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Research Article

Ichthyofaunal Diversity of Erracheruvu in Siddipet District, Telangana State, India

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Abstract

Studies were conducted on the Ichthyofaunal diversity of Erracheruvu in Siddipet District of Telangana State for a period of three years - from June 2015 to May 2018. Four distinctive locations were selected for the study. Fish belonging to 29 species, 19 genera, 6 orders, and 12 families were recorded in this study. Of the 13 recorded species, Order Cypriniformes was the most dominant among the 6 orders followed by Order Siluriformes with 7 species. Of the recorded species 4 represent Order Perciformes and 3 represent Channiformes. Order Osteoglossiformes and Order Antherniformes were represented by single species each.

Keywords: Fish Diversity; Environmental Factors; Fish Abundance

Introduction

Around 60 million people in developing countries depend on fish and their by-products to meet their nutritional needs [17]. The continuous increase in fish trade value around the world clearly indicates the increasing demand for fishing products. Better preservation conditions and industrialization contributed significantly to the growth of the fish trade [15]. Essential nutrients such as proteins, fat oils, and micronutrients available in inland fishes can help to fight against malnutrition around the world [19]. Easily digestible fish proteins provide us with many essential amino acids such as tryptophan, cystine, lysine, methionine, and threonine [26].

Around 33 percent of the world population is suffering from chronic hunger and many more people are suffering from micronutrient deficiency [18]. It is estimated that the number of undernourished people increases from 678 million (in 2018) to 841 million (by 2030) [5]. On the other hand, millions of people suffer from obesity due to the overconsumption of red meat and fast foods [26]. Since 1975, obesity cases were increased by three folds making almost 13 percent of the world's adult population obese [31]. One of the major consequences of obesity is cardiovascular diseases which account for 17.8 million deaths annually. A 21.1 percentage of increase was found in the death rate due to cardiovascular diseases between 2007 and 2017 [22]. The number of deaths for the same period was found to be 9.0 million due to cancers, and 1.6 million due to diabetes-related [20,29,30].

Fish meat is the single solution for both undernutrition and over-nutrition-related complications. It is an alternative animal product to meet our food needs [25]. 17% of animal proteins and 7% of the total proteins we consume globally come from fish meat [5]. It provides us with all the required nutrients such as proteins, essential fatty acids, and micronutrients [28]. As per the WHO recommended protein standards, fish proteins composition and digestibility range from 77 to 98.7% [21]. Nutraceuticals is the branch of science that deals with the treatment of diseases that are due to malnutrition by providing suitable food materials or the bioactive molecules available in those food materials. Fish and its by-products are important tools in this field as they are proven to be cheap dietary supplements [24].

Fisheries and aquaculture not only help humankind in winning the combat against hunger and malnutrition but also improves food and nutrition security [18]. Apart from meeting our food needs,

the aquaculture industry provides either full-time or part-time job opportunities to sixty million people almost 10 -12% of the world population. India stands in the second position after China in the production of culture fish [4].

Indian aquaculture has grown almost 7 times in the last 20 years of which, freshwater aquaculture accounts for 95%. With 3.15 million ha of reservoirs, 2.36 million ha of ponds and tanks, and 0.19 million ha of rivers and canals, Indian freshwater aquaculture accounts for 95% of total aquaculture production. In the mid-1980s the share of freshwater aquaculture in inland fisheries was 34% and in recent years it has increased to about 80% [1]. The objective of the current study is to document the fish fauna of Erracheruvu in the Siddipet district of Telangana state as there is no earlier study on the fish diversity of the Erracheruvu lake.

Materials and Methods

- **Study Area:** Erracheruvu is located in Siddipet town which is the district headquarter of the newly formed Siddipet district in Telangana state. Latitude and longitude coordinates are 18.116724351452934^0N, 78.84467748016777^0E. Siddipet is 104 kilometers (65 mi) away from Hyderabad and 86 kilometers (53 mi) away from Secunderabad. It is spread over 96 acres of land and has a bund of 1070 meters in length. The maximum depth is 7.1 meters. Erracheruvu water is used for drinking and cultivating paddy around the Lake [23].
- **Collection of Samples:** Four distinctive places were chosen for collecting samples from Erracheruvu at monthly intervals for a period of three years starting June 2015 to May 2018. Cast nets having a mesh size of 6-12 mm were used to capture small-size fish. Gill nets of 40-90 mm mesh size were used for capturing big-size fishes. Samples were collected with the help of local fishermen. Cast nets were operated to 2 meters depth while Gill nets were operated to 5 meters depth. The collected specimens were photographed, labeled, and preserved in 10% formalin in suitable-sized glass jars.
- **Preservation:** Fish that were brought to the laboratory were fixed in 10% formalin solution in separate jars according to the size of the species. Smaller fishes were directly placed in the formalin solution, while larger fishes were given an incision on the abdomen before they were fixed. The collected and fixed fish were labeled giving serial numbers, the exact locality from where collected, date of the collection. The common local names of fishes used in this region were labeled in each jar containing the fish.
- **Equipment used:** Vernier caliper, rulers, counting needles, forceps, surgical gloves, magnifying glasses, and light microscopes were used for morphometric measurements.
- **Identification:** Body shapes, structures of various fins, color patterns, and specific spots on the body surface were the basis for the identification of fish species. Keys provided by [2,3,8,12,16,27] were followed for this purpose.

Specimens were collected, photographed, labeled, and preserved in 4-10% formalin solution relative to the fish size [27]. Fish were identified up to the species level followed by [9,13,14]. and the Nomenclature of fishes followed by [12]. Voucher specimens are deposited in the Department of Zoology, Osmania University, Hyderabad, Telangana State, India.

Results and Discussion

Erracheruvu is home to 29 species of fish which are enlisted in table 1. All these fishes fall into 19 genera of 6 orders and 12 families. Cypriniformes is the biggest order with 13 species of fish that fall in 2 families and 8 genera. With 7 species of fish from 4 families and 5 genera, Order Siluriformes stands second in position. Order Perciformes comprises 4 species that fall under 3 families and 3 genera. With 3 species that come under single-family and genera, Order Channiformes stands next to Perciformes. With single species each, Orders - Osteoglossifomes and Antherniformes share the last position.

Lakes in India support a rich variety of fish species, which interns, support the commercial exploitation of the fisheries' potential [34]. Various efforts were made by different researchers to enumerate the fish species in freshwater bodies across the Telangana State. 25 species of fish were reported from Pocharam Reservoir by [33]. 33 species from 7 orders, 22 genera of 13 families were reported by [32] from Saralasagar Reservoir of Mahabubunagar district [35] have documented 30 species of fish in Nagaram Tank of Warangal district. As per the current study, Erracheruvu also provides shelter for 29 species of fish. In all these lakes the dominant species belong to the Cypriniformes order followed by Siluriformes order.

Conclusion

It is observed that the fish fauna of Erracheruvu faces some threats due to habitat loss by encroachments, loss of riparian vegetation, and excessive use of pesticides and inorganic fertilizers

leading to eutrophication. Recently the Government of Telangana took initiated to beautify the Erracheruvu lake by constructing a bund around the lake, steps back retaining walls, etc. apart from these steps, to help the local fishermen fingerlings of *Catla, Rohu, Cirhinus* are being released into the Erracheruuvu. This also may pose a threat to the fish diversity of the lake.

Declarations

Ethical Approval

Not Applicable.

Competing Interests

We declare that the authors have no competing interests as defined by Springer, or other interests that might be perceived to influence the results and/or discussion reported in this paper.

Authors' Contributions

- **First Author:** Srikanth Bandi: Conceived the idea, Conducted the Studies, Collected the samples, and prepared a rough draft.
- **Second Author:** Dr. Madhavi Maddala: Identified the fish species, Prepared the Final draft.
- **Third Author:** Mahesh Lingakari: Prepared Second draft, figure 1, and table 1.

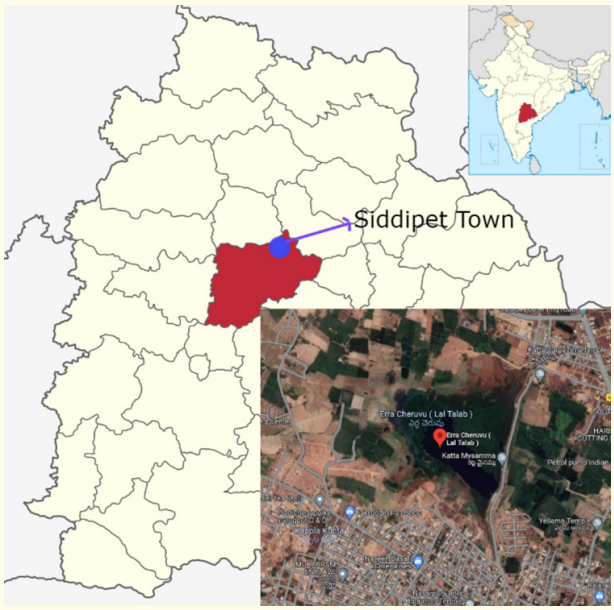

Figure 1: Location map of Erracheruvu lake, Siddipet, Telangana State, India. (Courtesy: Google.co.in/maps, and https://te.wikipedia.org).

Order	Family	Genus	Species
Cipriniformes	Ciprinidae	Catla	Catla
		Cirrhinus	*Mrigala*
			Reba
		Labeo	*Calbasu*
			rohita
			Potail
		Cyprinus	*carpio carpio*
		Punctius	*Chola*
			Titius
			sarana sarana
		Amplypharygodon	*Microlepis*
		Salmostoma	*Bacaila*
	Cobotidae	*Lepidocephalius*	*Guntea*
Siluriformes	Bagridae	*Mystus*	*Bleeker*
			Cavasius
			Vittatus
	Siluridae	*Wallago*	*Attu*
		Ompok	*Bimaculatus*
	Claridae	*Clarias*	*Batracus*
	Heteropneustidae	*Heteropneustues*	*Fossils*
Perciformes	Gobidae	*Glosobius*	*giuris giuris*
	Anabantidae	*Anabas*	*Testudineus*
	Mastacembelidae	*Mastacembelus*	*Armatus*
			Panclus
Channiformes	Channidae	Channa	*Punctatus*
			Striatus
			Orientalis
Osteoglossifomes	Notopteride	*Notopterus*	*Notopterus*
Antherniformes	Belonidae	*Xenentodon*	*Cancilla*

Table 1: List of fishes of the Erracheruvu in Siddipet District, Telangana State, India.

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Not applicable.

Availability of Data and Materials

Not applicable.

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