



Diversity of aquatic macrophytic vegetation in summer season of Kamsagar Lake, Channagiri Taluk, Davanagere, Karnataka

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Abstract

Aquatic macrophyte aggregates essential components of much fresh water. The current analysis deals with the diversity of aquatic macrophytic vegetation of Kamsagar lake of Channagiri taluk. Aquatic macrophytes are important component of ecosystem and play a major role in primary productivity of the aquatic ecosystem. An extensive field survey and plant collection revealed the presence of 06 species of aquatic plants belonging to 06 genera and 06 families in the site. Most identified aquatic species were found to be used for various purposes. The use for providing traditional health care was the most abundant causing the wide spread use of most of the plants for medicinal purposes, some species were edible and few species were used as fodder. In the present study was conducted during the month of March 2021 to June 2021, for 04 months. Diversity were calculated by statistical analysis. The present study describes the ecological status including Density, Abundance and Frequency of aquatic flora of the Kamsagar Lake. The data recorded from the site shows the Predominant species is *Nelumbo nucifera* having 1 frequency. It is found that highest density 6.0 and abundance 6.02. Unfortunately, aquatic ecosystem destroyed rapidly due to various reasons. Present paper is specially focused on aquatic plants biodiversity for their conservation.

Keywords: diversity, aquatic macrophytes, Kamsagar Lake

Introduction

Diversity and diversity of organisms in the aquatic ecosystem directly depend on other accessibility and high quality of water. Fresh water is required for agriculture, industry and for human survival to continue human progeny. Its constrained resource of earth. Fast development of urban areas directly or indirectly pathetic or distressed the existence of the pond. Such as excessive use or overutilization of resources and discarding of waste without proper way (Thilaga et.al. 2005). Limnology plays a vital role in the decision rationing process in aquaculture practices. A small vary in water quality causing great damage to biotic community of an aquatic ecosystem eventually reducing the primary productivity (Jwana et.al. 2000). Aquatic macrophytes comprise a diverse group of organisms as well as some freshwater macroalgae, liverworts, mosses, ferns and angiosperms and that occur in seasonally or wet environment (Lacoul and Freedman, 2006; Chamber et.al., 2008). On the basis of their life forms macrophytes are classified into four forms namely free floating, floating, submerged and emergent.

The leading component of fresh water ecosystem is aquatic macrophytes because they afford better nourishment to the aquatic organisms in the form of nutrients, food and also contribute habitat for the maintenance and enhance the biodiversity of aquatic ecosystem (Agustinbo et.al 2007, Theel et.al 2008)

Aquatic macrophytes serve as bio indicator as they react to the changes in quality of water, minerals and other organic component. Aquatic ecosystem changes has been monitored the aquatic ecosystem changes has been monitored by the aquatic macrophytes as they are used as indicators and heavy metals aggregates which are present in aquatic ecosystem (Devlin, 1967). Submerged macrophytes yield

oxygen in the aquatic ecosystem. Aquatic macrophytes can reduce biological oxygen demand, and these plants are now exploited for bio filtration of organic waste in the waste water treatment system (Ghosh, 2005).

Growing in suitable habitats several species are considered aquatic weeds due to massive colonization and deleterious upon aquatic diversity and ecosystem functioning. Unwanted plants in ponds, lakes, reservoirs and other perennial water bodies, called as aquatic weeds causing economic as well as ecological losses by adversely damaging the aquatic ecosystem, navigation, public health, irrigation and fisheries development of any nation.

Materials and Methods

Study area

Kamsagar lake is situated in Channagiri Taluk, Davanagere district of Karnataka, India. Kamsagar Lake covers a geographical area of 74 acres. About 41% of lake is occupied by aquatic macrophytes. Channagiri Taluk is located at 14.03° N 75.93° E. Channagiri lies on 664 m above sea level the climate here is considered to be a local steppe climate. The average temperature in Channagiri is 24.9 °C/76.8°F. The annual rainfall is 679 mm/ 26.7 inch. This consists of very good aquatic ecosystem.

Sample collection

The study area was explored thoroughly and detailed observation on the vegetation. Macrophytes were collected at an interval of 30 days, during the month of March 2021 to June 2021, for 04 months, summer season. Collected material were identified with the help of standard literatures and confirmed in the herbarium of Botanical Survey of India.

Statistical analysis

The samples were collected at an interval of 30 days , during the month of March 2021 to June 2021, for 04 months, summer season , 1m×1m .Quadrants was lied randomly the number of macrophytes present in the Quadrant area were recorded and identified by using available manuals. The frequency, density, abundance are calculated using respective formulas (Cottam and Curtis 1956 :Magurran 1958) as follows.

$$\text{Frequency} : \frac{\text{Number of quadrant in which species occur}}{\text{Total number of quadrants studied}}$$

$$\text{Relative frequency} : \frac{\text{Frequency of a species}}{\text{Total frequency of all the species}} \times 100$$

$$\text{Density} : \frac{\text{Total number of individuals of a species}}{\text{Total number of quadrants studied}}$$

$$\text{Relative density} : \frac{\text{Density of a species}}{\text{Total density of all the species}} \times 100$$

$$\text{Abundance} : \frac{\text{Total number of individuals of a species in all the quadrants}}{\text{Total number of quadrants in which the species as occurred}}$$

Results and discussion

In the present investigation, Kamsagar lake is situated in the Channagiri Taluk , Davanagere district of Karnataka , India . Kamsagar Lake covers a geographical area of 74 acres. About 41% of lake is occupied by aquatic macrophytes , Channagiri Taluk is one of the famous called as land of

Arecanut , Channagiri is located at 14.03°N 75.93° E and it spread in 6 acres with variety of submerged , rooted , floating macrophytes and a road passes along the bank of lake . The effluent which were discharged from the anthropogenic activities.

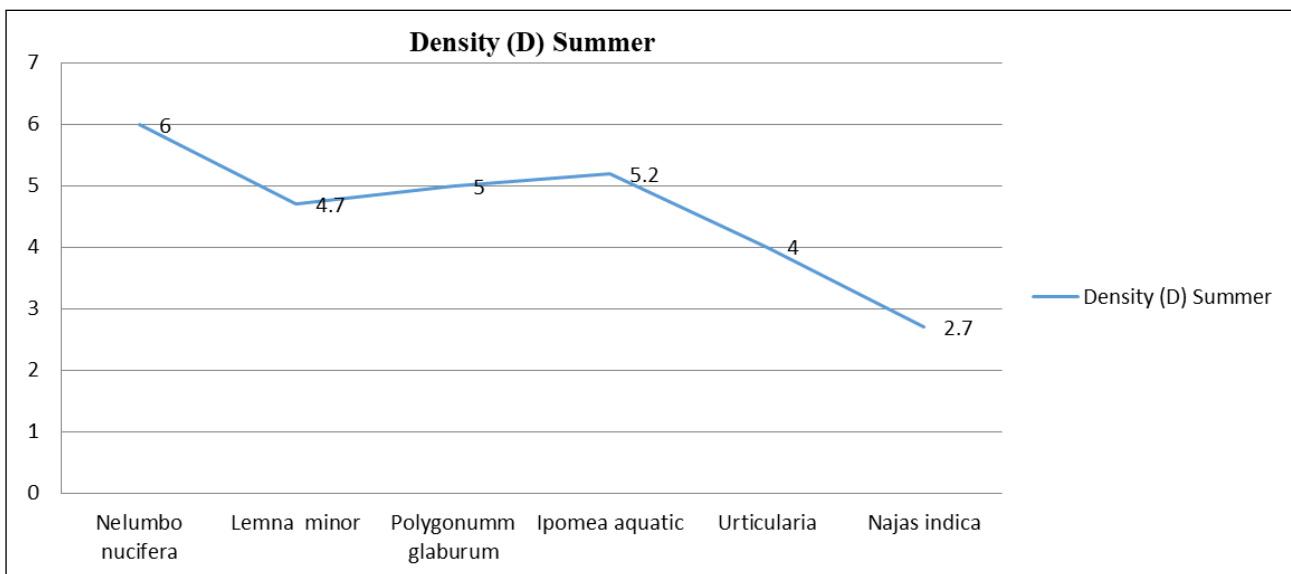
In the present investigation of Kamsagar lake, the frequent visit during the month of March 2021 to June 2021, for 04 months, summer season, were made and recorded 06 species by quadrat method to know the Density, Frequency and Abundance. The list of aquatic macrophytes is furnished below Table 01.

Table 1: List of aquatic macrophytes in Chiradone lake

Sl. No	Species name	Family
1	<i>Nelumbo nucifera</i>	Nelumbonaceae
2	<i>Lemna minor</i>	Lemnaceae
3	<i>Polygonum glabrum</i>	Polygonaceae
4	<i>Ipomea aquatic</i>	Convolvaceae
5	<i>Urticularia</i>	Lentibulariaceae
6	<i>Najas indica</i>	Najadaceae

Table 2: Aquatic Macrophytes Density in Summer Season

Sl. No	Species Name	Density (D)
		Summer
1	<i>Nelumbo nucifera</i>	6.0
2	<i>Lemna minor</i>	4.7
3	<i>Polygonum glabrum</i>	5.0
4	<i>Ipomea aquatic</i>	5.2
5	<i>Urticularia</i>	4
6	<i>Najas indica</i>	2.7

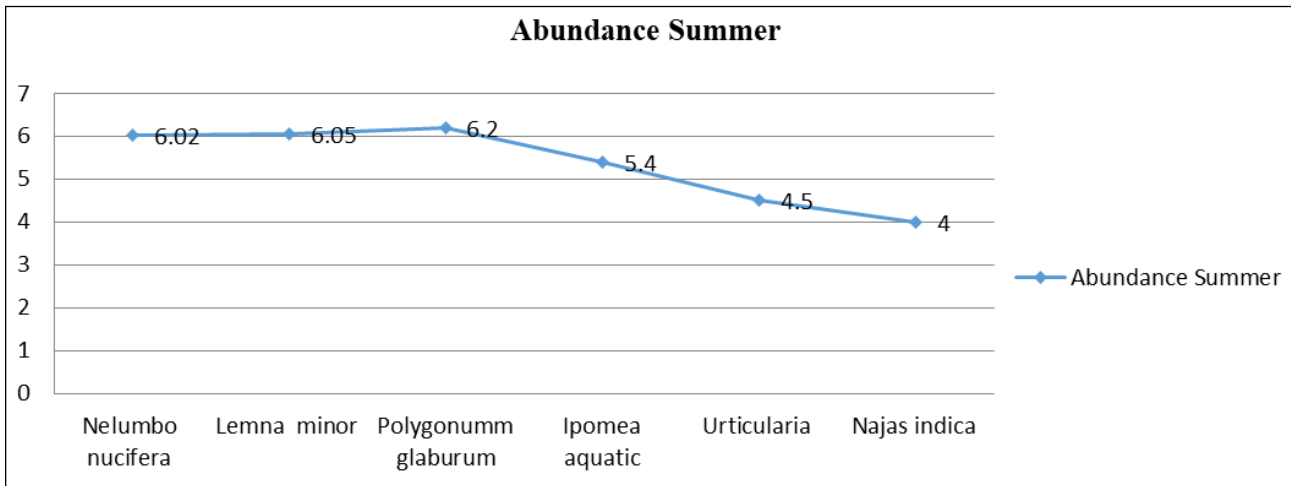


Graph 1: Aquatic Macrophytes Density in Summer Season

The density of the study site represents that a total 06 aquatic macrophytes belonging to 06 families were found in the lake , out of total 06 species recorded Nelumbonaceae family has shown the presence of maximum number of species i.e Nelumbo to 40-41% other families like Lemnaceae , Polygonaceae , Convolvaceae , Najadaceae. One species each contributing to 10-13% . The more value of Density was shown by *Nelumbo nucifera* with values ranging from D=6.0 in Summer Season followed by other species respectively.

Table 3: Aquatic Macrophytes Abundance in Summer Season

Sl. No	Species name	Abundance
		Summer
1	<i>Nelumbo nucifera</i>	6.02
2	<i>Lemna minor</i>	6.05
3	<i>Polygonum glabrum</i>	6.2
4	<i>Ipomea aquatic</i>	5.4
5	<i>Urticularia</i>	4.5
6	<i>Najas indica</i>	4.0

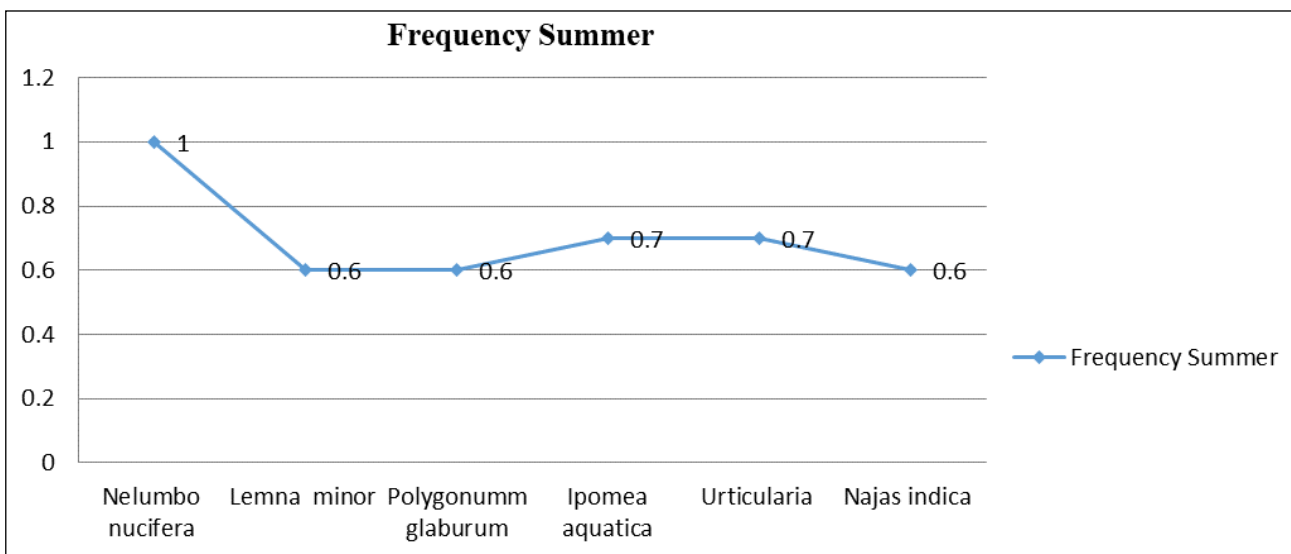


Graph 2: Aquatic Macrophytes Abundance in Summer Season

The abundance of study site represents that a total of 06 aquatic macrophytes belonging to 06 families were found in the lake, out of total 06 species recorded Nelumbonaceae family has shown the presence of maximum number of species I.e. *Nelumbo nucifera* contributing the maximum value of abundance was shown by *Nelumbo nucifera* with values ranging from A=6.02 in summer season followed by other species respectively.

Table 4: Aquatic Macrophytes Frequency in Summer Season

Sl. No	Species Name	Frequency
		Summer
1	<i>Nelumbo nucifera</i>	1
2	<i>Lemna minor</i>	0.6
3	<i>Polygonum glaburum</i>	0.6
4	<i>Ipomea aquatica</i>	0.7
5	<i>Urticularia</i>	0.7
6	<i>Najas indica</i>	0.6



Graph 3: Aquatic Macrophytes Frequency in Summer Season

The frequency of study site represents that a total of 06 aquatic macrophytes belonging to 06 families were found in the lake, out of 06 species recorded Nelumbonaceae family has shown the presence of maximum number of species, the maximum value of frequency was shown by *Nelumbo nucifera* with values ranging from F=1 in summer season followed by other species and seasons respectively.

Conclusion

Aquatic plants serve as good source of food to mankind and animals thus forming a palatable food for water birds and a best for aquatic wild life conservation practices. Aquatic vesicular plants are important indicators of water pollution. Many workers contributed recent aspects of production studies of macrophytes. In this present study, *Nelumbo*

nucifera was enormously distributed in Kamsagar Lake and other species were also found.

Acknowledgements

Authors are grateful to the Department of Botany, Sahyadri Science College Shivamogga, Karnataka for providing lab and support to carry out this study. We express deepest gratitude to Principal Sahyadri Science College Shivamogga and Gram Panchayth Office Kamsagar Village.

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