

## Algal diversity of Lonar Lake in Maharashtra state of India

Rafiullah M Khan<sup>1</sup>, Milind J Jadhav<sup>2\*</sup>

<sup>1</sup> Department of Botany, Kohinoor Arts, Commerce and Science College, Khuldabad, Aurangabad, Maharashtra, India

<sup>2</sup> Department of Botany, Sir Sayyed College, Roshan Gate, Aurangabad, Maharashtra, India

### Abstract

Lonar Lake is natural water body situated in Buldhana district of Maharashtra. It is a alkaline and saline water habitat. In order to study in detail algal diversity of Lonar Lake, algal samples were collected from 10 selected sites of lake and taxonomic study was carried out. Research work was carried out for the period of two consecutive years i.e. from October 2015 to September 2017. A total of 79 species of algae, under 39 genera were identified and recorded. Cyanophyceyan algae were found dominant. *Arthrospira platensis* was found dominant at all selected sites of Lonar Lake throughout the period of study. Abundance of Cyanophyceyan algae in Lonar Lake indicates that alkaline and saline water supports luxuriant growth of Cyanophyceyan algae. Algal flora of Lonar Lake is rich and it is found in diverse form. Present study enrich the knowledge of algal diversity of alkaline and saline water habitat.

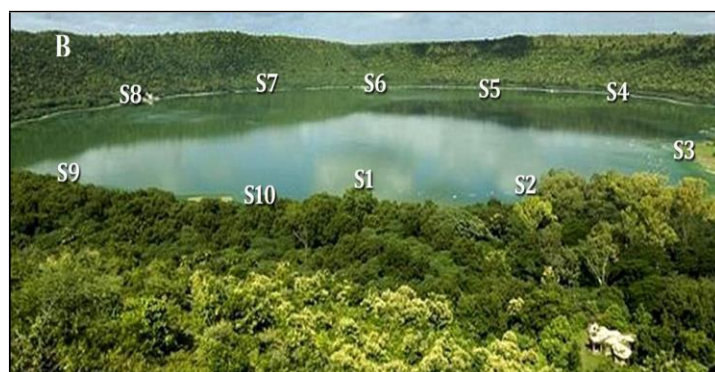
**Keywords:** algal diversity, Lonar Lake, alkaline and saline water

### Introduction

Lonar Lake is a natural water body. It is situated (North Latitude 19° 55' 45" and East Longitude 76° 34' 00") in Buldhana district of Maharashtra in India. The lake is believed to be originated due to meteoritic impact (Beals et.al 1960, Nayak 1972 and Hagerty and Newson 2001) [1, 11]. Lonar Lake is famous in the world due to its alkaline and saline water habitat. The presence of alkaline and saline water having pH around 9 to 11 is a unique feature of this ecosystem. Many microecosystem are found in this lake (Dabhade et.al. 1998, Mahajan 2005, Kanekar et.al. 2007) [3]. The lake water appears to be saline due to high concentration of dissolved solids and total suspended solids. Alkaline and saline water of Lonar lake is a special habitats and support growth of particular algae especially Cyanophyceyan algae (Jadhav et.al. 2007) [7]. The lake water is observed blue green in colour throughout the year due to abundance of blue green algae. Except few reports very rare attention has been paid towards the algal flora of Lonar Lake. To fulfill this lacuna it has been decided to work in detail on diversity and distribution of algae in Lonar Lake

### Materials and Methods

In order to study algal flora of Lonar Lake in detail, algal samples were collected from 10 selected sites of Lonar Lake. Algal samples were collected at monthly intervals. Algal collections were made for the period of two consecutive years i.e. October 2015 to September 2017. Acid washed collection bottles were used for the collection of algal samples. Floating, planktonic and submerged algal forms were collected. Collected algal samples were brought immediately to the laboratory. The algal samples were preserved in 4 % formalin for further taxonomic study. Fresh as well as preserved algal forms were observed under research microscope and identified with the help of standard literature on algae.



**Fig 1:** Algal collection sites of Lonar Lake

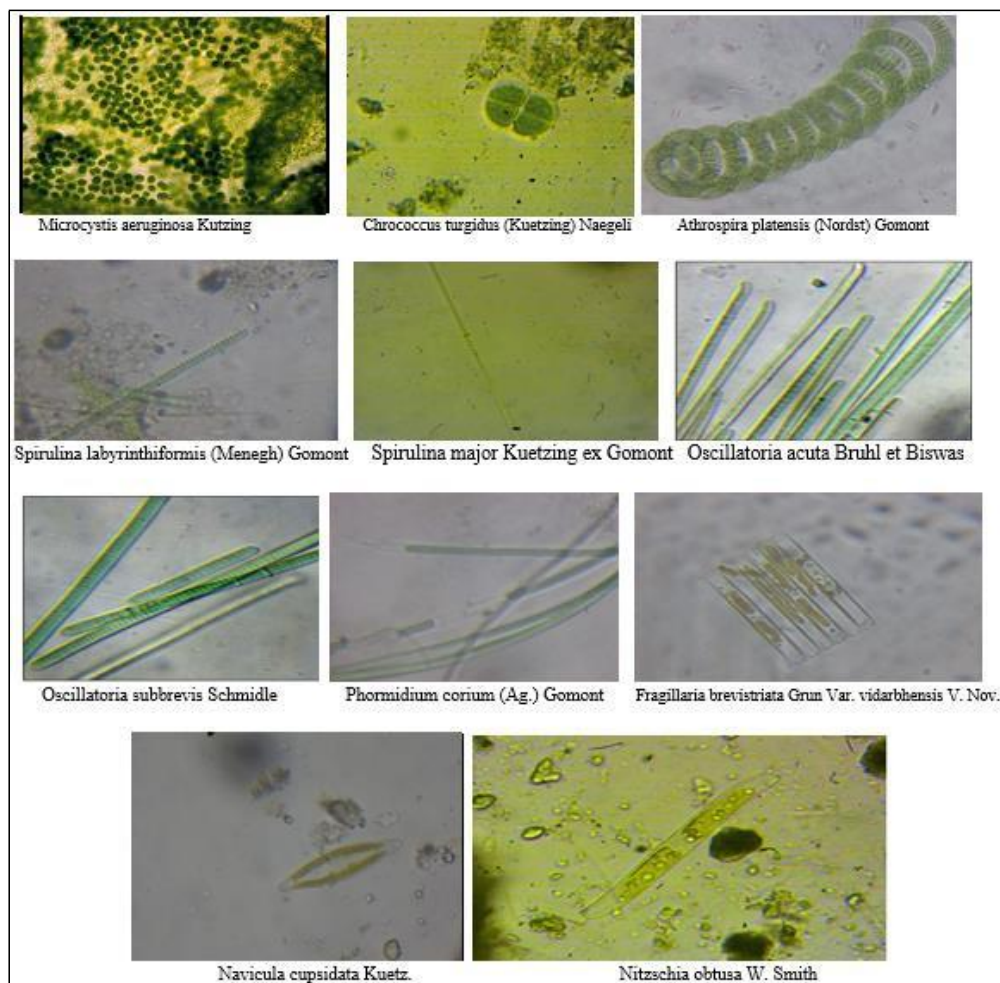
## Results and Discussion

A total of 79 species of algae under 39 genera were identified and recorded from alkaline and saline water of Lonar Lake. 11 species under 10 genera belonged to Chlorophyceae, 15 species under 8 genera belonged to Bacillariophyceae, 2 species under 1 genus belonged to Euglenophyceae and 51 species under 20 genera belonged to Cyanophyceae (Table 1). The species composition of Cyanophyceae was greater as compared to other groups of algae. Cyanophyceae were found dominant followed by Bacillariophyceae, Chlorophyceae and Euglenophyceae. Rath and Adhikary (2005), Satapathy *et al.* (2007), Gour *et al.* (2013) <sup>[5]</sup>, Khairy *et al.* (2015) and Bhat *et al.* (2016) <sup>[2]</sup> systematically studied algal diversity of alkaline and saline water habitats. In present study Cyanophycean algae were found dominant. Andreas *et al.* (2005), Jadhav *et al.* (2007) <sup>[7]</sup>, and Satyanarayana *et al.* (2008) <sup>[15]</sup>. Reported dominance of Cyanophycean algae. On the contrary, Rath and Adhikary (2005) and Rath, P.K *et al.* (2015) <sup>[13]</sup> reported dominance of Diatoms from Chilka lake.

In present study among Cyanophyceae *Arthrospira platensis*, *Aphanothece nidulans*, *Spirulina labyrinthiformis*, *Spirulina laxissima*, *Spirulina major*, *Spirulina subtilissima*, *Oscillatoria acuta*, *Oscillatoria amphibia*, *Oscillatoria quadripunctulata*, *Oscillatoria obscura*, *Phormidium molle*, *Phormidium jenkelianum*, *Phormidium corium*, *Plectonema nostocorum*, *Plectonema gracillimum*, *Microcystis aeruginosa* and *Gloeotheca palea* were found dominant. Similar kind of observations were made by Jadhav *et al.* (2007) <sup>[7]</sup> and Deshmukh and Puranik (2009). *Arthrospira platensis* was found at all sites throughout the period of study. *Aphanothece nidulans* is also found at all sites.

Among Chlorophyceae *Gloeocystis gigas*, *Gloeocystis major*, *Chlorella vulgaris* and *Coelastrum microporum* were dominant. Satyanarayan *et al.* (2008) reported dominance of *Ankistrodesmus* and *Selestrastrum*. Gour *et al.* (2013) <sup>[5]</sup> observed dominance of *Spirogyra psudoreticulata* from Sundarbans mangrove. Bhat *et al.* (2016) <sup>[2]</sup> recorded dominance of *Dunaliella*.

Among diatoms *Fragilaria brevistriata*, *Fragilaria construens*, *Navicula capsidata*, *Nitzschia closterium*, *Nitzschia fonticola*, *Nitzschia palea* and *Gomphonema* sp. were found dominant. Rath and Adhikary (2005) reported dominance of *Amphora ovalis*, *Navicula salinarum*, *Gyrosigma accuminatum*, *Nitzschia obtusa* and *Nitzschia sigma* from Chilka Lake. In earlier study Jadhav *et al.* (2007) <sup>[7]</sup> recorded dominance of *Nitzschia palea* in Lonar Crater Lake. Euglenoids were also found in Lonar Crater Lake and represented by *Euglena acus* and *Euglena polymorpha*. Jadhav *et al.* (2007) <sup>[7]</sup> recorded *Euglena acus* from Lonar Crater Lake.



**Fig 2:** Microphotographs of algae isolated from Lonar Lake

**Table 1:** Total number of algal genera and species recorded from selected Sites of Lonar Crater Lake

Sr. No.	Class	Species	Genera
1	Chlorophyceae	11	10
2	Bacillariophyceae	15	08
3	Euglenophyceae	02	01
4	Cyanophyceae	51	20
Total		79	39

**Table 2:** Overall algal taxa recorded from all selected sites of Lonar Crater Lake

Chlorophyceae
<i>Gloeocystis gigas</i> , <i>Gloeocystis major</i> , <i>Tetraspora lamellose</i> , <i>Chlorococcum humicola</i> , <i>Trebouxia humicola</i> , <i>Trochiscia aspera</i> , <i>Chlorella vulgaris</i> , <i>Ankistrodesmus falcatus</i> , <i>Crucigenia tetrapedia</i> , <i>Cosmerium</i> sp., <i>Coelastrum microporum</i> .
Bacillariophyceae
<i>Amphora</i> sp., <i>Fragillaria brevistriata</i> , <i>Fragillaria construens</i> , <i>Navicula capsidata</i> , <i>Navicula capsidata</i> var. <i>donace</i> , <i>Navicula hustedtii</i> , <i>Navicula salinarum</i> , <i>Cymbella aspera</i> , <i>Nitzschia closterium</i> , <i>Nitzschia obtusa</i> ., <i>Nitzschia fonticola</i> , <i>Gomphonema</i> sp., <i>Surirella ovate</i> , <i>Diatoma valgaris</i>
Euglenophyceae
<i>Euglena acus</i> , <i>Euglena polymorpha</i> .
Cyanophyceae
<i>Microcystis aeruginosa</i> , <i>Microcystis robusta</i> , <i>Chroocococcus coharens</i> , <i>Chroocococcus minor</i> , <i>Chroocococcus minutus</i> , <i>Chroocococcus turgidus</i> , <i>Gloeothecae palea</i> , <i>Aphanocapsa pulchra</i> , <i>Aphanothece nidulans</i> , <i>Aphanothece saxicola</i> , <i>Synechococcus aeruginosus</i> , <i>Synechocystis aquatilis</i> , <i>Merismopedia tenuissima</i> , <i>Chlorogloea microcystoides</i> , <i>Myxosarcina burmensis</i> , <i>Arthrospira plantensis</i> , <i>Spirulina giganta</i> , <i>Spirulina laxissima</i> , <i>Spirulina labyrinthiformis</i> , <i>Spirulina major</i> , <i>Spirulina subtilissima</i> , <i>Oscillatoria acuta</i> , <i>Oscillatoria amphibia</i> , <i>Oscillatoria minimus</i> , <i>Oscillatoria obscura</i> , <i>Oscillatoria pseudogeminata</i> , <i>Oscillatoria quadripunctulata</i> , <i>Oscillatoria salina</i> , <i>Oscillatoria salina</i> Var. <i>major</i> , <i>Oscillatoria subbrevis</i> , <i>Phormidium abronema</i> , <i>Phormidium ambigum</i> , <i>Phormidium angustissimum</i> , <i>Phormidium corium</i> , <i>Phormidium fragile</i> , <i>Phormidium foveolarum</i> , <i>Phormidium jenkelianum</i> , <i>Phormidium laminosum</i> , <i>Phormidium tenue</i> , <i>Phormidium molle</i> , <i>Lyngbya aeustuarii</i> , <i>Lyngbya crptovaginata</i> , <i>Lyngbya hieronymusii</i> , <i>Microcoleus acutissimus</i> , <i>Microcoleus subtorulosus</i> , <i>Nostoc commune</i> , <i>Nostoc linckia</i> , <i>Plectonema gracillimum</i> , <i>Plectonema notatum</i> , <i>Plectonema nostocorum</i> , <i>Plectonema puteale</i> .

## Conclusion

Altogether 79 species under 39 genera of algae were identified and recorded from four classes of algae i.e. Chlorophyceae, Bacillariophyceae, Cyanophyceae and Euglenophyceae. Cyanophyceae algae were found dominant. *Arthrospira platensis* was found in dominant form in Lonar Lake. Dominance of Cyanophycean algae in Lonar Lake indicates that alkaline and saline water of lake favours luxuriant growth of Cyanophycean algae. *Gloeocystis gigas*, *Gloeocystis major*, *Coelastrum microporum*, *Fragilaria brevistriata*, *Fragilaria construens*, *Navicula capsidata*, *Nitzschia closterium*, *Nitzschia fonticola*, *Nitzschia palea* *Arthrospira platensis*, *Aphanothece nidulans*, *Spirulina labyrinthiformis*, *Spirulina laxissima*, *Spirulina major*, *Spirulina subtilissima*, *Oscillatoria acuta*, *Oscillatoria amphibia*, *Oscillatoria quadripunctulata*, *Phormidium molle*, *Phormidium jenkelianum*, *Phormidium corium*, *Plectonema nostocorum*, *Plectonema gracillimum*, *Microcystis aeruginosa* and *Gloeothecae palea* were dominant. Algal flora of Lonar Crater Lake is rich and it is found in diverse form.

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