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# AQUATIC BIODIVERSITY OF GREATER BANGALORE WETLANDS

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## ABSTRACT

Physical and chemical integrity of a lake decides the biological constituents. Phytoplankton diversity and productivity are dependent on the lake water quality as well as to the abiotic and biotic factors prevailing in the ecosystem. Algae have been used successfully worldwide as indicators for the environmental assessment of lakes, wetlands etc. The present study gives an idea of the different algal groups present and also evaluates the species richness, species diversity as well as species evenness in the lakes of Greater Bangalore.

## INTRODUCTION

Phytoplanktons are free-floating unicellular, filamentous and colonial organisms that grow photo-autotrophically in aquatic environments. They are the basis of food chains and food webs which directly provide food for the consumers like zooplankton, fishes and other aquatic animals, i.e., they occupy the base level in energy transfer within aquatic ecosystems (Ramachandra et al., 2007). Phytoplankton plays an important role in maintaining the microclimate, helps in regulating the level of atmospheric oxygen, carbon di oxide and vital gases for life (Shinde et al., 2012).

Algae, being single-celled organisms with a short regeneration time respond rapidly in terms of community structure and density to physical and chemical changes than larger animals and plants (Khuantrairong et al., 2008). The composition and diversity of algae in lakes can be used to quantify water quality and to measure the efficacy of restoration efforts as they are the primary producers (Yang et al., 2012). The variations in physico-chemical characteristics of lakes brings about changes in the species distribution pattern, elimination of sensitive species, dominance of tolerant species, changes in diversity and subtle morphological and physiological changes. This forms the basis of bio monitoring water quality. This forms an excellent and inexpensive tool for measuring pollution levels in water (Ramachandra et al., 2007; Priyanka et al., 2014)

Phytoplankton fluctuation and diversity are widely used as biological determinates of water quality in lakes and reservoirs. In lakes, the phytoplankton succession mainly depends on the availability of nutrients, hydraulic retention time, temperature, light intensity and transparency. The different algal groups found in lake have varied growth conditions, temperature as well as light tolerances (Basavaraja et al., 2013). Light limitation due to high turbidity reduces the photosynthetic rate and thus, controls phytoplankton growth either during the whole year or seasonally (Ariyadej et al., 2004). Some other physico-chemical factors like

pH, alkalinity, dissolved oxygen and dissolved nutrients also affect the phytoplankton production in lakes (Devi et al., 2013). The growth of algae in lakes also depends on the concentration of nutrients such as phosphates and nitrates. The nutrients at a higher concentration may produce excessive algal growth/blooms. These algal blooms may cause many deleterious effects such as reduced aesthetic appeal, recreational use and taste and odour problems. The level of oxygen may also get reduced or depleted due to massive algae growth and its decay, which in turn, makes the lake an unsuitable habitat for other aquatic life (Ramachandra et al., 2006). Some algae in cyanobacteria can produce potent toxins, which can cause adverse health/ ecological effects to aquatic animals, and sometimes even livestock and humans (Khuantrairong et al., 2008; Azari et al.., 2011).

The biological entities provide insights to the water quality. Sampling includes collection, counting and identification of aquatic organisms; and processing and interpretation of biological data. The plankton analysis would help in explaining the cause of colour and turbidity and the presence of objectionable odour, tastes and visible particles in waters; interpretation of chemical analyses, identifying the nature, extent and biological effects of pollution and provides data on the status of an aquatic system on a regular basis (Ramachandra et al., 2007). Biological diversity or biodiversity is the degree of variation of life forms within a given species, ecosystem, biome or planet. The value of a biodiversity index increases when the number of types increases and when evenness increases (Ganai et al., 2014). The reduction in numbers of species and the increase in number of individuals that characterize polluted areas results in significant decreases in values of diversity. A high diversity value suggests a healthier ecosystem and a low diversity value a less healthy or degraded one (Khuantrairong et al., 2008).

Unplanned rapid urbanization, population explosion and industrialisation in Bangalore have resulted in either disappearance of lakes or had deteriorated the lake water quality impairing the ecological processes. The lakes are experiencing deterioration through varying degrees of environmental stress due to encroachments, eutrophication (especially from domestic effluents), and siltation (Mahapatra et al., 2010). Keeping these in view, the present study was done to investigate the different algal groups present in different lakes of Greater Bangalore and also to evaluate the phytoplankton diversity indices which would indicate the quality of water in the selected lakes of Greater Bangalore.



## MATERIALS AND METHODS

**Study Area:** Greater Bangalore with an area of 741 square kilometers, lies between the latitudes 12°39'00" to 131°3'00"N and longitude 77°22'00" to 77°52'00"E. Bangalore is known for its pleasant climate throughout the year with the mean annual total rainfall of about 880 mm; the summer temperature ranging from 18° C – 38° C and the winter temperature ranging from 12° C – 25° C. Spatial distribution of lakes chosen for the current investigations are depicted in Figure 1. Bangalore is located at an altitude of 920 meters above mean sea level, delineating four watersheds, viz. Hebbal, Koramangala, Challaghatta and Vrishabhavathi watersheds. The undulating terrain in the region has facilitated the creation of a large number of tanks for meeting the needs of people

i.e., irrigation, drinking, fishing and washing (Ramachandra, 2010).

**Figure 1:** Study area involving lakes of Greater Bangalore.

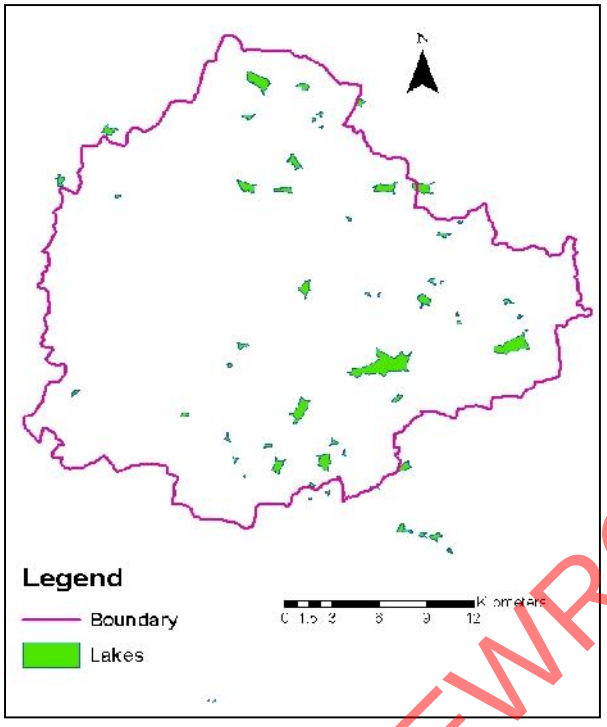


**Table 1: L**akes considered for biological assessment in Greater Bangalore

| | | | |
|---|---|---|---|
| 1 | Allalasandra | 28 | Kodagisingasandra |
| 2 | Anchepalya | 29 | Kogilu |
| 3 | Arekere | 30 | Kothanur |
| 4 | Bagmane | 31 | KR puram |
| 5 | Ballahalli | 32 | Lalbagh |
| 6 | Begur | 33 | Madivala |
| 7 | Bellandur | 34 | Mahadevapura |
| 8 | Bommasandra | 35 | Maragondanahalli |
| 9 | Challakere | 36 | Munnekolalu |
| 10 | Chikka Begur | 37 | Mylasandra 1 |
| 11 | Chikka togur | 38 | Mylasandra 2 |
| 12 | Chikkabanavara | 39 | Nagavara |
| 13 | Chinnapanahalli | 40 | Nallurahalli |
| 14 | Chunchughatta | 41 | Rachenahalli |
| 15 | Dasarahalli | 42 | Rampura |
| 16 | Doddanekundi | 43 | Rayasandra |
| 17 | Doraikere | 44 | RK mission 3 |
| 18 | Hebbagodi | 45 | RK mission S1 |
| 19 | Hebbal | 46 | RK mission S2 |
| 20 | Heelaligae | 47 | Sheelavanthakere |
| 21 | Hulimavu | 48 | Subbrayankere |
| 22 | Jakkur | 49 | Thirumenahalli S1 |
| 23 | Kaikondrahalli | 50 | Thirumenahalli S2 |
| 24 | Kalkere | 51 | Varthur |
| 25 | Kammasandra | 52 | Vittasandra |
| 26 | Kelegene kere | 53 | Yeklghatta |
| 27 | Kengeri | 54 | Yelahanka |



## Phytoplankton Analysis

**Phytoplankton Collection, Preservation and Concentration:** Water has to be collected from the surface with minimal disturbance and filter in a No. 25 bolting silk cloth net of mesh size 63 mm and 30 cm diameter. The final volume of the filtered samples was made upto 125ml. The sample is then transferred to another 125ml plastic bottle and labeled mentioning the time, date and place of sampling. The collected samples are preserved by adding 5ml of 4% formalin. The preserved samples are kept for 24 hours undisturbed, so as to allow the sedimentation of plankton suspended in the water. After 24 hours, the supernatant is discarded carefully without disturbing the sediments and make up the final volume of concentrated sample to 50ml (Ramachandra et al., 2007).

**Qualitative and Quantitative Analysis of Phytoplankton:** The qualitative and quantitative analysis of phytoplankton is done by Lackey's drop method. Phytoplankton samples collected

from the surface water of lakes were identified and counted microscopically. In Lackey's drop method, the coverslip was placed over a drop of water in the slide and whole of the coverslip was examined by parallel overlapping strips to count all the organisms in the drop. The total organisms per liter were calculated. (Trivedy and Goel, 1986). The identification of algal species was carried out based on the morphological features, according to Prescott (1954), Palmer (1984), Adoni (1985). The data were subjected to PAST programme to evaluate seven diversity indices such as Dominance index, Shannon and Weiner index, Simpson's index, Pielou's evenness index, Menhinick's index, Margalef's index and Shannon equitability index (Table 2). The cluster analysis of lakes based on algae was also performed.

**Table2:** different diversity indices.

| Index | Equation | Description |
|---|---|---|
| Menhinick's Index | $DMe = \frac{S}{\sqrt{N}}$ | S: the total number of identified groups<br>N: the total number of counted individuals |
| Simpson's Measure of Evenness | $V' = \frac{D}{Dmax}$ | D: the species diversity index<br>Dmax: the maximum amount of the species diversity index |
| Margalef's Diversity Index | $Ri = S - 1/\ln(N)$ | S: the total number of species<br>N: the total density of species |
| Pielou Evenness Index | $J' = \frac{H'}{H'max} = \frac{H'}{LnS}$ | H': the amount of Shannon_Wiener Index<br>H'max: the maximum value of ShannonWiener Index<br>S: the number of taxon in samples |
| Simpson's Index | $D = \sum_{i=1}^{n} Pi2$ | Pi: the ratio of the species i |
| Shannon-Wiener Index | $H' = -\sum_{i=1}^{n} Pi \log 2P i$ | n: the total number of species<br>Pi: the ratio of the species i |



## RESULT AND DISCUSSION

The commonly found algae in lakes in Greater Bangalore are Bacillariophyceae, Euglenophyceae, Cyanophyceae, Chlorophyceae and Chrysophyceae. Table 3 shows the different algal groups present in the lakes.

**Bacillariophyceae:** They occur in fresh water, salt water, and terrestrial ecosystems. They may occur as plankton or periphyton, with most brownish-green films on substrates such as rocks or aquatic plants being composed of attached diatoms. They are single-celled algae with shells constructed of two overlapping valves composed of pectin and impregnated with silica. The diatoms are single-celled or unicellular organisms, but some can form colonies and filaments. They comprises of two main types, centric and pennate. Many diatoms have conspicuous oil droplets within the cell, which is the photosynthetic food reserve, chrysolaminarin. The diatoms contain the

pigments chlorophyll *a* and *b*, alpha and beta carotene, and several xanthophylls (Lee, 2008). Example: *Nitzschia* sp., *Cymbella* sp., *Melosira* sp., *Navicula* sp., *Gomphonema* sp., *Cyclotella* sp., *Pinnularia* sp., *Gyrosigma* sp., etc. Bacillariophyceae were abundant in Chikkabanavara, Kaikondrahalli, Yelahanka, Nagavara, Mylasandra 1, RK mission S2 and Doraikere.

**Euglenophyceae:** They are typically green and unicellular, euglenoid flagellates occur in most freshwater habitats: puddles, ditches, ponds, streams, lakes, and rivers, particularly waters contaminated by animal pollution or decaying organic matter. Euglenoids lack a cellulose cell wall; instead, they have a proteinaceous pellicle just inside the plasmalemma. Euglenoids are characterized by chlorophylls *a*, *b*, beta carotene, and xanthophylls, one membrane of chloroplast endoplasmic reticulum, a mesokaryotic nucleus, two emergent flagella with fibrillar hairs in one row and paramylon or chrysolaminarin as the storage product in the cytoplasm. They have eyespot (stigma) which is a collection of orange-red lipid droplets. Most do not reproduce sexually (Adoni et al., 1985). Example: *Euglena* sp., *Phacus* sp., *Trachelomonas* sp., etc. Lakes like Thirumenahalli S1, Chunchughatta, Kelegene kere, Yeklghatta and Chikka togur had large number of Euglenophycean members.

**Cyanophyceae:** They are prokaryotic algae that lack membrane bound organelles. Cyanobacteria are aerobic phototrophic organisms that can perform photosynthesis as they possess chlorophyll a and photosystem II. They are ubiquitous in nature and are found in every type of environment including terrestrial, freshwater, and marine habitats. These algae are unicellular or colonial to branched or unbranched and filamentous. The cyanobacterial cells possess a number of cell inclusion bodies like include phycobilisomes, carboxysomes, glycogen granules, polyphosphate granules, poly-β – hydroxybutyrate granules, cyanophycin granules and gas vesicles. They are heavily pigmented with chlorophyll *a*, beta carotene, and several xanthophylls. The presence of several phycobiliproteins gives the cyanophyta their unique blue-green coloration (Ramachandra et al., 2014). Food is stored in the form of glycogen. Example: *Microcystis* sp., *Merismopedia* sp., *Phormidium* sp., *Anabaena* sp., etc. Lakes like Anchepalya, Mahadevapura, Dasarahalli, Sheelavanthakere, Bagmane, Nallurahalli, KR puram, Allalasandra, Madivala, Chinnapanahalli, Vittasandra and Mylasandra had Cyanophyceae as the dominant members.

**Chlorophyceae:** Chlorophytes commonly occur in fresh water, salt water, and soil. They have unicellular or multicellular thalli. Chlorophyte reproduction varies greatly, from asexual division to isogamy and heterogamy to oogamy. Cell walls are constructed of cellulose and pectin. Some are flagellates, and others produce reproductive cells, the majority of which are biflagellate. Green algae possess true chloroplasts, which contain the same pigments found in higher plants: chlorophyll *a* and *b*, alpha and beta carotene, and many xanthophylls. Photosynthetic reserves are usually stored as starch (Ramachandra et al., 2001; 2006). Example: *Chlorella* sp., *Ankistrodesmus* sp., *Chlamydomonas* sp., *Pandorina* sp., *Chlorogonium* sp., *Actinastrum* sp., *Pediastrum* sp., *Scenedesmus* sp., etc. Chlorophyceae were found to be dominant in lakes such as Kogilu, Thirumenahalli S2, Doddanekundi, Bellandur, Varthur, Begur, Kothanur, Kodagisingasandra, Lalbagh, Kengeri, Hebbal, Ballahalli, Maragondanahalli, Rachenahalli, Kammasandra, Heelaligae, Chikka Begur, Hebbagodi,

Munnekolalu, Bommasandra, RK mission S2, RK mission S3 and Rayasandra.

**Chrysophyceae:** They are motile cells, either uniflagellate or biflagellate; chromatophores are golden- brown in colour with chl.a and c, β carotene and xanthophylls. They lack a cellulosic cell wall and has lucosin and oils as food reserves. Example: *Synura* sp., *Dinobryon* etc. Table 3 shows the results of algal diversity indices of different lakes. Kogilu lake had about 6 taxa of algae, namely Chlorophyceae, Cyanophyceae, Bacillariophyceae, Euglenophyceae, Glaucophyceae and Chrysophyceae. Almost all the lakes had 4 taxas such as Chlorophyceae, Cyanophyceae, Bacillariophyceae, Euglenophyceae. Mahadevapura had diverse as well as highest number of individuals. In case of Bagmane lake (with *Microcystis* sp.) and Dasarahalli lake (with *Spirulina* sp.), the number of taxa, Dominance as well as Eveness is equal to 1, whereas the Simpson's Index, Shannon and Weiner index_and Equitability is 0. In case Simpson's index, species are not evenly distributed with the values ranging from a minimum of 0 -0.685. Kalkere lake had higher values of Shannon and Weiner index (1.259), Menhinick index (0.094) and Margalef index (0.4). Equitability takes a value between 0 and 1, with 1being complete evenness. Here, Equitability varies from 0 – 0.991, which, indicates that individuals of the community in all lakes are not evenly distributed.

**Cluster Analysis:** The Cluster analysis (Figure 2) grouped all the lakes into two main clusters. Cluster 1 has Euglenophyceae as dominant member. Cluster 2 is subdivided to many sub clusters, S1 has Chlorophycean members as the dominant members. S2 possess lakes with Bacillariophyceae as the major algae present. S3 bears lakes with Cyanophyceae members as the dominant algae whereas S4 includes lakes with rich and mixed population of algae.

## CONCLUSION

Phytoplanktons have different growth requirements and shows varied responses to physical, chemical and biological parameters such as light, temperature, nutrient regimes, temperature and grazing pressures. Almost all the lakes had mainly four taxas such as Chlorophyceae, Cyanophyceae, Bacillariophyceae, Euglenophyceae.



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**Table 3:** Shows different diversity indices of algae species in Bangalore lakes.

| Lake Names | Taxa | Indi | Dominance | Simpson_1-D | Shannon_H | Evenness_e^H/S | Menhinick | Margalef | Equitability_J |
|---|---|---|---|---|---|---|---|---|---|
| Allalasandra | 4 | 17300 | 0.436 | 0.564 | 1.018 | 0.692 | 0.030 | 0.307 | 0.734 |
| Anchepalya | 3 | 822000 | 0.993 | 0.007 | 0.026 | 0.342 | 0.003 | 0.147 | 0.024 |
| Arekere | 4 | 58800 | 0.407 | 0.593 | 1.002 | 0.681 | 0.017 | 0.273 | 0.723 |
| Bagmane | 1 | 357800 | 1 | 0 | 0 | 1 | 0.00167 | 0 | 0 |
| Ballahalli | 4 | 79900 | 0.542 | 0.458 | 0.757 | 0.533 | 0.014 | 0.266 | 0.546 |
| Begur | 4 | 78100 | 0.547 | 0.453 | 0.724 | 0.515 | 0.014 | 0.266 | 0.522 |
| Bellandur | 4 | 59900 | 0.386 | 0.614 | 1.043 | 0.710 | 0.016 | 0.273 | 0.753 |
| Bommasandra | 4 | 60200 | 0.427 | 0.573 | 1.026 | 0.697 | 0.016 | 0.273 | 0.740 |
| Challakere | 4 | 47250 | 0.530 | 0.470 | 0.770 | 0.540 | 0.018 | 0.279 | 0.556 |
| ChikkaB | 4 | 18000 | 0.534 | 0.466 | 0.841 | 0.580 | 0.030 | 0.306 | 0.607 |
| ChikkaT | 4 | 8300 | 0.472 | 0.528 | 0.924 | 0.630 | 0.044 | 0.332 | 0.666 |
| Chikkabanavara | 4 | 166000 | 0.499 | 0.502 | 0.876 | 0.601 | 0.010 | 0.250 | 0.632 |
| Chinnapanahalli | 4 | 19900 | 0.363 | 0.637 | 1.157 | 0.795 | 0.028 | 0.303 | 0.835 |
| Chunchughatta | 4 | 74600 | 0.408 | 0.592 | 0.990 | 0.673 | 0.015 | 0.267 | 0.714 |
| Dasarahalli | 1 | 40900 | 1 | 0 | 0 | 1 | 0.005 | 0 | 0 |
| Doddanekundi | 4 | 255000 | 0.418 | 0.582 | 0.960 | 0.653 | 0.008 | 0.241 | 0.692 |
| Doraikere | 4 | 110900 | 0.402 | 0.599 | 1.059 | 0.721 | 0.012 | 0.258 | 0.764 |
| Hebbagodi | 4 | 3200 | 0.328 | 0.672 | 1.212 | 0.840 | 0.071 | 0.372 | 0.875 |
| Hebbal | 4 | 109100 | 0.801 | 0.199 | 0.377 | 0.364 | 0.012 | 0.259 | 0.272 |
| Heelaligae | 4 | 78100 | 0.451 | 0.549 | 0.949 | 0.646 | 0.014 | 0.266 | 0.684 |
| Hulimavu | 4 | 62000 | 0.46 | 0.54 | 1 | 0.680 | 0.016 | 0.272 | 0.722 |
| Kaikondrahalli | 4 | 13100 | 0.38 | 0.62 | 1.06 | 0.721 | 0.035 | 0.316 | 0.764 |
| Kalkere | 4 | 1800 | 0.315 | 0.685 | 1.259 | 0.881 | 0.094 | 0.400 | 0.908 |
| Kammasandra | 4 | 59400 | 0.679 | 0.321 | 0.627 | 0.468 | 0.016 | 0.273 | 0.452 |
| Kelegene | 4 | 403900 | 0.668 | 0.332 | 0.584 | 0.449 | 0.006 | 0.232 | 0.422 |
| Kengeri | 3 | 39600 | 0.951 | 0.049 | 0.126 | 0.378 | 0.015 | 0.189 | 0.115 |
| Kodagi | 4 | 46800 | 0.834 | 0.166 | 0.355 | 0.357 | 0.018 | 0.279 | 0.256 |
| Kogilu | 6 | 408500 | 0.752 | 0.248 | 0.550 | 0.289 | 0.009 | 0.387 | 0.307 |
| Konanamkunte | 4 | 69500 | 0.339 | 0.661 | 1.143 | 0.784 | 0.015 | 0.269 | 0.824 |
| Kothanur | 4 | 15400 | 0.617 | 0.383 | 0.768 | 0.539 | 0.032 | 0.311 | 0.554 |
| KRpuram | 2 | 17200 | 0.988 | 0.012 | 0.036 | 0.518 | 0.015 | 0.103 | 0.052 |
| Lalbagh | 4 | 77100 | 0.691 | 0.309 | 0.644 | 0.476 | 0.014 | 0.267 | 0.465 |
| Madivala | 4 | 32600 | 0.387 | 0.613 | 1.038 | 0.706 | 0.022 | 0.289 | 0.749 |
| Mahadevapura | 3 | 893000 | 0.436 | 0.564 | 0.926 | 0.841 | 0.003 | 0.146 | 0.843 |
| Maragondana | 4 | 66050 | 0.444 | 0.556 | 0.923 | 0.629 | 0.016 | 0.270 | 0.666 |
| Munnekolalu | 4 | 28900 | 0.433 | 0.567 | 0.972 | 0.661 | 0.024 | 0.292 | 0.701 |
| Myla1 | 4 | 8400 | 0.380 | 0.620 | 1.137 | 0.779 | 0.044 | 0.332 | 0.820 |
| Myla2 | 4 | 15100 | 0.440 | 0.560 | 0.983 | 0.668 | 0.033 | 0.312 | 0.709 |
| Nagavara | 4 | 19050 | 0.407 | 0.593 | 1.006 | 0.684 | 0.029 | 0.304 | 0.726 |
| Nallurahalli | 5 | 100300 | 0.434 | 0.566 | 0.973 | 0.529 | 0.016 | 0.347 | 0.605 |
| Rachenahalli | 4 | 59400 | 0.256 | 0.744 | 1.374 | 0.988 | 0.016 | 0.273 | 0.991 |
| Rampura | 4 | 59100 | 0.735 | 0.265 | 0.531 | 0.425 | 0.016 | 0.273 | 0.383 |
| Rayasandra | 4 | 16500 | 0.476 | 0.524 | 0.988 | 0.671 | 0.031 | 0.309 | 0.713 |
| RK3 | 4 | 6400 | 0.420 | 0.580 | 1.075 | 0.733 | 0.050 | 0.342 | 0.776 |
| RK1 | 4 | 54900 | 0.421 | 0.579 | 1.005 | 0.683 | 0.017 | 0.275 | 0.725 |
| RK2 | 5 | 69500 | 0.397 | 0.603 | 1.174 | 0.647 | 0.019 | 0.359 | 0.729 |
| Sheelavantha | 4 | 13400 | 0.504 | 0.496 | 0.941 | 0.641 | 0.035 | 0.316 | 0.679 |
| Subbrayankere | 4 | 45500 | 0.679 | 0.321 | 0.658 | 0.483 | 0.019 | 0.280 | 0.474 |
| Thiru1 | 4 | 623000 | 0.508 | 0.492 | 0.899 | 0.614 | 0.005 | 0.225 | 0.648 |
| Thiru2 | 4 | 660000 | 0.425 | 0.575 | 0.956 | 0.651 | 0.005 | 0.224 | 0.690 |
| Varthur | 4 | 92300 | 0.819 | 0.181 | 0.398 | 0.372 | 0.013 | 0.262 | 0.287 |
| Vittasandra | 4 | 13400 | 0.392 | 0.609 | 1.119 | 0.765 | 0.035 | 0.316 | 0.807 |
| Yediyur | 4 | 120500 | 0.785 | 0.215 | 0.421 | 0.381 | 0.012 | 0.256 | 0.304 |
| Yeklghatta | 4 | 349 | 0.438 | 0.562 | 0.965 | 0.656 | 0.214 | 0.512 | 0.696 |
| Yelahanka | 5 | 16700 | 0.419 | 0.582 | 1.005 | 0.546 | 0.039 | 0.411 | 0.625 |

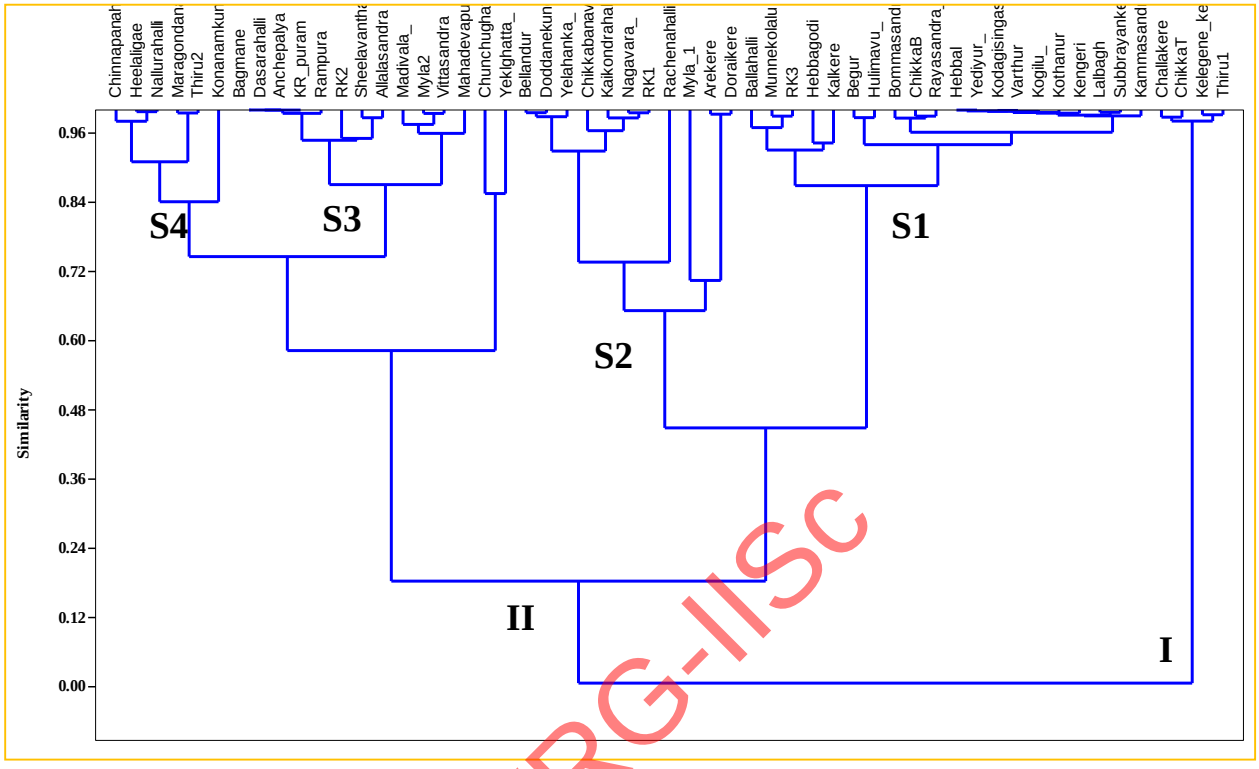


**Figure 2:** cluster analysis of lakes based on algal population

## ANNEXURE

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Chlorophyceae** | **Anchepalya** | **Bagmane** | **Begur** | **Bellandur** | **Chikkabanavara** | **Chunchughatta** | **Dasarahalli** | **Doddanekundi** | **Kelegenekere** | **Kengeri** | **Kodagisingasandra** | **Kogilu** | **Kothanur** | **Mahadevapura** | **Lalbagh** | **Sheelavanthakere** | **Thirumenahalli S1** | **Thirumenahalli S2** | **Varthur** |
| *Actinastrum* sp. | - | - | - | + | + | + | - | - | - | - | - | + | - | - | - | - | - | - | + |
| *Ankistrodesmus* sp. | - | - | + | - | - | - | - | - | - | - | - | - | + | - | - | - | - | - | + |
| *Asterococcus* sp. | - | - | - | - | - | + | - | + | - | + | - | + | - | - | - | - | - | - | - |
| *Botryococcus* sp. | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| *Chlamydomonas* sp. | - | - | + | - | + | - | - | - | + | - | - | - | - | - | - | + | - | - | - |
| *Chlorella* sp. | - | - | + | + | - | - | - | - | - | - | + | + | + | - | + | - | - | - | + |
| *Chlorococcum* sp. | - | - | - | - | - | + | - | + | - | - | + | - | - | - | - | - | - | - | - |
| *Chlorogonium* sp. | - | - | - | - | + | - | - | + | - | - | - | - | - | - | - | - | - | - | + |
| *Closterium* sp. | - | - | + | - | - | + | - | - | - | - | - | - | - | - | - | - | - | + | + |
| *Coelastrum* sp. | - | - | - | + | - | + | - | - | - | - | - | - | - | - | - | - | - | + | + |
| *Cosmarium* sp. | + | - | + | - | + | - | - | + | - | - | + | + | + | + | + | - | - | + | + |
| *Crucigenia* sp. | - | - | + | - | + | - | - | + | - | - | - | - | - | + | - | - | - | - | - |
| *Desmodesmus* spp. | - | - | - | - | - | - | - | - | - | - | - | + | - | - | - | - | - | - | - |

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| *Dictyosphaerium* sp. | - | - | + | + | - | - | - | - | + | - | - | - | - | + | - | + | - | + | + |
| *Eudorina* sp. | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| *Gloeocystis* sp. | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | + | - |
| *Golenkinia* sp. | - | - | - | + | + | - | - | - | + | - | - | + | - | - | + | + | - | + | + |
| *Gonium* sp. | - | - | - | - | + | - | - | - | - | - | - | + | - | + | - | - | - | - | + |
| *Haematococcus* sp. | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| *Hydrodictyon* sp. | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| *Kirchenerilla* sp. | - | - | + | + | + | - | - | + | - | - | + | - | + | - | + | - | - | + | + |
| *Micractinium* sp. | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | + |
| *Monoraphidium* sp. | - | - | - | + | + | - | - | + | - | - | - | + | - | - | - | - | - | - | + |
| *Oocystis* sp. | - | - | - | - | - | + | - | - | - | - | - | + | - | - | - | - | - | + | + |
| *Pandorina* sp. | - | - | - | - | - | - | - | - | - | - | + | + | - | - | - | - | + | - | + |
| *Pediastrum* sp. | - | - | + | - | - | - | - | - | - | - | - | + | + | - | + | - | - | + | - |
| *Pyrobotrys* sp. | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| *Quadrigula* sp. | - | - | - | - | - | - | - | - | - | - | - | - | - | + | - | - | - | - | - |
| *Scenedesmus* spp. | - | - | + | + | + | + | - | - | - | + | + | + | - | + | + | - | + | + | + |
| *Schroederia* sp. | - | - | + | + | - | - | - | - | - | - | - | + | + | - | + | - | + | + | + |

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| *Selenastrum* sp. | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| *Sphaerocystis* sp. | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| *Spirogyra* sp. | - | - | - | + | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| *Staurastrum* sp. | - | - | - | - | - | - | - | - | - | - | - | + | - | - | - | - | - | - | - |
| *Staurodesmus* sp. | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| *Stichococcus* sp. | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | + |
| *Stigeoclonium* sp. | - | - | - | - | - | - | - | + | - | - | - | - | - | - | - | - | - | - | - |
| *Tetraedron* sp. | - | - | + | + | - | - | - | - | - | - | + | - | + | + | + | - | - | + | + |
| *Tetrastrum* spp. | - | - | + | - | - | - | - | - | - | - | - | + | - | - | - | - | - | + | + |
| *Xanthidium* sp. | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| **Cyanophyceae** | | | | | | | | | | | | | | | | | | | |
| *Anabaena* sp. | - | - | - | - | + | - | - | - | - | - | + | - | - | - | + | - | - | - | - |
| *Aphanizomenon* sp. | | | | | | | | | | | | | | | | | | | |
| *Aphanocapsa* sp. | - | - | - | - | - | + | - | - | - | - | - | - | - | - | - | - | - | + | + |
| *Chroococcus* sp. | - | - | + | + | + | - | - | - | - | - | - | + | - | + | - | - | - | + | + |
| *Coelosphaerium* sp. | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| *Cylindriospermopsis* spp. | - | - | - | - | - | - | - | + | + | - | - | - | + | - | - | + | - | + | - |
| *Gleocapsa* sp. | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

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| *Limnothrix* sp. | - | - | - | - | - | - | - | - | + | - | - | - | - | - | - | + | - | - | - |
| *Lyngbya* sp. | - | - | - | - | - | - | - | + | - | - | - | - | - | - | - | - | - | - | - |
| *Merismopedia* sp. | - | - | + | + | + | + | - | - | + | - | + | + | + | + | + | + | - | + | + |
| *Microcystis* sp. | + | + | + | + | - | - | + | + | + | - | + | - | + | + | + | + | - | - | - |
| *Nostoc* sp. | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| *Oscillatoria* sp. | - | - | - | - | - | + | - | - | + | - | - | - | - | - | - | + | + | - | + |
| *Phormidium sp.* | - | - | - | + | - | - | - | + | + | - | - | + | - | - | - | + | + | - | - |
| *Planktothrix* sp. | - | - | - | - | - | + | - | - | - | - | - | - | + | - | - | - | - | + | + |
| *Pseudoanabaena* sp. | - | + | - | + | + | - | - | + | + | - | - | - | - | + | - | + | - | - | + |
| *Pseudoplanktothrix* sp. | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| *Radiocystis* sp. | - | - | - | - | - | - | - | - | - | - | - | + | - | + | - | - | - | + | + |
| *Spirulina* sp. | + | - | + | - | - | + | + | + | + | + | - | + | - | - | - | + | - | - | - |
| *Stichococcus* sp. | - | + | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| *Synechococcus* sp. | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| **Bacillariophyceae** | | | | | | | | | | | | | | | | | | | |
| *Achnanthes* sp. | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| *Amphora* sp. | - | - | - | + | - | - | - | - | + | + | - | + | - | - | - | + | - | - | - |
| *Aulacoseira* sp. | - | - | - | - | - | - | - | - | - | - | - | + | - | - | - | - | + | - | - |
| *Caloneis* sp. | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| *Cocconeis* sp. | - | - | - | + | - | - | - | + | - | - | - | - | - | - | - | - | - | - | - |

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| *Cyclotella* sp. | - | - | - | - | + | - | - | + | - | + | + | + | - | + | - | - | + | - | + |
| *Cymbella* sp. | - | - | - | + | + | - | - | + | - | + | - | + | - | - | - | - | - | - | - |
| *Diploneis* sp. | - | - | - | - | + | - | - | + | - | - | - | - | - | - | - | - | - | - | - |
| *Eunotia* sp. | - | - | - | - | - | - | - | + | - | - | - | - | - | - | - | - | - | - | - |
| *Fragillaria* sp. | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| *Gomphonema* sp. | - | - | - | + | - | - | - | + | - | - | - | - | - | - | - | - | - | - | - |
| *Navicula* spp. | - | - | - | + | + | - | - | + | + | + | - | + | - | - | - | + | + | + | - |
| *Nitzschia* spp. | + | - | + | + | + | + | - | + | + | - | - | + | + | + | + | + | + | + | + |
| *Pinnularia* sp. | + | - | - | + | - | - | - | - | - | - | - | - | - | + | - | - | - | - | - |
| *Stauroneis* sp. | - | - | - | + | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| *Stephanodiscus* sp. | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| *Surirella* sp. | - | - | - | - | + | - | - | + | - | - | - | - | - | - | - | - | - | - | - |
| *Synedra* sp. | - | - | - | - | + | - | - | - | - | - | - | - | - | + | - | - | - | - | - |
| **Euglenophyceae** | | | | | | | | | | | | | | | | | | | |
| *Euglena* spp. | - | - | - | + | + | + | - | + | + | | + | + | - | - | + | + | + | + | + |
| *Phacus* spp. | - | - | + | - | - | + | - | - | + | | - | + | + | - | + | + | - | - | - |
| *Trachelomonas* sp. | - | - | - | - | - | - | - | - | + | | - | + | + | - | - | + | - | + | - |
| **Glaucophyceae** | | | | | | | | | | | | | | | | | | | |
| *Glaucocystis* sp. | - | - | - | - | - | - | - | - | - | | - | + | - | - | - | - | - | - | - |
| **Chrysophyceae** | | | | | | | | | | | | | | | | | | | |
| *Dinobryon* | - | - | - | - | - | - | - | - | - | | - | + | - | - | - | - | - | - | - |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| sp. | | | | | | | | | | | | | | | | | | | |
| *Ophiocytium* sp. | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

| | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Chlorophyceae** | **Allalasandra** | **Ballahalli** | **Hebbal** | **Kaikondrahalli** | **Kalkere** | **KR puram** | **Madivala** | **Maragondanahalli** | **Nallurahalli** | **Yeklghatta** | **Yelahanka** |
| *Actinastrum* sp. | - | - | - | - | - | - | + | - | + | - | + |
| *Ankistrodesmus* sp. | - | - | + | - | + | - | + | - | + | - | + |
| *Asterococcus* sp. | - | - | - | - | - | - | - | - | - | - | - |
| *Botryococcus* sp. | - | - | - | - | - | - | - | - | - | - | - |
| *Chlamydomonas* sp. | + | - | + | - | - | - | + | + | + | - | - |
| *Chlorella* sp. | + | - | + | - | - | - | - | - | + | + | + |
| *Chlorococcum* sp. | - | - | - | - | - | - | - | - | - | - | - |
| *Chlorogonium* sp. | - | - | - | - | - | - | - | - | + | - | - |
| *Closterium* sp. | - | + | - | - | - | - | - | - | + | + | - |
| *Coelastrum* sp. | - | + | - | - | - | - | + | - | + | - | + |
| *Cosmarium* sp. | + | - | - | - | - | - | - | - | + | + | + |
| *Crucigenia* sp. | - | + | - | - | + | - | - | - | + | - | + |
| *Desmodesmus* spp. | - | + | - | - | - | - | - | - | - | - | - |
| *Dictyosphaerium* sp. | + | + | + | - | - | - | + | - | + | - | + |
| *Eudorina* sp. | - | - | - | - | - | - | - | - | - | - | - |
| *Gloeocystis* sp. | - | - | - | - | - | - | - | - | - | - | - |
| *Golenkinia* sp. | + | - | - | - | - | - | + | - | + | + | + |
| *Gonium* sp. | - | - | - | - | - | - | + | - | + | + | + |
| *Haematococcus* sp. | + | - | - | - | + | - | - | - | + | + | + |
| *Hydrodictyon* sp. | - | - | - | - | - | - | - | - | - | - | - |
| *Kirchenerilla* sp. | - | + | - | + | - | - | + | + | + | + | + |

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|---|---|---|---|---|---|---|---|---|---|---|---|
| *Micracitinium* sp. | - | - | + | - | - | - | + | - | + | + | + |
| *Monoraphidium* sp. | - | - | + | - | + | - | - | - | + | + | - |
| *Oocystis* sp. | + | - | - | - | - | - | + | - | + | - | + |
| *Pandorina* sp. | - | - | - | - | - | - | - | - | - | - | - |
| *Pediastrum* sp. | - | + | - | + | - | - | + | - | + | - | - |
| *Pyrobotrys* sp. | - | - | - | - | - | - | - | - | + | - | - |
| *Quadrigula* sp. | - | - | - | - | - | - | + | - | - | - | - |
| *Scenedesmus* spp. | + | + | + | + | + | - | + | + | + | - | + |
| *Schroederia* sp. | - | + | + | - | - | - | + | - | + | - | - |
| *Selenastrum* sp. | - | - | + | - | - | - | - | - | - | + | - |
| *Sphaerocystis* sp. | - | - | - | - | - | - | - | - | - | - | - |
| *Spirogyra* sp. | - | - | - | + | - | - | - | - | - | - | + |
| *Staurastrum* sp. | - | - | - | - | - | - | + | - | - | - | + |
| *Staurodesmus* sp. | - | - | - | - | - | - | + | - | - | - | - |
| *Stichococcus* sp. | - | - | - | - | - | - | - | - | - | - | + |
| *Stigeoclonium* sp. | - | - | - | - | - | - | - | - | - | - | - |
| *Tetraedron* sp. | - | + | - | - | - | - | - | - | + | - | + |
| *Tetrastrum* spp. | - | + | - | - | - | - | - | - | + | - | + |
| *Xanthidium* sp. | - | + | - | - | - | - | - | - | + | - | - |
| | | | | | | | | | | | |
| **Cyanophyceae** | | | | | | | | | | | |
| *Anabaena* sp. | - | - | - | - | - | - | + | - | - | - | - |
| *Aphanizomenon* sp. | - | - | - | - | - | - | - | - | - | - | - |
| *Aphanocapsa* sp. | + | - | - | - | - | - | + | - | + | - | - |
| *Chroococcus* sp. | - | + | + | - | + | - | + | + | + | + | + |
| *Coelosphaerium* sp. | - | - | - | - | - | - | + | - | - | - | - |
| *Cylindriospermopsis* spp. | - | - | - | - | - | - | - | - | - | - | + |

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|---|---|---|---|---|---|---|---|---|---|---|---|
| *Gleocapsa* sp. | - | - | - | - | - | - | + | - | - | - | + |
| *Limnothrix* sp. | - | - | - | + | - | - | - | + | - | - | - |
| *Lyngbya* sp. | - | - | - | - | - | - | - | - | - | - | - |
| *Merismopedia* sp. | - | + | - | - | - | - | + | - | + | - | + |
| *Microcystis* sp. | - | - | - | - | - | - | - | - | + | - | - |
| *Nostoc* sp. | - | - | - | - | + | - | - | - | - | - | - |
| *Oscillatoria* sp. | - | + | + | - | - | - | - | + | - | - | - |
| *Phormidium sp.* | - | + | - | - | - | - | + | - | - | - | - |
| *Planktothrix* sp. | - | - | - | - | + | - | - | - | - | - | - |
| *Pseudoanabaena* sp. | - | + | - | - | - | - | - | - | + | - | - |
| *Pseudoplanktothrix* sp. | - | - | - | - | - | - | - | - | - | - | - |
| *Radiocystis* sp. | - | - | - | - | - | - | + | + | + | - | - |
| *Spirulina* sp. | + | - | - | - | - | + | + | + | - | - | - |
| *Stichococcus* sp. | - | - | - | - | - | - | - | - | - | - | - |
| *Synechococcus* sp. | - | - | - | - | - | - | + | - | + | - | - |
| | | | | | | | | | | | |
| **Bacillariophyceae** | | | | | | | | | | | |
| *Achnanthes* sp. | - | + | - | - | - | - | - | - | - | - | - |
| *Amphora* sp. | - | + | - | + | - | - | - | + | - | + | - |
| *Aulacoseira* sp. | - | - | - | - | - | - | + | + | + | - | + |
| *Caloneis* sp. | - | - | - | - | - | - | - | - | - | - | - |
| *Cocconeis* sp. | - | - | - | - | - | - | - | - | - | - | - |
| *Cyclotella* sp. | + | + | + | - | - | - | + | + | + | - | + |
| *Cymbella* sp. | - | + | - | + | - | - | - | - | + | - | + |
| *Diploneis* sp. | - | - | - | - | - | - | - | - | - | - | - |
| *Eunotia* sp. | - | - | - | - | - | - | - | - | - | - | - |
| *Fragillaria* sp. | | | | | | | | | | | |
| *Gomphonema* sp. | - | + | - | - | - | - | - | + | - | - | + |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| *Navicula* spp. | + | + | - | + | - | + | - | + | + | + | + |
| *Nitzschia* spp. | + | + | - | - | + | - | + | + | + | + | + |
| *Pinnularia* sp. | + | - | - | + | + | - | - | + | - | - | + |
| *Stauroneis* sp. | - | - | - | - | - | - | - | - | - | - | - |
| *Stephanodiscus* sp. | - | - | - | - | - | - | - | - | - | - | + |
| *Surirella* sp. | - | + | - | + | - | - | - | + | - | - | - |
| *Synedra* sp. | - | - | - | + | - | - | - | - | - | - | - |
| | | | | | | | | | | | |
| **Euglenophyceae** | | | | | | | | | | | |
| *Euglena* spp. | + | - | - | - | + | - | - | - | + | + | + |
| *Phacus* spp. | + | + | - | - | - | - | - | - | - | - | - |
| *Trachelomonas* sp. | - | + | + | - | - | - | + | + | + | + | + |
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| **Glaucophyceae** | | | | | | | | | | | |
| *Glaucocystis* sp. | - | - | - | - | - | - | - | - | - | - | - |
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| **Chrysophyceae** | | | | | | | | | | | |
| *Dinobryon* sp. | - | - | - | - | - | - | - | - | - | - | - |
| *Ophiocytium* sp. | - | - | - | - | - | - | - | - | + | - | + |



| | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | |
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| | **Bommasandra** | **ChikkaBegur** | **Chikkatogur** | **Chinnapanahalli** | **Doraikere** | **Hebbagodi** | **Heelaligae** | **Hulimavu** | **Kammasandra** | **Rachenahalli** | **Munnekolalu** | **Raya** |
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| | 44 | 45 | 46 | 47 | 48 | 49 | 50 | 51 | 52 | 53 |
|---|---|---|---|---|---|---|---|---|---|---|
| **Chlorophyceae** | **Arekere** | **Challakere** | **Mylasandra 1** | **Mylasandra 2** | **Nagavara** | **Rampura** | **RK mission S1** | **RK mission S2** | **RK mission 3** | **Subbrayankere** |
| *Actinastrum* sp. | - | - | - | - | + | + | + | + | - | - |
| *Ankistrodesmus* sp. | - | + | - | - | + | - | - | + | - | + |
| *Asterococcus* sp. | - | + | - | - | + | - | - | - | - | - |
| *Botryococcus* sp. | - | - | - | - | - | - | + | - | - | - |
| *Chlamydomonas* sp. | - | - | - | - | - | + | + | - | - | - |
| *Chlorella* sp. | + | + | - | - | - | + | - | + | - | + |
| *Chlorococcum* sp. | + | - | - | - | - | - | - | - | - | - |
| *Chlorogonium* sp. | - | - | - | - | - | - | - | + | - | - |
| *Closterium* sp. | - | + | - | - | + | - | + | + | - | - |
| *Coelastrum* sp. | - | - | - | - | - | - | - | + | - | - |

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| *Cosmarium* sp. | - | - | - | - | - | + | + | + | - | - |
| *Crucigenia* sp. | - | - | - | - | + | + | + | + | - | + |
| *Desmodesmus* spp. | - | + | - | - | - | - | - | - | - | + |
| *Dictyosphaerium* sp. | - | - | - | - | - | - | - | + | - | - |
| *Eudorina* sp. | - | - | - | - | - | - | - | - | - | - |
| *Gloeocystis* sp. | - | - | - | - | - | - | - | - | - | - |
| *Golenkinia* sp. | - | + | + | - | + | - | - | + | - | - |
| *Gonium* sp. | - | + | + | + | - | - | + | - | - | - |
| *Haematococcus* sp. | - | - | - | - | + | + | - | - | - | - |
| *Hydrodictyon* sp. | - | - | - | - | - | - | - | - | - | - |
| *Kirchenerilla* sp. | - | - | - | - | + | + | - | + | - | - |
| *Micracitinium* sp. | - | + | - | - | + | - | - | - | - | - |
| *Monoraphidium* sp. | - | - | + | + | + | - | - | + | - | + |
| *Oocystis* sp. | - | - | - | - | + | - | + | + | - | - |
| *Pandorina* sp. | - | - | - | - | - | + | - | - | - | - |
| *Pediastrum* sp. | - | - | + | + | - | - | - | + | - | + |
| *Pyrobotrys* sp. | - | - | - | - | - | - | - | - | - | - |
| *Quadrigula* sp. | - | - | - | - | - | - | - | - | - | - |
| *Scenedesmus* spp. | - | + | + | + | + | + | + | + | - | + |
| *Schroederia* sp. | + | - | - | + | + | + | - | + | - | + |
| *Selenastrum* sp. | - | - | - | - | - | - | + | - | - | - |
| *Sphaerocystis* sp. | - | - | - | - | - | - | + | - | - | - |
| *Spirogyra* sp. | - | - | - | - | - | - | - | - | + | - |
| *Staurastrum* sp. | - | - | - | - | - | - | - | + | - | - |
| *Staurodesmus* sp. | - | - | - | - | - | - | - | - | - | - |
| *Stichococcus* sp. | - | - | - | - | - | - | + | - | - | - |
| *Stigeoclonium* sp. | - | - | - | - | - | - | - | - | - | - |
| *Tetraedron* sp. | - | - | - | - | + | - | + | - | - | + |

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| *Tetrastrum* spp. | - | + | + | + | - | - | - | + | - | - |
| *Xanthidium* sp. | - | - | - | - | + | - | - | - | - | - |
| | | | | | | | | | | |
| **Cyanophyceae** | | | | | | | | | | |
| *Anabaena* sp. | - | - | - | - | - | - | + | + | - | - |
| *Aphanizomenon* sp. | - | - | - | - | + | - | - | - | - | - |
| *Aphanocapsa* sp. | - | - | + | + | - | - | - | + | - | - |
| *Chroococcus* sp. | - | - | + | + | + | + | + | + | + | - |
| *Coelosphaerium* sp. | - | - | - | - | - | - | - | + | - | - |
| *Cylindriospermopsis* spp. | - | - | - | - | + | - | - | + | - | - |
| *Gleocapsa* sp. | - | - | - | - | + | - | - | + | - | - |
| *Limnothrix* sp. | - | - | - | - | - | - | - | - | - | - |
| *Lyngbya* sp. | - | - | - | - | - | - | - | - | - | - |
| *Merismopedia* sp. | - | - | + | - | + | - | + | + | - | + |
| *Microcystis* sp. | - | - | - | + | - | - | + | + | - | - |
| *Nostoc* sp. | - | - | - | - | - | - | - | - | - | - |
| *Oscillatoria* sp. | + | - | + | - | + | + | + | - | - | - |
| *Phormidium* sp. | + | - | - | - | + | + | - | - | - | - |
| *Planktothrix* sp. | + | - | - | - | - | + | - | - | - | - |
| *Pseudoanabaena* sp. | - | - | - | - | - | + | - | - | - | - |
| *Pseudoplanktothrix* sp. | - | - | + | - | - | - | + | + | - | - |
| *Radiocystis* sp. | - | + | - | + | + | - | - | + | - | - |
| *Spirulina* sp. | - | + | - | - | - | - | - | - | - | - |
| *Stichococcus* sp. | - | - | - | - | - | - | - | - | - | - |
| *Synechococcus* sp. | - | - | - | - | - | - | - | - | - | - |
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| **Bacillariophyceae** | | | | | | | | | | |
| *Achnanthes sp.* | - | - | - | - | - | - | + | + | - | - |

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| *Amphora* sp. | - | - | + | + | + | + | - | - | - | - |
| *Aulacoseira* sp. | - | - | + | - | - | - | - | + | - | - |
| *Caloneis* sp. | - | - | - | - | - | - | - | - | - | - |
| *Cocconeis* sp. | - | - | - | + | - | - | + | - | - | - |
| *Cyclotella* sp. | - | - | - | + | + | + | + | + | - | + |
| *Cymbella* sp. | - | - | - | + | + | - | + | - | - | - |
| *Diploneis* sp. | - | - | - | - | - | - | - | - | - | - |
| *Eunotia* sp. | - | - | - | - | - | - | - | - | - | - |
| *Fragillaria* sp. | - | - | - | - | + | - | - | - | - | - |
| *Gomphonema* sp. | + | - | + | + | - | - | + | + | + | - |
| *Navicula* spp. | + | - | + | + | + | - | + | - | - | - |
| *Nitzschia* spp. | + | + | + | + | + | + | + | + | + | + |
| *Pinnularia* sp. | - | - | + | + | + | - | + | + | + | - |
| *Stauroneis* sp. | - | - | - | - | - | - | - | + | - | - |
| *Stephanodiscus* sp. | - | - | - | - | - | - | - | - | - | - |
| *Surirella* sp. | - | - | - | - | - | - | - | - | - | - |
| *Synedra* sp. | - | - | - | - | - | - | - | - | - | - |
| | | | | | | | | | | |
| **Euglenophyceae** | | | | | | | | | | |
| *Euglena* spp. | + | + | - | + | + | + | + | + | + | + |
| *Phacus* spp. | - | + | + | - | - | + | - | - | - | + |
| *Trachelomonas* sp. | - | - | + | - | - | + | + | + | - | + |
| **Glaucophyceae** | | | | | | | | | | |
| *Glaucocystis* sp. | - | - | - | - | - | - | - | - | - | - |
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| **Chrysophyceae** | | | | | | | | | | |
| *Dinobryon* sp. | - | - | - | - | - | - | - | + | - | - |
| *Ophiocytium* sp. | - | - | - | - | - | - | - | - | - | - |