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Ichthyofaunal diversity status in Kelageri Lake, Dharwad, Karnataka state

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Abstract

In the present study, we determined the fish faunal diversity status in the Kelageri lake of Dharwad. The study reveals presence of 22 species of fish belonging to six orders spread over 13 families. Cypriniformes was dominant with ten species followed by Siluriformes with five species, Perciformes with four species, Synbranchiformes, Clupeiformes and Osteoglossiformes with one species each. Siluriformes and Perciformes consisted of four families each followed by Cypriniformes with two families, whereas Synbranchiformes, Clupeiformes and Osteoglossiformes consisted of one family each. Species such as, *Puntius sarana*, *Balantiocheilos melanopterus*, *Wallago attu*, *Ompok pabda*, *Parambassis ranga*, and *Notopterus notopterus* were infrequently seen during the study period. These observations suggest the need for proper control measures on overfishing and human interference to conserve and promote the fish faunal diversity in this lake.

Keywords: Ichthyofauna; fish diversity; Kelageri Lake; cypriniformes; foot hills; Western Ghats

1. Introduction

Fishes not only play a role in regulation of food web dynamics, carbon flux, and sediment processes, but also act as bioindicators. Currently, freshwater ecosystems are among the mostly heavily used, depended upon and exploited by humans for sustainability and well-being [1]. This anthropogenic pressure on fresh water ecosystems has been implicated in species diversity depletion. Therefore, knowing the status of fish diversity is a key to understand the impact of changing environmental conditions due to natural or human activities. Fish diversity in rivers of India has been extensively studied by number of investigators. For instance, 23 fish species in Jawalgaon reservoir at Solapur district [2], 54 species in Bhima River at Indapur [3], 62 species from Mula and Mutha River in Pune [4], 11 species from Sirur dam of Nanded District [5], and 51 species from Krishna River at Wai, Northern Western Ghats [6] of Maharashtra are reported. Similarly, 56 species from Bhadra river of Western Ghats are recorded by Shahnawaz *et al.* [7], whereas 32 species are documented in Sharavathi estuary [8]. Since the Western Ghats of India has a rich freshwater fish fauna with a high level of endemism [9], documentation of fish diversity is necessary to know about their status in this region. Dharwad is a city, which is regarded as gate way of malnad. Although previously Dharwad city was well known for its lakes, most of these are dried out now. However, the lakes like Kelageri, Sadhankeri, and Navalur still exist. Of these, Kelageri Lake is of particular interest as it is a man-made lake created during British rule, almost 100 years old. No published literature is available on fish fauna of this lake. Hence, the aim of this investigation is to document the fish diversity status in Kelageri Lake of Dharwad.

2. Materials and Methods

2.1 Study Area

Dharwad district encompasses an area of 4263 km² lying between the latitudinal parallels of 15°02' and 15°51' N and longitudes of 73°43' and 75°35' E. The Kelageri Lake (Fig. 1), which was constructed by Sir M. Vishweshwaraiah in March 1911, is geographically located at latitude 15° 27' N and longitude 15° 27' E. The catchment area of the lake is 6.36 square miles.

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2.2 Sampling method and identification

Fish sampling was carried out in the Kelageri Lake (Fig.1) from July 2015 to March 2016. Four samplings per month were done using drag net having mesh size 2 mm × 3 m × 1 m size as well as cast net of standard size with the help of fishermen. Fish specimens collected were photographed on the site, and representative species were preserved in formalin solution and carried to the laboratory for identification purpose. All species were identified based on keys provided for fishes of the Indian subcontinent [10-12] and classified according to the taxonomic literatures [10-15]. The abundance of fish species were categorized as common (encountered frequently 7 - 8 times in 10 visits), moderate (encountered 4 - 5 times in 10 visits) and rare (spotted 1 - 2 times in 10 visits). The percentage occurrence of fish species in each order was calculated using the following formula.

$$\frac{\text{Number of species in each order}}{\text{Total number of species}} \times 100$$

The percentage occurrence of number of families in each order was calculated using the following formula.

$$\frac{\text{Number of families in each order}}{\text{Total number of families}} \times 100$$



Fig 1: (A-C): Map of India showing the location of Karnataka state (A), Dharwad (B) and the study area, Kelageri Lake (C).

3. Results and Discussion

The present study documented occurrence of 22 fish species belonging to six orders and 13 families in Kelageri Lake of Dharwad (Table 1). Of these, Cypriniformes dominated with 10 species (45.45%) followed by Siluriformes with five species (22.72%), Perciformes with four species (18.18%),

Synbranchiformes, Clupeiformes and Osteoglossiformes with one species each (4.54% each; Fig. 2). Analysis on percent abundance of families under each order reveals dominance of Siluriformes and Perciformes with four families each (30.76%) followed by Cypriniformes with two families (15.38%), whereas Synbranchiformes, Clupeiformes and Osteoglossiformes consisted of one family each (7.69% each; Fig. 3). Majority of other studies also have reported maximum number of species belonging to Cypriniformes. For instance, Shahnawaz *et al.* [7] have recorded 56 species of fish representing 39 genera and 15 families from Bhadra river of Western Ghats. Sakhare [2] has documented the occurrence of 23 fish species belonging to 7 orders in Jawalgaon reservoir in Solapur district of Maharashtra, whereas 54 fish species belonging to 15 families in Bhima river at Indapur [3], 11 species belonging to 5 orders from Sirur dam of Nanded District [5], 51 species belonging to 14 families and 33 genera from Krishna River at Wai, Northern Western Ghats [6] and 13 species of catfish belonging to five families and 10 genera at Krishna river, Sangli [16] were recorded. In contrast, out of 32 species recorded in Sharavathi estuary, 20 species belonged to Perciformes [8].

The family Cyprinidae was dominant with eight species followed by Cobitidae that consisted of two species under Cypriniformes, whereas the families Channidae, Cichlidae, Gobiidae, and Ambassidae contributed to one species each under Perciformes (Table-1). The family Siluridae consisted of two species, whereas Pangasidae, Claridae and Bagridae had one species each under Siluriformes (Table-1). Other families, namely, Mastacembelidae, Clupeidae and Notopteridae contributed to one species each under Synbranchiformes, Clupeiformes and Osteoglossiformes respectively (Table-1). Although the present investigation reveals good number of species in a Lake with catchment area of 6.36 square miles, fish belonging to many orders/families were not found during the study period. This could be due to the presence of predatory fish such as catfish, which are commonly noticed. In addition, high percentage of moderate occurrence of species (40.90%; Fig. 4), compared to commonly found species (31.81%) suggests the abundance of these species only during particular season in a year. This Lake also comprises of some of the rare species (22.72%; Table-1, Fig. 4) such as, *Puntius sarana*, *Balantiocheilos melanopterus*, *Wallago attu*, *Ompok pabda*, *Parambassis ranga*, and *Notopterus notopterus*, which were infrequently seen during the study period.

4. Conclusion

The fish faunal diversity dominated by Cypriniformes indicates that the lake has pristine nature around. Whereas the catchment area of Kelageri Lake has bountiful natural resources and houses rich biodiversity, control on overfishing and strict restriction on usage of inappropriate mesh size might minimize the death of non-target fishes. Elimination of predatory/invasive fishes in the Lake as well as threats due to human interference might help flourishing of other sensitive fishes; thereby improve fish faunal diversity in Kelageri Lake.

5. Acknowledgements

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Table 1: Check list of fish fauna in Kelageri Lake, Dharwad

S. No.	Scientific name	Common/local name	Status
Cypriniformes			
Family: Cyprinidae			
1	<i>Labeo rohita</i>	Rohu	C
2	<i>Labeo angra</i>	Araj	C
3	<i>Cirrhinus mrigala</i>	Mrigal	M
4	<i>Cyprinus carpio</i>	Common carp	M
5	<i>Catla catla</i>	Catla	C
6	<i>Puntius sarana</i>	Olive barb	R
7	<i>Balantiocheilos melanopterus</i>	Bala fish	R
8	<i>Hypothalamichthys molitrix</i>	Silver carp	M
Family: Cobitidae			
9	<i>Cobitis paludica</i>	Moorangi	M
10	<i>Misgurnus anguillicaudatus</i>	Pond loach	M
Siluriformes			
Family: Siluridae			
11	<i>Wallago attu</i>	Wallago	R
12	<i>Ompok pabda</i>	Pabdah catfish	R
Family: Pangasidae			
13	<i>Pangasius pangasius</i>	Chudi	M
Family: Claridae			
14	<i>Clarius batrachus</i>	Catfish	C
Family: Bagridae			
15	<i>Mystus bleekeri</i>	Tengra	M
Perciformes			
Family: Channidae			
16	<i>Channa striata</i>	Snake head	M
Family :Cichlidae			
17	<i>Oreochromis mossambicus</i>	Tilapia	C
Family: Gobidae			
18	<i>Glossogobius giuris</i>	Tank goby	M
Family : Ambassidae			
19	<i>Parambassis ranga</i>	Indian glass fish	R
Synbranchiformes			
Family: Mastacembelidae			
20	<i>Mastacembelus armatus</i>	Tire track eel	C
Clupeiformes			
Family : Clupeidae			
21	<i>Alosa aestivalis</i>	Blue back herring	C
Osteoglossiformes			
Family : Notopteridae			
22	<i>Notopterus notopterus</i>	Chapli	R

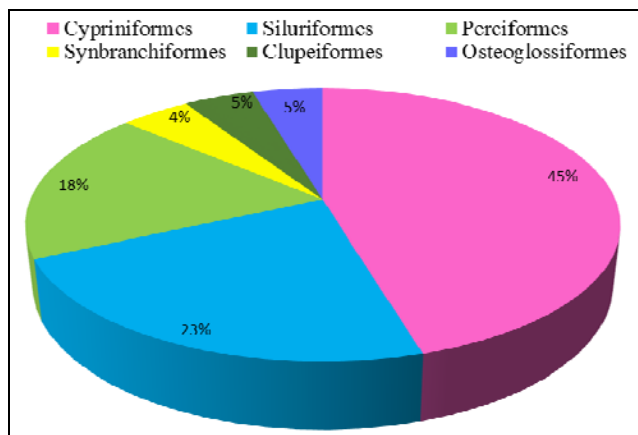


Fig 2: Pie chart showing percent distribution of fish species belonging to different orders in Kelageri Lake, Dharwad

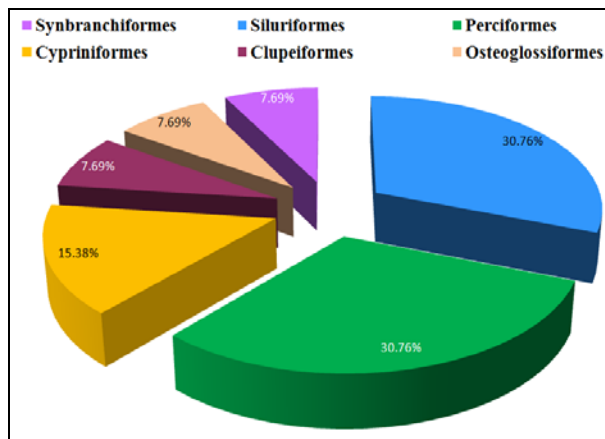


Fig 3: Pie chart showing percent distribution of families under each order in Kelageri Lake, Dharwad.

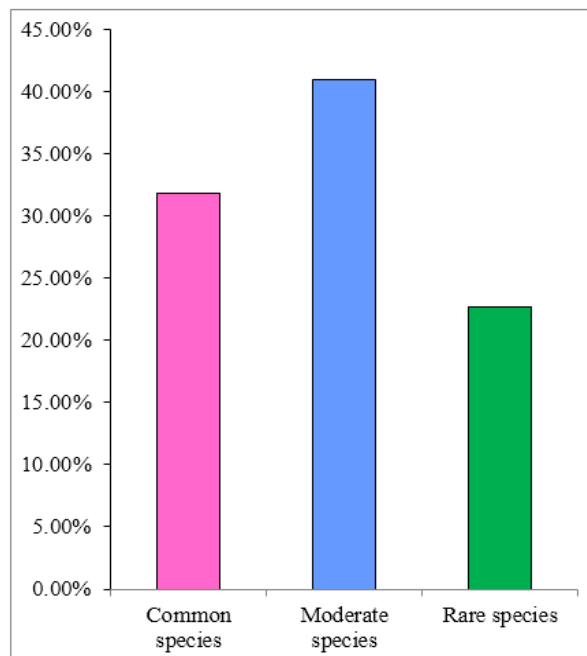


Fig 4: Bar diagram showing the status of percent abundance of fish species in Kelageri Lake, Dharwad.

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