



CORRELATION BETWEEN PHYSICOCHEMICAL PARAMETERS OF WATER AND FRESHWATER ALGAE

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ABSTRACT

Algal interactions with physicochemical parameters of some manmade freshwater ponds have been studied. Algal species and their correlation with physicochemical parameters in some manmade ponds were correlated. Algae and water samples were collected, preserved and analyzed using standard methods. Closterium sp. and Rhizoclonium hookeri Kuetz. were positively associated with the concentration of Fe, however they were negatively correlated (sensitive) to alkalinity, total dissolved solids and electrical conductivity. Stichococcus bacillaris, Naegeli, Staurastrum rotula Nordst. and Sphaeroplea sp. had significant positive correlation with biochemical oxygen demand (BOD), Mn, and Mo levels in the water. Pseudowella americana (snow) Wille. and Scenedesmus quadricauda (Turp.) de Breb. showed a close positive correlation with alkalinity but were sensitive to Fe, BOD, Mn and Mo. The species reported here showed closed correlation with physicochemical factors in these freshwater ponds in Karauli.

KEYWORDS: *correlation, algae, freshwater, physicochemical, species, samples, ponds, standard*

INTRODUCTION

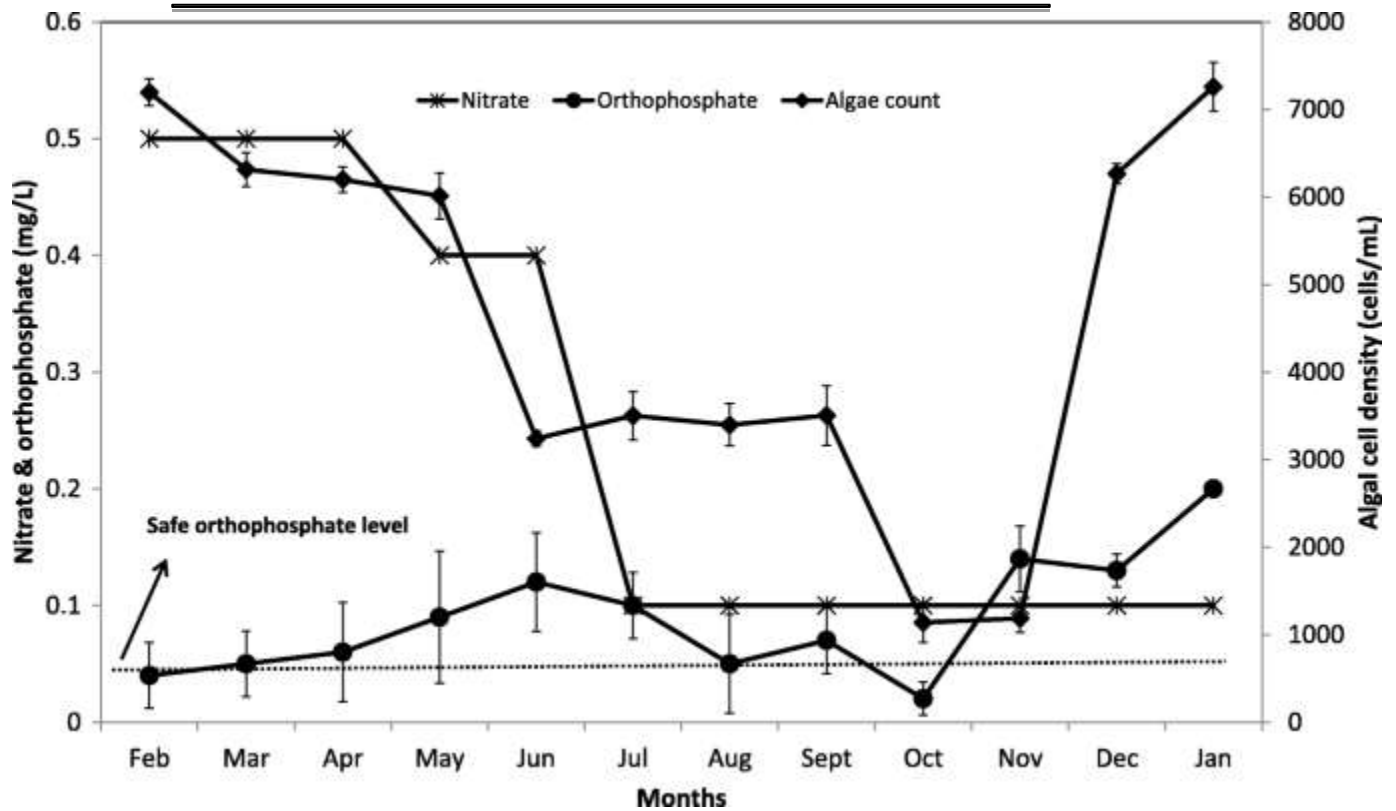
The freshwaters have great importance in India due to its necessity in transportations, municipal and agricultural purposes. But the ecological status and impacts of water quality on algal diversity were undiscovered. To cover the maximum area of the freshwater samples were collected from the 6 locations (ST) covering about 13 km. Some parameters were measured immediately after sampling by portable devices and others done in laboratory following standard methods. The overall quality of the water was found good according to water quality guidelines of World Health Organization, although the water showed comparatively high SO₄²⁻ and CO₃⁻ values which attracts attention for future monitoring. ST 6 showed comparatively more alkaline water (pH 8.45) along

with highest EC, TDS, NO₃⁻, NH₄⁺ and DIP values. Besides, 53 algal taxa belonging to Cyanophyceae (6), Chlorophyceae (10), Euglenophyceae (12) and Bacillariophyceae (25) were identified from freshwater. *Scenedesmus acuminatus* was found commonly in five stations except ST 1, whereas *Euglena chlamydotheca* (ST 1), *Gomphonema olivaceum* (ST 3) and *Cymbella parva* (ST 5) found rarely. Highest diversity was counted in ST 6. Moreover, Chlorophyceae and Bacillariophyceae have positive correlation with several physical parameters, whereas Cyanophyceae negatively correlated. Euglenophyceae has both negative and positive correlations with some physicochemical parameters. However, this was first attempt to measure diversity of primary producers and their correlations with water of Karauli.[1,2]

**PLATE 1****Freshwater Algal Species****OBSERVATIONS**

Algae are possibly the most important group of organisms on earth generating most of the oxygen and also produce vegetative matter required at various links in a food chain. Algae form good indicators of water quality as they have rapid turn-over time and are sensitive indicators of environmental stresses. Algal communities are affected by physical, chemical and biological factors, making them valuable tool in monitoring programmes. Algal survey thus help to find out the trophic status and the organic pollution in the ecosystem. On the basis of this, many workers have emphasized that algal communities as a whole serve as

reliable indicators of pollution. Over the last few decades, there has been much interest in the processes influencing the diversity, distribution and development of algal communities and in relation to physico-chemical factors. Study of physico-chemical parameters is basic tool that contributes in making up of the ecosystems and determine the trophic dynamics of the water body. Therefore in the present study investigations were conducted on fresh water algae along with physicochemical parameter. Seasonal diversity of algae was studied to understand the distribution and diversity of microalgae in relation to environmental parameters also. [3,4]



Physico-Chemical Correlation with Freshwater Algae

DISCUSSION

53 algal taxa belonging to Cyanophyceae (6), Chlorophyceae (10), Euglenophyceae (12) and Bacillariophyceae (25) were identified from freshwater. *Scenedesmus acuminatus* was found commonly in five stations except ST 1, whereas *Euglena chlamydotheca* (ST 1), *Gomphonema olivaceum* (ST 3) and *Cymbella parva* (ST 5) found rarely. Highest diversity was counted in ST 6. Moreover, Chlorophyceae and Bacillariophyceae have positive correlation with several physical parameters, whereas Cyanophyceae negatively correlated. Euglenophyceae has both negative and positive correlations with some physico-chemical parameters. *Closterium* sp. and *Rhizoclonium*

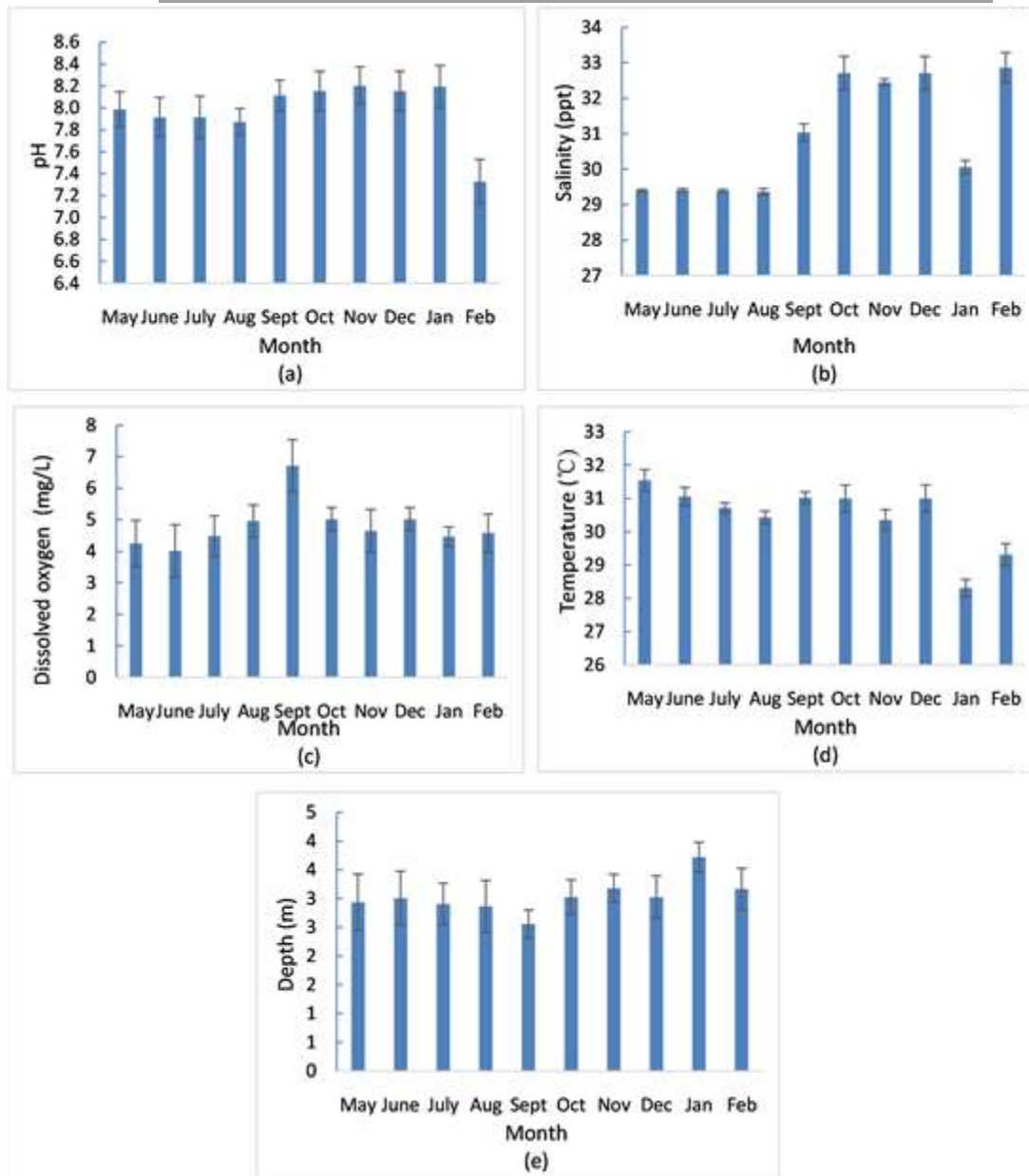
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**Different algal families**

RESULTS

The sulfates, EC, Chl a and calcium were the most important variables affecting the algae and its distribution. Great variability in the levels of nitrites, nitrates, phosphates and ammonia was observed from one season to another. The values of the environmental parameters for each species optimum were determined through calculation of their weighted averages. This allowed us to fairly accurately determine the distribution of the most prevalent species for every season. The results confirmed earlier findings

stipulating that freshwaters of each area was dominated by algal species, but in spite of their lower number and crustacean zooplankton were also found, especially in the spring. This pilot investigation suggests that more studies are necessary in freshwater areas to improve our knowledge of algal species distributions, composition and relationships with the water quality, so this report represents the beginning of studies on environmental conditions.[7,8]



Variation in physicochemical parameters

CONCLUSION

In the present study, the physicochemical factors and algal community were seasonally surveyed. The results indicate that the concentration of pH and nitrate matched the surface water quality whereas the content of dissolved oxygen has reached the value lower. The average concentration of phosphate exceeded. There were many species in the studied areas belonging to the divisions of Bacillariophyta, Chlorophyta, Cyanophyta,

Euglenophyta, Chrysophyta, and Dinophyta, of which Bacillariophyta was dominant in species number. The species number of algae positively correlated with pH, dissolved oxygen and nitrate in the rainy season. The results of this study contributed with essential information on algal composition and abundance, their correlation with environmental parameters and environmental characteristics in Karauli, Rajasthan.[9,10]

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