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DIVERSITY OF PHYTOPLANKTON IN KANWAR SEN LIFT CANAL, LUNKARANSAR (NORTHERN RAJASTHAN)

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ABSTRACT

The water resources of the Thar Desert are divided into two major groups; one is surface water and second is ground water resource. The main source of the drinking water in the region at present is ground water, however most important source of surface water is Indira Gandhi Canal, which runs along the northern edge of Thar Desert and supplies water for drinking and irrigation through its distributaries. A large irrigation and power project has established for desert region namely Indira Gandhi Nahar Project. The Kanwar Sen lift canal is largest lift canal of Indira Gandhi Nahar Project. Ecology and biodiversity of Kanwar Sen lift canal is unique around the Thar Desert. Phytoplankton are generally microscopic ($< \mu\text{m}$ in diameter) unicellular, autotrophs that belong to the first trophic level. These organisms play a very important role in the aquatic food web as producers. Phytoplankton is a good indicator of environmental changes. The present study was undertaken to observe the diversity of phytoplankton in Kanwar Sen lift canal. The present study was made for a period of six months (Jan 2019 to June 2019). The study exposed the occurrence of 28 species of phytoplankton belonging to six families: bacillariophyceae, chlorophyceae, zygnemataceae, cynophyceae, hydrodictyaceae and myxophyceae.

Keywords: Phytoplankton, Diversity, Thar desert, Lift canal.

INTRODUCTION

The fresh water ecosystem divided into two groups – lentic (standing or still water habitats) and lotic (running water habitats). Lentic and lotic types are inland fresh water bodies, are support rich biodiversity. Rivers, lakes, streams are most extremely deep fertile, different aquatic ecosystems, home for both benthic and interstitial micro and macro flora and fauna.

The water resources of the Thar Desert are divided into two major groups; one is surface water and second is ground water resource. The main source of the drinking water in the region at present is ground water, however most important source of surface water is Indira Gandhi Canal (Rajasthan), which runs along the northern edge of Thar Desert and supplies water for drinking and irrigation through its distributaries. A large irrigation and power project has established for desert region namely Indira Gandhi Nahar Project. Indira Gandhi Nahar Project is largest irrigational project around the world. The Kanwar Sen lift canal is largest lift canal of IGNP which provide irrigate water for Lunkaransar tehsil and drinking water for Bikaner city. Phytoplankton diversity of Kanwar Sen lift canal is unique around the Thar Desert because its running area differ from rest part of desert with respect to chemical composition thus the study of phytoplankton diversity of Kanwar Sen lift canal is great significance for research.

Phytoplankton are generally microscopic ($< \mu\text{m}$ in diameter) unicellular, autotrophs that belong to the first trophic level. Their movements are more or less dependent on water currents. The number of phytoplankton

is very advantageous to the ecosystem though they are normally present in all types of water. These organisms play a very important role in the aquatic food web as producers (mainly bacillariophyceae, chlorophyceae and cynophyceae). Phytoplankton is a good indicator of environmental changes. Conservation and preservation of freshwater habitats is a vital need of the time. All freshwater habitats mainly canals are rapidly affected due to human interference. The phytoplankton diversity of a canal is often distinct and different from the lakes, reservoirs and ponds.

Therefore, the present study was undertaken to explore the diversity of phytoplankton in Kanwar Sen lift canal holds great significance. The knowledge of the phytoplankton diversity of the Kanwar Sen lift canal is very important because of the water supply for drinking in Bikaner city.

STUDY AREA

Bikaner is situated in the central area of the Thar Desert which denotes the northwest of Rajasthan (27°22' to 28°01' north latitude and 71°54' to 74°22' east longitude). Lunkaransar is a tehsil in the Bikaner district. A salt lake is situated in Lunkaransar, which is dry now. Kanwar Sen lift canal starts from Birdhwal Head of the Indira Gandhi Canal. The water of the Sutlej and Beas rivers flows in the Kanwar Sen lift canal. Kanwar Sen lift canal is providing drinking water to Bikaner city and more than a hundred villages situated nearby this canal's region. The total length of its distribution system is 179.72 km. This canal mainly covers the area of Lunkaransar tehsil of the Bikaner district.

MATERIALS AND METHODS

The present study was carried out monthly for a period of six months (from Jan, 2019 to June, 2019). Phytoplankton samples were collected from four study stations in the early hours of the day. The samples were collected in wide-mouthed 500 ml polyethylene bottles. The collected samples were fixed and preserved in lugol's iodine solution and 4% formaldehyde and observed under the compound microscope. The phytoplankton were identified and results were expressed in No./l. Identification of phytoplankton were made by following respective keys like Edmondson (1966), Round (1975), Chapman & Chapman (1975) and Needham & Needham (1978).

RESULTS AND DISCUSSION

The abundance of phytoplankton was rich in canal and varied throughout the study period. It was represented by 28 species belonging to the six families: Bacillariophyceae, Chlorophyceae, Cynophyceae, Myxophyceae, Zygnemataceae, and Hydrodictyaceae. In the present study the order of abundance of different families was Bacillariophyceae > Chlorophyceae > Cynophyceae > Zygnemataceae > Myxophyceae and Hydrodictyaceae. Bacillariophyceae with 12 species was the most dominant group at the Kanwar Sen lift canal. Chlorophyceae was represented by seven species, Cynophyceae was represented by three species, Zygnemataceae was represented by three species and Hydrodictyaceae and Myxophyceae were represented by one, two species respectively.

Bahura (1989) noted that diatoms dominant desert water. Sharma (2017) recorded 12 species of bacillariophyceae in Sirhind feeder canal, Hanumangarh. During present study Chlorophyceae was the second most dominant family. Sharma (2013) reported six genera of Cyanophyceae in pond waters of Bikaner. Bishnoi *et al.* (2013) reported two species of Myxophyceae: *Rivularia* sp. and *Phormidium* sp. Sharma (2017) reported one species of Myxophyceae in Sirhind feeder canal, Hanumangarh. Bishnoi *et al.* (2013) studied primary productivity in relation to planktonic diversity in a stretch of Gang Canal (Rajasthan) and reported that canal algae were represented by Bacillariophyceae, Chlorophyceae, Myxophyceae and Xanthophyceae. Sharma and Srivastava (2016) recorded 27 species of phytoplankton in Sadul Branch of Sirhind Feeder Canal (Hanumangarh, Rajasthan)

CONCLUSION

The knowledge of the phytoplankton diversity of is very important because Phytoplankton play a very important role in the aquatic food web as producers and a good indicator of environmental changes. The moderate numbers of phytoplankton species were recorded in the Kanwar Sen lift canal which indicates that water of canal is valuable and can be use for irrigation purpose and supply for drinking in Bikaner city.

Table 1. Diversity of phytoplankton in Kanwar Sen lift canal, Lunkaransar (Northern Rajasthan) during Januaray 2019 to June 2019

| Phytoplankton Families | Species name |
|--|---------------------------------|
| Bacillariophyceae | <i>Cyclotella menegheniana</i> |
| | <i>Cyclotella stelligera</i> |
| | <i>Diatoma</i> sp. |
| | <i>Fragillaria crotonesis</i> |
| | <i>Nitzschia palea</i> |
| | <i>Nitzschia thermalis</i> |
| | <i>Nitzschia linearis</i> |
| | <i>Navicula radiosa</i> |
| | <i>Navicula elginensis</i> |
| | <i>Navicula cuspidate</i> |
| | <i>Synedra ulna</i> |
| | <i>Tabellaria</i> sp. |
| Total number of species = 12 | |
| Chlorophyceae | <i>Chlamydomonas</i> sp. |
| | <i>Closterium</i> |
| | <i>Chlorococcales</i> |
| | <i>Cosmarium botrytis</i> |
| | <i>Hormidium</i> sp. |
| | <i>Microspora willenea</i> |
| | <i>Ulothrix zonata</i> |
| Total number of species = 7 | |
| Cynophyceae | <i>Mougeotia punctata</i> |
| | <i>Spirogyra ravularis</i> |
| | <i>Spirogyra paludosa</i> |
| Total number of species = 3 | |
| Zygnemataceae | <i>Spirulina</i> sp. |
| | <i>Oscillatoria</i> sp. |
| | <i>Nostoc</i> sp. |
| Total number of species = 3 | |
| Hydrodictyceae | <i>Hydrodictyon reticulatum</i> |
| | <i>Pediastrum</i> sp. |
| Total number of species = 2 | |
| Myxophyceae | <i>Rivularia</i> sp. |
| Total number of species = 1 | |
| Total Phytoplankton Species =28 | |

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