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Ecological study on Navule pond, Shimoga, Karnataka

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INTRODUCTION

Wetlands are beautiful landscapes covered by water and a green mat of various types of hydrophytes. These hydrophytes are important habitat for fishes, insects, amphibians, reptiles and other wild life. Ecologically speaking, the lentic systems are important ecotones, transition between open water and land endowed with a definite structure and function to perform specific ecological balancing roles^[8].

In our present study the fish fauna of Navule pond has been studied. The Navule pond is situated in Shimoga city of Karnataka state. The tank acquires a land of 26 hectare and depth of tank is 6 ft. Since the study of biodiversity is most important as a base line data for all conservational measure. The present study was undertaken the study on ecology in Navule pond Shimoga. Further there is also not such literature is available on the fish diversity of this pond. Hence, the study was carried out.

MATERIALS AND METHODS

In our study made from Navule pond during 20th July 2008 to 15th October 2008. Water being a chemical factor influences the ecosystem. Hence, the physicochemical properties of water was analyzed. The samples were analyzed by methods described by APHA^[1]. Identification of fishes was done with the help^[7]. Fishes for the presents study were collected with the help of fisherman.



Photograph 1 : Study area

RESULTS AND DISCUSSION

To the study the ecology of present pond, the water samples were collected from 20th July 2008 to 15th October 2008. The values for various parameters obtained are given in TABLES 1 to 3. 14 species of fishes which are come under 4 orders and 4 family has been collected. These are all fishes are

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great economic value in the fishery and they form the consumers preference.

TABLE 1: List of fish species

SL	COMMON NAME	SCIENTIFIC NAME	VERNACULA NAME
1	Flying carp	<i>Hypophthalmichthys molitrix</i>	Silver carp
2	Catla	<i>Catla catla</i>	Catla
3	Common carp	<i>Cyprinus carpio</i>	Gauri menu
4	Rohu	<i>Labeo Rohita (Ham)</i>	Rahu
5	Mrigal	<i>Cirrhinus Mrigal</i>	Mrigal
6	Mahanadi razor belly minnow	<i>Salstoma Untrachi</i>	Bilichi (chela)
7	Black line Rasbora	<i>Rasbora doniconius (Ham)</i>	Sasalu
8	Giants snake head	<i>Channa marulius (Ham)</i>	Owlu menu
9	Banded snake head	<i>Channa striatus</i>	Kuchu menu
10	Spotted snake head	<i>Channa punctatus (Bloch)</i>	Korava
11	Magur	<i>Clarias batrachus (Linnaeus)</i>	Murugodu
12	Gangetic myetus	<i>Mystus cavasius</i>	Girulu
13	Tilapia	<i>Oreochromis massambica</i>	Jelabi
14	Olive barb	<i>Puntius pinnauratis (Day)</i>	Gendu

The temperature of the surface water often had a direct bearing on chemical concentration. The temperature directly influences the changes in dissolved oxygen, alkalinity, salinity and the taste of water^[6]. In the present investigation the water temperature was around 23° C in (TABLES 2). The temperature prevailed in the ponds are found to be favourable for the better productivity of the plankton biomass, which intum enhances the fish and zooplankton productivity in these ponds. The fishes and the zooplanktons are the main food for the birds living in these wetlands.

pH value is a term used universally to express the intensity of acid or alkalinity condition of a solution The range of pH scale is from 0 to 14. The pH of was around 6 in Nauvle pond. The pH of the ponds indicates that the water is acidic. This is because of the leaching of soil and decomposition of plankters.

Dissolved oxygen is one of the most important parameters in water quality assessment and reflects the physical and biological process prevailing in the waters^[11]. In the present investigation low dissolved oxygen levels in Nauvle pond revealed that the water is polluted by oxygen demanding materials^[4].

Total hardness is the property of water which prevents the lather formation with the soap and increases the boiling point of water. The hardness of water is caused by carbonates, bicarbonates, sulphates, chlorides and nitrates of calcium and magnesium. Water quality association has provided a general scale of hardness demarcating the limits of soft and hard water. It is given in Training Modules on Drinking Water Quality Analysis and Rem-

edies (2000). Very hard > 80 mg. The present data revealed that all the pond have very hard water. Swarnalatha and Narasinga Rao^[10] have recorded more total hardness during rainy season. The present findings are in conformity with the above workers.

Calcium hardness is one the most abundant substances of the natural water^[11]. It is very important element influencing the flora of an ecosystem. It greatly influences the distribution of phytoplankton in the aquatic system, which requires for the metabolic activities. Dakshini and Soni (1979) have stated that, calcium content increases during rainy season with corresponding decrease in winter followed by summer. However, in the present study, the behaviour of calcium during rainy season is rather regular. Hence, the observations of the current study are in agreement with that of Dakshini and Soni^[3].

Magnesium also occurs in all kinds of natural water with calcium, but its concentration remains generally lower than the calcium. Zutshi and Khan^[12] have concluded that, natural water contains magnesium concentration is lower than the concentration of calcium. In the present study also, the content of magnesium was found to be less than calcium.

Chloride is an important parameter in assessing the water quality. Munawar^[9] stated that higher concentration of chloride indicate high degree of organic pollution. According to drinking water standard, the water must have 20 mg/L, the increased content is due to organic pollution due to agricultural waste water inlet. In the present study pond has high chloride content.

The phosphate occurs mainly in the form of orthrophosphate as the most important critical factor in the maintenance of pond fertility^[2]. According to him natural water contains 5 to 20 mg/L of phosphate. In the present investigation the pond water partial related to him.

Biological oxidation of reduced sulfur species to sulphate also increases its concentration. Rain water has quite high concentration of sulphate particularly in the area with high atmospheric pollution. Zutshi and Khan^[12] are of the opinion that polluted water are found to be rich in sulphate content. In the present study sulphate amount was high, this is due to the eutrophication.

Macrophytes are the conspicuous plants that are dominate in wetlands, shallow lakes and streams In the present study, totally 15 species of macrophytes have been recorded from these ponds.

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TABLE 3 : Physico – chemical properties of water.

SL	Parameter	
1	Temperature	23 ⁰ C
2	p ^H	6 (acidic)
3	Dissolved oxygen	2.6 µg/l
4	Fresh Co ₂	4 µg/l
5	Chloride	115.02 µg/l
6	Total hardness	300 µg/l
7	Calcium	38.72 µg/l
8	Magnesium	36.2 µg/l
9	Total dissolved solid	135 µg/l
10	Phosphate	3.2 µg/l
11	Sulphate	165 µg/l
12	Dissolved organic matter	4.23 µg/l

TABLE 4 : Aquatic macrophytes found in the study area

Sl. No.	Scientific Name	Common Name	Family
1	<i>Hydrilla verticillata</i>	Hydrilla	Hydrocharitaceae
3	<i>Najas minor</i>	Najas	Hydrocharitaceae
4	<i>Utricularia vulgaris</i>	Neerugulle	Lentibulariaceae
5	<i>Marsilea quadrifolia</i>	Citiginasoppu	Marsiliaceae
6	<i>Pistia stratiotes</i>	Pissia	Araceae
7	<i>Nymphaea nouchali</i>	Water lilly	Nymphaeaceae
8	<i>Nelumbo nucifera</i>	Nelumbo (Kamala)	Nymphaeaceae
9	<i>Jussia repens</i>	Neeru dantu	Onagraceae
10	<i>Trapa bipinosa</i>	Neeru akrotu	Trapaceae
11	<i>Nymphoid indicum</i>	Neeru tavare	Gentianaceae
12	<i>Nymphoid cristatum</i>	Kumudni	Gentianaceae
13	<i>Polygonum barbatum</i>	Konde malle	Polygonaceae
14	<i>Ipomea aquatica</i>	Water spinach	Convolvulaceae
15	<i>Typha latifolia</i>	Ane jondu	Typhaceae

These ponds are spectacular site for faunal diversity especially water fowl density. These ponds provide food, shelter to resident and resident migratory, as well as migratory. During the present study total 13 species were recorded.

The pond receives sewage water from the Shimoga town and agricultural waste discharge from the agricultural field around the pond. The Navule pond totally shelters of 16 species of cultivable, predatory and forage fishes. The tank requires a special attention because of all the culturable fish fingerlings which are left in to pond are eaten by predatory fishes in the pond. Therefore special care must be taken to increase the fish population. The vegetation around the pond consists of paddy. Coconut trees etc.

TABLE 10 : Biodiversity of birds found in the study area

Sl. No.	Name of the Bird	Scientific Name
1	Little Cormorant	<i>Phalacrocorax niger</i>
2	Purple Moorhen	<i>Porphyrio porphyrio</i>
3	Pond Heron	<i>Ardeola grayii</i>
6	Kingfisher	<i>Alcedo atthis</i>
7	Little Grebe	<i>Tachybaptus ruficollis</i>
8	Sand Pipers	<i>limicola falcinellus</i>
9	Purple Heron	<i>Ardea purpurea</i>
10	Cattle Egret	<i>Bubulcus ibis</i>
11	Black Ibis	<i>Pseudibis papillosa</i>
12	Coots	<i>Fulica atra</i>
13	Median Egret	<i>Mesophoyex intermedia</i>

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