ISSN NO. 2320-5407

*Journal homepage: http://www.journalijar.com*

*INTERNATIONAL JOURNAL OF ADVANCED RESEARCH*

**RESEARCH ARTICLE**

# Fish faunal Diversity and Conservation Status of River Krishna at Vijayawada Region, Andhra Pradesh, India.

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## *Manuscript Info*

***Manuscript History:***

Received: 15 June 2015
Final Accepted: 26 July 2015
Published Online: August 2015

***Key words:***

Fish fauna, River Krishna, Conservation and IUCN status

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## *Abstract*

Rivers conserve a variety of fish fauna which is the most important ones directly or indirectly influence human health and wealth. Fishery resources are finite but renewable. If placed under sound management before overfishing has caused irreversible effects, the fisheries can be conserved and maintained so as to provide optimum yields on a continuing basis. The present study deals with the fish fauna of River Krishna at Vijayawada region, over a period of one year from July 2013 to June 2014. The results of the investigation reveals at occurrence of 41 species belong to 6 orders, 12 families and 27 genera. Among the species order Cypriniformes consisting 46.34%, order Siluriformes goes to 21.95%, order Perciformes 19.51%, order Osteoglossiformes and Synbranchiformes goes 4.87% each and Baloniformes goes to 2.43% of the total fish species. The detailed of the discussion on the fish fauna and IUCN status also presented.



## INTRODUCTION

India is one of the mega diversity countries in the world and occupies ninth position in terms of freshwater mega biodiversity (Shinde et al., 2009). Potentially, the inland fish resources of India are richest in the world with an assemblage of 930 species belonging to 326 genera (Talwar and Jhingran, 1991). River Krishna is one among the longest rivers of south central India. The length of river Krishna is nearly 1,400 km. Its place of origin is at Mahabaleswar near the Jor village in the far north of Wai taluka in Satara district of Indian state of Maharashtra in the west. The river flows into the Bay of Bengal at Hamasaladevi village of Andhra Pradesh located at east-coast. Vijayawada is the largest city that is situated on the bank of river Krishna.

Fish faunal diversity refer to the variety of fish species depending on the scale and context, it could refer to alleles or genotypes within fish population to species of life forms within a fish community and species or life forms across aqua regimes (Burton et al., 1992). Fish constitute half of the total number of vertebrates in the world and live in almost all conceivable aquatic habitats. Approximately 22,000 species of fishes have been recorded around the world out of which 11% are found in India, i.e. about 2,500 species of fishes of which, 930 live in freshwater (Jayaram, 1999) and 1,570 are marine (Kar et al., 2003). About 158 species in 68 genera belonging to 27 families of 10 orders were reported in Andhra Pradesh by Barman (1993). Biodiversity is essential for stabilization of ecosystem, protection of overall environmental quality for understanding intrinsic worth of all species on Earth (Vijaykumar, 2008). Fishes have declined at a faster rate from the last decades due to habit degradation, diminishing water quality and over exploitation. Conservation of water bodies and their quality is the conservation of fishes and all other aquatic organisms (Moyle et al., 1992). In this context, the present investigations were undertaken to explore the fish faunal diversity of River Krishna at Vijayawada and to propose recommendation for future planning.

## Materials and Methods:

For the present study, data of the River Krishna have been collected during the period of 2013-14. The river is situated in between the latitude 16° 31' Longitude 80° 39'. The fishes were collected from three stations of the river namely Bhavanipuram, Thummalapalem and Ibrahimpatnam(Ferri) during the period of July 2013 to 2014 June with the help of local fishermen using different types of nets i.e. Cast nets, Gill nets, Drag nets and Hook lines. The fish samples were preserved in 5% formalin and brought to the laboratory for identification. The identification of fishes was done with the help of standard taxonomic references (Day, 1986, Talwar and Jhingran, 1991, Jayaram, 2002 and Jayaram, 2010).

**Table-1: Fish faunal diversity and IUCN status of River Krishna**

| S.NO | Order | Family | Species | IUCN Status |
|---|---|---|---|---|
| 1 | Osteoglossiformes | Notopteridae | *Notopterus notopterus* | LC |
| 2 | | | *Chitala chitala* | NT |
| 3 | Cypriniformes | Cyprinidae | *Catla catla* | NE |
| 4 | | | *Cirrhinus mrigala* | LC |
| 5 | | | *Cirrhinus reba* | LC |
| 6 | | | *Hypselobarbus lithopidos* | DD |
| 7 | | | *Labeo fimbriatus* | LC |
| 8 | | | *Labeo calbasu* | LC |
| 9 | | | *Labeo rohita* | LC |
| 10 | | | *Osteobrama cotio* | LC |
| 11 | | | *Osteochilichthys brevidorsalis* | LC |
| 12 | | | *Puntius thomassi* | CR |
| 13 | | | *Pantius sarana* | LC |
| 14 | | | *Pantius sophore* | LC |
| 15 | | | *Pantius ticto* | LC |
| 16 | | | *Laubuca fasciata* | VU |
| 17 | | | *Salmostoma clupeoides* | LC |
| 18 | | | *Amblypharyngodan mola* | LC |
| 19 | | | *Barilius bendelisis* | LC |
| 20 | | | *Esomus danricus* | LC |
| 21 | | | *Rasbora rasbora* | LC |
| 22 | Siluriformes | Bagridae | *Sperata seenghala* | LC |
| 23 | | | *Mystus bleekeri* | LC |
| 24 | | | *Mystus cavasius* | LC |
| 25 | | | *Mystus vittatus* | LC |
| 26 | | Siluridae | *Ompok bimaculatus* | NT |
| 27 | | | *Ompok pabda* | NT |
| 28 | | | *Wallago attu* | NT |
| 29 | | Schelbeidae | *Clupisoma garua* | LC |
| 30 | | Pangasiidae | *Pangasius pangasius* | LC |
| 31 | Baloniformes | Belonidae | *Xenentodon cancila* | LC |
| 32 | Perciformes | Channidae | *Channa marulius* | LC |
| 33 | | | *Channa punctatus* | LC |
| 34 | | | *Channa striata* | LC |
| 35 | | Ambassidae | *Chanda nama* | LC |
| 36 | | | *Chanda ranga* | LC |
| 37 | | Cichlidae | *Etroplus suratensis* | LC |
| 38 | | | *Etroplus maculates* | LC |
| 39 | | Gobiidae | *Glossogobius giuris* | LC |
| 40 | Synbranchiformes | Mastacembelidae | *Mastacembelus armatus* | LC |
| 41 | | | *Macrognathus aral* | LC |

LC-Least concerned, DD-Data Deficient, NT-Near Threatened, VU-Vulnerable, CR-Critically Endangered and NE-Not Evaluated.

**Fig 1: Species percentages under various threat categories as per IUCN**

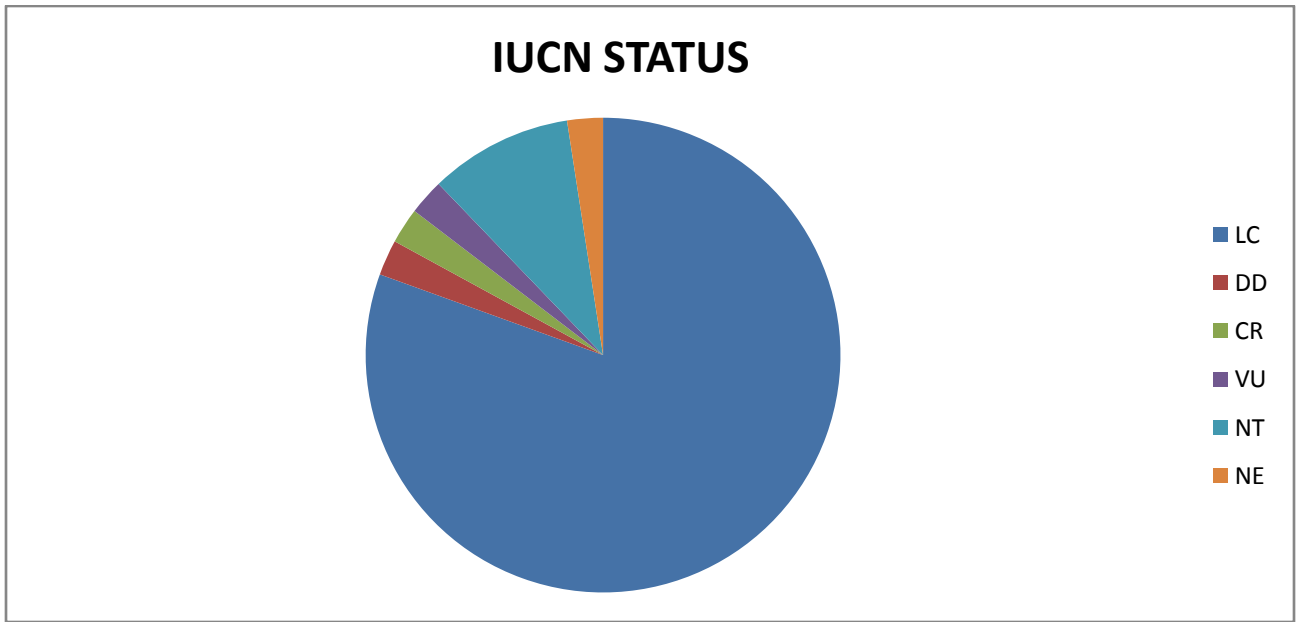
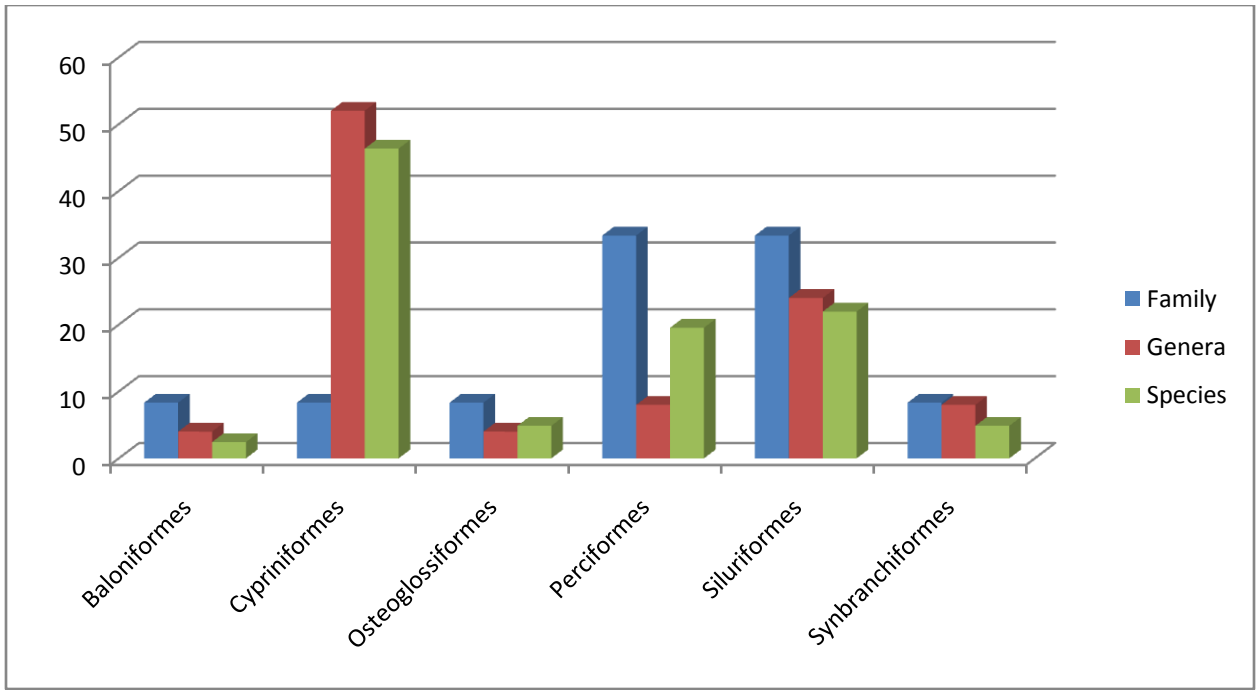



**Table-2: Number and percentage composition of families, genera and species under various orders.**

| S.No | Order | Families | Genera | Species | % of families in an Order | % of Genera in an Order | % of species in an Order |
|---|---|---|---|---|---|---|---|
| 1 | Baloniformes | 1 | 01 | 01 | 8.33% | 4% | 2.43% |
| 2 | Cypriniformes | 1 | 13 | 19 | 8.33% | 52% | 46.34% |
| 3 | Osteoglossiformes | 1 | 01 | 02 | 8.33% | 4% | 4.87% |
| 4 | Perciformes | 4 | 02 | 08 | 33.33% | 8% | 19.51% |
| 5 | Siluriformes | 4 | 06 | 09 | 33.33% | 24% | 21.95% |
| 6 | Synbranchiformes | 1 | 02 | 02 | 8.33% | 8% | 4.87% |

**Fig: 2: Percentage contributions of family, genera and species under various orders.**




## Results and Discussion:

Inland fisheries in India have great potential of contribution to the food security to the country. Rivers and lakes are the main resources of exploited for inland fisheries and understanding of the fish faunal diversity is a major aspect for development and sustainable management. In the present study 41 fish species belonging to 6 orders and 12 families were recorded from 3 stations including the Bhavanipuram, Tummalapalem and Ibrahimpatnam at Vijayawada, (Table.1) and IUCN status also given (Fig.1). The member of order Cypriniformes was dominated by 19 species followed by Siluriformes and Perciformes with 9 and 8 species each. Osteoglossiformes and Synbranchiformes contribute 2 species each while Baloniformes with 1 species. In the present study, family Cyprinidae was comparatively more dominant (46.34%) and followed by Siluriformes and Perciformes (Table.2). Most of the earlier viz, Shinde et al., (2009), Ubarhande et al., (2011), Nagma and Khan (2013) etc. have reported the strong dominance of Cyprinidae family in their investigation on fish faunal diversity in the various river systems.

The physical habit variation able to play key role in the distribution of fishes in this area and the habitat alterations and fragmentation brought about the significant effect on the fresh water fish fauna. It is observed that the habitat attributes, water depth and dissolved $O_2$ are key habitat features and may directly influence the fish fauna. De Silva et al., (2007) reported that the variations in habitats attributes like dissolved $O_2$, turbidity and other parameters are responsible for variations of species diversity and distribution. Similar pattern of habitat attributes has been observed by Aadland (1993) and Shahnawaz et al., (2010). Peres-Neto (2004) reported that the species occurrence are driven more by relationship with abiotic factor than species interaction.

Fish communities in the revirine system typically follow a pattern of increasing species richness, diversity and abundance from upstream and downstream (Granado, 2000). The river is fragmented due to lack of water, damming and multiple water use but supported more species as compared to downstream might be to positive influence of reservoirs connected with the river in this region as well as due existence of more open river, slow river and pool habitats along with macrophytes which might have importance in fish assemblage and aggregation (Raghavan et al., 2008a, 2008b). Open river habitat was the most preferred habitat for fishes inhabited in the tropical rivers (Arunachalam, 2000; Sarkar et al., 2010). According to Bunn and Arthington (2002), the river system has been lost the populations of many fish species have become highly fragmented due to human intervention. The reason of this area degradation due to high sedimentation rate, pollution, thermal power plants and industrial waste may cause of exploitation of fishes. Sreekanth and Ramachandra (2005) recorded the low fish richness due to degradation of breeding grounds from Linganamakka reservoir on Sharavathi River. Habitat fragmentation of damming has serious consequences in terms of alternative life history strategies (Morita et al., 2009).

Aruanachalam et al., (2012) recorded 14 species of freshwater fish from Dhom reservoir. Kharat et al., (2003) reported 22 fish species in Dhom reservoir which is an under representation compared to checklists from other tributaries of the Krishna River system. Similar results reported by Jadhav et al., (2011) and Dahabukar et al., (2012). The fish fauna of Krishna River near Prakasam barrage is threatened due to several factors including heavy harvesting of fish resources, competition and predation by introducing species and habitat degradation due to pollutants. Ghate et al., (2002), Kharat et al., (2003) and Dahanukar et al., (2012) reported that the suspected pollution of the river and heavy harvest of the fish resources as possible causes for decline of the species from other fishes. Many of these effects of habitat fragmentation due to damming are not immediate but rather occur gradually over several generations (Fukushima et al., 2007). Hence we summarized the probable interlinking induced changes on the habitat as well as fish populations effective strategies can be adapted up to the effective conservation agencies for sustainable fish biodiversity. The fish faunal diversity of Krishna river near Prakasam barrage constitute a valuable natural resources in economics, aesthetic, scientific and educational terms and conservation and management are critical to the interests of human kind itself. The information collected from the local people and fishermen of the area reveals high decline in the fish population in the last decade (Dey et al., 2013). This may due to uncontrolled fishing to meet the high market demand of the local fishes. In addition, the fishing activities were intensified with the introduction of modern fishing gear and techniques. In view of the unscientific practices there is need to take care certain conservation and approach to control of drastic change in fishery and to save some of the valuable species from wiping out of the region. The use of indigenous fishing gears which are eco friendly as well as sustainable need to be encouraged instead of modern gears (Shinde et al., 2009). To this may all concerned, conservationists, government and NGO organizations have a major role to play in creating awareness and support for the conservation mechanism of the fish species.

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