented as vulnerable; two species *Platycephalus indicus, Taenioides cirratus* are data deficient; 17 species *Pisodonophis boro, Mystus gulio, Hyporhamphus limbatus, Ambassis nalua, Epinephelus maculates, Terapon jarbua, Leiognathus equulus, Eubleekeria splendens, Gerres filamentosus, Gerres limbatus, Mugil cephalus, Butis butis, Eleotris fusca, Boleophthalmus boddarti, Glossogobius giuris, Psammogobius biocellatus, Scatophagus argus* are least concern and remaining 39 species are not evaluated.

In spite of pressure from anthropogenic activities of mangrove swamps of Krishna estuary were overwhelming due to perennial flow of river Krishna and other climatic disturbances. However, current industrialization in the upstream and port activities along core mangroves might obstruct the faunal diversity in the near-future. Krishna and Rao (2011) reported that the degredated due to aquaculture activities and other industrial activities. Further, they reported that changes in the species composition noticed can be attributed to the impacts of solid waste from shrimp and fish ponds effluents released from the surrounding areas and decreased inflow of freshwater from the surrounding areas from the river Krishna due to the construction of dams across the river for use of water for agriculture and other purpose. From the standpoint of conservation, the faunal diversity of Krishna estuarine systems has so far received little attention. Their existence has now come under the threat of a host of anthropogenic activities, of which the habitat distinction is most alarming. The present study reveals that the fish composition of the Interu mangrove swamp is helpful to extend our knowledge of fish communities in the Krishna estuarine systems for conservation and management of east cost mangrove ecosystem. Hopefully, this checklist will be a good reference for current and future studies and also ensure the sustainability of wetland ecosystems and fisheries importance.

Table 1: Taxonomic composition of fish fauna from Interu mangrove swamp.

S. No.	ORDER	FAMILY	SPECIES	IUCN-2014 STATUS
1	Anguilliformes	Moringuidae	*Moringua raitaboura* (Hamilton, 1822)	NE
2		Muraenidae	*Gymnothorax meleagris* (Shaw, 1795)	NE
3			*Strophidon sathete* (Hamilton, 1822)	NE
4		Ophichthidae	*Muraenichthys schultzei* Bleeker, 1857	NE
5			*Pisodonophis boro* (Hamilton, 1822)	LC
6			*Pisodonophis cancrivorus* (Richardson, 1848)	NE
7		Congridae	*Uroconger lepturus* (Richardson, 1845)	NE
8		Muraenesocidae	*Muraenesox bagio* (Hamilton, 1822)	NE
9	Clupeiformes	Clupeidae	*Anodontostoma chacunda* (Hamilton, 1822)	NE
10			*Escualosa thoracata* (Valenciennes, 1847	NE
11			*Sardinella gibbosa* (Bleeker,1849)	NE
12		Engraulidae	*Coilia reynaldi* Valenciennes,1848	NE
13			*Stolephorus baganensis* Hardenberg,1931	NE
14			*Thryssa hamiltonii* Gray, 1835	NE
15			*Thryssa purava* (Hamilton, 1822)	NE
16			*Thryssa setirostris* (Broussonet, 1782)	NE
17	Gonorynchiformes	Chanidae	*Chanos chanos* (Forsskål, 1775)	NE
18	Siluriformes	Bagridae	*Mystus gulio* (Hamilton, 1822)	LC
19	Beloniformes	Hemiramphidae	*Hyporhamphus limbatus* (Valenciennes, 1846)	LC
20	Scorpaeniforms	Platycephalidae	*Grammoplites scaber* (Linnaeus, 1758)	NE
21			*Platycephalus indicus* (Linnaeus, 1758)	DD
22	Perciformes	Ambassidae	*Ambassis kopsii* Bleeker, 1856	NE
23			*Ambassis nalua* (Hamilton, 1822)	LC
24		Latidae	*Lates calcarifer* (Bloch, 1790)	NE
25		Serranidae	*Epinephelus maculatus* (Bloch, 1790)	LC
26			*Epinephelus lanceolatus* (Bloch, 1790)	VU
27		Terapontidae	*Terapon jarbua* (Forssåkl, 1775)	LC
28			*Terapon puta* Cuvier, 1829	NE
29		Sillaginidae	*Sillago sihama* (Forssåkl, 1775)	NE
30		Leiognathidae	*Leiognathus daura* (Cuvier, 1829)	NE
31			*Leiognathus equulus* (Forssåkl, 1775)	LC
32			*Eubleekeria splendens* (Cuvier, 1829)	LC
33		Lutjanidae	*Lutjanus fulviflamma* (Forssåkl, 1775)	NE
34			*Lutjanus johnii* (Bloch, 1792)	NE
35			*Lutjanus russellii* (Bleeker, 1849)	NE
36		Gerreidae	*Gerres filamentosus* Cuvier, 1829	LC
37			*Gerres limbatus* Cuvier, 1830	LC
38		Haemulidae	*Pomadasys maculates* (Bloch1793)	NE
39		Polynemidae	*Eleutheronema tetradactylum* (Shaw, 1804)	NE
40		Mullidae	*Upeneus sulphureus* Cuvier, 1829	NE
41		Drepaneidae	*Drepane punctata* (Linnaeus, 1758)	NE
42		Mugilidae	*Mugil cephalus* Linnaeus, 1758	LC
43			*Valamugil speigleri* (Bleeker, 1958)	NE
44		Cichlidae	*Oreochromis mossambicus* (Peters, 1852)	NT
45		Eleotridae	*Butis butis* (Hamilton, 1822)	LC
46			*Eleotris fusca* (Forster, 1801)	LC
47		Gobiidae	*Stigmatogobius sadanundio* (Hamilton,	NE

			1822)	
48			*Boleophthalmus boddarti* (Pallas, 1770)	LC
49			*Pseudapocryptes elongates* (Cuvier, 1816)	NE
50			*Brachyamblyopus brachysoma* (Bleeker, 1853)	NE
51			*Taenioides buchanani* (Day, 1873)	NE
52			*Taenioides cirratus* (Blyth, 1860)	DD
53			*Trypauchen vagina* (Bloch & Schneider, 1801)	NE
54			*Acentrogobius cyanomos* (Bleeker, 1849)	NE
55			*Acentrogobius viridipunctatus*(Valenciennes,1837)	NE
56			*Glossogobius giuris* (Hamilton, 1822)	LC
57			*Psammogobius biocellatus* (Valenciennes, 1837)	LC
58			*Yongeichthys criniger* (Valenciennes, 1837)	NE
59		Scatophagidae	*Scatophagus argus* (Linnaeus, 1766)	LC
60		Sphyraenidae	*Sphyraena jello* Cuvier, 1829	NE

Abbreviations: NE = Not Evaluated; LC = Least Concern; DD = Data Deficient;
NT = Near Threatened; VU=Vulnerable

Fig 1. Aerial view of Interu mangrove swamp of River Krishna estuarine region.

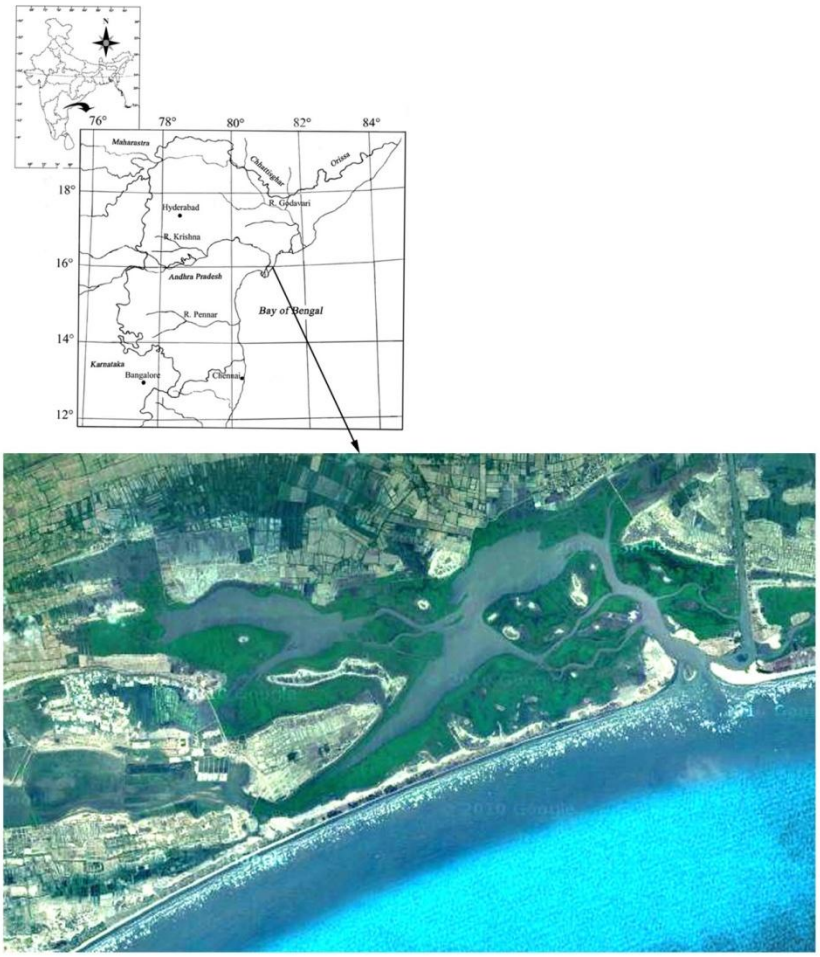
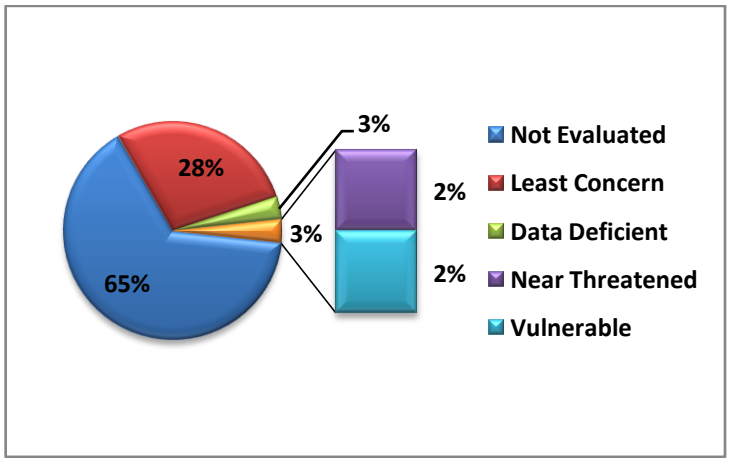


Fig 2. IUCN (2014) statuses of fish fauna from Interu mangrove swamp.



Abbreviations: NE = Not evaluated; LC = Least Concern; DD = Data deficient; NT = Near Threatened; VU= Vulnerable

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