



Pilot Study on Ichthyofauna Diversity in Narasapura Lake Kolar, Karnataka

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Abstract

A pilot study was conducted to document the fish diversity in the Narasapura Lake, Kolar District, Karnataka, which recorded 15 fish species belonging to 13 genera and 8 families. The fish assemblage included catfishes such as *Clarias batrachus* (Clariidae), *Wallago attu* (Siluridae), and *Mystus gulio* (Bagridae); cichlids represented by *Oreochromis mossambicus*; Notopteridae by *Notopterus notopterus*; small indigenous fishes such as *Rasbora* sp. (Danionidae); predatory snakeheads *Ophiocephalus marulius* and *Ophiocephalus striatus* (Channidae); *Poecilia reticulata* and *Gambusia affinis* (Poeciliidae); and exotic carps *Hypophthalmichthys molitrix* and *Ctenopharyngodon idella* (Xenocyprididae). The family Cyprinidae exhibited the highest diversity, represented by *Labeo rohita*, *Catla catla*, *Cirrhinus cirrhosus*, and *Puntius* sp. The study highlighting the ecological and economic importance of Indian major carps and small barbs. It also showed the presence of a mixed assemblage of native and exotic fish species reflects the heterogeneous habitat conditions of the lake and suggests a moderately productive and ecologically balanced freshwater ecosystem largely influenced by natural environmental factors.

Key words: Native, Exotic, Heterogeneous

Introduction

Fresh water ecosystems represent an alternate revenue for culture fisheries. Freshwater aquaculture contributes 3 million tonnes of fish annually, at a utilisation level of 40 per cent of the potential water area of 2.4 million ha, leaving sufficient scope for vertical and horizontal expansion (Ayyappan, et.al., 2009). Lakes are important natural resources, utilized by the population around them as a source of natural beauty, serene environment and economic return (from tourism). From an economic point of view, lakes serve as drinking water resource, irrigation, fisheries, tourism, etc. (Das, 1996). An increased rise in developments around lakes surroundings has made them vulnerable to problems such as pollution, rapid sedimentation and eutrophication (Chakrapani, 2002).

The fish fauna is an important aspect of fishery potential of a water body. It was observed that the distribution of fish species is quite variable because of geographical and geological conditions. At present, the three Indian major carps viz., catla (*Catla catla*), rohu (*Labeo rohita*) and mrigal (*Cirrhinus mrigala*) constitute 87 per cent of freshwater aquaculture production (Kumar et al., 2015). Fishes constitute the most conspicuous component of inland aquatic fauna and rank very high as a source of proteins. For sustained exploitation and simultaneous conservation of fisheries resources, basic scientific information on biodiversity is vital (Sone and Malu, 2000; Shendge, 2008). Productions of fish from water bodies basically depend on right selection of cultivable varieties and control of predatory and weed fishes (Sone and Malu, 2000). The study of fish diversity in reservoir used for fish cultivation becomes an essential tool for better fish production. Aquaculture is now

providing about half of the fish consumed by the human population globally. An ecosystem constitutes the ultimate source areas for freshwater provisioning services. Growth in global human population and water consumption rate will put supplementary pressure on freshwater resources in the coming period. During the last two decades, aquaculture has grown rapidly, expanding faster than most other food sectors. Aquaculture will face many challenges such as diseases and improvement of water quality management over the next decade (Mahanta et al., 2014). India is one of the mega biodiversity countries in the world and occupies 9th position in terms of fresh water biodiversity. India contributes to about 7.7% of global fish diversity, of which 1,673 are marine and 994 are freshwater (Froese & Pauly, 2020). The fresh water fish biodiversity is declining due to man-made pressure (Kurup, 2000). The threat status of fishes, suggests that nearly 41% of fish fauna are threatened vulnerable, endangered or critically endangered state (Dahamukar et al., 2004)

Materials and Methods

Study area and fish collection

Narasapura lake situated in kolar, Karnataka total lake area roughly means used is 327.35 acres (131 Hectares). The geographically it is located at 13°07'59.7"N 77°59'59.0"E, about 15 km from Kolar city and 55 km from Bangalore city. Lake appears as irregular circle and depth varies at different location within the lake. Lake connected to Koromangala and Challaghatta (KC) Valley project treated water. It is well known for fishing due to its shallowness and huge number of fishes which make the lake a fish paradise. Several fish cooperative and local residents use this lake for irrigation, domestic and household purpose.

The fishes were collected from January 2023 to December 2023 by using cast net and gill nets and also from the landing site. They were fixed in aqueous formaldehyde solution (10%) and analysed for their identification, using several standard literatures (Talwar and Jhingran, 1991; Jayaram, 2010). Samples were also used for diversity estimation.



Fig. 1. Collection of Fishes from the study site

Result and Discussion

The diversity of fishes recorded in the study area, representing 8 families, 15 species, and 13 genera, including both indigenous and exotic forms. This diversity reflects a heterogeneous aquatic ecosystem supporting fishes with varied ecological roles and habitat preferences (Table 1).

Table 1: Checklist of fishes recorded in Narasapura lake Near Kolar district.

Family	Scientific name	Common name
Clariidae	<i>Clarias batrachus</i>	Walking catfish
Siluridae	<i>Wallago attu</i>	Wallago catfish
Bagridae	<i>Mystus gulio</i>	Asian stinging catfish
Cichlidae	<i>Oreochromis mossambicus</i>	Tilapia
Notopteridae	<i>Notopterus notopterus</i>	Bronze featherback
Danionidae	<i>Rasbora sp.</i>	Minnows
Channidae	<i>Ophiocephalus marulius</i>	Indian snakehead
	<i>Ophiocephalus Straitus</i>	Banded snakehead
Poeciliidae	<i>Poecilia reticulata</i>	Guppy
	<i>Gambusia affinis</i>	Mosquito fish
Xenocyprididae	<i>Hypophthalmichthys molitrix</i>	Silver carp
	<i>Ctenopharyngodon idella</i>	Grass carp
Cyprinidae	<i>Labeo rohita</i>	Rohu
	<i>Catla catla</i>	Catla
	<i>Cirrhinus cirrhosus</i>	Mrigal
	<i>Puntius sp.</i>	Barb fish

The family Clariidae is represented by *Clarias batrachus* (walking catfish), a hardy air-breathing species well adapted to fluctuating environmental conditions. Presence of Siluridae (*Wallago attu*) and Bagridae (*Mystus gulio*) indicates the availability of benthic habitats and ample food resources. The family Cichlidae, represented by *Oreochromis mossambicus* (tilapia), highlights the presence of an exotic, highly adaptable species capable of thriving under a wide range of environmental conditions. Notopteridae, with *Notopterus notopterus*, reflects moderate water depth and structured habitats. Small indigenous fishes are represented by Danionidae (*Rasbora sp.*), indicating the presence of shallow littoral zones. The family Channidae, represented by *Ophiocephalus marulius* and *Ophiocephalus striatus*, contributes predatory fishes, suggesting a well-structured trophic hierarchy. The family Poeciliidae (*Poecilia reticulata* and *Gambusia affinis*) indicate tolerance to environmental stress and possible biological control of mosquitoes. Xenocyprididae, represented by *Hypophthalmichthys molitrix* and *Ctenopharyngodon idella*, reflects the introduction of exotic carps, often associated with fishery enhancement practices. The family Cyprinidae shows the highest diversity, represented by *Labeo rohita*, *Catla catla*, *Cirrhinus cirrhosus*, and *Puntius sp.*, emphasizing the dominance of Indian major carps and small barbs, which are ecologically and economically important. The fish diversity of fishes indicated a mixed assemblage of native and exotic species, comprising bottom dwellers, column feeders, surface feeders, predators, and omnivores. Such diversity suggests a moderately productive and ecologically balanced freshwater ecosystem, influenced by natural conditions as well as anthropogenic interventions such as stocking and species introductions. *Catla catla*, *Labeo rohita* and *Cirrhinus mrigala* (Indian Major Carp) and this fish is economically significant in terms of local consumption and production potential (Dwivedi and Nautiyal 2010; Tripathi, et al., 2017).

Table 1: Diversity and Abundance fishes recorded in Narasapura lake Near Kolar district.

Scientific name	Jan	Feb	Mar	Apr	May	June	Jul	Aug	Sep	Oct	Nov	Dec
<i>Clarias batrachus</i>	+++	+++	+++	+++	+++	+++	+++	+++	++	+	+	++
<i>Wallago attu</i>	+	+	+	++	++	++	+	+++	++	++	+	+
<i>Mystus gulio</i>	+	+	+	+	+	++	+++	++	++	++	+	+
<i>Oreochromis mossambicus</i>	++	+	+	+	+	++	+++	+++	+	+	++	++
<i>Notopterus notopterus</i>	-	-	-	-	-	-	+	+	-	++	+	+
<i>Rasbora sp.</i>	-	-	-	+	+	-	-	-	-	-	-	-
<i>Ophiocephalus marulius</i>	-	-	+	+		++	+	+	-	-	-	-
<i>Ophiocephalus Straitus</i>	+	+	-	++	+			-		+	+	
<i>Poecilia reticulata</i>	+	+	-	++	+	+	+	-	++	+	+	+
<i>Gambusia affinis</i>	+	+	-	++	+	+	+	-		+	+	
<i>Hypophthalmichthys molitrix</i>	-	+	+		++	+	+	-	-	-	-	-
<i>Ctenopharyngodon idella</i>	-	-	+	+		++	+	+	-	-	-	-

<i>Labeo rohita</i>	+	+	-	++	+	+	+	-	-	-	+	+
<i>Catla catla</i>	+	+	-	++	+	+	-	-	-	-	-	-
<i>Cirrhinus cirrhosus</i>	-	-	+	+		++	+	-	-	-	-	-
<i>Puntius sp.</i>	-	-	-	+	+	-	++	-	-	-	-	-

The monthly occurrence and relative abundance of fish species recorded over a year (January 2023–December 2023). Abundance is expressed qualitatively using symbols (– absent, + low, ++ moderate, +++ high) as showed in the Table 2. The dominant species; *Clarias batrachus*, *Wallago attu*, *Mystus gulio* and *Oreochromis mossambicus* are widely distributed species. *Clarias batrachus* shows the highest and most consistent abundance throughout the year. It records (+++) from January to August, slightly declining to (++) in September and (++) or (+) during October–December. This indicates its strong adaptability and dominance in the ecosystem. *Wallago attu* is present in all months, with moderate abundance (++) during April–June and a peak (+++) in August. Its abundance decreases to (+) during winter months, suggesting seasonal fluctuations linked to environmental conditions. *Mystus gulio* remains present year-round, with increased abundance (++ to +++) from June to September, coinciding with the monsoon season. *Oreochromis mossambicus* (tilapia) also shows continuous occurrence. Its abundance peaks (+++) in July and August, indicating favourable breeding during monsoon months. Seasonally abundant species like *Notopterus notopterus* is absent from January to May but appears from June onwards, showing low to moderate presence during monsoon and post-monsoon months (Chandan Debnath 2025). *Ophiocephalus marulius* appears mainly between March and August, with moderate abundance in June, but is absent during winter. *Ophiocephalus striatus* shows scattered occurrence, being more evident during April–June and again in October–November. *Poecilia reticulata* and *Gambusia affinis* occur intermittently, mostly during pre-monsoon and monsoon months, reflecting their tolerance to variable water conditions (Alphonse Hin Fat Tsang and David Dudgeon 2021). Indian major carps like *Labeo rohita*, *Catla catla*, and *Cirrhinus cirrhosus* show clear seasonal pattern of distribution. This pattern suggests stocking or breeding influence during favourable temperature and nutrient conditions. The exotic carps, *Hypophthalmichthys molitrix* (Silver carp) and *Ctenopharyngodon idella* (Grass carp) show limited seasonal occurrence. The small indigenous fishes, *Rasbora sp.* and *Puntius sp.* showed very limited and seasonal occurrence, mainly during monsoon (April–July). They are absent for most of the year, indicating sensitivity to habitat conditions (Uttam Kumar Sarkar 2018).

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