



Checklist of Fishes from the Estuarine waters of River Vamsadhara at Kalingapatnam coast in Srikakulam district of Andhra Pradesh, India.

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Abstract

Vamsadhara river which is also called as Bnshaadhara in Odisha is a minor, yet Perennial flows for about 254 kms long starting from the boarder of Thuamul Rampur in the Kalahandi district of Odhisha enters in to Srikakulam district at Pathapatnam Mandal in Andhra Pradesh till it connects to Bay of Bengal at Kalingapatnam Coast. The present study conducted to report the fish diversity in the estuarine (River mouth) waters of the Vamsadhara river at Kalingapatnam (Geographical coordinates of Lat. 18.3387⁰N and Long. 84.1211⁰E) and Rajaramapuram (Lat.18.5835⁰ N and Long. 83.8995⁰ E) which resulted in the identification of total 32 species of fishes under 29 genera, 21 families and 10 Orders. Checklist of fishes was provided along with IUCN Status. In our findings one species that is *Arius gogora* is listed as Nearly Threatened, while *Channa orinetalis* is listed as Vulnerable as per the IUCN Red Data list. Three more species *Thryssa malabarica*, *Platycephalus indicus* and *Taenioides cirratus* are categorized as Data Deficient, Five species, including *Glossogobius giuris*, *Eleutheronema tetradactylum*, *Valamugil cunnesius*, *Liza parsia* and *Arius jella* caterogized as Not Evaluated. The remaining species are belongs to Least Concern. The estuarine area of Vamsadhara sustains a subsistence fishery that supports the livelihood of the fishermen communities in its surrounding villages.

Key words: Vamsadhara Estuary, Kalingapatnam, Fish Species, IUCN Status

Introduction:

Biodiversity broadly refers to the variety and variability of the living organisms of the particular area. It is assessed at different levels, from Genus to Ecosystem, with species -level diversity being the most generally used measure. Indian estuaries are home to a wide range of fish species, reflecting the rich diversity of fish fauna. Fish is a good source of protein, vitamins and essential nutrients serve as vital food resources and they act as key indicators of the ecological health of the waters they inhabit.

India considered as one of the mega diversity country. At present, of the recorded 24,000 species of fin fishes in the world, about 2364 species of marine, brackish and fresh water fishes are known to occur in India and India is home to 930 fresh water fish species belongs to 326 genera, 99 families and 20 orders (Talwar and Jhingran, 1991), is eighth in the world and third in Asia in fresh water fish diversity (Kottelat and Whitten, 1996). Diversity of fresh water fish species have been studied by Motawani and Saigal (1974), Ghate and Wagh (1995). Sir Francis Day studied the systematic of Indian fishes for over 20 years and listed 351 genera and 1418 species marine, brackish and fresh water fishes in 1868. Later Alcock added 200 species.

Fisheries play a crucial role in our nation's economy, serving as an alternative food resource for the growing population. Due to its significant contribution in socio-economic landscape the fisheries sector is considered as Engines of Growth and offering both nutritious food and creating income and employment opportunities for many communities. India ranks as the third largest fish producing nation globally and is the second largest producer of aquaculture fish. The country accounts for approximately 7% of the world's total fish production and harbours over 10% of global fish diversity making it one of the 17 mega diverse countries.

The fisheries sector, along with related activities, supports the livelihoods of around 14 million people. Andhra Pradesh leads as the top fish producing state, followed by West Bengal and Gujarat. India exports nearly 50 different varieties of fin and shell fish products to about 75 countries worldwide. In recent times fish and fish products have become the largest category in India's agricultural exports, with 13.77 lakh tonnes in quantity and value of ₹ 45,106.89 crore. These exports account for approximately 10% of the country's total exports and nearly 20% of its agricultural exports. The sector contributes around 0.91% to India's GDP and 5.23% to the country's agricultural Gross Value Added(GVA).

An Estuary is a semi- enclosed coastal body of water that maintains an open connection with the sea, where seawater is measurable diluted by freshwater from rivers, land and drainage. Estuaries are highly dynamic ecosystems, supporting diverse habits with distinctly diverse biotic communities. In recent times, however, these systems have been subjected to various stress factors. Loss of ecological services, including the fishery and biodiversity, has become the hallmark of the estuarine ecosystems in the country. Estuaries are the extremely exploited ecosystems, being very closely associated with the humans throughout the globe. It shows that there must be a proper protocols for the effective management of fisheries along with conservation of biodiversity.

Fish are a diverse and abundant part of estuarine ecosystem and there is extensive research on the composition, structure, dynamics and functioning of their communities. Estuarine fish assemblage have been studied across the globe, through the number and depth of studies vary significantly by region (Global analyses by Vasconcelos et al., 2015; Henriques et al., 2107 a,b). Major research has been concentrated in estuaries located in Europe, North America, South Africa and Australia (Whitefield, 1998; Blaber ,2000; Ellitt and Hemingway, 2002; Harrison, 2003; Nagelkerken, 2009; Sheaves and Johnston, 2009; Nicolas et al., 2010).

India has extensive estuarine and brackish water resources along its east and west coasts. According to the Government of India (2000), India's total brackish water resources are projected to be 1.44 million hectares. Orissa, Gujarat, Kerala and West Bengal all have abundant brackish water resources. Andhra Pradesh with a long coastal line of 974 kms and a continental shelf are of 33,227 kms is spread over nine districts. The state has approximately 2.0 lakhs hectares of brackish water and 27,500 hectares of mangrove swamps. The North Eastern Andhra is made up of three districts of Andhra Pradesh state Vishakhapatnam, Vizianagaram and Srikakulam. One of the important rivers in North Eastern Andhra is the River Vamsadhara.

The Vamsadhara River is a minor but perennial river that originates at the border of Thuamul Rampur in the Kalahandi district and Kalyansinghpur in the Rayagada district of Odisha. The Vamsadhara River is a major river in the east flowing basin between the Mahanadi and Pennar basins. It flows for about 254 kilometers, initially passing through Odisha before entering the Pathapatnam taluk in the Srikakulam district of Andhra Pradesh. After flowing eastward for approximately 30-40 kilometers in Srikakulam, the river empties into the Bay of Bengal at 18°21'N, 84°08'E, near Kalingapatnam (Fig-01), just north of Srikakulam town. The

width of the river is approximately 700 meters and widens further about 2 kilometres upstream from its mouth, where it divided into two branches with an island like landmass between them. The branches rejoin to form a single stream with a narrow opening into the sea. A sandbar formation at the mouth makes the estuary shallow for most of the year, except the rainy season. Due to limited freshwater discharge, deposition of silt and clay at the mouth is also limited. The absence of mudflats, mangroves and swamps has further limited the colonization of benthic life and faunal diversity which results in the limited faunal diversity of the study area in addition to its shallow nature and low fresh water discharge. The current study aims to give up-to-date information on the fish species found in this estuarine area mainly the selected stations like Kalingapatnam and Rajaramapuram.

Materials and Methods:

A survey was conducted at estuarine areas of River Vamsadhara and collections of fish specimens were made at localities that are close to the river mouth and its vicinity only. The sample collection sites are (Fig-1) Kalingapatnam (18.343629 N, 84.116297 E) and Rajaramapuram (18.354871 N, 84.118357 E) from February 2023 to January 2024. The samples were collected with help of local fishermen by using Seine net, bag net, cast net, gill net, scoop net, drag net, stake net, trap net of varying mesh size, hooks and line. Freshly collected fish were carefully cleansed and photographed. These fish were taken to the lab and fixed in glass jars before being preserved in 8-10% formalin solution (Jayaram,K.C 1999). The fish were identified to the species level using keys for Indian subcontinent fish. The identification of specimens was effected with the help of available standard literature Day, 1875-78, 1888; Munro, 1955, 2000; Fischer and whitehead, 1974; Fisher and Bianchi, 1984; Talwar and Kacker, 1984; Smith and Heemstra, 1986; Barman, R.P.1993, Day. F 1994, Jayaram K.C.1999, 2011; Nath, P and Dey, S.C, 2000; Talwar P.K AND Jingran A.G, 1991; Froese. R and D. Pauly, 2023; Fischer, W. and G. Bianchi (1984). Other relevant literatures consulted during the study are given under respective species. The IUCN (2023) conservation status of the fish species has been listed.

Results and Discussion:

The present paper is the recent report of the Ichthyofauna of Vamsadhara estuarine waters of Srikakulam District in Andhra Pradesh. All the recorded fish species are represented in the checklist (Table-1). 32 species under 29 genera belonging to 21 families and 10 orders of fishes were reported during our investigation. Order Perciformes has 8 families with 12 species, Clupeiformes has 3 families with 5 species, order Siluriformes has 2 families with 3 species,

orders Cypriniformes and Mugiliformes have 1 family with 3 species each, order Anguilliformes has 2 families with 2 species, orders Beloniformes, Gonorhynchiformes, Scorpaeniformes and Pleuronectiformes have one family and one species each. Of all the above orders, Perciformes dominates the total fish fauna with 12 species followed by 5 species of Clupeiformes, followed by orders Siluriformes, Cypriniformes and Mugiliformes with 3 species each, followed by Anguilliformes with 2 species and orders Beloniformes, Gonorhynchiformes, Scorpaeniformes and Pleuronectiformes were represented by one species each (Fig-3). Present IUCN status of each species also mentioned in the checklist. Among them 69 % of the fish species are Least Concern and 16% Not Evaluated and 9% Data Deficient and 3% belongs to vulnerable and again 3% of fishes belongs to Near Threatened (Fig-2).

The current study records presence of one species “*Arius gogora* (Hamilton 1822)” is as Near Threatened, one species *Channa orientalis* (Bloch & Schneider 1801) represented as Vulnerable; Three species *Thryssa malabarica* (Bloch 1795), *Platycephalus indicus* (Linnaeus 1758), *Taenioides cirratus* (Blyth, 1860) are Data Deficient; 5 species *Glossogobius giuris* (Hamilton 1822), *Eleutheronema tetradactylum* (Shaw 1804), *Valamugil cunnesius* (Valenciennes 1836), *Liza parsia* (Hamilton 1822), *Arius jella* (Day 1877) are Not Evaluated and remaining 22 species (Table-1) are belongs to Least Concern category.

It was observed that *Arius gogora* has been recorded in this area which shows extension of its distribution range, as it was previously reported only from Odisha and West Bengal in India. Approximately 80% of the fish species documented in our study are commercially important. Some species highlighting the need for further research to understand its biology, status, distribution and habitat use. This study will be valuable if proper management strategies can be developed for the Near Threatened Species i.e *A. gogora*. Changes in species composition in the Vamsadhara estuarine system have been linked to several other factors such as the impact of solid waste form aquaculture pond effluents and limited freshwater inflow.

Conservation point of view, the faunal diversity of the Vamsadhara estuarine system has been largely overlooked and now it is facing significant threats from various anthropogenic activities in the name of development, habitat destruction is the most concerning issue here. The Current study provides valuable insights into the fish composition of the Vamsadhara estuarine waters, enhancing our understanding about the fish assemblages within this estuarine system and contributing to the conservation and management of the North Coastal brackish water ecosystem. This checklist is anticipated to serve as a useful reference for both current and future

research and to support the sustainability of wetland ecosystems and the importance of fisheries.

Table: I-Check list of fishes of Vamsadhara Estuary:

Sl.No	Order	Family	Name of the Species	IUCN Status
01.	Angulliformes	Ophichthidae	<i>Pisbdonophis boro</i> (Hamilton 1822)	LC
02.		Muraenidae	<i>Strophidon sahete</i> (Hamilton 1822)	LC
03.	Clupeiformes	Clupeidae	<i>Sardinella fimbriata</i> (Valenciennes,1847)	LC
04.		Pristigasteridae	<i>Opisthopterus tardoore</i> (Cuvier 1829)	LC
05.		Engraulididae	<i>Stolephorus andhraensis</i> (Rao 1966)	LC
06.			<i>Stolephorus indicus</i> (Van Hasselt 1823)	LC
07.			<i>Thryssa malabarica</i> (Bloch 1795)	DD
08.	Gonorhynchiformes	Chanidae	<i>Chanos chanos</i> (Forsska 1775)	LC
09.	Cypriniformes	Cyprinidae	<i>Cirrhinus reba</i> (Hamilton 1822)	LC
10.			<i>Labeo boga</i> (Hamilton 1822)	LC
11.			<i>Puntius ticto</i> (Hamilton 1822)	LC
12.	Siluriformes	Bagridae	<i>Mystus gulio</i> (Hamilton 1822)	LC
13.		Ariidae	<i>Arius gogora</i> (Hamilton 1822)	NT*
14.			<i>Arius jella</i> (Day 1877)	NE
15.	Mugiliformes	Mugilidae	<i>Liza parsia</i> (Hamilton 1822)	NE
16.			<i>Mugil cephalus</i> (Linnaeus 1758)	LC
17.			<i>Valamugil cunnesius</i> (Valenciennes 1836)	NE
18.	Beloniformes	Hemiramphidae	<i>Hyporhamphus limbatus</i> (Valenciennes 1847)	LC
19.	Scorpaeniformes	Platycephlidae	<i>Platycephalus indicus</i> (Linnaeus 1758)	DD
20.	Perciformes	Latidae	<i>Lates calcarifer</i> (Bloch 1790)	LC
21.		Teraponidae	<i>Terapon jarbua</i> (Forsskal 1775)	LC
22.			<i>Terapon theraps</i> (Cuvier 1829)	LC
23.		Sillaginidae	<i>Sillago sihama</i> (Forsskal 1775)	LC
24.		Scatophagidae	<i>Scatophagus argus</i> (Linnaeus 1766)	LC
25.		Mullidae	<i>Upeneus sulphureus</i> (Cuvier 1829)	LC
26.		Polynemidae	<i>Eleutheronema tetradactylum</i> (Shaw 1804)	NE
27.		Gobidae	<i>Acentrogobius viridipunctatus</i> (Valencien 1837)	LC
28.			<i>Taenioides cirratus</i> (Blyth,1860)	DD
29.			<i>Glossogobius giuris</i> (Hamilton 1822)	NE
30.			<i>Oligolepis acutipennis</i> (Valenciennes 1837)	LC
31.		Channidae	<i>Channa orientalis</i> (Bloch&Schneider 1801)	VU
32.	Pleuronectiformes	Cynoglossidae	<i>Cynoglossus puncticeps</i> (Richardson 1846)	LC

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

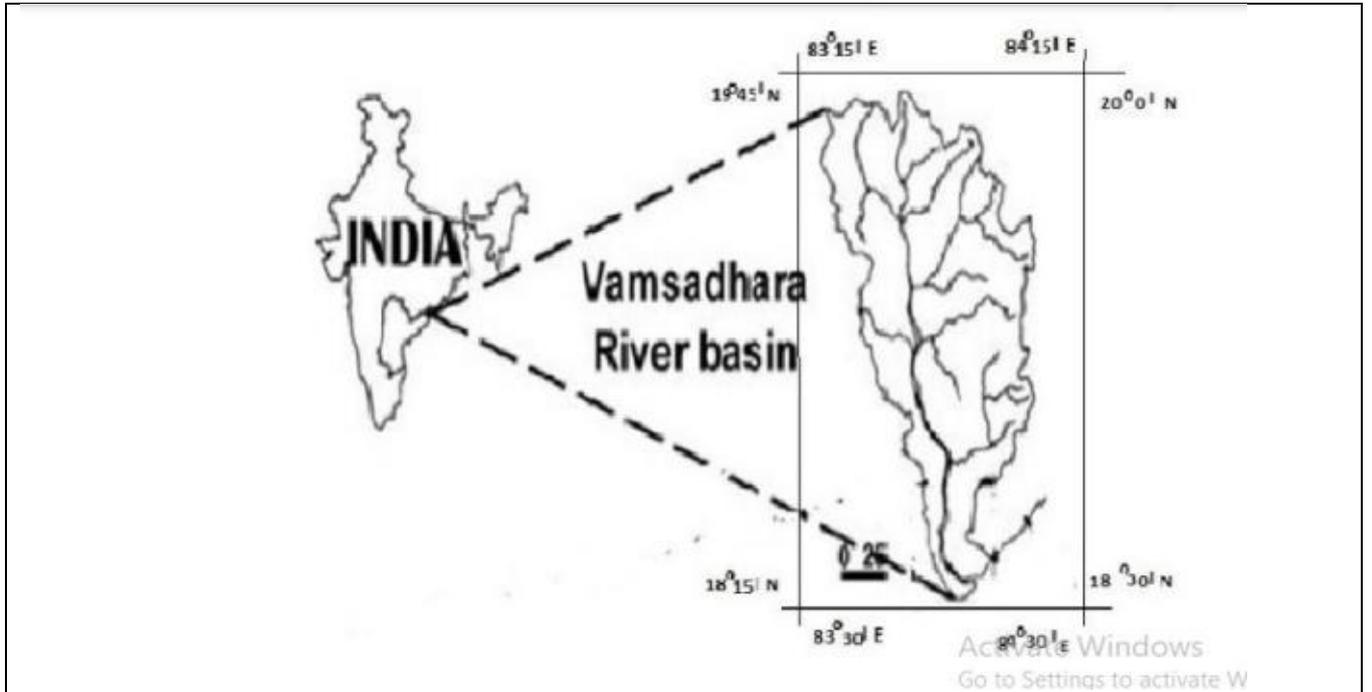
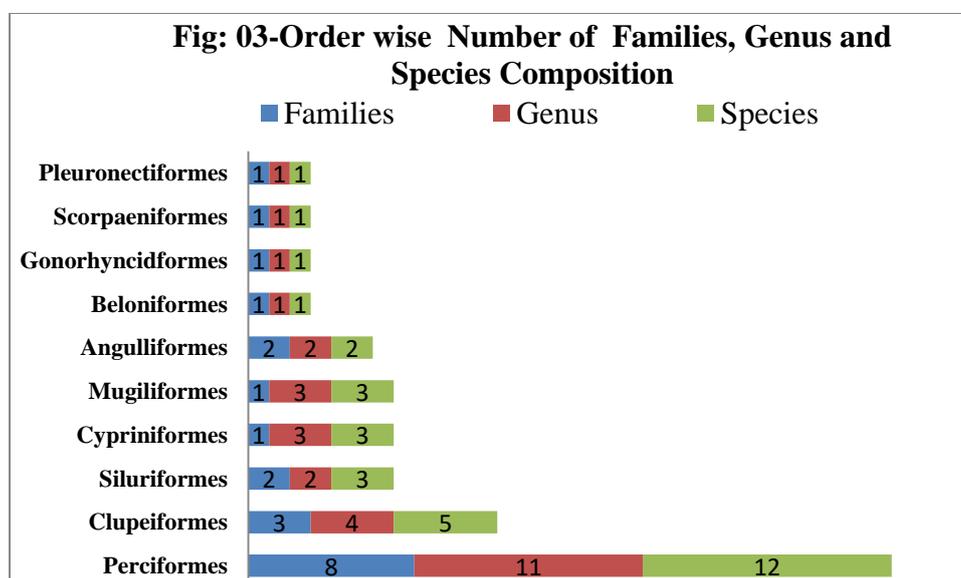
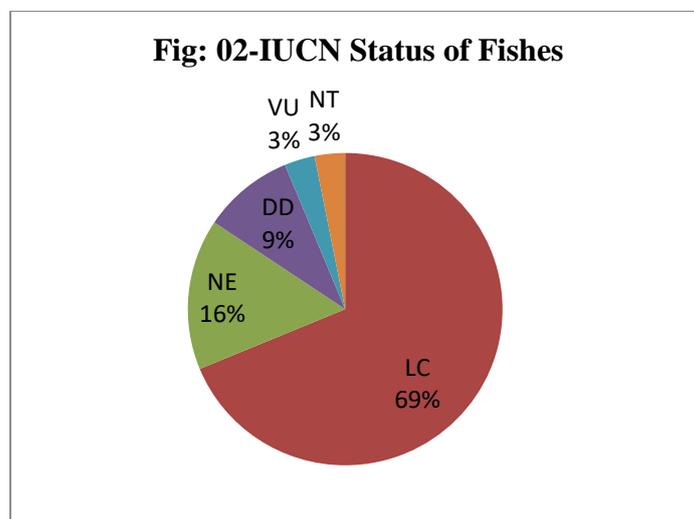


Figure-01:Map Showing Kalingapatnam and Rajarampuram Study Areas Of Vamsadhara Estuary Of Srikakulam District in A.P, India.



Acknowledgements: The authors would like to thank to the Commissioner, Commissionerate of Collegiate Education, Andhra Pradesh, and Principal Govt. Degree & PG College (A), Kakinada for providing necessary facilities.

Competing Interests: Authors have declared that no competing interest exist.

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