



## Study on biodiversity of Lonar crater lake

Deshpande RP

Department of Zoology, Sharda Mahavidyalaya, Parrbhani, Dist. Parbhani, MS, India.  
Email: deshpanderp16@gmail.com | Mob. No. 9423759546

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### ABSTRACT

Lonar crater is believed to have been formed by an impact of a huge meteorite 50,000 years ago. It is unique in being bigger than Arizona crater and ranks third in the World, the water it is filled with is salty and far different in composition, part of its floor being flooded by fresh water, marshy areas around it, manmade plantation and crop fields in open land of the lake. Thus, Lonar lake is a unique Biogeographical natural wonder. These peculiar ecological conditions must have their impact on the flora and fauna of Lonar lake. This fascinating aspect has motivated us to undertake the work. In the limnological study of Lonar lake hydrobiological parameters were studied for 3 months (Oct. Nov., and Dec. 2011) of saline water as well as fresh water. Extensive survey of animals around lake was undertaken during the study. The survey pertaining to biological studies indicate the presence of blue green algae-14, Bacteria-4, Trees-26, Shrubs-10, Climbers-13, Herbs-8, Grasses-6, Birds-39, Reptiles-4 and Mammals -10. The peculiarity of the lake lies in the presence of abundant spirulina in the salt water, total absence of fishes and the common aquatic animals, dominant water bird fauna, presence of funnel spiders on the ground and huge height of the trees.

**Key words:** Biodiversity, Lonar Lake, Saline water.

### INTRODUCTION

Biodiversity in simple sense is the variety of all living organisms throughout the world. According to Kotwal and Banerjee (2002) biodiversity is defined as, "the variety and variability of organisms and ecosystems is referred as biological diversity." India contributes a lot in the biodiversity of the world and ranks sixth amongst the 12 mega biodiversity countries of the world. The Lonar crater, situated in Buldhana Forest Division in Maharashtra, about 125 kms. from Parbhani and one km away from Lonar town to the south west lies (19° 58' North 76° 31' East) and ranks third among the five largest craters in the world. Amongst them the Arizona crater U.S.A. & Lonar craters stand out as craters which have been proved beyond doubt to have been caused by the impact of Meteorites (India Today, 1979).

Some of the glass spheres discovered at the site have been examined by a team of scientists from physical research laboratory Ahmadabad in 1984. These studies have indicated that Lonar crater was formed about 50 thousand years ago. The lake lies in a nearly circular depression surrounding on all sides by a steeply rising escarpment to an even height of 150 meters above the lake level. The circumference of the lake is 6 Kms. on the top & along it's inner rim 3.5 Kms. The Lake is a saline and hyperalkaline ecosystem formed entirely on basalt rock by meteor impact (Pawar, 2018, Tambekar *et al.*, 2010). Part of its floor being flooded by fresh water carried through a constant flow of water of unknown origin. The saline lake, marshy areas around it, fresh water streams, manmade plantations, crop fields & remnants of original forests provided special niches for plants & animals.

Pedge and Ahirrao (2016) reported 20 Arthropod species out of which 13 species of butterflies belonging to 4 families of order Lepidoptera, 5 species of order Orthoptera and 2 species of order Odonata.

Microbiological studies using culture-dependent and culture-independent strategies have identified and characterized both bacterial (Kadam and Bhusare, 2015, Surakasi *et al.*, 2007).

## MATERIALS AND METHODS

In the limnological study of Lonar lake water analysis of saline water ecosystem and fresh water ecosystem was done for three months. Physico-chemical & Biological parameters studied includes Temp., pH, dissolved oxygen, dissolved carbon dioxide, alkalinity, salinity, chlorides, sodium, potassium & iron. To get over all limnological picture of water body two sampling stations were fixed. One to the East & the other to the North of the lake in front of Kamalja Devi temple. The sampling stations for fresh water are also two one to the North where Dhara & Sita Nahani springs merge into each other and second is in the East from Ram Gaya exactly in front of Guest house. The collecting bottles were filled by samples from desired depth to study different parameters. For the study of planktonic biomass large volume of samples was filtered through silk cloth with different aperture sizes. The samples were preserved in 4% formalin solution and the organisms thus collected were identified up to generic level.

The zoobenthos were collected by scrapping and also from mud, it was filtered and transferred to enamel tray. The floating organisms were picked up and preserved in 4% formalin and 70% alcohol and then identified. Various types of small sized animals around the lake were collected & preserved in 4% formalin & the larger animals were observed with binocular & photographed by using telelense camera. With the help of an electronic portable PH meter readings were taken and the temperature was noted down with the help of thermometer. For detecting chemical parameters titrimetric methods and spectrophotometric methods were used.

## RESULTS AND DISCUSSIONS

In recent years there is considerable increase in water level due to precolation which is responsible for changing the quality of water affecting the organisms living with in the lake. However, between 1970 to 1985 the water of the lake dries every year in summer and in the rainy season accommodation of water takes place. The dried salt from the lake was sold in the market there by decreasing the content of the salt. The lake receives fresh water from three springs of which the largest " Dhar", Sita Nahani and Ram Gaya are smaller in size. According to Badve *et al.* (1993) the water has considerably been increasing since 1991.

In the present investigation the pH value of fresh water ranges between 6.5 to 7.00 and that of saline water ranges between 10.00 to 10.5. Jhingran and Rao (1958) have also studied the pH values of the lake according to him the pH of spring water is 7.5 and that of lake water ranges from 9.3 to 9.7. The values given by Jhingran and Rao (1958) when compared with the present values shows fluctuations, the pH of spring water is less and that of lake water is more.

Badve (1993) studied the phytoplanktons of the lonar lake consisting of eight genera of which three are dominant as Viz. Spirulina, Arthrospira and Oscillatoria. Ghanekar (1996) while studying on phytoplanktons have identified 14 genera of which spirulina is dominant. Spirulina contains 70% proteins, 16% carbohydrates, & 8% fat. Due to its high protein content it is the best food. Due to the abundance of spirulina the water birds have considerably been increased in population. Aithal *et al.*, (1999) isolated alkalophilic bacteria from water &

soil. Malu *et al.*, (1999) has identified three genera of Rotifers, Brachionus, Mytilina and Pompholex and mentioned the total absence of Cladosera and Copepoda the other two major groups of zooplanktons. In the present investigation Brachionus spp. were found.

The survey pertaining to biological studies indicate the presence of following organisms.

#### MICRO-ORGANISMS :

1. *Ankistrodesmus* spp.
2. *Arthrospira* spp.
3. *Brachionus* spp.
4. *Chlorella* spp.
5. *Chlosterium* spp.
6. *Cosmerium* spp.
7. *Cylindrospermum* spp.
8. *Dactylococcopsis* spp.
9. *Dimorphococcus* spp.
10. *Dinoflagellates* spp.
11. *Eudorena* spp.
12. *Euglena* spp.
13. *Navicula* spp.
14. *Oscillatoria* spp.
15. *Pandorina* spp.
16. *Spirulina* spp.

Identification of the Algae done with the help of following books Introduction to Algae by Bold & Wine, Indian Phycological Review Vol. 1 (1992) by Khan and Algae Today by M.Khan.

#### Birds:

##### Common Name

1. Shikra: *Accipiter badius*
2. Great Reed Warbler: *Acrocephalus stentoreus*
3. Iora: *Aegithina tiphia*
4. Spotbill Duck: *Anas poecilorhyncha*
5. Pond Heron: *Ardeola grayii*
6. Crow Pheasant/Coucal: *Centropus sinensis*
7. Yelloweyed Babbler: *Chrysomma sinense*
8. Whitenecked stork: *Ciconia episcopus*
9. Marsh Harrier: *Circus aeruginosus*
10. Magpie Robin: *Copsychus saularis*
11. Jungle Crow: *Corvus macrorhynchos*
12. Black Drongo: *Dicrurus adsimilis*
13. Little Egret: *Egretta garzetta*
14. Black-winged Kite: *Elanus caeruleus*
15. Indian Koel: *Eudynamis scolopacea*

16. Coot: *Fulica atra*
17. Indian Moorhen: *Gallinula chloropus*
18. Rufousbacked Shrike: *Lanius schach*
19. Chrimsonbreasted Barbet: *Megalania haemacephala*
20. Small Green Bee-eater: *Merops orientalis*
21. Grey Wagtail: *Motacilla caspica*
22. Golden Oriole: *Oriolus oriolus*
23. Tailor Bird: *Orthotomus sutorius*
24. Grey Tit: *Parus major*
25. Indian Peacock: *Pavo cristatus*
26. Bush Quail: *Perdica argoondah*
27. Greater Flamingo: *Phoenicopterus roseus*
28. Baya Weaver Bird: *Ploceus philippinus*
29. Little Grebe: *Podiceps ruficollis*
30. Ashy Wren Warbler: *Prinia socialis*
31. Roseringed Parakeet: *Psittacula krameri*
32. Whitespotted Fantailed: *Rhipidura albicollis*
33. Fan-tail Flycatcher: *Rhipidura aureola*
34. Brabminy Duck: *Tadorna ferruginea*
35. Grey Hornbill: *Tockus birostsisis*
36. Sandpipers: *Tringa hypoleucos*
37. Large Grey Babbler: *Turdoides malcolmi*
38. Barn Owl: *Tyto alba*
39. Redwattled Lapwing: *Vanellus indicus*

Identification of the birds done with the help of Handbook of the Birds of India and Pakistan written by the Author Saleem Ali & Dillon b Oxford University Press, Newyork (1983).

#### MAMMALS:

##### Common Name

1. Palm Squirrel: *Funambulus*
2. Mongoose: *Harpestes*
3. Insect Eating Bat: *Vesperugo*
4. Black-naped Hare: *Lepus*
5. Indian False Vampire: *Megaderma*
6. Barking Deer: *Cervulus*
7. Rabbit: *Oryctolagus*
8. Indian Langoor: *Semnopithecus*
9. Fruit Bat: *Cynopterus*
10. Shrew : *Sorex*

#### REPTILES:

##### Common Name

1. Garden lizzard: *Calotes*
2. Geckoes: *Hemidactylus*
3. Skinks: *Mabuia*
4. Monitor lizzard: *Varanus*

**Table 1: Physic-Chemical parameters of Saline & fresh water of Lonar Lake.**

Sr. No.	Site of Sample	Year	Temp.	pH	Dissolved Oxygen	Dissolved Carbon di-oxide	Alkalinity		Chlorides	Salinity	Sodium	Potassium	Iron
							Co3	HC <sub>o</sub> 3					
1.	Easten side of Lake (saline water)	2011	21 <sup>o</sup> C	10.5	2.05 Mg/lit.	Absent	259 Mg/lit.	521 Mg/lit.	2970.8 Mg/lit.	5455.26 Mg/lit.	64.00 Mg/lit.	15.00 Mg/lit.	2.57 Mg/lit.
2.	Northern side of lake near Kamalia Devi Temple (Saline water)	2011	22 <sup>o</sup> C	10.5	2.29 Mg/lit.	Absent	259 Mg/lit.	559 Mg/lit.	2998.16 Mg/lit.	5492.87 Mg/lit.	62.00 Mg/lit.	14.37 Mg/lit.	2.58 Mg/lit.
3.	Northern side of the Lake Dhar (Fresh water )	2011	26 <sup>o</sup> C	7	5.21 Mg/lit.	19 Mg/lit.	8 Mg/lit.	159 Mg/lit.	131.75 Mg/lit.	241.18 Mg/lit.	5.62 Mg/lit.	8.00 Mg/lit.	0.93 Mg/lit.
4.	Easten side of the lake in front of Guest house (Fresh water )	2011	27 <sup>o</sup> C	6.5	2.5 Mg/lit.	29 Mg/lit.	7.3 Mg/lit.	91 Mg/lit.	102 Mg/lit.	209 Mg/lit.	7.76 Mg/lit.	8.67 Mg/lit.	0.87 Mg/lit.

# Other Animals in fresh water and around the lake:

- 1) Giant red velvet mite
- 2) Gambusia fish: Gambusia affinis
- 3) Millipede: Julus
- 4) Frog: Rana
- 5) Water Beetle: Enhydrus
- 6) Snail (commonly known as slug): Vaginulus
- 7) Crab: Carcinus
- 8) Honey bee: Apis indica
- 9) Dragon fly: Dragon fly
- 10) Dinotrumbium Julus : Spirobolus

## CONCLUSION:

During the present investigation it has been observed that Lonar crater lake is an unique example of an assemblage of about six different types of ecosystems. Out of all ecosystems naturally occurring the saline water ecosystem is the largest and peculiar in having total absence of common aquatic fauna in it. The Lonar crater is having huge biodiversity and there is still more scope to the researchers to work about hydrobiology and biodiversity of Lonar Crater.

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