

## **DYNAMICS OF ALGAL DIVERSITY IN HOMBARGALLI LAKE OF H.D. KOTE, MYSORE DISTRICT, KARNATAKA**

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### **ABSTRACT**

*The dynamics and distribution of algae in a fresh water lake was studied over a period of 12 months. One way ANOVA was used to test the significance between five groups of algae (Desmids, Diatoms, Euglenophyceae, Myxophyceae and Chlorococcales. Related physico-chemical parameters were also analysed. Euglenophyceae were predominant. Dissolved Oxygen played a significant role in the distribution of algae in this lake. The water was alkaline and phosphates played a minor role.*

**Keywords:** Algal diversity, ANOVA, Dissolved Oxygen, Euglenophyceae

### **INTRODUCTION**

Diversity measures are useful in lake ecosystems which harbour a large variety of algal species in general and species diversity within the genera. Hutchinson(1967) states that species diversity is often a paradox. Species diversity studies have been done by Pianka(1983), Marguran(1983), Hosmani(2010) and Hosmani and Mruthunjaya(2012). Detailed studies on algal diversity have been done by Aiyazet al (2010) and Basavarajappa et al., (2009). Most of these studies deal with the distribution of algal species in different water bodies. However the study on algal groups is lacking and the significant relationship between different groups of algae is meagre.

### **MATERIALS AND METHODS**

#### **Sampling site and collection of samples**

Hombargalli Lake is located about 50 kms from Mysore near Hampapura village on the Mysore-H.D. Kote Road in Karnataka. The lake has a catchment area of 2 acres. It is a rain fed lake and has a maximum depth of 10 feet when full. It supports abundant growth of aquatic vegetation and the water in it is used for agriculture and aquaculture. Human interference in the lake is very high.

**Analysis of samples**

Standard methods were employed for the analysis of physical and chemical parameters as described by APHA(1995).Collection, preservation, identification and enumeration of algae were done as per the methods described by Welch(1948), Hosmani and Bharathi(1980). Identification was done by consulting the monographs by Philipose(1960), Desikachary(1948) ,Gandhi(1998) and Prescott(1982). Enumeration was done as per Lackey's drop method (1938) modified by Suxena(1987) and all counts were expressed as organisms/Litter(O/L). The data obtained were subjected to the one way ANOVA for independent samples. Analysis was done separately to the algal data and chemical data.

**RESULTS AND DISCUSSION**

The results of the analysis are presented in Table 1. The tests performed were to determine whether there was any significant difference between the different groups of algae and the chemical variables (Table 2). According to the test of variance it was observed that Desmids and Myxophyceae showed a highly significant association ( $P < 0.01$ ) indicating that the two groups tolerated each other in the ecosystem and there was no antagonism. Diatoms and Myxophyceae also showed a similar association. Euglenophyceae and Chlorococcales were abundant and were inversely proportional and significant. The remaining groups were not closely associated. Euglenophyceae were the predominant groups of algae.

**Table 1.** Distribution of algae and related parameters in Hombargalli lake of H.D. Kote (Mysore District. ( Algae expressed as organisms/liter; Parameters as parts per million(ppm)

Months	Desmids	Diatoms	Euglenophyceae	Chlorococcales	Myxophyceae	Oxidisable organic matter	Nitrate	Dissolved Oxygen	Albumonoid Ammonia	Phosphates	Free Carbondioxide	pH
Jan	672	1848	8820	420	168	1.25	4.43	10.46	24.0	2.0	80.72	8.60
Feb	5040	6426	15455	1092	504	1.01	8.86	6.99	14.0	2.0	15.82	6.52
Mar	3360	3356	14954	1470	378	2.32	1.32	5.33	28.0	12.0	64.92	7.82
Apr	3780	6950	11350	1654	576	1.91	4.43	4.98	16.2	2.0	56.93	7.52
May	4200	7560	2016	126	168	2.07	4.43	1.93	19.2	4.0	43.95	8.52
Jun	2520	1386	2352	168	2394	5.0	8.86	1.24	33.6	2.0	10.93	8.52
Jul	840	3360	168	1952	798	5.18	4.43	1.56	33.6	3.0	93.89	8.62
Aug	4200	1764	4746	1260	63	1.67	13.29	1.96	12.0	6.0	138.83	8.72
Sep	5250	1197	29624	126	63	2.88	4.43	3.30	9.2	6.0	114.87	7.20
Oct	6930	108	4524	1134	1071	0.5	4.43	1.30	15.0	4.0	105.1	8.52
Nov	630	210	2352	1932	84	0.5	4.47	2.79	0.0	2.0	134.8	7.52
Dec	420	756	945	84	567	5.13	4.43	3.94	13.0	2.0	125.6	7.52

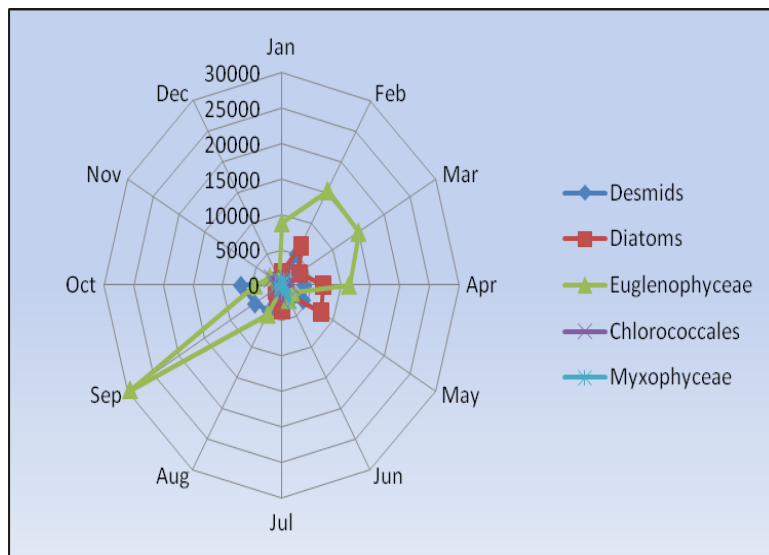
**Table 2.** Tukey HSD Test for Chemical parameters

M1 vs M2	nonsignificant
M1 vs M3	nonsignificant
M1 vs M4	nonsignificant
M1 vs M5	P<0.01(Highly significant)
M2 vs M3	nonsignificant
M2 vs M4	nonsignificant
M2 vs M5	P<0.01(Highly significant)
M3 vs M4	nonsignificant
M3 vs M5	P<0.01(Highly significant)
M4 vs M5	P<0.01(Highly significant)
M1:	Oxi disable Organic Matter (ppm)
M2:	Nitrate (ppm)
M3:	Dissolved Oxygen (ppm)
M4:	AlbuminoidalAmmonia (ppm)
M5:	Free Carbon dioxide

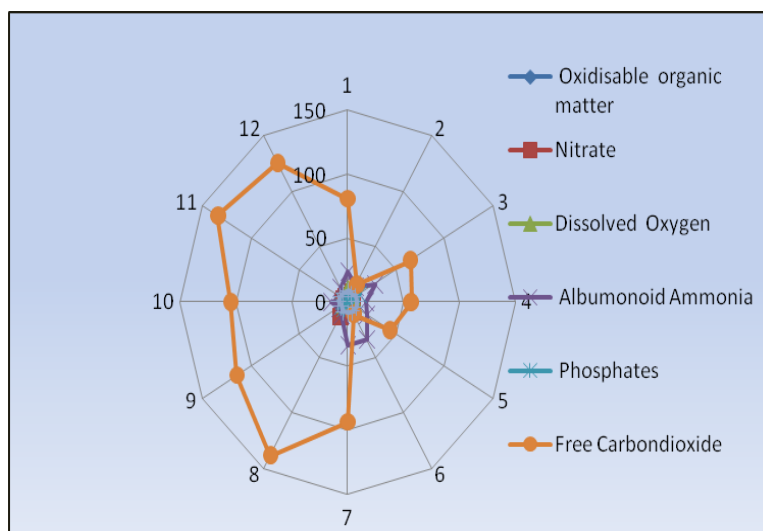
**Tukey HSD for algal populations**

M1 vs M2	non significant
M1 vs M3:	P<0.05(Significant)
M1 vs M4	non significant
M1 vs M5	non significant
M2 vs M3	P<0.05(Significant)
M2 vs M4	non significant
M3 vs M4	P<0.01(Highly significant)
M3 vs M5	P<0, 01(Highly significant)
M4 vs M5	non significant
M1:	Desmids(O/L))
M2:	Diatoms(O/L)
M3:	Euglenophyceae(O/L)
M4:	Chlorococcales(O/L)
M5:	Cyanophyceae(O/L)

The significance of association between the chemical parameters showed that Ox disable Organic matter was significant and correlated to Dissolved oxygen and Nitrate. Dissolved Oxygen played a very significant role in the diversity and distribution of algae in this lake. Albuminoidal ammonia and free carbon dioxide showed high significance while Phosphate had a minor role in the distribution of algae. This is in spite of large amount of agricultural waste flowing into the lake. Variations in the algal groups and the chemical parameters are represented in Fig. 2 and Fig.3.



**Figure 2.** Distribution of Algae in Hombargallilake



**Figure 3 :** Physico-chemical parameters in Hombargallilake

pH has an important role in the ecology of fresh water algae. The variation of pH was very high. The mean pH during the 12 months was 8.12 and fluctuated between 6.52 and 7.52. The last quartile showed minor variations up to 8.72. The lake water was considered to be alkaline.

**CONCLUSION**

The algal diversity of Hombargalli Lake of H.D. Kote is very high. Diatoms, Euglenophyceae and Chlorococcales dominate the lake to a greater extent. Desmids and Myxophyceae are less dominant. Dissolved oxygen plays a significant role in the distribution of algae in this lake.

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