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Original Article

Biodiversity of Fishes in Jog River in Dapoli District Ratnagiri in Maharashtra

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Abstract

The present investigation was carried out in Dapoli and nearby areas of the Ratnagiri district. The main aim of this work is to find out the productivity of the said river. The fishes play a very important role in the food chain and food web. Jog River near the Dapoli Ratnagiri district is the main water resource helpful for agriculture and fisheries it has good water storage capacity, and the reservoir is a good source of fish fauna. The present study on the Fish diversity of Jog River was carried out from October 2020 to November 2021. During the present investigation, fish were collected and identified. The aim of this study was to reveal the diversity of fish species in this River. The present study reported 22 species of freshwater fishes belonging to 06 orders, 11 families, and 19 genera from the Dapoli of Maharashtra, India. From the present study, we concluded that the Jog River is a good source of food fish diversity.

Keywords:- Fresh water fish, Fish diversity, Jog River.

Introduction

About 71 percent of the globe is covered by water, making it the most fundamental characteristic of the planet. The sea, rivers, and lakes hold 97.47 percent of all accessible water on the planet, whereas the most significant water sources contribute just 2.53 percent. As a result, clean water on the planet is the insignificance of seawater, with 69.6% chained away in glacial ice, 30.1 percent in subterranean aquifers, and just 0.26 percent in lakes and rivers. Such lakes and rivers create freshwater systems, which are home to a diverse range of plants and animals. The amount and accessibility of water determine the number and variety of these biological things. Water is the basis of all life on this planet, and it completely controls the chemical components of all living things [1]. Water's distinctive physiochemical characteristics are due to its prevalence in biota as the fulcrum of biotransformation.

India is one of the few countries in the world that are bestowed with a high degree of terrestrial and aquatic biodiversity. Studies of freshwater Biodiversity in India have a long tradition and cover a wide range of faunal and floral groups.

Since 1961, there has not been notable progress in the studies of the diversity of freshwater fishes on the west coast of India, save for occasional reports. Within this period the taxonomic statuses of several species have also been revised. Hence there is a need to update the current knowledge of the biodiversity studies of freshwater fishes on the west coast of India.

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State Maharashtra is rich in freshwater (dams, rivers, and lakes) reservoirs and its fish study. Hence Maharashtra is one of the important states for natural resources and the production of fish. The Jog River is a small river emerging. Fish plays an important role as it is not only useful for food but also used in recreation and biological control. The constant decrease in the number of fish is due to water pollution as various kinds of wastewater and garbage is disposed of in the water. Freshwater fishes are those that spend some or all of their lives in freshwaters such as rivers, and lakes, with a salinity of less than 1.05%.These environments differ from marine conditions in many ways, the most obvious being the difference in the level of salinity. Various threats faced by freshwater fish is due to human activities such as the building of the dam, overfishing, loss of habitat, and water pollution through industrial waste discharge.Biodiversty is the biological variety and variability of life on earth. Fish plays an important role in the nutrients cycle and they do not maintain a constant body temperature

Nature has endowed with wealth i.e., biodiversity and its environment, which is vital for the sustenance of life on this earth. Biodiversity is the variety and variability of plants, animals, and microorganisms in their environment. Ichthyodiversity refers to a variety of fish species; depending on context and scale, it could refer to alleles or genotypes within piscian population, to species of life forms within a fish community, and to species of life forms across aqua regimes (Battul et.al., 1992). India is endowed with a vast expanse of open inland water. Freshwater resources are very precious for the life on our planet. The number of dams, reservoirs, tanks, etc. has significantly increased in the last few years. The aquatic ecosystem is important and it has a large number of economically important animals, especially fish which is an important source of food.

Fish constitutes almost half of the total number of vertebrates in the world. They live in almost all conceivable aquatic habitats. They exhibit enormous diversity of size, shape, and biology, and in the habitats, they occupy. Of the 39,900 species of vertebrates in the world, Nelson (2006) estimated 21,723 extant species of fish under 4,044 genera, 445 families, and 50 Orders in the world, compared to 21,450 extant tetrapods. Of these, 8,411 are freshwater species and 11,650 are marine. Day (1889) described 1418 species of fish under 342 genera from British India.

Maharashtra is rich in freshwater (rivers, irrigation canals, dams, and lakes) reservoirs and its fish diversity. Therefore, Maharashtra is one of the important states for fish production and natural water resources and there is great scope for developing fisheries in this state. The fish diversity was studied by many workers to a great extent that includes Bandyopadhyay (1999), Ahmad et al., (2008), Bhakta and Bandyopadhyay (2008), Devi Prasad et.al (2009), Goswami and Landmankodi (2010), Sarwade et al. (2010), Jadhav et al.,(2011), Thirumala et al., (2011), Muruga (2012), Gohil and Mankodi (2013), Islam et al., (2013), Bose et al., (2013), Khanna and Fouzia (2013), Mohite and Samant (2013), Chouhan et al., (2013), Sirajudheen and Khan (2014) and Londhe (2015).

Fish diversity is declining rapidly each day due to unending anthropogenic stress. This diversity is not only the wealth of our world but it also has some serious implications on fishery. Thus there is an urgent need for proper investigation and documentation of fish diversity in order to develop a freshwater fish diversity information system having both bioinformatics and geo-referenced databases of fish and fish habitat. Although extensive surveys have been conducted in the Dapoli region they did not provide a separate list of fish species in the present study area. The present study is an attempt to document the diversity of freshwater fishes in the Dapoli region of Maharashtra.

Origin of Research Problem

The feasibility of culturing freshwater fish has received attention in some countries because of high market demands and decreasing availability.

Freshwater is one unique habitat representative of varieties of Freshwater fishes that are one of the important protein-rich food sources easily available almost throughout the year. Many fishes are known for their delicacy, high price, and export. Freshwater fishes are members of the Class –Pisces the most diverse group of animals on earth. 41.24% of all known species of fish are found in freshwater. This is primarily due to the rapid speciation that the scattered habitats make possible.

Freshwater fish culture a promising enterprise was gradually realized, but the non-availability of quality of fish seed and lack of scientific culture constrains the development of carp farming.1 Presently, freshwater fish culture is gaining importance in the state of Maharashtra in India.2 It has been observed farmers in the state are taking a keen interest to practice freshwater aquaculture. However, the major constraint is on the supply and access to quality freshwater fish seed.3 The Konkan region of Maharashtra falls under a high rainfall zone, the pre-monsoon showers (March-May) account for 25% of annual rainfall, while the bulk of the rainfall (67%) occurs during June-September, which constitutes the monsoon season 3-4 months.4

The physical, biological and chemical characteristics of water quality are which determine aquaculture operations. In short, it can be concluded that effective water quality management is one of the important factors that contributes to the success of fish culture, and determines pond productivity.5 Though the Konkan region falls under the high rainfall category, the major part of the water is drained and mixed in seawater due to its topography. Considering this situation, it is necessary to concentrate on harvesting rainwater which can be used for producing of freshwater fish seeds.

Konkan in Maharashtra having a large network of rivers and a long-stretched coastal area is blessed with both marines as well as inland fishery resources. Despite this abundance, these resources have been neglected so far and have not been used on a large or commercial scale. Despite their economic importance and food potential freshwater has received very little attention.

Materials and Methods

Study Area:-

Dapoli is a city in the Ratnagiri district of Maharashtra in India.Dapoli is 215 km away from Mumbai. It is also called the "Mini Mahabaleshwar" (Mahabaleshwar is a hill station in Maharashtra) because of its cool climate throughout the year. It is close to the Arabian Sea (approx 8 km away) and acts as the main town (Taluka Headquarters) for several other small surrounding villages such as Anjarle, Sarang, Bhopan, Harnai, Dabhol, Navse (Bharti Ship Yard), Unhavare, Jalgaon, Gavhe, Gimhavane, Asud, Vanand, Kherdi, Karde, Murud, and Umberghar. Dapoli is now a day’s developing as a tourist destination due to its climate, tourist places, beaches, and scenery.

Dapoli is separated from the Sahyadri range by the Khed Taluka. Dapoli has a seaboard of 50 km which stretches from Burondi, Kelshi to Dabhol. The coastline differs little in its general characteristics from that of other parts of Konkan. It is densely covered by coconut farms. The principal rivers are Bharja in the north and Vashishti in the south. There is also a small river called Jog which flows through Sarang, Tadil, and into the Arabian Sea.

Despite being only 7 km away from the coast of the Arabian Sea, the town is located at an altitude of around 800 feet (240 m).

Freshwater fishes were surveyed in different locations in Dapoli and near the places. The following stations were selected for the present study – Dapoli, Bandhtiware, Sarang, Tadil, Anjarle, Dabhol, etc. The study was made from August 21 to December 21. During this Study, no fish is collected from the visited field and preserved. Just I had made photography in their natural habitat. Photography of some fishes also made at the location.

Useful Equipment During The Survey:

-The plastic containers
-Thermometers
-Fish identification wheel
-Small fishing nets
-Camera
-Hand gloves

In Konkan coast, the nets used for fish catching are boat seines, shore seines, gill nets, baited lines, hooks, and rods. The fishing season is from August to October. The fishes were only observed and Photographed during low tide from August 2021 to Dec.2021.

The freshwater fish diversity was studied at their different stations. Selection of the stations was done on the basis of two parameters- one is habitat diversity and the second is the accessibility of the study site.

Collection of Fish Samples:-

The fish for the present study were collected from local fish markets and various water resources such as Tadil, Anjarle, Bandhtiware, and Dabhol.

Identification of Fish Sample:-

The fish from rivers were collected using various fishing methods. After sampling, photographs of fish were taken and collected fish samples were preserved in 10% formalin for detailed examination and identification by using standard literature of Day (1878), Jayaram (2010), and Talwar and Jhingran (2001). Some of the samples were sent to the Western Regional Office of the Zoological Survey of India for further identification.

Results and Discussion

The present study reported 22 species of freshwater fishes belonging to 06 orders, 11 families, and 19 genera from the Dapoli of Maharashtra, India. The results of the present study show Cypriniformes as the dominant group in the assemblage composition contributing 50% to total fish diversity in which *Labeo rohita, Catla catla, Cirrhinusmrigala, Cyprinus carpio, Labeo boggut, Garra mullya, Puntius sophore Cirrhinus reba Salmostoma sp., Rasbora daniconius and Crossocheilus latius* were found most abundant. Siluridae family contributed 9.09% to total fish diversity in which *Ompok bimaculatus, Wallago attu* were found. Bagridae contributed 9.09% to the total fish diversity in which *Mystus bleekeri* and *Mystus cavasius* were found. Cichlidae contributed 4.54% to total fish diversity in which *Tilapia mosumbica* was reported. Gobiidae contributes 4.54% to total fish diversity in which *Glossogobius giuris* species. The Mastocembelidae family was reported to contribute 4.54% to total fish diversity in which *Mastocemelus arnatus* was the dominant species. Notopteridae was reported with 6 species contributing 4.54% to total fish diversity with *Notopterus notopterus f*ish. Anguillidae family contributes 4.54% to total fish diversity *Anguilla bengalenisis.* Channidae family contributes 4.54% to total fish diversity with *Channa striata.* Ambassidae family contributes 4.54% to total fish with *Chanda nama.*

India is one of the mega diversity countries with respect to freshwater fish species (650+species). In freshwater fish diversity, India is eighth in the world and third in Asia. There are plenty of cultivable species. The indigenous fishes should also be incorporated into the value systems of the society (sport, biological control, aesthetics, etc). The water bodies harboring endangered fishes must be declared as fish sanctuaries or aquatic diversity management areas. The use of illegal methods to catch fish should be banned in this area to prevent the depletion of freshwater fish resources. The fishermen should make aware of fishing, and scientific training and facilities should be made available to the fish farmers. Fishing of the spawns, larval fishes, and immature fishes should be avoided, and subsides loan facility may provide on a large scale which may help in high yield of fish production. It was further concluded that studies may be done to develop techniques for fish culturing, protecting, and conserving the biodiversity of fish.

With the rapid increase in the human population and the increasing dependence on aquatic fishery resources including water and the continuing introduction of exotic species in natural water bodies, the loss of aquatic fish diversity is likely to increase further unless proper conservation measures are implemented.

The freshwater fishes reported during the present study are depicted in the table given below:

Table 1: List of freshwater fishes from the Dapoli of Maharashtra

Sl. No.	Order	Family	Fish Species
1	Cypriniformes	Cyprinidae	*Labeo rohita* (Hamilton-Bucha 1822)
2	Cypriniformes	Cyprinidae	*Catla catla* (Jhingran 1966)
3	Cypriniformes	Cyprinidae	*Cirrhinus mrigala* (Hamilton Bachanan, 1822)
4	Cypriniformes	Cyprinidae	*Cyprinus carpio* (Linnaeus 1758)
5	Cypriniformes	Cyprinidae	*Labeo boggut* (Sykes 1838)
6	Cypriniformes	Cyprinidae	*Garra mullya* (Sykes 1841)
7	Cypriniformes	Cyprinidae	*Puntius sophore* (Hamilton Bachanan, 1822)
8	Cypriniformes	Cyprinidae	*Cirrhinus reba* (Hamilton Bachanan1822)
9	Siluriformes	Siluridae	*Ompok bimaculatus* (Lacepede 1803)
10	Siluriformes	Bagridae	*Mystus bleekeri* (Day)
11	Siluriformes	Bagridae	*Mystus cavasius* (Hamilton Bachanan 1822)
12	Siluriformes	Siluridae	*Wallago attu*
13	Perciformes	Cichlidae	*Tilpia mosumbica* (W.K.H pterus 1852)
14	Percisforme	Gobiidae	*Glossogobius giuris* (Hamilton- Bachanan1822)
15	Synbranchiformes	Mastocembelidae	*Mastocemelus arnatus* (Scopoli 1777)
16	Osteoglossiformes	Notopteridae	*Notopterus notopterus* (pallas1769)
17	Cypriniformes	Cyprinidae	*Rasbora daniconius (Hamilton)*
18	Cypriniformes	Cyprinidae	*Crossocheiluslatius Hamilton)*
19	Anguilliformes	Anguillidae	*Anguilla bengalensis (Gray)*
20	Perciformes	Channidae	*Channa striata (Bloch)*
21	Cypriniformes	Cyprinidae	*Salmostoma sp.*
22	Perciformes	Ambassidae	*Chanda nama (Hamilton)*

Conclusions

Studies of freshwater fish biodiversity in India have a long tradition and cover a wide range of faunal and floral groups. But since 1961, there has not been notable progress in the studies of the diversity of fish on the western coast of India. Hence there is a need to update the current knowledge of the biodiversity studies of fish on the west coast of India.

Aquaculture is a major important component of rural development culture. The aim of it is to provide an improved Food Supply as well as generate more income for Poor farming households. Fish farming supports the farmer either for food or for money in the case in the failure of the other crops. The fresh fish culture is not accepted widely in Konkan by the farmer due to the following reasons.

1. Lack of information about the habit and habitat of fishes

2. Lack of knowledge regarding fish culture

3. No proper guidance related to the government schemes regarding fresh fish culture and rearing.

Fish rearing plays an important role in the financial condition of a large number of poor people living on the Konkan coast. The study site that is Dapoli is in the vicinity of Agriculture Research University. There is a need to update the current knowledge of the biodiversity studies of fishes in the Konkan region.

The freshwater fishery in India is yet to be recognized as a major fishery despite the abundant occurrence of freshwater fish all along the Indian coast. There are a number of species occurring in Indian waters. However, only a few of them are used for human consumption. Dapoli is a small city famed as a gateway to escape from the metropolitan life of Mumbai and Pune. It has very clean beaches, so it attracts thousands of tourists. This is a coastal city in the Konkan coast with soft sands and lush greeneries. The sandy and rocky shore of Dapoli is one of the unique habitats for freshwater fish in Konkan in Maharashtra having a large network of rivers and a long-stretched coastal area is blessed with both marine as well as inland fishery resources, despite this abundance, these resources have been neglected so far and have not been used on large or commercial scales.

The feasibility of culturing freshwater fish must receive attention in India because of the high market demand and decreasing availability of fish

The local poor people in Dapoli used soup or curry of fish in their daily food. Hence from the scientific point of view, it is essential that intensive investigation on improved fishing techniques and on farming of suitable varieties of fish is to be carried out to harvest fish.

Conflicts of Interest
The authors declare that there are no conflicts of interest regarding the publication of this work.

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