

# Airborne Algal Diversity in the Atmosphere of Lonar Crater, Buldhana District, Maharashtra

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**Abstract:** Study of airborne algae from the atmosphere of World famous Lonar Crater. It is situated (North Latitude 19° 55' 45", East Longitude 76° 34' 00") in Buldhana district of Maharashtra state. For the first time, by using Petriplate exposure method, aerophycological experiments were conducted for one year i. e. from December 2022 to January 2023. A total of 24 samples were obtained during study tenure. 29 airborne algal taxa under 22 genera belonging to Chlorophyceae, Bacillariophyceae and Cyanophyceae were cultured, identified and recorded. Cyanophycan algal taxa dominated the algal flora of Lonar Crater. Among Cyanophyceae, Phormidium, Arthrospira and Plectonema were dominant. Gloeocystis gigas and Gloeocystis major were dominant among Chlorophyceae. Bacillariophyceae was represented by Pinnularia, Navicula sp and Nitzschia palea.

**Keywords:** Air borne algae, Lonar Crater and atmosphere biology, cyanophyceae, biodiversity

## 1. Introduction

There are several bioparticles in the atmosphere, including bacteria, fungus spores, pollen grains and insect scales. Filaments and spores of algae are also significant elements of the air microflora. Algae found in air are the airborne algae. Airborne algae are transported by the air similar to other microbes. Lonar Crater lake is a natural water body, situated in Buldhana district of Maharashtra. It is the biggest meteorite impact crater in the World with natural alkaline water habitat. It is also the third largest natural saline water lake in the world after Bosmatilake in Ghana and New Cubec in Canada (Andhale *et. al.* 2005). Air transports a great number of algal propagules and resting spores (Benninghoff 1991, Schlichting 2000, Broady 1996, Sharma *et al.* 2006a) and may provide reliable evidence for the systematic of algae. For the first time, by using agarized petriplate exposure method, aerophycological experiments were carried out in order to this study examines airborne algae in the atmosphere of the world - famous Lonar Crater. Airborne algae is one of the important biocomponent of atmosphere, which remains viable in the form of spores and filaments.

## 2. Materials and Methods

In order to study the presence of airborne algae in the atmosphere of Lonar Crater lake, agarized petriplates were exposed on the top of Lonar Crater. The air samples were collected by using petriplates containing agarized Bold's basal medium. The duration of exposure was normally of two hours. The experiments were conducted for one year i. e. from December 2022 to January 2023. Exposed petriplates were incubated under the tube lights having 1000 to 1500 lux capacity in algal culture chamber. Liquid nutrients medium was poured into the plates at the time of keeping those for incubation and frequently supplemented with the same. Encouraged the growth of algal organisms, besides avoiding drying. Upon visualizing the growth as

discrete colony - forming units (CFU), they were picked up and identified under research microscope. A total of 24 samples were obtained during study period.

## 3. Results and Discussion

Presence of algal spores and filaments in the atmosphere has been known since long time (Overeem, 1937; Ramalingam, 1971, Savvas G. *et. al* 2011, Ramalingam A. and Pasrwanath H. V. 1979 and Naveen K. *et. al* 2007). During present investigation 24 air samples were obtained. Algal taxa belonging to Chlorophyceae, Bacillariophyceae and Cyanophyceae were cultured, identified and recorded. 29 species of airborne algae under 22 genera were isolated and cultured from the atmosphere of Lonar Crater, of these 9 species under 7 genera belonged to Chlorophyceae, 5 species under 5 genera belonged to Bacillariophyceae and 15 species under 10 genera belonged to Cyanophyceae (Table 1). Cyanophycan algal taxa were found in the atmosphere of Lonar Crater, it is an conformity with the earlier reports (Balkrishnan and Gunale, 1980; Jadhav and Chavan, 2007, Jadhav and Quazi, 2010 and Patil and Patil, 2014, Sunita and Jadhav 2017).

Air borne algal taxa which were found dominant during present study are *Gloeocystis gigas*, *Gloeocystis major*, *Chlorella vulgaris*, *Nitzschia palea*, *Aphanothece nidulans*, *Phormidium jenkelianum*, *Phormidium molle*, *Plectonema gracillimum*, *Microcoleus* sp. and *Arthrospira* sp. (Table 2).

## 4. Conclusion

It is concluded that atmosphere of Lonar Crater contains a variety of airborne algal spores and filaments. The presence of algae in the atmosphere has long been known. Airborne algae play important roles in the dispersal of algae, colonization of new habitats. Airborne algae have great potential as bioindicators. The present work is significant in environmental biology.

**Table 1:** Total number of airborne algal taxa and genera from the atmosphere of Lonar Crater

Sr. No.	Class	Algal taxa	Algal genera
1	Chlorophyceae	09	07
2	Bacillariophyceae	05	05
3	Cyanophyceae	15	10

**Table 2:** Airborne algae cultured from the atmosphere of Lonar Crater

<b>Chlorophyceae</b> <i>Gloeocystis gigas</i> , <i>Gloeocystis major</i> , <i>Tetraspora gelatinosa</i> , <i>Scenedesmus</i> sp. <i>Chlorella vulgaris</i> , <i>Chlorococcum humicola</i> , <i>Chlorococcum</i> sp. <i>Ankistrodesmus falcatus</i> , <i>Glyocystis</i> sp.
<b>Bacillariophyceae</b> <i>Pinnularia</i> sp., <i>Nitzschia palea</i> , <i>Surirella ovata</i> , <i>Navicula</i> sp. <i>Cyclotella</i> sp.
<b>Cyanophyceae</b> <i>Chroococcus minor</i> , <i>Chroococcus minutes</i> , <i>Aphanothece nidulans</i> , <i>Aphanothece saxicola</i> , <i>Arthrospira</i> sp. <i>Oscillatoria</i> sp. <i>Phormidium angustissimum</i> , <i>Phormidium jenkelianum</i> , <i>Phormidium Molle</i> , <i>Nostoc muscorum</i> , <i>Nostoc linkia</i> . <i>Plectonema gracillimum</i> , <i>Microcoleus</i> sp., <i>Merismopedia</i> sp. <i>Lyngbya</i> sp.

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