

# Distribution of Actinopterygii in Selected Districts of Northern and Central Karnataka India

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## Abstract

India is endowed with a vast ichthyofaunal diversity and among the southern states of India, Karnataka is richest in ichthyofaunal diversity and Kerala has the most number of endemic species. Actinopterygii dominates the fish diversity with almost 99% of which 95% are teleosts. This study, for the first time, reports the diversity of Actinopterygii from Yadgiri district, which lies 16°20' - 17°45' N latitude and 76° 4' - 77° 42' E longitudes and has a total area of 2920.75 hectares of water and 2805 hectares of water fishing activities. There are more than 280 lakes in the district, as per the reports of Minor Irrigation Department of the district. This region is generally hot and temperature ranges from 22°C-45°C and lakes usually dry up in summer. Second study area Davangere has a total geographical area of 5.97 lakh hectares and 6284 hectares of water. The district lies in the centre of Karnataka between the latitudes 13°5' and 14°50' N and between the longitudes 75°30' and 76°30' E. The second study area has a pleasant weather conditions and water bodies do not dry during summer.

The field work carried on for a year revealed 19 species belonging to 9 families in Yadgiri lakes and 13 species from 6 families of Davangere lakes. Cyprinidae family dominates the lakes of both the districts with 8 species in Yadgiri district lakes and 6 species in Davangere lakes. Yadgiri district lakes had fish diversity of 3 species from Channidae, 2 species Bagridae, 1 species from Clariidae, Cichlidae, Ambassidae Mastacembelidae, Siluridae and Anguillidae each.

Davangere district lakes sustains fishes 2 species each from Channidae and Cichlidae and one species from Clariidae, Bagridae and Notopteridae families. Actinopterygii is found to be the dominant group in the lakes of Davangere. There are fish species which are vulnerable and near threatened whose conservation has to be top priority for sustainable development of human and fisheries which has to combat each other need.

## Keywords

Actinopterygii, Cypriniformes, Davangere, Ichthyofauna, Perciformes, Yadgiri.

## INTRODUCTION

Fishes dominate the animal world through their distribution and diversity. Highest number of fishes belongs to Actinopterygii among which teleosts surpass all other fish species. India harbours rich ichthyofaunal diversity as a peninsular country and southern part of India possess both good number of fish and unique diversity. Fish diversity and abundance indicate the health of an ecosystem. Karnataka, the eighth largest state in India, is situated on the western edge of the Deccan plateau. The climate and geography of the region makes the state one of the most important in the country with regard to water resources. However, due to multiple use of fisheries resources, fishing has become a major industry and a large number of these aquatic communities are being disturbed. In addition, human alteration of fish habitats such as converting wetlands into cultivation lands, tanks for irrigation, using for land filling, constructing dams for hydroelectric purpose has led to decrease of habitat which in turn has led to reduction in fish diversity.

There have been studies from few parts of northern Karnataka relating to ichthyofaunal diversity [1] and [2] but there are no studies from Yadgiri district till date on fish diversity. Studies about fish diversity from Davangere lakes are few, most reports being from Bhadra reservoir. It is to be noted that Bhadra reservoir is a tributary flowing through

Western Ghats and hence more diversity is expected. However, studies from Davangere lakes are sparse and hence the present study was undertaken to evaluate the fish diversity in these two region i.e, Yadgiri in northern Karnataka and Davangere in central part of Karnataka.

## MATERIAL AND METHODS:

Fishes were collected from both study areas (Map -1 and 2) further detailed in Table 1 and 2 during the non-breeding season with the help of local fisherman using different types of nets namely gill nets, cast nets and dragnets. The fishes were photographed immediately using EOS1500D Cannon 24.1 megapixel DSLR camera. The fishes were identified as per [3] and [4]. The lakes selected were Eutrophic, oligotrophic and mesotrophic types. The study area had following physical parameters:

**Table 1:** Lakes from Yadgiri districts:

Taluka	Name of lake	Catchment area (in KM2)	Live capacity (in mcft)	Water temperature in °c	pH	Type of lake
Shahapur	Khanapur lake	4.02	6.30	26	7	Eutrophic
	Naikal Bheem Lingeshwar tank	1.03	4.14	27	9	Oligotrophic
	Hundekal Basavan tank	6.84	8.62	28	7	Oligotrophic
	Tadibidi Herimadkeri tank	4.53	5.80	28.5	7	Oligotrophic
Surpur	Surpur Bonal lake	2.59	3.10	28	8	Eutrophic
Hunasagi	Kakkeri Mallakere	2.41	8.10	26	7	Eutrophic
Yadgiri	Doddkeri	13.95	48.79	32	6	Oligotrophic
	Lumbini lake	3.88	12.53	29	6	Eutrophic
	Ramasamudra lake	8.41	16.56	30	6	Oligotrophic

Yadgiri district, which lies between 16°20'-17°45' N latitude and 76° 4'-77° 42' E longitudes, has a total area of 2920.75 hectares of water and 2805 hectares of water fishing activities. Yadgir has been blessed by incessant flowing of two main rivers, Krishna and Bheema. The annual rainfall is 71mm and has a semi-arid type of climate with relative humidity varying from 26% in summer to 62% in winter. The

district has highest number of lakes in the state estimated to be around 280 lakes as according to the survey of Minor Irrigation Sub-division (MID) of Yadgir. However, it is considered as dry land with least biodiversity and there are no published reports or records of Ichthyofaunal diversity till date.

**Table 2:** Lakes from Davangere district:

Taluka	Name of lake	Catchment area (in ha)	Live capacity (in ha)	Water temperature in ° c	pH	Type of lake
Davangere	Bathi lake	41.2	84.64	24.5	7.1	Eutrophic
	Devarbelakre lake	647.5	664	26	7.5	Mesotrophic
	Kondajji lake	80	64	28	7.2	Oligotrophic
	Hadadi lake	54.6	607.5	26.3	7.3	Mesotrophic
	Naganuru lake	42.6	29.6	25	7.2	Mesotrophic
	Hiremegalagere lake	41.37	113	24.6	7.4	Mesotrophic

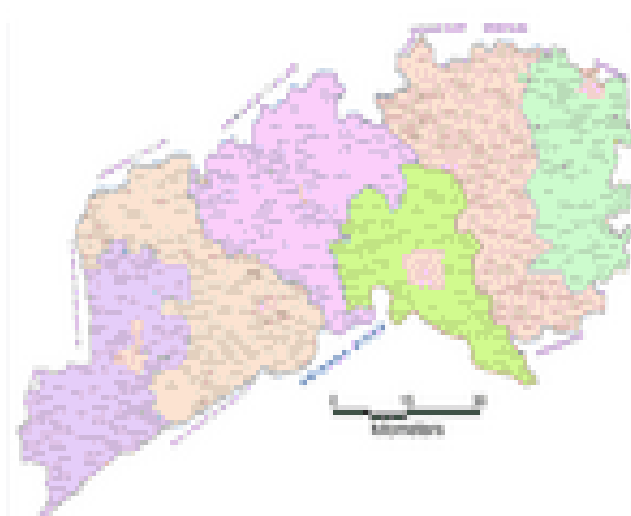
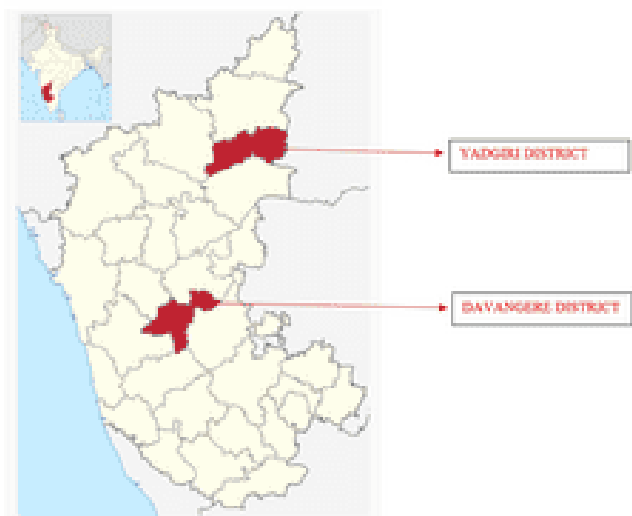
Davangere has a total geographical area of 5.97 lakh hectares and 6284 hectares of water shed area. The district lies in the centre of Karnataka between the latitudes 13°5' and 14°50' N and between the longitudes 75°30' and 76°30' E. The district has pleasant climatic condition where in winters are cold with 20°C - 22°C and summer temperature ranges

from 32°C – 34° c and water bodies do not dry here.

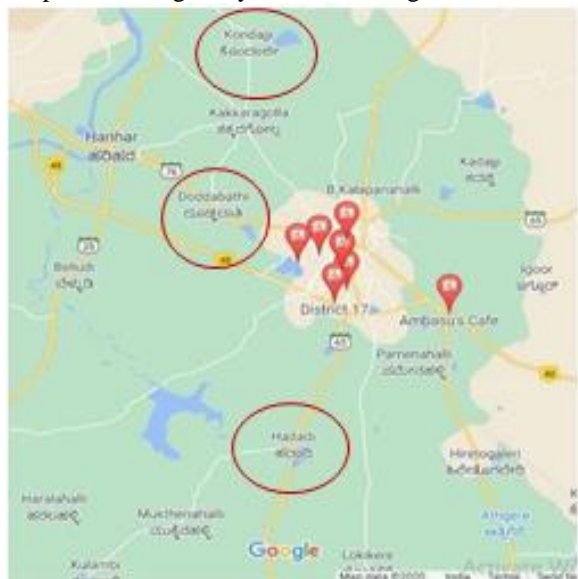
The percentage occurrence of fish species in each order was calculated using the following formula.

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

Yadgiri District



Map -2 Showing study area -2 Davangere District



## RESULTS

**Table: 3** Species diversity of fishes in selected lakes of Yadgiri district (Taluka wise):

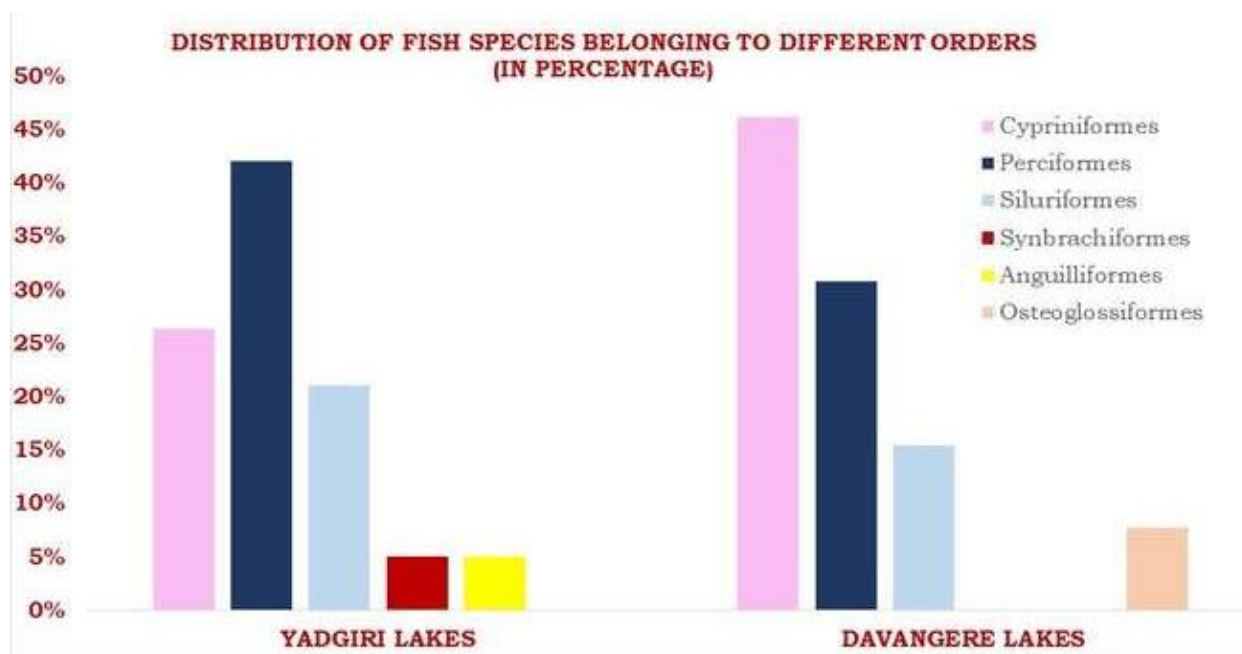
Taluka	Lake	Order	Family	Species	IUCN Status
Shahapur	Khanapurgaon lake	Perciformes	Cichlidae	<i>Oreochromis mossambicus</i>	V
		Cypriniformes	Cyprinidae	<i>Labeo rohita</i>	LC
		Cypriniformes	Cyprinidae	<i>Labeo pungaia</i>	
		Cypriniformes	Cyprinidae	<i>Cirrihinus mrigala</i>	LC
		Cypriniformes	Cyprinidae	<i>Catla catla</i>	LC
		Perciformes	Channidae	<i>Channa straita</i>	LC
	Bhemlingashwar lake	Cypriniformes	Cyprinidae	<i>Labeo rohita</i>	LC
		Perciformes	Channidae	<i>Channa straita</i>	LC
	Basavan Hundekal Lake	Cypriniformes	Cyprinidae	<i>Labeo rohita</i>	LC
		Perciformes	Cichlidae	<i>Oreochromis mossambicus</i>	V
		Perciformes	Channidae	<i>Channa gachua</i>	LC
		Siluriformes	Bagridae	<i>Rita rita</i>	LC
	Herimadkeri lake Tadibidi	Synbranchiformes	Mastacembelidae	<i>Mastacembelus armatus</i>	LC
		Perciformes	Cichlidae	<i>Oreochromis mossambicus</i>	V
		Cypriniformes	Cyprinidae	<i>Labeo rohita</i>	LC
Surpur	Bonal lake	Cypriniformes	Cyprinidae	<i>Cyprinus carpio var communis Benkock strain</i>	V
		Cypriniformes	Cyprinidae	<i>Cyprinus carpio var communis German strain</i>	V
		Perciformes	Channidae	<i>Channa straita</i>	LC
Hunusugi	Mallakere lake	Perciformes	Cichlidae	<i>Oreochromis mossambicus</i>	V
		Perciformes	Channidae	<i>Channa punctatus</i>	LC
		Siluriformes	Clariidae	<i>Clarias batrachus</i>	LC
		Cypriniformes	Cyprinidae	<i>Labeo rohita</i>	LC
		Cypriniformes	Cyprinidae	<i>Cirrihinus mrigala</i>	LC
Yadgiri	Doddakera lake	Cypriniformes	Cyprinidae	<i>Labeo rohita</i>	LC
		Cypriniformes	Cyprinidae	<i>Catla catla</i>	LC
		Cypriniformes	Cyprinidae	<i>Cirrihinus mrigala</i>	LC
	Lumbini lake	Cypriniformes	Cyprinidae	<i>Labeo rohita</i>	LC
		Cypriniformes	Cyprinidae	<i>Labeo fimbriatus</i>	LC
		Cypriniformes	Cyprinidae	<i>Catla catla</i>	LC
		Cypriniformes	Cyprinidae	<i>Cirrihinus mrigala</i>	LC
		Cypriniformes	Cyprinidae	<i>Ctenopharyngodon idella</i>	LC

		Siluriformes	Clariidae	<i>Clarias batrachus</i>	LC
		Siluriformes	Siluridae	<i>Wallago attu</i>	V
		Siluriformes	Bagridae	<i>Mystus seenghala</i>	LC
		Perciformes	Cichlidae	<i>Oreochromis mossambicus</i>	V
	Ramasamudra lake	Cypriniformes	Cyprinidae	<i>Cirrihinus mrigala</i>	LC
		Cypriniformes	Cyprinidae	<i>Labeo rohita</i>	LC
		Cypriniformes	Cyprinidae	<i>Catla catla</i>	LC
		Siluriformes	Siluridae	<i>Wallago attu</i>	V
		Anguilliformes	Anguillidae	<i>Anguilla bengalensis</i>	NT
		Perciformes	Ambassidae	<i>Parambassis ranga</i>	LC

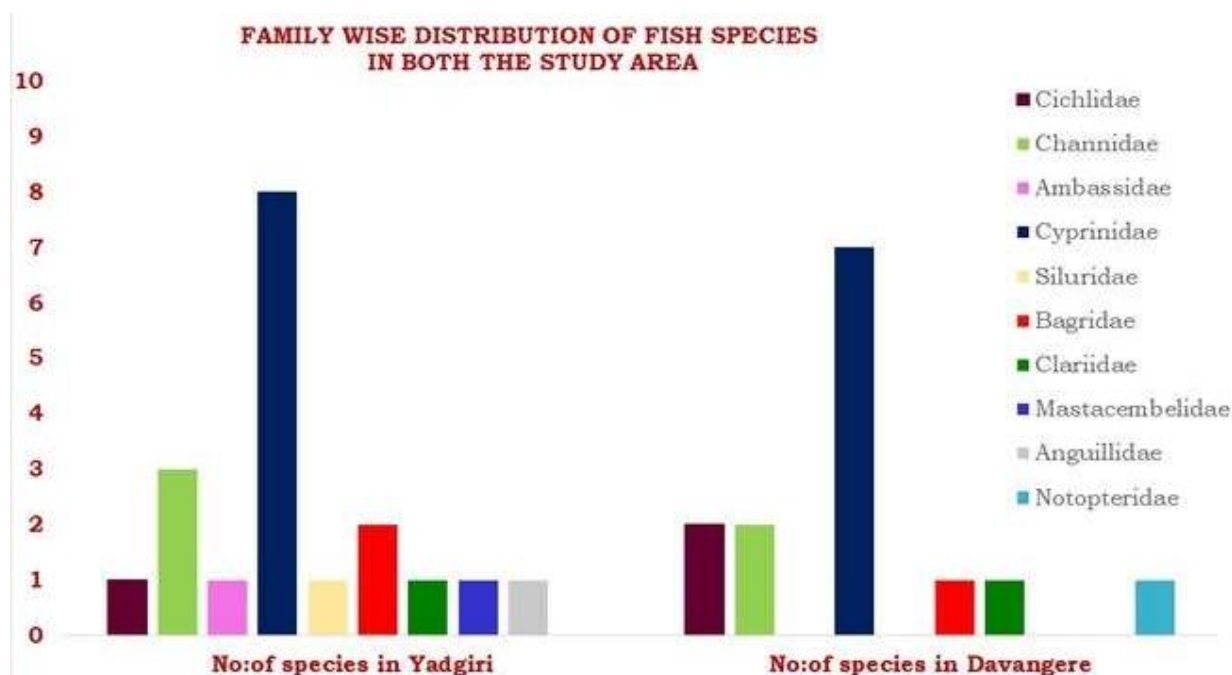
**Table: 4** Species diversity of fishes in selected lakes of Davangere district:

	Lake	Order	Family	Species	IUCN Status
Davangere	Bathi lake	Cypriniformes	Cyprinidae	<i>Labeo rohita</i>	LC
		Cypriniformes	Cyprinidae	<i>Cyprinus carpio</i>	V
		Cypriniformes	Cyprinidae	<i>Catla catla</i>	LC
		Siluriformes	Clariidae	<i>Clarias batrachus</i>	LC
		Perciformes	Channidae	<i>Channa straita</i>	LC
		Perciformes	Cichlidae	<i>Oreochromis mossambicus</i>	V
Davangere	Devarbelakare lake	Siluriformes	Clariidae	<i>Clarias batrachus</i>	LC
		Osteoglossiformes	Notopteridae	<i>Notopterus notopterus</i>	LC
		Siluriformes	Bagridae	<i>Mystus seenghala</i>	LC
		Perciformes	Channidae	<i>Channa marulius</i>	LC
		Cypriniformes	Cyprinidae	<i>Labeo calbasu</i>	LC
		Cypriniformes	Cyprinidae	<i>Ctenopharyngodon idella</i>	LC
		Perciformes	Cichlidae	<i>Oreochromis niloticus</i>	LC
Davangere	Kondajji lake	Cypriniformes	Cyprinidae	<i>Catla catla</i>	LC
		Cypriniformes	Cyprinidae	<i>Labeo calbasu</i>	LC
		Cypriniformes	Cyprinidae	<i>Cyprinus carpio</i>	V
		Siluriformes	Clariidae	<i>Clarias batrachus</i>	LC
		Siluriformes	Bagridae	<i>Mystus seenghala</i>	LC
Davangere	Hadadi lake	Cypriniformes	Cyprinidae	<i>Labeo rohita</i>	LC
		Cypriniformes	Cyprinidae	<i>Catla catla</i>	LC
		Siluriformes	Clariidae	<i>Clarias batrachus</i>	LC
Davangere	Naganuru lake	Cypriniformes	Cyprinidae	<i>Catla catla</i>	LC
		Cypriniformes	Cyprinidae	<i>Labeo calbasu</i>	LC
		Siluriformes	Clariidae	<i>Clarias batrachus</i>	LC
		Siluriformes	Bagridae	<i>Mystus seenghala</i>	LC

		Perciformes	Cichlidae	<i>Oreochromis mossambicus</i>	V
Davangere	Hiremegalagere lake	Cypriniformes	Cyprinidae	<i>Puntius sophore</i>	LC
		Perciformes	Channidae	<i>Channa straita</i>	LC
		Cypriniformes	Cyprinidae	<i>Catla catla</i>	LC
		Cypriniformes	Cyprinidae	<i>Cyprinus carpio</i>	V
		Cypriniformes	Cyprinidae	<i>Labeo rohita</i>	LC
		Siluriformes	Clariidae	<i>Clarias batrachus</i>	LC
		Siluriformes	Bagridae	<i>Mystus seenghala</i>	LC



**Graph -1** showing percent occurrence of fish species in each order of both the study areas:



**Graph -2** showing family wise distribution of fishes in two study area:



Ichthyofaunal diversity from selected lakes of Yadgiri district:

Plate: 1 Representatives of fishes from order Cypriniformes



*Labeo rohita*



*Labeo punga*



*Catla catla*



*Cirrhinus mrigala*



*Cyprinus carpio var communis*  
*communis* (German strain)



*Cyprinus carpio var*  
*(Benkok strain)*



*Ctenopharyngodon idella*



*Labeo fimbriatus*

Plate: 2 Siluriformes



*Clarias batrachus*



*Rita rita*



*Wallago attu*



*Mystus seenghala*

Plate: 3 Perciformes



*Channa gachua*



*Channa strata*



*Channa punctatus*



*Parambassis ranga*



*Oreochromis mossambicus*



Plate: 4 Anguilliformes



*Anguilla bengalensis*

Plate: 5 Synbranchiformes



*Mastacembelus armatus*

Ichthyofaunal diversity from selected lakes of Davangere district:

Plate: 6 Representatives of fishes from order Cypriniformes:-



*Puntius sophore*(LC)



*Cyprinus carpio* (V)



*Labeo calbasu*



*Labeo rohita*



*Catla catla*



*Ctenopharyngodon idella*

Plate: 7 Representatives of fishes from order Perciformes:



*Channa straita*



*Channa marulius*



*Oreochromis mossambicus*



*Oreochromis niloticus*

Plate: 8 Representatives of fishes from order Siluriformes:



*Mystus seenghala*



*Clarias batrachus*

Plate: 9 Representative of order Osteoglossiformes:



*Notopterus notopterus*

The current study is the first of its kind on the diversity of fish species from Yadgiri district which indicates distribution of 19 species dominated by Cypriniformes (42.10% Graph -1) with 8 species followed by Siluriformes (21.05% - Graph -1) with 4 species, Perciformes (26.31% - Graph -1) with 4 species, Anguilliformes and Synbranchiformes (5.26% - Graph -1) with 1 species each. Whereas the ichthyofaunal diversity from Davangere lakes studied revealed prevalence of 13 species which was again dominated by Cypriniformes (50% - Graph -1) with 6 species followed by Perciformes (28.57% Graph -1) with 4 species, Siluriformes (14.28% - Graph -1) with 2 species, Osteoglossiformes (7.14% - Graph -1) with a single species. However no species from Anguilliformes or Synbranchiformes either was recorded from study area 2. In first study area there were no species spotted from Osteoglossiformes. The observed change in the distribution of fish species may be due to geographical and physical variations in the study area.

Further the distribution of fish family-wise (Graph -2) depicted presence of Cyprinidae 8 species (study area 1) and 6 species (study area 2), Channidae 3 (study area 1) and 2 (study area 2), Cichlidae 1 species from study area 1 and 2 species in study area 2, while study area 1 revealed 1 species from Ambassidae whereas there were species spotted from

this family in the second study area. Family Bagridae had 2 species (study area 1) and 1 (study area 2). Clariidae was represented by single species in both the study area and Siluridae had its representative only in the first study area. There was 1 representative from Anguillidae and Mastacembelidae from first study area whereas in second study area no species from these families were spotted. However, the second study area had a representative from Notopteridae which was absent in first study area.

## DISCUSSION

Earlier reports from northern parts of Karnataka [1] revealed dominance of the order Cypriniformes with seven fish species followed by order Siluriformes with four species, and the order Channiformes, Mastacembeliformes and Osteoglossiformes each with one species. However in the present study area 1 there were no species spotted belonging to Osteoglossiformes and study area 2 lacked representatives from Anguilliformes and Synbranchiformes; however, 1 species from Osteoglossiformes was observed. This observed difference may be due to geographical variations and climatic condition prevalent in the study area. The report [2] also revealed the dominance of Cypriniformes with 7 species followed by 6 species each from Perciformes and



Siluriformes and only one species from Osteoglossiformes from Kattisangavi (Bheema river) and Tintini (Krishna river) of Gulbarga and Raichur district, which is again at a far distance from the current study areas. Overall studies on ichthyofaunal diversity throughout northern part of Karnataka reveals the predominance of Actinopterygii in general and Cypriniformes in particular followed by Perciformes.

The percentage of fish diversity family wise is depicted in Graph -1 and Graph -2 reveals the distribution of fish species in the two selected study area and Plate 1-9 reveals the species observed in both the study areas. Both the selected areas showed predominance of edible fish species. However, the first study area although considered as dry region, revealed a presence of higher number of species compared to the second, where due to higher degree of fishing activities fingerlings of edible/commercially important fish species are introduced into the ecosystem and harvested for commercial purposes. This may be one of the reason for lower diversity in the study area 2. It is evident that habitat loss, environmental degradation and human interferences has seriously affected the fish fauna globally.

### CONCLUSION

This is the first report on ichthyofaunal diversity from Yadgiri district of northern Karnataka which is considered as dry region with minimum diversity and this report may prove that the region has good fish diversity which needs to be maintained and improvised. Protection of fish diversity has highest priority in the present condition of drastic habitat degradation. The information about the biology and diversity of fish species can be a leading tool to combat the declining diversity and abundance and judicious utilization of the same water bodies may help to regain the loss to these species of economic and biological importance. There is an urgent need for survey of diversity of fish fauna in both the study area, as these areas harbour rare, threatened and endemic species, whose conservation and proper maintenance of their habitat will lead to increase in abundance and diversity in future. This data may provide insight into future strategies for development of water bodies and fish conservation.

### ACKNOWLEDGMENT

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